Protecting innovation through Trade Secrets & Patents
Determinants for European Union firms

Nathan Wajsman
IP Statistics for Decision Makers
14 November 2017, Mexico City

Trade Secrets, legal definition

- Non-registered IP
  - Technical Information (know how)
  - Confidential business information (formulas, manufacturing processes, recipes, information on customers or suppliers, etc.)

- Protected by national civil or labour or competition or criminal law
  - Information must be secret
  - Must have economic value
  - It must be protected (reasonable efforts)

CIS: Appropriability answers

IP	Appropriability Mechanism	Firms
	Lead time advantages	62%
	Complexity of good / services	61%
✔	**Trade secrets**	**52%**
✔	Trade marks	41%
✔	**Patents**	**32%**
✔	Copyright	27%
✔	Design Registration	25%

"Protecting knowledge" iceberg

Patents:

- products
- manufacturing
- new to market

Trade secrets:

- products / process
- manufacturing / services
- new to market / to firm
- non patentable knowledge
- tacit patent information

Hypotheses and variables

H1: DEGREE OF INNOVATION COMPETITION: strong competition in innovation and quality vs. strong price competition;

H2: LEVEL OF INNOVATION: new to market vs. new to firm innovations + innovation intensity;

H3: TYPE OF INNOVATION: product vs. process innovation;

H4: OPEN INNOVATION: co-operation with business and other partners;

H5: FINANCIAL CONSTRAINTS: lack of adequate finance.

Community Innovation Survey

- IP office registry data cannot be used for TS studies; instead we relied on raw data from the Community Innovation Survey (CIS);

- Coordinated by Eurostat, carried out by Member States every 2 years;

- CIS focuses on the innovation behaviour of firms; in 2012 questions were asked regarding the use of TS (and other IP) as innovation appropriability mechanisms;

- CIS 2012 received 197 000 responses from all EU MS. No data on TS available for Czech Republic, Denmark, France and Spain.

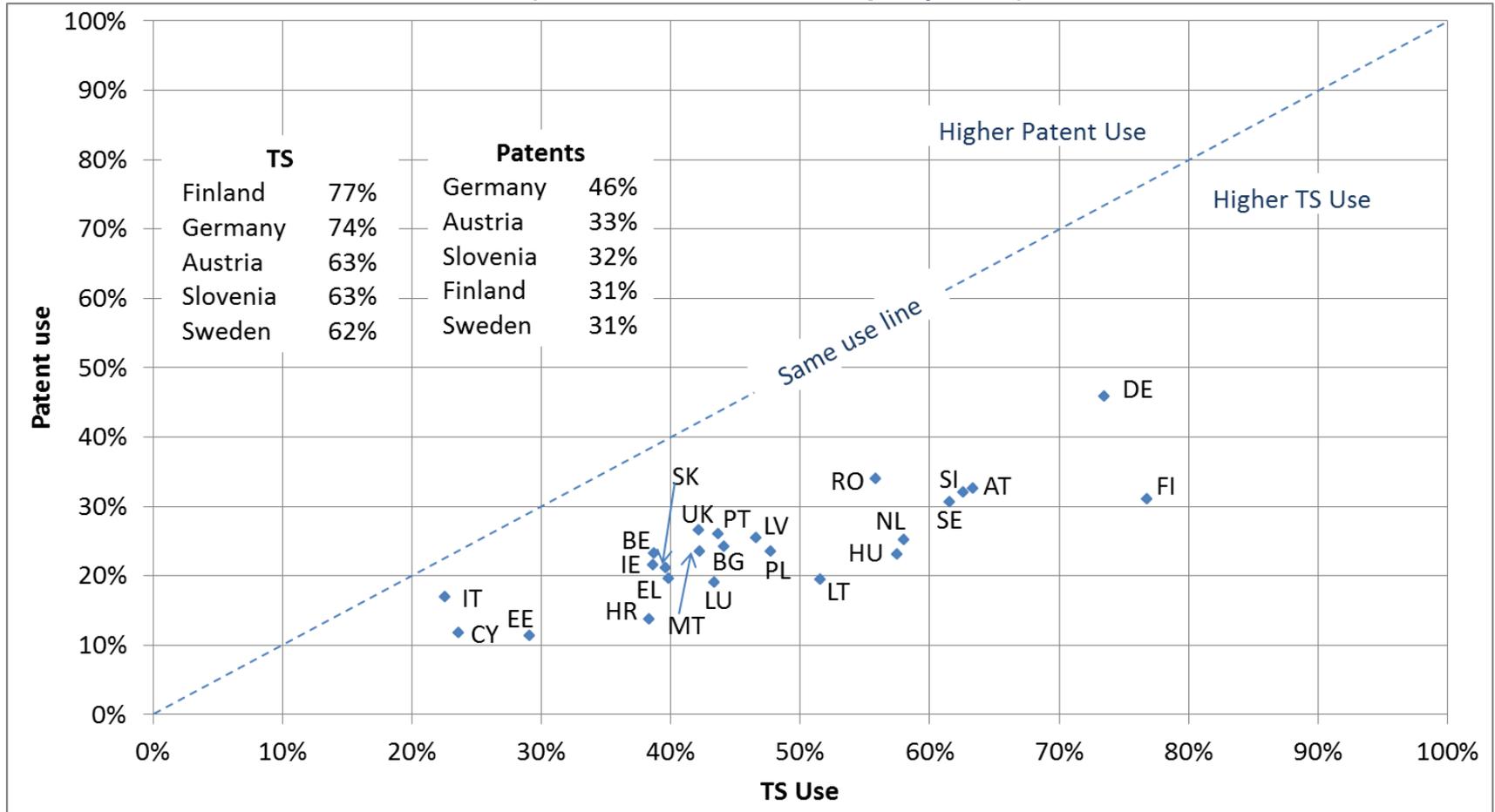# Community Innovation Survey: appropriability question

7. Competitiveness of your enterprise's product and process innovations

7.1 How effective were the following methods for maintaining or increasing the competitiveness of product and process innovations introduced during 2010 to 2012?

	Degree of effectiveness				
	High	**Medium**	**Low**	**Not used**	
	3	*2*	*1*	*0*	
Patents	☐	☐	☐	☐	*CMPAT*
Design registration	☐	☐	☐	☐	*CMRCD*
Copyright	☐	☐	☐	☐	*CMCO*
Trademarks	☐	☐	☐	☐	*CMCTM*
Lead time advantages	☐	☐	☐	☐	*CMLTAD*
Complexity of goods or services	☐	☐	☐	☐	*CMCPX*
Secrecy (include non-disclosure agreements)	☐	☐	☐	☐	*CMSEC*

Trade Secrets vs Patents among innovating firms in 2010-2012

SMEs (less than 250 employees)

TS		Patents	
Finland	77%	Germany	46%
Germany	74%	Austria	33%
Austria	63%	Slovenia	32%
Slovenia	63%	Finland	31%
Sweden	62%	Sweden	31%

Trade Secrets vs Patents among innovating firms in 2010-2012

Large firms (250 employees or more)
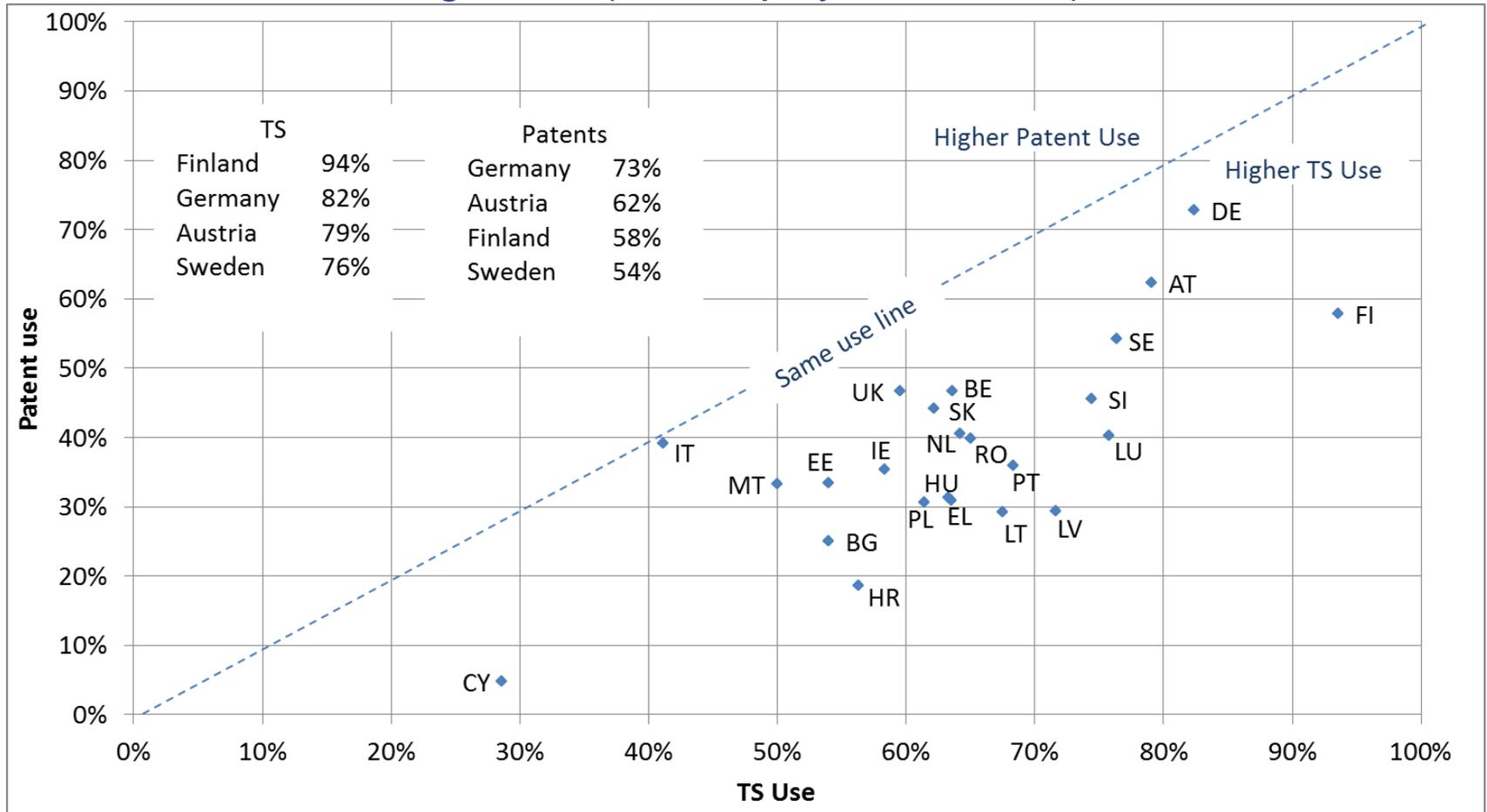
Trade Secrets vs Patents among innovating firms in 2010-2012

Economic Sector (NACE code)
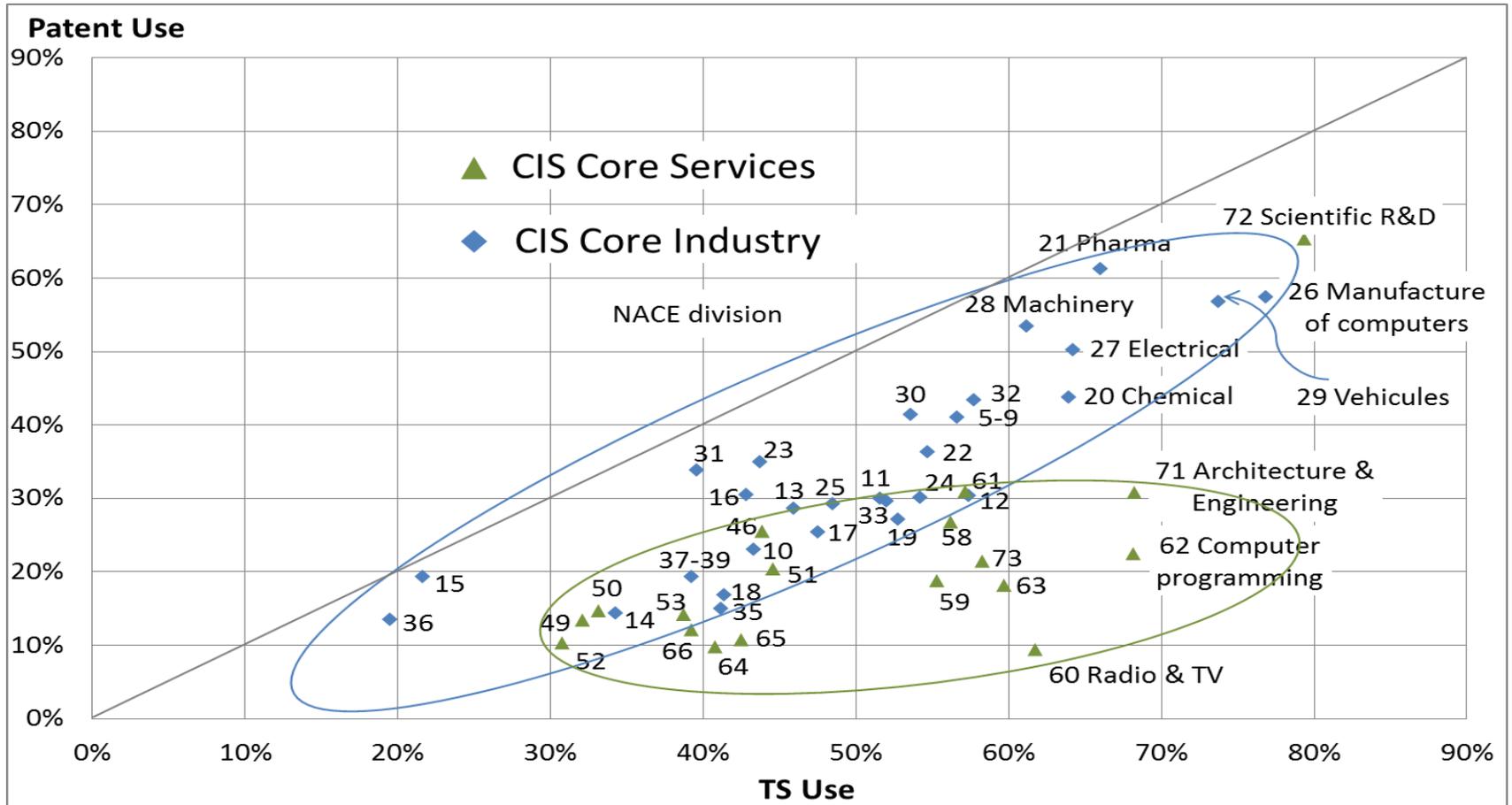
Descriptive analysis: two main conclusions

- Innovating firms often use both patents and trade secrets to protect their innovations (complementarity);

- The use of trade secrets for protecting innovations is higher than the of use patents by most types of companies, in most economic sectors and in all Member States.

Results of econometric analysis- probit regressions

TS USE (D) (DEPENDENT VARIABLE)		COEF.	STD. ERR.	Z	P>z	[95 % CONF. INT.]	
H1 INNOVATION COMPETITION	quality competition (D)	0.062**	0.028	2.230	0.026	0.007	0.116
	price competition (D) (-)	0.050**	0.024	2.070	0.039	0.003	0.097
H2 LEVEL OF INNOVATION	market novelty (D)	0.248***	0.027	9.230	0.000	0.195	0.300
	firm novelty (D)	0.091***	0.028	3.220	0.001	0.036	0.147
	innovation intensity (log10)	0.092***	0.010	8.840	0.000	0.071	0.112
	internal R&D (D)	0.315***	0.029	10.980	0.000	0.371	0.258
H3 TYPE OF INNOVATION	good innovation (D)	0.155***	0.031	4.930	0.000	0.093	0.216
	service innovation (D)	0.097***	0.028	3.450	0.001	0.042	0.152
	process innovation (D)	0.215***	0.025	8.500	0.000	0.165	0.265
H4 OPEN INNOVATION PRACTICES	cooperation (C)						
	no cooperation	0	(base)				
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	other	0.027	0.384	0.070	0.943	-0.725	0.780
H5 FINANCIAL CONS.	lack of finance (D)	0.002	0.030	0.050	0.957	-0.057	0.060

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H2 LEVEL OF INNOVATION	market novelty (D)	0.278***	0.028	10.110	0.000	0.224	0.332
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	innovation intensity (log10)	0.078***	0.011	6.950	0.000	0.056	0.100
	internal R&D (D)	0.219***	0.030	7.240	0.000	0.278	0.160
H3 TYPE OF INNOVATION	good innovation (D)	0.316***	0.034	9.360	0.000	0.250	0.382
	service innovation (D)	0.022	0.028	0.790	0.429	-0.033	0.078
	process innovation (D)	− 0.024	0.026	-0.920	0.355	-0.075	0.027
H4 OPEN INNOVATION PRACTICES	cooperation (C)						
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	national	0.086**	0.035	2.420	0.015	0.016	0.155
	Europe	− 0.007	0.036	-0.200	0.844	-0.078	0.064
	USA	0.291***	0.061	4.750	0.000	0.171	0.411
	China/India	0.360***	0.061	5.940	0.000	0.241	0.478
	other	− 0.166	0.416	-0.400	0.691	-0.982	0.651
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	innovation intensity (log10)	0.078***	0.011	6.950	0.000	0.056	0.100
	internal R&D (D)	0.219***	0.030	7.240	0.000	0.278	0.160
H3 TYPE OF INNOVATION	good innovation (D)	0.316***	0.034	9.360	0.000	0.250	0.382
	service innovation (D)	0.022	0.028	0.790	0.429	-0.033	0.078
	process innovation (D)	− 0.024	0.026	-0.920	0.355	-0.075	0.027
H4 OPEN INNOVATION PRACTICES	cooperation (C)						
	no cooperation	0	(base)				
	national	0.086**	0.035	2.420	0.015	0.016	0.155
	Europe	− 0.007	0.036	-0.200	0.844	-0.078	0.064
	USA	0.291***	0.061	4.750	0.000	0.171	0.411
	China/India	0.360***	0.061	5.940	0.000	0.241	0.478
	other	− 0.166	0.416	-0.400	0.691	-0.982	0.651
H5 FINANCIAL CONS.	lack of finance (D)	0.046	0.030	1.510	0.131	-0.014	0.106

Results of econometric analysis- ordered probit

[Patent preference over TS] = [Patent use] – [TS use] from -1 to 1.
Positive means patent preference, negative means TS preference

PATENT PREFERENCE OVER TS (DEPENDENT VARIABLE)		DY/DX	DELTA -METHOD STD. ERR.	z	P>z	[95 % CONF. INT.]	
H2 LEVEL OF INNOVATION	market novelty (D)	0.017***	0.003	4.970	0.000	0.010	0.023
	firm novelty (D)	− 0.009***	0.003	-2.730	0.006	-0.016	-0.003
	innovation intensity (log10)	0.004***	0.001	2.750	0.006	0.001	0.007
	internal R&D (D)	− 0.006	0.004	−1.500	0.134	-0.014	0.002
H3 TYPE OF INNOVATION	good innovation (D)	0.042***	0.004	9.630	0.000	0.033	0.050
	service innovation (D)	− 0.013***	0.003	-3.700	0.000	-0.020	-0.006
	process innovation (D)	− 0.020***	0.003	-6.150	0.000	-0.026	-0.014
CONTROL VARIABLES	employees (log 10)	0.012***	0.003	4.630	0.000	0.007	0.018
	export (D)	0.011***	0.004	2.840	0.004	0.003	0.019
	part of group (D)	0.006*	0.003	1.810	0.070	-0.001	0.013
	public funding (D)	0.016***	0.003	4.570	0.000	0.009	0.023

Econometric analysis: Determinants of use (summary)

	TRADE SECRETS	PATENT
Major determinant	*Use of patents* Internal R&D (H2) Innovation expenditure (H2)	*Use of TS* Product innovation: good (H3)
Important determinant	Co-operation (H4) Process innovation (H3) Market novelty (H2) **No effect**: Financial constrains (H5)	Market novelty (H2) Innovation expenditure (H2) Internal R&D (H2)
Other	Product innovation: service (H3) Firm novelty (H2) Quality competition (H1) Price competition (H1)	Co-operation (H4) Quality competition (H1) **Negative**: Price competition (H1)

Econometric analysis: conclusions (1)

H1: DEGREE OF INNOVATION COMPETITION: **quality innovation** has a positive impact on TS and patent use; **price competition** (low innovation markets) a negative impact on patent use but positive for TS use (early innovators or process innovators?).

H2: LEVEL OF INNOVATION: TS and Patents are used for **market novelties**; only TS is used for **firm novelties** (innovations new to the firm only). **R&D expenditure per employee** increases the use of patents and TS, but the impact on the use of TS is greater.

Econometric analysis: conclusions (2)

H3: TYPE OF INNOVATION: **process** innovation or innovation in **services** relates positively to the use of TS and negatively to the use of patents; **product** innovation positively related to both TS and patent use.

H4: OPEN INNOVATION: **co-operation with other entities** correlates positively with the use of TS and patents for protection of innovations once in the market, especially when the partner is geographically distant.

H5: FINANCIAL CONSTRAINTS: lack of adequate **finance** does not appear to influence the choice between TS and patents.

Econometric analysis: conclusions (3)

Other factors -control variables-

- Trade secret and (especially) patent use positively correlated with the size of company.

- Exporters and firms receiving public funding prefer to use patents over trade secrets, although both sets of companies tend to use both.

- The country of origin of a firm is significant: Finnish firms are the most likely to use trade secrets and German firms most likely to use patents.

- Similar "use" preferences can be detected across industry sectors, as noted in the descriptive results.

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Thank you