

Competition among Proprietary and Open-Source Software Firms: The Role of Licensing on Strategic Contribution

Abstract

In enterprise software markets, firms are increasingly using *services*-based business models built on open-source software (OSS) to compete with established, proprietary software firms. Because third-party firms can also strategically contribute to OSS and compete in the services market, the nature of competition between OSS constituents and proprietary software firms can be complex. Moreover, their incentives are strongly influenced by the licensing schemes that govern OSS. We study a three player game and examine how open-source licensing affects competition among an open-source originator, open-source contributor, and a proprietor competing in an enterprise software market. In this regard, we examine: (i) how quality investments and prices are endogenously determined in equilibrium, (ii) how license restrictiveness impacts equilibrium investments and the quality of offerings brought to market, and (iii) how license restrictiveness affects consumer surplus and social welfare. Although some in the open-source community often advocate restrictive licenses such as GPL, because it is not always in the best interest of the originator for the contributor to invest greater effort, such licensing can actually be detrimental to both consumer surplus and social welfare when it exacerbates this incentive conflict. We find such an outcome to be the case in markets characterized by software providers with similar development capabilities. In contrast, when their capabilities are more dispersed, a more restrictive license can instead encourage greater effort from the OSS contributor, lead to higher OSS quality, and provide a larger societal benefit.

Keywords: Open-source software, software competition, licensing, collaborative development, product quality, software services market, strategic contributions to open-source software