

The International Trade in Knowledge

Licensing, Technology Services
Trade and the Role of Intellectual
Property



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The International Trade in Knowledge

- Why is the international trade in technological knowledge of interest?
- Magnitude of this trade
- Forms of the trade in technological knowledge
- Direction of trade in technological knowledge
- Role of Intellectual Property Protection

Why is the international trade
in technological knowledge of
interest?



The impossibility of trading technological knowledge?

- Technology imbued FDI and international licensing dominant modes of technology transfer
- Fear of leakage and IPR protection
- Technology transfer literature
 - Role of absorptive capacity and capability
 - Tacit technology and the limits to contracting

Technology entrepreneurship and new business models

- Large integrated firms are the dominant model of innovation
- IP based licensing became popular in small technology niches
 - biotechnology, software, telecoms
- Mixture of licensing (backed by patents) and customised technology services

Technology services trade trade compare with trade in services in general

- Joint production & burden of proximity
- Arms length export not the only mode of supply . Other modes include
 - movement of customer to country of service provision
 - service through offshore affiliates
 - temporary movement of people to provide the services.

Magnitude of the trade in technological knowledge



Data sources

- Country level data:
 - IMF BoP statistics collated by World bank in their WDI
 - Technology balance of payments by OECD
- Firm level data
 - MERIT/CATI database
 - Thompson SDC

Shares and rates of growth (1999-2009), US \$million

Country Group	1999		2009		Share in 1999		Share in 2009		Avg. annual rate of growth	
	Nominal	Deflated	Nominal	Deflated	Nominal	Deflated	Nominal	Deflated	Nominal	Deflated
All countries										
<i>RLF receipt values</i>	71362.7	72710.52	180514.9	153190.1					9.72	7.74
<i>RLF payment values</i>	74753.99	77373.65	188376.8	153138.6					9.68	7.07
High income countries										
<i>RLF receipt values</i>	70586.82	71959.44	176716.1	151119	98.91	98.97	97.9	98.65	9.61	7.70
<i>RLF payment values</i>	67964.66	70370.91	155881.4	135162.5	90.92	90.95	82.75	88.26	8.66	6.74
Middle income countries										
<i>RLF receipt values</i>	759.8839	736.7714	3765.188	2055.244	1.06	1.01	2.09	1.34	17.36	10.80
<i>RLF payment values</i>	6705.073	6930.979	32428.24	17942.38	8.97	8.96	17.21	11.72	17.07	9.98
Low income countries										
<i>RLF receipt values</i>	15.99409	14.31751	33.6785	15.87138	0.02	0.02	0.019	0.01	7.73	1.04
<i>RLF payment values</i>	84.26246	71.7618	67.09778	33.77832	0.11	0.09	0.04	0.02	-2.25	-7.26

Licensing flows between sectors

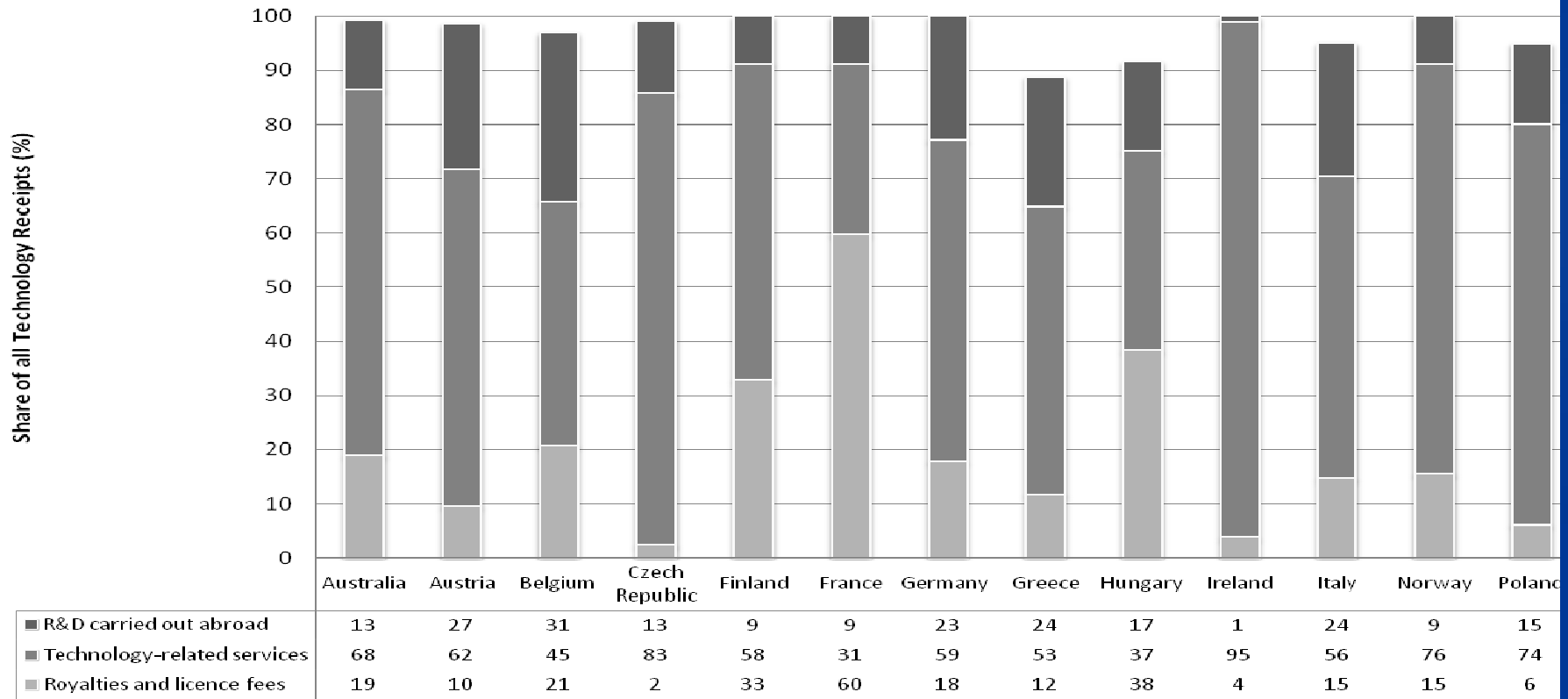
Licensor	Licensee							Sum of agreements
	Drugs	Chemicals	Computers	Electrical/ electronic Equipment	Transport	Instruments	KIBS	
Drugs	64.78	3.65	0.37	0.22	0.07	4.62	11.69	1343
Chemicals	16.85	42.82	1.93	3.31	2.49	4.42	9.39	362
Computers	0.16	1.63	27.08	22.35	3.10	5.55	27.73	613
Electrical/electronic Equipment	0.75	2.13	17.00	46.38	1.00	4.88	20.50	800
Transport	1.96	6.86	7.84	12.75	27.45	5.88	24.51	102
Instruments	18.99	2.79	6.42	10.61	1.68	29.89	13.97	358
KIBS	10.56	2.41	9.81	10.43	1.17	2.65	45.62	1620

Source: Gambardella and Torrisi (2010), Table 4 and Table B.1

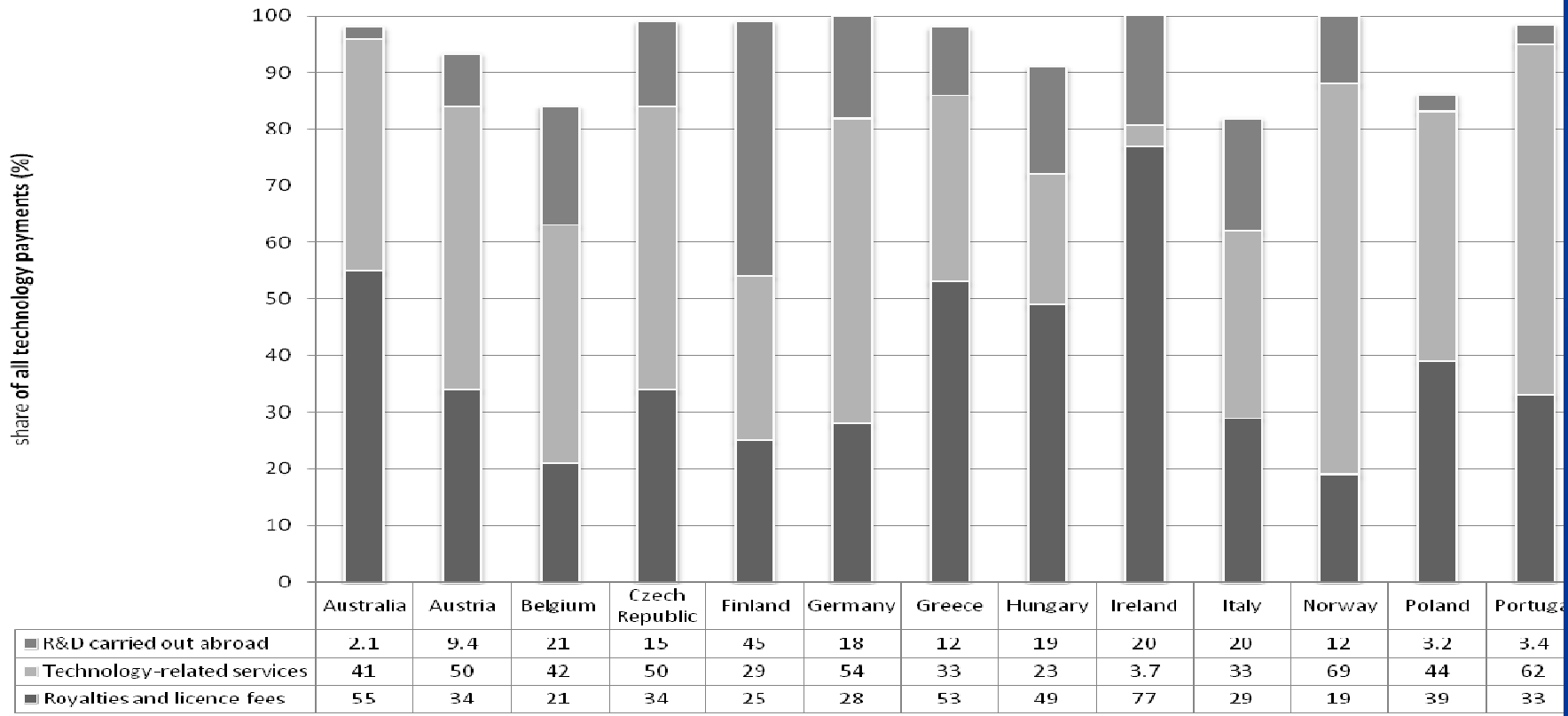
Forms of the trade in Technological knowledge



Different components of the TBP: Technology Receipts



Different components of the TBP: payments



Impact of IPR on the volume of technology trade

	Volume share of Royalty and License fees (RLF)		Volume share of R&D service exports (RD)		Volume share of Technology Related services (TRS)	
IPR (1960-90)	0.446*** (0.06)	0.0137 (0.05)	0.108** (0.05)	0.118*** (0.03)	-0.151** (0.07)	-0.254*** (0.06)
ΔIPR (1990-95)	0.338*** (0.08)	-0.0663 (0.07)	0.0603 (0.07)	0.0624 (0.04)	-0.280*** (0.09)	-0.244*** (0.07)
Country's GDP	-0.250*** (0.04)	-0.0502 (0.03)	0.00534 (0.03)	-0.0327* (0.02)	0.120*** (0.04)	0.174*** (0.04)
Scientific articles	-0.0367** (0.02)	-0.0188 (0.01)	-0.00696 (0.01)	-0.0330*** (0.01)	-0.0604*** (0.02)	-0.0109 (0.02)
RLF (initial period)		0.628*** (0.04)				
RD (initial period)				1.175*** (0.06)		
TRS (initial period)						0.421*** (0.05)
Constant	1.445*** (0.43)	0.824*** (0.30)	-0.222 (0.35)	0.277 (0.20)	0.470 (0.44)	-0.402 (0.40)
R-squared	0.272	0.650	0.094	0.716	0.231	0.431
No. observation	198	198	198	198	198	198

Note: * p<.10; ** p<.05; *** p<.01

Direction of trade in technological knowledge



Direction of trade - Technology receipts

Country (year)	Region of trade (shares in %)					
	North					
	America	EU(15)	EU(25)	Japan	Asia	Others
Australia(2007)	33.4	12.7		1.9	0.2	51.8
Austria(2006)	6.6	56.7		0.3	0.8	35.6
Belgium(2007)	17	68.8		1	0.4	12.9
Czech Republic(2007)	11.4	49.4		0.2	0	38.9
France(2002)	38.7	39.5		8.8	0.4	12.6
Germany(2007)	21.7	38		3.8	1	35.6
Greece(2007)	10.5	51.5		0.3	0	37.7
Hungary (2007)	11.7	56.8		16.1	1.3	14.1
Ireland (2006)		67.5				32.5
Italy (2007)		49.2		1.2		49.5
Japan(2006)	46				2.6	51.5
Poland(2007)	15.9	66.8		0.1	0.1	17.1
Slovak Republic(2005)	19.1	45.1		0.1	0	35.7
Sweden(2007)	18.6	37.6		1.5	0.8	41.4
USA(2006)	10		42.4	13.2	3.3	31.1

Direction of trade- Technology payments

Region of trade (shares in %)

North

Region	America	EU(15)	EU(25)	Japan	Asia	Others
Australia(2007)	46.5	19.4		7.6	0.5	26
Austria(2006)	4.6	74.4		0.6	0.1	20.3
Belgium(2007)	22.6	66.3		2.4	0	8.6
Czech Republic(2007)	7	70.3		6.2	0	16.5
France(2003)	45.6	43.8		2.8	0	7.8
Germany(2007)	26.1	49.7		1.8	0.2	22.3
Greece(2007)	9.9	73.4		0.1	0	16.5
Hungary(2007)	19.7	49.7		5.9	3.3	21.4
Ireland(2007)		28.2				71.8
Italy(2007)		65.3		1		33.6
Japan(2007)	71.8					28.2
Poland(2007)	13.3	70.6		1.5	0.3	14.4
Slovak Republic(2005)	7	49		0.7	0	43.2
Sweden(2007)	35.5	48		1.7	0.2	14.5
USA(2006)	3.8		44.4	29.5	0.2	22

Using firm level data

- Branstetter et. al. (2006) find that IPR reform in 17 countries increased US affiliate transfers to these countries. No effect on unaffiliated transactions
- Athreye et al (2010) control for perceived effectiveness of patenting and find the IPR in destination country is important in explaining the destination of R&D services transfers as well as licensing transfers among unaffiliated firms.

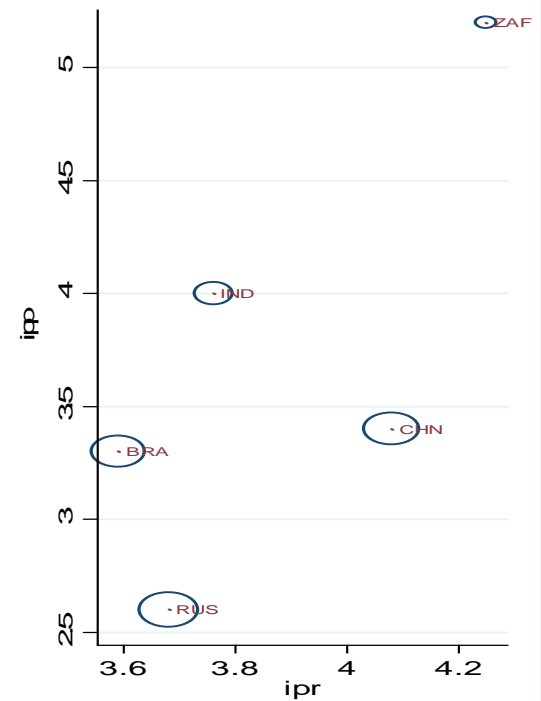
Role of Intellectual Property Protection



Some qualifications

- Intellectual property protection is problematic to measure as
 - it typically evolves with a country's technological capability
 - perceptions of IR vary much more slowly than actual signing up
- The data we have are limited (on cross border licensing) and so its centrality in the literature should be interpreted with caution

IPP and IPR (2007): BRICS



Role of IPR in cross border transactions

- Influences the form of technology service traded in favour of R&D services and licensing which are also higher value-added services
- Strong IPR is crucial in securing the larger value transactions
- Whether IPR is central when we take into account sector-specific elements of the innovative process needs more investigation