

New Technology and The Small Firm*

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ABSTRACT. This paper examines how and why the role of small business has become more important over time. A special focus is placed on the role of small business in the New Economy.

1. Wealth and the small firm

How much of our wealth is created by small firms? The question is somewhat misleading because many of today's giant firms did not exist thirty years ago. Consider Table I, which reports the twenty largest companies by market capitalization, as of the end of August 1999, and the dates when they were incorporated. Some like Lucent are spun off from an old company, while others like Citigroup comprise companies that were founded at much earlier dates than the column reports. But four of these giants – Microsoft, Cisco Systems, MCI and Dell – are clearly less than twenty years of age, and their value adds up to 12 or 13 percent of our gross domestic product.

The broader picture emerges when we look at a larger sample of companies. Most stock-market incumbents are identifiable from the Center for Research in Security Prices (CRSP) data. These data can identify who, precisely created the additional wealth? To a large measure, the once-small firms in the NASDAQ replaced the 1968 incumbents. These firms represent a particularly high-tech subset of the post-1968 entrants. To get a broader representation of the fate of incumbents, we now present plots of market shares of various

generations of incumbents, which we endearingly call “dinosaurs” because of their tendency to atrophy with the passage of time. One way to see the process of decay is to look at the share of market value, in December 1996, of each vintage of CRSP entrant, starting in 1928 when the observations start.

The vertical axis measures the share that each vintage holds in total stock-market capitalization in 1996. The large spike in 1928 that we see in Figure 1 is the value of companies that were started before that date. From Table I we see that GE, IBM, Exxon, AT&T, etc., are all in this group of firms. The spikes reflect the intensity of investment in the year in which a particular “vintage” of firms entered the stock market, as well the survivorship of that vintage of capital. We see, for instance, that not much value from the World War II vintages survives today, but that is probably because very few firms entered during the wartime years. Similar remarks apply to the years of the great depression. Moreover, two of the spikes are artificial because the 1961 spike reflects largely the entry of the AMEX firms into the CRSP, and 1971 spike reflects the entry of the NASDAQ firms. Once these anomalies are recognized, we see a definite drop-off in the contribution of the vintage of a firm as the age of the capital rises.

2. Small firms versus large over the past seventy years

One barometer of how well small business does is to compare the stock market values of small firms with those of large firms. What I do here is report the relative performance of a broad-based small company index against that of the S&P 500 index over the seventy-year period 1926–1996.¹ The figure shows two striking things. The first of these is well known – small companies grow faster

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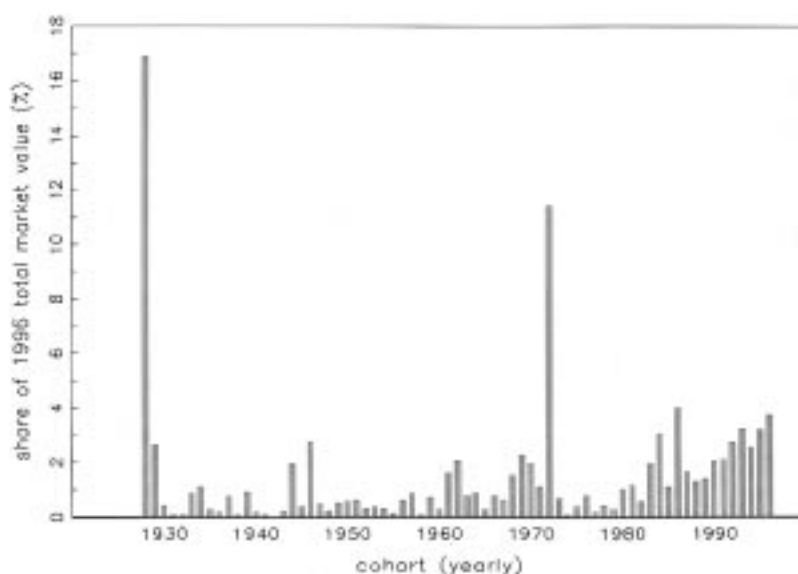


Figure 1. 1996 capitalization shares by cohort.

in value than large companies. The difference in trend is about 1% per year. This is a risk premium, but it is nowhere near as large as the premium that both indexes would command over bonds and treasury bills.

The second striking thing we see is rather larger waves or departures from trend. The arrival of the microprocessor in the early 1970s seemed, for about ten years or so, to favor the small firm. This is what one would expect, in as much as the arrival of any major new technology should favor young, small firms – firms that tend to have a nonhierarchical structure, fewer unionized or tenured workers, and fewer outdated management practices.

Figure 2 plots the ratio of the small cap index to the S&P 500 index. During the period 1974–1982, small cap stocks outperformed the S&P 500 by a factor of nearly 4. Since then, the S&P 500 has done better than the small caps, probably because, by the early 1980s and the advent of the junk-bond, inefficient large firms began to feel stronger hostile-takeover pressures, and responded by becoming more efficient.

3. What is new in the “New Economy”

The new economy is one in which technologies and products become obsolete at a much faster rate

than a few decades ago. Recently, this is the result of the information age, but it is merely a continuation of a trend that we have been witnessing for at least the past century. Shrinking imitation lags: A startling finding by Agarwal and Gort is that imitation lags have shrunk. Response times are shrinking. That is, new products are produced faster than before, and new technologies are

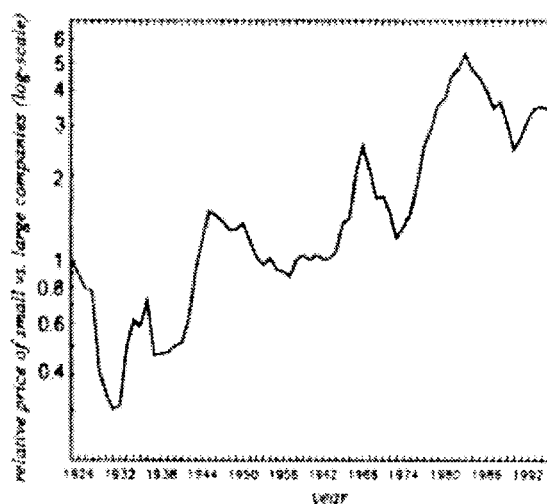


Figure 2. Performance of small companies vs. large companies.

TABLE I

The twenty largest companies by market capitalization, August 29, 1999, and the dates when they were incorporated

Largest Dow companies	Market value* \$ billion	Year incorporated
General Electric	389	1892
IBM	223	1911
Wal-Mart	211	1969
Exxon	195	1882
Merck	162	1934
Citigroup	161	1968**
AT&T	159	1885
Coca-Cola	152	1919
Johnson & Johnson	140	1887
Procter & Gamble	133	1905

Largest non-Dow companies	Market value* \$ billion	Year incorporated
Microsoft	483	1981
Intel	269	1968
Cisco	220	1984
Lucent	202	1995**
Pfizer	154	1942
AIG	153	1967**
MCI	146	1983
Bristol Myers Squibb	145	1933
Dell Computer	122	1987
Bank of America	111	1968**

Notes:

* In billions.

** Predecessor companies were founded at significantly earlier dates.

Source: Wall Street Journal August 30, 1999.

adopted faster. Companies are now going public on the internet – a practice unheard of before 1995. That is, the “speed of diffusion” has risen sharply over the last century. But the same is true about the IT revolution. The early companies – Microsoft, for instance – took a long time to IPO,

but now the process is faster, partly because the technology is mature.

It is clear that we are entering the era of the young firm. The average age of all companies in the stock market – and the average age of the giants – is shrinking as well. Since the death rate of old capital is higher, this means that the “birth rate” of new capital must rise if we are to maintain the stock of existing capital at existing levels. The small firm will thus resume a role that, in its importance, is greater than it has been at any time in the last seventy years or so.

Notes

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¹ The data come from Ibbotson et al. (1997). More precisely, the data underlying the plot in Figure 1 are as follows: 1. Large company stocks: S&P 500 index with dividends reinvested (S&P 500, 1957-present, S&P 90, 1926–1956). 2. Small Company stocks: Fifth capitalization quintile of stock on the NYSE for 1926–1981. Performance of the Dimensional Fund Advisors (DFA) Small Company Fund, 1982-present. [This is also a total return index, i.e. dividends (which are probably insignificant anyway for small firms) are also assumed to be reinvested.]

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