Patents Only Live Twice: A Patent Survival Analysis in Europe*

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Abstract Relying on a comprehensive dataset including detailed information on all patent applications filed to the European Patent Office from 1980 to 2000 and on the renewal of those of them that were granted, this paper presents a survival time analysis of the determinants of patent length in Europe. First of all, they reveal that the increase in the length of patent rights in Europe despite an apparent (but slow) decline in the average grant rate is mainly due to the dilatation of the examination process (significant increase in decision lags) and not only to higher maintenance rates (significant increase in patent renewals). Secondly, filing strategies considerably expand the decision process and by so doing generate uncertainty on the markets, which may be an expected result for some patentees. And thirdly, more important patents (i.e. more cited or with larger family sizes) take more time to be examined, are more likely to be granted, and tend to be renewed for longer periods, providing strong support to the widely spread view of patent renewals as value indicators, and hence reinforcing previous results in van Zeebroeck and van Pottelsberghe (2007). On the contrary, the complexity of patent applications logically induces longer decision lags as well but is associated with lower grant and renewal rates. These results have many policy implications for technology markets, patent systems and all their stakeholders.
Key words patent length, patent value, renewals, granting process, survival time analysis

1 Introduction

A side but detrimental effect of patents may come from the legal uncertainty they may induce. This is because under legal uncertainty, firms have to hedge or avoid the risks of litigation which may result into an underinvestment in the development and commercialization of new inventions around the patented one. This uncertainty induced by patents is essentially enrooted into the difficulty to assess their exact validity and technological coverage (or breadth). This uncertainty is obvious in case a patent application is under review (i.e. pending). Indeed, from the publication of a patent (coming 18 months after its date of priority filing by law) till a final decision is reached concerning its grant, the market is informed that some rights might be granted to someone but is unsure of their exact breadth, geographical scope and legal validity.

What is more, by virtue of the provisions of the European Patent Convention, pending patent applications are enforceable in all European States designated by the applicant at the time the application was filed (Article 67 EPC). Compensation damages could therefore be claimed from potential infringers, at least theoretically. Hence, pending patent applications are somehow enforceable on the market and do therefore impede competition and represent a cost for the consumer, even before they get granted (or not). In addition, this theoretical enforceability may be credible enough to provide a substantial negotiation power to the owner of a pending application. Should the application prove to be ultimately unpatentable and refused for grant by the office, such a bargaining power may have been arguably unfair.

In addition, the examination phase consumes a lot of resources (drafting by patent attorneys, administration processing and examination by qualified experts at the patent office) while it generates limited revenues in compensation for these efforts (the major costs of a European patent come from their validation, translation and renewal in all national offices where protection is sought (see van Pottelsberghe and François, 2006)).

Therefore, the length of the examination procedure represents the amount of time during which there will be a significant uncertainty around each patent application and during which some provisional exclusive rights might be exploited at least as a bargaining instrument. As a matter of fact, statistical

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evidence suggests the granting process is increasingly long at the European Patent Office (EPO) as in other offices around the world. There are also some arguments for believing that patenting strategies – especially in how applicants interact with the patent office and manage their patent filings – may considerably affect the pace and length of their application's processing.

As a consequence, it is critical to assess the effect of these strategies on the examination phase, but also to assess some differences in the effect of patenting practices on the granting process, on the probability of patents to be granted and on the renewal of patents.

Most the empirical literature on patent length and scope has actually focused on simulating value distributions from the costs of patenting in various countries (Putnam, 1996) or the cost of renewing patent rights (Pakes and Schankerman, 1984; Pakes, 1986; Schankerman and Pakes, 1986; Pakes and Simpson, 1989; Lanjouw et al., 1998; Schankerman, 1998; O'Donoghue et al., 1998; Cornelli and Schankerman, 1999) on the basis that rational patentees would only file or maintain patents when the net return on patent rights is expectedly positive.

For lack of detailed information on the extension (or validation) and renewal of patents, together with their characteristics, none of this abundant literature has so far offered a systematic analysis of the determinants of patent length, notwithstanding a few exceptions: in a companion paper (van Zeebroeck and van Pottelsberghe, 2007), we analysed the determinants of the size of European and triadic families and the probability that European patents have been maintained 10 years or more, along with other value indicators. Maurseth (2005) and Svensson (2007) propose two different attempts to model the length of patents using survival time analysis, but are limited to very small samples and sets of explanatory variables.

The present paper contributes to this literature in three respects. First, using an unmatched dataset on European patent applications, their characteristics, outcome, validation and renewal in every European country, it presents a comprehensive analysis of the duration of patents and its determinants. Second, contrarily to most of the literature on patent value, the analysis presented in this paper is not restricted to granted patents but takes all patent applications into account. And third, we evaluate the impact of the many procedural options offered to European patentees in filing and managing their patent applications as well as many additional characteristics of patents on the length of their rights.

To address this research question, a survival time model is estimated over the entire cohort of applications filed to the EPO between 1980 and 2000. In addition, since the duration of patents is conditioned to the procedural events that may occur (refused and withdrawn patents will never be renewed and granted patents revoked in an opposition would lapse immediately as a result of the proceedings), understanding the factors that may affect the chances for a patent to survive the examination procedure or an opposition will bring additional light on the issue of patent length.

The results of this paper are threefold. First of all, they reveal that the increase in the length of patent rights in Europe despite an apparent (but slow) decline in the average grant rate is mainly due to the dilatation of the examination process (significant increase in decision lags) and not only to higher maintenance rates (significant increase in patent renewals). Secondly, filing strategies considerably expand the decision process and by so doing generate uncertainty on the markets, which may be an expected result for some patentees. And thirdly, more important patents (i.e. more cited or with larger family sizes) take more time to be examined, are more likely to be granted, and tend to be renewed for longer periods, providing strong support to the widely spread view of patent renewals as value indicators, and hence reinforcing previous results in van Zeebroeck and van Pottelsberghe (2007). On the contrary, the complexity of patent applications logically induces longer decision lags as well but is associated with lower grant and renewal rates.

The remaining of this paper is organised into 5 sections: section 2 details the institutional framework in which European patents are applied, examined, and eventually maintained. Section 3 synthesizes several developments in patenting strategies in Europe. The empirical model is introduced in Section 4, whereas the results of the econometric estimates are discussed in section 5. Section 6 concludes.

2 Institutional Framework

As depicted in Figure 1, a patent has two distinct lives: a first one that goes from filing to the grant decision – henceforth referred to as the 'provisional' life –, and a second one from the grant decision to the lapse of the patent – henceforth the 'active' or 'post-grant' life. Once granted, however, patents may be opposed within 9 months and are then susceptible of being maintained, amended or revoked.

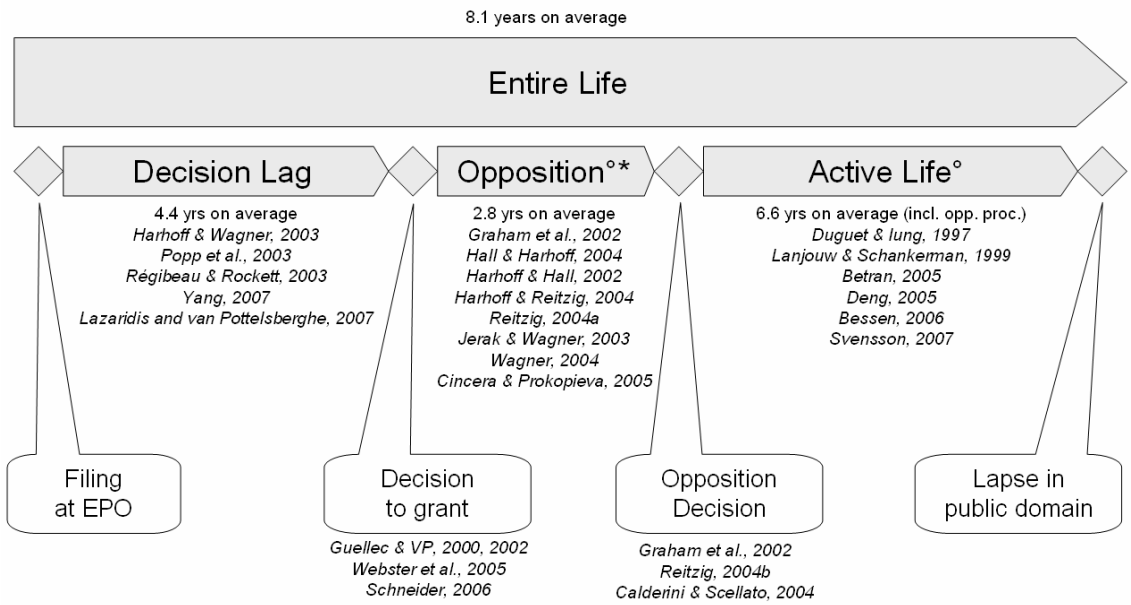


Figure 1 Overview of Institutional Framework and Related Empirical Studies

*° Only for patents granted | * Optionally*

To the best of our knowledge, all empirical studies on the length of patent rights focus either on the provisional life (time to decision) or on the active life (term of maintenance). Papers from the former group include Harhoff and Wagner (2003), Popp et al. (2003), Régibeau and Rockett (2003), and Yang (2007), and aim at understanding the drivers of the time required to examine and grant patents in different offices. The latter group of papers, including Maurseth (2005) and Svensson (2007), focus on the determinants of the renewal of patents as an indicator of patent value. Most these papers, however, rely on small samples of patents.

The main originality of this paper is precisely to compare the effect of different factors on the different pieces of a patent life. Including many potential drivers into a common model to estimate each lag and decision affecting a patent application or grant will allow the identification of variations in the effect of each driver along the life of patents. These different lags and outcomes are schematized in Figure 2.

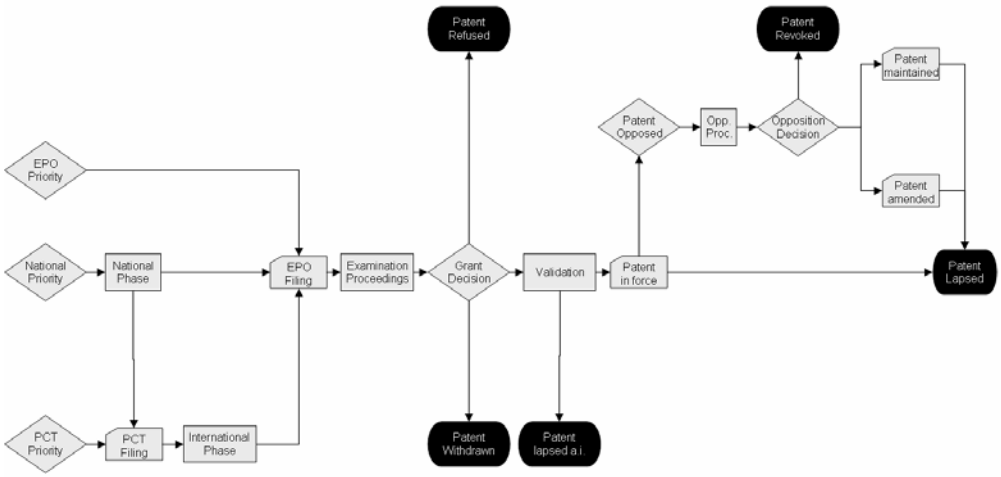


Figure 2 Possible Trajectories of European Patents

Decision lags in particular are crucially important, not only because of the provisional rights conferred to pending applications by the European Patent Convention, but also because the costs incurred during the granting process are very limited compared with the renewal fees needed to maintain a granted patent in many countries, whereas provisional protection may be extended to the entire EPC area for free.[48] As a result, it is often in the interest of patentees to face as long pendency times as possible, especially when they know their chances to get a patent granted to be low or when they would like to enjoy an abusively large scope of protection for the longest possible time.[49]

Once received by the EPO, any patent filing will follow a similar process. No matter the route, it will be searched for relevant prior art (in an attempt to assess the novelty of the claimed invention) and published after 18 months from the date of filing (or as soon as it reaches the office), along with the search report if it has already been produced. Based on the search report, the applicant will decide either to proceed with the examination phase or to withdraw her filing. If requested, the application will then be examined in view of the patentability requirements (inventive step, subject matter). The opinion on the patentability of the invention expressed by the examiner may induce applicants to withdraw their file at some point (see Lazaridis and van Pottelsberghe, 2007), which is the case for about 30% of all applications filed. Another 5% are refused by the examiner (a decision which may be appealed by the applicant), and the remaining 65% are granted. From the latter group, a small fraction (about 5% of all applications) will never be validated in any contracting State, provoking the patent to lapse immediately (*ab initio*).

As mentioned earlier, patents granted by the EPO may be opposed by any third party within 9 months following the notification of the decision. About 6% of EPO patent grants are opposed, and opposition proceedings may lead to the maintenance, amendment or revocation of the patent (each outcome is observed in about one third of the cases).

Applicants who have been granted a patent by the EPO still have to validate them in all European States in which they would like their protection to be enforced. As a consequence, there is no such thing as a European patent per se, but rather a bundle of national patents. This validation step, to be completed within 12 months from the notification of the decision, requires applicants to pay validation fees in each country where protection is desired and to provide a translation of the patent in the national language of each country. Once validated, the applicant will be requested to pay maintenance fees in each State on a regular basis (usually each year). Failure to pay the required renewal fees will provoke the patent to irremediably lapse in the country concerned. The statutory limit of patent rights is 20 years in the EPC area, starting from the date of filing at the EPO.

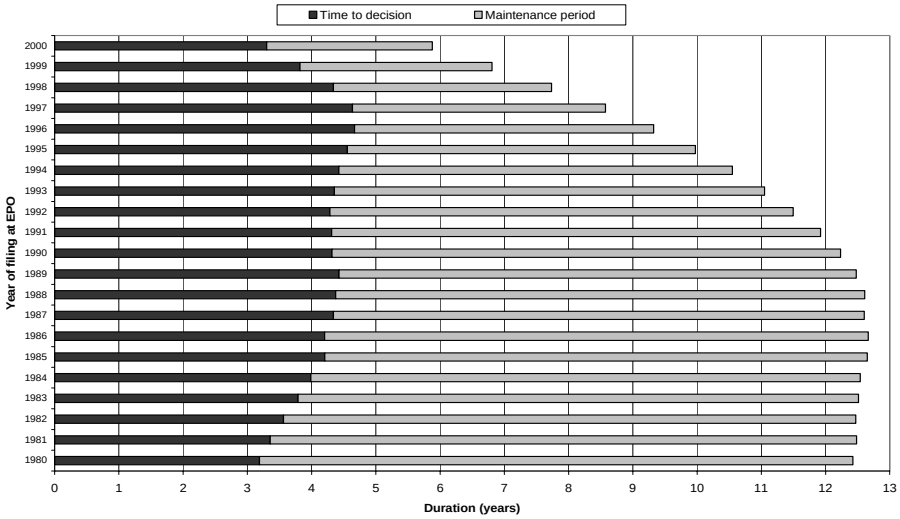


Figure 3 Evolution of EPO Patents Entire Life (from filing to lapse)

[48] As of the 7th designated State onward, all member states of the EPC are automatically deemed to be covered.

[49] It is beyond the scope of this paper to dissert on the optimal duration of the granting process to establish the proper balance between the benefits of a careful examination of patents to maximize the legal certainty and its social costs in terms of potential abusive behaviours. For such a discussion, see Régibeau and Rockett (2003).

Figure 3 presents the breakdown of patent life between granting and maintenance phases and their evolution over time (for granted patents only). Note that the drop in average pendency time in recent years is an artefact due to censoring, as is the maintenance period from the mid-eighties.

This figure however clearly suggests a substantial increase in the average time it takes to reach a decision on a patent application filed to the EPO. From slightly over 3 years on average in the early eighties, the granting process took almost 5 years for patents filed in 1997, a close to 50 percent increase. In addition, record pendency times are increasingly encountered, as attested by Figure 4. This figure exhibits the evolution in the average share of patents filed to the EPO with a time to decision of 10 years or more. From virtually none in the early eighties, such record pendency times represented about 4.5 percent of applications filed in 1995.

Because of censoring, it is of course difficult to precisely assess the extent to which more recent patents are renewed longer, but this may be concluded from the following figure (Figure 5) depicting the share of granted patents from two different cohorts (those filed in the period 1980-1984 and those filed in the period 1990-1994). It clearly appears that the share of patents surviving up to ten years is larger in the second than in the first cohort (from about 50% in the first cohort to about 60% in the second), confirming that patents from the more recent cohort are more likely to be maintained longer.

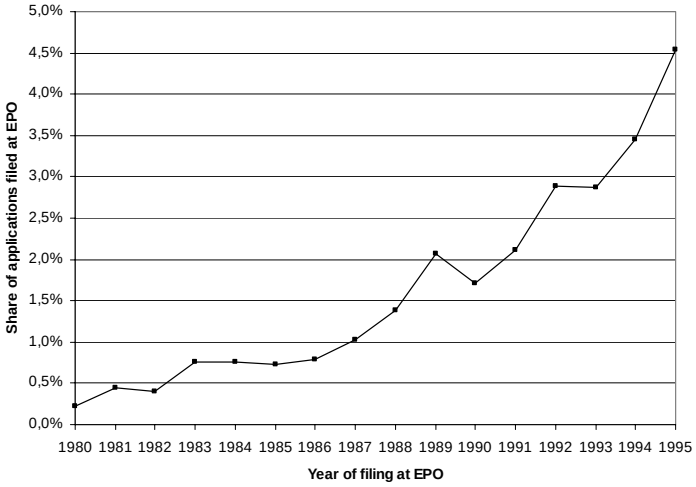


Figure 4 Share of EPO patent Applications Pending 10 Years or more

This also reveals that from the patents filed in the early eighties, only about 14% have reached the statutory term of maintenance. Censoring makes it of course impossible to determine whether this proportion will increase with more recent patents.

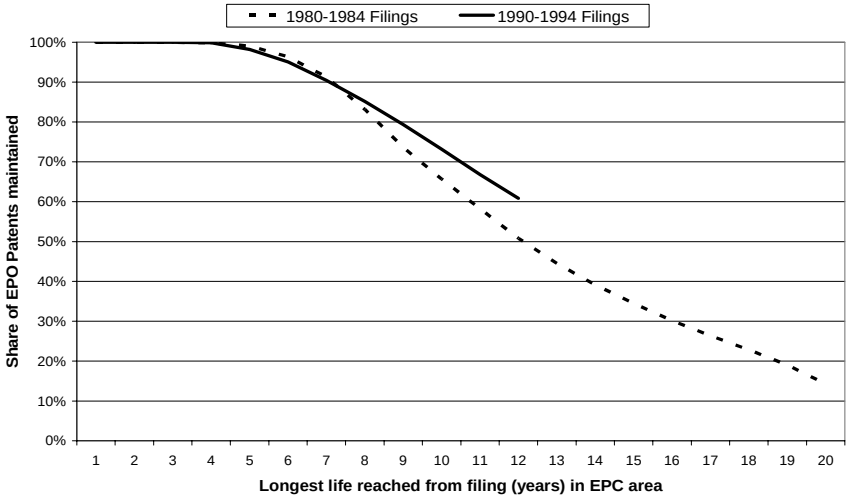


Figure 5 Share of granted Patents Maintained at the end of each year from their Filing Date

3 Patenting strategies at the EPO

The strategies developed and implemented by inventors seeking patent protection in Europe have been significantly developing over the past decades. Described and typified by Stevnsborg and van Pottelsberghe (2007), most these new strategies have been found significantly associated with the value of patents in van Zeebroeck and van Pottelsberghe (2008).

Table 1 Overview of explanatory variables used in econometric estimations

Group	Determinant	Notation
Filing strategies (FS)		
Filing routes	PCT vs. EP Direct	*RTE_PCT*
	Accelerated Search Request	*RTE_ACCSRC*
	Number of legal representatives	*RTE_LEGREP**
Drafting styles	Number of claims in application filed	*DRF_CLAIMS*
	Number of specification pages in application	*DRF_PAGES_DSC**
	Presence of illustrations in the application	*DRF_PAGES_DRW**
	Share of claims lost in examination	*DRF_CLMLS**
	Number of priorities listed in application	*DRF_PRIO*
	Number of EP equivalents	*DRF_EQUIV*
	Application followed by divisionals	*DRF_HASDIV*
	Application is a divisional	*DRF_ISDIV*

(*) Variables not included in main models but only in some complementary specifications

These strategies can be divided into two categories: filing routes and drafting styles, as summarized in Table 1. The first category includes different indications on the route followed by each application to reach the EPO (PCT option (*RTE_PCT*), filing of a request for accelerated search (*RTE_ACCSRC*), number of legal representatives (*RTE_LEGREP*)). The second category is made up of different characteristics of the drafted document as filed: number of claims (*DRF_CLAIMS)*, number specification pages (*DRF_PAGES_DESC*), presence of illustrations in the document filed (*DRF_PAGES_DRAW*), percentage of claims abandoned in the course of the examination proceedings (*DRF_CLMLS*), number of priorities merged to form the application (*DRF_PRIO*), number of EP equivalents (separate EP filings having at least one priority in common, *DRF_EQUIV*), whether the application was split into divisional filings (*DRF_HASDIV*), and whether it is a divisional filing in itself (*DRF_ISDIV*).[50]

Descriptive statistics for all explanatory variables are provided in Table 2. It shows that about 31% of applications filed in the period 1980-2000 were filed through the PCT option, that only 2% of applications have been subject to an accelerated search request, and that the average number of legal representatives solicited by EPO applicants is close to 1 (some firms have in-house agents who represent them in front of the Office, in which case this number should be 0). The average number of claims per application in the sample is slightly over 13 (with a maximum of 592), but 28% of these claims were abandoned on average in patents granted. The average application at EPO contains about 13 pages of specification (with a maximum of about 5500) and 81% of them include at least one illustration. Patent filings have on average one priority filing (zero for EP first filings and up to 136 for second filings), and 0.15 equivalents at the EPO. Finally, 3% of applications are parents of divisionals and a similar share are divisionals (suggesting that parents give on average rise to only 1 divisional filing). The evolution of these variables is presented in Figures A1 to A3 in the appendix.

[50] Note that the two latter variables are mutually exclusive and that parent divisional filings are excluded from the number of EP equivalents.

Table 2 Summary Statistics of Patenting Strategies

Variable	Type	Obs.	Mean	S.D.	Min	Max
Filing routes						
RTE_ACCSRC	Y/N	1189058	0.02	0.13	0.00	1.00
RTE_PCT	Y/N	1189058	0.31	0.46	0.00	1.00
RTE_LEGREP	Discrete	1189058	0.89	0.32	0.00	3.00
RTE_US1ST	Y/N	1189058	0.03	0.16	0.00	1.00
RTE_XUS1ST	Y/N	1189058	0.02	0.13	0.00	1.00
Drafting						
DRF_CLAIMS	Discrete	1188907	13.33	10.81	1.00	592.00
DRF_CLMLS	Continuous	517037	0.28	1.05	-1.00	116.50
DRF_PAGES_DESC	Discrete	1181840	12.71	21.78	0.50	5502.50
DRF_PAGES_DRAW	Y/N	1181840	0.81	0.39	0.00	1.00
DRF_PRIO	Discrete	1189058	1.16	0.87	0.00	136.00
DRF_EQUIV	Discrete	1189058	0.15	0.65	0.00	39.00
DRF_HASDIV	Y/N	1189058	0.03	0.16	0.00	1.00
DRF_ISDIV	Y/N	1189058	0.03	0.16	0.00	1.00

4 Empirical Implementation

In order to assess the impact of filing strategies on the different stages in the life of patent applications, patent life can be subdivided into several periods and decisions: the time to grant (or decision lag), the grant decision itself (i.e. granted or not), the outcome of opposition cases (if applicable), and the post-grant maintenance period (obviously for granted patents only). The empirical strategy consists in evaluating the effect of each explanatory variable on these different lags and decisions. Therefore, a common econometric model has been implemented and tested over several dependent variables: the duration of the examination process (i.e. the time to decision), a dummy variable equal to 1 for granted patents and 0 for refused and withdrawn applications, the period of maintenance (or renewal) of each application, and whether opposed patents survived the opposition or not. In addition, for the sake of robustness and to enlighten the main results on the effect of filing strategies on the examination process, two additional dependent variables will be considered as well: a dummy variable equal to 1 for applications still pending 10 years after their filing date and 0 for all others, and the number of communications exchanged between applicants and the office about each application. This empirical methodology is summarized in Table 3 along with some descriptive statistics for each dependent variable.

Table 3 Descriptive Statistics and Empirical Strategy

Variable	Unit	Obs.	Mean	S.D.	Range	% Cens.	Model
Time to decision	Years	1189058	4.41	1.97	0-20	9%	Cox
Examination >10 years	Y/N	1189058	0.01	0.11	0-1	9%	Probit
# Communications	Discrete	1186556	3.52	2.61	0-31	9%	Poisson
Granted	Y/N	1189058	0.61	0.49	0-1	9%	Probit
Renewal period	Years	671334	6.63	4.02	0-20	45%	Cox
Survived opposition	Y/N	45742	0.27	0.45	0-1	22%	Probit

The dataset used in the empirical implementation is made of all patent applications filed to the EPO between 1980 and 2000, about 1.2 million observations in total. Detailed data on all patent applications were obtained by merging an extraction from the main EPO database kindly provided by the Office and the PATSTAT database (EPO, 2006) with Triadic Patent Families (OECD, 2004). Together, these databases allowed the construction of all grant decision variables (including decision lags) and most explanatory variables. In addition, detailed renewal and lapse data on all European patents from all contracting States (except Italy) were provided by the EPO.

However, measuring the length of each patent right is not as straightforward as it may sound as it depends first on the outcome and second – at least for granted patents – on the geographical scope considered. For refused, withdrawn and revoked applications, this measure is relatively simple: it is a

mere difference between the date of filing and the date of withdrawal, refusal of revocation. For granted patents however, the maintenance period requires some choices to be made as discussed in van Pottelsberghe and van Zeebroeck (2008). European patents may indeed be validated in any contracting State, but from then on split into a set of national patents that will live on their own. Two approaches to this problem are proposed in van Zeebroeck (2007): the Single Renewal Approach (*SRA*) consists in measuring the longest renewal reached in any EPC Contracting State, and the Complete Renewal Approach (*CRA*) consists in observing the shortest common renewal term over a given set of countries. The methodology adopted in this paper corresponds to the former approach (*SRA*), considering that as long as some fees are paid in at least one country, a patent must still carry some expected value to its owner and is still enforceable in some markets.

The three binary dependent variables (pending 10 years or more, granted, survived opposition unamended) are estimated using a probit model. Given its positive integer range of values and following Hausman, Hall and Griliches (1984), the number of communications is estimated with a Poisson model (therefore avoiding to make a strong assumption on the form of its distribution). Finally, the two durations (time to decision and renewal period) will be estimated with the well-known survival time model due to Cox (1979). Due to the very large censoring affecting the data on renewals (some 45% of all observations on renewals are censored), the two latter variables will also be regressed with a tobit-like model in the form of a censored normal regression. In all cases, heteroskedastic-robust standard errors will be reported.

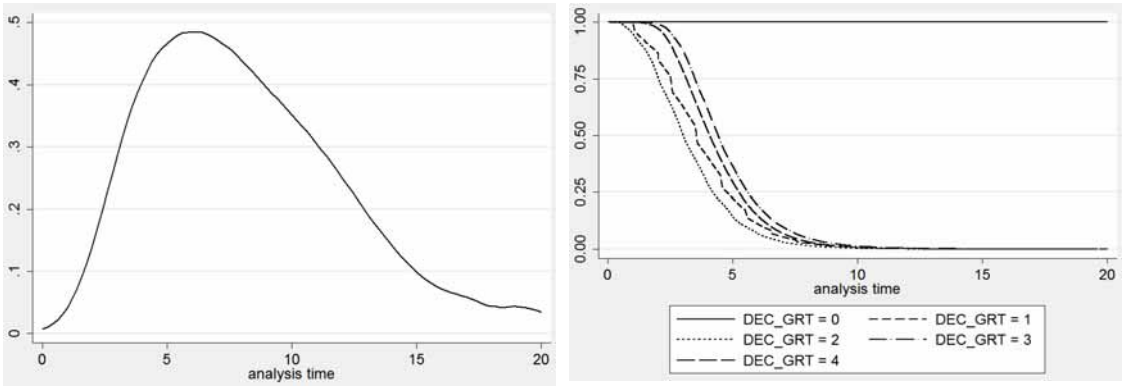


Figure 6 Estimates of the Survival and Hazard Functions (Time to Decision)

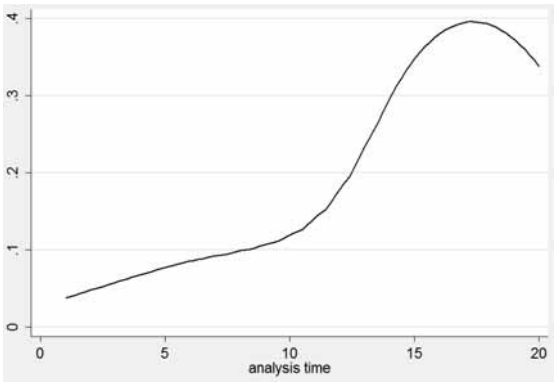
Smoothed Estimate of the Hazard Function *K-M Estimate of the Survival Function by Status (*)*

(*) Legend: 0=Pending, 1=Deemed Withdrawn, 2=Withdrawn, 3=Refused, 4=Granted

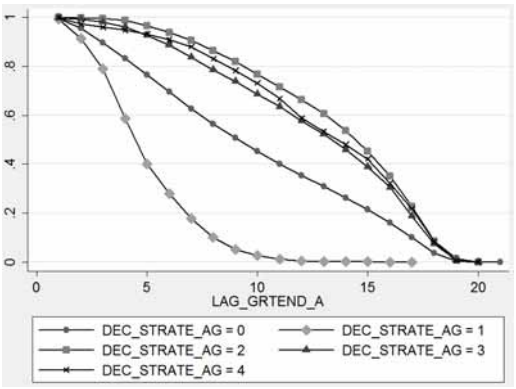
Kaplan-Meier estimates of the survival and hazard functions for the time to decision and maintenance periods are provided in Figures 6 and 7. The Kaplan-Meier estimates presented in Figure 6 shows in particular that the hazard function associated with decision lags strongly increases during the first five years of application (corresponding to the average decision lag), but then strongly decreases until about the 15th year of activity. The upper right chart, exhibits Kaplan-Meier estimates of the survival function by stratum, where each stratum corresponds to a particular decision on the grant. From this figure, it appears that explicit withdrawals are observed faster than deemed withdrawals, which is highly logical (it takes some time before an application can be considered deemed withdrawn). But it seems also that decisions to refuse a file are in fact longer to take than decisions to grant a patent. This result is actually in line with the findings of Lazaridis and van Pottelsberghe (2007). In any case, it appears that after about 10 years, there should remain virtually no applications in the pipeline. Note that the different strata look almost perfectly parallel.

Kaplan-Meier estimates presented in Figure 7 for maintenance periods alone show that the hazard rate is slightly increasing in the first ten years after filing, then surges until the 17th year and finally decreases in the last years before the statutory limit. The upper right chart, exhibiting Kaplan-Meier estimates of the survival function by stratum, where each stratum corresponds to a particular cause of lapse, slightly refine these results. It first shows – as expected – that patents revoked in opposition

almost surely disappear within 10 years (the average grant and opposition lags total about 8 years on average). The survival rate of granted but unopposed patents decreases continuously and quite smoothly throughout the years, but patents opposed and not revoked tend to survive a few years longer than unopposed ones. The effect of opposition outcomes on patent maintenance deserves a closer examination.



Smoothed Estimate of the Hazard Function



K-M Estimate of the Survival Function by Status (*)

Figure 7 Estimates of the Survival and Hazard Functions (Maintenance Period)

(*) Legend: 0=Granted but not opposed, 1=Revoked in opposition, 2=Amended in opposition 3=Maintained in opposition, 4=Opposition pending

A test for differences and trend in the survival function across opposition outcomes is presented in Table 4. This test confirms that the survival functions of patent unopposed, opposed but maintained as such, and amended in opposition are significantly different from each other and that they are increasing in this order. This validates the results from the Kaplan-Meier estimates presented in Figure 7 that patents amended tend to be maintained longer than those that survived an opposition unchanged and those that were not opposed. This result may be quite unexpected as one might have thought that amendments at least sometimes remove some scope of protection from a patent, reducing its value to the owner and the interest of the latter in maintaining the patent. It is nonetheless in line with the commonly accepted view that opposed patents are more valuable than average.

Table 4 Test For Trend in Survival Function over Opposition and Outcomes

Filing Year	**Events observed**	**Events expected**
Patent unopposed	340011	330171.60
Opposition rejected or closed	6771	11093.42
Patent amended in opposition	5617	11133.96
Total	**352399**	**352399.00**
Chi2(2)	5473.54	
P>Chi²	0.00	
Test for trend of survivor functions		
Chi²(1)	5222.93	
P>Chi²	0.00	

Tests for trends in the survival functions for decision lags and maintenance periods, reported in Tables A1 and A2 in the appendix, bring strong support for the assumption that decision lags have considerably increased over the past decades. This result is depicted in Figure 8, where an almost two years difference between the first period (applications filed in 1980-1984) and the latest one (1995-2000) appears. There is also a significant trend in the maintenance of granted patents, which confirms the results presented in van Pottelsberghe and van Zeebroeck (2008) of a propensity to renew patents longer.

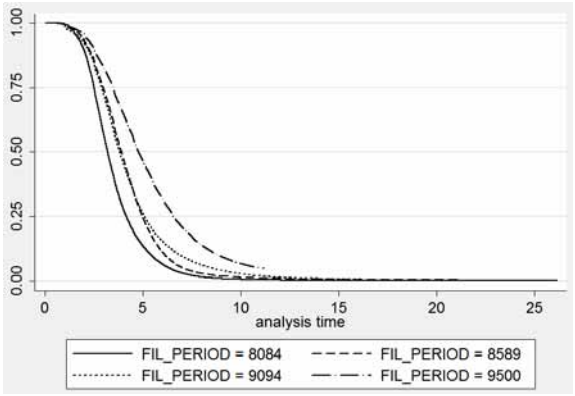


Figure 8 K-M Estimates of the Survival Function by Period of Filing (Time To Decision)

4.1 Explanatory Factors

Next to the filing strategies described in section 3, the model includes different factors that may also have an impact on decision lags, on grant decisions, on renewals, or all. They may be organised into 4 groups: value indicators, complexity indicators, ownership structure, on opposition track record. The variables included in each of these groups are described in Table 5.

The first group is made up of different patent characteristics frequently found in the literature on patent value (see van Zeebroeck and van Pottelsberghe, 2007): whether the application is triadic (i.e. has been filed or granted at the USPTO and the Japanese Patent Office, *IMP_TRIADIC*), the number of forward citations received within 5 years from the date of publication (*IMP_FWDCIT5*), the number of designated States among the 10 initial EPC contracting States (except Italy, *IMP_DSTATES_B10*) and the number of contracting States in which the application was validated (*IMP_VSTATES*) (this latter information is of course only available for granted applications). Table 5 shows that about 56% of all EPO applications are triadic and that they received on average 0.47 citations within 5 years.

The second set of variables denotes the complexity of inventions and includes: the number of citations made to prior patent (*CMP_BPC*) and non patent (*CMP_NPC*) documents (about 4.5 and 1 on average respectively), the number of inventors who contributed to the creation of the invention (*CMP_INV*, 2.33 on average) and the number of IPC classes at four digits (*CMP_IPC4*) associated with the application (about 1.5 on average).

Table 5 Summary Statistics of Potential Explanatory Factors

Variable	Type	Obs.	Mean	S.D.	Min	Max
Value						
IMP_TRIADIC	Y/N	1189058	0.56	0.50	0.00	1.00
IMP_FWDCIT5	Discrete	1187863	0.47	1.10	0.00	70.00
IMP_DSTATES_B10	Discrete	1189058	6.88	2.89	0.00	10.00
IMP_VSTATES	Discrete	671439	5.31	3.31	1.00	18.00
Complexity						
CMP_BPC	Discrete	1137261	4.49	2.90	0.00	125.00
CMP_NPC	Discrete	1137261	0.95	1.81	0.00	170.00
CMP_INV	Discrete	1189058	2.33	1.68	0.00	49.00
CMP_IPC4	Discrete	1184888	1.51	0.78	1.00	13.00
Ownership						
APP_MULTIPLE	Y/N	1189058	0.06	0.24	0.00	1.00
APP_CUMUL	Discrete	1189049	364.22	853.19	0.00	6904.00
APP_OCCAS	Y/N	1189049	0.17	0.37	0.00	1.00
APP_CBOWN	Y/N	1189058	0.10	0.30	0.00	1.00
Opposition Track Record						
OPP_MULTIPLE	Y/N	45742	0.18	0.08	0.00	1.00
OPP_ORALPROC	Y/N	45742	0.45	0.50	0.00	1.00

The third group of explanatory variables allows to account for the ownership structure (co-application (*APP*_MULTIPLE), and cross-border ownership (*APP_CBOWN*) as defined by Guellec and van Pottelsberghe (2000)), and the size of the applicant's portfolio as measured with the cumulated number of applications filed to the EPO by the same applicant over the past 5 years and the current year (*APP_CUMUL*), under deduction of the filing considered (see van Zeebroeck et al., 2006). In case the size of the applicant portfolio is zero, the applicant can be considered as a very inexperienced patentee and an additional dummy variable (*APP_OCCAS*) takes the value 1, which is the case with about 17% of EPO applications.

Finally, the last set of variables only applies to granted patents which were opposed and indicates whether the opposition involved more than one opponent (which is true in about 18% of opposition cases) and whether the opposition case included oral proceedings (they occur in some 45% of all opposition cases). These two factors could be expected to somehow affect the outcome of oppositions.

5 Econometric Results

The main regressions on each dependent variable are reported in Table 6. Detailed estimates, competing risks, models with time-varying covariates and robustness estimates for the decision lags and maintenance periods are provided in the appendix.[51]

5.1 Pre-Grant Life

The results of the estimates of decision lags – provided in the second column of Table 6 – are very close to the estimates of the entire life – though logically more stable across strata – and will thus not be discussed in details. Generally speaking, the factors which lead to longer patent rights are also leading to longer decision lags. More specifically, the PCT option induces much longer decision lags (which may be due to institutional factors as recalled by Harhoff and Wagner (2003)), so do the number of claims (contrarily to Harhoff and Wagner's paper, the number of claims is here significant across all strata) and of EP equivalents. Divisional filings are by far associated with the longest decision lags, which is nonetheless an unavoidable consequence of what they are: subsequent filings issuing from an original application (older by assumption). More valuable patents (triadic or with more forward citations) take longer to get granted, so do patents on more complex inventions. The only striking differences concern the applicant profiles: multiple applicants are now associated with shorter decision lags and inexperienced patentees are now associated with much longer lags.

The fourth column in Table A4 in the appendix presents the results of an additional specification in which four new variables are included: the number of legal representatives, the number of pages in the specification of the patent application, the presence of some illustrations in the document, and the number of designated states. All these variables are significant without affecting the estimates with the preceding covariates, and they do improve the fit of the model very slightly but significantly (according to a likelihood ratio test at the 1% probability level). In particular, the higher the number of legal representatives, the higher the hazard rate (that is, the shorter the decision lag), though this effect is of limited magnitude. On the contrary, the number of specification pages and the presence of drawings do significantly decrease the hazard ratio, that is, they tend to inflate the examination procedure. This is probably due to the extra workload that many pages and illustrations induce for the examiner. Finally, the number of designated states (restricted to the first 10 member States of the EPC except Italy) is also associated with a slightly lower hazard rate. If one considers the number of designated states as indicative of the expected value of the application (for a larger geographical coverage ends up more expensive than a limited coverage), then this result only corroborates the observation – already made by Harhoff and Wagner (2003) as well as in the preceding model – that more valuable patents take more time to be granted.

Overall, the main message from these results is that most filing strategies lead to longer decision lags, suggesting some endogenous behaviour of the applicants as pointed out by Harhoff and Wagner (2003), and suggested by previous results (van Zeebroeck and van Pottelsberghe, 2007) in which we observed that such strategies are associated with higher value patents. In particular, the PCT option, the volume of applications and the recourse to divisional filings induce considerable delays in decision lags – hence much legal uncertainty on the market –, which are probably anticipated if not expected by patentees.

[51] Robustness estimates and alternative specifications are available upon request.

Table 6 Econometric Estimatesof Patent Life

	Time to Decision		Pending 10 yrs		Communications		Granted		Maintenance		Survived Oppos.	
Model	*Cox*		*Probit*		*Poisson*		*Probit*		*Cox*		*Probit*	
Variables	**H.R.**	**z**	**Coef.**	**z**	**Coef.**	**z**	**Coef.**	**z**	**H.R.**	**z**	**Coef.**	**z**
Filing routes												
RTE_ACCSRC	0,94	-7,62 (**)	0,17	6,13 (**)	0,08	17,88 (**)	0,10	9,19 (**)	0,93	-4,58 (**)	0,01	0,11
RTE_PCT	0,82	-75,19 (**)	0,13	10,26 (**)	0,02	15,27 (**)	0,19	53,47 (**)	1,03	6,49 (**)	0,05	2,13 (*)
Drafting												
DRF_CLAIMS	0,99	-65,60 (**)	0,01	17,07 (**)	0,00	24,05 (**)	0,00	-14,40 (**)	1,00	-12,62 (**)	0,01	6,00 (**)
DRF_PRIO	1,00	0,11	0,02	4,24 (**)	0,01	5,30 (**)	0,00	1,30	1,00	-0,36	0,03	2,45 (*)
DRF_EQUIV	0,90	-33,33 (**)	0,15	19,46 (**)	-0,01	-8,75 (**)	-0,04	-15,95 (**)	0,99	-2,48 (*)	0,00	-0,31
DRF_HASDIV	0,64	-68,58 (**)	0,61	34,51 (**)	0,33	122,07 (**)	0,85	75,61 (**)	0,80	-21,04 (**)	0,01	0,32
DRF_ISDIV	0,22	-212,41 (**)	2,09	150,93 (**)	-0,05	-10,31 (**)	0,05	4,26 (**)	0,94	-3,83 (**)	-0,03	-0,45
Importance												
IMP_TRIADIC	0,85	-63,78 (**)	0,19	16,08 (**)	0,24	170,16 (**)	0,65	214,57 (**)	0,85	-42,08 (**)	0,28	17,26 (**)
IMP_FWDCIT5	0,96	-42,89 (**)	0,04	11,52 (**)	0,03	35,73 (**)	0,07	36,50 (**)	0,89	-55,65 (**)	0,02	2,84 (**)
Technical Complexity												
CMP_BPC	0,98	-49,46 (**)	0,01	6,49 (**)	0,01	31,05 (**)	0,00	-6,93 (**)	1,00	-0,06	0,03	10,49 (**)
CMP_NPC	0,96	-61,22 (**)	0,04	12,24 (**)	0,00	11,61 (**)	-0,03	-29,43 (**)	1,00	3,06 (**)	0,04	8,36 (**)
CMP_INV	0,99	-19,72 (**)	0,01	5,48 (**)	0,01	19,35 (**)	0,01	13,07 (**)	0,99	-7,23 (**)	0,00	0,77
CMP_IPC4	0,98	-15,18 (**)	0,05	8,96 (**)	0,01	10,71 (**)	-0,02	-12,31 (**)	1,02	8,07 (**)	-0,03	-2,68 (**)
Applicant Profiles												
APP_MULTIPLE	1,04	7,43 (**)	-0,02	-1,00	-0,02	-6,13 (**)	0,01	2,27 (*)	1,02	2,32 (*)	-0,07	-2,14 (*)
APP_CUMUL	1,00	7,10 (**)	0,00	-4,61 (**)	0,00	-15,79 (**)	0,00	-9,73 (**)	1,00	16,75 (**)	0,00	-4,46 (**)
APP_OCCAS	0,89	-36,66 (**)	0,20	14,56 (**)	-0,03	-13,56 (**)	-0,18	-48,28 (**)	1,11	21,10 (**)	0,06	2,81 (**)
APP_CBOWN	0,94	-16,33 (**)	0,10	5,88 (**)	0,04	20,04 (**)	0,13	27,13 (**)	0,97	-5,01 (**)	0,03	1,22
EPO Joint Clusters (Reference = Organic Chemistry)												
JC-01 - Ind. Chem.	1,12	29,70 (**)	-0,13	-7,63 (**)	0,05	25,80 (**)	0,08	17,10 (**)	1,02	3,03 (**)	-0,11	-5,10 (**)
JC-03 - Polymers	0,91	-24,35 (**)	0,05	3,00 (**)	0,04	19,75 (**)	0,02	5,09 (**)	0,99	-0,90	0,01	0,45
JC-04 - Biotech	0,76	-67,39 (**)	0,47	32,29 (**)	0,00	1,55	-0,23	-44,76 (**)	1,02	2,99 (**)	-0,10	-3,31 (**)
JC-05 - Telecoms	0,58	-98,91 (**)	0,49	24,65 (**)	-0,16	-43,92 (**)	-0,14	-18,48 (**)	0,93	-6,73 (**)	-0,05	-0,86
JC-06 - AV/Media	0,76	-52,53 (**)	0,12	6,01 (**)	-0,08	-24,91 (**)	-0,01	-1,64	0,90	-12,44 (**)	-0,16	-3,14 (**)
JC-07 - Electronics	0,80	-54,41 (**)	-0,11	-5,41 (**)	-0,05	-22,41 (**)	0,00	-0,60	0,99	-0,91	0,02	0,50
JC-08 - Electricity	0,88	-33,81 (**)	0,13	7,77 (**)	-0,11	-51,19 (**)	-0,04	-8,48 (**)	1,01	1,12	-0,05	-1,76
JC-09 - Computers	0,65	-76,39 (**)	0,26	12,38 (**)	-0,07	-17,70 (**)	-0,11	-15,51 (**)	0,96	-3,87 (**)	-0,12	-2,26 (*)
JC-10 - Optics	0,91	-23,84 (**)	-0,10	-6,66 (**)	-0,08	-36,70 (**)	0,03	6,82 (**)	1,00	-0,52	0,03	1,08
JC-11 - Handling	1,19	46,71 (**)	-0,33	-14,49 (**)	-0,05	-25,69 (**)	0,09	20,31 (**)	0,97	-5,83 (**)	0,10	4,31 (**)
JC-12 - Vehicles	1,21	46,31 (**)	-0,36	-12,47 (**)	-0,04	-21,17 (**)	0,18	36,59 (**)	0,91	-15,25 (**)	0,14	5,18 (**)
JC-13 - Civil Eng.	1,11	22,98 (**)	-0,35	-11,87 (**)	-0,03	-13,25 (**)	0,14	26,28 (**)	0,94	-9,62 (**)	0,17	6,31 (**)
JC-14 - Human Nec.	1,03	6,55 (**)	-0,14	-8,03 (**)	-0,07	-32,57 (**)	0,05	11,36 (**)	0,92	-13,78 (**)	0,17	6,83 (**)
Country of residence of applicants (Reference = France)												
AT	0,99	-0,86	-0,10	-1,36	-0,01	-2,06 (*)	0,01	0,78	1,06	3,52 (**)	-0,04	-0,72
AU	0,54	-50,35 (**)	0,27	5,66 (**)	-0,11	-11,31 (**)	-0,69	-39,91 (**)	1,17	6,19 (**)	-0,15	-1,18
BE	0,84	-14,02 (**)	0,15	2,83 (**)	-0,05	-7,84 (**)	-0,18	-13,31 (**)	1,04	2,08 (*)	0,09	1,23

Model	Time to Decision *Cox*		Pending 10 yrs *Probit*		Communications *Poisson*		Granted *Probit*		Maintenance *Cox*		Survived Oppos. *Probit*	
Variables	**H.R.**	**z**	**Coef.**	**z**	**Coef.**	**z**	**Coef.**	**z**	**H.R.**	**z**	**Coef.**	**z**
CA	0,80	-20,58 (**)	-0,02	-0,47	-0,04	-6,76 (**)	-0,36	-26,06 (**)	1,17	8,28 (**)	-0,23	-2,65 (**)
CH	0,90	-14,43 (**)	-0,01	-0,23	-0,05	-13,08 (**)	-0,15	-18,24 (**)	1,04	4,31 (**)	-0,02	-0,49
DE	0,93	-14,67 (**)	-0,03	-1,21	0,00	0,53	0,00	-0,30	1,02	3,42 (**)	0,04	1,51
DK	0,76	-17,66 (**)	0,18	3,28 (**)	-0,02	-2,46 (*)	-0,08	-4,36 (**)	0,92	-3,14 (**)	0,11	1,36
ES	0,80	-14,02 (**)	-0,27	-2,09 (*)	-0,08	-7,50 (**)	-0,37	-18,94 (**)	1,24	6,86 (**)	0,17	1,12
FI	0,64	-41,99 (**)	-0,04	-0,67	0,01	1,79	-0,10	-6,05 (**)	0,91	-3,62 (**)	0,01	0,12
GB	0,83	-30,84 (**)	0,02	0,78	-0,06	-18,52 (**)	-0,39	-57,37 (**)	1,12	12,99 (**)	-0,19	-5,41 (**)
IL	0,74	-16,89 (**)	0,11	1,57	-0,17	-13,01 (**)	-0,62	-28,54 (**)	1,37	8,74 (**)	-0,01	-0,03
IT	0,81	-30,15 (**)	-0,07	-1,62	-0,04	-10,06 (**)	-0,19	-23,52 (**)	1,14	12,33 (**)	0,04	0,83
JP	0,60	-103,37 (**)	0,06	2,78 (**)	0,02	9,48 (**)	-0,13	-22,65 (**)	0,97	-4,30 (**)	-0,03	-0,94
KR	0,68	-25,21 (**)	0,07	0,78	-0,07	-6,94 (**)	-0,42	-19,25 (**)	1,01	0,28	-0,17	-0,74
NL	0,85	-22,75 (**)	0,00	-0,03	-0,03	-7,73 (**)	-0,17	-19,96 (**)	1,17	16,63 (**)	-0,06	-1,43
SE	0,75	-33,22 (**)	-0,05	-1,26	-0,10	-18,71 (**)	-0,39	-37,98 (**)	1,28	16,96 (**)	-0,12	-1,77
US	0,69	-44,57 (**)	0,09	2,04 (*)	-0,05	-11,81 (**)	-0,21	-18,32 (**)	0,92	-6,16 (**)	-0,11	-2,03 (*)
RoW	0,66	-89,86 (**)	0,11	5,77 (**)	-0,09	-40,01 (**)	-0,58	-109,27 (**)	1,14	21,38 (**)	-0,25	-8,59 (**)
Time dummies (Reference = 1990)												
1980	1,82	44,85 (**)	-0,24	-4,16 (**)	-0,27	-51,15 (**)	0,21	17,97 (**)	1,11	11,12 (**)	-0,23	-4,82 (**)
1981	1,56	39,61 (**)	-0,08	-1,95	-0,37	-71,30 (**)	0,18	17,37 (**)	1,15	15,10 (**)	-0,20	-4,66 (**)
1982	1,34	30,47 (**)	-0,17	-4,08 (**)	-0,34	-71,19 (**)	0,20	19,23 (**)	1,20	20,31 (**)	-0,15	-3,70 (**)
1983	1,12	12,94 (**)	0,01	0,31	-0,27	-61,30 (**)	0,18	18,70 (**)	1,24	24,32 (**)	-0,11	-2,71 (**)
1984	0,99	-0,84	-0,01	-0,46	-0,36	-84,12 (**)	0,13	14,03 (**)	1,29	30,20 (**)	-0,02	-0,54
1985	0,90	-14,74 (**)	-0,08	-2,68 (**)	-0,34	-80,25 (**)	0,11	11,78 (**)	1,35	36,03 (**)	-0,02	-0,51
1986	0,90	-14,21 (**)	-0,09	-3,03 (**)	-0,30	-71,16 (**)	0,07	7,93 (**)	1,11	11,08 (**)	-0,02	-0,50
1987	0,87	-20,14 (**)	-0,10	-3,55 (**)	-0,21	-51,82 (**)	0,01	0,85	1,10	10,47 (**)	-0,02	-0,51
1988	0,89	-18,40 (**)	-0,06	-2,32 (*)	-0,12	-33,10 (**)	-0,04	-4,65 (**)	1,08	8,46 (**)	-0,01	-0,17
1989	0,91	-14,72 (**)	0,06	2,34 (*)	-0,04	-11,83 (**)	-0,07	-8,89 (**)	1,05	5,59 (**)	-0,01	-0,13
1991	1,03	4,14 (**)	0,07	3,33 (**)	0,01	2,15 (*)	0,06	7,18 (**)	0,96	-4,85 (**)	-0,03	-0,89
1992	1,03	4,27 (**)	0,21	10,06 (**)	-0,01	-2,64 (**)	0,03	3,77 (**)	0,93	-7,78 (**)	-0,04	-1,08
1993	0,96	-6,63 (**)	0,11	5,28 (**)	-0,01	-3,81 (**)	0,04	5,53 (**)	0,90	-10,73 (**)	-0,05	-1,12
1994	0,86	-22,76 (**)	0,20	9,65 (**)	-0,02	-7,92 (**)	0,02	2,85 (**)	0,86	-14,79 (**)	-0,06	-1,56
1995	0,75	-44,33 (**)	0,34	16,57 (**)	-0,05	-16,73 (**)	-0,02	-2,46 (*)	0,83	-17,50 (**)	-0,09	-2,01 (*)
1996	0,68	-64,29 (**)			-0,08	-24,67 (**)	-0,08	-9,74 (**)	0,80	-19,14 (**)	-0,09	-1,96
1997	0,66	-71,39 (**)			-0,13	-41,33 (**)	-0,14	-18,99 (**)	0,74	-22,77 (**)	-0,17	-3,21 (**)
1998	0,74	-54,13 (**)			-0,20	-60,59 (**)	-0,21	-27,49 (**)	0,69	-23,53 (**)	-0,17	-2,74 (**)
1999	0,94	-11,12 (**)			-0,25	-73,06 (**)	-0,23	-30,39 (**)	0,73	-17,67 (**)	-0,21	-2,72 (**)
2000	1,29	44,29 (**)			-0,30	-81,29 (**)	-0,20	-25,87 (**)	0,80	-11,04 (**)	-0,49	-4,61 (**)
Model												
# Subjects / Observations	1134856		704758		1039608		1039622		647426		34512	
# Failures / Pseudo-R²	1039618		0,37		0,04		0,08		347552		0,03	
Log pseudolikelihood	-12279390		-41014		-2392439		-603310		-4208305		-21167	
Wald chi²[65] (P>chi²)	206 417 (0,00)		36 914 (0,00)		154 849 (0,00)		99 175 (0,00)		20 615 (0,00)		1 159 (0,00)	

All z-statistics based on heteroskedastic-robust standard errors

This result is reinforced by an alternative estimation in which the dependent variable – instead of the decision lag itself – is a dummy variable equal to 1 if the granting process exceeded 10 years and 0 otherwise. This variable is estimated with a probit regression over a sample limited to applications filed up to 1995 and the results are reported in the third column of Table 6.[52] These results widely confirm those from previous estimates and clearly establish that the most significant factor associated with abnormally long pending times is to be a divisional filing. The other factors inducing longer decision lags (routes, drafting, value and complexity) also increase the probability to be pending for more than 10 years, but to a much smaller extent than divisionals. In other words, if one wants the process to last for an outrageously long period of time, the best thing to do is clearly to file divisionals, over several generations if needed. This is not to state that all divisional filings are purely aimed at postponing the decision on a given application, but rather that it is the most efficient way to do it should someone be willing to. Given the numerous reasons applicants may have to slow the granting process down (see section 1), one may reasonably argue that there must indeed be some cases of endogenous behaviours of applicants to file divisionals with the aim to maintain the application undecided in the process. In fact, 43% of the applications which remained pending for 10 years or more are divisional filings (against barely 3% in the overall dataset).

One of the consequences from very long pendency times is that it makes the validation of patents much less profitable given the very short time span left to enjoy the monopolistic power granted by the patent until the statutory term. This translates into 5 times as high a proportion of non validated granted patents (lapses ab initio) than for applications with normal decision lags (20% of lapses ab initio against about 4% for patents with standard decision lags), despite similar granting rates. Note that this might also be a sign that some applicants found the provisional protection entitled by a pending patent sufficient and financially highly attractive, and hence deliberately used divisional applications to maintain this provisional protection for as long as possible. In addition, within applications with over 10 years decision lags, more than 6% have been refused, which is twice as much as for standard applications. Now one could arguably question the legitimacy of the provisional protection enjoyed by some applicants who used divisionals to maintain their file pending for more than 10 years and end up with the patent being refused by the Office, meaning that the patentability requirements were not met in the first place.

Harhoff and Wagner also point out the impact of the workload at the EPO (in terms of the number of pending applications per examiner) in increasing decision lags, which the model presented here does not account for (though this latent variable is probably partly captured by the joint cluster dummies, which correspond to the different examining divisions at the Office). Besides, the present model provides an idea on the factors which increase the length of the examination process, but does not model the intensity of this process in terms of communications between applicants and examiners. Therefore, we use a similar model to estimate the number of communications exchanged during the examination phase as a measure of the intensity of the process according to the same characteristics of applications. This information has been considered by Lazaridis and van Pottelsberghe (2007) in their analysis of the 'induced' withdrawals and appeared as positively affected by the number of claims in an application.

Given the count nature of the endogenous variable, a Poisson regression is used, whose results are reported in the fourth column of Table 6.[53] Generally speaking, these results suggest that the factors inducing longer decision lags also induce more communications exchanged. A few exceptions are worth being stressed out: the number of legal representatives, which had a small negative impact on decision lags, has a strongly positive impact on the number of communications. Conversely, specification pages and illustrations are associated with longer decision lags but with actually much less communications. Whereas parents of divisionals are huge inducers of communications, their derived divisional filings are associated with less communications. This suggests that divisionals take a considerable time to be issued but are actually easier to process, or that they are just a convenient device to postpone the final grant decision. Finally, inexperienced patentees are associated with slightly longer decision lags, but in fact with less communications, which may be a sign that they are less reactive during the granting process.

5.2 Grant Decisions

Overall, since most explanatory factors considered increase both the overall life expectancy of patent applications and their time to decision, the next question is whether they also increase their post-grant active life. Prior to examining this question, one should recall that only granted patents may

[52] Robustness estimates and alternative specifications are available upon request.
[53] Robustness estimates and alternative specifications are available upon request.

be validated and maintained. Therefore, longer patents on average might simply come from higher grant rates. This is why the same model is applied to estimate the probability for each patent application to get granted.

Some empirical analyses of the like have been conducted in recent years, from the pioneering work by Guellec and van Pottelsberghe (2000, 2002). In their first paper, the authors found that the PCT route, technological diversity, domestic and international R&D collaborations and/or co-applications, and the mix of designated states for protection increase the probability for patents to be granted. In their companion paper (2002), the authors refined their earlier findings by showing that the geographical and technological specificities of filing strategies also influence the likelihood of grant. Using a matched sample of 70,000 non-PCT triadic applications, Webster et al. (2007) examine grant outcomes at the trilateral offices with a multinomial logit model. They show that application outcomes do vary systematically across all three patent offices and in particular, that the geographical origin of patent applications has a strong effect on the outcome of decisions at the JPO and, to a lesser extent, the EPO. Finally, Schneider (2006) analyzes the determinants of grant decisions on patents applied for by Danish firms at the EPO and observes that the size and grant rate of the patent portfolio of the applicant increases the likelihood to reach the examination phase, that quality measures of patents and the PCT route are also associated with higher grant likelihoods.

The model presented in the fifth column of Table 6 estimates the influence of filing strategy variables on grant decisions.[54] These econometric results bring some nuances to the preceding observations on the determinants of longer or more intense granting procedures. The route variables and value indicators are positively associated with the probability to get granted, but drafting options for instance are more balanced: the number of claims, often seen as a value determinant in the literature (Tong and Frame, 1994; Graham et al., 2002; Harhoff and Hall, 2002; Harhoff and Reitzig, 2004; Gambardella et al., 2006) is in fact associated with a slightly smaller probability to be granted. The same applies with the number of pages in the specification, but illustrations slightly increase the probability of a positive outcome. The number of priorities is non significant in the first specification (and slightly positive in another one), but the number of equivalents negatively affects grant decisions. On the contrary, parents of divisionals are much more likely to be granted (one of the most significant parameters in the model), but divisional filings themselves are only associated with a very small positive contribution. This suggests that the main – and supposedly the most valuable – substance from the original application remains in the parent filing whereas minor or surrounding inventions are spread into divisionals. Triadic applications are much more likely to be granted (by far the most significant parameter in the model), and forward citations received are also associated with a higher grant rate, suggesting that more valuable patent applications are more likely to pass the examination successfully. However, the number of designated states is in fact reducing the chance of positive outcomes, suggesting that a larger expected geographical scope of protection is not necessarily associated with higher quality applications. This may also be related with the possibility offered by the Office to designate many countries at no cost, which renders the designated scope of coverage a lousy approximation of the actual cost the patentee would be ready to incur to obtain and maintain a large scope of protection.

Complexity indicators also provide very striking results. Indeed, most complexity indicators (backward patent and non patent citations, IPC classes) are associated with lower grant rates. In a sense, this result may not be so surprising. Indeed, the number of backward citations – usually seen as a sign of cumulative inventions – denotes in the first place the presence of potentially killing prior art, at least susceptible of reducing the patentable scope of protection claimed for. And a high number of IPC classes, related with the technological scope of protection desired (Lerner, 1994) and sometimes indicative of more architectural inventions (see van Zeebroeck et al., 2006), may also provide advanced notice of a potential lack of unity in the application. On the contrary, the number of inventors is always associated with higher grant rates. Brusoni et al. (2006) have emphasized that this variable may actually be essentially related with the size of the inventing firm as larger teams of inventors are typical of the organisation of research activities within large firms. In this sense, it may sound quite logical that large firms – supposedly better advised – tend to file patent applications which are more likely to meet the patentability requirements. Though, in the alternative view proposed in van Zeebroeck et al. (2006) that a larger team of inventors involves a larger set of skills and expertise, this result may be seen as a confirmation that inventions developed by such teams lead to patents of a higher quality.

[54] Robustness estimates and alternative specifications are available upon request.

Finally, in terms of applicant profiles, co-application does not seem to affect probabilities of grant but cross-border ownership – as observed by Guellec and van Pottelsberghe (2000, 2002) – does increase them. However, contrarily to Schneider (2006)'s findings, the cumulative size of the applicant portfolio has a small negative effect on grant rates (though Schneider accounted for the historical grant rate of applicants instead of sheer portfolio sizes as is the case here), and inexperienced patentees (identified by the *APP_OCCAS* dummy variable) are associated with much lower grant rates.

Note also that – consistently with Guellec and van Pottelsberghe (2002) – the present results highlight very large differences across countries and industries. In particular, the biotechnologies, telecommunications and computers clusters are associated with the lowest grant rates, whereas the vehicles, civil engineering and handling and processing ones are associated with the highest grant likelihoods. These results suggest that emerging (or at least more recent) technologies either induce a higher propensity to file patents on inventions of more dubious patentability, or that patenting practices and standards are still evolving in these technologies, inducing a smaller predictability of the patentability requirements and patentable subject matters. The latter hypothesis particularly applies to computers with the huge uncertainties surrounding software patents and biotechnologies with the very complex discussions on the patentability of genetic discoveries and material.

Looking at the broad picture offered by the various regressions presented so far in this section, the following observations may be made. First, filing strategies are all inducing longer decision lags, possibly due to the extra workload induced by longer and more complex patent filings, hence suggesting at least some endogenous behaviour from the patentees to slow down the process or delay the decision. Such behaviour may be guided by an abusive willingness to exploit the provisional protection entitled by Article 67 EPC on non-patentable inventions or to avoid or postpone the important costs of validating and maintaining a granted patent. But they may also be dictated by the relative immaturity of the invention at the time of filing. Because patentees increasingly tend to file their applications as soon as possible in the invention process (see van Zeebroeck et al., 2006), they may have to file a patent to cover an invention which is still largely unclear and unfocused to avoid being invented or patented around before their invention gets clearer and commercially exploitable. As a consequence, they will need to exploit any procedural possibility offered by the patent system (e.g. the PCT route to delay by 30 months the time of international extension, then the filing of divisionals at the EPO) to claim the broadest possible scope of protection, and maintain their application pending for as long as possible, at least until the invention's market potential gets more certain. But these strategies do not lead to higher grant rates. Quite on the contrary, longer documents in terms of claims and specification pages and larger EP families induce lower grant rates. Nevertheless, root filings issuing subsequent divisionals are associated with some of the highest grant rates, suggesting that such strategies usually surround large inventions with a highly valuable core but too broad a scope at filing.

Second, both patent value indicators included in the regressions (*IMP_TRIADIC* and *IMP_FWDCIT5*) are strongly associated with longer and more intense decision lags and with higher grant rates (especially triadic patents). This is consistent with Harhoff and Wagner (2003) and may again be a sign that patentees are ready to bargain more intensively with the patent Office to get their patents granted when they think them more valuable.

Third, technological complexity logically induces a longer and more complex granting procedure, but most complexity indicators – frequently used in the literature as positive determinants of patent value – are in fact associated with lower grant rates. This again suggests that they may also be indicative of a smaller inventive step or a lack of unity in the application.

Finally, applicant profiles provide the most nuanced results from the model: co-applicants are associated with more efficient granting procedure (shorter decision lags and smaller number of communications exchanged), but they do not significantly affect the probability to get granted. On the contrary, cross-border ownership of patents (at least one inventor and applicant reside in different countries) – a sign of an international organization of research activities (Guellec and van Pottelsberghe, 2000) – is associated with longer and more intense decision lags but also with higher grant rates. Inexperienced patentees (applicants with no earlier filing at the EPO in the five previous years) witness longer but less intense decision lags (longer time to grant but less communications), suggesting that these newcomers to the patent system are less reactive during the granting process than incumbents. Their lack of experience also translates into much lower grant rates. Nonetheless, the size of applicant portfolios is somewhat associated with shorter and less intense granting processes, but they are also associated with slightly lower grant rates. This may actually be a sign that the relationship between

applicant portfolios and the duration, intensity and outcome of the granting process is not entirely linear, which opens some avenues for further empirical investigation.

5.3 Post-Grant Life

We now turn to the second life of patents, their 'active' or post-grant life. A preliminary though trivial observation, only granted patents get a chance to live this second life. As already discussed, a choice had to be made as to the geographical scope over which the renewal and lapse of patent rights should be observed. The choice made in the present analysis is the entire EPC area, considering that as long as a patent may still be enforced somewhere – should it be in only one small contracting State – it is still enforceable and must still be worth some value to its owner. On this basis, the period of maintenance of patents can be estimated as such using a Cox model. The results of these estimates are provided in the sixth column of Table 6.[55]

The results reported in Table 6 are very close to previous estimates of the entire life – though logically more stable across strata – and will thus not be discussed in details. Generally speaking, the factors which lead to longer patent rights are also associated with longer maintenance periods. If one recalls that this period is entirely under control of the patent holders (they are entirely free to choose to renew their patents up to 20 years), and significantly indicate the perceived private value of their patents, these results actually confirm our previous findings that filing strategies are positively associated with patent value (van Zeebroeck and van Pottelsberghe, 2007).

The main observed difference is on the effect of the PCT procedure, which led to much longer decision lags but look here associated with slightly shorter renewal periods. This suggests that the institutional characteristics of the PCT route which result in delays in the granting process do not necessarily predict longer active patent rights. Another very important difference appears with the significance of the *DRF_ISDIV* variable, the most significant variable in explaining longer decision lags, which is here weakly associated with slightly longer maintenance periods. The most unstable group of explanatory variables is nevertheless the set of complexity indicators. Most of them are indeed completely overturned when looking at maintenance periods instead of decision lags: backward patent and non patent citations – major contributors to longer decision lags – have no significant effect on maintenance rates or a very slightly negative one, and the number of IPC classes, also associated with longer decision lags, appears associated with shorter active lives.

In a complementary specification, we also test the effect of two additional variables: the share of claims lost in the course of the examination proceedings and the number of EPC member States in which each patent was validated as a complementary measure of its value. One would expect the former variable (*CLMLS*) to be negatively affecting the survival rate of patents (in van Zeebroeck and van Pottelsberghe (2007) we showed that it reduces the value of patents). The second factor is more ambiguous. On the one hand it is frequently considered as an indicator of patent value and should therefore be associated with longer survivals, but on the other hand van Pottelsberghe and van Zeebroeck (2008) have shown that the scope of validation and the likelihood to survive 10 years or more have actually experienced opposite trends in the eighties and nineties (the former decreasing while the latter increased). These opposite trends might suggest at first hand a negative association between EPC family size (*IMP_VSTATES*) and patent renewals.

The results reported in the fourth column of Table A10 (in the appendix) show that the first conjecture was right: the share of abandoned claims is indeed associated with slightly shorter maintenance periods. But the empirical results clearly show that larger validation scopes within the EPC are strongly associated with longer active lives. This is clearly in line with the dominant interpretation that the geographical scope of validation is a credible indicator of patent value, but it may also be a sign that when a patent is validated in more European countries, the probability that it will be maintained in at least one is also higher.

The non parametric estimates of survival and hazard functions reported above have clearly illustrated the potential impact of opposition cases on the survival of patent rights. On the one hand, a patent revoked in an opposition is by definition immediately lapsed and can no longer be maintained, but patents which survived an opposition are unanimously said to be of much higher value (Graham et al., 2002). Therefore, the outcome of an opposition case filed against a European patent is a major determinant of the patent's life expectancy.

Numerous empirical works have analysed the determinants of the likelihood to be opposed (Graham et al., 2002; Harhoff and Hall, 2002; Jerak and Wagner, 2003; Calderini and Scellato, 2004;

[55] Robustness estimates and alternative specifications are available upon request.

Hall and Harhoff, 2004; Harhoff and Reitzig, 2004; Reitzig, 2004a; Cincera and Propokieva, 2005). In an earlier paper (van Zeebroeck and van Pottelsberghe, 2007), we showed that parents of divisionals and backward patent and non patent citations were the most significant determinants of opposition incidences in addition to very strong technological and geographical patterns, and that the size of an applicant's patent portfolio was the only very significant protection against oppositions.

What is most critical here is what increases the chances that a patent would survive an opposition case – provided it has been opposed. This question has been addressed in two previous empirical works (Graham et al., 2002, Reitzig, 2004b) which provided many ambiguous results, where only the number of inventors appeared consistently and positively associated with the likelihood to be maintained. The last column of Table 7 reports estimates of the probability to be maintained (amended or not) after an opposition case for all granted EPO patents against which an opposition was filed (pending opposition cases excluded).[56]

These results confirm that many explanatory factors included in our model have no significant effect on the probability to survive an opposition. Nevertheless, from the filing strategy variables, the PCT route and the number of claims and priorities are all associated with a slightly higher likelihood. Both value indicators (triadic patents and forward citations) are also associated with higher opposition survival rates, and surprisingly enough, so is the number of backward citations. However, the number of IPC classes has an opposite effect and the number of inventors is not significant. For as far as applicant profiles are concerned, only co-application and the size of the portfolio are found negatively associated with higher survival rates, suggesting that although large portfolios tend to have a dissuasive effect on potential opponents (see van Zeebroeck and van Pottelsberghe, 2007), they do not increase the chances for their patents to survive an opposition. On the contrary, the chances for an opponent to get a patent from an occasional patentee revoked are lower.

The third column of Table A10 (in the appendix) provides the results of an alternative specification in which two additional characteristics of the opposition procedure are included as potential explanatory factors: the presence of multiple opponents (previously found positively associated with opposition survival rates in Graham et al., 2002), denoting an even higher potential embarrassment caused by the patent in the market (which is the case in about 18% of all oppositions), and the recourse to oral proceedings in the course of the opposition, which take place on average in about 45% of all opposition cases.

To the best of our knowledge, this latter variable had never been examined in the empirical literature. The results reveal that these two additional variables are actually the most significant determinants of the outcome of opposition cases: multiple opponents are strongly increasing the chances to get a patent revoked, and oral proceedings are clearly having the opposite effect. This suggests first that the characteristics of an opposition are the most important factors influencing the future outcome of the proceedings, second that when multiple opponents join their forces in the battle, they increase their chances to get the patent revoked but possibly also render any potential off-proceedings settlement much more difficult as more than two parties are involved, and third, that oral proceedings more frequently play in favour of the patent holder.

Some key messages may be drawn from these results on the post-grant life of European patents. Firstly, these results provide at last strong empirical support to the idea that more valuable patents (identified by more citations received, a larger scope of application or validation, or which survived an opposition) also tend to live longer. This result had been anticipated for long in the literature and used as a justification for simulating value distributions of patents (Pakes and Schankerman, 1984), but they find here an empirical confirmation. Secondly, as a consequence, it is quite logical that the factors that were found positively associated with patent value in van Zeebroeck and van Pottelsberghe (2007) are also found positively associated with longer maintenance rates here. Thirdly, however, it appears that this is not true with all explanatory factors. Not all filing strategies lead to longer renewal rates – see in particular the case of the PCT option and divisional filings – and complexity indicators are almost all associated with longer decision lags but with lower renewal rates. Finally, most filing strategies are more strongly associated with longer decision lags than with higher renewal rates, suggesting that they contribute to the length of patent rights more through an expansion of the granting process than through a higher likelihood to be maintained. In particular, most strategies do not increase the probability for a patent opposed to survive the opposition.

[56] Robustness estimates and alternative specifications are reported in details in Table A11 in the appendix.

6 Concluding Remarks

The objective of this paper was to analyse the impact of patenting strategies on the length of patent rights in Europe, thereby providing an indication on the potential embarrassment caused by these developing practices for the patent system.

The main originality of this paper resides in that – to the best of our knowledge – it constitutes the first attempt to investigate the determinants of patent renewals in a systematic way, in the richness and size of the dataset, and in the first answer it brings to the question of the impact of patenting strategies on the patent system.

The first conclusion drawn from this work is that the increase in the average patent length observed in previous studies (see van Zeebroeck, 2008 and van Pottelsberghe and van Zeebroeck, 2008) is largely due to the dilatation of the examination process (significant increase in decision lags) and not only to higher maintenance rates.

Secondly, most filings strategies mainly result in substantial delays in the examination procedure whereas they are not necessarily associated with higher maintenance rates. This proves that the main effect of filing strategies – deliberate or not, expected or not by patent applicants – is to slow down the examination process. The PCT may induce this result for institutional reasons, but the size of applications (in terms of claims or pages) probably increases the time needed to examine them, and divisional filings are the ultimate instrument to delay a decision when the application is lacking unity or when the invention is still unclear or unfocused.

Whereas the filing of divisionals remains an exceptional practice (about 4.5% of applications filed in the late nineties were divisionals), they represent almost 50% of the applications whose examination took 10 years or more. It is easy to imagine the potential abuses of the patent system this procedural option offered to patentees could lead to, as acknowledged by the EPO Enlarged Board of Appeal.[57] By filing divisionals of an application, embedding the valuable subject matter, and then divisionals of divisionals, and so on for up to twenty years, such a strategy could provide the applicant with a provisional protection as provided by Article 67 EPC[58] over some subject-matter which had already been judged unpatentable by the Office. The present paper clearly establishes that this possibility is real.

A similar phenomenon is actually observed in the United States with the counterpart of European divisionals: patent continuations.[59] A frequently cited case in the US is Lemelson's patent on automated analysis (US patent 5,283,641), which has been followed by 11 continuations and remained pending for about 40 years. Quillen and Webster (2001) shows that US applicants actually use repeated continuations to wear down a patent examiner and gain a patent, and Lemley and Moore (2004) added that the US continuations are used to extend the review process and modify the claims to incorporate ideas from the competitors or covering competing products. In particular, they suggested that US continuations make it almost impossible for a patent examiner to ever reject an application: the applicant always has a chance to respond to any concerns raised by the examiner. In a world of infinitely-repeated interactions, the examiner has a (perverse) incentive to give up objecting to the applicant's claims (Webster et al., 2007).

Thirdly, more important patents (i.e. more cited or with larger family sizes) take more time to be examined, are more likely to be granted, and tend to be renewed for longer periods, which is consistent with most the literature on patent indicators. On the contrary, the complexity of patent applications logically induces longer decision lags as well but is associated with lower grant and renewal rates.

Fourth, the first look at the number of communications exchanged between patentees and examiners in the course of the examination procedure presented in this paper provides a valuable complement to the analysis of decision lags. It indeed reflects the intensity of the examination process in the sense that it illustrates what is actually happening during the examination. This offers a validation tool for the determinants of decision lags – as most factors inducing delays in the granting process are also associated with larger numbers of communications exchanged – but also nuances some of the

[57] Cases G0001/05 and G0001/06, decided on June 28th, 2007. The full transcription of the decision is available on the EPOLINE website. See also the conclusions from van Zeebroeck and van Pottelsberghe (2007).

[58] According to Article 67 EPC, a pending application provisionally confers upon the applicant the same rights in all designated States as if the patent was granted (see van Zeebroeck, 2007).

[59] Note that there are different types of continuations in the US (continuation application, continuation in parts and division) which do not have the exact same features and objectives as European divisionals. Their closest equivalent in the US is nonetheless the divisions.

results, especially with the effect of patent constructionism: all forms of patent constructions (see Harhoff, 2006) induce longer decision lags (except the number of priorities), but priorities and parents of divisionals are associated with more communications whereas EP equivalents and divisional filings are associated with less. This suggests that patent constructions are actually requiring much more effort and time to be processed, whereas their parts or building blocks are in fact easier to process.

Overall, these results stress out the role of filing strategies in the duration of the granting process and in the resulting backlogs – with all potential consequences in terms of legal uncertainty on the markets – and emphasizes a particular side effect of increasing decision lags: they result in European patent applications and grants living overall longer. As the EPO Enlarged Board of Appeal stated it, it is for the legislator to determine where there may abuses to the patent system and what should be done about it.

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Appendices

Table A1– Test for trend in survival function over time to decision

Filing Year	Events observed	Events expected
1980	19090	7500.65
1981	24204	10816.25
1982	27626	14239.42
1983	30711	18466.37
1984	35903	24112.54
1985	38103	28336.26
1986	41855	31459.51
1987	45461	36296.42
1988	51920	42254.04
1989	57224	47598.14
1990	63625	49578.45
1991	59064	47153.75
1992	60022	50120.48
1993	59390	53286.09
1994	60725	60341.74
1995	62730	71887.89
1996	66577	85777.38
1997	71180	99708.03
1998	73821	107729.59
1999	70763	104041.77
2000	66176	95465.23
Total	**1086170**	**1086170.00**
	Chi2(20)	131275.80
	P>Chi²	0.00
	Test for trend of survivor functions	
	Chi²(1)	116549.38
	P>Chi²	0.00

Table A2– Test for trend in survival function over maintenance period

Filing Year	Events observed	Events expected
1980	13754	12500.39
1981	17182	15429.51
1982	19686	17123.89
1983	21635	18229.79
1984	24922	20376.24
1985	26417	20964.45
1986	23874	22902.15
1987	23414	22098.40
1988	24546	23732.03
1989	24419	24101.54
1990	25528	26490.90
1991	21917	23585.49
1992	20316	22364.46
1993	18157	20524.36
1994	15583	18457.34
1995	12807	15724.79
1996	10177	12951.70
1997	7312	10016.44
1998	5228	7463.03
1999	4021	5329.64
2000	2867	3395.47
Total	**363762**	**363762.00**
	Chi2(20)	10401.02
	P>Chi²	0.00
	Test for trend of survivor functions	
	Chi²(1)	8819.03
	P>Chi²	0.00

Table A3 – Survival Analysis of Patent Applications Time to Decision (competing risks)

Variables	Stratified H.R.	z		Deemed Withdr. H.R.	z		Withdrawn H.R.	z		Refused H.R.	z		Granted H.R.	z	
Filing routes															
RTE_ACCSRC	0,94	-7,62	(**)	0,88	-8,42	(**)	0,91	-2,80	(**)	0,93	-1,92		0,97	-3,11	(**)
RTE_PCT	0,82	-75,19	(**)	0,64	-82,49	(**)	0,75	-27,21	(**)	0,80	-15,32	(**)	0,89	-36,10	(**)
Drafting															
DRF_CLAIMS	0,99	-65,60	(**)	1,00	-22,23	(**)	1,00	-11,08	(**)	0,99	-11,73	(**)	0,99	-63,45	(**)
DRF_PRIO	1,00	0,11		0,99	-3,82	(**)	1,01	2,50	(*)	1,02	2,07	(*)	1,00	2,32	(*)
DRF_EQUIV	0,90	-33,33	(**)	0,91	-25,58	(**)	0,95	-7,69	(**)	0,87	-12,99	(**)	0,90	-39,02	(**)
DRF_HASDIV	0,64	-68,58	(**)	0,55	-23,52	(**)	0,44	-16,89	(**)	0,55	-15,80	(**)	0,66	-64,68	(**)
DRF_ISDIV	0,22	-212,41	(**)	0,21	-92,00	(**)	0,23	-40,87	(**)	0,21	-32,03	(**)	0,21	-163,47	(**)
Importance															
IMP_TRIADIC	0,85	-63,78	(**)	0,66	-85,40	(**)	0,64	-52,58	(**)	0,80	-18,11	(**)	0,96	-14,85	(**)
IMP_FWDCIT5	0,96	-42,89	(**)	0,95	-19,47	(**)	0,94	-12,46	(**)	0,93	-12,51	(**)	0,96	-36,61	(**)
Technical Complexity															
CMP_BPC	0,98	-49,46	(**)	0,99	-7,75	(**)	0,99	-9,87	(**)	0,98	-10,27	(**)	0,98	-53,74	(**)
CMP_NPC	0,96	-61,22	(**)	0,97	-21,29	(**)	0,97	-12,53	(**)	0,94	-16,29	(**)	0,95	-58,88	(**)
CMP_INV	0,99	-19,72	(**)	0,98	-12,26	(**)	0,99	-3,85	(**)	0,98	-5,03	(**)	0,99	-16,62	(**)
CMP_IPC4	0,98	-15,18	(**)	0,97	-11,85	(**)	0,99	-2,16	(*)	0,96	-5,57	(**)	0,98	-11,85	(**)
Applicant Profiles															
APP_MULTIPLE	1,04	7,43	(**)	0,98	-1,77		0,96	-2,28	(*)	1,05	1,83		1,06	10,41	(**)
APP_CUMUL	1,00	7,10	(**)	1,00	1,46		1,00	10,92	(**)	1,00	-1,36		1,00	4,08	(**)
APP_OCCAS	0,89	-36,66	(**)	0,99	-2,67	(**)	0,94	-4,60	(**)	0,91	-6,05	(**)	0,84	-46,91	(**)
APP_CBOWN	0,94	-16,33	(**)	0,94	-8,82	(**)	0,90	-7,26	(**)	0,94	-3,28	(**)	0,94	-14,32	(**)
EPO Joint Clusters (Reference = Organic Chemistry)															
JC-01 - Industrial Chemistry	1,12	29,70	(**)	1,09	11,50	(**)	1,08	5,63	(**)	1,09	5,13	(**)	1,14	31,80	(**)
JC-03 - Polymers	0,91	-24,35	(**)	0,91	-11,32	(**)	0,93	-5,63	(**)	0,89	-5,95	(**)	0,90	-23,96	(**)
JC-04 - Biotechnology	0,76	-67,39	(**)	0,82	-25,30	(**)	0,89	-7,79	(**)	0,80	-11,02	(**)	0,72	-67,97	(**)
JC-05 - Telecommunications	0,58	-98,91	(**)	0,63	-41,31	(**)	0,62	-24,42	(**)	0,61	-14,92	(**)	0,55	-82,53	(**)
JC-06 - Audio/Video/Media	0,76	-52,53	(**)	0,88	-11,31	(**)	0,83	-9,33	(**)	0,78	-9,04	(**)	0,72	-50,81	(**)
JC-07 - Electronics	0,80	-54,41	(**)	0,89	-13,66	(**)	0,86	-9,48	(**)	0,86	-7,32	(**)	0,77	-53,85	(**)
JC-08 - Electricity	0,88	-33,81	(**)	0,91	-12,34	(**)	0,86	-11,20	(**)	0,91	-5,05	(**)	0,86	-34,40	(**)
JC-09 - Computers	0,65	-76,39	(**)	0,71	-31,53	(**)	0,67	-20,02	(**)	0,62	-16,43	(**)	0,61	-67,88	(**)
JC-10 - Measuring Optics	0,91	-23,84	(**)	0,92	-11,38	(**)	0,88	-8,99	(**)	0,91	-4,62	(**)	0,92	-19,63	(**)
JC-11 - Handling & Processing	1,19	46,71	(**)	1,17	23,21	(**)	1,14	9,66	(**)	1,28	13,76	(**)	1,20	46,67	(**)
JC-12 - Vehicles	1,21	46,31	(**)	1,18	21,10	(**)	1,15	8,95	(**)	1,33	13,82	(**)	1,22	45,28	(**)
JC-13 - Civil Engineering	1,11	22,98	(**)	1,08	9,57	(**)	1,08	4,99	(**)	1,27	11,07	(**)	1,12	24,44	(**)
JC-14 - Human Necessities	1,03	6,55	(**)	1,08	11,49	(**)	1,07	4,85	(**)	1,03	1,31		1,00	1,02	

Cox Regression Model - Breslow method for ties - Stratified by grant decision unless otherwise specified (EPO Filings 1980-2000)

Variables	Stratified H.R.	Stratified z		Deemed Withdr. H.R.	Deemed Withdr. z		Withdrawn H.R.	Withdrawn z		Refused H.R.	Refused z		Granted H.R.	Granted z	
Country of residence of applicants (Reference = France)															
AT	0,99	-0,86		1,08	3,88	(**)	0,96	-0,60		0,81	-3,50	(**)	0,97	-2,20	(*)
AU	0,54	-50,35	(**)	0,81	-9,48	(**)	0,98	-0,34		0,57	-8,26	(**)	0,44	-44,60	(**)
BE	0,84	-14,02	(**)	1,09	4,22	(**)	0,84	-3,46	(**)	0,75	-4,24	(**)	0,77	-20,60	(**)
CA	0,80	-20,58	(**)	1,00	0,08		1,05	1,05		0,81	-3,91	(**)	0,72	-25,08	(**)
CH	0,90	-14,43	(**)	1,08	6,08	(**)	1,25	7,74	(**)	0,87	-4,05	(**)	0,82	-26,70	(**)
DE	0,93	-14,67	(**)	0,98	-1,91		1,05	3,07	(**)	0,85	-7,05	(**)	0,91	-19,02	(**)
DK	0,76	-17,66	(**)	0,90	-3,60	(**)	0,84	-2,73	(**)	0,78	-2,96	(**)	0,72	-20,26	(**)
ES	0,80	-14,02	(**)	1,00	0,14		0,82	-3,94	(**)	0,69	-4,34	(**)	0,74	-14,14	(**)
FI	0,64	-41,99	(**)	0,76	-10,77	(**)	0,87	-2,53	(*)	0,60	-6,83	(**)	0,59	-36,68	(**)
GB	0,83	-30,84	(**)	1,07	6,07	(**)	1,17	6,97	(**)	0,82	-7,18	(**)	0,73	-48,23	(**)
IL	0,74	-16,89	(**)	1,04	1,38		1,23	3,15	(**)	0,83	-2,02	(*)	0,59	-21,65	(**)
IT	0,81	-30,15	(**)	1,02	1,69		1,03	1,02		0,74	-7,72	(**)	0,73	-40,46	(**)
JP	0,60	-103,37	(**)	0,82	-20,34	(**)	0,92	-4,28	(**)	0,60	-20,22	(**)	0,53	-124,63	(**)
KR	0,68	-25,21	(**)	0,97	-0,93		1,11	1,59		0,62	-4,80	(**)	0,58	-25,21	(**)
NL	0,85	-22,75	(**)	0,99	-0,41		1,08	3,00	(**)	0,78	-7,49	(**)	0,80	-29,78	(**)
SE	0,75	-33,22	(**)	0,98	-1,75		1,03	1,04		0,75	-6,58	(**)	0,67	-40,34	(**)
US	0,69	-44,57	(**)	0,92	-4,80	(**)	1,01	0,29		0,66	-8,80	(**)	0,61	-50,71	(**)
RoW	0,66	-89,86	(**)	0,92	-9,66	(**)	1,06	3,47	(**)	0,70	-16,59	(**)	0,56	-119,12	(**)
Time dummies (Reference = 1990)															
1980	1,82	44,85	(**)	1,42	16,34	(**)	1,56	13,66	(**)	1,53	10,85	(**)	2,00	68,58	(**)
1981	1,56	39,61	(**)	1,24	11,57	(**)	1,25	7,30	(**)	1,37	8,64	(**)	1,71	57,61	(**)
1982	1,34	30,47	(**)	1,13	6,94	(**)	1,11	3,43	(**)	1,16	4,08	(**)	1,44	41,01	(**)
1983	1,12	12,94	(**)	0,98	-1,37		0,89	-4,06	(**)	1,05	1,27		1,19	20,69	(**)
1984	0,99	-0,84		0,88	-8,14	(**)	0,82	-7,02	(**)	0,94	-1,81		1,05	5,60	(**)
1985	0,90	-14,74	(**)	0,81	-14,16	(**)	0,72	-11,87	(**)	0,82	-5,25	(**)	0,94	-7,19	(**)
1986	0,90	-14,21	(**)	0,83	-12,88	(**)	0,72	-11,98	(**)	0,77	-7,63	(**)	0,96	-5,80	(**)
1987	0,87	-20,14	(**)	0,83	-13,33	(**)	0,73	-12,59	(**)	0,78	-7,52	(**)	0,91	-12,34	(**)
1988	0,89	-18,40	(**)	0,86	-11,48	(**)	0,80	-9,60	(**)	0,87	-4,62	(**)	0,91	-12,50	(**)
1989	0,91	-14,72	(**)	0,93	-5,70	(**)	0,90	-4,79	(**)	0,89	-4,08	(**)	0,91	-12,98	(**)
1991	1,03	4,14	(**)	1,02	1,14		1,02	0,88		0,95	-1,66		1,04	5,38	(**)
1992	1,03	4,27	(**)	0,98	-1,21		1,02	0,90		1,00	0,06		1,05	6,51	(**)
1993	0,96	-6,63	(**)	0,88	-10,28	(**)	0,98	-1,07		0,96	-1,58		0,99	-1,98	(*)
1994	0,86	-22,76	(**)	0,76	-21,14	(**)	0,86	-6,34	(**)	0,90	-3,64	(**)	0,90	-15,75	(**)
1995	0,75	-44,33	(**)	0,65	-34,20	(**)	0,80	-9,64	(**)	0,80	-7,37	(**)	0,79	-34,28	(**)
1996	0,68	-64,29	(**)	0,61	-40,40	(**)	0,69	-16,34	(**)	0,83	-6,49	(**)	0,70	-51,54	(**)
1997	0,66	-71,39	(**)	0,63	-38,70	(**)	0,64	-20,19	(**)	0,92	-2,55	(*)	0,66	-58,93	(**)
1998	0,74	-54,13	(**)	0,73	-27,82	(**)	0,69	-17,43	(**)	1,11	3,02	(**)	0,73	-44,79	(**)
1999	0,94	-11,12	(**)	0,94	-5,62	(**)	0,84	-8,21	(**)	1,47	10,08	(**)	0,93	-10,10	(**)
2000	1,29	44,29	(**)	1,29	21,86	(**)	1,03	1,58		1,85	13,62	(**)	1,29	34,82	(**)
Model															
# Subjects / Observations		1134856			238412			68663			35441			697102	
# Failures / R^2		1039618			238412			68663			35441			697102	
Log likelihood		-12279390			-2676170			-688149			-330926			-8574342	
F (P>F) / LR chi^2 ($P>chi^2$)		206.417 (0,00)			75.297 (0,00)			15.881 (0,00)			9.859 (0,00)			216.668 (0,00)	

Table A4 – Survival Analysis of Applications Time to Decision (Robustness estimates)

	OLS			Cens. Norm. Reg.			Unstratified 1			Stratified 1			Stratified 2			Full Stratified			Random Sample			Instrumental Var			Log		
Variables	**Coef.**	**t**		**Coef.**	**t**		**H.R.**	**z**		**H.R.**	**z**		**H.R.**	**z**		**H.R.**	**z**		**H.R.**	**z**		**H.R.**	**z**		**H.R.**	**z**	
Filing routes																											
RTE_ACCSRC	-0,03	-2,81	(**)	-0,05	-3,66	(**)	0,94	-8,65	(**)	0,94	-7,62	(**)	0,94	-8,27	(**)	0,94	-7,62	(**)	0,97	-1,37		0,93	-9,73	(**)	0,94	-7,69	(**)
RTE_PCT	0,46	116,55	(**)	0,47	110,95	(**)	0,80	-85,22	(**)	0,82	-75,19	(**)	0,84	-66,48	(**)	0,82	-75,19	(**)	0,82	-24,41	(**)	0,73	-84,58	(**)	0,82	-79,04	(**)
RTE_LEGREP													1,01	2,31	(*)												
Drafting																											
DRF_CLAIMS	0,01	86,50	(**)	0,02	98,67	(**)	0,99	-88,02	(**)	0,99	-65,60	(**)	0,99	-58,50	(**)	0,99	-65,60	(**)	0,99	-21,89	(**)	1,02	21,58	(**)	0,89	-76,13	(**)
DRF_PAGES_DESC													1,00	-23,62	(**)												
DRF_PAGES_DRAW													0,91	-29,88	(**)												
DRF_PRIO	0,00	0,21		0,00	2,14	(*)	1,01	3,97	(**)	1,00	0,11		1,00	3,45	(**)	1,00	0,11		1,00	-0,15		0,94	-27,30	(**)	1,06	16,86	(**)
DRF_EQUIV	0,07	27,65	(**)	0,08	29,31	(**)	0,90	-50,71	(**)	0,90	-33,33	(**)	0,91	-48,79	(**)	0,90	-33,33	(**)	0,91	-14,71	(**)	0,90	-51,29	(**)	0,80	-56,42	(**)
DRF_HASDIV	0,80	84,77	(**)	0,72	71,50	(**)	0,72	-54,17	(**)	0,64	-68,58	(**)	0,64	-72,32	(**)	0,64	-68,58	(**)	0,65	-22,10	(**)	0,55	-76,21	(**)	0,65	-71,32	(**)
DRF_ISDIV	3,58	353,00	(**)	4,13	352,58	(**)	0,20	-209,15	(**)	0,22	-212,41	(**)	0,22	-192,19	(**)	0,22	-212,41	(**)	0,22	-62,04	(**)	0,23	-179,98	(**)	0,22	-190,88	(**)
Importance																											
IMP_TRIADIC	0,40	116,48	(**)	0,40	110,04	(**)	0,81	-92,35	(**)	0,85	-63,78	(**)	0,85	-70,77	(**)	0,85	-63,78	(**)	0,85	-22,41	(**)	2,31	35,45	(**)	0,84	-73,85	(**)
IMP_FWDCIT5	0,09	65,72	(**)	0,10	65,10	(**)	0,95	-51,62	(**)	0,96	-42,89	(**)	0,96	-42,11	(**)	0,96	-42,89	(**)	0,95	-15,62	(**)	0,94	-7,60	(**)	0,88	-52,33	(**)
IMP_DSTATES													1,00	-4,38	(**)												
Technical Complexity																											
CMP_BPC	0,03	57,71	(**)	0,03	57,70	(**)	0,98	-55,40	(**)	0,98	-49,46	(**)	0,98	-52,58	(**)	0,98	-49,46	(**)	0,98	-17,80	(**)	0,98	-51,64	(**)	0,91	-45,30	(**)
CMP_NPC	0,07	78,13	(**)	0,08	79,06	(**)	0,96	-62,31	(**)	0,96	-61,22	(**)	0,96	-62,24	(**)	0,96	-61,22	(**)	0,96	-20,76	(**)	0,95	-67,54	(**)	0,87	-75,92	(**)
CMP_INV	0,02	22,45	(**)	0,02	21,81	(**)	0,99	-22,71	(**)	0,99	-19,72	(**)	0,99	-18,52	(**)	0,99	-19,72	(**)	0,99	-6,85	(**)	0,98	-25,01	(**)	0,96	-24,28	(**)
CMP_IPC4	0,03	14,13	(**)	0,03	13,63	(**)	0,98	-15,22	(**)	0,98	-15,18	(**)	0,98	-17,09	(**)	0,98	-15,18	(**)	0,98	-4,64	(**)	0,97	-19,21	(**)	0,96	-15,95	(**)
Applicant Profiles																											
APP_MULTIPLE	-0,02	-2,55	(*)	-0,01	-1,75		1,02	3,66	(**)	1,04	7,43	(**)	1,04	8,70	(**)	1,04	7,43	(**)	1,02	1,45		1,05	12,07	(**)	1,04	8,70	(**)
APP_CUMUL	0,00	-11,28	(**)	0,00	-12,73	(**)	1,00	13,48	(**)	1,00	7,10	(**)	1,00	6,94	(**)	1,00	7,10	(**)	1,00	1,58		1,00	-17,49	(**)	1,02	40,83	(**)
APP_OCCAS	0,11	25,29	(**)	0,11	22,75	(**)	0,92	-28,05	(**)	0,89	-36,66	(**)	0,89	-39,93	(**)	0,89	-36,66	(**)	0,90	-12,23	(**)	1,03	6,26	(**)	0,94	-17,34	(**)
APP_CBOWN	0,09	16,19	(**)	0,08	13,61	(**)	0,94	-17,91	(**)	0,94	-16,33	(**)	0,93	-18,98	(**)	0,94	-16,33	(**)	0,93	-6,38	(**)	0,94	-17,19	(**)	0,93	-18,92	(**)
EPO Joint Clusters (Reference = Organic Chemistry)																											
JC-01 - Industrial Chemistry	-0,19	-37,70	(**)	-0,20	-37,05	(**)	1,11	32,74	(**)	1,12	29,70	(**)	1,12	32,99	(**)	1,12	29,70	(**)	1,13	11,80	(**)	1,10	28,54	(**)	1,13	36,91	(**)
JC-03 - Polymers	0,06	10,01	(**)	0,05	7,92	(**)	0,94	-18,33	(**)	0,91	-24,35	(**)	0,89	-33,16	(**)	0,91	-24,35	(**)	0,91	-8,18	(**)	0,86	-38,84	(**)	0,91	-26,01	(**)
JC-04 - Biotechnology	0,47	81,20	(**)	0,51	82,21	(**)	0,75	-72,88	(**)	0,76	-67,39	(**)	0,76	-70,23	(**)	0,76	-67,39	(**)	0,77	-21,61	(**)	0,71	-70,06	(**)	0,78	-65,64	(**)
JC-05 - Telecommunications	0,95	116,63	(**)	1,08	120,83	(**)	0,54	-107,54	(**)	0,58	-98,91	(**)	0,59	-90,99	(**)	0,58	-98,91	(**)	0,58	-29,90	(**)	0,62	-75,61	(**)	0,59	-92,83	(**)
JC-06 - Audio/Video/Media	0,52	67,43	(**)	0,59	70,05	(**)	0,70	-68,46	(**)	0,76	-52,53	(**)	0,78	-46,52	(**)	0,76	-52,53	(**)	0,75	-16,87	(**)	0,72	-60,77	(**)	0,76	-51,98	(**)
JC-07 - Electronics	0,29	46,82	(**)	0,29	44,50	(**)	0,81	-53,75	(**)	0,80	-54,41	(**)	0,82	-49,08	(**)	0,80	-54,41	(**)	0,81	-16,66	(**)	0,80	-55,54	(**)	0,80	-55,20	(**)
JC-08 - Electricity	0,21	40,38	(**)	0,25	43,59	(**)	0,82	-55,41	(**)	0,88	-33,81	(**)	0,89	-32,46	(**)	0,88	-33,81	(**)	0,88	-11,62	(**)	0,88	-36,22	(**)	0,88	-36,02	(**)
JC-09 - Computers	0,67	81,72	(**)	0,77	85,51	(**)	0,61	-87,65	(**)	0,65	-76,39	(**)	0,67	-70,80	(**)	0,65	-76,39	(**)	0,65	-24,55	(**)	0,67	-68,49	(**)	0,65	-77,23	(**)
JC-10 - Measuring Optics	0,16	28,94	(**)	0,18	29,39	(**)	0,88	-33,64	(**)	0,91	-23,84	(**)	0,93	-19,20	(**)	0,91	-23,84	(**)	0,89	-9,68	(**)	0,90	-27,68	(**)	0,92	-21,61	(**)
JC-11 - Handling & Processing	-0,26	-49,51	(**)	-0,27	-49,77	(**)	1,21	59,33	(**)	1,19	46,71	(**)	1,22	57,39	(**)	1,19	46,71	(**)	1,19	16,41	(**)	1,26	62,27	(**)	1,19	51,42	(**)
JC-12 - Vehicles	-0,24	-42,57	(**)	-0,26	-42,80	(**)	1,22	55,39	(**)	1,21	46,31	(**)	1,23	55,42	(**)	1,21	46,31	(**)	1,19	14,86	(**)	1,32	67,47	(**)	1,22	53,98	(**)
JC-13 - Civil Engineering	-0,17	-27,82	(**)	-0,19	-28,98	(**)	1,16	38,97	(**)	1,11	22,98	(**)	1,13	30,56	(**)	1,11	22,98	(**)	1,09	7,05	(**)	1,27	48,09	(**)	1,11	27,47	(**)
JC-14 - Human Necessities	-0,04	-7,15	(**)	-0,04	-7,63	(**)	1,04	10,55	(**)	1,03	6,55	(**)	1,05	12,48	(**)	1,03	6,55	(**)	1,02	1,45		1,07	17,42	(**)	1,03	8,41	(**)

Variables	OLS Coef.	OLS t		Cens. Norm. Reg. Coef.	Cens. Norm. Reg. t		Unstratified 1 H.R.	Unstratified 1 z		Stratified 1 H.R.	Stratified 1 z		Stratified 2 H.R.	Stratified 2 z		Full Stratified H.R.	Full Stratified z		Random Sample H.R.	Random Sample z		Instrumental Var H.R.	Instrumental Var z		Log H.R.	Log z	
Country of residence of applicants (Reference = France)																										
AT	-0,01	-0,86		-0,01	-0,77		1,01	0,86		0,99	-0,86		0,99	-1,13		0,99	-0,86		1,02	0,49		1,12	10,81	(**)	0,97	-3,12	(**)
AU	0,87	44,66	(**)	1,00	47,00	(**)	0,54	-46,09	(**)	0,54	-50,35	(**)	0,54	-46,10	(**)	0,54	-50,35	(**)	0,54	-14,88	(**)	0,45	-57,49	(**)	0,56	-43,96	(**)
BE	0,15	9,27	(**)	0,15	8,65	(**)	0,86	-14,89	(**)	0,84	-14,02	(**)	0,84	-16,90	(**)	0,84	-14,02	(**)	0,84	-5,12	(**)	0,81	-20,08	(**)	0,84	-16,25	(**)
CA	0,20	12,99	(**)	0,20	11,92	(**)	0,83	-17,78	(**)	0,80	-20,58	(**)	0,81	-20,97	(**)	0,80	-20,58	(**)	0,80	-6,83	(**)	0,65	-38,54	(**)	0,82	-19,04	(**)
CH	0,07	7,76	(**)	0,08	7,64	(**)	0,92	-13,77	(**)	0,90	-14,43	(**)	0,90	-17,44	(**)	0,90	-14,43	(**)	0,91	-5,12	(**)	0,80	-34,77	(**)	0,90	-17,53	(**)
DE	0,03	5,53	(**)	0,03	4,88	(**)	0,95	-12,84	(**)	0,93	-14,67	(**)	0,93	-17,23	(**)	0,93	-14,67	(**)	0,92	-6,20	(**)	1,02	5,32	(**)	0,92	-21,53	(**)
DK	0,30	14,27	(**)	0,30	13,59	(**)	0,78	-18,15	(**)	0,76	-17,66	(**)	0,77	-19,27	(**)	0,76	-17,66	(**)	0,72	-7,25	(**)	0,73	-22,58	(**)	0,76	-20,00	(**)
ES	0,14	6,06	(**)	0,14	5,55	(**)	0,88	-8,50	(**)	0,80	-14,02	(**)	0,79	-15,09	(**)	0,80	-14,02	(**)	0,81	-4,40	(**)	0,97	-1,96		0,78	-16,13	(**)
FI	0,68	38,06	(**)	0,74	38,19	(**)	0,64	-36,79	(**)	0,64	-41,99	(**)	0,64	-37,04	(**)	0,64	-41,99	(**)	0,66	-10,72	(**)	0,65	-35,74	(**)	0,63	-37,69	(**)
GB	0,10	12,86	(**)	0,10	12,04	(**)	0,86	-27,83	(**)	0,83	-30,84	(**)	0,82	-37,17	(**)	0,83	-30,84	(**)	0,83	-11,47	(**)	0,78	-45,48	(**)	0,83	-35,54	(**)
IL	0,30	12,35	(**)	0,33	12,45	(**)	0,76	-16,83	(**)	0,74	-16,89	(**)	0,75	-17,56	(**)	0,74	-16,89	(**)	0,68	-7,25	(**)	0,62	-27,92	(**)	0,76	-16,28	(**)
IT	0,20	20,06	(**)	0,20	19,26	(**)	0,84	-27,43	(**)	0,81	-30,15	(**)	0,81	-34,50	(**)	0,81	-30,15	(**)	0,79	-11,70	(**)	0,90	-15,33	(**)	0,82	-31,91	(**)
JP	0,73	111,12	(**)	0,78	110,43	(**)	0,61	-116,26	(**)	0,60	-103,37	(**)	0,60	-112,25	(**)	0,60	-103,37	(**)	0,60	-37,11	(**)	0,44	-89,30	(**)	0,59	-121,46	(**)
KR	0,50	20,88	(**)	0,61	23,39	(**)	0,67	-23,85	(**)	0,68	-25,21	(**)	0,68	-22,78	(**)	0,68	-25,21	(**)	0,67	-7,63	(**)	0,56	-33,43	(**)	0,69	-21,97	(**)
NL	0,18	18,50	(**)	0,20	19,90	(**)	0,86	-25,03	(**)	0,85	-22,75	(**)	0,85	-26,56	(**)	0,85	-22,75	(**)	0,85	-8,10	(**)	0,79	-36,00	(**)	0,83	-29,70	(**)
SE	0,28	23,33	(**)	0,29	22,68	(**)	0,79	-30,50	(**)	0,75	-33,22	(**)	0,75	-36,57	(**)	0,75	-33,22	(**)	0,74	-12,34	(**)	0,74	-38,00	(**)	0,77	-33,73	(**)
US	0,52	42,00	(**)	0,56	42,28	(**)	0,69	-45,77	(**)	0,69	-44,57	(**)	0,69	-45,57	(**)	0,69	-44,57	(**)	0,69	-14,55	(**)	0,59	-56,98	(**)	0,69	-45,61	(**)
RoW	0,52	86,31	(**)	0,55	84,38	(**)	0,69	-94,18	(**)	0,66	-89,86	(**)	0,66	-103,67	(**)	0,66	-89,86	(**)	0,65	-33,92	(**)	0,47	-98,48	(**)	0,67	-100,09	(**)
Time dummies (Reference = 1990)																										
1980	-0,70	-51,04	(**)	-0,67	-47,37	(**)	1,65	58,46	(**)	1,82	44,85	(**)	1,85	71,69	(**)	1,82	44,85	(**)	1,89	23,08	(**)	1,88	72,57	(**)	1,81	69,46	(**)
1981	-0,55	-43,50	(**)	-0,52	-39,65	(**)	1,45	47,28	(**)	1,56	39,61	(**)	1,58	58,43	(**)	1,56	39,61	(**)	1,52	16,90	(**)	1,62	60,73	(**)	1,53	54,26	(**)
1982	-0,39	-32,57	(**)	-0,36	-29,11	(**)	1,26	30,96	(**)	1,34	30,47	(**)	1,36	41,27	(**)	1,34	30,47	(**)	1,36	13,16	(**)	1,40	44,55	(**)	1,32	36,84	(**)
1983	-0,20	-16,94	(**)	-0,17	-14,32	(**)	1,08	10,86	(**)	1,12	12,94	(**)	1,14	18,10	(**)	1,12	12,94	(**)	1,17	6,76	(**)	1,18	22,22	(**)	1,10	13,53	(**)
1984	-0,02	-1,85		0,00	0,14		0,97	-4,89	(**)	0,99	-0,84		1,01	1,22		0,99	-0,84		1,00	0,05		1,01	0,88		0,98	-3,68	(**)
1985	0,12	11,25	(**)	0,14	12,19	(**)	0,89	-16,85	(**)	0,90	-14,74	(**)	0,91	-14,15	(**)	0,90	-14,74	(**)	0,91	-4,26	(**)	0,89	-16,39	(**)	0,88	-18,17	(**)
1986	0,13	11,91	(**)	0,14	12,76	(**)	0,90	-15,76	(**)	0,90	-14,21	(**)	0,91	-13,93	(**)	0,90	-14,21	(**)	0,90	-5,21	(**)	0,90	-15,69	(**)	0,90	-16,72	(**)
1987	0,19	18,05	(**)	0,20	18,16	(**)	0,87	-20,89	(**)	0,87	-20,14	(**)	0,88	-20,77	(**)	0,87	-20,14	(**)	0,90	-5,44	(**)	0,87	-21,89	(**)	0,87	-21,69	(**)
1988	0,18	17,67	(**)	0,19	17,64	(**)	0,89	-19,30	(**)	0,89	-18,40	(**)	0,89	-19,19	(**)	0,89	-18,40	(**)	0,90	-5,29	(**)	0,88	-21,09	(**)	0,89	-19,50	(**)
1989	0,15	15,52	(**)	0,15	15,10	(**)	0,91	-16,23	(**)	0,91	-14,72	(**)	0,91	-15,43	(**)	0,91	-14,72	(**)	0,93	-3,60	(**)	0,90	-17,40	(**)	0,91	-15,49	(**)
1991	-0,08	-8,75	(**)	-0,09	-8,98	(**)	1,04	7,18	(**)	1,03	4,14	(**)	1,03	4,77	(**)	1,03	4,14	(**)	1,04	2,09	(*)	1,03	4,84	(**)	1,03	4,44	(**)
1992	-0,08	-8,09	(**)	-0,08	-8,43	(**)	1,01	1,93		1,03	4,27	(**)	1,03	5,05	(**)	1,03	4,27	(**)	1,02	1,04		1,02	3,62	(**)	1,03	5,75	(**)
1993	-0,02	-2,64	(**)	-0,04	-3,83	(**)	0,97	-4,94	(**)	0,96	-6,63	(**)	0,96	-7,34	(**)	0,96	-6,63	(**)	0,97	-1,81		0,95	-8,48	(**)	0,96	-6,60	(**)
1994	0,11	11,88	(**)	0,10	9,91	(**)	0,87	-23,93	(**)	0,86	-22,76	(**)	0,86	-25,52	(**)	0,86	-22,76	(**)	0,86	-7,90	(**)	0,85	-27,29	(**)	0,87	-23,21	(**)
1995	0,32	34,37	(**)	0,31	31,62	(**)	0,75	-50,52	(**)	0,75	-44,33	(**)	0,75	-48,30	(**)	0,75	-44,33	(**)	0,77	-13,92	(**)	0,74	-50,72	(**)	0,77	-44,15	(**)
1996	0,54	59,74	(**)	0,56	57,81	(**)	0,63	-79,21	(**)	0,68	-64,29	(**)	0,68	-66,65	(**)	0,68	-64,29	(**)	0,68	-20,98	(**)	0,67	-67,52	(**)	0,71	-60,00	(**)
1997	0,66	74,55	(**)	0,73	76,56	(**)	0,56	-101,62	(**)	0,66	-71,39	(**)	0,66	-71,77	(**)	0,66	-71,39	(**)	0,67	-22,65	(**)	0,66	-69,97	(**)	0,72	-58,46	(**)
1998	0,58	66,50	(**)	0,73	77,99	(**)	0,54	-110,52	(**)	0,74	-54,13	(**)	0,74	-53,57	(**)	0,74	-54,13	(**)	0,75	-15,91	(**)	0,75	-47,92	(**)	0,85	-28,66	(**)
1999	0,30	34,65	(**)	0,57	61,62	(**)	0,54	-107,18	(**)	0,94	-11,12	(**)	0,94	-10,84	(**)	0,94	-11,12	(**)	0,95	-2,96	(**)	0,95	-7,28	(**)	1,19	30,29	(**)
2000	-0,05	-5,29	(**)	0,42	45,22	(**)	0,57	-98,11	(**)	1,29	44,29	(**)	1,29	44,14	(**)	1,29	44,29	(**)	1,29	13,82	(**)	1,42	44,34	(**)	1,90	107,34	(**)
Model																										
# Subjects	1134860			1134271			1134856			1134856			1130353			1134856			113481			1134976			1134267		
# Failures	0,31			1039047			1039618			1039618			1038298			1039618			103894			1039717			1039043		
Log likelihood				-2121659			-13390381			-12279390			-12262008			-12279390			-987697			-12286400			-12042936		
LR chi² (P>chi²)	7.537 (0,00)			439.816 (0,00)			395.406 (0,00)			206.417 (0,00)			298.637 (0,00)			206.417 (0,00)			29.738 (0,00)			286.605 (0,00)			303.043 (0,00)		

Cox Regression Model by group of variables - Breslow method for ties - Stratified by decision unless otherwise specified (EPO Filings 1980-2000)

Table A5 – Estimates of the likelihood to be pending for at least 10 years

Variables	OLS Coef.	OLS z	Model 1 Coef.	Model 1 z	Model 2 Coef.	Model 2 z	Model 3 Coef.	Model 3 z	Instrumental Vars Coef.	Instrumental Vars z	Model 4 Coef.	Model 4 z	Model 5 Coef.	Model 5 z	Model 6 Coef.	Model 6 z	Model 7 Coef.	Model 7 z	Model 8 Coef.	Model 8 z
Filing routes																				
RTE_ACCSRC	0,00	12,53 (**)	0,17	6,13 (**)	0,15	5,40 (**)	0,17	6,49 (**)	0,18	6,69 (**)	0,36	17,50 (**)								
RTE_PCT	0,00	7,21 (**)	0,13	10,26 (**)	0,12	9,40 (**)	0,14	11,20 (**)	0,32	18,63 (**)	-0,07	-7,42 (**)								
RTE_LEGREP					-0,02	-0,98														
Drafting																				
DRF_CLAIMS	0,00	33,98 (**)	0,01	17,07 (**)	0,01	17,76 (**)	0,01	22,28 (**)	0,01	3,14 (**)			0,01	32,39 (**)						
DRF_PAGES_DESC					0,00	7,49 (**)														
DRF_PAGES_DRAW					0,17	12,79 (**)														
DRF_PRIO	0,00	4,88 (**)	0,02	4,24 (**)	0,02	4,00 (**)	0,02	5,85 (**)	0,01	2,06 (*)			0,03	8,66 (**)						
DRF_EQUIV	0,00	38,14 (**)	0,15	19,46 (**)	0,15	29,94 (**)	0,16	31,15 (**)	0,16	30,65 (**)			0,20	42,55 (**)						
DRF_HASDIV	0,00	50,82 (**)	0,61	34,51 (**)	0,61	35,75 (**)	0,64	38,33 (**)	0,60	21,66 (**)			0,64	39,40 (**)						
DRF_ISDIV	0,00	363,69 (**)	2,09	150,93 (**)	2,06	146,52 (**)	2,10	153,44 (**)	2,06	136,02 (**)			2,08	168,93 (**)						
Importance																				
IMP_TRIADIC	0,00	9,24 (**)	0,19	16,08 (**)	0,20	16,88 (**)			-2,91	-25,12 (**)					0,32	35,31 (**)				
IMP_FWDCIT5	0,00	24,16 (**)	0,04	11,52 (**)	0,04	12,69 (**)			0,07	2,59 (*)					0,04	15,97 (**)				
IMP_DSTATES_B10					-0,02	-10,50 (**)														
Technical Complexity																				
CMP_BPC	0,00	2,79 (**)	0,01	6,49 (**)	0,01	7,50 (**)	0,01	7,17 (**)	0,01	6,48 (**)							0,02	13,86 (**)		
CMP_NPC	0,00	58,81 (**)	0,04	12,24 (**)	0,04	25,33 (**)	0,05	27,85 (**)	0,05	27,03 (**)							0,05	33,27 (**)		
CMP_INV	0,00	6,81 (**)	0,01	5,48 (**)	0,01	4,84 (**)	0,02	7,05 (**)	0,02	7,05 (**)							0,06	30,18 (**)		
CMP_IPC4	0,00	11,97 (**)	0,05	8,96 (**)	0,05	9,36 (**)	0,06	10,76 (**)	0,06	8,61 (**)							0,11	23,89 (**)		
Applicant Profiles																				
APP_MULTIPLE	0,00	0,47	-0,02	-1,00	-0,03	-1,42	-0,03	-1,43	-0,08	-3,94 (**)									-0,04	-2,77 (**)
APP_CUMUL	0,00	-8,28 (**)	0,00	-4,61 (**)	0,00	-5,41 (**)	0,00	-3,86 (**)	0,00	13,28 (**)									0,00	-21,20 (**)
APP_OCCAS	0,00	16,45 (**)	0,20	14,56 (**)	0,21	15,04 (**)	0,18	13,06 (**)	-0,30	-12,74 (**)									0,00	-0,41
APP_CBOWN	0,00	5,69 (**)	0,10	5,88 (**)	0,10	6,17 (**)	0,10	6,08 (**)	0,07	4,19 (**)									0,09	6,60 (**)
EPO Joint Clusters (Reference = Organic Chemistry)																				
JC-01 - Industrial Chemistry	0,00	-9,87 (**)	-0,13	-7,63 (**)	-0,14	-8,03 (**)	-0,14	-8,04 (**)	-0,12	-6,77 (**)	-0,12	-8,99 (**)	-0,09	-5,74 (**)	-0,12	-8,99 (**)	-0,20	-13,46 (**)	-0,14	-10,43 (**)
JC-03 - Polymers	0,00	-0,20	0,05	3,00 (**)	0,09	5,44 (**)	0,06	3,38 (**)	0,16	8,85 (**)	0,01	0,63	0,07	4,83 (**)	-0,01	-0,58	-0,05	-3,63 (**)	0,01	0,86
JC-04 - Biotechnology	0,00	46,82 (**)	0,47	32,29 (**)	0,50	33,66 (**)	0,49	34,05 (**)	0,49	27,57 (**)	0,60	54,26 (**)	0,57	45,34 (**)	0,56	51,01 (**)	0,47	39,43 (**)	0,56	51,22 (**)
JC-05 - Telecommunications	0,00	25,36 (**)	0,49	24,65 (**)	0,44	20,76 (**)	0,50	24,59 (**)	0,23	9,76 (**)	0,38	22,12 (**)	0,46	23,90 (**)	0,38	22,07 (**)	0,40	22,14 (**)	0,42	24,61 (**)
JC-06 - Audio/Video/Media	0,00	5,95 (**)	0,12	6,01 (**)	0,06	2,97 (**)	0,13	6,36 (**)	0,19	9,16 (**)	0,22	13,96 (**)	0,11	5,72 (**)	0,21	13,56 (**)	0,24	14,47 (**)	0,25	16,04 (**)
JC-07 - Electronics	0,00	-8,03 (**)	-0,11	-5,41 (**)	-0,16	-8,16 (**)	-0,11	-5,80 (**)	-0,09	-4,84 (**)	-0,04	-2,73 (**)	-0,12	-6,58 (**)	-0,04	-2,47 (*)	-0,04	-2,39 (*)	-0,02	-1,54
JC-08 - Electricity	0,00	4,25 (**)	0,13	7,77 (**)	0,07	3,88 (**)	0,12	7,35 (**)	0,11	6,99 (**)	0,02	1,35	0,07	4,50 (**)	0,03	2,11 (*)	0,05	3,29 (**)	0,04	3,18 (**)
JC-09 - Computers	0,00	10,56 (**)	0,26	12,38 (**)	0,19	8,81 (**)	0,25	11,89 (**)	0,06	2,60 (**)	0,20	12,03 (**)	0,22	11,20 (**)	0,23	13,53 (**)	0,21	11,81 (**)	0,26	15,21 (**)
JC-10 - Measuring Optics	0,00	-13,62 (**)	-0,10	-6,66 (**)	-0,17	-10,63 (**)	-0,11	-7,48 (**)	-0,07	-4,45 (**)	-0,15	-12,53 (**)	-0,16	-11,45 (**)	-0,14	-11,02 (**)	-0,10	-7,59 (**)	-0,14	-11,69 (**)
JC-11 - Handling & Processing	0,00	-10,86 (**)	-0,33	-14,49 (**)	-0,38	-17,18 (**)	-0,35	-16,36 (**)	-0,51	-21,98 (**)	-0,25	-16,02 (**)	-0,29	-15,85 (**)	-0,21	-13,69 (**)	-0,26	-15,06 (**)	-0,27	-17,58 (**)
JC-12 - Vehicles	0,00	-6,98 (**)	-0,36	-12,47 (**)	-0,42	-15,19 (**)	-0,38	-13,91 (**)	-0,56	-19,62 (**)	-0,34	-17,13 (**)	-0,34	-14,56 (**)	-0,30	-15,11 (**)	-0,33	-14,85 (**)	-0,37	-18,45 (**)
JC-13 - Civil Engineering	0,00	-8,46 (**)	-0,35	-11,87 (**)	-0,41	-14,52 (**)	-0,39	-14,10 (**)	-0,75	-23,55 (**)	-0,31	-15,48 (**)	-0,34	-14,25 (**)	-0,25	-12,16 (**)	-0,32	-14,01 (**)	-0,33	-16,55 (**)
JC-14 - Human Necessities	0,00	-8,48 (**)	-0,14	-8,03 (**)	-0,20	-10,81 (**)	-0,16	-8,87 (**)	-0,32	-16,94 (**)	-0,04	-2,99 (**)	-0,18	-11,28 (**)	-0,01	-0,47	0,03	2,22 (*)	-0,05	-4,05 (**)

Variables	OLS Coef.	OLS z		Model 1 Coef.	Model 1 z		Model 2 Coef.	Model 2 z		Model 3 Coef.	Model 3 z		Instrumental Vars Coef.	Instrumental Vars z		Model 4 Coef.	Model 4 z		Model 5 Coef.	Model 5 z		Model 6 Coef.	Model 6 z		Model 7 Coef.	Model 7 z		Model 8 Coef.	Model 8 z	
Country of residence of applicants (Reference = France)																														
AT	0,00	-0,14		-0,10	-1,36		-0,07	-1,04		-0,11	-1,67		-0,43	-6,25	(**)	0,06	1,27		0,04	0,69		0,09	1,86		-0,02	-0,32		0,04	0,82	
AU	0,00	3,40	(**)	0,27	5,66	(**)	0,26	5,24	(**)	0,28	5,77	(**)	0,52	10,15	(**)	0,52	12,94	(**)	0,37	8,14	(**)	0,47	11,67	(**)	0,47	10,93	(**)	0,49	12,08	(**)
BE	0,00	1,38		0,15	2,83	(**)	0,14	2,72	(**)	0,15	2,93	(**)	0,13	2,62	(**)	0,31	8,12	(**)	0,22	5,09	(**)	0,32	8,11	(**)	0,28	6,51	(**)	0,29	7,53	(**)
CA	0,00	-2,55	(*)	-0,02	-0,47		-0,04	-0,83		0,01	0,13		0,25	4,77	(**)	0,25	6,41	(**)	0,03	0,60		0,21	5,19	(**)	0,28	6,89	(**)	0,22	5,57	(**)
CH	0,00	-1,47		-0,01	-0,23		0,01	0,20		0,01	0,37		0,23	6,46	(**)	0,04	1,52		-0,03	-1,03		0,01	0,42		0,10	3,45	(**)	0,02	0,82	
DE	0,00	0,76		-0,03	-1,21		-0,02	-0,89		-0,04	-1,71		-0,28	-10,80	(**)	0,01	0,51		0,04	1,91		0,03	1,51		-0,08	-4,24	(**)	0,05	2,97	(**)
DK	0,00	3,85	(**)	0,18	3,28	(**)	0,17	2,96	(**)	0,20	3,51	(**)	0,24	4,25	(**)	0,33	7,50	(**)	0,19	3,61	(**)	0,29	6,52	(**)	0,38	7,62	(**)	0,30	6,81	(**)
ES	0,00	-1,26		-0,27	-2,09	(*)	-0,25	-1,97	(*)	-0,30	-2,40	(*)	-0,61	-4,81	(**)	-0,37	-3,63	(**)	-0,32	-2,63	(**)	-0,31	-2,99	(**)	-0,29	-2,63	(**)	-0,39	-3,75	(**)
FI	0,00	-1,90		-0,04	-0,67		-0,04	-0,58		-0,02	-0,31		-0,05	-0,74		-0,01	-0,19		-0,05	-0,80		-0,05	-0,97		0,07	1,27		-0,06	-1,12	
GB	0,00	-3,58	(**)	0,02	0,78		0,03	1,17		0,04	1,35		0,06	2,32	(*)	0,20	9,92	(**)	0,09	3,73	(**)	0,18	8,63	(**)	0,19	8,70	(**)	0,17	8,45	(**)
IL	0,00	0,47		0,11	1,57		0,10	1,36		0,12	1,70		0,27	3,68	(**)	0,23	3,94	(**)	0,14	2,01	(*)	0,24	3,96	(**)	0,25	3,94	(**)	0,23	3,79	(**)
IT	0,00	-0,71		-0,07	-1,62		-0,05	-1,32		-0,08	-2,00	(*)	-0,40	-9,30	(**)	-0,14	-4,20	(**)	-0,06	-1,74		-0,09	-2,81	(**)	-0,12	-3,33	(**)	-0,14	-4,25	(**)
JP	0,00	-7,37	(**)	0,06	2,78	(**)	0,01	0,25		0,10	4,69	(**)	1,07	23,55	(**)	0,34	20,78	(**)	0,04	2,22	(*)	0,26	15,25	(**)	0,32	17,76	(**)	0,39	22,82	(**)
KR	0,00	-1,17		0,07	0,78		-0,05	-0,50		0,10	1,12		0,77	8,39	(**)	0,12	1,63		0,06	0,73		0,08	1,09		0,15	1,98	(*)	0,08	1,12	
NL	0,00	-1,46		0,00	-0,03		-0,01	-0,20		0,01	0,39		0,28	8,19	(**)	0,05	2,02	(*)	0,00	-0,04		0,02	0,65		0,08	2,98	(**)	0,08	2,95	(**)
SE	0,00	-2,36	(*)	-0,05	-1,26		-0,06	-1,32		-0,05	-1,09		-0,06	-1,30		0,13	4,00	(**)	0,02	0,39		0,14	4,08	(**)	0,14	3,96	(**)	0,09	2,71	(**)
US	0,00	2,45	(*)	0,09	2,04	(*)	0,09	2,13	(*)	0,12	2,95	(**)	0,62	13,30	(**)	0,22	6,74	(**)	0,15	4,10	(**)	0,14	4,38	(**)	0,27	7,35	(**)	0,17	5,27	(**)
RoW	0,00	-1,09		0,11	5,77	(**)	0,10	4,52	(**)	0,16	7,70	(**)	0,76	21,38	(**)	0,40	25,59	(**)	0,12	6,79	(**)	0,31	19,64	(**)	0,40	23,69	(**)	0,41	25,51	(**)
Time dummies (Reference = 1990)																														
1980	0,00	0,21		-0,24	-4,16	(**)	-0,27	-4,84	(**)	-0,25	-4,54	(**)	-0,19	-3,43	(**)	-0,64	-12,66	(**)	-0,39	-7,50	(**)	-0,63	-12,40	(**)	-0,53	-10,16	(**)	-0,66	-13,11	(**)
1981	0,00	2,27	(*)	-0,08	-1,95		-0,10	-2,42	(*)	-0,09	-2,20	(*)	-0,08	-1,84		-0,43	-11,76	(**)	-0,22	-5,61	(**)	-0,41	-11,33	(**)	-0,34	-8,82	(**)	-0,45	-12,26	(**)
1982	0,00	1,10		-0,17	-4,08	(**)	-0,20	-4,64	(**)	-0,18	-4,19	(**)	-0,20	-4,56	(**)	-0,47	-13,28	(**)	-0,27	-6,89	(**)	-0,45	-12,87	(**)	-0,42	-10,82	(**)	-0,48	-13,72	(**)
1983	0,00	3,47	(**)	0,01	0,31		-0,01	-0,22		0,00	0,05		-0,03	-0,96		-0,27	-9,68	(**)	-0,08	-2,52	(*)	-0,25	-9,11	(**)	-0,22	-7,24	(**)	-0,28	-10,11	(**)
1984	0,00	3,19	(**)	-0,01	-0,46		-0,03	-0,92		-0,02	-0,48		0,03	0,88		-0,27	-10,44	(**)	-0,11	-3,66	(**)	-0,27	-10,17	(**)	-0,20	-7,27	(**)	-0,28	-10,77	(**)
1985	0,00	0,98		-0,08	-2,68	(**)	-0,10	-2,94	(**)	-0,08	-2,53	(*)	0,00	-0,06		-0,31	-12,08	(**)	-0,20	-6,56	(**)	-0,32	-12,09	(**)	-0,23	-8,35	(**)	-0,32	-12,49	(**)
1986	0,00	0,38		-0,09	-3,03	(**)	-0,10	-3,09	(**)	-0,09	-2,84	(**)	-0,01	-0,31		-0,29	-11,73	(**)	-0,19	-6,70	(**)	-0,29	-11,75	(**)	-0,21	-7,92	(**)	-0,30	-12,07	(**)
1987	0,00	-1,93		-0,10	-3,55	(**)	-0,10	-3,52	(**)	-0,10	-3,47	(**)	-0,04	-1,19		-0,19	-8,40	(**)	-0,09	-3,64	(**)	-0,18	-8,04	(**)	-0,18	-7,41	(**)	-0,19	-8,42	(**)
1988	0,00	-2,01	(*)	-0,06	-2,32	(*)	-0,06	-2,19	(*)	-0,06	-2,25	(*)	0,01	0,24		-0,07	-3,53	(**)	0,02	1,08		-0,06	-2,96	(**)	-0,12	-5,22	(**)	-0,06	-3,25	(**)
1989	0,00	1,58		0,06	2,34	(*)	0,06	2,25	(*)	0,05	2,24	(*)	0,10	3,91	(**)	0,10	5,82	(**)	0,17	8,37	(**)	0,11	6,24	(**)	0,02	0,92		0,11	5,94	(**)
1991	0,00	2,48	(*)	0,07	3,33	(**)	0,07	2,85	(**)	0,07	3,22	(**)	0,07	2,82	(**)	0,07	3,86	(**)	0,04	1,78		0,06	3,53	(**)	0,09	4,91	(**)	0,07	3,80	(**)
1992	0,00	8,98	(**)	0,21	10,06	(**)	0,20	9,20	(**)	0,22	9,94	(**)	0,23	10,57	(**)	0,22	12,84	(**)	0,17	8,70	(**)	0,20	12,02	(**)	0,23	12,75	(**)	0,21	12,81	(**)
1993	0,00	2,57	(*)	0,11	5,28	(**)	0,10	4,51	(**)	0,11	5,17	(**)	0,11	4,84	(**)	0,21	12,32	(**)	0,11	5,45	(**)	0,19	11,41	(**)	0,18	9,93	(**)	0,20	12,07	(**)
1994	0,00	7,08	(**)	0,20	9,65	(**)	0,18	8,21	(**)	0,20	9,58	(**)	0,20	9,31	(**)	0,29	17,49	(**)	0,20	10,42	(**)	0,27	16,38	(**)	0,25	14,40	(**)	0,28	17,04	(**)
1995	0,00	16,81	(**)	0,34	16,57	(**)	0,31	14,87	(**)	0,34	16,57	(**)	0,34	16,32	(**)	0,42	26,92	(**)	0,35	19,14	(**)	0,40	25,52	(**)	0,36	21,33	(**)	0,41	25,98	(**)
Model																														
# Observations	704758			704758			703723			704762			704781			744435			744414			743856			704787			744426		
Adjusted/Pseudo R^2	0,20			0,37			0,36			0,37			0,37			0,12			0,34			0,13			0,15			0,12		
F (P>F) / LR chi^2 (P>chi^2)	2.756 (0,00)			36.914 (0,00)			45.764 (0,00)			47.414 (0,00)			47.618 (0,00)			16.938 (0,00)			48.666 (0,00)			18.291 (0,00)			19.611 (0,00)			17.134 (0,00)		

Probit Regressions - Post-1995 applications excluded

Table A6 – Estimates of the likelihood to be pending for at least 10 years (v. Random sample)

Variables	OLS Coef.	OLS z	Model 1 Coef.	Model 1 z	Model 2 Coef.	Model 2 z	Model 3 Coef.	Model 3 z	Instrumental Vars Coef.	Instrumental Vars z	Model 4 Coef.	Model 4 z	Model 5 Coef.	Model 5 z	Model 6 Coef.	Model 6 z	Model 7 Coef.	Model 7 z	Model 8 Coef.	Model 8 z
Filing routes																				
RTE_ACCSRC	0,00	1,50	0,24	3,44 (**)	0,24	3,55 (**)	0,25	3,61 (**)	0,25	3,69 (**)	0,49	9,57 (**)								
RTE_PCT	0,00	17,26 (**)	0,25	9,08 (**)	0,22	7,61 (**)	0,27	9,89 (**)	0,54	13,88 (**)	0,02	1,03								
RTE_LEGREP					0,01	0,31														
Drafting																				
DRF_CLAIMS	0,00	10,96 (**)	0,01	10,71 (**)	0,01	9,17 (**)	0,01	12,26 (**)	0,02	2,01 (*)			0,02	19,41 (**)						
DRF_PAGES_DESC					0,00	6,91 (**)														
DRF_PAGES_DRAW					0,15	5,03 (**)														
DRF_PRIO	0,00	2,50 (*)	0,00	0,30	0,00	-0,49	0,02	1,76	0,00	0,29			0,03	3,03 (**)						
DRF_EQUIV	0,00	29,01 (**)	0,39	24,07 (**)	0,37	22,78 (**)	0,39	24,28 (**)	0,37	22,88 (**)			0,53	33,93 (**)						
DRF_HASDIV	0,00	30,55 (**)	0,95	21,82 (**)	0,97	22,13 (**)	0,99	22,87 (**)	0,91	13,81 (**)			0,92	22,13 (**)						
DRF_ISDIV	0,00	97,64 (**)	2,56	64,44 (**)	2,56	63,82 (**)	2,57	65,04 (**)	2,51	58,96 (**)			2,50	66,76 (**)						
Importance																				
IMP_TRIADIC	0,00	12,73 (**)	0,28	11,21 (**)	0,28	11,42 (**)			-4,06	-16,13 (**)					0,49	25,41 (**)				
IMP_FWDCIT5	0,00	13,35 (**)	0,08	10,38 (**)	0,08	9,93 (**)			0,06	0,82					0,06	8,80 (**)				
IMP_DSTATES_B10					-0,04	-9,88 (**)														
Technical Complexity																				
CMP_BPC	0,00	6,86 (**)	0,02	5,86 (**)	0,02	6,26 (**)	0,02	6,08 (**)	0,02	5,65 (**)							0,03	10,47 (**)		
CMP_NPC	0,00	15,58 (**)	0,08	15,77 (**)	0,08	14,93 (**)	0,08	16,44 (**)	0,08	16,12 (**)							0,07	16,85 (**)		
CMP_INV	0,00	3,79 (**)	0,02	3,15 (**)	0,01	2,16 (*)	0,03	4,70 (**)	0,04	5,01 (**)							0,09	18,38 (**)		
CMP_IPC4	0,00	5,54 (**)	0,06	4,79 (**)	0,06	5,02 (**)	0,08	6,14 (**)	0,09	5,71 (**)							0,15	14,54 (**)		
Applicant Profiles																				
APP_MULTIPLE	0,00	-0,99	-0,03	-0,68	-0,03	-0,74	-0,05	-1,04	-0,10	-2,30 (*)									-0,09	-2,60 (**)
APP_CUMUL	0,00	-2,45 (*)	0,00	-2,47 (*)	0,00	-2,87 (**)	0,00	-1,89	0,00	8,97 (**)									0,00	-14,26 (**)
APP_OCCAS	0,00	8,26 (**)	0,26	8,73 (**)	0,29	9,59 (**)	0,22	7,47 (**)	-0,43	-8,50 (**)									-0,05	-2,20 (*)
APP_CBOWN	0,00	4,16 (**)	0,13	3,53 (**)	0,14	3,74 (**)	0,14	3,67 (**)	0,09	2,46 (*)									0,14	4,80 (**)
EPO Joint Clusters (Reference = Organic Chemistry)																				
JC-01 - Industrial Chemistry	0,00	-5,99 (**)	-0,17	-4,66 (**)	-0,16	-4,29 (**)	-0,18	-4,97 (**)	-0,16	-4,44 (**)	-0,15	-5,42 (**)	-0,10	-3,18 (**)	-0,14	-5,14 (**)	-0,27	-8,86 (**)	-0,17	-5,97 (**)
JC-03 - Polymers	0,00	3,26 (**)	0,12	3,41 (**)	0,17	4,68 (**)	0,12	3,50 (**)	0,27	7,04 (**)	0,04	1,30	0,15	4,71 (**)	0,02	0,67	-0,06	-1,94	0,04	1,56
JC-04 - Biotechnology	0,00	19,70 (**)	0,52	15,52 (**)	0,57	16,56 (**)	0,56	16,73 (**)	0,57	13,34 (**)	0,80	31,89 (**)	0,75	25,70 (**)	0,75	29,47 (**)	0,63	22,41 (**)	0,78	30,73 (**)
JC-05 - Telecommunications	0,00	17,78 (**)	0,75	15,18 (**)	0,70	13,88 (**)	0,75	15,34 (**)	0,37	6,63 (**)	0,51	12,65 (**)	0,68	14,69 (**)	0,52	12,71 (**)	0,55	12,93 (**)	0,58	14,16 (**)
JC-06 - Audio/Video/Media	0,00	6,08 (**)	0,22	4,73 (**)	0,15	3,18 (**)	0,22	4,77 (**)	0,31	6,34 (**)	0,35	9,69 (**)	0,18	4,21 (**)	0,34	9,34 (**)	0,39	10,27 (**)	0,39	10,62 (**)
JC-07 - Electronics	0,00	-3,42 (**)	-0,15	-3,67 (**)	-0,20	-4,96 (**)	-0,16	-4,04 (**)	-0,14	-3,53 (**)	-0,08	-2,45 (*)	-0,17	-4,61 (**)	-0,07	-2,21 (*)	-0,09	-2,71 (**)	-0,06	-1,87
JC-08 - Electricity	0,00	8,65 (**)	0,27	7,83 (**)	0,22	5,95 (**)	0,26	7,50 (**)	0,25	7,22 (**)	0,07	2,38 (*)	0,19	5,74 (**)	0,07	2,49 (*)	0,11	3,58 (**)	0,10	3,67 (**)
JC-09 - Computers	0,00	9,24 (**)	0,40	8,13 (**)	0,32	6,39 (**)	0,38	7,85 (**)	0,12	2,24 (*)	0,33	8,52 (**)	0,34	7,27 (**)	0,36	9,21 (**)	0,35	8,40 (**)	0,39	10,01 (**)
JC-10 - Measuring Optics	0,00	-1,73	-0,05	-1,38	-0,11	-3,11 (**)	-0,07	-2,18 (*)	-0,03	-0,91	-0,14	-5,32 (**)	-0,15	-4,81 (**)	-0,13	-4,63 (**)	-0,07	-2,58 (*)	-0,13	-4,77 (**)
JC-11 - Handling & Processing	0,00	-10,50 (**)	-0,40	-9,49 (**)	-0,43	-10,04 (**)	-0,42	-10,25 (**)	-0,66	-14,47 (**)	-0,32	-10,44 (**)	-0,34	-9,52 (**)	-0,28	-8,91 (**)	-0,36	-10,58 (**)	-0,35	-11,29 (**)
JC-12 - Vehicles	0,00	-9,58 (**)	-0,43	-8,43 (**)	-0,50	-9,49 (**)	-0,47	-9,25 (**)	-0,73	-13,24 (**)	-0,48	-12,73 (**)	-0,43	-9,77 (**)	-0,42	-11,08 (**)	-0,49	-11,53 (**)	-0,51	-13,50 (**)
JC-13 - Civil Engineering	0,00	-9,78 (**)	-0,47	-8,99 (**)	-0,52	-9,68 (**)	-0,54	-10,41 (**)	-1,05	-16,78 (**)	-0,46	-12,02 (**)	-0,46	-10,20 (**)	-0,35	-9,01 (**)	-0,49	-11,26 (**)	-0,47	-12,26 (**)
JC-14 - Human Necessities	0,00	-4,46 (**)	-0,19	-4,91 (**)	-0,22	-5,41 (**)	-0,21	-5,42 (**)	-0,44	-10,73 (**)	-0,02	-0,78	-0,24	-7,09 (**)	0,03	0,92	0,08	2,52 (*)	-0,03	-1,10

Probit Regressions - Post-1995 applications excluded – Test against a random sample control group

Variables	OLS Coef.	OLS z		Model 1 Coef.	Model 1 z		Model 2 Coef.	Model 2 z		Model 3 Coef.	Model 3 z		Instrumental Vars Coef.	Instrumental Vars z		Model 4 Coef.	Model 4 z		Model 5 Coef.	Model 5 z		Model 6 Coef.	Model 6 z		Model 7 Coef.	Model 7 z		Model 8 Coef.	Model 8 z	
Country of residence of applicants (Reference = France)																														
AT	0,00	-0,01		0,02	0,12		0,05	0,38		0,01	0,05		-0,43	-3,09	(**)	0,18	1,82		0,19	1,74		0,22	2,21	(*)	0,08	0,70		0,18	1,79	
AU	0,00	3,35	(**)	0,37	3,25	(**)	0,38	3,36	(**)	0,40	3,56	(**)	0,72	6,06	(**)	0,65	7,10	(**)	0,54	5,20	(**)	0,61	6,55	(**)	0,72	7,34	(**)	0,67	7,28	(**)
BE	0,00	2,46	(*)	0,29	2,67	(**)	0,30	2,70	(**)	0,31	2,81	(**)	0,29	2,63	(**)	0,44	5,09	(**)	0,35	3,63	(**)	0,44	5,04	(**)	0,43	4,60	(**)	0,41	4,74	(**)
CA	0,00	-1,29		-0,17	-1,56		-0,20	-1,85		-0,12	-1,11		0,22	1,96		0,26	3,05	(**)	-0,10	-1,01		0,21	2,45	(*)	0,34	3,79	(**)	0,26	3,03	(**)
CH	0,00	-0,51		0,01	0,08		0,04	0,50		0,04	0,57		0,35	4,71	(**)	0,04	0,66		-0,05	-0,75		-0,02	-0,40		0,13	2,14	(*)	-0,01	-0,14	
DE	0,00	-0,68		0,00	-0,10		0,01	0,27		-0,02	-0,35		-0,34	-6,52	(**)	0,03	0,83		0,07	1,77		0,06	1,47		-0,10	-2,47	(*)	0,09	2,46	(*)
DK	0,00	1,50		0,23	1,72		0,25	1,80		0,28	2,07	(*)	0,33	2,53	(*)	0,44	4,30	(**)	0,30	2,46	(*)	0,41	3,88	(**)	0,52	4,47	(**)	0,45	4,37	(**)
ES	0,00	-1,43		-0,28	-1,21		-0,21	-0,91		-0,29	-1,23		-0,70	-2,99	(**)	-0,55	-2,87	(**)	-0,35	-1,59		-0,51	-2,60	(**)	-0,38	-1,91		-0,55	-2,86	(**)
FI	0,00	-0,43		-0,09	-0,64		-0,08	-0,53		-0,06	-0,42		-0,06	-0,45		-0,02	-0,21		-0,14	-1,03		-0,05	-0,44		0,18	1,42		-0,07	-0,65	
GB	0,00	2,35	(*)	0,15	2,58	(*)	0,16	2,75	(**)	0,17	3,08	(**)	0,21	3,62	(**)	0,33	7,61	(**)	0,21	4,19	(**)	0,31	7,01	(**)	0,36	7,48	(**)	0,33	7,32	(**)
IL	0,00	1,73		0,16	0,91		0,14	0,78		0,18	1,06		0,39	2,24	(*)	0,42	3,04	(**)	0,17	1,05		0,42	2,99	(**)	0,48	3,30	(**)	0,43	3,10	(**)
IT	0,00	0,24		0,03	0,34		0,04	0,51		0,01	0,07		-0,44	-5,10	(**)	-0,13	-2,00	(*)	-0,02	-0,23		-0,07	-1,12		-0,11	-1,48		-0,14	-2,15	(*)
JP	0,00	4,96	(**)	0,18	3,65	(**)	0,08	1,57		0,25	5,35	(**)	1,62	16,43	(**)	0,58	15,75	(**)	0,17	3,87	(**)	0,41	11,05	(**)	0,56	14,06	(**)	0,63	16,92	(**)
KR	0,00	0,75		0,05	0,23		-0,08	-0,40		0,10	0,53		1,04	5,18	(**)	0,25	1,55		0,03	0,15		0,15	0,91		0,37	2,20	(*)	0,19	1,16	
NL	0,00	-0,69		-0,06	-0,84		-0,05	-0,78		-0,02	-0,26		0,37	5,11	(**)	0,07	1,37		-0,01	-0,19		0,02	0,42		0,11	1,99	(*)	0,10	1,77	
SE	0,00	-1,28		-0,09	-0,96		-0,08	-0,83		-0,09	-0,99		-0,10	-1,07		0,18	2,56	(*)	-0,02	-0,22		0,19	2,67	(**)	0,27	3,54	(**)	0,14	1,88	
US	0,00	1,82		0,26	2,78	(**)	0,26	2,82	(**)	0,31	3,36	(**)	0,99	9,72	(**)	0,31	4,45	(**)	0,30	3,73	(**)	0,24	3,44	(**)	0,48	6,06	(**)	0,30	4,22	(**)
RoW	0,00	2,29	(*)	0,06	1,33		0,03	0,69		0,14	3,15	(**)	1,01	12,63	(**)	0,55	16,02	(**)	0,07	1,77		0,42	12,18	(**)	0,59	15,96	(**)	0,57	16,24	(**)
Time dummies (Reference = 1990)																														
1980	0,00	-4,25	(**)	-0,30	-3,07	(**)	-0,37	-3,74	(**)	-0,32	-3,32	(**)	-0,26	-2,70	(**)	-0,99	-11,31	(**)	-0,58	-6,17	(**)	-0,97	-10,97	(**)	-0,80	-8,80	(**)	-1,03	-11,74	(**)
1981	0,00	-2,88	(**)	-0,15	-1,78		-0,22	-2,60	(**)	-0,16	-2,01	(*)	-0,15	-1,81		-0,63	-9,29	(**)	-0,37	-4,74	(**)	-0,60	-8,76	(**)	-0,51	-7,06	(**)	-0,67	-9,90	(**)
1982	0,00	-4,15	(**)	-0,27	-3,36	(**)	-0,36	-4,35	(**)	-0,30	-3,67	(**)	-0,34	-4,09	(**)	-0,69	-10,52	(**)	-0,43	-5,83	(**)	-0,66	-10,02	(**)	-0,63	-8,86	(**)	-0,72	-11,04	(**)
1983	0,00	-0,69		-0,02	-0,26		-0,08	-1,12		-0,03	-0,44		-0,11	-1,53		-0,35	-6,26	(**)	-0,16	-2,40	(*)	-0,33	-5,93	(**)	-0,29	-4,73	(**)	-0,38	-6,75	(**)
1984	0,00	-1,04		-0,05	-0,70		-0,10	-1,52		-0,05	-0,78		-0,01	-0,19		-0,37	-7,10	(**)	-0,20	-3,29	(**)	-0,36	-6,83	(**)	-0,26	-4,66	(**)	-0,40	-7,57	(**)
1985	0,00	-2,36	(*)	-0,11	-1,67		-0,15	-2,25	(*)	-0,12	-1,86		-0,04	-0,52		-0,44	-8,51	(**)	-0,31	-5,02	(**)	-0,43	-8,23	(**)	-0,32	-5,62	(**)	-0,47	-8,96	(**)
1986	0,00	-3,42	(**)	-0,20	-3,08	(**)	-0,23	-3,50	(**)	-0,20	-3,05	(**)	-0,10	-1,60		-0,46	-9,37	(**)	-0,36	-6,04	(**)	-0,46	-9,30	(**)	-0,33	-6,20	(**)	-0,49	-9,88	(**)
1987	0,00	-2,56	(*)	-0,13	-2,08	(*)	-0,13	-2,16	(*)	-0,13	-2,06	(*)	-0,05	-0,81		-0,24	-5,27	(**)	-0,10	-1,93		-0,23	-5,06	(**)	-0,27	-5,41	(**)	-0,25	-5,54	(**)
1988	0,00	-1,64		-0,06	-1,11		-0,07	-1,22		-0,06	-1,10		0,01	0,24		-0,08	-1,81		0,06	1,14		-0,06	-1,55		-0,19	-3,97	(**)	-0,09	-2,10	(*)
1989	0,00	1,65		0,09	1,77		0,08	1,43		0,09	1,74		0,14	2,58	(*)	0,21	5,35	(**)	0,27	5,94	(**)	0,22	5,67	(**)	0,05	1,24		0,20	5,31	(**)
1991	0,00	1,97	(*)	0,08	1,54		0,06	1,24		0,08	1,51		0,05	0,95		0,05	1,26		0,04	0,93		0,05	1,38		0,11	2,69	(**)	0,06	1,46	
1992	0,00	8,88	(**)	0,38	7,87	(**)	0,34	6,97	(**)	0,38	7,96	(**)	0,39	7,97	(**)	0,32	8,63	(**)	0,31	6,97	(**)	0,31	8,29	(**)	0,37	9,37	(**)	0,32	8,66	(**)
1993	0,00	5,61	(**)	0,21	4,37	(**)	0,19	3,86	(**)	0,21	4,35	(**)	0,19	3,88	(**)	0,27	7,21	(**)	0,23	5,20	(**)	0,27	7,22	(**)	0,26	6,63	(**)	0,27	7,20	(**)
1994	0,00	8,83	(**)	0,34	7,22	(**)	0,31	6,49	(**)	0,34	7,29	(**)	0,34	7,06	(**)	0,34	9,37	(**)	0,36	8,32	(**)	0,35	9,53	(**)	0,33	8,50	(**)	0,35	9,56	(**)
1995	0,00	15,74	(**)	0,59	12,87	(**)	0,55	11,91	(**)	0,59	12,87	(**)	0,58	12,39	(**)	0,53	15,04	(**)	0,62	15,10	(**)	0,54	15,33	(**)	0,50	13,27	(**)	0,52	14,96	(**)
Model																														
# Observations	26959			26959			26560			26960			26961			29388			29387			29372			26961			29388		
Adjusted/Pseudo R^2	0,51			0,47			0,47			0,47			0,47			0,19			0,43			0,21			0,24			0,19		
F (P>F) / LR chi^2 (P>chi^2)	448 (0,00)			17.730 (0,00)			17.368 (0,00)			17.472 (0,00)			17.587 (0,00)			7.680 (0,00)			17.332 (0,00)			8.366 (0,00)			9.073 (0,00)			7.814 (0,00)		

Table A7 – Estimates of the number of communications

Variables	OLS		Model 1		Model 2		Model 3		Instrumental Vars		Model 4		Model 5		Model 6		Model 7		Model 8	
	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z
Filing routes																				
RTE_ACCSRC	0,00	18,90 (**)	0,08	17,88 (**)	0,08	22,02 (**)	0,04	9,95 (**)	0,04	11,27 (**)	0,06	15,10 (**)								
RTE_PCT	0,00	14,75 (**)	0,02	15,27 (**)	0,03	20,95 (**)	-0,05	-37,35 (**)	-0,03	-14,60 (**)	-0,04	-29,04 (**)								
RTE_LEGREP					0,04	21,08 (**)														
Drafting																				
DRF_CLAIMS	0,00	27,94 (**)	0,00	24,05 (**)	0,00	36,24 (**)	0,00	47,43 (**)	0,00	-0,48			0,00	57,59 (**)						
DRF_PAGES_DESC					0,00	-7,98 (**)														
DRF_PAGES_DRAW					-0,06	-41,44 (**)														
DRF_PRIO	0,00	14,02 (**)	0,01	5,30 (**)	0,01	13,20 (**)	0,01	13,61 (**)	0,02	20,83 (**)			0,01	19,69 (**)						
DRF_EQUIV	0,00	-10,19 (**)	-0,01	-8,75 (**)	-0,01	-11,22 (**)	0,00	1,12	0,00	3,02 (**)			0,00	1,76						
DRF_HASDIV	0,00	119,79 (**)	0,33	122,07 (**)	0,33	131,38 (**)	0,14	52,82 (**)	0,18	45,49 (**)			0,15	58,57 (**)						
DRF_ISDIV	0,00	-11,52 (**)	-0,05	-10,31 (**)	-0,03	-9,16 (**)	-0,05	-12,81 (**)	-0,05	-12,90 (**)			-0,03	-7,01 (**)						
Importance																				
IMP_TRIADIC	0,00	176,52 (**)	0,24	170,16 (**)	0,24	210,13 (**)			0,00	-0,16					0,01	8,34 (**)				
IMP_FWDCIT5	0,00	61,56 (**)	0,03	35,73 (**)	0,03	66,43 (**)			-0,11	-25,36 (**)					0,02	47,55 (**)				
IMP_DSTATES_B10					0,00	-14,90 (**)														
Technical Complexity																				
CMP_BPC	0,00	33,83 (**)	0,01	31,05 (**)	0,01	38,23 (**)	0,01	39,92 (**)	0,01	51,74 (**)							0,01	50,58 (**)		
CMP_NPC	0,00	16,36 (**)	0,00	11,61 (**)	0,01	17,96 (**)	0,01	37,13 (**)	0,01	45,13 (**)							0,01	42,78 (**)		
CMP_INV	0,00	21,27 (**)	0,01	19,35 (**)	0,01	22,35 (**)	0,01	15,09 (**)	0,01	30,08 (**)							0,01	21,84 (**)		
CMP_IPC4	0,00	11,33 (**)	0,01	10,71 (**)	0,01	11,02 (**)	0,02	22,54 (**)	0,03	35,75 (**)							0,02	27,84 (**)		
Applicant Profiles																				
APP_MULTIPLE	0,00	-6,40 (**)	-0,02	-6,13 (**)	-0,02	-6,92 (**)	-0,02	-8,32 (**)	-0,02	-8,21 (**)									-0,01	-6,28 (**)
APP_CUMUL	0,00	-14,78 (**)	0,00	-15,79 (**)	0,00	-13,91 (**)	0,00	-3,98 (**)	0,00	-4,13 (**)									0,00	-5,23 (**)
APP_OCCAS	0,00	-12,60 (**)	-0,03	-13,56 (**)	-0,02	-14,94 (**)	0,03	17,36 (**)	0,03	11,34 (**)									0,02	12,37 (**)
APP_CBOWN	0,00	20,48 (**)	0,04	20,04 (**)	0,04	22,29 (**)	0,00	1,11	0,00	0,64									0,00	0,28
EPO Joint Clusters (Reference = Organic Chemistry)																				
JC-01 - Industrial Chemistry	0,00	26,82 (**)	0,05	25,80 (**)	0,05	31,70 (**)	0,01	8,08 (**)	0,01	4,37 (**)	0,03	18,01 (**)	0,03	16,83 (**)	0,03	17,15 (**)	0,01	6,41 (**)	0,03	16,86 (**)
JC-03 - Polymers	0,00	20,54 (**)	0,04	19,75 (**)	0,03	14,22 (**)	0,04	20,06 (**)	0,05	25,17 (**)	0,05	26,14 (**)	0,05	25,10 (**)	0,04	23,54 (**)	0,04	18,77 (**)	0,05	26,39 (**)
JC-04 - Biotechnology	0,00	1,10	0,00	1,55	0,00	0,67	0,09	43,17 (**)	0,13	51,05 (**)	0,12	61,06 (**)	0,10	50,62 (**)	0,10	51,93 (**)	0,09	44,61 (**)	0,11	57,78 (**)
JC-05 - Telecommunications	0,00	-46,47 (**)	-0,16	-43,92 (**)	-0,15	-47,73 (**)	-0,09	-26,31 (**)	-0,05	-14,54 (**)	-0,09	-27,26 (**)	-0,09	-27,45 (**)	-0,09	-28,87 (**)	-0,09	-26,41 (**)	-0,08	-26,10 (**)
JC-06 - Audio/Video/Media	0,00	-24,63 (**)	-0,08	-24,91 (**)	-0,06	-23,48 (**)	-0,05	-18,71 (**)	-0,04	-15,03 (**)	-0,04	-16,00 (**)	-0,05	-18,49 (**)	-0,04	-15,91 (**)	-0,04	-15,83 (**)	-0,04	-14,95 (**)
JC-07 - Electronics	0,00	-22,26 (**)	-0,05	-22,41 (**)	-0,04	-18,99 (**)	-0,04	-19,15 (**)	-0,04	-20,38 (**)	-0,04	-17,53 (**)	-0,04	-17,21 (**)	-0,04	-16,62 (**)	-0,04	-19,04 (**)	-0,04	-16,55 (**)
JC-08 - Electricity	0,00	-50,96 (**)	-0,11	-51,19 (**)	-0,09	-50,71 (**)	-0,08	-42,68 (**)	-0,09	-46,99 (**)	-0,08	-43,25 (**)	-0,08	-41,69 (**)	-0,08	-41,30 (**)	-0,08	-42,92 (**)	-0,08	-41,95 (**)
JC-09 - Computers	0,00	-20,40 (**)	-0,07	-17,70 (**)	-0,05	-18,23 (**)	-0,01	-2,18 (*)	0,00	0,60	0,00	-0,83	0,00	-1,13	0,00	-0,34	0,00	-0,66	0,00	-0,05
JC-10 - Measuring Optics	0,00	-37,50 (**)	-0,08	-36,70 (**)	-0,07	-33,89 (**)	-0,08	-41,18 (**)	-0,10	-46,32 (**)	-0,08	-40,34 (**)	-0,08	-39,76 (**)	-0,07	-37,43 (**)	-0,08	-40,07 (**)	-0,08	-39,79 (**)
JC-11 - Handling & Processing	0,00	-25,17 (**)	-0,05	-25,69 (**)	-0,03	-18,65 (**)	-0,08	-41,22 (**)	-0,09	-44,44 (**)	-0,07	-39,57 (**)	-0,07	-39,19 (**)	-0,06	-36,52 (**)	-0,07	-39,36 (**)	-0,07	-40,49 (**)
JC-12 - Vehicles	0,00	-19,99 (**)	-0,04	-21,17 (**)	-0,03	-14,46 (**)	-0,09	-45,35 (**)	-0,11	-47,79 (**)	-0,09	-47,17 (**)	-0,09	-44,26 (**)	-0,09	-44,27 (**)	-0,09	-45,63 (**)	-0,09	-47,03 (**)
JC-13 - Civil Engineering	0,00	-13,55 (**)	-0,03	-13,25 (**)	-0,01	-6,26 (**)	-0,08	-34,94 (**)	-0,09	-33,78 (**)	-0,07	-33,23 (**)	-0,07	-31,66 (**)	-0,06	-30,18 (**)	-0,07	-34,23 (**)	-0,07	-33,86 (**)
JC-14 - Human Necessities	0,00	-32,51 (**)	-0,07	-32,57 (**)	-0,05	-27,16 (**)	-0,08	-38,24 (**)	-0,08	-36,05 (**)	-0,07	-34,55 (**)	-0,07	-37,18 (**)	-0,06	-33,47 (**)	-0,07	-33,80 (**)	-0,07	-35,62 (**)

Variables	OLS Coef.	OLS z	Model 1 Coef.	Model 1 z	Model 2 Coef.	Model 2 z	Model 3 Coef.	Model 3 z	Instrumental Vars Coef.	Instrumental Vars z	Model 4 Coef.	Model 4 z	Model 5 Coef.	Model 5 z	Model 6 Coef.	Model 6 z	Model 7 Coef.	Model 7 z	Model 8 Coef.	Model 8 z
Country of residence of applicants (Reference = France)																				
AT	0,00	-2,11 (*)	-0,01	-2,06 (*)	-0,01	-1,74	0,01	1,18	0,00	0,56	0,00	-0,52	-0,01	-1,09	0,00	-0,84	0,00	0,29	0,00	-0,78
AU	0,00	-13,36 (**)	-0,11	-11,31 (**)	-0,11	-15,36 (**)	0,15	18,80 (**)	0,16	18,96 (**)	0,20	25,28 (**)	0,15	19,32 (**)	0,17	22,17 (**)	0,14	18,27 (**)	0,18	22,67 (**)
BE	0,00	-7,94 (**)	-0,05	-7,84 (**)	-0,05	-8,78 (**)	0,05	8,52 (**)	0,06	9,84 (**)	0,05	9,23 (**)	0,05	8,60 (**)	0,05	8,86 (**)	0,05	8,33 (**)	0,06	9,55 (**)
CA	0,00	-7,30 (**)	-0,04	-6,76 (**)	-0,04	-8,05 (**)	0,08	13,67 (**)	0,11	17,47 (**)	0,10	17,37 (**)	0,07	11,84 (**)	0,08	14,52 (**)	0,08	14,67 (**)	0,09	15,40 (**)
CH	0,00	-12,56 (**)	-0,05	-13,08 (**)	-0,04	-12,51 (**)	0,04	12,21 (**)	0,06	15,31 (**)	0,04	13,49 (**)	0,04	11,88 (**)	0,04	12,56 (**)	0,04	13,23 (**)	0,05	13,94 (**)
DE	0,00	-0,16	0,00	0,53	0,01	5,54 (**)	0,03	12,47 (**)	0,03	11,05 (**)	0,02	8,43 (**)	0,02	9,16 (**)	0,02	7,92 (**)	0,02	8,43 (**)	0,02	10,20 (**)
DK	0,00	-2,14 (*)	-0,02	-2,46 (*)	-0,01	-1,82	0,03	3,78 (**)	0,04	5,89 (**)	0,02	2,87 (**)	-0,01	-0,91	0,00	0,07	0,02	2,76 (**)	0,00	0,62
ES	0,00	-8,30 (**)	-0,08	-7,50 (**)	-0,08	-10,10 (**)	0,08	8,85 (**)	0,06	6,39 (**)	0,07	7,69 (**)	0,08	8,97 (**)	0,07	8,07 (**)	0,08	8,41 (**)	0,07	7,30 (**)
FI	0,00	1,39	0,01	1,79	0,01	2,14 (*)	0,06	9,57 (**)	0,08	12,16 (**)	0,05	8,19 (**)	0,04	6,07 (**)	0,03	5,44 (**)	0,05	7,49 (**)	0,04	6,27 (**)
GB	0,00	-18,89 (**)	-0,06	-18,52 (**)	-0,06	-23,77 (**)	0,08	28,37 (**)	0,10	32,21 (**)	0,09	31,75 (**)	0,07	24,76 (**)	0,08	27,81 (**)	0,08	28,45 (**)	0,08	29,42 (**)
IL	0,00	-16,54 (**)	-0,17	-13,01 (**)	-0,17	-18,61 (**)	0,10	9,48 (**)	0,13	11,76 (**)	0,12	11,91 (**)	0,10	9,72 (**)	0,11	11,02 (**)	0,11	10,65 (**)	0,12	11,42 (**)
IT	0,00	-9,92 (**)	-0,04	-10,06 (**)	-0,04	-12,23 (**)	0,05	14,92 (**)	0,05	13,75 (**)	0,05	13,15 (**)	0,05	15,59 (**)	0,05	14,75 (**)	0,06	15,50 (**)	0,05	14,24 (**)
JP	0,00	9,97 (**)	0,02	9,48 (**)	0,01	5,09 (**)	0,11	46,67 (**)	0,11	22,83 (**)	0,12	58,22 (**)	0,11	52,69 (**)	0,12	56,21 (**)	0,11	51,41 (**)	0,14	62,13 (**)
KR	0,00	-7,54 (**)	-0,07	-6,94 (**)	-0,08	-9,37 (**)	0,09	9,48 (**)	0,07	7,47 (**)	0,09	9,92 (**)	0,09	9,51 (**)	0,09	9,90 (**)	0,09	9,71 (**)	0,09	10,03 (**)
NL	0,00	-8,28 (**)	-0,03	-7,73 (**)	-0,03	-10,03 (**)	0,04	11,66 (**)	0,04	12,33 (**)	0,03	9,83 (**)	0,03	9,73 (**)	0,03	8,53 (**)	0,03	8,52 (**)	0,04	10,95 (**)
SE	0,00	-19,70 (**)	-0,10	-18,71 (**)	-0,10	-23,42 (**)	0,06	13,32 (**)	0,06	12,61 (**)	0,07	15,45 (**)	0,06	12,77 (**)	0,06	13,61 (**)	0,06	13,27 (**)	0,06	12,84 (**)
US	0,00	-10,73 (**)	-0,05	-11,81 (**)	-0,05	-12,10 (**)	0,04	8,36 (**)	0,04	8,24 (**)	0,01	3,41 (**)	0,00	-0,05	-0,01	-1,37	0,02	4,12 (**)	0,00	-0,30
RoW	0,00	-40,42 (**)	-0,09	-40,01 (**)	-0,10	-47,99 (**)	0,11	51,89 (**)	0,15	35,76 (**)	0,13	63,25 (**)	0,10	49,67 (**)	0,11	55,67 (**)	0,12	56,31 (**)	0,13	61,52 (**)
Time dummies (Reference = 1990)																				
1980	0,00	-52,84 (**)	-0,27	-51,15 (**)	-0,28	-60,05 (**)	-0,39	-77,06 (**)	-0,41	-80,79 (**)	-0,39	-79,41 (**)	-0,38	-76,98 (**)	-0,38	-77,45 (**)	-0,38	-76,61 (**)	-0,38	-78,89 (**)
1981	0,00	-73,53 (**)	-0,37	-71,30 (**)	-0,36	-84,65 (**)	-0,47	-99,06 (**)	-0,49	-102,14 (**)	-0,47	-101,31 (**)	-0,45	-99,04 (**)	-0,46	-99,43 (**)	-0,46	-98,42 (**)	-0,46	-100,71 (**)
1982	0,00	-73,69 (**)	-0,34	-71,19 (**)	-0,34	-84,98 (**)	-0,43	-98,63 (**)	-0,45	-101,40 (**)	-0,43	-100,88 (**)	-0,42	-98,57 (**)	-0,43	-99,09 (**)	-0,43	-98,12 (**)	-0,43	-100,27 (**)
1983	0,00	-61,96 (**)	-0,27	-61,30 (**)	-0,27	-70,88 (**)	-0,34	-83,68 (**)	-0,36	-86,19 (**)	-0,35	-86,61 (**)	-0,34	-84,21 (**)	-0,34	-84,80 (**)	-0,34	-82,99 (**)	-0,34	-85,92 (**)
1984	0,00	-83,20 (**)	-0,36	-84,12 (**)	-0,36	-96,66 (**)	-0,43	-106,30 (**)	-0,44	-108,02 (**)	-0,43	-108,93 (**)	-0,42	-106,75 (**)	-0,42	-107,38 (**)	-0,42	-105,46 (**)	-0,42	-108,22 (**)
1985	0,00	-81,57 (**)	-0,34	-80,25 (**)	-0,34	-94,32 (**)	-0,40	-102,53 (**)	-0,41	-103,55 (**)	-0,40	-106,20 (**)	-0,40	-104,62 (**)	-0,40	-105,12 (**)	-0,40	-101,67 (**)	-0,40	-105,77 (**)
1986	0,00	-74,77 (**)	-0,30	-71,16 (**)	-0,30	-86,45 (**)	-0,35	-93,72 (**)	-0,36	-94,46 (**)	-0,36	-97,60 (**)	-0,35	-95,97 (**)	-0,35	-96,66 (**)	-0,35	-92,91 (**)	-0,35	-97,15 (**)
1987	0,00	-56,61 (**)	-0,21	-51,82 (**)	-0,21	-64,79 (**)	-0,24	-66,93 (**)	-0,24	-67,32 (**)	-0,24	-70,01 (**)	-0,24	-68,55 (**)	-0,24	-68,96 (**)	-0,23	-65,64 (**)	-0,24	-69,31 (**)
1988	0,00	-36,10 (**)	-0,12	-33,10 (**)	-0,12	-40,82 (**)	-0,13	-38,95 (**)	-0,13	-39,07 (**)	-0,13	-41,33 (**)	-0,13	-39,83 (**)	-0,13	-40,17 (**)	-0,12	-37,56 (**)	-0,13	-40,38 (**)
1989	0,00	-12,75 (**)	-0,04	-11,83 (**)	-0,04	-14,19 (**)	-0,03	-8,20 (**)	-0,03	-8,62 (**)	-0,03	-8,94 (**)	-0,02	-7,97 (**)	-0,02	-8,06 (**)	-0,02	-7,15 (**)	-0,03	-8,25 (**)
1991	0,00	2,33 (*)	0,01	2,15 (*)	0,01	2,32 (*)	0,00	-0,73	0,00	-0,18	0,00	1,21	0,00	0,05	0,00	0,25	-0,01	-1,90	0,00	0,45
1992	0,00	-2,53 (*)	-0,01	-2,64 (**)	-0,01	-3,24 (**)	-0,01	-3,14 (**)	-0,01	-1,85	0,00	0,16	-0,01	-1,73	0,00	-1,21	-0,01	-4,24 (**)	0,00	-0,69
1993	0,00	-3,67 (**)	-0,01	-3,81 (**)	-0,01	-4,65 (**)	-0,02	-6,78 (**)	-0,01	-4,14 (**)	-0,01	-1,86	-0,01	-5,01 (**)	-0,01	-4,02 (**)	-0,02	-8,11 (**)	-0,01	-3,25 (**)
1994	0,00	-7,65 (**)	-0,02	-7,92 (**)	-0,02	-9,01 (**)	-0,03	-9,41 (**)	-0,02	-5,47 (**)	-0,01	-4,03 (**)	-0,02	-8,14 (**)	-0,02	-7,09 (**)	-0,03	-11,15 (**)	-0,02	-5,99 (**)
1995	0,00	-16,59 (**)	-0,05	-16,73 (**)	-0,05	-19,10 (**)	-0,04	-14,87 (**)	-0,03	-10,34 (**)	-0,02	-6,94 (**)	-0,04	-12,21 (**)	-0,03	-10,79 (**)	-0,05	-17,46 (**)	-0,03	-9,56 (**)
1996	0,00	-25,00 (**)	-0,08	-24,67 (**)	-0,08	-28,33 (**)	-0,05	-15,74 (**)	-0,03	-9,75 (**)	-0,03	-8,93 (**)	-0,05	-15,44 (**)	-0,04	-13,57 (**)	-0,05	-18,39 (**)	-0,04	-12,14 (**)
1997	0,00	-42,54 (**)	-0,13	-41,33 (**)	-0,13	-48,07 (**)	-0,07	-22,65 (**)	-0,05	-16,66 (**)	-0,05	-16,44 (**)	-0,07	-23,54 (**)	-0,06	-21,20 (**)	-0,08	-25,66 (**)	-0,06	-20,07 (**)
1998	0,00	-63,05 (**)	-0,20	-60,59 (**)	-0,20	-72,20 (**)	-0,10	-33,61 (**)	-0,09	-28,35 (**)	-0,08	-27,74 (**)	-0,11	-35,35 (**)	-0,10	-32,29 (**)	-0,11	-36,69 (**)	-0,09	-31,57 (**)
1999	0,00	-76,09 (**)	-0,25	-73,06 (**)	-0,25	-88,04 (**)	-0,14	-43,72 (**)	-0,14	-37,91 (**)	-0,12	-38,71 (**)	-0,14	-47,04 (**)	-0,13	-42,94 (**)	-0,15	-47,07 (**)	-0,13	-42,91 (**)
2000	0,00	-84,69 (**)	-0,30	-81,29 (**)	-0,30	-98,79 (**)	-0,19	-57,65 (**)	-0,20	-44,85 (**)	-0,17	-53,25 (**)	-0,20	-61,94 (**)	-0,18	-56,54 (**)	-0,20	-61,32 (**)	-0,18	-57,57 (**)
Model #																				
Observations	1039608		1039608		1038302		697094		697150		719416		719345		719416		697152		719412	
Adjusted/Pseudo R^2	0,13		0,04		0,04		0,04		0,04		0,03		0,04		0,03		0,04		0,03	
F (P>F) / LR chi^2 (P>chi^2)	2.255 (0,00)		154.849 (0,00)		208.921 (0,00)		111.492 (0,00)		110.077 (0,00)		103.188 (0,00)		111.325 (0,00)		104.360 (0,00)		103.421 (0,00)		102.287 (0,00)	

Table A8 – Estimates of the likelihood to be granted

Variables	OLS		Model 1		Model 2		Model 3		Instrumental Vars		Model 4		Model 5		Model 6		Model 7		Model 8	
	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z
Filing routes																				
RTE_ACCSRC	0,00	9,45(**)	0,10	9,19(**)	0,09	8,94(**)	0,12	11,56(**)	0,12	12,07 (**)	0,12	12,49(**)								
RTE_PCT	0,00	54,04(**)	0,19	53,47(**)	0,23	61,52(**)	0,24	68,07(**)	0,21	42,64 (**)	0,15	49,64(**)								
RTE_LEGREP					0,13	24,45(**)														
Drafting																				
DRF_CLAIMS	0,00	-14,85(**)	0,00	-14,40(**)	0,00	-7,88(**)	0,00	-4,33(**)	0,00	4,19 (**)			0,00	-2,97(**)						
DRF_PAGES_DESC					0,00	-20,33(**)														
DRF_PAGES_DRAW					0,02	5,53(**)														
DRF_PRIO	0,00	1,69	0,00	1,30	0,01	4,66(**)	0,04	19,33(**)	0,05	16,23 (**)			0,04	24,55(**)						
DRF_EQUIV	0,00	-16,51(**)	-0,04	-15,95(**)	-0,04	-16,58(**)	-0,02	-8,25(**)	-0,02	-7,14 (**)			-0,01	-5,02(**)						
DRF_HASDIV	0,00	79,17(**)	0,85	75,61(**)	0,86	80,60(**)	0,91	86,54(**)	0,93	72,05 (**)			0,95	92,51(**)						
DRF_ISDIV	0,00	5,52(**)	0,05	4,26(**)	0,06	5,57(**)	0,14	13,21(**)	0,18	17,05 (**)			0,09	8,59(**)						
Importance																				
IMP_TRIADIC	0,00	223,72(**)	0,65	214,57(**)	0,65	217,16(**)			0,91	29,14 (**)					0,68	240,63(**)				
IMP_FWDCIT5	0,00	49,31(**)	0,07	36,50(**)	0,08	53,57(**)			-0,31	-28,57 (**)					0,08	56,16(**)				
IMP_DSTATES_B10					-0,03	-49,24(**)														
Technical Complexity																				
CMP_BPC	0,00	-6,72(**)	0,00	-6,93(**)	0,00	-6,69(**)	0,00	-8,90(**)	0,00	4,26 (**)							0,00	-4,50(**)		
CMP_NPC	0,00	-30,60(**)	-0,03	-29,43(**)	-0,03	-29,88(**)	-0,02	-26,43(**)	-0,02	-18,67 (**)							-0,02	-20,16(**)		
CMP_INV	0,00	12,48(**)	0,01	13,07(**)	0,02	18,14(**)	0,02	26,74(**)	0,04	35,47 (**)							0,04	48,26(**)		
CMP_IPC4	0,00	-12,21(**)	-0,02	-12,31(**)	-0,02	-8,32(**)	-0,01	-4,57(**)	0,02	10,74 (**)							0,01	3,41(**)		
Applicant Profiles																				
APP_MULTIPLE	0,00	1,90	0,01	2,27 (*)	0,01	1,05	0,00	0,03	0,02	2,75 (**)									0,01	1,80
APP_CUMUL	0,00	-10,25(**)	0,00	-9,73(**)	0,00	-7,03(**)	0,00	5,20(**)	0,00	-14,81 (**)									0,00	1,57
APP_OCCAS	0,00	-50,06(**)	-0,18	-48,28(**)	-0,17	-44,08(**)	-0,27	-73,56(**)	-0,12	-19,79 (**)									-0,28	-80,76(**)
APP_CBOWN	0,00	27,89(**)	0,13	27,13(**)	0,13	27,39(**)	0,13	26,29(**)	0,13	27,26 (**)									0,12	25,16(**)
EPO Joint Clusters (Reference = Organic Chemistry)																				
JC-01 - Industrial Chemistry	0,00	16,91(**)	0,08	17,10(**)	0,07	14,90(**)	0,07	16,28(**)	0,04	9,86 (**)	0,06	14,72(**)	0,07	16,34(**)	0,07	15,88(**)	0,05	12,41(**)	0,07	17,25(**)
JC-03 - Polymers	0,00	4,98(**)	0,02	5,09(**)	0,04	7,62(**)	0,05	11,11(**)	0,04	7,97 (**)	0,07	16,06(**)	0,08	16,91(**)	0,03	5,46(**)	0,05	11,31(**)	0,06	12,69(**)
JC-04 - Biotechnology	0,00	-45,58(**)	-0,23	-44,76(**)	-0,18	-34,38(**)	-0,20	-40,42(**)	-0,13	-20,54 (**)	-0,19	-41,35(**)	-0,18	-39,86(**)	-0,22	-46,82(**)	-0,17	-34,12(**)	-0,16	-35,66(**)
JC-05 - Telecommunications	0,00	-18,68(**)	-0,14	-18,48(**)	-0,17	-22,27(**)	-0,16	-21,70(**)	0,00	-0,34	-0,15	-22,22(**)	-0,15	-22,08(**)	-0,15	-21,36(**)	-0,14	-19,42(**)	-0,17	-24,85(**)
JC-06 - Audio/Video/Media	0,00	-1,59	-0,01	-1,64	-0,05	-7,38(**)	0,01	1,77	-0,01	-1,53	0,00	0,31	-0,01	-1,07	-0,03	-4,96(**)	0,02	3,35(**)	0,00	0,04
JC-07 - Electronics	0,00	-0,30	0,00	-0,60	-0,04	-7,29(**)	0,00	0,05	-0,01	-2,48 (*)	0,00	-0,98	-0,01	-1,71	-0,01	-2,66(**)	0,00	0,91	-0,01	-1,80
JC-08 - Electricity	0,00	-8,17(**)	-0,04	-8,48(**)	-0,08	-16,77(**)	-0,05	-10,23(**)	-0,07	-14,59 (**)	-0,06	-12,83(**)	-0,06	-13,48(**)	-0,06	-12,98(**)	-0,05	-11,97(**)	-0,07	-14,97(**)
JC-09 - Computers	0,00	-16,19(**)	-0,11	-15,51(**)	-0,15	-19,87(**)	-0,14	-19,47(**)	-0,08	-10,16 (**)	-0,18	-26,07(**)	-0,18	-25,93(**)	-0,16	-22,59(**)	-0,16	-21,77(**)	-0,17	-24,94(**)
JC-10 - Measuring Optics	0,00	6,80(**)	0,03	6,82(**)	-0,02	-3,00(**)	0,03	6,08(**)	-0,03	-5,29 (**)	0,01	1,90	0,01	1,73	0,02	3,28(**)	0,01	2,08 (*)	0,01	3,12(**)
JC-11 - Handling & Processing	0,00	20,54(**)	0,09	20,31(**)	0,07	14,35(**)	0,04	9,86(**)	0,05	10,56 (**)	0,01	1,33	0,00	0,67	0,08	17,85(**)	0,01	2,48 (*)	0,04	8,54(**)
JC-12 - Vehicles	0,00	36,82(**)	0,18	36,59(**)	0,14	27,72(**)	0,13	26,95(**)	0,16	28,92 (**)	0,10	22,07(**)	0,10	21,66(**)	0,17	35,93(**)	0,10	21,06(**)	0,12	24,72(**)
JC-13 - Civil Engineering	0,00	27,21(**)	0,14	26,28(**)	0,10	19,57(**)	0,05	9,74(**)	0,12	18,68 (**)	0,00	0,46	0,00	-0,01	0,11	23,26(**)	0,00	0,71	0,04	7,83(**)
JC-14 - Human Necessities	0,00	11,38(**)	0,05	11,36(**)	0,03	6,25(**)	0,01	2,76(**)	0,06	11,02 (**)	-0,03	-8,03(**)	-0,04	-9,46(**)	0,04	8,19(**)	-0,02	-4,54(**)	0,02	4,00(**)

Variables	OLS Coef.	OLS z	Model 1 Coef.	Model 1 z	Model 2 Coef.	Model 2 z	Model 3 Coef.	Model 3 z	Instrumental Vars Coef.	Instrumental Vars z	Model 4 Coef.	Model 4 z	Model 5 Coef.	Model 5 z	Model 6 Coef.	Model 6 z	Model 7 Coef.	Model 7 z	Model 8 Coef.	Model 8 z
Country of residence of applicants (Reference = France)																				
AT	0,00	1,33	0,01	0,78	0,03	1,92	-0,05	-3,85 (**)	0,05	3,38 (**)	-0,03	-2,01 (*)	-0,02	-1,79	0,05	4,09 (**)	-0,02	-1,80	-0,03	-2,50 (*)
AU	0,00	-40,49 (**)	-0,69	-39,91 (**)	-0,70	-40,33 (**)	-0,63	-37,32 (**)	-0,73	-41,41 (**)	-0,63	-38,54 (**)	-0,57	-34,68 (**)	-0,63	-37,43 (**)	-0,53	-31,83 (**)	-0,50	-30,26 (**)
BE	0,00	-13,30 (**)	-0,18	-13,31 (**)	-0,16	-11,18 (**)	-0,17	-12,14 (**)	-0,16	-11,66 (**)	-0,14	-10,54 (**)	-0,14	-10,68 (**)	-0,15	-11,06 (**)	-0,15	-10,77 (**)	-0,17	-12,77 (**)
CA	0,00	-26,10 (**)	-0,36	-26,06 (**)	-0,38	-27,78 (**)	-0,29	-21,39 (**)	-0,35	-23,95 (**)	-0,27	-21,41 (**)	-0,26	-20,05 (**)	-0,32	-24,93 (**)	-0,22	-17,18 (**)	-0,23	-18,10 (**)
CH	0,00	-18,92 (**)	-0,15	-18,24 (**)	-0,11	-13,33 (**)	-0,09	-11,62 (**)	-0,15	-16,77 (**)	-0,03	-4,34 (**)	-0,03	-4,58 (**)	-0,09	-11,85 (**)	-0,03	-4,41 (**)	-0,09	-11,59 (**)
DE	0,00	0,07	0,00	-0,30	0,04	6,97 (**)	-0,05	-9,27 (**)	0,03	5,37 (**)	0,01	1,86	0,01	1,70	0,04	7,03 (**)	-0,01	-1,36	-0,03	-6,18 (**)
DK	0,00	-4,44 (**)	-0,08	-4,36 (**)	-0,05	-2,75 (**)	-0,07	-3,85 (**)	-0,05	-2,84 (**)	-0,07	-4,41 (**)	-0,03	-1,68	-0,02	-1,48	0,03	1,43	-0,01	-0,63
ES	0,00	-19,59 (**)	-0,37	-18,94 (**)	-0,36	-18,16 (**)	-0,41	-21,35 (**)	-0,32	-16,27 (**)	-0,48	-26,10 (**)	-0,48	-25,74 (**)	-0,39	-20,69 (**)	-0,47	-24,75 (**)	-0,42	-22,37 (**)
FI	0,00	-6,15 (**)	-0,10	-6,05 (**)	-0,11	-6,53 (**)	-0,08	-4,72 (**)	-0,02	-1,46	-0,06	-4,26 (**)	-0,02	-1,23	-0,05	-3,02 (**)	0,01	0,66	-0,03	-1,86
GB	0,00	-57,92 (**)	-0,39	-57,37 (**)	-0,40	-57,77 (**)	-0,37	-54,59 (**)	-0,36	-52,05 (**)	-0,35	-55,02 (**)	-0,34	-53,95 (**)	-0,36	-55,22 (**)	-0,29	-44,96 (**)	-0,35	-53,51 (**)
IL	0,00	-29,56 (**)	-0,62	-28,54 (**)	-0,61	-28,27 (**)	-0,56	-26,72 (**)	-0,61	-27,67 (**)	-0,59	-28,59 (**)	-0,57	-27,71 (**)	-0,61	-29,01 (**)	-0,57	-27,13 (**)	-0,51	-24,93 (**)
IT	0,00	-23,37 (**)	-0,19	-23,52 (**)	-0,19	-22,83 (**)	-0,24	-29,53 (**)	-0,14	-15,64 (**)	-0,25	-31,80 (**)	-0,26	-32,79 (**)	-0,19	-23,72 (**)	-0,27	-33,91 (**)	-0,25	-31,25 (**)
JP	0,00	-25,15 (**)	-0,13	-22,65 (**)	-0,22	-35,30 (**)	0,08	13,87 (**)	-0,20	-16,61 (**)	0,19	36,31 (**)	0,14	25,57 (**)	-0,09	-15,59 (**)	0,15	27,09 (**)	0,13	24,03 (**)
KR	0,00	-19,02 (**)	-0,42	-19,25 (**)	-0,48	-21,86 (**)	-0,27	-12,63 (**)	-0,51	-22,63 (**)	-0,25	-12,29 (**)	-0,27	-13,07 (**)	-0,41	-19,25 (**)	-0,26	-12,27 (**)	-0,25	-12,28 (**)
NL	0,00	-19,77 (**)	-0,17	-19,96 (**)	-0,18	-21,31 (**)	-0,10	-12,25 (**)	-0,16	-18,58 (**)	0,00	-0,56	0,00	-0,24	-0,09	-11,05 (**)	-0,01	-1,46	-0,07	-9,04 (**)
SE	0,00	-38,64 (**)	-0,39	-37,98 (**)	-0,39	-38,34 (**)	-0,38	-37,93 (**)	-0,39	-38,68 (**)	-0,37	-39,40 (**)	-0,34	-36,65 (**)	-0,33	-34,49 (**)	-0,35	-36,05 (**)	-0,32	-33,70 (**)
US	0,00	-18,52 (**)	-0,21	-18,32 (**)	-0,21	-18,42 (**)	-0,07	-6,57 (**)	-0,21	-16,90 (**)	-0,07	-6,82 (**)	-0,01	-0,81	-0,14	-13,57 (**)	0,04	3,28 (**)	-0,01	-1,51
RoW	0,00	-111,57 (**)	-0,58	-109,27 (**)	-0,61	-113,52 (**)	-0,42	-80,23 (**)	-0,58	-57,42 (**)	-0,34	-70,27 (**)	-0,33	-67,55 (**)	-0,53	-106,59 (**)	-0,32	-65,44 (**)	-0,36	-73,17 (**)
Time dummies (Reference = 1990)																				
1980	0,00	17,88 (**)	0,21	17,97 (**)	0,22	18,82 (**)	0,21	17,87 (**)	0,15	12,60 (**)	0,22	19,76 (**)	0,20	18,48 (**)	0,23	20,45 (**)	0,17	14,49 (**)	0,22	19,64 (**)
1981	0,00	16,94 (**)	0,18	17,37 (**)	0,20	18,58 (**)	0,17	16,22 (**)	0,13	12,66 (**)	0,19	18,45 (**)	0,17	17,05 (**)	0,20	19,78 (**)	0,13	12,68 (**)	0,18	18,01 (**)
1982	0,00	18,72 (**)	0,20	19,23 (**)	0,21	20,12 (**)	0,18	17,60 (**)	0,16	15,35 (**)	0,19	20,05 (**)	0,18	18,63 (**)	0,21	21,73 (**)	0,14	14,55 (**)	0,19	19,24 (**)
1983	0,00	18,24 (**)	0,18	18,70 (**)	0,20	19,74 (**)	0,16	16,99 (**)	0,16	15,89 (**)	0,18	19,28 (**)	0,16	17,79 (**)	0,20	21,11 (**)	0,13	13,71 (**)	0,17	18,22 (**)
1984	0,00	13,69 (**)	0,13	14,03 (**)	0,14	15,39 (**)	0,13	14,47 (**)	0,11	11,56 (**)	0,15	16,62 (**)	0,13	14,97 (**)	0,14	15,78 (**)	0,10	11,00 (**)	0,14	15,49 (**)
1985	0,00	11,60 (**)	0,11	11,78 (**)	0,12	13,13 (**)	0,12	13,40 (**)	0,09	9,61 (**)	0,14	15,77 (**)	0,12	14,51 (**)	0,12	13,81 (**)	0,09	10,36 (**)	0,13	15,04 (**)
1986	0,00	7,83 (**)	0,07	7,93 (**)	0,08	8,80 (**)	0,08	9,67 (**)	0,06	6,27 (**)	0,11	12,99 (**)	0,10	11,93 (**)	0,09	10,70 (**)	0,06	6,67 (**)	0,10	12,21 (**)
1987	0,00	0,88	0,01	0,85	0,01	1,56	0,02	2,47 (*)	0,00	0,00	0,05	5,66 (**)	0,04	4,62 (**)	0,03	3,58 (**)	0,00	-0,06	0,04	5,10 (**)
1988	0,00	-4,50 (**)	-0,04	-4,65 (**)	-0,04	-4,33 (**)	-0,02	-2,73 (**)	-0,04	-5,28 (**)	0,00	0,00	0,00	-0,26	-0,02	-2,09 (*)	-0,04	-4,43 (**)	0,00	-0,04
1989	0,00	-8,78 (**)	-0,07	-8,89 (**)	-0,07	-8,74 (**)	-0,06	-7,55 (**)	-0,08	-9,53 (**)	-0,04	-5,76 (**)	-0,05	-6,21 (**)	-0,06	-7,36 (**)	-0,07	-8,90 (**)	-0,05	-6,01 (**)
1991	0,00	6,95 (**)	0,06	7,18 (**)	0,05	6,47 (**)	0,05	6,93 (**)	0,06	7,71 (**)	0,03	4,43 (**)	0,04	5,10 (**)	0,04	5,17 (**)	0,07	9,17 (**)	0,04	5,27 (**)
1992	0,00	3,61 (**)	0,03	3,77 (**)	0,02	2,54 (*)	0,03	3,74 (**)	0,03	3,99 (**)	0,05	6,69 (**)	0,05	7,14 (**)	0,05	6,48 (**)	0,06	7,27 (**)	0,06	7,74 (**)
1993	0,00	5,49 (**)	0,04	5,53 (**)	0,03	3,86 (**)	0,04	4,82 (**)	0,05	6,92 (**)	0,10	13,79 (**)	0,11	14,55 (**)	0,11	14,63 (**)	0,08	10,23 (**)	0,12	15,78 (**)
1994	0,00	2,78 (**)	0,02	2,85 (**)	0,01	0,99	0,02	2,59 (*)	0,04	5,37 (**)	0,09	12,40 (**)	0,10	13,93 (**)	0,10	13,53 (**)	0,07	9,21 (**)	0,11	15,33 (**)
1995	0,00	-2,44 (*)	-0,02	-2,46 (*)	-0,04	-4,84 (**)	-0,02	-2,46 (*)	0,00	0,41	0,06	7,70 (**)	0,07	9,98 (**)	0,07	8,93 (**)	0,04	5,66 (**)	0,08	11,19 (**)
1996	0,00	-9,77 (**)	-0,08	-9,74 (**)	-0,09	-12,17 (**)	-0,08	-10,48 (**)	-0,04	-5,22 (**)	0,00	0,17	0,03	3,53 (**)	0,02	3,16 (**)	0,00	-0,42	0,03	4,78 (**)
1997	0,00	-19,20 (**)	-0,14	-18,99 (**)	-0,16	-21,38 (**)	-0,16	-21,40 (**)	-0,11	-14,23 (**)	-0,08	-11,56 (**)	-0,05	-7,39 (**)	-0,05	-6,31 (**)	-0,08	-11,23 (**)	-0,05	-6,64 (**)
1998	0,00	-28,14 (**)	-0,21	-27,49 (**)	-0,22	-29,76 (**)	-0,24	-32,95 (**)	-0,19	-23,60 (**)	-0,16	-22,53 (**)	-0,13	-17,91 (**)	-0,10	-13,65 (**)	-0,16	-21,93 (**)	-0,12	-17,43 (**)
1999	0,00	-31,29 (**)	-0,23	-30,39 (**)	-0,24	-31,24 (**)	-0,29	-38,45 (**)	-0,24	-27,84 (**)	-0,20	-28,41 (**)	-0,16	-23,05 (**)	-0,12	-16,29 (**)	-0,20	-26,76 (**)	-0,16	-22,95 (**)
2000	0,00	-27,12 (**)	-0,20	-25,87 (**)	-0,19	-24,85 (**)	-0,32	-42,45 (**)	-0,22	-21,14 (**)	-0,25	-33,82 (**)	-0,20	-28,31 (**)	-0,09	-12,35 (**)	-0,23	-30,81 (**)	-0,21	-28,87 (**)
Model																				
# Observations	1039622		1039622		1038302		1039630		1039721		1086174		1086049		1085017		1039727		1086165	
Adjusted/Pseudo R^2	0,10		0,08		0,09		0,05		0,05		0,03		0,04		0,07		0,03		0,03	
F (P>F) / LR chi^2 (P>chi^2)	1.729 (0,00)		99.175 (0,00)		114.789 (0,00)		59.402 (0,00)		61.107 (0,00)		40.709 (0,00)		49.769 (0,00)		103.254 (0,00)		38.208 (0,00)		45.798 (0,00)	

Probit Regressions, Pending applications excluded

Table A9 – Survival Analysis of Patents Maintenance Periods (competing risks)

Variables	Stratified H.R.	Stratified z		Non Opposed H.R.	Non Opposed z		Revoked H.R.	Revoked z		Amended H.R.	Amended z		Maintained H.R.	Maintained z		Opp. Pending H.R.	Opp. Pending z	
Filing routes																		
RTE_ACCSRC	0,93	-4,58	(**)	0,92	-4,93	(**)	1,02	0,22		1,10	0,66		1,05	0,35		1,08	0,34	
RTE_PCT	1,03	6,49	(**)	1,03	5,83	(**)	1,05	1,44		1,14	2,67	(**)	0,94	-1,24		1,03	0,35	
Drafting																		
DRF_CLAIMS	1,00	-12,62	(**)	1,00	-11,88	(**)	1,00	-1,11		1,00	0,39		1,00	0,04		1,00	-0,57	
DRF_CLMLS																		
DRF_PRIO	1,00	-0,36		1,00	-0,32		1,00	-0,27		1,02	1,09		0,99	-0,29		0,94	-1,27	
DRF_EQUIV	0,99	-2,48	(*)	0,99	-2,53	(*)	1,00	0,01		0,97	-0,96		1,05	2,32	(*)	1,07	1,77	
DRF_HASDIV	0,80	-21,04	(**)	0,80	-17,36	(**)	0,77	-4,78	(**)	0,90	-1,35		0,72	-3,90	(**)	0,64	-2,85	(**)
DRF_ISDIV	0,94	-3,83	(**)	0,93	-3,93	(**)	0,98	-0,22		1,18	1,23		1,32	1,68		1,09	0,36	
Importance																		
IMP_TRIADIC	0,85	-42,08	(**)	0,86	-38,07	(**)	0,82	-8,63	(**)	0,81	-6,64	(**)	0,79	-8,61	(**)	0,83	-3,07	(**)
IMP_FWDCIT5	0,89	-55,65	(**)	0,89	-51,21	(**)	0,95	-6,70	(**)	0,93	-6,35	(**)	0,91	-6,90	(**)	0,93	-2,78	(**)
Technical Complexity																		
CMP_BPC	1,00	-0,06		1,00	0,07		1,00	0,64		1,00	-0,51		1,00	0,41		0,99	-0,85	
CMP_NPC	1,00	3,06	(**)	1,01	3,73	(**)	0,98	-2,46	(*)	0,99	-1,11		1,01	0,68		1,00	0,02	
CMP_INV	0,99	-7,23	(**)	0,99	-6,09	(**)	0,98	-2,94	(**)	0,98	-1,86		0,98	-1,81		0,99	-0,40	
CMP_IPC4	1,02	8,07	(**)	1,02	8,05	(**)	1,00	0,32		1,00	-0,11		1,00	0,23		0,98	-0,41	
Applicant Profiles																		
APP_MULTIPLE	1,02	2,32	(*)	1,02	2,64	(**)	0,98	-0,44		0,92	-1,17		1,08	1,30		0,96	-0,31	
APP_CUMUL	1,00	16,75	(**)	1,00	15,84	(**)	1,00	0,85		1,00	1,35		1,00	1,01		1,00	-0,79	
APP_OCCAS	1,11	21,10	(**)	1,12	22,01	(**)	0,94	-2,06	(*)	0,91	-2,38	(*)	1,04	1,17		1,12	1,49	
APP_CBOWN	0,97	-5,01	(**)	0,97	-4,57	(**)	0,95	-1,40		1,00	0,00		1,02	0,32		0,99	-0,06	
EPO Joint Clusters (Reference = Organic Chemistry)																		
JC-01 - Industrial Chemistry	1,02	3,03	(**)	1,01	2,31	(*)	1,05	1,59		0,98	-0,46		1,08	1,91		0,90	-1,23	
JC-03 - Polymers	0,99	-0,90		0,99	-0,85		1,00	0,09		0,98	-0,46		0,96	-0,99		0,96	-0,43	
JC-04 - Biotechnology	1,02	2,99	(**)	1,03	4,24	(**)	0,81	-5,04	(**)	0,93	-1,24		0,90	-1,78		1,07	0,58	
JC-05 - Telecommunications	0,93	-6,73	(**)	0,93	-5,94	(**)	0,78	-2,98	(**)	1,01	0,11		1,10	0,89		1,24	0,76	
JC-06 - Audio/Video/Media	0,90	-12,44	(**)	0,89	-11,84	(**)	1,01	0,09		0,98	-0,23		1,09	0,87		0,99	-0,04	
JC-07 - Electronics	0,99	-0,91		0,98	-2,14	(*)	1,05	0,94		1,32	4,54	(**)	1,13	2,28	(*)	1,05	0,36	
JC-08 - Electricity	1,01	1,12		1,00	0,07		1,05	1,42		1,08	1,50		1,03	0,72		1,28	2,41	(*)
JC-09 - Computers	0,96	-3,87	(**)	0,96	-3,55	(**)	0,83	-2,59	(*)	1,11	0,94		1,01	0,05		0,91	-0,39	
JC-10 - Measuring Optics	1,00	-0,52		0,99	-2,07	(*)	1,16	3,42	(**)	1,15	2,46	(*)	1,15	2,48	(*)	1,25	1,88	
JC-11 - Handling & Processing	0,97	-5,83	(**)	0,96	-6,73	(**)	1,13	3,87	(**)	0,98	-0,50		1,00	0,12		1,05	0,61	
JC-12 - Vehicles	0,91	-15,25	(**)	0,90	-15,38	(**)	1,07	1,80		0,99	-0,12		0,93	-1,57		1,05	0,48	
JC-13 - Civil Engineering	0,94	-9,62	(**)	0,93	-10,02	(**)	1,12	2,79	(**)	0,99	-0,12		0,95	-1,20		0,95	-0,50	
JC-14 - Human Necessities	0,92	-13,78	(**)	0,92	-13,45	(**)	0,97	-0,81		0,91	-1,93		1,01	0,13		1,19	1,81	

Cox Regression Model - Breslow method for ties - Stratified by reason for lapse unless otherwise specified (EPO Grants filed 1980-2000)

Variables	Stratified H.R.	z		Non Opposed H.R.	z		Revoked H.R.	z		Amended H.R.	z		Maintained H.R.	z		Opp. Pending H.R.	z	
Country of residence of applicants (Reference = France)																		
AT	1,06	3,52	(**)	1,05	2,81	(**)	1,08	0,93		1,19	1,33		1,27	2,42	(*)	0,98	-0,06	
AU	1,17	6,19	(**)	1,16	5,57	(**)	1,34	1,41		1,40	1,46		1,28	1,11		0,98	-0,02	
BE	1,04	2,08	(*)	1,06	2,83	(**)	0,77	-2,29	(*)	1,04	0,25		0,82	-1,55		0,90	-0,39	
CA	1,17	8,28	(**)	1,17	7,89	(**)	1,01	0,05		1,33	1,48		0,96	-0,24		2,49	3,20	(**)
CH	1,04	4,31	(**)	1,04	3,62	(**)	1,05	0,75		1,27	3,10	(**)	0,96	-0,54		1,39	2,24	(*)
DE	1,02	3,42	(**)	1,02	2,85	(**)	1,03	0,77		1,13	2,33	(*)	0,99	-0,14		1,13	1,23	
DK	0,92	-3,14	(**)	0,91	-3,22	(**)	0,94	-0,51		1,06	0,35		0,78	-1,57		1,54	1,47	
ES	1,24	6,86	(**)	1,24	6,64	(**)	1,56	1,95		1,00	0,00		1,41	1,48		2,64	2,11	(*)
FI	0,91	-3,62	(**)	0,91	-3,48	(**)	0,74	-2,31	(*)	1,16	0,73		1,05	0,26		2,02	2,45	(*)
GB	1,12	12,99	(**)	1,13	13,68	(**)	0,95	-1,12		1,00	0,01		1,07	1,07		1,32	2,08	(*)
IL	1,37	8,74	(**)	1,37	8,30	(**)	0,92	-0,30		1,49	1,41		1,49	1,18		2,72	2,35	(*)
IT	1,14	12,33	(**)	1,14	11,91	(**)	0,96	-0,61		1,20	1,93		1,03	0,39		1,13	0,67	
JP	0,97	-4,30	(**)	0,97	-3,94	(**)	0,91	-2,05	(*)	1,14	2,25	(*)	1,01	0,26		1,06	0,47	
KR	1,01	0,28		1,01	0,27		0,83	-0,61		1,45	0,64		2,28	1,64		0,90	-0,10	
NL	1,17	16,63	(**)	1,20	17,78	(**)	0,91	-1,68		1,05	0,59		0,93	-1,01		1,00	0,02	
SE	1,28	16,96	(**)	1,29	16,89	(**)	0,99	-0,07		1,17	1,14		1,13	0,94		2,27	3,38	(**)
US	0,92	-6,16	(**)	0,92	-5,48	(**)	0,90	-1,24		0,94	-0,55		0,87	-1,29		1,01	0,05	
RoW	1,14	21,38	(**)	1,15	20,55	(**)	0,98	-0,49		1,24	3,83	(**)	1,08	1,43		1,32	2,49	(*)
Time dummies (Reference = 1990)																		
1980	1,11	11,12	(**)	1,10	8,56	(**)	1,13	1,88		1,38	3,43	(**)	1,33	3,79	(**)	1,95	2,66	(**)
1981	1,15	15,10	(**)	1,14	12,15	(**)	1,15	2,22	(*)	1,54	5,14	(**)	1,38	4,48	(**)	1,81	2,36	(*)
1982	1,20	20,31	(**)	1,19	16,60	(**)	1,18	2,74	(**)	1,55	5,58	(**)	1,46	5,31	(**)	2,30	3,28	(**)
1983	1,24	24,32	(**)	1,23	20,94	(**)	1,06	0,91		1,62	6,24	(**)	1,43	5,02	(**)	1,94	2,47	(*)
1984	1,29	30,20	(**)	1,29	26,63	(**)	1,08	1,30		1,66	6,72	(**)	1,44	5,31	(**)	2,04	2,35	(*)
1985	1,35	36,03	(**)	1,35	31,41	(**)	1,12	1,92		1,74	7,45	(**)	1,65	7,33	(**)	3,80	4,37	(**)
1986	1,11	11,08	(**)	1,11	10,97	(**)	1,13	2,01	(*)	1,08	1,00		1,17	2,16	(*)	1,60	1,44	
1987	1,10	10,47	(**)	1,11	10,60	(**)	1,18	2,80	(**)	0,98	-0,22		1,05	0,69		1,00	0,00	
1988	1,08	8,46	(**)	1,08	8,45	(**)	1,03	0,55		1,06	0,75		1,08	1,04		0,92	-0,24	
1989	1,05	5,59	(**)	1,05	5,43	(**)	1,04	0,68		0,95	-0,58		1,12	1,54		1,34	0,93	
1991	0,96	-4,85	(**)	0,96	-4,74	(**)	0,98	-0,34		1,02	0,22		1,00	-0,05		0,62	-1,44	
1992	0,93	-7,78	(**)	0,93	-7,70	(**)	1,05	0,80		1,05	0,54		0,86	-1,76		0,38	-2,69	(**)
1993	0,90	-10,73	(**)	0,90	-10,90	(**)	1,08	1,36		0,98	-0,19		0,96	-0,45		0,70	-1,19	
1994	0,86	-14,79	(**)	0,85	-14,90	(**)	1,14	2,15	(*)	0,92	-0,66		0,74	-2,81	(**)	0,67	-1,37	
1995	0,83	-17,50	(**)	0,82	-17,91	(**)	1,31	4,29	(**)	0,79	-1,60		0,74	-2,54	(*)	0,61	-1,69	
1996	0,80	-19,14	(**)	0,79	-19,57	(**)	1,45	5,53	(**)	0,78	-1,33		0,53	-3,87	(**)	0,65	-1,52	
1997	0,74	-22,77	(**)	0,72	-23,44	(**)	1,82	7,88	(**)	0,63	-1,56		0,37	-3,85	(**)	0,74	-1,11	
1998	0,69	-23,53	(**)	0,68	-24,33	(**)	2,13	8,15	(**)	0,40	-1,56		0,52	-2,03	(*)	1,04	0,14	
1999	0,73	-17,67	(**)	0,72	-18,70	(**)	2,22	6,85	(**)	0,35	-1,05		0,43	-1,69		1,48	1,47	
2000	0,80	-11,04	(**)	0,77	-12,40	(**)	2,82	6,58	(**)				0,38	-0,97		2,12	2,81	(**)
Model																		
# Subjects / Observations	647426			605245			9632			11210			12000			9339		
# Failures / R^2	347552			324722			9632			5470			6438			1290		
Log likelihood	-4208305			-4019583			-79925			-44911			-53699			-9271		
F (P>F) / LR chi² (P>chi²)	20.615 (0,00)			18.703 (0,00)			815 (0,00)			532 (0,00)			612 (0,00)			394 (0,00)		

Table A10 – Survival Analysis of Patents Maintenance Periods (Robustness estimates)

	OLS		Cens. Norm. Reg.		Unstratified 1		Stratified 1		Stratified 2		Random Sample		1980-1987		Instrumental Var		Log	
Variables	**Coef.**	**t**	**Coef.**	**t**	**H.R.**	**z**	**H.R.**	**z**	**H.R.**	**z**	**H.R.**	**z**	**H.R.**	**z**	**H.R.**	**z**	**H.R.**	**z**
Filing routes																		
RTE_ACCSRC	0,25	7,46 (**)	0,26	4,49 (**)	0,93	-4,73 (**)	0,93	-4,58 (**)	0,95	-3,33 (**)	0,96	-1,24	1,01	0,17	0,92	-5,21 (**)	0,93	-4,50 (**)
RTE_PCT	-0,10	-8,95 (**)	-0,14	-6,66 (**)	1,03	5,25 (**)	1,03	6,49 (**)	1,03	5,57 (**)	1,03	2,12 (*)	1,12	8,48 (**)	1,07	9,10 (**)	1,03	5,87 (**)
Drafting																		
DRF_CLAIMS	0,00	-2,26 (*)	0,01	14,96 (**)	1,00	-13,07 (**)	1,00	-12,62 (**)	1,00	-15,10 (**)	1,00	-5,52 (**)	1,00	-0,26	0,99	-5,70 (**)	0,98	-9,13 (**)
DRF_CLMLS									1,01	4,38 (**)								
DRF_PRIO	0,03	5,40 (**)	0,01	1,16	1,00	-0,65	1,00	-0,36	1,00	-0,49	1,00	0,50	1,00	-1,08	1,00	0,41	0,99	-1,61
DRF_EQUIV	-0,02	-2,38 (*)	0,05	3,07 (**)	0,99	-2,34 (*)	0,99	-2,48 (*)	0,98	-4,16 (**)	0,98	-1,98 (*)	1,01	2,08 (*)	0,99	-2,71 (**)	0,99	-1,94
DRF_HASDIV	-0,17	-7,00 (**)	0,91	20,03 (**)	0,80	-18,92 (**)	0,80	-21,04 (**)	0,74	-20,33 (**)	0,79	-8,61 (**)	0,91	-5,10 (**)	0,82	-12,83 (**)	0,79	-19,69 (**)
DRF_ISDIV	-1,82	-52,72 (**)	-0,12	-1,76	0,92	-4,21 (**)	0,94	-3,83 (**)	0,87	-7,30 (**)	0,95	-1,28	1,23	5,76 (**)	0,94	-3,24 (**)	0,93	-3,63 (**)
Importance																		
IMP_TRIADIC	0,42	42,81 (**)	0,76	45,85 (**)	0,85	-41,41 (**)	0,85	-42,08 (**)	0,87	-26,64 (**)	0,85	-18,49 (**)	0,85	-27,78 (**)	0,74	-7,30 (**)	0,86	-39,18 (**)
IMP_FWDCIT5	0,16	39,89 (**)	0,49	61,76 (**)	0,89	-54,30 (**)	0,89	-55,65 (**)	0,89	-46,11 (**)	0,89	-23,35 (**)	0,92	-26,08 (**)	0,90	-5,25 (**)	0,78	-55,45 (**)
IMP_VSTATES									0,96	-52,78 (**)								
Technical Complexity																		
CMP_BPC	-0,02	-12,43 (**)	0,00	1,13	1,00	-2,77 (**)	1,00	-0,06	1,00	-1,74	1,00	-1,64	1,00	1,90	1,00	-0,45	0,99	-1,89
CMP_NPC	-0,04	-13,61 (**)	-0,01	-2,01 (*)	1,00	1,23	1,00	3,06 (**)	1,00	0,19	1,00	1,05	1,00	2,01 (*)	1,00	1,03	1,02	5,70 (**)
CMP_INV	0,00	1,01	0,04	7,34 (**)	0,99	-7,12 (**)	0,99	-7,23 (**)	0,99	-4,11 (**)	0,99	-2,96 (**)	0,99	-3,87 (**)	0,99	-7,34 (**)	0,97	-10,36 (**)
CMP_IPC4	-0,05	-9,08 (**)	-0,09	-9,58 (**)	1,02	8,14 (**)	1,02	8,07 (**)	1,03	8,79 (**)	1,02	3,86 (**)	1,01	2,26 (*)	1,01	4,40 (**)	1,04	8,25 (**)
Applicant Profiles																		
APP_MULTIPLE	-0,01	-0,45	-0,09	-2,76 (**)	1,03	3,41 (**)	1,02	2,32 (*)	1,02	1,61	1,01	0,39	1,00	0,39	1,02	2,29 (*)	1,01	1,48
APP_CUMUL	0,00	-26,12 (**)	0,00	-18,55 (**)	1,00	17,28 (**)	1,00	16,75 (**)	1,00	6,00 (**)	1,00	8,40 (**)	1,00	20,96 (**)	1,00	14,14 (**)	1,01	7,65 (**)
APP_OCCAS	-0,35	-27,13 (**)	-0,54	-25,28 (**)	1,11	19,91 (**)	1,11	21,10 (**)	1,15	21,31 (**)	1,11	9,50 (**)	1,06	7,60 (**)	1,08	9,06 (**)	1,12	19,59 (**)
APP_CBOWN	0,09	5,89 (**)	0,18	6,53 (**)	0,97	-5,15 (**)	0,97	-5,01 (**)	0,99	-1,25	0,97	-1,98 (*)	0,95	-4,78 (**)	0,96	-5,48 (**)	0,97	-4,99 (**)
EPO Joint Clusters (Reference = Organic Chemistry)																		
JC-01 - Industrial Chemistry	0,05	3,38 (**)	-0,07	-2,81 (**)	1,02	2,74 (**)	1,02	3,03 (**)	1,04	5,27 (**)	1,00	0,01	1,00	-0,24	1,03	4,51 (**)	1,02	2,74 (**)
JC-03 - Polymers	0,05	3,11 (**)	0,09	3,55 (**)	0,99	-2,24 (*)	0,99	-0,90	1,01	1,01	1,01	0,40	0,97	-3,23 (**)	1,00	0,64	1,00	-0,15
JC-04 - Biotechnology	-0,28	-16,74 (**)	-0,16	-5,72 (**)	1,03	3,94 (**)	1,02	2,99 (**)	1,07	8,07 (**)	1,00	0,32	1,03	3,41 (**)	1,02	2,41 (*)	1,01	1,91
JC-05 - Telecommunications	-0,25	-9,30 (**)	0,33	7,13 (**)	0,94	-5,43 (**)	0,93	-6,73 (**)	0,87	-9,76 (**)	0,93	-2,89 (**)	0,98	-1,20	0,94	-5,21 (**)	0,93	-5,83 (**)
JC-06 - Audio/Video/Media	-0,04	-1,60	0,47	12,03 (**)	0,90	-10,75 (**)	0,90	-12,44 (**)	0,81	-17,79 (**)	0,89	-5,56 (**)	0,99	-0,96	0,91	-8,97 (**)	0,90	-11,29 (**)
JC-07 - Electronics	-0,04	-2,42 (*)	0,12	4,29 (**)	0,99	-0,75	0,99	-0,91	0,91	-11,09 (**)	0,99	-0,97	1,06	5,73 (**)	1,00	-0,22	1,00	-0,63
JC-08 - Electricity	0,06	3,85 (**)	0,06	2,34 (*)	1,01	1,20	1,01	1,12	0,95	-6,74 (**)	0,99	-0,54	1,01	1,20	1,01	1,86	1,01	1,91
JC-09 - Computers	-0,16	-6,12 (**)	0,19	4,26 (**)	0,97	-3,03 (**)	0,96	-3,87 (**)	0,88	-10,05 (**)	0,95	-2,04 (*)	1,03	1,92	0,97	-2,78 (**)	0,97	-3,20 (**)
JC-10 - Measuring Optics	-0,02	-1,19	0,09	3,41 (**)	1,00	-0,59	1,00	-0,52	0,90	-12,70 (**)	1,00	0,14	1,05	5,77 (**)	1,01	0,91	1,00	-0,50
JC-11 - Handling & Processing	0,22	15,46 (**)	0,22	9,35 (**)	0,96	-7,20 (**)	0,97	-5,83 (**)	0,96	-6,06 (**)	0,97	-2,27 (*)	0,98	-2,36 (*)	0,96	-5,90 (**)	0,97	-5,92 (**)
JC-12 - Vehicles	0,31	19,99 (**)	0,50	19,23 (**)	0,91	-15,50 (**)	0,91	-15,25 (**)	0,84	-20,63 (**)	0,92	-6,35 (**)	0,97	-2,71 (**)	0,90	-13,89 (**)	0,91	-15,26 (**)
JC-13 - Civil Engineering	0,23	14,20 (**)	0,36	13,10 (**)	0,93	-10,59 (**)	0,94	-9,62 (**)	0,91	-10,44 (**)	0,95	-3,65 (**)	0,95	-4,88 (**)	0,93	-8,50 (**)	0,94	-9,58 (**)
JC-14 - Human Necessities	0,17	11,40 (**)	0,44	16,94 (**)	0,92	-13,78 (**)	0,92	-13,78 (**)	0,86	-18,46 (**)	0,92	-5,70 (**)	0,98	-2,09 (*)	0,92	-12,08 (**)	0,92	-12,83 (**)

Variables	OLS Coef.	OLS t	Cens. Norm. Reg. Coef.	Cens. Norm. Reg. t	Unstratified 1 H.R.	Unstratified 1 z	Stratified 1 H.R.	Stratified 1 z	Stratified 2 H.R.	Stratified 2 z	Random Sample H.R.	Random Sample z	1980-1987 H.R.	1980-1987 z	Instrumental Var H.R.	Instrumental Var z	Log H.R.	Log z
Country of residence of applicants (Reference = France)																		
AT	-0,17	-4,04 (**)	-0,18	-2,57 (*)	1,05	3,09 (**)	1,06	3,52 (**)	1,03	1,21	1,06	1,63	1,16	5,98 (**)	1,04	2,21 (*)	1,06	3,53 (**)
AU	-0,99	-14,89 (**)	-0,78	-7,02 (**)	1,17	6,12 (**)	1,17	6,19 (**)	1,01	0,23	1,16	2,55 (*)	1,22	5,45 (**)	1,19	6,35 (**)	1,17	6,00 (**)
BE	-0,11	-2,50 (*)	-0,13	-1,74	1,04	2,03 (*)	1,04	2,08 (*)	1,04	1,71	0,96	-1,01	1,01	0,29	1,05	2,46 (*)	1,04	2,00 (*)
CA	-0,45	-9,55 (**)	-0,73	-9,17 (**)	1,18	8,67 (**)	1,17	8,28 (**)	1,07	2,64 (**)	1,22	4,37 (**)	1,23	6,86 (**)	1,21	9,26 (**)	1,17	8,12 (**)
CH	-0,20	-8,00 (**)	-0,18	-4,30 (**)	1,04	3,96 (**)	1,04	4,31 (**)	1,04	2,60 (**)	1,04	1,78	1,07	4,60 (**)	1,06	5,44 (**)	1,04	4,19 (**)
DE	-0,01	-0,78	-0,04	-1,48	1,01	1,97 (*)	1,02	3,42 (**)	1,02	2,22 (*)	1,01	0,66	1,02	2,09 (*)	1,01	0,81	1,04	5,57 (**)
DK	0,04	0,63	0,42	3,99 (**)	0,90	-3,94 (**)	0,92	-3,14 (**)	0,89	-3,48 (**)	0,83	-2,94 (**)	0,92	-1,66	0,93	-2,79 (**)	0,92	-3,08 (**)
ES	-0,45	-6,07 (**)	-0,86	-6,81 (**)	1,24	6,77 (**)	1,24	6,86 (**)	1,25	6,21 (**)	1,20	2,58 (*)	1,18	2,73 (**)	1,17	4,99 (**)	1,25	7,10 (**)
FI	-0,23	-4,44 (**)	0,35	3,60 (**)	0,92	-3,44 (**)	0,91	-3,62 (**)	0,86	-5,14 (**)	0,94	-1,14	0,94	-0,97	0,91	-3,59 (**)	0,92	-3,41 (**)
GB	-0,41	-18,06 (**)	-0,57	-15,28 (**)	1,13	13,51 (**)	1,12	12,99 (**)	1,08	6,92 (**)	1,10	4,89 (**)	1,11	8,56 (**)	1,12	12,37 (**)	1,12	12,76 (**)
IL	-0,83	-9,45 (**)	-1,21	-8,04 (**)	1,37	8,49 (**)	1,37	8,74 (**)	1,30	6,17 (**)	1,28	2,99 (**)	1,33	4,20 (**)	1,40	8,93 (**)	1,38	8,63 (**)
IT	-0,33	-11,93 (**)	-0,45	-9,81 (**)	1,13	11,63 (**)	1,14	12,33 (**)	1,11	7,49 (**)	1,12	4,67 (**)	1,19	9,96 (**)	1,11	8,57 (**)	1,14	11,96 (**)
JP	-0,10	-5,46 (**)	0,22	7,63 (**)	0,98	-3,27 (**)	0,97	-4,30 (**)	0,87	-15,16 (**)	0,96	-2,33 (*)	0,95	-5,31 (**)	1,03	1,94	0,97	-3,82 (**)
KR	-0,67	-8,30 (**)	-0,29	-1,83	1,03	0,54	1,01	0,28	0,91	-2,01 (*)	0,91	-0,85	1,36	1,38	1,05	0,97	1,00	0,07
NL	-0,43	-16,55 (**)	-0,71	-16,77 (**)	1,17	16,32 (**)	1,17	16,63 (**)	1,21	15,37 (**)	1,21	8,78 (**)	1,11	7,27 (**)	1,18	15,72 (**)	1,18	17,06 (**)
SE	-0,74	-20,69 (**)	-1,06	-17,74 (**)	1,29	17,49 (**)	1,28	16,96 (**)	1,22	11,27 (**)	1,29	7,86 (**)	1,33	12,29 (**)	1,27	16,52 (**)	1,28	17,05 (**)
US	-0,21	-6,19 (**)	0,38	6,23 (**)	0,92	-5,72 (**)	0,92	-6,16 (**)	0,82	-10,08 (**)	0,92	-2,29 (*)	1,00	0,05	0,93	-4,00 (**)	0,92	-5,70 (**)
RoW	-0,62	-37,33 (**)	-0,68	-24,26 (**)	1,16	21,95 (**)	1,14	21,38 (**)	1,05	5,29 (**)	1,15	9,39 (**)	1,15	14,08 (**)	1,22	14,32 (**)	1,14	19,95 (**)
Time dummies (Reference = 1990)																		
1980	1,39	40,13 (**)	0,33	6,36 (**)	1,11	9,15 (**)	1,11	11,12 (**)	1,79	2,59 (*)	1,13	4,94 (**)	1,03	2,65 (**)	1,11	8,85 (**)	1,11	9,05 (**)
1981	1,23	38,69 (**)	0,14	2,94 (**)	1,14	12,81 (**)	1,15	15,10 (**)	2,02	5,98 (**)	1,20	7,88 (**)	1,06	5,37 (**)	1,14	12,15 (**)	1,14	12,85 (**)
1982	1,02	33,73 (**)	-0,10	-2,13 (*)	1,19	17,52 (**)	1,20	20,31 (**)	1,87	8,01 (**)	1,22	8,97 (**)	1,10	9,47 (**)	1,19	16,70 (**)	1,19	17,83 (**)
1983	0,84	28,63 (**)	-0,30	-6,74 (**)	1,23	21,60 (**)	1,24	24,32 (**)	1,88	15,38 (**)	1,24	10,09 (**)	1,13	12,64 (**)	1,22	20,40 (**)	1,23	21,70 (**)
1984	0,64	23,00 (**)	-0,52	-12,33 (**)	1,28	26,87 (**)	1,29	30,20 (**)	1,77	25,24 (**)	1,33	13,90 (**)	1,18	17,42 (**)	1,29	26,80 (**)	1,29	27,50 (**)
1985	0,52	18,90 (**)	-0,69	-16,59 (**)	1,34	32,39 (**)	1,35	36,03 (**)	1,65	33,74 (**)	1,39	16,04 (**)	1,23	22,25 (**)	1,35	32,35 (**)	1,35	32,70 (**)
1986	0,55	20,44 (**)	-0,25	-5,98 (**)	1,11	10,71 (**)	1,11	11,08 (**)	1,23	16,83 (**)	1,14	6,14 (**)	1,01	0,87	1,11	11,07 (**)	1,11	10,99 (**)
1987	0,36	13,52 (**)	-0,30	-7,27 (**)	1,10	10,08 (**)	1,10	10,47 (**)	1,20	18,03 (**)	1,13	5,70 (**)	1,13	5,70 (**)	1,10	10,36 (**)	1,10	10,36 (**)
1988	0,32	12,53 (**)	-0,16	-4,07 (**)	1,08	8,13 (**)	1,08	8,46 (**)	1,12	11,97 (**)	1,08	3,69 (**)	1,08	3,69 (**)	1,08	8,63 (**)	1,08	8,26 (**)
1989	0,14	5,70 (**)	-0,12	-3,14 (**)	1,05	5,39 (**)	1,05	5,59 (**)	1,06	5,90 (**)	1,05	2,37 (*)	1,05	2,37 (*)	1,05	5,71 (**)	1,05	5,36 (**)
1991	-0,27	-11,05 (**)	0,03	0,81	0,96	-4,56 (**)	0,96	-4,85 (**)	0,95	-5,66 (**)	0,97	-1,36	0,97	-1,36	0,96	-4,52 (**)	0,96	-4,69 (**)
1992	-0,65	-27,10 (**)	-0,01	-0,28	0,93	-7,56 (**)	0,93	-7,78 (**)	0,92	-9,01 (**)	0,97	-1,56	0,97	-1,56	0,94	-6,93 (**)	0,93	-7,43 (**)
1993	-1,15	-47,64 (**)	-0,07	-1,80	0,90	-10,54 (**)	0,90	-10,73 (**)	0,88	-12,47 (**)	0,91	-4,07 (**)	0,91	-4,07 (**)	0,91	-9,47 (**)	0,90	-10,27 (**)
1994	-1,73	-71,71 (**)	-0,08	-2,01 (*)	0,86	-14,68 (**)	0,86	-14,79 (**)	0,84	-17,23 (**)	0,88	-5,43 (**)	0,88	-5,43 (**)	0,87	-13,11 (**)	0,86	-14,48 (**)
1995	-2,43	-100,23 (**)	-0,11	-2,78 (**)	0,82	-17,48 (**)	0,83	-17,50 (**)	0,79	-20,97 (**)	0,89	-4,64 (**)	0,89	-4,64 (**)	0,84	-15,20 (**)	0,83	-17,21 (**)
1996	-3,21	-132,79 (**)	-0,12	-2,82 (**)	0,79	-19,48 (**)	0,80	-19,14 (**)	0,75	-23,95 (**)	0,84	-6,50 (**)	0,84	-6,50 (**)	0,81	-16,81 (**)	0,80	-18,83 (**)
1997	-3,94	-161,37 (**)	0,01	0,22	0,73	-23,36 (**)	0,74	-22,77 (**)	0,66	-29,53 (**)	0,76	-9,05 (**)	0,76	-9,05 (**)	0,75	-20,44 (**)	0,73	-22,55 (**)
1998	-4,49	-179,24 (**)	0,18	3,59 (**)	0,69	-24,23 (**)	0,69	-23,53 (**)	0,59	-31,81 (**)	0,74	-8,64 (**)	0,74	-8,64 (**)	0,71	-21,50 (**)	0,69	-23,32 (**)
1999	-4,88	-185,58 (**)	0,09	1,73	0,72	-18,58 (**)	0,73	-17,67 (**)	0,52	-32,14 (**)	0,74	-7,67 (**)	0,74	-7,67 (**)	0,75	-15,63 (**)	0,74	-17,55 (**)
2000	-5,25	-184,96 (**)	0,01	0,10	0,79	-11,82 (**)	0,80	-11,04 (**)	0,46	-28,85 (**)	0,85	-3,61 (**)	0,85	-3,61 (**)	0,80	-9,65 (**)	0,80	-10,97 (**)
Model																		
# Subjects / Observations	649910		649924		647426		647426		496530		129460		170881		647469		647437	
# Failures / R^2	0,27		350034		347552		347552		216510		69750		160254		347565		347550	
Log likelihood			-1212577		-4323903		-4208305		-2622046		-734114		-1730575		-4211079		-4208323	
F (P>F) / LR chi^2 (P>chi^2)	3.609 (0,00)		14.713 (0,00)		19.983 (0,00)		20.615 (0,00)		20.354 (0,00)		3.857 (0,00)		4.618 (0,00)		14.012 (0,00)		19.154 (0,00)	

Cox Regression Model by group of variables - Breslow method for ties - Stratified by reason for lapse unless otherwise specified (EPO Grants filed 1980-2000)

Table A11 – Estimates of the probability to survive an opposition

Variables	OLS Coef.	OLS z	Model 1 Coef.	Model 1 z	Model 2 Coef.	Model 2 z	Model 3 Coef.	Model 3 z	Instrumental Vars Coef.	Instrumental Vars z	Model 4 Coef.	Model 4 z	Model 5 Coef.	Model 5 z	Model 6 Coef.	Model 6 z	Model 7 Coef.	Model 7 z	Model 8 Coef.	Model 8 z
Opposition track record																				
OPP_MULTIPLE					-0,65	-34,45 (**)														
OPP_ORALPROC					0,35	23,21 (**)														
Filing routes																				
RTE_ACCSRC	0,00	0,19	0,01	0,11	0,05	0,77	0,02	0,30	0,03	0,43	0,07	1,12								
RTE_PCT	0,00	2,15 (*)	0,05	2,13 (*)	0,04	2,05 (*)	0,08	3,55 (**)	0,12	4,08 (**)	0,06	3,18 (**)								
Drafting																				
DRF_CLAIMS	0,00	6,67 (**)	0,01	6,00 (**)	0,01	6,67 (**)	0,01	7,86 (**)	0,01	1,72			0,01	10,03 (**)						
DRF_PRIO	0,00	2,47 (*)	0,03	2,45 (*)	0,03	3,01 (**)	0,04	4,00 (**)	0,05	2,74 (**)			0,05	4,89 (**)						
DRF_EQUIV	0,00	-0,35	0,00	-0,31	0,00	0,11	0,00	0,30	0,00	0,35			0,00	0,19						
DRF_HASDIV	0,00	0,55	0,01	0,32	0,06	1,45	0,03	0,85	0,02	0,37			0,08	2,07 (*)						
DRF_ISDIV	0,00	-0,39	-0,03	-0,45	-0,02	-0,28	0,00	-0,05	0,01	0,13			0,03	0,42						
Importance																				
IMP_TRIADIC	0,00	17,54 (**)	0,28	17,26 (**)	0,26	15,75 (**)			-0,37	-2,09 (*)					0,28	18,37 (**)				
IMP_FWDCIT5	0,00	2,83 (**)	0,02	2,84 (**)	0,03	4,89 (**)			-0,21	-3,17 (**)					0,03	5,75 (**)				
Technical Complexity																				
CMP_BPC	0,00	10,37 (**)	0,03	10,49 (**)	0,03	10,38 (**)	0,03	10,74 (**)	0,03	11,85 (**)							0,03	12,33 (**)		
CMP_NPC	0,00	7,76 (**)	0,04	8,36 (**)	0,04	9,01 (**)	0,04	8,56 (**)	0,05	9,38 (**)							0,05	9,46 (**)		
CMP_INV	0,00	0,83	0,00	0,77	0,00	0,84	0,01	1,99 (*)	0,02	4,07 (**)							0,02	3,04 (**)		
CMP_IPC4	0,00	-2,49 (*)	-0,03	-2,68 (**)	-0,03	-2,84 (**)	-0,02	-1,94	0,01	0,68							-0,01	-0,71		
Applicant Profiles																				
APP_MULTIPLE	0,00	-2,22 (*)	-0,07	-2,14 (*)	-0,07	-2,03 (*)	-0,08	-2,45 (*)	-0,09	-2,58 (*)									-0,07	-2,15 (*)
APP_CUMUL	0,00	-4,53 (**)	0,00	-4,46 (**)	0,00	-4,90 (**)	0,00	-3,41 (**)	0,00	-1,41									0,00	-4,13 (**)
APP_OCCAS	0,00	2,99 (**)	0,06	2,81 (**)	0,07	3,32 (**)	0,03	1,32	-0,03	-0,86									0,03	1,50
APP_CBOWN	0,00	1,14	0,03	1,22	0,03	1,06	0,03	1,06	0,03	1,06									0,02	0,97
EPO Joint Clusters (Reference = Organic Chemistry)																				
JC-01 - Industrial Chemistry	0,00	-5,09 (**)	-0,11	-5,10 (**)	-0,11	-4,95 (**)	-0,10	-4,97 (**)	-0,12	-5,37 (**)	-0,09	-4,36 (**)	-0,09	-4,69 (**)	-0,09	-4,69 (**)	-0,10	-4,95 (**)	-0,09	-4,55 (**)
JC-03 - Polymers	0,00	0,38	0,01	0,45	0,04	1,94	0,03	1,21	0,06	2,37 (*)	0,01	0,48	0,00	0,20	-0,02	-0,89	0,03	1,15	0,01	0,70
JC-04 - Biotechnology	0,00	-3,12 (**)	-0,10	-3,31 (**)	-0,07	-2,16 (*)	-0,07	-2,39 (*)	-0,02	-0,44	0,00	-0,08	-0,04	-1,29	-0,05	-1,82	-0,04	-1,27	0,00	-0,03
JC-05 - Telecommunications	0,00	-0,77	-0,05	-0,86	-0,05	-0,81	-0,07	-1,10	-0,06	-0,92	-0,09	-1,57	-0,09	-1,45	-0,09	-1,52	-0,08	-1,30	-0,08	-1,34
JC-06 - Audio/Video/Media	0,00	-3,17 (**)	-0,16	-3,14 (**)	-0,17	-3,31 (**)	-0,14	-2,87 (**)	-0,14	-2,80 (**)	-0,13	-2,78 (**)	-0,14	-2,89 (**)	-0,15	-3,20 (**)	-0,13	-2,75 (**)	-0,13	-2,63 (**)
JC-07 - Electronics	0,00	0,55	0,02	0,50	0,02	0,73	0,01	0,42	0,01	0,35	0,01	0,16	0,00	0,14	0,01	0,18	0,01	0,34	0,01	0,33
JC-08 - Electricity	0,00	-1,81	-0,05	-1,76	-0,05	-1,78	-0,05	-2,01 (*)	-0,07	-2,69 (**)	-0,07	-2,64 (**)	-0,07	-2,62 (**)	-0,06	-2,43 (*)	-0,06	-2,39 (*)	-0,06	-2,41 (*)
JC-09 - Computers	0,00	-2,25 (*)	-0,12	-2,26 (*)	-0,15	-2,68 (**)	-0,14	-2,58 (*)	-0,16	-2,87 (**)	-0,14	-2,70 (**)	-0,15	-2,85 (**)	-0,13	-2,51 (*)	-0,13	-2,51 (*)	-0,14	-2,67 (**)
JC-10 - Measuring Optics	0,00	1,12	0,03	1,08	0,00	-0,12	0,04	1,17	0,01	0,28	0,03	1,09	0,03	1,12	0,03	1,08	0,03	1,03	0,03	1,15
JC-11 - Handling & Processing	0,00	4,35 (**)	0,10	4,31 (**)	0,13	5,76 (**)	0,09	4,08 (**)	0,04	1,54	0,09	4,47 (**)	0,09	4,33 (**)	0,11	5,04 (**)	0,10	4,51 (**)	0,08	3,91 (**)
JC-12 - Vehicles	0,00	5,09 (**)	0,14	5,18 (**)	0,14	5,23 (**)	0,12	4,67 (**)	0,08	2,69 (**)	0,11	4,45 (**)	0,12	4,67 (**)	0,13	5,22 (**)	0,12	4,59 (**)	0,10	4,09 (**)
JC-13 - Civil Engineering	0,00	6,36 (**)	0,17	6,31 (**)	0,18	6,38 (**)	0,14	5,14 (**)	0,07	1,93	0,13	5,21 (**)	0,13	5,19 (**)	0,17	6,73 (**)	0,14	5,19 (**)	0,13	4,85 (**)
JC-14 - Human Necessities	0,00	6,95 (**)	0,17	6,83 (**)	0,16	6,29 (**)	0,16	6,24 (**)	0,13	4,87 (**)	0,18	7,37 (**)	0,16	6,68 (**)	0,20	8,15 (**)	0,18	7,09 (**)	0,17	6,88 (**)

Variables	OLS Coef.	OLS z	Model 1 Coef.	Model 1 z	Model 2 Coef.	Model 2 z	Model 3 Coef.	Model 3 z	Instrumental Vars Coef.	Instrumental Vars z	Model 4 Coef.	Model 4 z	Model 5 Coef.	Model 5 z	Model 6 Coef.	Model 6 z	Model 7 Coef.	Model 7 z	Model 8 Coef.	Model 8 z
Country of residence of applicants (Reference = France)																				
AT	0,00	-0,79	-0,04	-0,72	-0,02	-0,29	-0,08	-1,38	-0,13	-2,04 (*)	-0,10	-1,72	-0,08	-1,43	-0,05	-0,91	-0,10	-1,65	-0,09	-1,54
AU	0,00	-1,20	-0,15	-1,18	-0,14	-1,11	-0,12	-0,96	-0,13	-0,97	0,00	-0,01	-0,03	-0,26	-0,02	-0,16	-0,05	-0,39	0,03	0,22
BE	0,00	1,15	0,09	1,23	0,08	0,98	0,08	1,07	0,08	1,07	0,10	1,39	0,09	1,24	0,12	1,58	0,08	1,13	0,11	1,50
CA	0,00	-2,72 (**)	-0,23	-2,65 (**)	-0,22	-2,47 (*)	-0,20	-2,28 (*)	-0,15	-1,63	-0,15	-1,73	-0,18	-2,09 (*)	-0,18	-2,14 (*)	-0,15	-1,80	-0,13	-1,56
CH	0,00	-0,52	-0,02	-0,49	-0,02	-0,40	0,00	-0,11	0,03	0,59	0,02	0,50	0,01	0,24	0,01	0,16	0,00	-0,01	0,02	0,61
DE	0,00	1,41	0,04	1,51	0,06	2,10 (*)	0,01	0,54	-0,01	-0,31	-0,02	-0,60	-0,01	-0,30	0,01	0,24	-0,02	-0,60	0,02	0,59
DK	0,00	1,24	0,11	1,36	0,12	1,49	0,10	1,26	0,11	1,34	0,04	0,50	0,05	0,67	0,06	0,82	0,14	1,70	0,07	0,89
ES	0,00	1,12	0,17	1,12	0,19	1,24	0,13	0,84	0,09	0,57	0,03	0,24	0,06	0,42	0,10	0,68	0,11	0,73	0,04	0,24
FI	0,00	-0,01	0,01	0,12	0,01	0,08	0,02	0,25	0,06	0,64	-0,04	-0,51	-0,03	-0,36	-0,04	-0,55	0,04	0,44	-0,02	-0,24
GB	0,00	-5,49 (**)	-0,19	-5,41 (**)	-0,19	-5,36 (**)	-0,17	-4,83 (**)	-0,16	-4,26 (**)	-0,16	-4,75 (**)	-0,17	-5,30 (**)	-0,18	-5,50 (**)	-0,16	-4,79 (**)	-0,13	-3,86 (**)
IL	0,00	-0,02	-0,01	-0,03	0,00	-0,01	0,06	0,32	0,07	0,37	0,14	0,81	0,10	0,55	0,07	0,39	0,09	0,50	0,16	0,88
IT	0,00	0,83	0,04	0,83	0,05	0,95	0,01	0,20	-0,02	-0,46	-0,01	-0,11	0,00	0,03	0,03	0,73	0,00	-0,09	0,00	-0,08
JP	0,00	-0,96	-0,03	-0,94	-0,09	-2,61 (**)	0,05	1,57	0,18	2,67 (**)	0,08	2,83 (**)	0,06	2,01 (*)	-0,02	-0,71	0,04	1,24	0,11	3,50 (**)
KR	0,00	-0,72	-0,17	-0,74	-0,18	-0,81	-0,13	-0,59	-0,08	-0,36	-0,11	-0,51	-0,11	-0,47	-0,15	-0,68	-0,15	-0,66	-0,11	-0,50
NL	0,00	-1,40	-0,06	-1,43	-0,06	-1,38	-0,06	-1,64	-0,01	-0,13	-0,08	-2,32 (*)	-0,09	-2,40 (*)	-0,08	-2,14 (*)	-0,09	-2,49 (*)	-0,06	-1,48
SE	0,00	-1,81	-0,12	-1,77	-0,10	-1,41	-0,13	-1,88	-0,14	-1,99 (*)	-0,09	-1,40	-0,09	-1,44	-0,08	-1,18	-0,10	-1,46	-0,09	-1,29
US	0,00	-2,12 (*)	-0,11	-2,03 (*)	-0,12	-2,10 (*)	-0,06	-1,13	0,01	0,14	-0,13	-2,55 (*)	-0,09	-1,84	-0,16	-3,16 (**)	-0,06	-1,15	-0,10	-2,02 (*)
RoW	0,00	-8,61 (**)	-0,25	-8,59 (**)	-0,26	-8,65 (**)	-0,19	-6,68 (**)	-0,09	-1,56	-0,15	-5,50 (**)	-0,19	-6,79 (**)	-0,22	-8,17 (**)	-0,16	-5,97 (**)	-0,12	-4,47 (**)
Time dummies (Reference = 1990)																				
1980	0,00	-4,99 (**)	-0,23	-4,82 (**)	-0,13	-2,72 (**)	-0,23	-4,89 (**)	-0,26	-5,19 (**)	-0,25	-5,34 (**)	-0,23	-5,03 (**)	-0,24	-5,18 (**)	-0,26	-5,44 (**)	-0,26	-5,66 (**)
1981	0,00	-4,87 (**)	-0,20	-4,66 (**)	-0,13	-2,95 (**)	-0,20	-4,75 (**)	-0,23	-5,10 (**)	-0,22	-5,31 (**)	-0,21	-5,04 (**)	-0,21	-5,05 (**)	-0,22	-5,24 (**)	-0,24	-5,66 (**)
1982	0,00	-3,88 (**)	-0,15	-3,70 (**)	-0,08	-1,83	-0,16	-3,98 (**)	-0,18	-4,33 (**)	-0,19	-4,80 (**)	-0,18	-4,58 (**)	-0,18	-4,45 (**)	-0,18	-4,50 (**)	-0,20	-5,08 (**)
1983	0,00	-2,81 (**)	-0,11	-2,71 (**)	-0,05	-1,25	-0,11	-2,74 (**)	-0,13	-3,13 (**)	-0,14	-3,42 (**)	-0,13	-3,25 (**)	-0,13	-3,30 (**)	-0,13	-3,27 (**)	-0,15	-3,71 (**)
1984	0,00	-0,59	-0,02	-0,54	0,03	0,83	-0,02	-0,51	-0,02	-0,55	-0,03	-0,85	-0,03	-0,77	-0,03	-0,83	-0,04	-0,97	-0,04	-1,07
1985	0,00	-0,55	-0,02	-0,51	0,02	0,46	-0,02	-0,46	-0,01	-0,27	-0,05	-1,35	-0,05	-1,27	-0,05	-1,32	-0,03	-0,80	-0,06	-1,50
1986	0,00	-0,51	-0,02	-0,50	0,01	0,12	-0,02	-0,58	-0,01	-0,30	-0,05	-1,24	-0,05	-1,25	-0,05	-1,17	-0,04	-0,90	-0,05	-1,41
1987	0,00	-0,51	-0,02	-0,51	0,00	-0,05	-0,02	-0,47	-0,01	-0,22	-0,03	-0,67	-0,03	-0,73	-0,03	-0,75	-0,03	-0,66	-0,03	-0,85
1988	0,00	-0,14	-0,01	-0,17	0,02	0,47	0,00	-0,09	0,01	0,17	-0,03	-0,88	-0,04	-0,96	-0,04	-1,00	-0,01	-0,24	-0,04	-0,94
1989	0,00	-0,08	-0,01	-0,13	0,00	0,04	-0,01	-0,16	0,00	-0,06	-0,04	-0,94	-0,04	-0,98	-0,04	-0,94	-0,01	-0,36	-0,04	-0,97
1991	0,00	-0,84	-0,03	-0,89	-0,04	-0,98	-0,04	-0,97	-0,04	-0,99	-0,02	-0,54	-0,02	-0,42	-0,02	-0,43	-0,03	-0,85	-0,02	-0,41
1992	0,00	-1,05	-0,04	-1,08	-0,06	-1,46	-0,05	-1,35	-0,04	-1,12	-0,02	-0,57	-0,02	-0,58	-0,01	-0,33	-0,05	-1,16	-0,02	-0,45
1993	0,00	-1,12	-0,05	-1,12	-0,06	-1,51	-0,06	-1,51	-0,05	-1,34	-0,01	-0,23	-0,01	-0,18	0,00	0,13	-0,05	-1,34	0,00	-0,03
1994	0,00	-1,55	-0,06	-1,56	-0,09	-2,18 (*)	-0,08	-1,95	-0,07	-1,67	-0,02	-0,44	-0,02	-0,45	0,00	-0,06	-0,07	-1,60	-0,01	-0,18
1995	0,00	-2,00 (*)	-0,09	-2,01 (*)	-0,11	-2,40 (*)	-0,10	-2,37 (*)	-0,10	-2,21 (*)	-0,02	-0,50	-0,01	-0,29	0,00	-0,10	-0,09	-2,08 (*)	-0,01	-0,16
1996	0,00	-1,93	-0,09	-1,96	-0,13	-2,85 (**)	-0,10	-2,27 (*)	-0,10	-2,22 (*)	-0,03	-0,57	-0,02	-0,39	-0,01	-0,23	-0,09	-1,88	-0,01	-0,20
1997	0,00	-3,15 (**)	-0,17	-3,21 (**)	-0,20	-3,77 (**)	-0,18	-3,54 (**)	-0,20	-3,66 (**)	-0,13	-2,45 (*)	-0,11	-2,26 (*)	-0,10	-2,04 (*)	-0,16	-3,12 (**)	-0,10	-2,03 (*)
1998	0,00	-2,71 (**)	-0,17	-2,74 (**)	-0,20	-3,14 (**)	-0,20	-3,17 (**)	-0,24	-3,65 (**)	-0,14	-2,32 (*)	-0,13	-2,09 (*)	-0,11	-1,73	-0,18	-2,88 (**)	-0,12	-2,02 (*)
1999	0,00	-2,67 (**)	-0,21	-2,72 (**)	-0,23	-2,90 (**)	-0,25	-3,18 (**)	-0,32	-3,85 (**)	-0,19	-2,43 (*)	-0,18	-2,31 (*)	-0,14	-1,84	-0,22	-2,79 (**)	-0,16	-2,07 (*)
2000	0,00	-4,58 (**)	-0,49	-4,61 (**)	-0,51	-4,67 (**)	-0,54	-5,04 (**)	-0,67	-5,85 (**)	-0,48	-4,57 (**)	-0,46	-4,42 (**)	-0,41	-3,94 (**)	-0,51	-4,86 (**)	-0,45	-4,26 (**)
Model																				
# Observations	34512		34512		34512		34512		34514		35625		35622		35625		34514		35625	
Adjusted/Pseudo R^2	0,03		0,03		0,06		0,02		0,02		0,01		0,01		0,02		0,02		0,01	
F (P>F) / LR chi^2 (P>chi^2)	18 (0,00)		1.159 (0,00)		2.786 (0,00)		931 (0,00)		881 (0,00)		503 (0,00)		668 (0,00)		887 (0,00)		784 (0,00)		517 (0,00)	

EPO opposed patents filed 1980-2000) – Probit regressions

Table A12 – Survival Analysis of Patent Applications Time to Decision by Type of Applicant

	Occasional			Others			Academic		
Variables	**H.R.**	**z**		**H.R.**	**z**		**H.R.**	**z**	
Filing routes									
RTE_ACCSRC	0,87	-7,83	(**)	0,96	-4,80	(**)	0,94	-1,23	
RTE_PCT	0,75	-45,49	(**)	0,84	-59,53	(**)	0,72	-17,61	(**)
Drafting									
DRF_CLAIMS	0,99	-27,64	(**)	0,99	-57,54	(**)	0,99	-8,44	(**)
DRF_CLAIMS fitted									
DRF_PRIO	1,03	8,38	(**)	0,99	-4,94	(**)	0,98	-2,17	(*)
DRF_EQUIV	0,91	-12,90	(**)	0,91	-44,21	(**)	0,86	-11,64	(**)
DRF_HASDIV	0,62	-17,80	(**)	0,65	-66,80	(**)	0,64	-13,43	(**)
DRF_ISDIV	0,19	-60,47	(**)	0,23	-174,37	(**)	0,17	-33,79	(**)
Importance									
IMP_TRIADIC	0,84	-30,61	(**)	0,85	-62,73	(**)	0,81	-13,45	(**)
IMP_TRIADIC fitted									
IMP_FWDCIT5	0,96	-15,32	(**)	0,95	-41,49	(**)	0,95	-8,99	(**)
IMP_FWDCIT5 fitted									
Technical Complexity									
CMP_BPC	0,98	-23,80	(**)	0,98	-46,19	(**)	0,99	-3,89	(**)
CMP_NPC	0,96	-21,69	(**)	0,96	-55,54	(**)	0,97	-11,98	(**)
CMP_INV	0,97	-13,70	(**)	0,99	-15,87	(**)	0,99	-2,26	(*)
CMP_IPC4	0,96	-12,12	(**)	0,98	-11,47	(**)	0,94	-7,44	(**)
Applicant Profiles									
APP_MULTIPLE	1,04	4,28	(**)	1,05	9,19	(**)	1,00	0,14	
APP_CUMUL				1,00	11,91	(**)	1,00	1,32	
APP_OCCAS							0,92	-3,96	(**)
APP_CBOWN	0,90	-10,28	(**)	0,94	-14,99	(**)	0,99	-0,21	
EPO Joint Clusters (Reference = Organic Chemistry)									
JC-01 - Industrial Chemistry	1,06	7,53	(**)	1,13	33,01	(**)	1,20	7,86	(**)
JC-03 - Polymers	0,85	-15,28	(**)	0,91	-23,30	(**)	1,01	0,31	
JC-04 - Biotechnology	0,80	-23,09	(**)	0,77	-60,47	(**)	0,75	-13,75	(**)
JC-05 - Telecommunications	0,72	-17,42	(**)	0,58	-89,94	(**)	0,76	-3,62	(**)
JC-06 - Audio/Video/Media	0,89	-7,10	(**)	0,75	-51,09	(**)	0,86	-3,15	(**)
JC-07 - Electronics	0,86	-12,91	(**)	0,80	-52,99	(**)	0,98	-0,49	
JC-08 - Electricity	0,92	-8,23	(**)	0,88	-35,18	(**)	0,97	-1,07	
JC-09 - Computers	0,84	-11,56	(**)	0,62	-77,98	(**)	0,81	-3,73	(**)
JC-10 - Measuring Optics	0,91	-9,49	(**)	0,92	-21,88	(**)	1,01	0,67	
JC-11 - Handling & Processing	1,21	26,66	(**)	1,17	42,26	(**)	1,22	5,61	(**)
JC-12 - Vehicles	1,21	22,81	(**)	1,22	48,38	(**)	1,34	6,54	(**)
JC-13 - Civil Engineering	1,09	11,10	(**)	1,12	25,31	(**)	1,18	4,50	(**)
JC-14 - Human Necessities	1,07	8,99	(**)	1,02	3,69	(**)	0,88	-4,39	(**)

Variables	Occasional H.R.	z		Others H.R.	z		Academic H.R.	z	
Country of residence of applicants (Reference = France)									
AT	0,97	-1,39		0,97	-2,86	(**)	0,98	-0,19	
AU	0,59	-26,18	(**)	0,54	-31,04	(**)	0,58	-10,85	(**)
BE	0,96	-1,94		0,79	-19,67	(**)	1,12	1,96	
CA	0,84	-9,55	(**)	0,78	-18,42	(**)	0,91	-2,20	(*)
CH	0,93	-5,56	(**)	0,88	-18,61	(**)	1,31	4,43	(**)
DE	0,93	-7,98	(**)	0,93	-16,63	(**)	1,02	0,59	
DK	0,78	-9,59	(**)	0,75	-17,70	(**)	1,01	0,06	
ES	0,82	-9,25	(**)	0,75	-12,63	(**)	0,82	-2,26	(*)
FI	0,66	-16,60	(**)	0,63	-33,43	(**)	1,40	1,72	
GB	0,82	-17,69	(**)	0,82	-32,57	(**)	0,91	-2,73	(**)
IL	0,78	-10,08	(**)	0,71	-13,69	(**)	0,81	-3,55	(**)
IT	0,87	-12,37	(**)	0,78	-32,93	(**)	0,91	-1,60	
JP	0,68	-30,36	(**)	0,60	-107,01	(**)	0,74	-8,51	(**)
KR	0,74	-8,83	(**)	0,68	-19,33	(**)	0,89	-1,80	
NL	0,93	-4,69	(**)	0,83	-26,75	(**)	1,06	1,23	
SE	0,79	-18,20	(**)	0,74	-28,19	(**)	0,89	-2,70	(**)
US	0,68	-22,83	(**)	0,69	-38,73	(**)	1,05	0,41	
RoW	0,63	-47,56	(**)	0,67	-89,31	(**)	0,70	-14,84	(**)
Time dummies (Reference = 1990)									
1980	1,45	19,04	(**)	1,94	69,09	(**)	1,60	5,65	(**)
1981	1,33	15,71	(**)	1,60	53,76	(**)	1,28	3,12	(**)
1982	1,17	8,71	(**)	1,36	37,15	(**)	1,33	4,21	(**)
1983	1,02	1,35		1,13	15,58	(**)	0,93	-1,20	
1984	0,92	-4,84	(**)	0,99	-0,89		0,90	-1,71	
1985	0,86	-9,13	(**)	0,89	-15,28	(**)	0,90	-2,04	(*)
1986	0,87	-8,34	(**)	0,90	-13,96	(**)	0,89	-2,24	(*)
1987	0,85	-10,35	(**)	0,88	-18,53	(**)	0,85	-3,23	(**)
1988	0,89	-7,89	(**)	0,89	-17,55	(**)	0,97	-0,56	
1989	0,92	-5,83	(**)	0,91	-14,52	(**)	1,04	0,81	
1991	1,02	1,49		1,03	4,25	(**)	0,90	-2,44	(*)
1992	0,97	-2,15	(*)	1,04	6,81	(**)	0,77	-5,88	(**)
1993	0,91	-6,28	(**)	0,97	-4,78	(**)	0,75	-6,65	(**)
1994	0,82	-13,80	(**)	0,88	-20,05	(**)	0,69	-8,60	(**)
1995	0,76	-18,92	(**)	0,77	-41,50	(**)	0,71	-8,06	(**)
1996	0,69	-26,08	(**)	0,70	-55,50	(**)	0,72	-7,88	(**)
1997	0,70	-25,13	(**)	0,71	-54,88	(**)	0,90	-2,65	(**)
1998	0,83	-13,43	(**)	0,84	-28,20	(**)	1,20	4,51	(**)
1999	1,11	7,06	(**)	1,19	27,02	(**)	1,73	13,12	(**)
2000	1,60	32,07	(**)	1,93	99,87	(**)	2,96	24,93	(**)
Model									
# Subjects	186638			926564			25293		
# Failures	174873			847182			20651		
Log likelihood	-1709739			-9661152			-155671		
LR chi² (P>chi²)	48.570 (0,00)			243.296 (0,00)			9.222 (0,00)		

Table A13– Survival Analysis of Patents Maintenance Periods by Type of Applicant

	Occasional			Others			Academic		
Variables	**H.R.**	**z**		**H.R.**	**z**		**H.R.**	**z**	
Filing routes									
RTE_ACCSRC	0,92	-2,12	(*)	0,93	-3,96	(**)	1,02	0,16	
RTE_PCT	1,05	4,23	(**)	1,02	3,11	(**)	1,02	0,44	
Drafting									
DRF_CLAIMS	1,00	-2,95	(**)	1,00	-10,74	(**)	0,99	-3,72	(**)
DRF_CLAIMS fitted									
DRF_PRIO	1,00	-0,23		1,00	-0,57		0,98	-0,64	
DRF_EQUIV	1,00	0,34		0,99	-2,30	(*)	1,01	0,23	
DRF_HASDIV	0,71	-6,33	(**)	0,81	-16,79	(**)	0,76	-3,69	(**)
DRF_ISDIV	0,89	-1,99	(*)	0,95	-2,63	(**)	0,94	-0,48	
Importance									
IMP_TRIADIC	0,84	-17,88	(**)	0,85	-36,19	(**)	0,79	-7,17	(**)
IMP_TRIADIC fitted									
IMP_FWDCIT5	0,90	-17,51	(**)	0,89	-49,13	(**)	0,91	-7,91	(**)
IMP_FWDCIT5 fitted									
Technical Complexity									
CMP_BPC	1,00	0,56		1,00	-0,38		0,99	-0,95	
CMP_NPC	1,00	-1,10		1,01	4,22	(**)	1,00	-0,60	
CMP_INV	0,98	-5,20	(**)	0,99	-5,39	(**)	1,00	0,08	
CMP_IPC4	1,01	1,43		1,02	7,24	(**)	1,02	1,10	
Applicant Profiles									
APP_MULTIPLE	1,11	6,38	(**)	0,98	-2,48	(*)	0,94	-1,68	
APP_CUMUL				1,00	15,12	(**)	1,00	-2,63	(**)
APP_OCCAS							1,03	0,77	
APP_CBOWN	0,96	-2,43	(*)	0,98	-3,04	(**)	1,00	-0,07	
EPO Joint Clusters (Reference = Organic Chemistry)									
JC-01 - Industrial Chemistry	0,98	-1,26		1,02	3,94	(**)	0,99	-0,21	
JC-03 - Polymers	0,95	-2,81	(**)	1,00	-0,72		1,16	2,71	(**)
JC-04 - Biotechnology	0,92	-4,45	(**)	1,04	5,69	(**)	0,91	-2,29	(*)
JC-05 - Telecommunications	1,07	1,59		0,92	-6,50	(**)	0,76	-1,56	
JC-06 - Audio/Video/Media	1,02	0,67		0,89	-11,76	(**)	0,87	-1,21	
JC-07 - Electronics	1,08	3,29	(**)	0,99	-1,74		1,24	2,43	(*)
JC-08 - Electricity	1,00	0,10		1,01	0,89		1,04	0,67	
JC-09 - Computers	1,07	2,13	(*)	0,95	-4,26	(**)	0,88	-1,01	
JC-10 - Measuring Optics	1,03	1,81		0,99	-1,54		1,15	3,41	(**)
JC-11 - Handling & Processing	1,01	0,44		0,97	-5,25	(**)	1,05	0,88	
JC-12 - Vehicles	0,99	-0,86		0,90	-14,76	(**)	1,01	0,17	
JC-13 - Civil Engineering	0,98	-1,47		0,94	-8,74	(**)	1,19	2,88	(**)
JC-14 - Human Necessities	1,07	4,79	(**)	0,88	-17,62	(**)	0,92	-1,53	

Variables	Occasional H.R.	z		Others H.R.	z		Academic H.R.	z	
Country of residence of applicants (Reference = France)									
AT	1,01	0,21		1,08	3,99	(**)	0,68	-1,61	
AU	1,17	4,24	(**)	1,17	3,87	(**)	1,02	0,24	
BE	0,99	-0,17		1,06	2,97	(**)	0,76	-1,77	
CA	1,09	2,49	(*)	1,20	7,62	(**)	1,26	2,48	(*)
CH	0,98	-0,79		1,06	4,92	(**)	1,19	1,75	
DE	0,99	-0,75		1,03	4,40	(**)	1,01	0,17	
DK	0,98	-0,54		0,89	-3,50	(**)	0,96	-0,16	
ES	1,18	3,66	(**)	1,27	5,39	(**)	1,45	1,84	
FI	0,89	-2,41	(*)	0,93	-2,49	(*)	4,13	2,44	(*)
GB	1,05	2,66	(**)	1,13	12,29	(**)	1,15	2,04	(*)
IL	1,43	6,55	(**)	1,32	4,96	(**)	1,04	0,32	
IT	1,14	6,39	(**)	1,13	9,26	(**)	1,30	2,42	(*)
JP	1,06	2,75	(**)	0,97	-3,57	(**)	0,92	-1,40	
KR	1,46	4,51	(**)	0,85	-2,68	(**)	1,28	1,72	
NL	0,97	-1,20		1,22	18,25	(**)	0,93	-0,67	
SE	1,30	11,05	(**)	1,21	9,92	(**)	1,61	5,91	(**)
US	1,00	-0,07		0,89	-6,56	(**)	0,95	-0,22	
RoW	1,14	7,69	(**)	1,15	18,87	(**)	1,21	4,22	(**)
Time dummies (Reference = 1990)									
1980	1,17	5,71	(**)	1,10	7,74	(**)	1,02	0,23	
1981	1,16	5,77	(**)	1,14	11,96	(**)	1,16	1,48	
1982	1,20	7,18	(**)	1,20	16,68	(**)	1,14	1,39	
1983	1,24	8,44	(**)	1,23	20,02	(**)	1,33	3,45	(**)
1984	1,29	10,37	(**)	1,29	25,41	(**)	1,32	3,28	(**)
1985	1,32	11,48	(**)	1,35	30,48	(**)	1,44	4,77	(**)
1986	1,09	3,60	(**)	1,11	10,18	(**)	1,24	2,81	(**)
1987	1,09	3,56	(**)	1,11	9,82	(**)	1,12	1,41	
1988	1,08	3,24	(**)	1,08	7,44	(**)	1,08	1,05	
1989	1,02	0,99		1,06	5,51	(**)	1,02	0,27	
1991	0,99	-0,22		0,95	-4,95	(**)	1,02	0,31	
1992	0,94	-2,42	(*)	0,93	-7,16	(**)	0,95	-0,65	
1993	0,94	-2,46	(*)	0,90	-10,15	(**)	0,95	-0,65	
1994	0,91	-3,83	(**)	0,85	-13,96	(**)	0,93	-0,89	
1995	0,88	-4,64	(**)	0,82	-16,51	(**)	0,94	-0,71	
1996	0,88	-4,42	(**)	0,78	-18,50	(**)	0,99	-0,11	
1997	0,78	-7,47	(**)	0,73	-21,02	(**)	0,86	-1,39	
1998	0,78	-6,88	(**)	0,68	-22,22	(**)	0,82	-1,69	
1999	0,83	-4,58	(**)	0,72	-16,99	(**)	0,76	-2,05	(*)
2000	0,97	-0,67		0,77	-11,59	(**)	0,94	-0,41	
Model									
# Subjects	93050			545749			10198		
# Failures	53637			289711			5041		
Log likelihood	-545294			-3458594			-40195193		
LR chi² (P>chi²)	2.340 (0,00)			16.306 (0,00)			501 (0,00)		