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This dissertation examines some of the economic issues surrounding patenting by smaller life science firms. In this context patents are viewed as firm assets that have a value separate from the patented innovation itself, derived from rents that accrue to the monopoly rights granted by the patent. Patents also have costs associated with their acquisition, including legal and patent office fees as well as the time and effort required to move them through the process from application to granted status.

The first essay investigates one facet of the cost of patent acquisition, pendency time. Patents which take longer to be granted can place a higher cost on the applicant firm, in the form of foregone revenues, as well as on society, as longer pendency slows the rate of innovation and creates uncertainty for other innovators. Much research in this area concentrates on the influence of patent characteristics on pendency. This essay uses a more comprehensive model that also includes the experience and interests of three stakeholders in the patenting process: applicants, their attorneys, and patent examiners. I find that applicant behavior is a significant factor in longer pendency. This suggests that pendency offers benefits to the applicant, including the aforementioned uncertainty on the part of potential competitors and more time to assess the nature and value of the invention and tailor the patent to market conditions.

The second essay turns to the subject of patent value, and examines the relationship between academic science and industrial innovation. Knowledge from academic science can be an important input for innovation in the life sciences. Previous research has described the impact of science intensity, defined as the number of scientific references in the patent, on patent value Scientific knowledge is not homogeneous, though, any more than are the patents that make use of it. Variations in quality may have a separate influence. Here I develop a novel measure of the quality of the scientific references in granted patents, augmenting previous research mainly concerned with the quantity of scientific references. I find that higher quality science is significantly related to patents of greater technological importance and thus overall value.

The third essay is concerned with how the value of patents changes over the course of a technology life cycle. Previous studies of value and pendency have reached conflicting conclusions based on whether technology position was included. This essay uses patents related to polymerase chain reaction technology to trace changes in value and the pace of change, as well as other patent characteristics, over a technology cycle. I find that patent value and the pace of technological change both change non-linearly over the cycle. The results suggest that these two factors may interact such that during periods of rapid technological change shorter pendency is in the applicant’s interest, while longer pendency may be preferred during periods of slower change.