

- a) Generate a report using one or more SQL queries that quantifies formation of alliances (with firms within and outside the software industry) at various annual levels of investments made by software firms in the following: research and development (R&D), advertising, physical capital, and employees. Consider dividing these investment metrics by total firm assets, so that investment intensities are given as a proportion to the firms' total investment capacity. Briefly interpret and describe your results. Also show and describe your SQL queries. The addendum describes possible reporting approaches, which you may consider.
- b) Generate a report using one or more SQL queries that shows average annual firm performance, in levels as well as changes over the course of one, two, three, or four years, for firms at various levels of alliance formation. Firm performance metrics should include sales, operating income, stock price, or return on assets (sales divided by assets). Consider also using Tobin's q (a measure of firm intangible value), which you can construct using the formula below. Briefly interpret and describe your results. Also show and describe your SQL queries.

$$\text{tobinsq} = (\text{prefstock} + \text{stock_price} \times \text{shares_outstanding} + \text{current_liabilities} - \text{currassets} + \text{invent} + \text{ltdebt}) / (\text{total_assets})$$

- c) Generate a report using one or more SQL queries that shows average performance of software firms at various levels of alliance formation with firms in the following industry categories, at the 2digit NAICS level: Manufacturing, Information, "Finance and insurance", "Healthcare and social assistance", "Management of companies and enterprises", Wholesale trade, Retail trade, and "Professional, Scientific, and Technical Services" (<https://www.census.gov/cgi-bin/sssd/naics/naicsrch?chart=2012>).