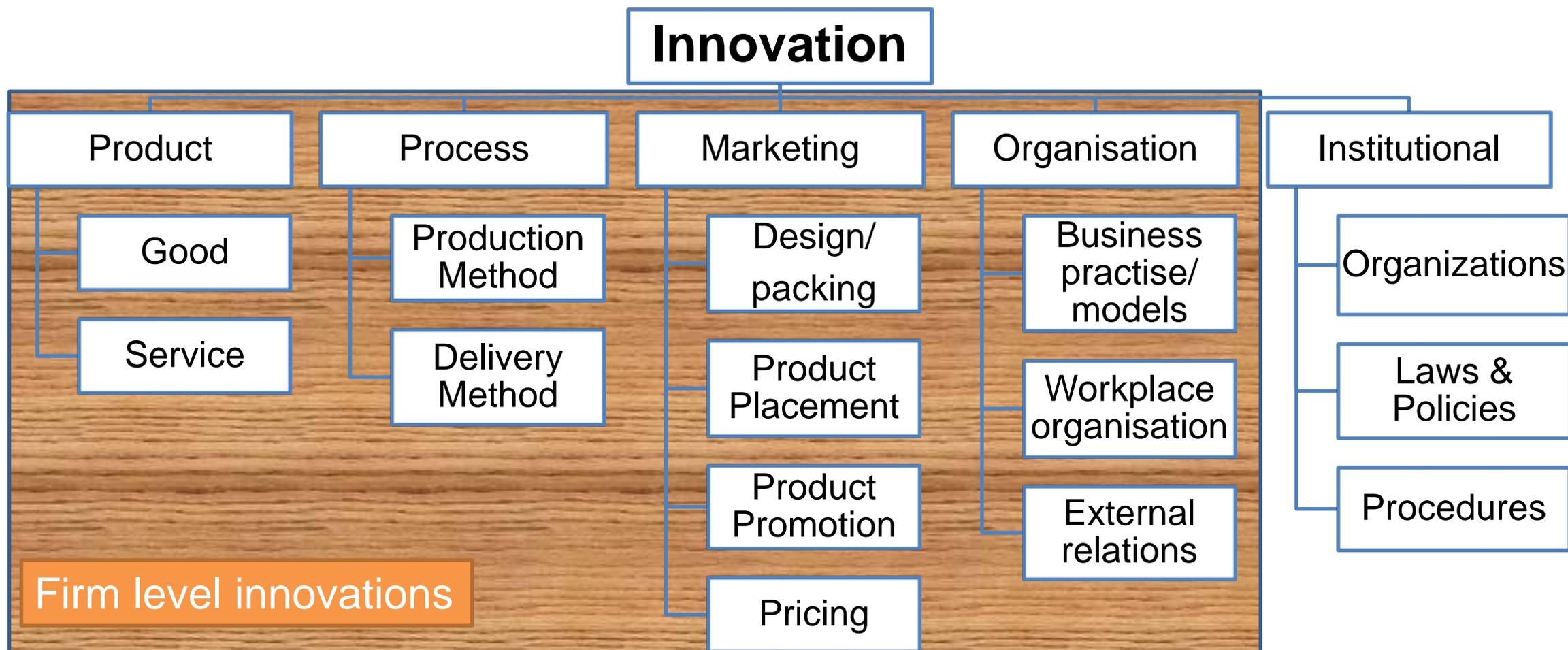


THE INFLUENCE OF INSTITUTIONAL INNOVATION TO THE DEVELOPMENT OF ESTONIAN FOREST SECTOR

MEELIS TEDER

**Department of Forest Industry
Institute of forestry and Rural engineering
Estonian University of Life Sciences
meelis.teder@emu.ee**

Review of the literature



Source: Integrating Innovation in Forest and Development Policies: Comparative Analysis of National Policies across Europe. Figure 1, Typology of Innovation – modified from OECD 2005, p. 42

Sectoral competitiveness

- used for innovation analyse at the institutional – societal level

Competitiveness - no single and fully comprehensive measures for its determinations.

Various indicators:

- **Growth:** growth of value added (GVA), growth of employment;
- **Productivity:** labour productivity, multifactor productivity
- **Profitability:** net profit margin, return on assets (ROA)
- **International trade:** **revealed comparative advantage (RCA)**, export market share
- **Foreign direct investments.**

Source: Peneder, M., *et al.*, 2009. Sectoral performance, in: Peneder, M. (Ed.) Sectoral Growth Drivers and Competitiveness in the European Union. EUR-OP, Luxembourg, pp. 7–40.

RESEARCH QUESTIONS

- What are the main developments of the Estonian forest sector in the context of policy changes and vice versa?
- Are the main forestry related policy changes fostering or impeding factors for innovation activities in the forest sector?
- What are the main policy-driven innovations in Estonian forestry governance, management of state-owned and privately owned forests and in forest industries?
- Have the forest policy changes influenced the international competitiveness of the sub-sectors of the Estonian wood industries?

Period: 1990 – 2010 (Based on Papers where comparison 1990=BEFORE; 2010 = NOW)

MATERIALS AND METHODS

Revealed Comparative Advantage (RCA)

$$RCA_{ij} = \frac{\frac{X_{ij}}{\sum_i X_{ij}}}{\frac{\sum_j X_{ij}}{\sum_i \sum_j X_{ij}}}$$

X =**export value**, i =commodity class, j =country

$$RMA_{ij} = \frac{\frac{M_{ij}}{\sum_j M_{ij}}}{\frac{\sum_i M_{ij}}{\sum_i \sum_j M_{ij}}}$$

M =**import value**, i =commodity class, j =country

$RCA_{ij} > 1$, country has a comparative advantage; the country of interest is specialized in producing the commodity of interest.

$RMA_{ij} > 1$, then the country has an import advantage: import exceeds export

MATERIALS AND METHODS (4)

Revealed Comparative Advantage (RCA)

Revealed Competitiveness – $RC_{ij} = \ln(RCA_{ij}) - \ln(RMA_{ij})$

Relative Trade Advantage – $RTA_{ij} = RCA_{ij} - RMA_{ij}$

In case of both RC and RTA, **positive values indicate a competitive advantage**, while negative values indicate a competitive disadvantage

The Aquino index (AI) is also based on Balassa's RCA concept

$$AI = \frac{RCA_{ij}}{RMA_{ij}}$$

SELECTED RESULTS

Innovative changes in forest legislation

Amendments to the first Forest Act (1993), entry into force 25.06.1995:

- **The notification of the forest owner's activities** was taken into use in Estonia. The private forest owner has to notify state authorities about forest felling, reforestation, forest damages.
- **Limited felling without the forest notification.** The private forest owner had the right to fell from their forest the trees with breast height diameter less than 20 cm up to one cubic metre per hectare per year. (At the moment 20 m³ per immovable)

METSATEATIS Reg. nr. _____

TÄIDAB OMANIK VÕI VOLITATUD ESINDAJA
Maaüksuse asukoht

Maaüksuse nr. _____ Vahel / rida _____ Koda _____
Kinnistu nr. _____ Kinnistu nimetus _____ Maaüksuse nr. _____

Omanik _____ Volitatud esindaja _____
Nimi või ettevõtte _____ Nimi _____
Maaüksuse / registrikoode _____ Maaüksuse _____
Address _____ Address _____
Postiühendus _____ Telefon _____ Postiühendus _____ Telefon _____

Kavandatud raiet- ja metsa uuendustööd, avastatud metsakahjustused

Töö nr.	Kavandatud töö / avastatud metsakahjustus		Kavandatud raiet		Kavandatud metsa uuendus		Metsakahjustus		Loodus- või muusrikkuste teed erisused	
	alaüksuse re.	kvartal	erakid	raiekiik	hirmanguline raietav maht (m ³)	semme- puud (t)	uuendus- viis	uuendatav puuikiik		põhjus
1										
2										
3										
4										
5										
6										
7										
8										

NS! Metsarale on lubatud pärast keskkonnateenistuse poolt sellekohase kirjaliku lubava märke tegemist!

Kavandatud metsa uuendussüsteemide ja metsatööde ehitamine ja uuendamine

Metsa uuendussüsteemide ehitamine	Maht (ha)	Loodus- või muusrikkuste kaitselised erisused	Metsatööde ehitamine	Maht (km ²)	Loodus- või muusrikkuste kaitselised erisused

Kavandatud raiet- ja metsa uuendustööd, avastatud metsakahjustused, ehitatavate või uuendatavate metsatööde ja metsa uuendussüsteemide asukohta skeem kaatritega või metsamajandamiskava metsaplaani paljunduse või printide pöördel!

Tähtsuse koosseis _____ Kinnitan esitatud andmete õigsust _____ Kontrollitud metsateatise tagasi saanud (Tähtsuse metsateatise tagasisaamise!) _____

Esitaja: _____ Omaniku või volitatud esindaja allkiri: _____

Metsateatise tähtsuse koosseis

Esitaja	huv	asukoht	Omaniku või volitatud esindaja allkiri

Metsateatise tähtsuse koosseis

Esitaja	huv	asukoht	Omaniku või volitatud esindaja allkiri

TÄIDAB KESKKONNATEENISTUS

Sisse tulnud _____

Märge teatise nõuetekohasuse kohta: _____

Märge kavandatud raiete lubatavuse kohta: _____

Osasta _____

Esitaja: _____ Kontrollitud metsateatise tagasi saanud (Tähtsuse metsateatise tagasisaamise!) _____

Innovative changes in forest legislation (3)

Amendments to the second Forest Act from 28.01.2004, entry into force 27.03.2004 (1)

Reforms of forest survey and management planning.

- The **field persons**, engaged in forest survey and management planning, must have **special education** in forestry and they have to **pass special theory exams and practical tests**.
- **Activity licence for firms** dealing with forest management planning.
- An **authority** authorised by the Minister of the Environment **shall establish or refuse the forest management plan (FMP)**

Innovative changes in forest legislation (4)



Amendments to the second Forest Act from 28.01.2004, entry into force 27.03.2004 (2)

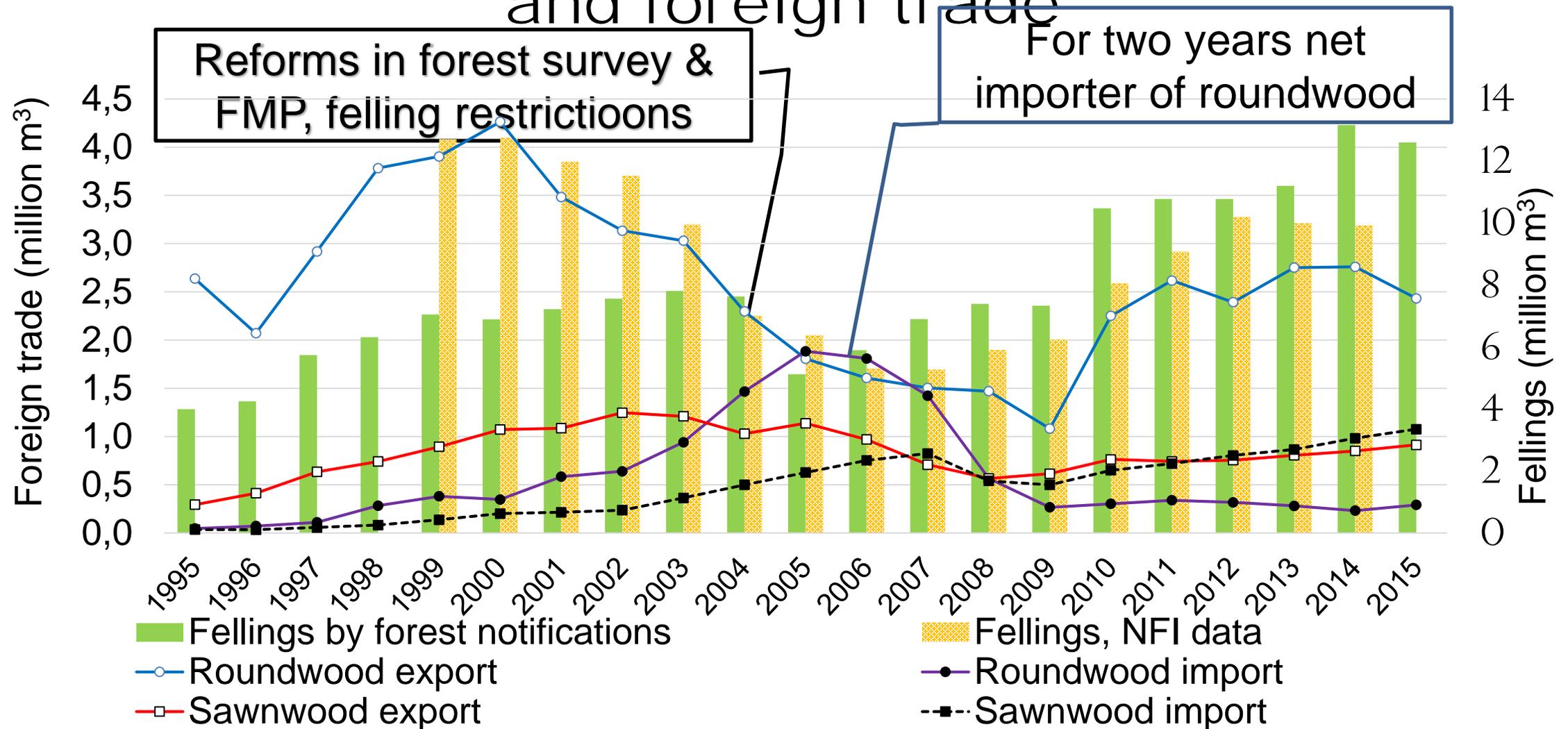
Limitation on fellings. **The exemption** allowing clearfelling in fertile forest types, based on minimum average breast height diameter, **was repealed**. The clearfell age for pine and valuable broadleaved tree stands was set as 100 years, for spruce stands 80 years and for birch stands 70 years.

Innovative changes in forest legislation (5)

The third forest act, entry into force 01.01.2007

- **Deposit for reforestation.** Upon the clear cut (areas bigger than two hectares) of three fertile spruce site types, private forest owners had to pay a mandatory deposit not less than 192 EUR and no more than 1278 EUR per hectare.
- **Forest management plan is not obligatory** for properties where the area of forest is less than two hectares.

Influence of forest policy changes to the fellings and foreign trade



Illegal logging as a fostering factor for policy changes

- Mid-1990-ies: NGO-s internationally report the share of illegal logging in Estonia is 50 %.
- Forest Act 1998 (+amendments) limited various felling types, improved the control in forestry, strengthened the forestry governance and related state authorities. As the result, felling volumes decreased for some period, being lowest in 2005.
- Result: decrease in number of illegal logging offences - **1010 in 2001; 22 in 2010**

Product and process innovations in forestry governance

- The general **information technology** development in combination with **control measures set up by legislation** created innovative solutions first to forestry related state authorities, then to forest owners and forestry specialists and finally some of them were made **publicly available**.
 - The sample is the **state register for the accounting of forest resource (a.k.a. forest register)**, which was created for storing forest inventory data, then map solutions were added and forestry officials started to use it in office or in the forests, finally it became available to the public via internet.

Innovations in sub-contracting and in use of roundwood

- Innovations in the use of forestry machinery: Decrease in fellings & RMK (State Forest Management Centre) high demands for contractors => Forestry machinery use in roadside slope fortification, landscaping, recovering former garbage areas, etc.
- Roundwood utilisation process innovation in bio-energy sector – **roundwood is used for pellet production** (2006).



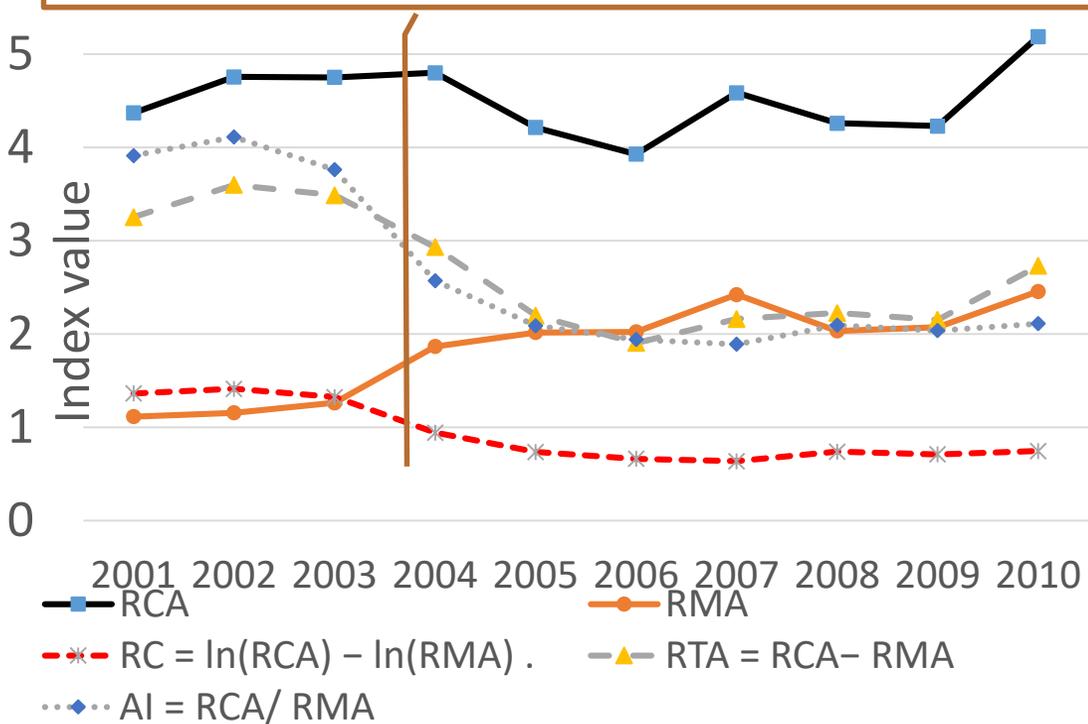
2007 - Changes in Electricity Market Act => first wood based CHP (Combined Heat and Power) started to operate in 2009

- Additional **market for roundwood**
- RMK created a **new sub department, the wood energy division**

RESULTS: Competitiveness, based on FAOSTAT item "forest products total" (NB! without furniture)

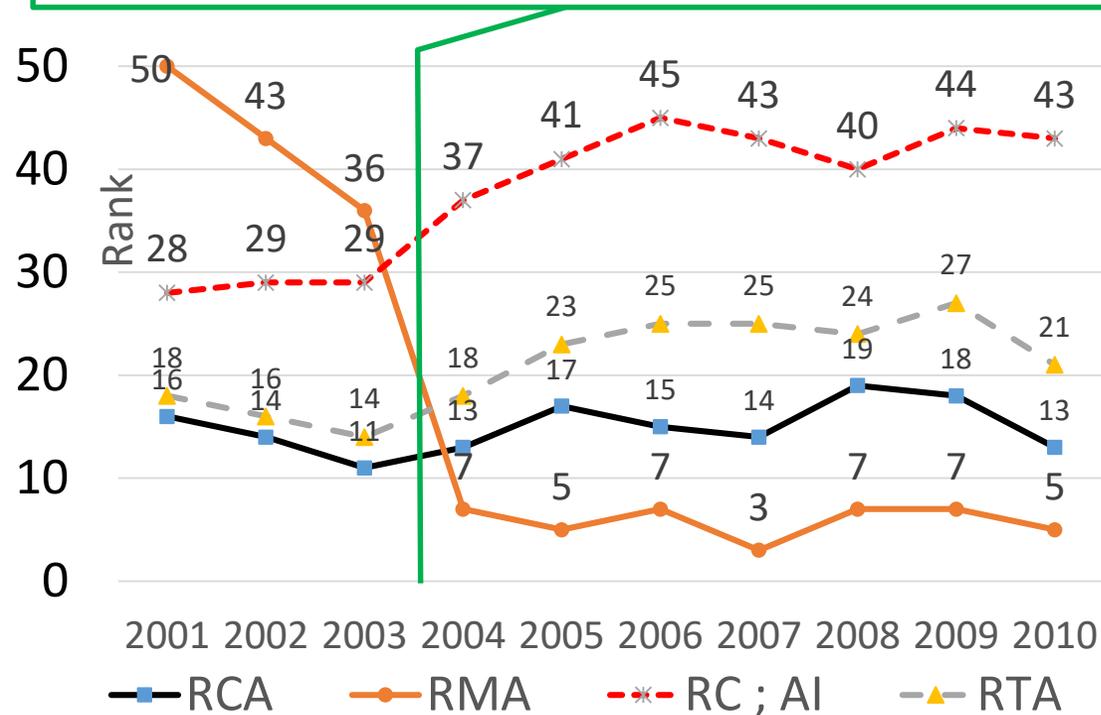
Values of Estonian forest sector foreign trade indices

2004 Forest survey/FMP & felling restrictions



Estonian worldwide ranking according to foreign trade indices

2004 Forest survey/FMP & felling restrictions



RESULTS: Revealed Competitiveness (RC) of Estonian timber products in 2007-2010 and Estonian worldwide ranking in 2010

Product group	RC values				2010	
	2007	2008	2009	2010	No of countries*	Worldwide rank**
Prefabricated buildings	2.25	2.85	3.08	3.50	116	1
Other manufactured wood	2.00	2.10	2.10	2.01	130	8
Furniture of wood	1.00	0.95	1.29	1.31	129	16
Wood panels, wool	0.56	0.62	0.72	0.69	124	21
Chips & particles	3.51	3.18	2.83	3.23	94	22
Fuel wood	3.23	3.37	2.06	2.17	101	26
Roundwood	0,59	1,32	1,31	1,98	108	31
Sawnwood	0.73	0.73	0.66	0.56	125	47
Wood products total	1.11	1.31	1.32	1.32	132	18

*Total no of countries in product group (both export and import values >0)

**Estonian worldwide rank in product group

Source: UN COMTRADE

Discussion and conclusions (1)

- Some of the Estonian forestry related activities are among the most controlled in Europe. For forest management planning (as well as forestry advisory services) a special activity licence or permit is required in addition to the compulsory forestry education. At the beginning, **the implementation of control mechanisms and felling restrictions had a negative influence on the timber flows** in the domestic market.

Discussion and conclusions(2)

- Political lobbying or politicians' activities have had both a positive and a negative influence on the forest sector innovativeness
 - Positive - wood based electricity production by CHPs
 - Negative - innovative ideas in forestry legislation that were not fully enforced
- In some policy changes the ambitions of the sitting minister of Environment and his/her political party or their popularity are more important than the forestry content (**e.g. deposit for reforestation**);

Discussion and conclusions (3)

- The governmental or policy-makers influence to the competitiveness of Estonian forestry and woodworking companies is testified in comparing felling volumes with forest related sector export and import values related indices and Estonian worldwide ranks. For felling volumes the strongest linear correlation is with RCA index 0.823 ($p=0.003$, $n= 10$).
- Thus, the Estonian institutional innovation and changes in forestry legislation have influenced not only forest owners and forest management practices but the whole national forest related sector.

A photograph of a large industrial wood processing facility. The foreground shows a long, neat stack of light-colored wooden planks. In the background, there are several yellow overhead cranes with the brand name 'ABUS' visible. The ceiling is high with exposed metal beams and numerous industrial lights. The overall atmosphere is that of a modern, well-lit manufacturing plant.

Thank you!

Photo: production hall of Peetry Puit / ARCWOOD (opened 2016), at the moment one of the most innovative woodworking firms in Southern-Estonia