

The Cost of Patent Protection

International Renewal Propensity

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(The views expressed here do not necessarily reflect those of the Swiss government or IGE.)

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QUESTIONS FOR DIFFERENT GROUPS

- **Administrator:** If we change the fees by X amount, what happens to our revenue?
- **Economist:** If we change the fees by X amount, is that optimal?
- **Statistician:** If we change the fees by X amount, how does that change the composition and duration of the patent population?

OVERVIEW OF THE LITERATURE

Study	DV	Methods & Data	η (lo, hi)
Adams et al. (1997)	Filings	Univariate ARIMA & multivariate ARDL US applications	[-0.12, +0.13]
Archontopoulos et al. (2007)	Claims	One-off 2004 US claim fee change	[-0.1,-0.2] ¹
de Rassenfosse & van Pottelsberghe de la Potterie (2007)	Filings	First diff rOLS ts-panel for 29 EPC countries in 2003	[-0.45, -0.56]
Harhoff et al. (2009)	“Validations”	Cross-section MLR for 1995, 1999, 2003 EP cohorts	[-0.30,-0.34]
de Rassenfosse & van Pottelsberghe de la Potterie (2009)	Filings	Cross-country rOLS of 34 EPC countries	[-0.5, -0.3]
van Pottelsberghe de la Potterie & Danguy (2009)	Maintenance rate	OLS 15 EPC members, JP, US	[-0.084]
van Pottelsberghe de la Potterie & de Rassenfosse (2012)	Filings	IFGLS, LSDV, GMM & ECM ts-panel for US, JP, EP	[-0.06,-0.12]
Swiss PO internal	Renewal	Event analysis of 2014 fee change for each renewal cohort	[0Y ₂₀ , -0.34Y ₅]
de Rassenfosse (2013)	Quality	Block testing for 1982 US fee change	[+0.01,+0.12]
USPTO (2013)	Renewal	Probit model of renewal propensity	[-0.056,-0.338]
WIPO (2014)	Filing choice	Probit model of PCT or Paris route filing	[-0.014,-0.028]
This study	Renewal	Logit, Poisson, Cox-PH, MMLR ts-panel 46 countries 1980-2013	[0,-0.25]

Adapted and extended from Table 5 of [van Pottelsberghe de la Potterie & Mejer \(2010\)](#)

LOGIC OF FEES

- Administrative logic
- Captured by special interests
- Irregular review

DATA SOURCES

- PATSTAT 2014a 'prs' table (+ Swiss registry for CH)
- Patent office websites for recent fees
- Patent office "Cheat sheets" for recent history
- Original legal texts for ancient history

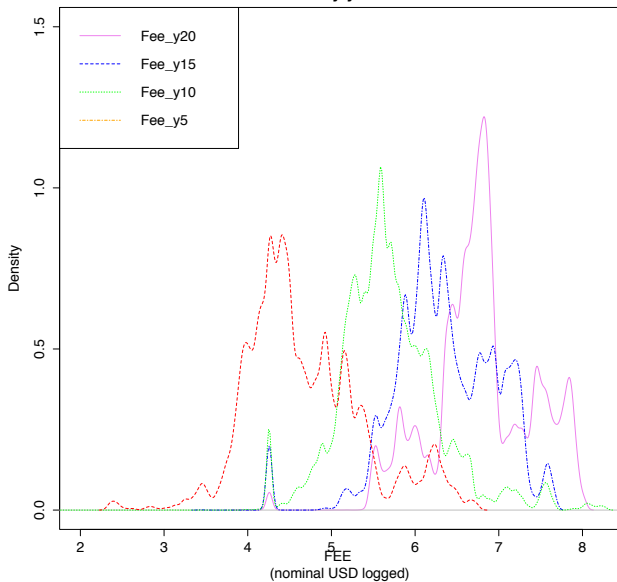
OFICIAL	QUARTA-FEIRA, 17 AGO 1988
2.2.8 - Cancelamento	19,00
2.2.9 - Recursos:	
2.2.9.1 - ao Presidente do INPI	12,50
2.2.9.2 - ao Ministro da Indústria e do Comércio	22,50
2.2.10 - de expedição de Carta Patente	2,00
2.2.11 - de restauração:	
2.2.11.1 - de pedido	5,00
2.2.11.2 - de patente	4,00
2.2.12 - manifestação sobre parecer técnico negativo	7,50
2.3 - Anuidades de Privilégios:	
2.3.1 - de Invenção	
2.3.1.1 - do 3º (terceiro) ao 6º (sexto) ano	7,00
2.3.1.2 - do 7º (sétimo) ao 10º (décimo) ano	16,00
2.3.1.3 - do 11 (décimo primeiro) ao 15º (décimo quinto) ano	21,00
2.3.2 - de Modelo de Utilidade:	
2.3.2.1 - do 3º (terceiro) ao 6º (sexto) ano	4,50
2.3.2.2 - do 7º (sétimo) ao 10º (décimo) ano	11,00
2.3.3 - de Modelo Industrial e Desenho Industrial:	
2.3.3.1 - do 3º (terceiro) ao 6º (sexto) ano	3,00
2.3.3.2 - do 7º (sétimo) ao 10º (décimo) ano	8,00
2.3.4 - com prazo de vigência decorrente de decisão judicial:	
2.3.4.1 - Privilégio de Invenção, a partir do 15º (décimo quinto) ano do depósito	21,00
2.3.4.2 - Modelo de Utilidade, a partir do 10º (décimo) ano do depósito	11,00
2.3.4.3 - Modelo Industrial ou Desenho Industrial, a partir do 10º (décimo) ano do depósito	8,00

COVERAGE

- Currently covers 64 jurisdictions.
- Earliest observation: NZ 1953-09-13
- Limiting factor is registry event data in PATSTAT.

CODING SCHEMA

fee_auth	entryIntoForce	endInForce	feeClass	currency	appln_fee	add_thru_grant	Y1	Y20
AL	2009-09-01	2010-11-29	reg	ALL	7000	6000	4000	50000
AT	1996-01-01	2001-12-31	seeNoteA	ATS	NULL	NULL	0	24000
AT	1996-01-01	2001-12-31	seeNoteB	ATS	NULL	NULL	0	24000
AR	2006-07-12	2010-12-31	reg	ARS	500	500	100	500
AZ	1111-11-11	9999-12-31	reg	AZN	NULL	NULL	0.00	660
AZ	1111-11-11	9999-12-31	individualState	AZN	NULL	NULL	132	
BR	1988-10-16	1989-07-05	BRC	CDR	8.70	12.00	0.00	NULL
BR	1988-10-16	1989-07-05	reg	BRL	0.00	0.00	0.00	NULL
BR	1989-07-06	1993-06-29	BRN	BRN	43.50	120	0.00	NULL
EC	2012-10-23	9999-12-31	reg	USD	2816	1510	1143	20760
KZ	1111-11-11	9999-12-31	individual	KZT	NULL	NULL	5443	42824
KZ	1111-11-11	9999-12-31	disabledRetired	KZT	NULL	NULL	363	2855

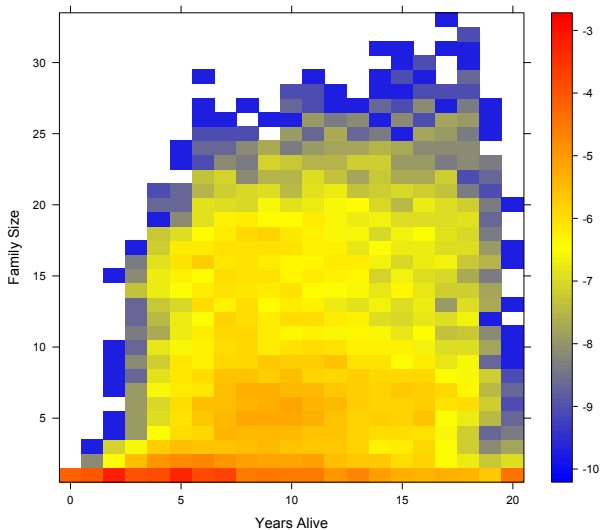
Distribution of Renewal Fees
at key years

TOTAL RENEWAL FEES OVER TIME

	1980			2014			Δ
	total fees	GDP (10^9)	fee/GDP	total fees	GDP (10^9)	fee/GDP	
AT	5892	80	7.36	16718	445	3.76	-0.49
BE	1449	122	1.19	5899	535	1.1	-0.07
CH	3198	113	2.84	9485	694	1.37	-0.52
DE	12660	826	1.53	17901	3876	0.46	-0.7
FR	3676	691	0.53	7574	2886	0.26	-0.51
GB	4002	542	0.74	7691	2828	0.27	-0.63
LU	590	6	9.12	3863	64	6.02	-0.34
SE	4633	131	3.53	8985	580	1.55	-0.56

Fees in nominal 2015 USD.

Patent population density by family size and age



FAMILY EFFECTS

$$\text{Patent} \equiv \ln[\text{textfeesPaid}_j] = \ln[\text{fwCites} + 1] + \text{IPC3} + \text{cohorts}$$

$$\text{Family} \equiv \ln\left[\sum^{\text{Juris}} \text{textfeesPaid}\right] = \ln[\text{fwCites} + 1] + \text{IPC3} + \text{cohorts}$$

$$\text{Multivariate} \equiv [\ln[\text{feesPaid}_{j=DE}] | \ln[\text{feesPaid}_{j=GB}]] = \ln[\text{fwCites} + 1] + \text{IPC3} + \text{cohorts}$$

	Patent	Family	Multi-jurisdiction
	lnFeesPaid		lnFeesPaid{GB,DE}
lnFwCites	0.20	0.28	0.32
seFwCites	0.00	0.00	0.02
lnNumInventors	0.06	0.39	0.29
seNumInventors	0.00	0.00	0.03
cohorts	Not displayed for concision.		
IPC3	Not displayed for concision.		
R2	0.06	0.20	0.06
N	371931	376829	14936

AGE CONDITIONAL RENEWAL FEE ELASTICITIES

Renewal Year	η OLS	seOLS	η Log	seLog	N_jurisdictions	N_cohorts	N_patents
1	0.00	0.00	0.00	0.00	14	26	158234
2	0.01	0.00	0.00	0.00	18	27	251971
5	-0.01	0.00	-0.01	0.00	34	28	1008241
10	-0.14	0.00	-0.13	0.00	43	23	499608
15	-0.13	0.00	-0.14	0.00	40	19	179546
19	0.00	0.00	0.00	0.00	32	14	77574
20	0.02	0.00	0.02	0.00	34	14	64820

Samples conditioned on registry information and non-zero fees.

POISSON LIFESPAN MODEL

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	3.616	0.028	127.261	0.000
ln[totalFees]	-0.139	0.002	-78	0.000
lnGDP10	-0.042	0.002	-22.482	0.000
UNM10	-1.232	0.035	-35.441	0.000
lnPOP10	0.067	0.002	35.205	0.000
ln[fwCites + 1]	0.073	0.001	104.883	0.000
lnNumInventors	0.039	0.001	44.858	0.000
isDomestic	0.016	0.002	6.592	0.000
EP	-0.092	0.002	-50.879	0.000
ln[patent_count]	0.008	0.000	27.591	0.000

Cohort dummies not displayed for concision.

Sector dummies not displayed for concision.

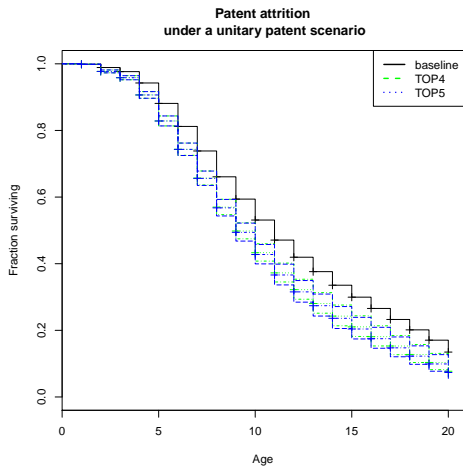
Jurisdiction dummies not displayed for concision.

IPC3 dummies not displayed for concision.

N=487220; fee errors clustered on jurisdiction and cohort.

COX SURVIVAL WITH TIME-VARYING COVARIATES

	coefficient	robust s.e.
ln[FEE]	0.14	0.017
ln[GDP]	0.22	0.025
UNM	2.08	0.208
POP	-0.22	0.023
ln[fwCites + 1]	-0.18	0.003
Jurisdiction	n/a	
IPC1	n/a	
Cohort	n/a	
EP	n/a	
Likelihood ratio: 0.000		
Hazard stratified by jurisdiction, IPC1, cohort, EP		



- Very low fee-elasticity \Rightarrow higher fees.
- No elasticity in early \Rightarrow earlier fees.
- Eliminate differentiated fees.

- tIs969_FEE table for PATSTAT?
- Better patent office forecasting
- Scrubbing and de-trending fee-based effects in patent data
- Global patent valuation and balance of trade (current project)
- ?

Owner (origin)	Prior Nr.	Age	Size	Cites	Fees*	Usage
Syngenta (CH)	CH19850002649	19	23	53	341466	Fungicide
Novartis (CH)	CH19780002865	20	17	16	321060	Hypertension
Ciba-Geigy (CH)	EP19860117098	19	21	21	314876	Blood thinning
AstraZeneca (GB)	GB19920002298	18	32	1	300663	Bacterial infection
Fondarex (CH)	DE19934302798	18	28	15	299822	Injection moulding
Syngenta (CH)	CH19920002315	18	30	76	291096	Insecticide
Asta Medica (DE)	DE19924222910	18	32	1	290180	Autoimmune treatment
GlaxoSmithKline (GB)	GB19920018830	17	33	1	290076	Diabetes treatment
Asta Medica (DE)	DE19924233842	18	31	4	286419	Cancer treatment
Roche (CH)	GB19890027913	18	29	90	277040	Antiviral treatment
Nestl (CH)	EP19920810515	19	25	35	269680	Industrial food cultures
Concast Standard (CH)	CH19920000690	18	23	9	239604	Steel casting

1993 NPV of estimated total renewal fees in 2015 USD using empirical depreciation.