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Examination workloads, grant decision bias and examination quality of patent office

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ABSTRACT

This paper investigates how increased examination workloads at patent office affect the patent examination process and tests whether workloads have any external effect on examiners' decisions. Using novel micro-level data, we provide the first empirical evidence that examiner decisions are systematically biased as workload increases, with examiners being more likely to grant a patent than to reject it. The regression results also indicate that the quality of examinations decreases as workload increases. In appeal trials, the likelihood of grant decision reversal significantly increases as workload increases, while the likelihood of the revocation of a refusal decision exhibits statistically significant negative relationship with increased workloads. These results imply that an examiner who lacks sufficient time for a prior art search tends to grant a patent and, consequently, a large workload decreases the quality of examinations by resulting in unqualified patents.

1. Introduction

Early patent grants are crucial for the IP management of firms so that they can maximize their opportunities to commercialize a technology and obtain full rights to injunctive relief against infringement (Gans et al., 2008; Harhoff and Wagner, 2009). Due to these advantages, applicants may have a strong interest on lesser streamlined examination procedures and expeditious acquisition of a patent right. With the increasing patent backlogs worldwide, however, the examination pendency periods have increased and the policies to expedite the examination process have become an important concern in patent offices.

Reductions in examination pendency periods, however, may involve a tradeoff with the quality of examination. Although the examination process of a patent office is fairly standardized, it is imperfect in that it substantially depends on the examiners' experience, motivation, and skills (Cockburn et al., 2003). Many scholars and policy makers address the "overload problem" of patent offices and wonder whether the average quality of patent examination would decline as the workload of examiners increases (Calliaud and Duchene, 2011; Schuett, 2013). When patent examiners with large backlogs experience tighter time constraints they may tend to overlook relevant prior art and grant patents to unqualified inventions.

Rejecting an application requires a more time-intensive prior art search, and the examiner must find clear evidence that the claimed invention already exists or would have been obvious to someone skilled in the art. Thus, facing time constraints, an examiner could simply report not having found such evidence and grant a patent (Schuett, 2013).[1] Langinier and Marcoul (2009) therefore argue that a reward system should be based on "rejections" rather than the number of disposals that the examiner has reviewed. It gives the examiners greater incentive to search for relevant information more rigorously. This implies that the examiners' workloads may have an external effect on the examinations and have a positive effect on patentability decisions.

In contrast, King (2003) argues that the workload is not relevant to the quality of examinations. By conducting empirical analysis

[1] To improve the examination quality and enhance the customer reliability of the examination results, KIPO introduced the Examination Quality Assurance Officer (EQAO); the directors of each examination division conduct semiannual reviews of examinations. The review system is much less significant than the production quotas because this review is based on a small number of random samples.

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on workloads at the United States Patent and Trademark Office (USPTO), he finds that patent examiners spend, on average, the same amount of time on each application regardless of increased workloads. In general, examiners are expected to meet certain disposal goals and are required to earn a certain number of credits per year. Once they meet these requirements, there is little pressure from the organization to perform additional examinations. As such, King (2003) argues that the examination process and the associated grant decision on an application are not related to the examiners' backlogs.

Despite this debate, there is still no explicit evidence on the relationship between the workload and the examination quality. Most of evidence is anecdotal, and there is surprisingly little compelling empirical evidence on this issue (Schuett, 2013). We believe that this issue is important because it addresses how institutional features and the design of incentives for examiners affect the quality of examinations and the quality of the associated patents. Patents mistakenly granted to an unqualified invention will cause costly legal disputes and serious social welfare distortions. These institutional costs will ultimately discourage innovation by inventors on the innovation markets.

We use Korean patent application data (1999–2009), along with examiner level rosters at Korea's Intellectual Property Office, and provide, to our knowledge, the first empirical evidence of whether heavy workloads have any statistically significant external effect on examiners' patent grant decisions. To address the quality of examinations, we also employ patent dispute information from the Korea Patent Dispute Tribunal data and explore whether the grant decisions under heavy workload are positively correlated with the likelihood of acceptance of invalidation appeals.

The regression results provide empirical evidence that the increased workload and time constraint of examiners significantly increase not only the likelihood of grant decisions but also the acceptance rate of invalidation trials. The results imply that increased workload has a statistically significant external effect on examiners' grant decisions and reduces the quality of examinations by producing invalid patents. The regression results, moreover, reveal the statistically significant negative relationship with increased workloads and the reversals of examiners' rejection decisions. This finding suggests that, under heavy workloads, time constraints limit the ability of examiners to reject applications, and policies to expedite the examination process may cause systematically biased side effect of producing invalid patents.

Numerous studies have addressed various issues in line with patent and firm behavior. However, only some studies have directly investigated the patent examination system and the quality of examination. van Pottelsberghe (2011) presents an in-depth study on the patent system and develops a methodology to compare the quality of examination services in three major patent offices. It consists of a two-layer analytical framework covering 'legal standard' and 'operational design' which includes several independent components that affect the stringency and transparency of the filtering process. He argues that different system designs lead to different outcomes of examination backlogs, patent propensity, and the number of dubious patent rights.

de Saint-Georges and van Pottelsberghe (2013) expand the study of van Pottelsberghe (2011) and construct a quality index for patent systems. They empirically analyze whether the degree of quality of patent systems affects the behavior of applicants, especially their propensity to patent. They discover evidence consistent with the "vicious cycle" hypothesis. The patent systems with a high-quality index receive fewer patent applications, meaning that applicants adapt their filing behavior in accordance with the broad quality of the patent system they target. The finding implies that the number of patent applications, and hence, the workload of examiners could be affected endogenously by the quality of examination ofthe patent office.

Picard and van Pottelsberghe (2013) theoretically study the relationship between governance of patent offices and the quality of patent systems. They present a model that describes the potential behavior of patent offices with respect to the setting of fees and the quality of their examination processes. They address the possibility that a self-funded patent office, having the tradeoff between softer examination and better credibility of the granted patents, can present a strategic choice regarding examination quality. They show that the demand for patent examination increases with smaller patent fees. On the other hand, the quality of patent examination is the highest in the social planner case that maximizes the protection of invention and incentive to innovate but the lowest in the self-funded patent office.

Nagaoka and Yamauchi (2015) recently examine how significantly the information constraint of the patent office affects its examination quality by assessing the effects of initiation lag, and find that a policy of reducing the initiation lag increased significantly the grant rate and the frequency of appeals against the initial rejections of the Japan Patent Office. The results suggest the patent office, under information constraint, lower examination quality and better information infrastructure will significantly improve patent examination quality.

Lemley (2000) provides a somewhat different viewpoint from the conventional perspectives. Using the US patent data, he argues that strengthening the examination process is not cost-effective because only very few patents are litigated or licensed. The patent office could be better to have "rational ignorance" on the objective validity of the patents it issues.

Lei and Wright (2017) find that US examiners tend to devote more search effort to weaker patents, and they can and do identify a substantial portion of the weak patents that they issue. They conclude that the issue of weak patents is not solely a problem of inter-examiner heterogeneity but also the problem of underutilization of examiner knowledge and expertise of USPTO on its patent examination.

Calliaud and Duchene (2011), on the other hand, theoretically analyze the overload problem within the patent office and its effect on the firm's R&D incentives. They assume that there exists a tradeoff between the workload and the examination quality, and argue that imperfect observability of these characteristics can lead to mistakenly granted patents. Thus they suggest that a penalty system for rejected patent applications and the applicant's commitment to high non-obviousness standard could attain the high R & D equilibrium by screening the low-quality inventions. The system may reduce the workload of the examiners and consequently increase the quality of examinations.

Palankaraya et al. (2011) estimates the extent of misclassification in patent examination decisions between the European Patent Office (EPO) and the Japanese Patent Office (JPO), which are incorrectly refused or granted patents. Their analysis reveals that granting an invalid patent is relatively higher than the rejection of patentable application, and patent offices are less likely to misclassify an application with longer duration of examination, more experienced applicants, and in areas where the office has a relative specialization.

Yamauchi and Nagaoka (2015) empirically analyze the effect of outsourcing of prior art searches on the efficiency of patent examination and find it significantly increases the examination quality of the Japanese Patent Office by expanding the scope of prior art searches.

The previous studies suggest that the patent system could be correlated with the quality of examination and the quality of patent. Most studies are however limited in theoretical analyses, or providing only indirect evidence on how the workload of examiners