
Impact of Intellectual Property Rights on Activity of Cross-Border Mergers and Acquisitions

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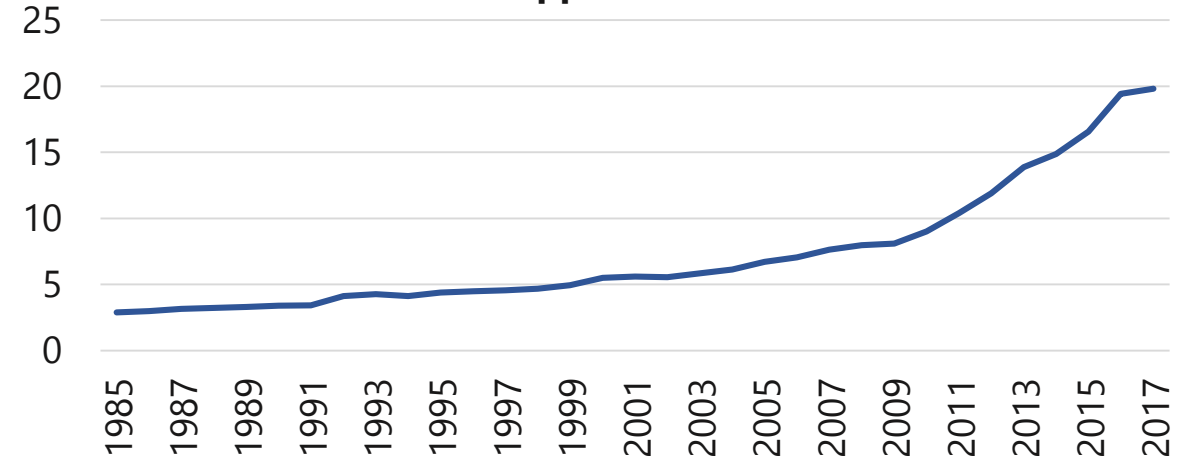
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Introduction

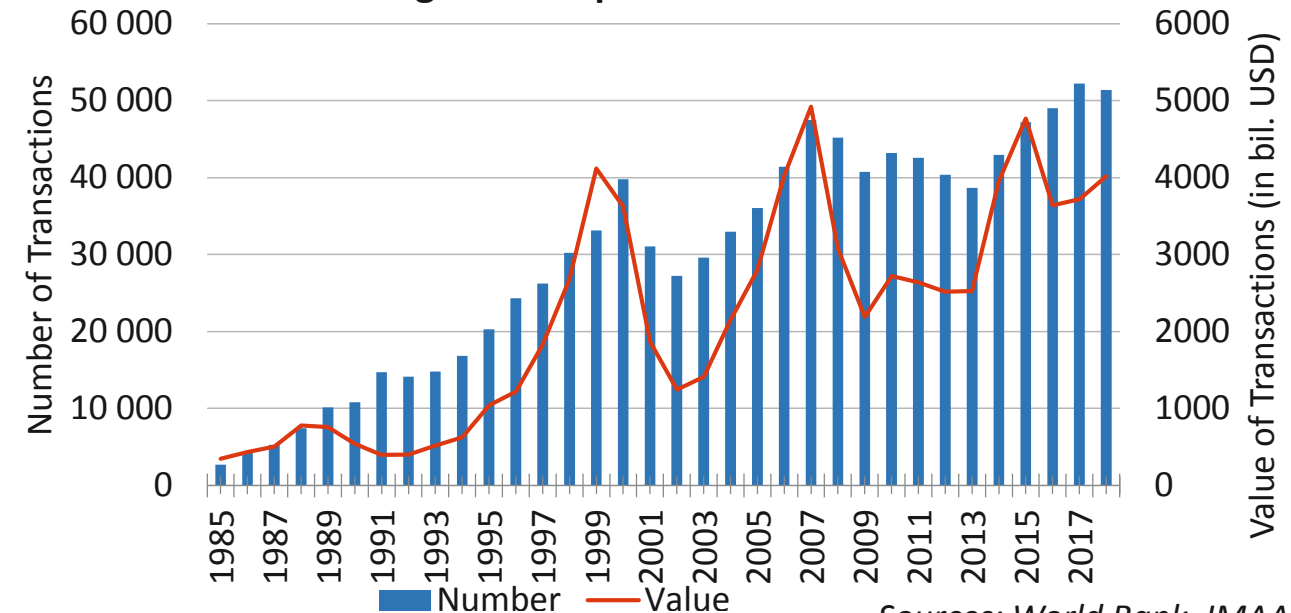
Motivation

- Economies are getting more innovative and international M&A are becoming more tied with intellectual property
- The volume of cross-border M&A has risen dramatically, they became a significant part of FDI
- Intellectual property Rights (IPR) protection is in the center of discussion. It helps to attract foreign acquirers, create channels of technology and knowledge transfer to emerging countries, contribute to their development and reduce the global inequality

Number of Patent Applications Worldwide, mln



Mergers & Acquisitions Worldwide



Sources: World Bank, IMAA

Literature review (1/2)

IPR Protection

- **Developed economies have stronger IPR** Ginarte and Park, 1997
- Country level of R&D, market environment and international integration influence positively on it Hsu and Tiao, 2015
- Multinational agreements help to strengthen IPR in adjacent countries and improve their welfare Klein, 2018
- The Index of Patent Strength developed by Ginarte and Park is the most popular measure of IPR protection Alimov & Officer, 2017; Campi et al., 2019

IPR & Innovations

- Strong IPR stimulates the innovation, knowledge creation and inward diffusion of new technologies, which stimulate more rapid growth in global economy Ginarte and Park, 1997; Branstetter et al., 2006;
- It prevents uncompensated R&D spillovers and allows to capture gains from investments Fan et al., 2013
- It induces productivity growth and manufacture of a big variety of goods with high quality
- Strong IPR allow to keep knowledge secret, so there is a lower ability to use technologies, smaller availability of new cheaper goods, higher transaction costs, and monopoly power without innovations Qian, 2007; Stiglitz, 2008; Ilie, 2014
- **There should be a trade-off, which balances costs and benefits of protection at the optimal level** Helpman, 1993; Allred and Park, 2007; Ilie, 2014
- Emerging economies are smaller and they produce less serious innovations, so the IPR protection should be lower there Grossman and Lai, 2004
- **Higher IPR protection harms the emerging countries, and benefits the developed ones** Diwan & Rodrik, 1991; Helpman, 1993

Literature review (2/2)

IPR & FDI

- **Positive effect of IPR protection on FDI:** it decreases the threat of imitation and provides high returns for the R&D investments Lee and Mansfield 1996; Branstetter et al., 2011; Hsu and Tiao, 2015
- **Negative effect of IPR protection on FDI:** there can be an increase of monopoly power of foreign businesses, they face less competition and may try to maximize profits by reducing output and sales and increasing prices Chin and Grossman, 1988; Helpman, 1993; Javorcik, 2004
- Strong IPR protection encourages foreign investors to establish subsidiaries in technology-intensive and long-life-cycle sectors Nunnenkamp and Spatz, 2004; Javorcik 2004; Bilir, 2014

IPR & M&A

- Highly-valued companies purchase lower-valued ones. Companies from wealthier countries purchase firms from poorer ones Froot & Stein, 1991; Rhodes-Kropf & Viswanathan, 2004
- Countries with civil legal origin, higher investor protection, weak enforcement of insider trading laws, less developed stock markets, better accounting standards and stronger shareholder protection are more attractive for cross-border M&A Qian, 2007; Ferreira et al., 2010; Erel et al., 2012
- Cross-border M&A can generate greater value than domestic deals due to a larger pool of potential partner, greater growth potential, possibility of more efficient distribution systems or improvement of managerial problems, which results in greater synergies Ahern et al., 2015
- **There are more inbound cross-border M&A if a country strengthens IPR**
- **This effect is stronger in the intellectual capital-intensive industries** Alimov and Officer, 2017;
- **This effect is stronger when target country has weaker IPR protection than acquirer** Campi et al., 2019
- **Increase in the Patent index of a target is positively associated with the synergy gains**

Literature gaps & novelty

Literature gaps

- No comparison of the impact of IPR protection on inward cross-border M&A for different countries
- No analysis of costs and benefits of the IPR protection in terms of M&A deals
- Analysis is limited by 2012 due to the lack of updated IP Index information

Novelty

- The impact of IPR protection on inward cross-border M&A is compared in detail for developed and emerging countries
- It is checked if the optimal level of IPR protection in terms of cross-border M&A exists for different countries
- This research covers the period until 2017

Hypotheses

1. IPR protection has a positive impact on inward cross-border M&A:

(Alimov and Officer, 2017; Campi et al., 2019)

2. IPR protection has a stronger positive impact on inward cross-border M&A in the emerging countries than in the developed ones:

(Grossman and Lai, 2004; Ferreira et al., 2010; Hsu and Tiao, 2015; Alimov and Officer, 2017)

3. IPR protection has an optimal level for inward cross-border M&A in the emerging and developed countries:

(Grossman and Lai, 2004; Allred and Park, 2007; Qian, 2007; Stiglitz, 2008; Hsu and Tiao, 2015)

Methodology

OLS panel regressions with fixed effects for years and countries:

$$\begin{aligned} \text{Log c-b deal number}_{tgt,t} = & \alpha + \beta_1 * PI_{tgt,t-1} + \beta_2 * \text{GDP per capita}_{tgt,t-1} + \beta_3 * \text{GDP growth}_{tgt,t-1} + \beta_4 * \text{Trade openness}_{tgt,t-1} + \\ & + \beta_5 * \text{Market return}_{tgt,t-1} + \beta_6 * \text{Financial market dev-t}_{tgt,t-1} + \beta_7 * \text{Credit market dev-t}_{tgt,t-1} + \beta_8 * \text{Exchange rate}_{tgt,t-1} + \\ & + \beta_9 * \text{Log dom. deal number}_{tgt,t-1} + \text{country } FE_{tgt} + \text{year } FE_t + \varepsilon_{k,t} \end{aligned}$$

Variable	Sign	Description	Source
Log c-b Deal Number/ Volume	/	The logarithm of one plus the total number/volume of inbound cross-border M&A deals in a target country	Thomson Reuters
Patent Index	+	PR index with 5-year intervals. Sum of 5 components (extent of coverage, membership in international treaties, duration of protection, absence of restrictions on rights, and statutory enforcement provisions). Ranges from 0 to 5	Ginarte and Park, 1997; Park, 2008; e-mail from Park
IPR Index by Alliance	+	International Property Rights Index developed by the Property Rights Alliance	Property Rights Alliance
GDP per Capita	+	Logarithm of the real GDP per capita	World Bank
GDP Growth	+	Average annual real growth rate of GDP	World Bank
Trade Openness	+	Ratio of imports and exports to the real GDP	World Bank
Market Return	-	Local stock market return	World Bank
Financial Mar. Dev.	+	Total stock market capitalization divided by GDP	World Bank
Credit Mar. Dev.	+	Total amount of private loans divided by GDP	World Bank
Exchange Rate	+	National exchange rate scaled by dollar CPI	World Bank
Log Dom. Deal Number/Volume	+	The logarithm of one plus the total number/volume of domestic deals in a target country	Thomson Reuters

Data and summary statistics

- Databases: Thomson Reuters Eikon database, World Bank
- 64 most active countries in terms of M&A
- Period from 1985 to 2017
- Only M&A
- No country pairs with less than 3 deals
- Both private and public companies
- Deals with disclosed and undisclosed value

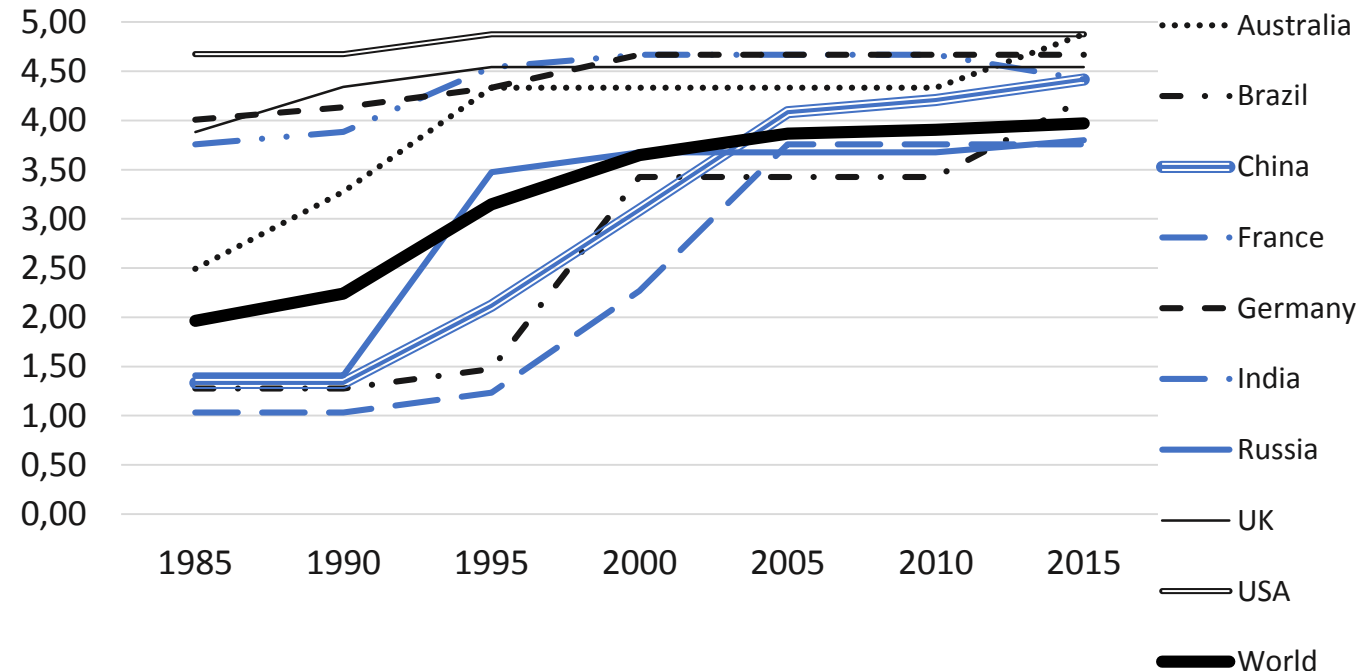


	Inbound	Total
Number of deals	115 905	509 216
Transaction value (\$ trillion)	11.9	41.4
Deal with disclosed value	43%	42%
Acquirer is a public firm	56%	47%
Target is a public firm	5%	6%



- 509 216 M&A deals with the total disclosed value of \$41.4 trillion;
- **of which 115 905 are cross-border inbound deals with value of \$11.9 trillion**

Patent Index



Results

Variables	Model (1): All	Model (2): All	Model (2): Em.	Model (2): Dev.	Model (3a): All	Model (3b): All
	Log C-b Deal Num.					
Patent Index	0.373***	0.216***	0.216***	0.209*	0.215*	0.552**
Patent Index Squared	H1	H2			H3	
Log GDP Per Capita (\$)		0.0400***	0.0495***	0.0261	0.0400***	0.161**
GDP Growth (%)		0.00612	0.00572	-0.00111	0.00612	-0.00669
Trade Openess		8.75e-05	-0.00141	0.000629	8.78e-05	-0.000243
Market Return		-0.000702**	-0.000662*	0.000482	-0.000702**	-0.00115
Financial Mar. Dev.		0.000150	0.000947	-4.39e-05	0.000150	0.000372
Credit Mar. Dev.		8.23e-05	0.000870	0.000315	8.14e-05	0.000501
Exchange Rate		1.65e-05	1.76e-05	0.000389**	1.65e-05	4.62e-05***
Log Dom. Deal Number		0.356***	0.371***	0.276***	0.356***	0.215***
Constant		-0.0815	-0.370***	-0.393**	-0.193	-0.370**
Year FE		Yes	Yes	Yes	Yes	Yes
Country FE		Yes	Yes	Yes	Yes	Yes
Observations		2,048	2,047	1,056	991	2,047
R-squared		0.757	0.817	0.819	0.835	0.817

- If the country from 25th percentile (2.65) of PI were to improve to 75th percentile (4.22), PI would increase by 59.2%
- Coefficient in Model (2) is 0.216, so raise of annual number of inbound cross-border deals is 12.8%
- **Given that the average number of inbound deals is 55, this translates into an increase of 7 inbound M&A deals per year**
- The average volume of 1 inbound M&A deal is \$102.3 mln, so this increase of IPR protection brings \$720.3 mln every year

Robustness checks

1. 3 most active countries in terms of M&A as targets and acquirers are excluded (USA, UK, Germany)
2. M&A activity measured through deals volume and not number
3. Poisson regression
4. Tobit model



The basic conclusions from the empirical analysis are confirmed

Conclusion

Empirical results

- **IPR protection has a positive impact on inward cross-border M&A** because the investors can benefit from owning IP abroad only if it is protected and there is a low risk of its copying or imitation
- Acquirers are likely to be particularly sensitive to IPR protection when they invest in less economically developed countries with weaker legal institutions. Emerging countries have a lower level of IPR protection than the developed ones, so **the marginal increase in IPR protection has a bigger impact for emerging countries**
- **There is an optimal level of IPR protection at the post-TRIPS period**, which balances the costs and the benefits of protection. This level should be lower for emerging countries due to their smaller markets and lower technological abilities

Future research

- The impact of IPR protection on M&A can be checked depending on industries
- The relationship of IPR and M&A should be checked depending on different characteristics of target and acquirer companies
- The connection between IPR and merger gains should be checked
- The probability of cross-border M&A can be researched depending on IPR protection and other new factors

Thank you for attention

Appendixes

Ap. 1: PI by countries

Country	PI: 1985	PI: 2017	PI: aver.	# inb. M&A	# outb. M&A	# dom. M&A	Dev./ Emer.
Argentina	1.54	4.02	2.95	993	165	841	7 547
Australia	2.49	4.88	4.09	4 190	3 126	13 785	32 007
Austria	3.43	4.54	4.17	1 116	1 521	1 108	33 010
Belgium	4.09	4.22	4.48	2 076	1 905	1 606	30 930
Brazil	1.28	4.22	2.73	1 964	359	3 521	5 767
Bulgaria	0.00	4.42	3.11	368	65	346	3 853
Canada	3.16	4.42	4.18	6 770	8 829	18 197	30 942
Chile	2.01	4.42	3.85	655	205	598	7 355
China	1.33	4.42	3.04	3 264	1 580	11 356	2 522
Colombia	0.96	4.42	2.83	489	184	345	3 505
Costa Rica	1.16	4.42	2.56	135	26	47	5 273
Cyprus	2.58	3.48	3.15	241	836	134	18 832
Czech Rep.	0.00	4.42	2.92	1 002	240	1 017	10 263
Denmark	3.63	4.54	4.40	1 947	1 709	2 497	40 466
Ecuador	1.16	4.22	2.88	125	16	39	3 105
Egypt	1.41	4.02	2.37	203	57	176	1 579
Finland	3.31	4.88	4.31	1 492	1 655	3 636	32 875
France	3.76	4.42	4.41	6 410	6 546	15 823	29 400
Germany	4.01	4.67	4.48	9 137	6 756	15 112	31 383
Greece	2.33	3.88	3.79	231	272	626	16 427
Hong Kong	2.70	4.02	3.43	1 830	2 783	2 965	25 754
Hungary	0.00	4.42	3.48	650	107	608	7 468
Iceland	1.67	3.42	2.98	38	199	84	37 478
India	1.03	3.76	2.49	1 351	1 343	3 569	756
Indonesia	0.20	2.77	1.92	702	114	752	1 591
Ireland	2.03	4.33	3.92	1 298	1 826	1 055	34 583
Israel	2.78	3.96	3.52	622	641	467	21 824
Italy	3.68	4.33	4.33	3 391	1 832	5 995	25 856
Japan	3.43	4.67	4.40	882	2 773	17 596	34 607
Kenya	1.58	3.22	2.72	84	37	51	649
Lithuania	0.00	3.88	2.81	255	96	236	6 418
Luxembourg	2.57	3.76	3.68	414	1 144	101	67 001

Country	PI: 1985	PI: 2017	PI: aver.	# inb. M&A	# outb. M&A	# dom. M&A	Dev./ Emer.
Malaysia	1.92	3.23	2.93	805	1 098	6 167	5 568
Malta	1.40	3.23	2.64	61	70	25	13 937
Mauritius	1.73	2.57	2.17	70	110	19	5 186
Mexico	1.02	3.75	2.80	1 305	414	907	6 472
Morocco	1.58	3.75	2.70	99	33	86	1 883
Netherlands	3.77	4.67	4.50	3 753	4 720	4 642	34 110
Nigeria	2.37	3.55	3.34	1 228	500	1 842	23 215
Norway	2.37	2.89	2.70	83	27	136	985
Panama	2.98	4.29	3.90	1 746	1 596	2 834	53 701
Peru	1.34	3.75	2.64	150	93	58	5 945
Philippines	0.59	3.63	2.52	432	82	385	3 050
Poland	2.36	3.88	3.28	272	124	629	1 424
Portugal	0.00	4.00	3.05	1 310	286	1 819	6 669
Romania	1.67	4.08	3.44	676	290	823	14 543
Russia	0.00	4.00	3.07	619	37	294	4 388
Saudi Arabia	1.41	3.80	3.11	1 561	675	8 189	5 594
Singapore	1.33	2.77	2.09	106	130	112	12 655
Slovakia	1.71	4.21	3.57	1 368	2 218	2 094	29 676
South Africa	1.21	3.88	3.00	262	66	118	8 887
South Korea	2.90	3.88	3.52	907	646	2 239	4 408
Spain	2.49	3.93	3.91	601	587	3 278	14 920
Sweden	2.64	4.33	3.94	3 518	1 854	7 216	20 237
Switzerland	3.48	4.54	4.33	3 111	4 068	6 077	37 976
Thailand	3.66	4.54	4.16	2 298	3 574	3 186	52 858
Turkey	1.21	3.23	2.35	389	189	846	3 146
Ukraine	1.20	3.88	3.08	700	153	871	5 986
United Kingdom	0.00	3.88	3.05	598	65	437	1 762
United States	3.88	4.54	4.45	13 404	14 239	38 878	30 575
Uruguay	4.68	4.88	4.83	19 207	28 079	173 634	37 768
Venezuela	1.67	3.23	2.63	149	23	34	7 582
Vietnam	0.92	2.44	2.32	157	45	179	5 288

Ap. 2: Sum. stat. for variables & correlation matrix

Variable	N	Mean	SD	P25	P50	P75
Deal Number	2 112	54.69	108.96	3.00	17.00	54.50
Deal Volume (\$ mln)	2 112	5 628	22 354	15	462	2 979
Patent Index	2 112	3.33	1.13	2.65	3.68	4.22
GDP Per Capita (\$)	2 112	16 753	18 550	2 816	9 663	25 218
GDP Growth (%)	2 112	3.29	3.88	1.42	3.40	5.33
Trade Openess	2 112	75.58	66.74	40.91	59.55	90.30
Market Return	2 112	9.85	32.90	-0.23	0.00	18.60
Financial Mar. Dev.	2 112	49.04	96.13	0.00	24.73	65.68
Credit Mar. Dev.	2 112	74.05	68.65	19.29	57.50	116.09
Exchange Rate	2 112	412.77	2 115.86	1.00	4.00	31.00
Domestic Deals	2 112	185.91	720.08	2.00	17.00	85.00

Variable	Deal Number	Patent Index	GDP Per Cap.	GDP Gr.	Trade Open.	Mark. Ret.	Fin. Dev.	Cred. Dev.	Exch. Rate
Deal Number	1								
Patent Index	0.4424*	1							
GDP Per Cap.	0.4063*	0.5755*	1						
GDP Growth	-0.0653*	-0.0733*	-0.1442*	1					
Trade Openess	-0.0594*	0.1697*	0.2852*	0.1134*	1				
Market Return	-0.0291	-0.0580*	-0.0862*	0.2555*	-0.0554*	1			
Fin. Mar. Dev.	0.1942*	0.2574*	0.2962*	0.0517*	0.4714*	-0.0028	1		
Cred. Mar. Dev.	0.3384*	0.4035*	0.5145*	-0.0976*	0.2195*	-0.1096*	0.3146*	1	
Exchange Rate	-0.0665*	-0.0671*	-0.1421*	0.0994*	0.0360	0.0043	-0.0584*	-0.0327	1
Dom. Deals	0.6185*	0.2779*	0.2528*	-0.0424	-0.1028*	-0.0169	0.1378*	0.3109*	-0.0434*

Ap. 3: Dynamics of the model variables

