How Well Do Intangible Assets Maintain their Value over Time?
Adam Saunders
The Wharton School, University of Pennsylvania
Part of Dissertation. 2,169 words.

Introduction

Intangible assets are what differentiate successful firms in today’s economy. Yet little is recorded about intangibles on corporate balance sheets. Current accounting rules require companies to expense most advertising, R&D, investments in human capital, and organizational capital, which means that spending in these areas is not fully reflected on the company’s assets on the balance sheet. One of the few exceptions to this rule is purchased goodwill, a residual that is listed when a company acquires another company, and lists the difference of what it pays and the target’s net assets. However, goodwill does not include intangibles created by the company outside of mergers and acquisitions.

While intangibles are mostly invisible on the balance sheet, most companies have market values that exceed their book values. We illustrate the difference between the market value and balance sheet value of three traditional components of the Dow Jones Industrial Average in Figure 1. This suggests the presence of uncounted intangible assets such as human capital, brand, and the ability to continually innovate and adapt to changing market conditions, which one might call its dynamic capabilities (Teece, Pisano and Shuen, 1997).

Yet while a company’s high market-to-book ratio suggests the presence of valuable intangible assets today, we cannot predict with any degree of certainty as to how much those intangibles will be worth in five or ten years. These intangible assets could be highly sensitive to the macroeconomic environment, business conditions facing the industry, and the firm’s capability to adapt to these changes. Depending on those factors, the market value of the firm, as well as its ability to maintain a competitive advantage over its peers, could change dramatically.
In this research, we plan to examine how well intangible assets maintain their value over time in the face of volatility. In order to address this question, we will analyze how long the leading firms are able to retain their competitive edge over their peers and how intangible assets play a role in sustaining that advantage. In a healthy, dynamic, and competitive economy, we would expect that, on average, the most advantaged firms from one year would see those advantages naturally erode over time, as competitors introduce new products and innovate in ways to imitate the industry leaders. Firms, even starting from a fortunate position, will see their high returns eroded unless they continually innovate.

This is where intangible assets can play an important role. Firms that possess intangible assets that are more sustainable and cannot be readily copied by their competitors will continue to remain market leaders for some time. For example, consider Apple’s continued dominance in portable media players for the last decade, as noted in a recent market research report by Euromonitor International:

“Apple remains the head of the class in the portable media industry. The company’s iPod brand has revolutionized how consumers purchase and view/listen to entertainment content, and has been widely praised for design quality, aesthetics and ease of use. While competitors have launched scores of products that are cheaper, more powerful or have more features, Apple remains the market leader. Given its success as a brand builder and product developer, Apple can extract a high price premium compared to its competitors. While Apple holds a very high volume share in portable media players, its value share is considerably higher, due to its robust price premium. The emergence of competing technologies, like smart phones or tablet computers, is not a threat to Apple because it is a leading innovator in those segments as well.”

While rival products have been introduced to mimic the iPod, Apple’s strong brand, as well as its ability to continually innovate and use those innovations in a variety of products, have enabled the company to maintain its competitive advantage.

What we intend to analyze in this research is the relationship between the size and type of intangible assets and a firm’s lasting competitive advantage. We also intend to examine whether this relationship has changed over time. Based on a preliminary examination of data from manufacturing firms from 1981-2009, it appears that a fundamental shift in the economy began to occur in the 1990s. Superstar firms became able to hold their competitive advantages for longer periods of time, which is remarkable given the amount of turbulence in the economy during that time.

In Figure 2, we display a profit decay analysis for U.S. manufacturing firms using all seven-year windows from 1981-1994 (that is, 1981-1988, 1982-1989, until 1987-1994). We select from all publicly traded companies those whose primary industry is in manufacturing (since those firms are responsible for most patenting activity). These firms account for about half of all publicly traded firms. To eliminate very small firms that might have extreme values of ROA, we drop business segments (or lines of business) that had less than $10 million in sales or assets, and keep firms if they had at least $50 million in total assets in any of the sample years.

---

In order to measure persistence of profits, we keep firms that have at least a 3-year consecutive period of data. For this period, we have 16,408 firm-year observations, about 1,000-1,500 firms with data in each year.

At the beginning of each period, we divide the sample into five equally sized groups, which we rank according their profitability as compared to the other firms in their industries. This metric of profitability, or firm-specific profits (FSP), is return on assets (ROA) for the firm minus the industry average ROA. Industry is defined at the 4-digit SIC level, and for firms that have more than one line of business, we use a weighted average of the FSPs in each industry according to the asset mix for each firm in the industry.

We then follow the median FSP in each group over the next seven years. While firms may disappear, no new firms are added to the group once it is tracked over the seven-year period. This allows us to examine for how long the firms sustain their advantage, or, if they start below average, how quickly they catch up.

We start with the group of firms that started in year 0 in the top quintile of firm-specific profits. The median firm began more than 10 percentage points of ROA ahead of its industry. Given that the median ROA was 10.8% during this period, it is quite an impressive advantage. Seven years later, the median firm in this cohort was still about 1.8 percentage points ahead of its peers. While some firms continued to perform exceptionally well after 7 years, the data indicates that the median firm in this group, as a whole, has found most of its advantages eroded by year 7.

Figure 2. Profit Decay Analysis for Manufacturing Firms: 7-year Windows from 1981-1994

![Graph showing profit decay over 7 years for manufacturing firms.](image-url)
However, the ability for leading firms to retain their advantages appears to have increased in the 1990s. When we use the identical screening procedures to create 7-year profit decay windows from 1995-2009 in Figure 3 (starting with 1995-2002 until 2002-2009, created from 17,417 observations), it appears that leading firms have retained their advantages for a longer period. As shown in Figure 2, not only did the median firm start with a higher FSP (at more than 15 percentage points above the industry average ROA), but at the end of seven years, the median firms were still 6.8 percentage points ahead of the ROA in their respective industries. (The median ROA for a firm during this later period was 8.4% per year.)

![Figure 3. Profit Decay Analysis for Manufacturing Firms: 7-year Windows from 1995-2009](image)

**Methodology**

In order to examine how intangible assets hold up under different economic conditions, we will combine the following two datasets: 1) Compustat, which includes financial data on every publicly traded company from 1950-present, and 2) The NBER patent citations database, comprising all patents granted in the United States from 1963-2006 (more than 3 million observations). Using these datasets, we will build knowledge stocks of the firm to be linked to financial performance data.

We will examine the relationship between a firm’s knowledge-based intangible assets and its ability to maintain its profitability during times of volatility. The advantage of using detailed patent data is that we can analyze specific details about the nature of a firm’s intangibles over and above the aggregate R&D spending reported by the firm that is found in Compustat. We can examine whether firms with patent stocks that are highly generalizable (as evidenced by...
being cited by other patents in a wide variety of fields) have more enduring returns. For example, Apple’s ability to use its touchscreen technology in a wide variety of products such as the iPhone, the iPad, or iPods, is a source of competitive advantage.

In addition to demonstrating a patent’s flexibility through measures of generalizability, patent citations can be used as a proxy for quality. Hall, Jaffé, and Trajtenberg (2005) found large market value premiums for firms with the highest citations per patent. We can also examine the distribution of patents within the firm, to understand the relationship between firms with a narrow focus of patents in one area, or patents spread in a wide variety of areas.

In addition to our focus on the market leaders, we can also examine the lagging firms. Do firms with certain kinds of intangible assets catch up more quickly than other firms? How well do they react to volatility?

With a focus on the high-performing firms, we will use a set of multivariate regressions to estimate the probability that a firm that starts in the top 20% of its industry will remain at the top of its industry in five years, or even ten years. We will analyze the size of each firm’s tangible and intangible assets, as well as accounting for three sources of volatility.

The first source of volatility will be economy-wide shocks, such as when the economy is in recession. The second source of volatility will be shocks that are industry-specific. We will use a number of different measures, such as the death rate of small firms in the industry, job losses and plant closings by large firms in the industry, debt price spreads, and the stock prices of other firms in the industry. The third source of volatility will be changes in the technological landscape facing the firm. For instance, if a firm’s competitors in its industry begin to patent in new areas, the value of the firm’s existing intangibles might decline.

Our early evidence suggests that the value of intangible assets is being increasingly concentrated in “superstar” firms (Saunders and Brynjolfsson, 2010). In this research, we will examine the extent to which intangible assets have allowed the best firms to remain dominant in the face of turbulence in the economy and their respective industries.

References


