

# PRODUCTIVITY GROWTH DETERMINANTS IN THE MANUFACTURING SECTOR IN THE BALTIC STATES: INTANGIBLE CAPITAL APPROACH

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# Presentation structure (1):

## 1. The Baltic KLEMS project (2017 September – 2019 September)

Project developer: assoc. prof. dr. Toma Lankauskiene, IVIE  
Supervisor: prof. dr. Matilde Mas, University of Valencia & IVIE



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# Presentation structure (2):

## *2. Continuation*

Productivity growth determinants in the manufacturing sector in the Baltic states:  
Intangible capital approach

# 1. The Baltic KLEMS project

# The aim

To apply the growth accounting methodology to the Baltic states in order to obtain detailed productivity growth determinants and conduct comparative economic analysis in the context of more developed economies.

For doing so, a new database following the KLEMS methodology with a particular focus on intangible capital was constructed.

# The object

Detailed determinants of labour productivity growth

# Key variables

- Economic growth and development theories dating back to R. Solow (Solow 1957).
- Contemporary approaches to sustainable development.
- The preparation of growth and productivity accounts, termed ‘Satellite accounts’, was advised in the European Parliament and Council Regulation (No. 549/2013, p. 525).  
However, not all National Statistics Departments have done so.

# The methodology

- Growth accounting method (Solow 1957)
- EU KLEMS methodology (Jorgenson *et al.* 1987; Timmer *et al.* 2007, Jäger 2018)



- Expanded by incorporation of the new intangibles (Corrado *et al.* 2012)



- New methodologies for the Baltic states and the more developed economies



# Databases

- EU KLEMS (tangible and intangible capital)
- INTAN Invest (new intangible capital)

**Table 1.** Contribution to EU KLEMS database

<b>Countries</b>	<b>Available indicators in EU KLEMS database, 2017 release (Jäger 2017)</b>	<b>Non-available indicators in EU KLEMS database, 2017 release (Jäger 2017)</b>
<b>Estonia</b>	SoftwDB, TR, OtherMash, NResid, Resid, RD, Minart, Cult	IT, CT
<b>Latvia</b>	IT, CT, SoftwDB, TR, OtherMash, NResid, Resid, Cult	Minart, RD
<b>Lithuania</b>	IT, CT, TR, OtherMash, NResid, Resid, Cult	SoftwDB, RD, Minart

**Table 2.** Contribution to INTAN Invest database

<b>Countries</b>	<b>Data availability for new intangibles in INTAN-Invest database, 2020 edition (Corrado <i>et al.</i> 2020)</b>
<b>Estonia</b>	No
<b>Latvia</b>	No
<b>Lithuania</b>	No
<b>Other more developed economies</b>	Yes

**Table 3.** Details on contribution

<b>Countries</b>	<b>Data availability in EU KLEMS database, 2017 release (Jäger 2017)</b>	<b>Data availability in INTAN-Invest database, 2020 edition (Corrado <i>et al.</i> 2020)</b>	<b>Research contribution</b>
<b>More developed countries</b>	YES	YES	<ul style="list-style-type: none"><li>• to the traditional EU KLEMS methodology (INTAN invest intangibles have been included)</li></ul>
<b>Baltic countries</b>	Only for some indicators, major gaps	NO	<ul style="list-style-type: none"><li>• new statistical EU KLEMS and new intangible data constructed</li><li>• to the traditional EU KLEMS methodology (new intangibles have been included)</li></ul>

**Table 4.** Research implementation details

Country coverage: Estonia, Latvia, Lithuania, Denmark, Germany, Spain, Sweden

Research period: 1995–2015

Method: Growth accounting

Methodology: EU KLEMS supplemented by new intangibles

Data: Capital, Labour, Capital and labour compensation, Value added

Capital data: different types of capital assets (in more detail in Table 6)

Labour data: labour composition according to the educational attainment

Databases: for capital data - EU KLEMS and INTAN-Invest (for more developed economies); EU KLEMS, INTAN-Invest, National statistics departments, WIOD, Eurostat (for the Baltic states), for labour data - EU KLEMS and WIOD

**Table 5.** Industrial aggregation

Industrial aggregation

Total (Market economy)

A - Agriculture, forestry and fishing

B - Mining and quarrying

C - Manufacturing

D–E - Electricity, gas and water supply

F - Construction

G - Wholesale and retail trade, Repair of motor vehicles

H - Transportation and storage

I - Accommodation and food service activities

J - Information and communication

K - Financial and insurance activities

M–N - Professional, scientific, technical, administrative and support service activities

R–S - Arts, entertainment, recreation, and other service activities

## Table 6. Capital data

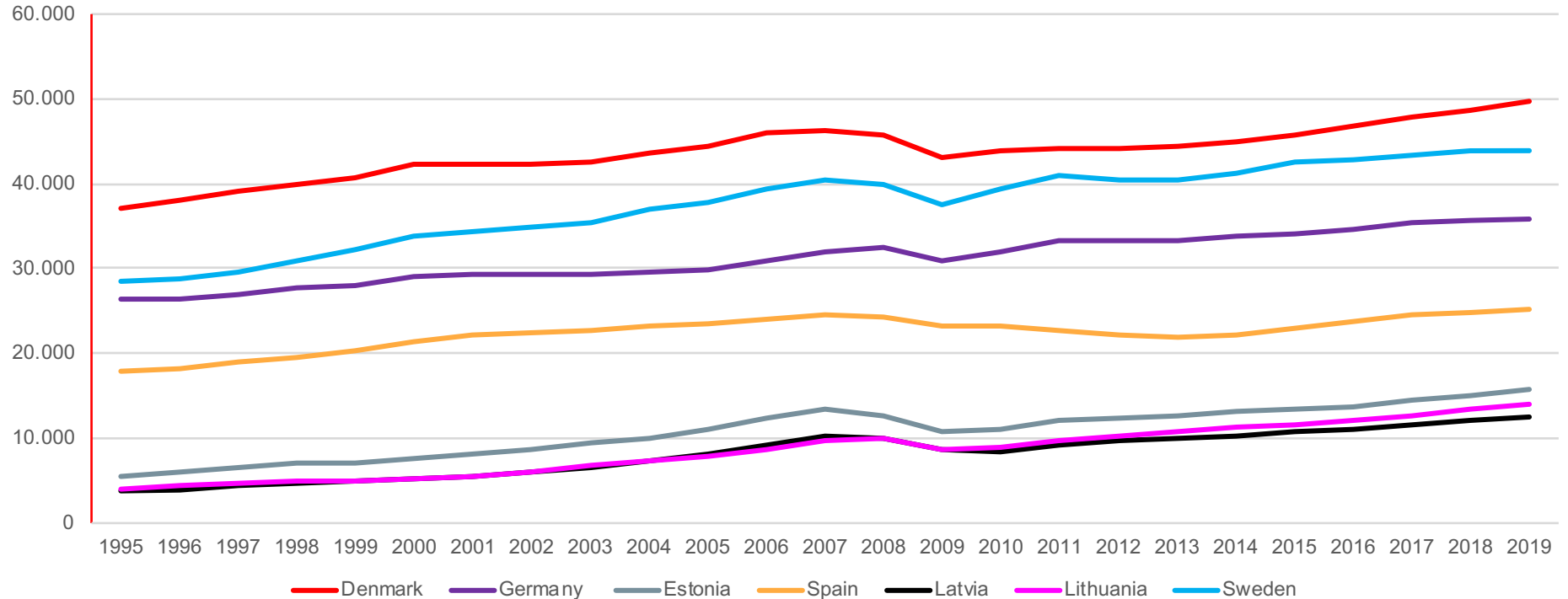
<b>EU KLEMS data</b>	<ol style="list-style-type: none"><li>1. IT - Computing equipment</li><li>2. CT - Communications equipment</li><li>3. SoftwDB - Computer software and databases</li><li>4. TR - Transport equipment</li><li>5. OtherMash - Other machinery and equipment</li><li>6. NonResid - Non-residential equipment</li><li>7. Resid - Residential structures</li><li>8. Cult - Cultivated assets</li><li>9. RD - Research and development</li></ol>
<b>INTAN Invest data – here referred as New Intangibles</b>	<ol style="list-style-type: none"><li>10. Minart – Entertainment Artistic and Literary Originals + Mineral Explorations</li><li>11. Design - Design</li><li>12. Brand - Brand</li><li>13. OrgCap - Organizational capital</li><li>14. Train - Training</li><li>15. Nfp - New product development in the financial sector</li></ol>

**Tangible capital = 1 + 2 + 4 + 5 + 6 + 7 + 8; Intangible capital = 3 + 9 + 10 + 11 + 12 + 13 + 14 + 15**

IT&CT = IT + CT; Machinery based capital = OtherMash + TR, Buildings = NonResid + Resid

Innovative property = RD + Minart + Design + Brand; Economic competencies = OrgCap + Train + Nfp

# Economies overview



**Figure 1.** GDP per capita at market prices, chain-linked volumes (2010) 1995–2019. *Source:* own elaboration, upon the Eurostat data



# Results:

1.1. Baltic states in the context of more developed economies 1995-2015

1.2. Baltic states before and after their entry into the EU (1995-2004; 2004-2015)

# **1.1. Baltic states in the context of more developed economies 1995-2015**

**Table 7.** Contributors to annual average aggregated Labour productivity growth (Productivity total, market economy); percentage points 1995–2015

			Estonia	Latvia	Lithuania	Denmark	Germany	Spain	Sweden
<b>AB = A + B</b>	<b>AB</b>	<b>Productivity total</b>	<b>5.0</b>	<b>4.9</b>	<b>4.8</b>	1.4	1.4	0.6	2.7
<b>A = f + g + h</b>	<b>A</b>	<b>Productivity sectorial</b>	4.6	4.0	4.4	1.4	1.3	0.7	2.7
	<b>B</b>	<b>Reallocation effect</b>	0.3	1.0	0.4	0.0	0.1	-0.1	-0.1
	<b>f</b>	<b>Contribution labour composition</b>	0.2	-0.1	-0.1	-0.1	0.2	-0.1	0.1
	<b>g</b>	<b>Contribution capital</b>	2.7	1.3	2.4	0.7	0.7	1.0	1.2
	<b>h</b>	<b>MFP</b>	<b>1.7</b>	<b>2.9</b>	<b>2.1</b>	0.8	0.4	-0.3	1.4 <sup>19</sup>

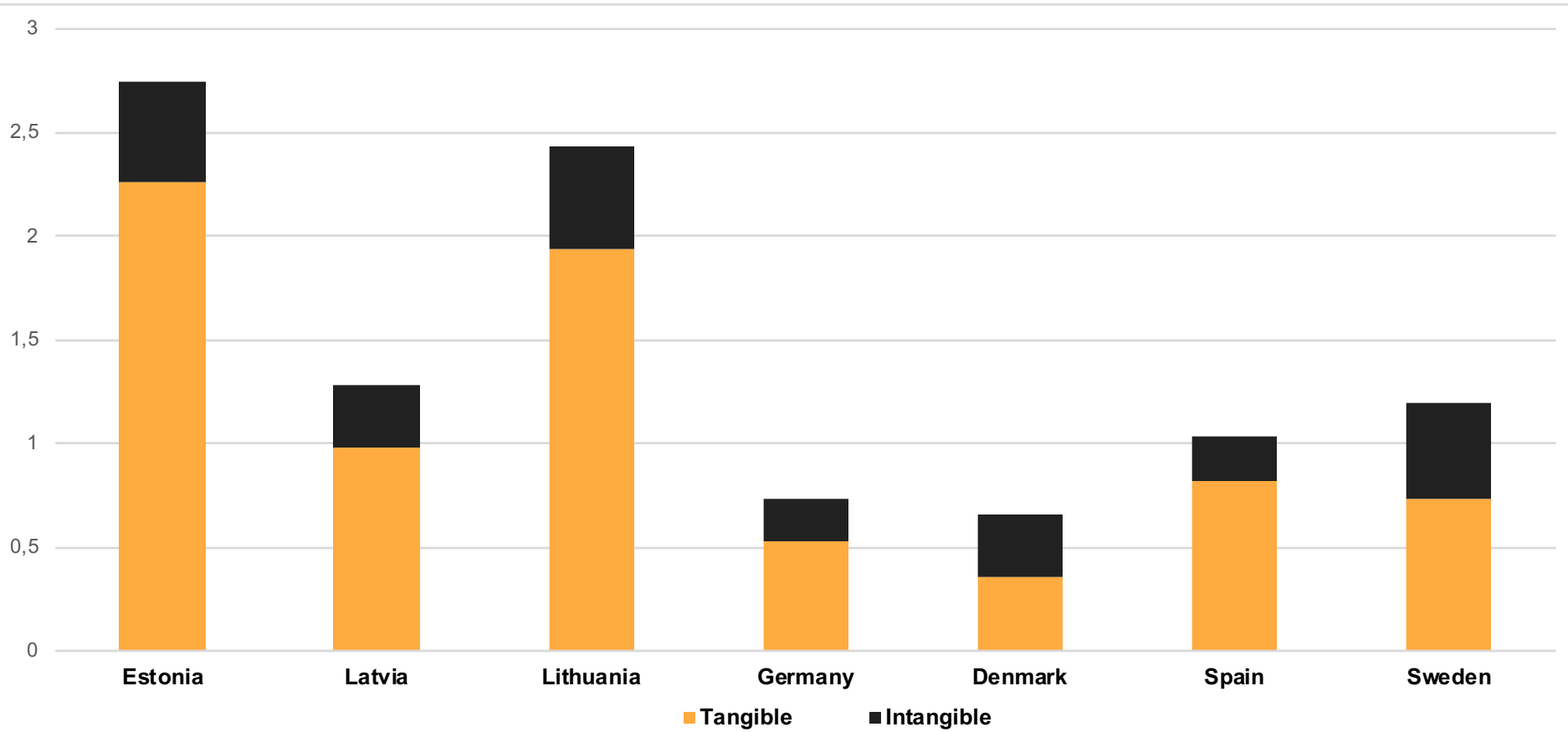
**Table 8.** Industrial growth contributions to aggregate LP growth, percentage points, 1995–2015

	Estonia	Latvia	Lithuania	Denmark	Germany	Spain	Sweden
<b>TOTAL INDUSTRIES, MARKET ECONOMY</b>	<b>4.6</b>	<b>4.0</b>	<b>4.4</b>	<b>1.4</b>	<b>1.3</b>	<b>0.7</b>	<b>2.7</b>
<b>AGRICULTURE, FORESTRY AND FISHING</b>	0.5	0.3	0.2	0.1	0.0	0.2	0.1
<b>MINING AND QUARRYING</b>	0.2	0.0	0.0	-0.2	0.0	0.0	0.0
<b>MANUFACTURING</b>	<b>1.4</b>	<b>1.1</b>	<b>1.7</b>	<b>0.6</b>	<b>0.8</b>	<b>0.4</b>	<b>1.3</b>
<b>ELECTRICITY, GAS AND WATER SUPPLY</b>	0.2	0.0	0.2	0.0	0.1	0.0	0.0
<b>CONSTRUCTION</b>	0.2	0.4	0.3	0.0	0.0	0.0	0.0
<b>WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES</b>	0.8	1.5	1.1	0.3	0.3	0.2	0.5
<b>TRANSPORTATION AND STORAGE</b>	0.5	0.6	0.4	0.1	0.1	0.0	0.1
<b>ACCOMMODATION AND FOOD SERVICE ACTIVITIES</b>	0.1	0.1	0.0	0.0	0.0	-0.2	0.0
<b>INFORMATION AND COMMUNICATION</b>	0.1	0.0	0.1	0.4	0.2	0.1	0.5
<b>FINANCIAL AND INSURANCE ACTIVITIES</b>	0.3	0.5	0.1	0.2	0.0	0.2	0.2
<b>PROFESSIONAL, SCIENTIFIC, TECHNICAL, ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES</b>	0.3	0.0	0.0	-0.1	-0.2	-0.1	0.2
<b>ARTS, ENTERTAINMENT, RECREATION AND OTHER SERVICE ACTIVITIES</b>	0.0	-0.4	0.2	0.0	0.0	0.0	0.0 <sup>20</sup>

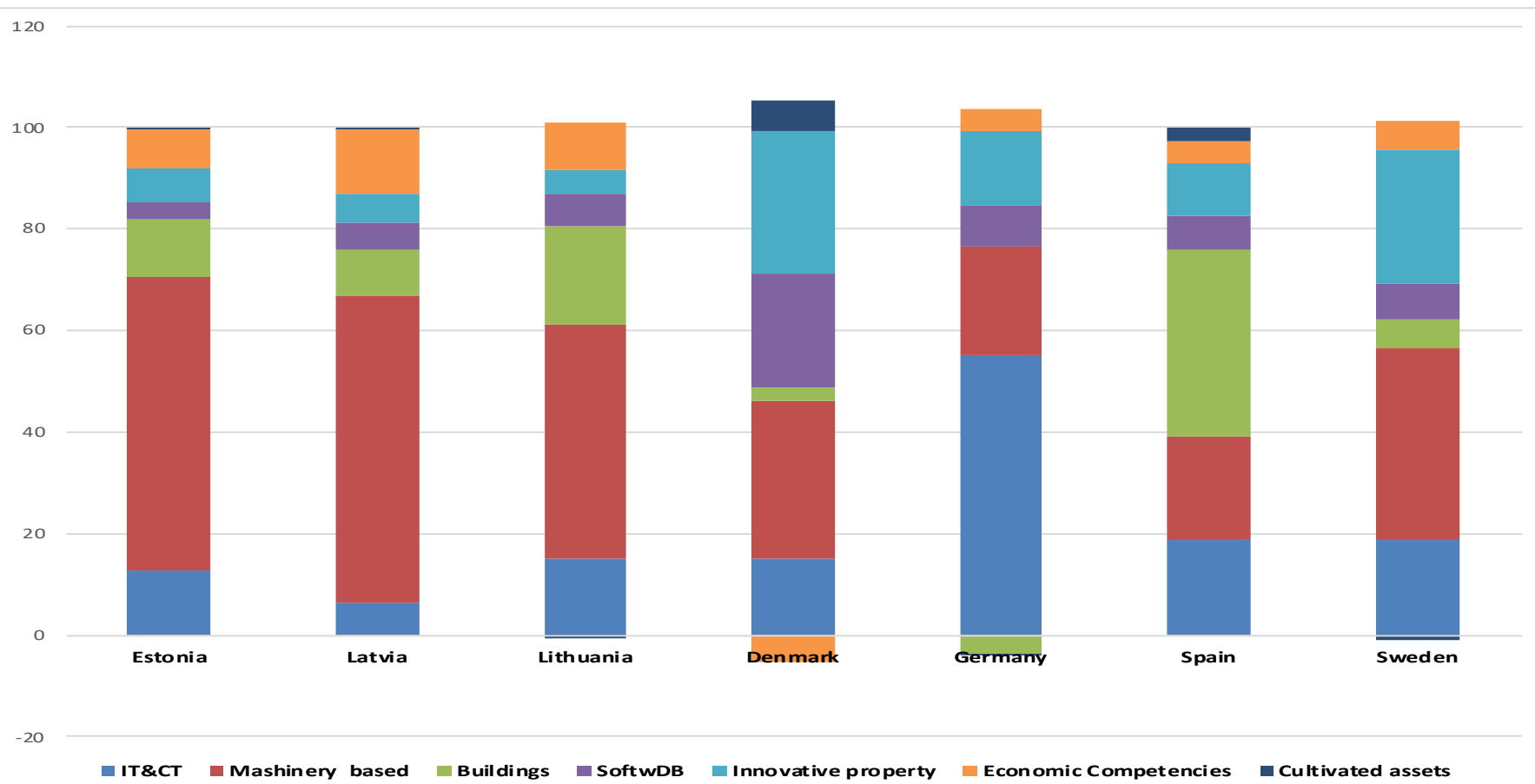
**Table 9.** Industry contributions to aggregated MFP growth; percentage points, 1995–2015

	Estonia	Latvia	Lithuania	Denmark	Germany	Spain	Sweden
<b>TOTAL, MARKET ECONOMY</b>	<b>1.70</b>	<b>2.85</b>	<b>2.11</b>	<b>0.85</b>	<b>0.42</b>	<b>-0.28</b>	<b>1.44</b>
<b>AGRICULTURE, FORESTRY AND FISHING</b>	0.17	0.19	0.20	0.04	0.02	0.11	0.04
<b>MINING AND QUARRYING</b>	0.02	0.02	0.01	-0.22	0.00	-0.01	-0.05
<b>MANUFACTURING</b>	<b>0.67</b>	<b>0.54</b>	<b>1.09</b>	<b>0.35</b>	<b>0.50</b>	<b>0.24</b>	<b>0.70</b>
<b>ELECTRICITY, GAS AND WATER SUPPLY</b>	0.02	-0.04	0.02	-0.04	0.02	-0.09	-0.05
<b>CONSTRUCTION</b>	0.00	0.32	0.20	0.08	-0.01	-0.20	-0.08
<b>WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES</b>	0.41	0.86	0.36	0.31	0.21	0.01	0.32
<b>TRANSPORTATION AND STORAGE</b>	0.00	0.39	0.08	0.07	0.07	-0.03	-0.02
<b>ACCOMMODATION AND FOOD SERVICE ACTIVITIES</b>	0.06	0.08	-0.01	-0.03	-0.02	-0.24	0.01
<b>INFORMATION AND COMMUNICATION</b>	-0.01	0.10	0.02	0.29	0.17	0.00	0.37
<b>FINANCIAL AND INSURANCE ACTIVITIES</b>	0.27	0.33	0.06	0.14	-0.08	0.10	0.12
<b>PROFESSIONAL, SCIENTIFIC, TECHNICAL, ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES</b>	0.02	0.02	0.00	-0.11	-0.41	-0.14	0.07
<b>ARTS, ENTERTAINMENT, RECREATION AND OTHER SERVICE ACTIVITIES</b>	0.08	0.04	0.08	-0.04	-0.04	-0.04	0.02

**Figure 2.** Shares of tangible and intangible capital, percentage points, 1995–2015



**Figure 3.** Capital contributions to aggregated annual average labour productivity growth (sum cap = 100) 1995–2015



# Conclusions (1):

## 1.1. Baltic states in the context of others

- The real growth rates of GDP, aggregated labour productivity, MFP, capital and reallocation effect were the highest for the Baltic states;
- The highest contribution of labour composition were for Estonia and Germany, but the least negative values belong to Latvia, Lithuania, Denmark and Spain.



## ***Insights from the results of the industrial contributions to aggregated labour productivity growth perspective***

- For more developed economies, highest industry contributors to aggregate labour productivity growth: ***Manufacturing***; Wholesale and retail trade, repair of motorvehicles; Information and communication or Financial and insurance activities.
- For the Baltic states the first two positions remain the same, i. e. : ***Manufacturing***; Wholesale trade, repair of motorvehicles; but the third position goes to Transportation and storage industry.

## ***Insights from the results of capital growth determinants perspective***

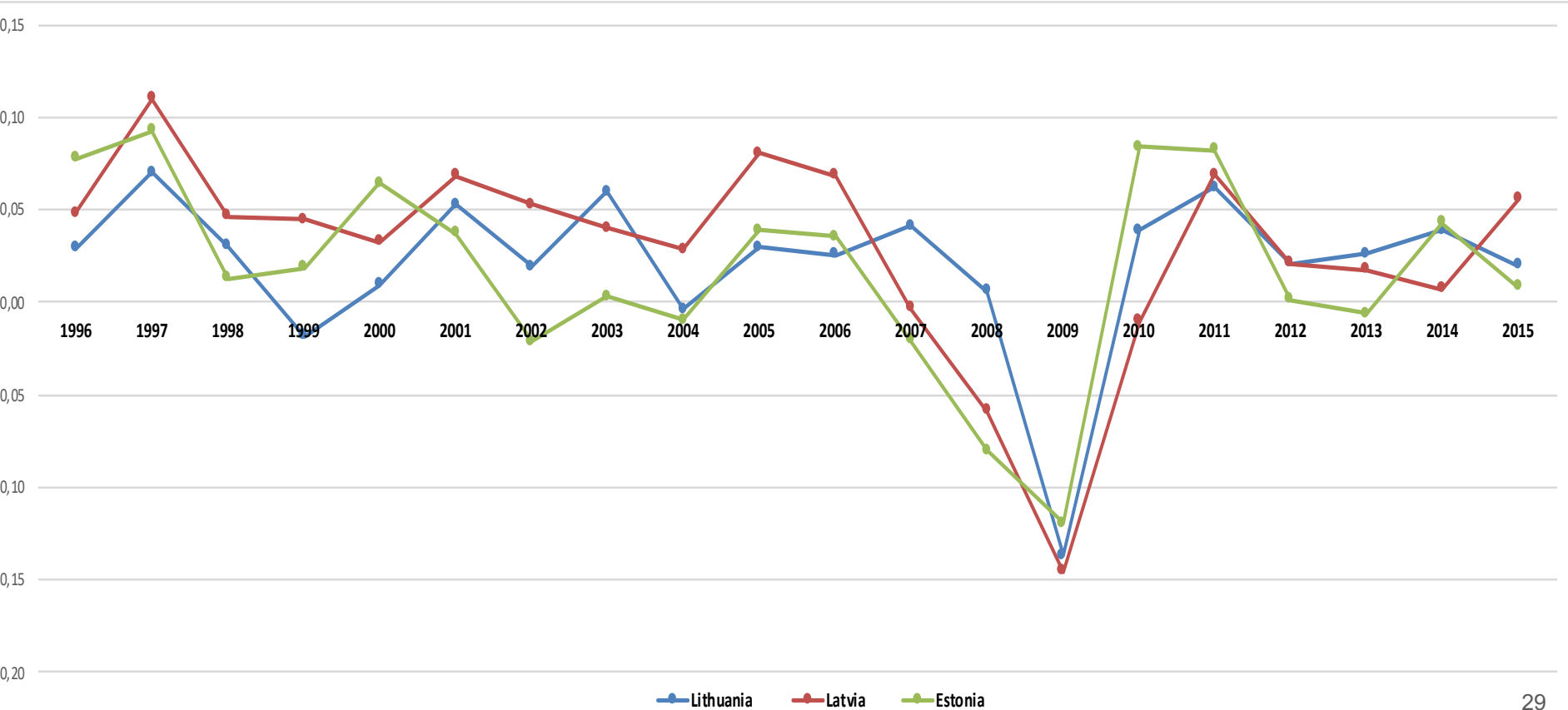
- For the Baltic states and Spain – which is the least developed of the four developed countries considered – *the share of tangible capital is greater when compared with the more developed economies*. Moreover, machinery-based (transport and other machinery) capital predominates in the Baltic countries. From this perspective, the Baltic economies are similar to Spain, in which NResid, Resid and OtherMachinery capital dominates.
- The Baltic economies are only at the stage of development when machinery-based capital predominates for necessary infrastructure creation, whereas later in the growth of their economic structure, both the industrial and main productivity growth determinants will change accordingly. *Much greater significance should be acknowledged for intangible capital*.

- The significance of intangible capital during the process of economic growth could be distinguished, investments to intangible capital should play a significant role.
- In terms of economic competencies (organisational capital, training, and Nfp), the Baltic countries maintain strong positions, Latvia being foremost.
- From IT and CT capital the highest share by far is made by Germany, while the SofwtDB and innovative property leader is Denmark.

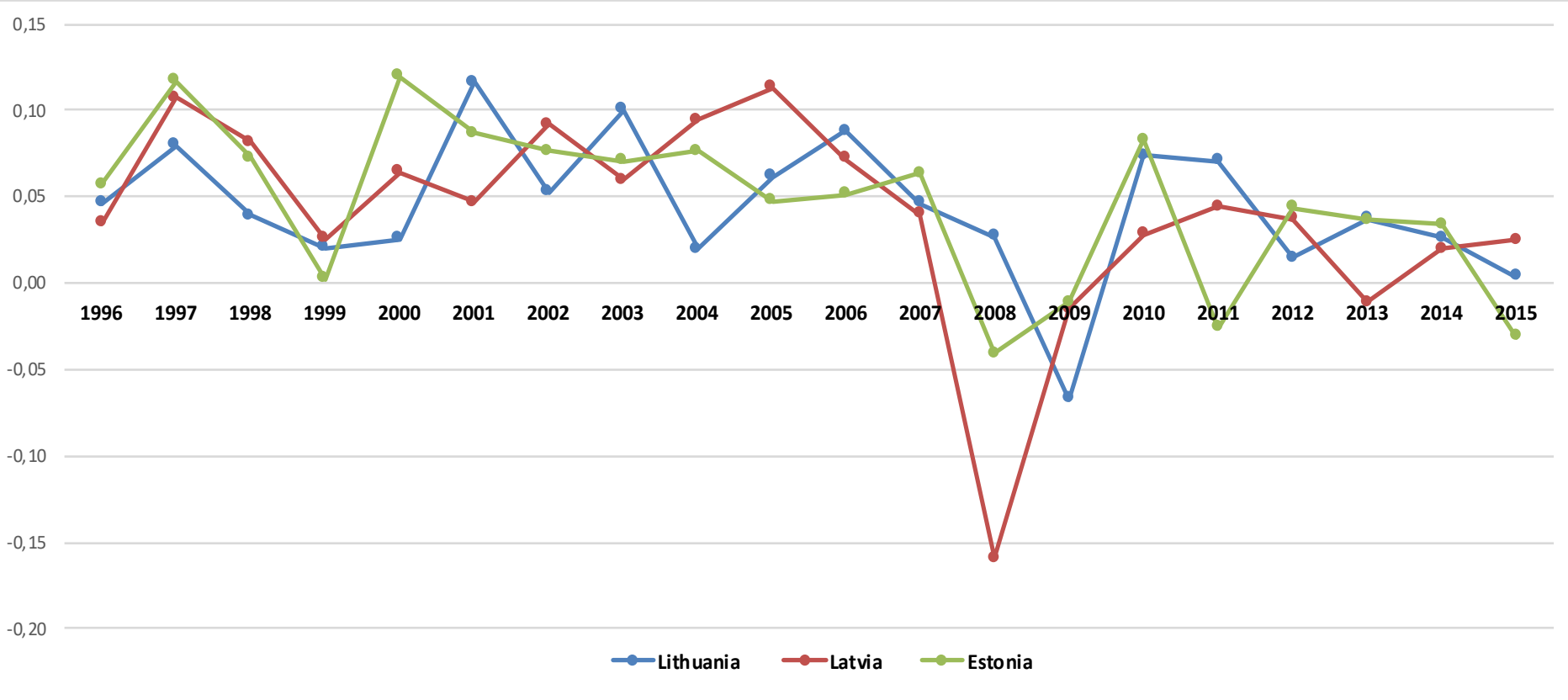
## 1.2. Baltic states: before and after before and after their entry into the EU



**Figure 4.** Aggregated labour productivity growth rates in Lithuania, Latvia, Estonia during 1995–2015, percentage points



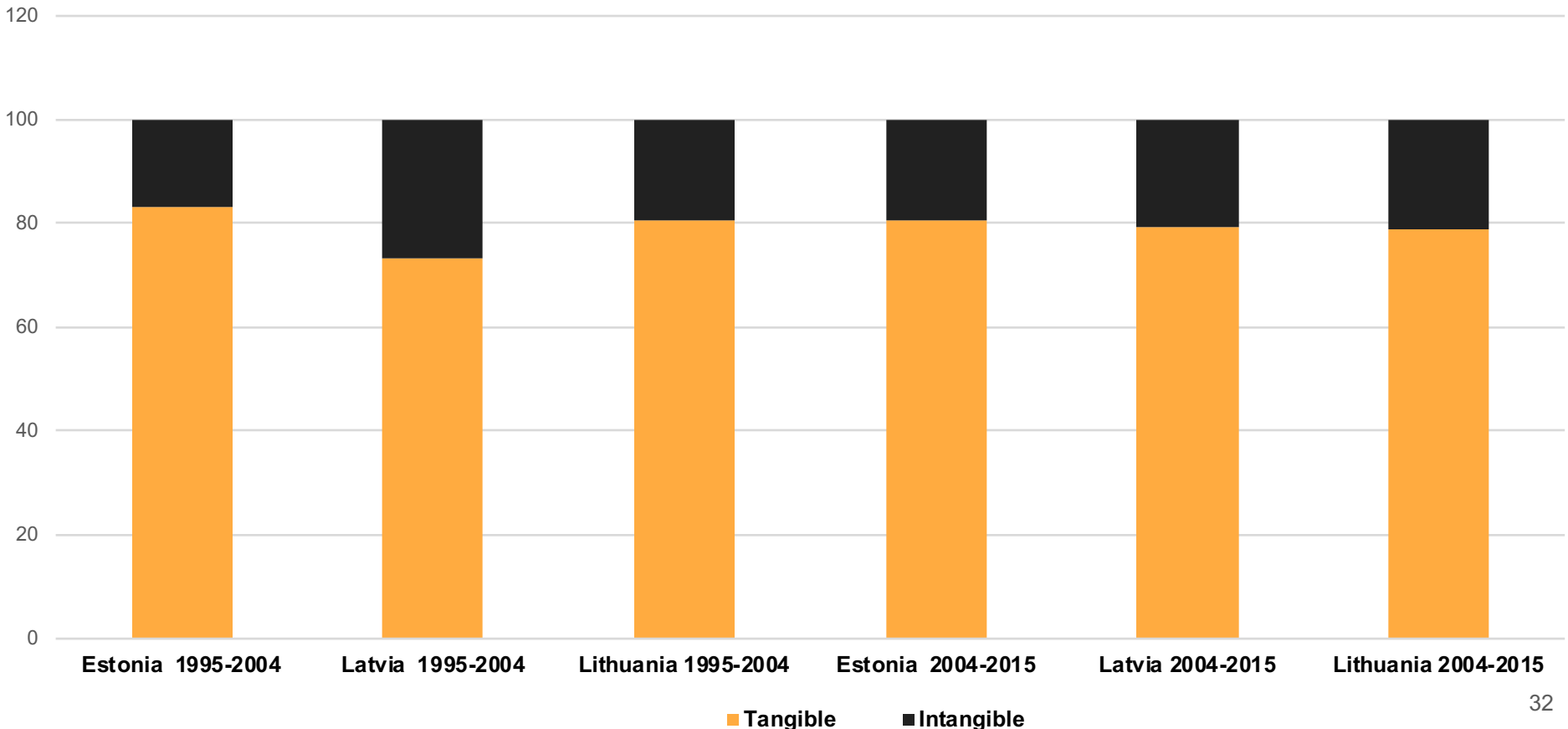
**Figure 5.** MFP contributions to aggregated labour productivity growth rates in Lithuania, Latvia, Estonia during 1995–2015, percentage points



**Table 10.** Contributors to annual average aggregated Labour productivity growth (Productivity Total); percentage points

			Estonia 1995- 2015	Latvia 1995- 2015	Lithuani a 1995- 2015	Estonia 1995- 2004	Latvia 1995- 2004	Lithuani a 1995- 2004	Estonia 2004- 2015	Latvia 2004- 2015	Lithuani a 2004- 2015
<b>AB = A + B</b>	<b>AB</b>	<b>Productivity total</b>	4.96	4.95	4.81	7.72	7.63	5.76	2.70	2.75	4.04
<b>A = f + g + h</b>	<b>A</b>	<b>Productivity sectorial</b>	4.64	3.99	4.41	7.54	6.73	5.55	2.27	1.75	3.47
	<b>B</b>	<b>Reallocation effect</b>	0.32	0.96	0.41	0.19	0.90	0.21	0.43	1.00	0.57
	<b>f</b>	<b>Contribution labour composition</b>	0.19	-0.14	-0.13	0.58	0.16	-0.06	-0.13	-0.39	-0.18
	<b>g</b>	<b>Contribution capital</b>	2.74	1.28	2.44	3.90	1.35	2.86	1.80	1.23	2.09
	<b>h</b>	<b>MFP</b>	1.70	2.85	2.10	3.06	5.22	2.76	0.60	0.91	1.56

**Figure 6.** Shares of tangible and intangible capital in aggregated annual average labour productivity growth, percentage points





# Conclusions (1):

## 1.2. Baltic states before and after before and after their entry into the EU

- Labor productivity growth and its main contributors, namely labour composition, capital, MFP decreased in all the Baltic states after the entry EU.
- *Insights from the aggregated level*

The share of intangible capital was greatest in Latvia during the period researched. Moreover, before entering the EU it was especially high relative to the other Baltic states, but decreased thereafter. In contrast, the shares of intangible capital increased for Estonia and Lithuania after entering the EU.

- The highest industrial annual average real value-added growth rates are being seen in the information and communication industry, financial and insurance activities and professional, scientific, technical, administrative and support service activities. Given that all of these industries are intangible and IT&CT capital-intensive, the main productivity determinants will change accordingly in the future. Indeed, the intangible capital group and its components will come to predominate, as has already occurred in more developed economies.

## **2. *Continuation***

Productivity growth determinants in the manufacturing sector in the Baltic states: Intangible capital approach

# The aim

To derive labour productivity growth determinants in the manufacturing sector in the Baltic states and accomplish a comparative analysis of derived results with a particular focus on intangible capital.

# The object

Detailed determinants of labour productivity growth

# Context

- Manufacturing sector remains important for the Baltic States
- Intangible capital is the secret that separates most of the EU successfully developing strong economies

# The methodology

- Growth accounting method (Solow 1957)
- EU KLEMS methodology (Jorgenson *et al.* 1987; Timmer *et al.* 2007, Jäger 2018)



- Expanded by incorporation of the new intangibles (Corrado *et al.* 2012)



- New methodologies for the Baltic states and the more developed economies

**Table 11.** Contribution to EU KLEMS database

Countries	Available indicators in EU KLEMS database, 2019 release (Stehrer <i>et al.</i> )	<b>Non-available</b> indicators in EU KLEMS database, 2019 release (Stehrer <i>et al.</i> )
<b>Estonia</b>	<p><b>GFCF:</b> IT, CT, SoftwDB, TR, OtherMash, NResid, Resid, Cult, RD, Minart – 1995-2017, <i>industrial coverage</i></p> <p><b>Stock:</b> IT, CT, SoftwDB, TR, OtherMash, NResid, Resid, Cult, RD, Minart – 2000-2017, <i>industrial coverage</i></p>	<p><b>Stock:</b> IT, CT, SoftwDB, TR, OtherMash, NResid, Resid, Cult, RD, Minart – 1995-2000, <i>industrial coverage</i></p>
<b>Latvia</b>	<p><b>GFCF:</b> IT, CT, TR, OtherMash, NResid, Resid, Cult – 1995-2017, <i>industrial coverage</i></p> <p><b>Stock:</b> IT, CT, SoftwDB, TR, OtherMash, NResid, Resid, Cult – 1995-2017, <i>industrial coverage</i></p>	<p><b>GFCF:</b> SoftwDB, RD, Minart – 1995-2000, <i>industrial coverage</i></p> <p><b>Stock:</b> RD, Minart – 1995-2017, <i>industrial coverage</i></p>
<b>Lithuania</b>	<p><b>GFCF:</b> IT, CT, SoftwDB, TR, OtherMash, NResid, Resid, Cult – 1995-2017, <i>industrial coverage</i></p> <p><b>Stock:</b> IT, CT, SoftwDB, TR, OtherMash, NResid, Resid, Cult, Minart – 1995-2017, <i>industrial coverage</i></p>	<p><b>GFCF:</b> RD, Minart – 1995-2000, <i>industrial coverage</i></p> <p><b>Stock:</b> RD – 1995-2000, <i>industrial coverage</i></p>



**Table 12.** Contribution to INTAN Invest database

<b>Countries</b>	<b>Data availability for new intangibles in INTAN-Invest database, 2020 edition (Corrado <i>et al.</i> 2020)</b>
<b>Estonia</b>	No
<b>Latvia</b>	No
<b>Lithuania</b>	No
<b>Other more developed economies</b>	Yes

# ***Summarized*** - Contribution to open access databases

- *The database created for all indicators lacked in EU KLEMS* database (Stehrer *et al.* 2019) presented in Table 11 for the Baltic States at industrial level and for the total market economy.
- *The database created for all lacked INTAN-Invest* database (Corrado *et al.* 2020) presented in Table 12 for the Baltic States at industrial level and for the total market economy.
- *Derived contributions of detailed capital assets* (presented in Tables 11 and 12) to the growth rate of value added and labour productivity, at industrial level and for the total market economy, 1995-2017 y.

**Table 13.** Details on contribution

<b>Countries</b>	<b>Data availability in EU KLEMS database, 2017 release (Jäger 2017)</b>	<b>Data availability in INTAN-Invest database, 2020 edition (Corrado <i>et al.</i> 2020)</b>	<b>Research contribution</b>
<b>More developed countries</b>	YES	YES	<ul style="list-style-type: none"><li>• to the traditional EU KLEMS methodology (INTAN invest intangibles have been included)</li></ul>
<b>Baltic countries</b>	Only for some indicators, major gaps	NO	<ul style="list-style-type: none"><li>• new statistical EU KLEMS and new intangible data constructed</li><li>• to the traditional EU KLEMS methodology (new intangibles have been included)</li></ul>

## Table 14. Capital data

<b>EU KLEMS data</b>	<ol style="list-style-type: none"><li>1. IT - Computing equipment</li><li>2. CT - Communications equipment</li><li>3. SoftwDB - Computer software and databases</li><li>4. TR - Transport equipment</li><li>5. OtherMash - Other machinery and equipment</li><li>6. NonResid - Non-residential equipment</li><li>7. Resid - Residential structures</li><li>8. Cult - Cultivated assets</li><li>9. RD - Research and development</li></ol>
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**Tangible capital = 1 + 2 + 4 + 5 + 6 + 7 + 8; Intangible capital = 3 + 9 + 10 + 11 + 12 + 13 + 14 + 15**

IT&CT = IT + CT; Machinery based capital = OtherMash + TR, Buildings = NonResid + Resid

Innovative property = RD + Minart + Design + Brand; Economic competencies = OrgCap + Train + Nfp

**Table 15.** Industrial aggregation

Industrial aggregation

Total (Market economy)

A - Agriculture, forestry and fishing

B - Mining and quarrying

C - Manufacturing

D–E - Electricity, gas and water supply

F - Construction

G - Wholesale and retail trade, Repair of motor vehicles

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I - Accommodation and food service activities

J - Information and communication

K - Financial and insurance activities

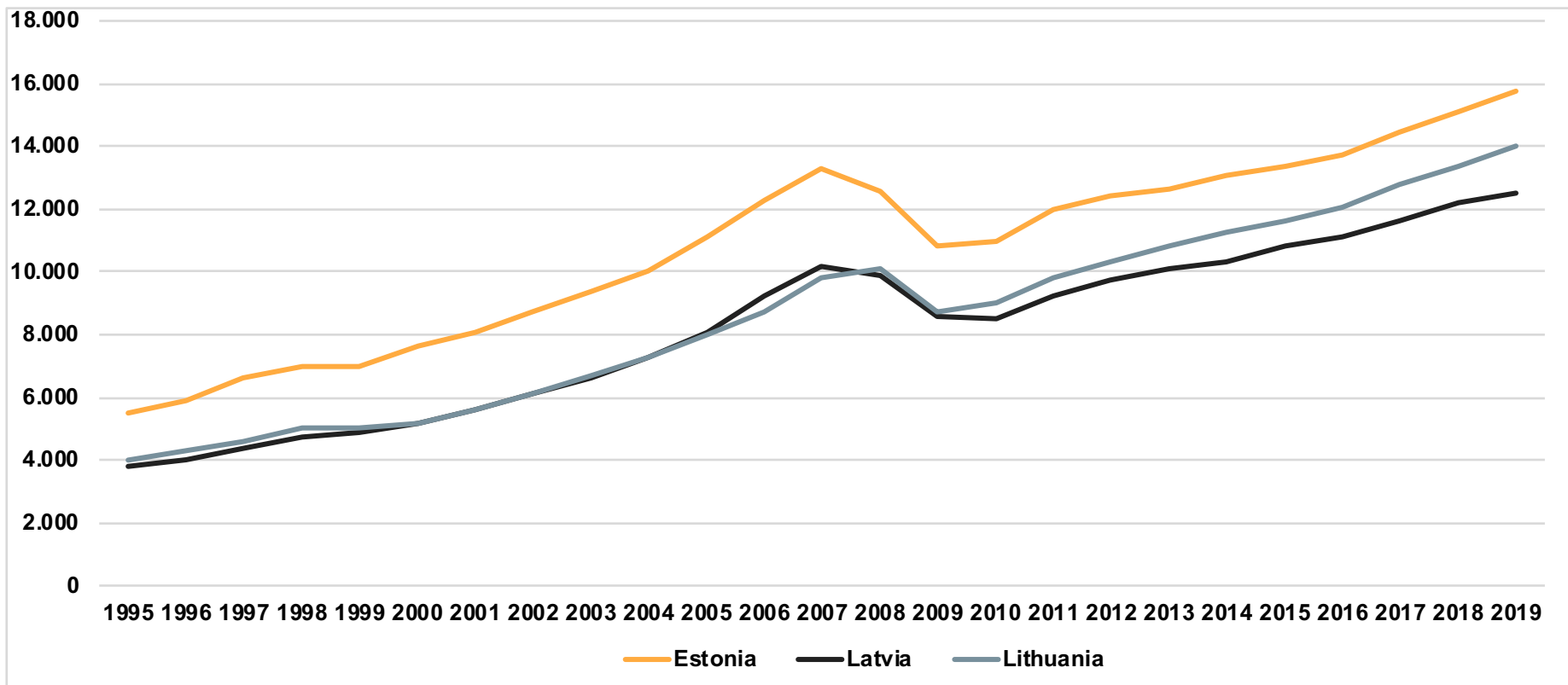
M–N - Professional, scientific, technical, administrative and support service activities

R–S - Arts, entertainment, recreation, and other service activities

**Table 16.** Research implementation details

Country coverage: Estonia, Latvia, Lithuania
Research period: 1995–2017
Method: Growth accounting
Methodology: EU KLEMS supplemented by new intangibles
Data: Capital, Labour, Capital and labour compensation, Value added
Capital data: different types of capital assets (in more detail in Table 4)
Labour data: labour composition according to the educational attainment
Databases: for capital data - EU KLEMS and INTAN-Invest (for more developed economies); EU KLEMS, INTAN-Invest, National statistics departments, WIOD, Eurostat (for the Baltic states), for labour data - EU KLEMS and WIOD

# Economies overview



**Figure 7.** GDP per capita at market prices, chain-linked volumes (2010) 1995–2019.

Source: own elaboration, upon the Eurostat data

**Table 17. Results (Manufacturing industry)**

1995-2017 Year	VAQ 1	H 2	LP 3	Contr LC 4	Contr C 5	TFP 6
	1=2+3		3=4+5+6			
<b>Lithuania</b>	0.06	-0.01	<b>0.07</b> (0.068)	0.00 (-0.001)	0.02 (0.025)	<b>0.04</b> (0.044)
<b>Latvia</b>	0.03	-0.02	0.05 (0.053)	0.01 (0.007)	0.02 (0.023)	0.02 (0.023)
<b>Estonia</b>	0.05	-0.01	0.06 (0.062)	0.00 (-0.002)	0.03 (0.035)	0.03 (0.029)

\*VAQ – growth rate of value added (%)

H – contribution of hour

LP – growth rate of labour productivity (%)

Conctr LC – contribution of labour composition (according to educational attainment)

Contr C – contribution capital

TFP – multifactor productivity



**Table 18.** Tangible and intangible capital shares in indicator of contribution of capital (Manufacturing industry)

<b>1995-2017 Year</b>	<b>Intangible capital 1</b>	<b>Tangible capital 2</b>
	$1 + 2 = 100 \%$	
<b>Lithuania</b>	<b>0.33</b>	0.67
<b>Latvia</b>	0.14	0.86
<b>Estonia</b>	0.22	0.78

**Table 19.** Contribution of detailed capital assets to capital (Manufacturing industry)

1995-2017 Year	Contr C	IT	CT	TR	OtherMash	NonResid	Resid	Cult	SoftwDB	Minart	Design	Nfp	RD	Brand	OrgCap	Train
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
	ContrC=1+2+3+4+5+6+7+8+9+10+11+12+13+14+15															
Lithuania	0,02	0,001477	0,000759	0,000939	0,010414	0,005429	0,000000	0,000000	0,001229	0,000024	0,001098	0,000000	0,000910	0,001271	0,000958	0,000397
Latvia	0,02	0,000307	0,000057	0,001832	0,016134	0,001459	0,000100	0,000009	0,000480	0,000029	0,000044	0,000000	0,000767	0,000733	0,000479	0,000211
Estonia	0,03	0,000313	0,002714	0,001864	0,015685	0,009643	0,000211	0,000000	0,000200	0,000000	0,000254	0,000000	0,000774	0,000979	0,001637	0,000672

**Table 20.** Ranked labour productivity detailed determinants to total capital contribution (Manufacturing industry)

1995-2017 Year	Contr C	*IT	*CT	*TR	*OtherMash	*NonResid	*Resid	*Cult	*SoftwDB	*Minart	*Design	*Nfp	*RD	*Brand	*OrgCap	*Train
Lithuania	0,02	3	10	8	1	2			5	12	6		9	4	7	11
Latvia	0,02	8	11	2	1	3	10	14	6	13	12		4	5	7	9
Estonia	0,03	11	3	4	1	2	13		14		12		7	10	5	8

*\*Intangible capital in red, \*Tangible in black*

# Conclusions (2):

## *Insights from the Manufacturing industry*

- The highest positions in labour productivity growth rate, Lithuania's remains.
- The contribution of TFP also remains the highest in Lithuania.
- Capital, more or less, remains an equal contributor in all the Baltic states.
- According to educational attainment, labour composition does not play a vital role for any of the three researched economies.
- The following indicators – value-added, labour productivity growth, and TFP – the highest are for Lithuania, followed by Estonia and Latvia.

# Conclusions (2):

## *Insights from intangible capital approach*

- The part of intangible capital of total capital remains the highest in Lithuanian as well.
- When the capital contributors have been ranked – 2 from 5 belong to intangible capital in Lithuania, Latvia; and 1 from 5 accordingly in Estonia.
- The research revealed that a more detailed analysis of different detailed manufacturing industries and the determinants of their labour productivity growth with the focus on intangible capital is needed in the nearest future for the Baltic states.

**Thank you!!!**

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