An economic analysis of deferred examination system: Evidence from a policy reform in Japan

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A B S T R A C T

We investigate how a deferred patent examination system promotes ex-ante screening of patent applications, which reduces both the number of granted patents and the use of economic resources for examinations, without reducing the return from R&D. Based on a real option theory, we develop a model of examination request behaviors. Exploiting the responses of Japanese firms to recent policy reform, we find that the shortening of the allowable period for an examination request significantly increases both eventual and early requests, controlling for the blocking use of a pending patent application. This effect is stronger in technology areas with higher uncertainty. These results support the importance of uncertainty for an applicant and of ex-ante screening.

1. Introduction

Unlike the United States Patent and Trademark Office (USPTO), the Japan Patent Office (JPO) and the European Patent Office (EPO) only examine patent applications after receiving formal examination requests from applicants. In Japan, if such a request is not received within three years of the date of the application, the application is deemed withdrawn. Under the first-to-file system, an inventor has an incentive to file his patent application as soon as possible. Therefore, inventors apply for a patent on even such an invention that has significant uncertainty in patentability and in the probability of its commercialization. Examining all applications has two important economic costs. First, it increases significantly the number of patent grants. Such grants constrain third parties without increasing the ex-ante profit of an applicant from its R&D. Second, economic resources are used for more examinations. Under the recent environment of "patent explosions," increasing patent applications place strains on the patent office, which can result in longer pendency periods and a higher probability of mistakes in grant decisions.

A deferred examination or an examination request system provides an important mechanism reducing these social costs. It does so by providing patent applicants with more time to screen their inventions before requesting examinations. Such an arrangement is likely to be especially important when uncertainty in commercialization is high. In this regard, what ultimately matters for a firm in seeking patent protection is not the technical quality of an invention per se but the value of patenting such invention, which depends on a number of factors, including the availability of complementary assets. For many inventions, the resolution of uncertainty in the value of patenting can take a long time. However, the examination request system may also induce applicants to use pending applications, even if they do not meet patentability standards, to block third-party innovative investment. An examination...
request by a third party may not adequately prevent this blocking use of
pending applications.2
Thus, a trade off may well exist in introducing or designing a deferred
examination system: a longer examination request period enhances the
ex-ante “screening effect” of examinations, thereby decreasing the number
of patent examinations (as well as patent grants) and reducing the
burden on a patent office, while increasing the “blocking effect” of pend-
ing applications. Perhaps reflecting this tradeoff, not all countries have
adopted an examination request system, and the allowable period for
examination requests varies among patent offices. In particular, all pat-
ent applications are automatically examined at the USPTO, although
there have been debates on whether the U.S. should also introduce a de-
ferred examination system.3 Moreover, in 2001, concern over pending
applications led to the reduction of the allowable period for examination
requests from seven to three years in Japan.
A comprehensive economic analysis of the deferred examination
system does not exist. This paper provides both a theoretical model
for such a system, based on a real option theory and an empirical valida-
tion of the importance of the ex-ante screening effect predicted by the
model, by examining the responses of Japanese firms to this policy
change. Our theoretical model explains why applicants might delay ex-
amination requests in an environment in which new information ar-
ries in the future, with particular focus on the importance of the
screening effect. We take into account the blocking value of a pending
application, although we do not model the interactions between firms.
We analytically solve the model and provide comparative statics results
on how the maximum length of the pending period affects the volume
of examination requests and their timing. In particular, we show theo-
retically that examination requests increase with the reduction of the
maximum pending period more in sectors where ex-ante screening is
important and that ultimate examination requests are not affected by
the blocking value of pending applications.
Our empirical analysis seeks to validate these theoretical results. The
reduction of the allowable period for Japanese examination requests
from seven to three years in 2001 provides us with a unique exogenous
shock, which affects the amount of information that an applicant can
use in making an examination request decision. Utilizing the panel
data at the monthly and individual patent application levels, we can
control for demand, technology, and patent system changes over time,
when we identify the effects of the policy change. We can also control
for the importance of blocking motivations of pending and granted pat-
ents in our estimations.
The rest of the paper is organized as follows. Section 2 presents a sur-
vey of related studies. In Section 3, we provide an option-based theore-
tical model and develop hypotheses grounded on comparative statics
results. Section 4 describes the dataset and provides the empirical re-
sults. Section 5 concludes the paper, discussing the policy implications
of our analysis.

2. Related studies
A patent renewal decision is similar to that of postponing a patent
examination request, in the sense that both involve the evaluation of
option values. Our research addresses related but distinct questions,
compared with the existing studies on patent renewals. Pakes (1986)
is a pioneering paper, which develops the option theory of patents

2 A third party can request an examination and will do so if it benefits from an early clar-
ification of the patentability of pending applications are greater than the cost of requesting
an examination. However, the individual benefit for a third party may not be large, when
the possibility of being blocked is relatively small, the cost of developing a circumventing
invention is small, or the invention may not immediately be used. Still, the collective ben-
efit for third parties from early clarification can be significant. However, even if that is the
case, a free rider problem among third parties for examination requests makes it difficult
to realize such aggregate benefits.
3 On January 28, 2009 the USPTO solicited public comments on whether a deferred ex-
amination procedure should be introduced in the US.

4 Using Pakes’ approach, Deng (2007) analyzes the changes in the value of patents after
the establishment of the EPO. She suggests that the harmonization of the patenting pro-
cess in the EPO reduced the differences in the patent value among these countries, while
the changes in patent length and renewal fees had only modest effects on patent value.
5 There are seminal papers that examine the influence of patent breadth and patent length on
the innovative activities of firms or social welfare, such as Gilbert and Shapiro
(1990), Matutes et al. (1996), and O’Donoghue et al. (1998).
6 Sampat (2011) suggests that the applicants have an inventive to contribute more to the
prior art search when the inventions are more important for them.
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