Do Firms Rely on *Big Secrets*?
Analysis of IP Protection Strategies
with the CIS 4 Survey

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IP Protection Choice

Usual determinants of patenting include firm size (R&D effort, reputation), industry, cooperation, competition
Blind, et al. 2006 ; Reitzig, 2004 ; Arundel and Patel, 2003 ; Hall, 2001.

Uncertainties Surrounding IP Rights :

- *Technical* – The protection is narrow and competitors can invent around (Hortsmann et al., 1985)
- *Legal* – The protection is not ironclad until the patent has been tested in court (Lemley and Shapiro, 2005)
  Example : Eli Lilly (Prozac), stock drops by 31% in a single day.
- *Other* – Enforcability is difficult in some countries (China)

IP Protection Choice

The theoretical literature predicts the use of secrecy for large innovations :

- ▶ Langinier (2001) for cumulative innovations
- ▶ Anton and Yao (2004) *Little Patents, Big Secrets* in a broad setting with patent strength

The Data : CIS 4 survey

For empirical investigation, we use the French CIS 4 (2002-2004) survey on firms' innovation practices. 6734 firms, 2270 innovative firms (1643 in product, 1621 in process).

Respondants reports the use, yes or no, of each of seven IP protection methods (patent, secrecy, drawing and design, trademark, copyright, lead time, technical complexity)

We measure the magnitude of an innovation by self-reported variable and the share of revenue from innovative products.

Results
Patent-to-secrecy ratio by industry

Let us first consider the patent-to-secrecy ratio $\rho = \frac{patent}{secrecy+patent}$.

	Brevet (freq.)	Secret (freq.)	Patent-to-secrecy ratio
Textile	.17	.14	.55
Woodwork	.23	.09	.70
Paper Industry	.30	.34	**.47**
Chemical Industry	.37	.40	**.49**
Plastic Industry	.39	.30	.55
Metalwork	.37	.31	.54
Manufacturing (misc.)[1]			.56
Automobile	.30	.17	.63
Furniture	.17	.14	.55
Post and telecommunications	.13	.09	.60

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[1](29 to 33)

Number of innovative industries exhibiting each behavior of the patent-to-secrecy ratio :

	Novelty	Innovative Revenue
		(threshold 10%)
Patent-to-secrecy ratio decreasing with the size of the innovation	7	7
Patent-to-secrecy ratio increasing with the size of the innovation (Intuitive behavior)	14	12

Results
Probit Estimates

	(1) All innovative firms		(2) All innovative firms		(3) Very innovative firms	
	Patent	Secret	Patent	Secret	Patent	Secret
Large innovation	.605***	.435***				
	(.061)	(.060)				
Small innovation	.121**	.135**				
	(.060)	(.060)				
% Innovative sales			.438***	.536***	−.152	.302**
			(.122)	(.122)	(.156)	(.154)
Employees	.043**	.043 **	.045**	.046**	.128**	.156**
	.020	(.019)	(.019)	(.019)	(.048)	(.05)
Revenue	< .001	< .001	< .001	< .001	< .001	< .001
R&D Expenses	.020***	.006**	.020***	.007***	.026***	.006**
	.004	(.002)	(.004)	(.002)	(.006)	(.002)
Cooperation	.343***	.325***	.425***	.379***	.398***	.315***
	(.061)	(.060)	(.059)	(.059)	(.083)	(.082)
Obs	2266		2265		1096	

	(4) Small firms		(5) Large firms	
	Patent	Secret	Patent	Secret
Large innovation	.382	1.151***		
	(.493)	(.419)		
Small innovation	1.802***	.747**		
	(.522)	(.363)		
% Innovative sales			−.619	2.225***
			(.766)	(.705)
Employees	−.056	.042	−.885	−.187
	(.044)	(.030)	(.662)	(.355)
Revenue	.446***	−.124	<.001	<.001
	.145	(.125)		
R&D Expenses	1.054**	.210	.277**	.015
	.513	(.448)	(.101)	(.014)
Cooperation	−.601	.176	−.091	.074
	(.532)	(.401)	(.328)	(.294)
Observations	72		121	

Conclusion

▶ Possibility that the paten-to-secrecy ratio be decreasing with the size of the innovation ; and size of innovation contributing negatively to the decision to patent

▶ In line with the predictions of recent models considering legal uncertainty : patents may fail to represent a secure alternative to secrecy

▶ Policy implications : a patent system reform with "patent menu", offering firms to select certain patents for in-depth review at filing time and enhanced presumption of validity before courts (Encaoua et al, 2006 ; Lemley et al, 2005)

IP Protection Choice
patent/(secret+patent) by size of innovation

	Innovative Revenue[2]	Novelty[3]
Small firms		
very innovative	.42	.53
less innovative	.55	.57
Medium Firms		
very innovative	.47	.50
less innovative	.48	.49
Large Firms		
very innovative	.52	.55
less innovative	.56	.51

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[2] share of innovative product in rev. > 20%, firms with internal R&D only

[3] Variable *newmkt*

IP Protection Choice

Anton and Yao Effect present :

	Novelty	Innovation Revenue threshold : 20%	Declared Effects process innov.
Overall	No		No
Small firms	**Yes**	**Yes**	**Yes**
Medium Firms	No	No	No
Large Firms	No	**Yes**	No

# of industries with a decreasing patent/secret ratio :

	Novelty	Innovative Revenue
		threshold 10%
Anton et Yao Effect	7	7
Intuitif Behavior	14	12

Avec critère de nouveauté : 15 Industries alimentaires, 24 Industrie chimique, 28 Travail des métaux, 29 Fabrication de machines et d'équipements, 33 Fabrication d'instruments médicaux, de précision, d'optique et d'horlogerie, 52 Commerce de détail et réparation d'articles domestiques, 60 Transports terrestres.

Avec critère de CA innovant : 28 Travail des métaux, 31 Fabrication de machines et appareils électriques, 32 Fabrication d'équipements de radio, télévision et communication, 33 Fabrication d'instruments médicaux, de précision, d'optique et d'horlogerie, 36 Fabrication de meubles ; industries diverses, 65 Intermédiation financière, 73 Recherche et développement.