## Abstract

This paper examines how drug pipelines (product lines and drug candidates under development stages) affect pharmaceutical licenses, controlling various firm characteristics such as firm size and diversity. We classify stages of licensing contracts into four stages: (i) drug discovery, (ii) early development, (iii) late development, and (iv) marketing. Collected data consists of 347 license-outs and 604 license-ins closed by 54 Japanese pharmaceutical companies with various types of counterparts such as horizontal rivals, bio-ventures, and universities between 1997 and 2007. Estimates from random effect IV models reveal that fewer drug candidates in a late stage accelerate license-ins in various stages (*exhaustion*). On the other hand, richer pipelines in any stage facilitate license-outs in that stage (*exploitation*). In addition, firm size also plays a significant role in licensing decisions. That is, large pharmaceutical firms are likely to be more active in license-ins, although they are rather reluctant to license out. Theoretical implications are also discussed. Our results suggest that capability theory may be more suitable for license-ins, while rent dissipation effect may be rather relevant to license-outs.



*JEL classification*: L24; L65; C13.