

Comparing the Market Valuation of Innovative Assets in U.S. and German Firms

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Since many years, the relationship between innovation and economic returns is frequently discussed in economic literature. A common approach of empirical investigations is to analyze whether innovation causes positive impacts on total factor productivity or profit growth (see Mairesse and Mohnen, 1996, for a survey of such studies). An alternative method is to relate the valuation by financial markets on a firm's assets to measures of innovation (see Hall, 2000, for a survey). This approach avoids problems of the productivity growth approach: the time lag between cost and revenues. Moreover, it is capable of forward looking evaluation and one can compare the economic impact of various measures of innovation. The disadvantage of the market value approach is that it is intrinsically limited in scope, because it can be used only for private firms and only where these firms are traded on a well functioning financial market.

The market value approach is based on Griliches (1981) who regressed Tobin's Q on the tangible assets of firms as well as on knowledge assets measured by R&D and/or patents. Hall et al. (2001) introduce an improved measure to this approach: They weigh the patents by their citations in order to control for the heterogeneity of patents in terms of economic value. A patent that is frequently cited is likely to have more economic value than less cited ones.

The purpose of this paper is to compare the market valuation of tangible assets and knowledge assets in a sample of large U.S. and German manufacturing firms. Because of the limited availability of German data, we first constructed the German sample and then drew a matched U.S. sample from the U.S. Compustat panel. Our goal was to have a sample matched on industry and size *rank*, recognizing that on average, the German firms in our sample would be smaller than the U.S. firms. The German sample consists of 305 firms in a variety of manufacturing industries. A comparable U.S. sample was drawn from the U.S. panel, originally consisting of about 2,500 firms with data from 1961 to 1998. Due to the limited availability of the German data, we cover only a time period from 1984 to 1998 in this paper.

Preliminary regression results of different specifications (least squares, non-linear least squares, least absolute deviations) show that patents and R&D contribute significantly to the firms' market value in the U.S. while in the German sample only patents show a significantly positive coefficient. Moreover, the impact of intellectual property on firm value is weaker in Germany than in the U.S. As expected, this result reflects that the German financial market reacts more ponderous to the creation of intellectual property than the U.S. market. Moreover, only certified intellectual property rights in terms of patents show an influence on firm value.

We are currently constructing the citation weights for the patent data. Hall et al. (2001) have shown that this weighted patent stock improves the regression fit significantly.