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R&D and market value of Japanese firms in the 1990s[☆]

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There is a concern in Japan that the R&D profitability of its domestic firms fell significantly in the 1990s, following the US pattern in the 1980s. This paper finds, however, that the effect of R&D on the market value of a firm, relative to that of tangible assets, increased in the 1990s in terms of both within firm variations and cross section variations, even though the average market value itself significantly fell. More trade and higher foreign ownership significantly enhanced the market value of a firm, and so did more patents in sectors such as pharmaceuticals. *J. Japanese Int. Economies* **20** (2) (2006) 155–176. Institute of Innovation Research, Hitotsubashi University, 2-1 Naka Kunitachi, Tokyo, 186 Japan.

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1. Introduction

The Japanese economy grew very little in the 1990s. The long stagnation of the Japanese economy in the 1990s suggests that it may have structural causes. The deterioration of R&D performance of Japanese firms is one candidate.¹ The low Tobin's q of many of these firms in the latter part of 1990s (which covered barely the book value of the asset) and the stagnation of the growth of R&D relative to firm size may provide some support to such view (see Table 1). In addition, the sharply weakening international competitiveness of some high-tech industries such as semiconductor industry seems to provide anecdotal evidence supporting such view. Furthermore, the US experience of a substantial decline of R&D profitability in the 1980s may also provide a reason for us to wonder whether Japan faced a similar challenge one decade later. The R&D profitability of the US industry fell significantly in the 1980s (see Hall, 1993a, 1993b). Griliches (1994) notes that the appropriability of R&D might have fallen during the latter part of the 1970s and the 1980s, due to "the internationalization of R&D, the rise in the technical and entrepreneurial skills of our competitors and the sharp rise in the dollar exchange rate in the mid-1980s." The Japanese economy may have faced a similar challenge one decade later, given the rise of industrial capability of neighboring East Asian economies and high yen since the latter part of the 1980s.

Although it is clear that the market valuation of the Japanese firms declined substantially in the 1990s, it is quite another question whether the deterioration of their R&D performance led that fall, since the Japanese economy suffered the other adverse shocks in the 1990s such as the collapse of the bubble in early 1990s and the banking crisis in late 1990s. This paper examines the capital market evaluation of the R&D investments of Japanese firms in the 1990s, using the same analytical framework as Hall (1993a, 1993b) and Toivanen et al. (2002), which is based on Griliches (1981). One advantage of capital market information over accounting information in evaluating the performance of a firm

Table 1

The average performance of Japanese manufacturing firms in 1990s (balanced panel)

Year	Market value/ Book value of the total asset (q)	R&D expenditure/ Total asset (rda)	Advertisement expenditure/ Total asset ($adva$)	Sales, 1995 price, million yen
1991	1.43	0.026	0.0094	1884
1994	1.31	0.024	0.0076	1714
1995	1.46	0.025	0.0075	1774
1996	1.25	0.026	0.0076	1892
1997	1.11	0.027	0.0077	1870
1998	1.10	0.027	0.0073	1755
1999	1.17	0.026	0.0070	1775
2000	1.07	0.025	0.0068	1890

Note 1. The balanced panel consists of 726 firms.

Note 2. The sales is deflated by GDP deflator.

¹ See Branstetter and Nakamura (2003) for one such view.

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