

# Intellectual property rights protection and cross-border R&D investments by multinational enterprises

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## SUMMARY

The globalization of Research and Development (R&D) by multinational enterprises (MNEs) has grown significantly in recent years, with emerging economies featuring as major recipients of R&D investments. One serious problem MNEs face in emerging economies is weaker intellectual property rights (IPRs), which put their important technologies at the risk of misappropriation by local firms. However, the recent rise of R&D investments in emerging economies is at odds with the previous IPR literature, showing that strengthening IPR protection has positive effects on inward R&D investments and technology transfer by MNEs. This dissertation aims to uncover how MNEs reconcile the needs of local R&D in these countries with great concerns for IP protection there.

In order to explain these twin phenomena, we argue that, while weak IPR protection is expected to increase IP hazards associated with foreign R&D activities in general, there are important firm-level (investor-level) and host country-level factors that determine the actual and heterogeneous IP risks that individual R&D investors are confronted with in host countries. We contend that the most important sources of this heterogeneity are IP protection strategies of MNEs, the nature of technologies MNEs develop, technological capabilities of MNEs and host countries, and inter-firm mobility of R&D personnel in host countries. We apply this insight to four essays with a variety of perspectives pertaining to MNEs' R&D location choices, the consequences of R&D investment announcements on stock market valuations, and outgoing knowledge spillovers from MNEs' local R&D units. Most essays rely on data on cross-border greenfield R&D investments and global patent applications of 120 European market leading MNEs across diverse industries, 2003-2014. We improve an existing IPR protection indicator for countries by taking into account both *de jure* and *de facto* patent protection.

The first source of the IPR heterogeneity is MNEs' strategies to protect their knowledge assets abroad. Our findings suggest that 1) firms with strong internal linkages across R&D units in multiple countries (i.e., their R&D projects tend to be conducted by cross-country inventor teams) are more likely to invest in R&D in weak IPR countries; 2) such linkage strategy mitigates the negative impact on market valuation due to R&D investments in countries with weak IP enforcement; 3) outward spillovers from MNEs' local R&D units are restricted if firms make use of international inventor teams due to their internal linkage strategies; and 4) this restrictive effect of linkage strategy is more profound in weaker IP protection environments.

Second, the nature of knowledge embodied in technologies is another source of heterogeneous

IPR effects. We show that 1) MNEs whose technology domains are focusing on discrete (complex) knowledge are less (more) likely to engage in R&D investments in weak IPR countries; 2) the risk of local spillovers from foreign R&D operations is higher for discrete technologies than complex technologies; 3) firms that operate in technology domains with tacit knowledge are less likely to invest in R&D in weak IPR countries; while 4) knowledge spillovers from MNEs' local R&D operations are less likely when technology domains involve tacit knowledge compared to codified knowledge. We also show the interplay between internal linkage strategies and two technology dimensions. We find that 1) weak IPR protection in host countries deters MNEs' R&D investments to a lesser extent if the MNEs use internal linkage strategies, but this relationship is most profound for firms whose technologies are based on tacit and discrete knowledge; and 2) the restrictive effect of linkage strategies on local spillovers is more profound for discrete technologies and less profound for technologies involving more tacit knowledge.

Third, heterogeneous IPR effects are also influenced by technological capabilities of MNEs and host countries. Our findings suggest that 1) strong IP protection is less needed to induce foreign R&D investments if MNEs are based in countries with lagging technological capabilities compared to the host country; 2) The negative effect of weak IPR on MNEs' R&D investments in a host country is augmented if the MNEs' technological capabilities are more advanced compared to the host country; 3) The restrictive effect of MNEs' linkage strategies on outward local spillovers is strengthened if the relative technological capabilities of MNEs compared to the host country are stronger.

Lastly, inter-firm mobility of scientists and engineers in host countries has a major influence on heterogeneity in IP protection effects. We find that 1) strong patent protection fails to attract foreign R&D investments if substantial inter-firm inventor mobility exists in the country; 2) firms' market values are negatively influenced by high mobility rates across their R&D host countries; and 3) outward mobility of MNE inventors from local R&D units is a crucial source of outgoing spillovers from their foreign R&D units, while such mobility is restricted by strong IPR regimes and linkage strategies.

Academic contributions and policy implications of our findings are discussed, as well as important topics for future research.