

Essays on Intellectual Property Rights Protection and Economic Growth

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The purpose of this essay is to analyze the effects of strengthening patent protection on innovations, economic growth, and social welfare. In general, patent systems have a role in protecting the rights of innovators and the monopolistic profits that result from R&D activities. According to this argument, strengthening patent protection promotes innovations and economic growth. However, patent systems have problems such as inefficiencies that result from increases in monopolistic power. Also, there is concern that if patent protection is too strong, future innovations will be stifled. In addition, the use of patents to block sequential innovations has recently been considered as a problem.

Many literatures has examined to find out the relationship between patent protection and innovations (and economic growth), and has attempted to reveal the optimal patent protection. These studies, however, do not focus on the blocking aspect of patents. Even the literatures that include analysis of a blocking patent in an endogenous growth model only examine the effect of patent policy within the *same* industries and do not reflect its effect across *different* industries. Therefore, the main purpose of this essay is to analyze the effects of strengthening patent protection on innovations, economic growth, and social welfare with a focus on the blocking role of patents across industries.

In chapter 2, a blocking patent on horizontal R&D are introduced into the endogenous growth model of Chu et al. (2012), which features a blocking patent on vertical R&D. Results show that strengthening patent protection on horizontal R&D promotes vertical innovation (quality improvement) but hinders horizontal innovation

(variety expansion). This effect of a horizontal blocking patent on directionality of innovation is opposite to that of the vertical blocking patent analyzed by Chu et al. (2012). Results also show that under mild conditions, strengthening a blocking patent on horizontal innovation as well as on vertical innovation can increase economic growth and social welfare.

In chapter 3, we analyze the effect of strengthening patent protection on innovation and economic growth by introducing a blocking patent into the endogenous growth model developed by Furukawa (2013a), which features survival activity of patent holders in the R&D sector with variety-expansion model. Results show that strengthening patent protection can raise the economic growth rate through an endogenous survival investment. Also, the effects of increasing subsidies for R&D are examined. We find that increasing R&D subsidy rate can negatively affect economic growth because of the investment for survival activity. This result shows the novel role of a blocking patent in determining innovation effects of R&D subsidies. Furthermore, we analyze the effect of patent breadth which is another patent instrument in this model on innovation and economic growth. Results show that the innovation effect of the profit-division rule and the subsidy rate for R&D may vary with the size of patent breadth.

Chapter 4 is the bases of Chapter 3. The result of policy interdependence between patent protection and R&D subsidies in Proposition 1 of Furukawa (2013a) is incomplete. In this chapter, we provide a reexamination on the sufficient condition of Proposition 1.