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## Tax Incentives for Investment: Evidence from Japan's High-Growth Era

Mariko Hatase\* and Yoichi Matsubayashi \*\*

### Abstract

Tax devices have occasionally been adopted as policy tools to promote economic growth in major industrialized countries after the Second World War. In Japan, various accelerated depreciation schemes under the name 'special depreciation' were employed as major devices to stimulate investments. In this paper, we manually collect firm-level data series in the heyday of the device from the mid-1950s to the early 1970s. The findings from firm-level data are as follows: the aggregated special depreciation hit two peaks when the schemes were expanded, applying special depreciation tax incentives prevailed among listed companies, and the actual amounts varied across firms with strong upward biases. A detailed examination of each firm's financial statements indicates that each firm retained its discretion when applying the scheme and sometimes chose not to enjoy the full benefits. An empirical analysis reveals that firms with relatively less capital to labor tended to use larger special depreciation, hinting at the probability of intended effects of policy devices. Increases in the number of designated machines for the scheme—once considered to represent its inefficiency—actually activated the usage of schemes by firms.

**Keywords:** Capital investments; Corporate taxes; Special depreciation; Investment policy; High-growth era

**JEL classification:** E22, E62, H25, N15

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## I. Introduction

Tax policies are often considered as a means to promote economic growth. After the Second World War, major industrialized countries deployed various tax incentives from the policy tools for encouraging capital investments that were introduced during the Second World War to stimulate production. These policies prevailed to such a degree that they are described as follows: “tax devices to stimulate investment have certainly been the greatest fad in economic policy” (Eckstein 1962).<sup>1</sup> For example, both France and Germany adopted selective special depreciation schemes on steels and export sectors for the former and on heavy industries for the latter (Eckstein and Tanzi 1964). The United States introduced tax credits against capital investments, and the United Kingdom applied the same scheme, which was considered “generous” (Eckstein and Tanzi 1964). Restrictions on depreciation methods were eased in the United States and major European countries until the 1960s, allowing firms to apply the declining-balance method, which enabled faster depreciation during the initial investment stage (Eckstein *et al.* 1964; Hall and Jorgenson 1967).

Japan followed or sometimes led that trend from the 1950s to the 1970s. Firms were allowed to choose the declining-balance method or the straight-line method from the early 1950s (Miyajima 2004). Special tax treatments which brought higher initial depreciation rates on selective investments, called “special depreciation,” were first introduced in 1951 and gradually expanded. Some special depreciation schemes were said to be even more generous than the British one.<sup>2</sup>

These policies were initially adopted without hard empirical evidence for their effects. Brown (1962) points out that governments experimentally applied those tools because factors related to investment decisions had yet to be revealed. The possible positive effects on economic growth were discussed as being associated with faster-than-average growth during the Golden Age (1950–1973) in Europe.<sup>3</sup> However, Eckstein and Tanzi (1964) admit, “there is at present no scientific analysis which explains the favorable growth performance” and “it is impossible to reach firm conclusions about the effects of European tax systems.”

Under such circumstances, Brown (1962) suggests that changes in the present value

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<sup>1</sup> Behind such active employment of fiscal devices was the international monetary system at the time. Under the Bretton Woods System, in which decisions on changing interest rates had to be consistent with the balance of payments positions, tax devices were considered more flexible stimulus policy tools for investments (Eckstein 1962).

<sup>2</sup> Ishi (1990) refers to an interview with the then staff members of the Tax Bureau of the Ministry of Finance, in which they admitted that the special depreciation for rationalization purposes was more generous than the one in other industrialized countries. For example, Japan’s system allowed an initial write-off of 50 per cent, whereas the British allowance was 20 per cent.

<sup>3</sup> For details on European growth in the Golden Age, see Crafts and Toniolo (1996).

of assets as a conceivable channel for tax devices to affect investment decisions and compares possible differences in the effects of various fiscal devices, such as accelerated depreciation and tax credits. Then, empirical studies drawing on macro-level data gradually developed. Hall and Jorgenson (1967) estimate the effects of U.S. tax devices to promote capital investments using a neo-classical investment equation in which fiscal tools affect investments by shifting desired capital stock levels derived from changes in the user cost of capital. On the basis of the national-level data between 1926 and 1963, they estimate the impacts of liberalization of depreciation, the shortening of lifetimes for tax purposes, the investment tax credit and the adoption of first-year write-offs. They find that all tools are highly effective because increments of investments and capital stocks are observed. Hall and Jorgenson (1969) introduce a distribution lagged function and extended their sample period to 1970, which covers several tax reforms. They conclude that the effects of tax cuts on investments in 1964 are small, those of the amendment in 1966 to increase the effective tax credit rates are substantial, and the suspension of tax devices in the late 1960s has a significant impact on curbing investments.

After the empirical studies based on neo-classical models as previously mentioned were conducted, a series of studies using models that explicitly addressed dynamics followed.<sup>4</sup> Summers *et al.* (1981) estimate that tax credits and accelerated depreciation—if announced in advance—increase capital stocks by 17.3 per cent in the long run. Bernanke (1983) also finds significant effects of tax credits on investments: a one percentage point innovation in the investment tax credit increases investment in net equipment by 1.9 per cent and in net structures by 0.3 per cent in the first year. Gummins *et al.* (1996) examine fixed investment responses to major tax reforms, including the abolishment of tax credits in some samples, in 14 member countries of the Organisation for Economic Co-operation and Development (OECD) between 1982 and 1992 by drawing on firm-level data. They find that investment behavior is affected by tax reforms, such as changes in corporate tax rates and tax device reforms through changes in the user cost of capital.<sup>5</sup>

Recently, empirical studies on U.S. cases that rely on firm-level data sets have appeared. Knittel (2007) examines the responses of firms in the early 2000s to temporary accelerated tax depreciation and finds that utilization rates were different by types of

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<sup>4</sup> For details, see the survey by Chirinko (1993).

<sup>5</sup> Apart from the literature on the effects of tax incentives on investments in general, their effects under inflation have been discussed since the late 1970s. When depreciation amounts are calculated on the basis of acquisition cost rather than replacement cost under increases in capital prices, the permissible depreciation deduction is depressed after the first year. In the United States, several studies suggest indexed depreciation or other reforms to solve this problem (Hall 1981). In Japan, Tajika and Yui (1989) estimate the effects of inflation on effective tax rates from 1970 to 1985 using macro-level data sets and conclude that the depressing effects on depreciation from inflation were cancelled out by decreases in real debt value, reflecting the high debt outstanding for Japanese firms.

corporation and industry. Edgerton (2010) estimates the effects of the existence of non-taxable firms, given operational losses and finds that bonus depreciation is less effective by 4 per cent than when all firms are taxable.

In the case of Japan, which is a showcase of various types of accelerated depreciation for enhancing investments, estimates of the actual effects of such devices were once considered to be difficult. The Ministry of International Trade and Industry (MITI), which promoted rationalization of industries and employed accelerated depreciation as a policy tool, states in its report, “it is technically hard to capture the effects of policy tools for rationalization numerically” (MITI 1955).<sup>6</sup> Yoshikuni, who was the then official from the Minister’s Secretariat of the Ministry of Finance (MOF), also claims, “practically, it is almost impossible to gauge the actual effects of a series of special treatments of corporate tax, though it is possible to capture them theoretically” (Yoshikuni 1965).

Then, a series of empirical estimates appear, which rely on industry-level data sets. Ogura and Yoshino (1985) define the benefits of special depreciation as hypothetical lending costs of funds equal to tax savings from accelerated depreciation. They estimate that the gains made by firms in the manufacturing sector are 1 per cent of after-tax profits between 1961 and 1973. Ogura and Yoshino (1987) estimate the impacts of special depreciation schemes through investment equations and conclude that such tax incentives raised the capital investments of all industries by 2 per cent during the high-growth era.

Existing studies, including those previously mentioned, have not reached a consensus on the effects of tax devices on investments. Extensive early works suggest that investments respond modestly to changes in user costs of capital,<sup>7</sup> whereas later works, such as Bernanke (1983) and Gummins *et al.* (1996), challenge this view with supportive empirical results. Most of the empirical results, except for those in recent literature drawing on U.S. data, rely on aggregated data sets at either the national or industrial levels, and hence, room exists to re-examine the numerical impact of tax incentives on firms’ investment behavior. First, the actual effects of tax incentives depend on detailed institutional designs. Expanding the coverage of the examination to other than the United States and different types of tax incentives is helpful in understanding the effectiveness of tax policies on a broader basis. Second, because investment decisions are usually made at the firm level rather than at the aggregated level, examinations using firm-level data sets for Japan could reveal different results from those of previous

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<sup>6</sup> Instead, it suggests increases in labor productivity as an indirect proof of the effects of such policies (MITI 1955).

<sup>7</sup> Chirinko (1993) summarizes, “the weight of the evidence clearly points to a modest response of investment to prices and a much greater response to output.”

empirical analyses.

In this paper, we construct a firm-level database for actual special depreciation in Japan on a semi-annual basis. Data from 1956 to 1972 are manually extracted from business reports. In doing so, we can fill in the discrepancy of empirical examinations given the lack of statistics for the 1950s, which witnessed the expansion of tax incentive schemes.<sup>8</sup> These new data series show that the aggregated volumes of special depreciation hit two peaks. The first was under the scheme to promote investments in machines and equipment to rationalize industries. The second was under the scheme for supporting exporters. The new findings, given firm-level figures, are as follows: applying special depreciation prevailed among listed companies on a broader basis than that for public lending—another important policy tool to stimulate capital investments, and the amounts varied across firms with strong upward biases, indicating that some firms enjoyed much more substantial benefits. Detailed examinations of each firm’s financial statements reveal that each firm retained discretion for the application of special depreciation. We conduct an empirical analysis using new data sets on the factors affecting special depreciation. The results hint that firms with a relatively lower capital-to-labor ratio tended to replace labor with capital through special depreciation schemes, indicating the possibility of the success of government policies to improve labor productivity.<sup>9</sup> The estimates also show that increases in the number of designated machines for the scheme—often considered as indicating the complexity of the scheme—actually activated the use of schemes by firms.

This paper is organized as follows. Section II describes the development of tax incentives in Japan and provides historical background information. Section III provides the facts revealed by newly collected data sets. Section IV conducts an empirical analysis of the factors that influence the special depreciation of each firm. Section V concludes this paper.

## **II. Development of Tax Incentives to Promote Capital Investments: Historical Background**

The Japanese government through the high-growth era from the late 1950s to the early 1970s employed tax devices and public lending to stimulate targeted industries’ investments and to improve their international competitiveness. Among them, a tax device called “special depreciation”—the combination of accelerated depreciation and a first-year write-offs—is one of the most important policy tools (Ogura and Yoshino 1985, 1987).

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<sup>8</sup> Previous studies cover the period only from 1961 because industrial-level statistics on special depreciation are available after that year.

<sup>9</sup> To obtain a reliable conclusion for this point, detailed estimates considering the channels through which tax incentives affect investments, such as reducing capital cost, are necessary.

The origin of “special depreciation” can be traced back to the favorable tax treatment for the munitions industry during the Second World War. After the war, various types of special depreciation were introduced in the early 1950s to modernize industrial equipment (Ishi 1989, 1990).<sup>10</sup> First, favored measures providing special redemptions on machinery were introduced in 1951, easing the basic principle of neutral corporate taxes established in the previous year under major tax system reform (Kosai 2003).<sup>11</sup> Under the new scheme, firms acquiring new equipment designated by the government could increase depreciation by 150 per cent compared with the normal depreciation for the first three years. The machines subject to this scheme were selected according to the criteria as follows: (a) machines with high capacity which were not available in Japan and could improve product quality, expand output or achieve remarkable rationalization by importing them, (b) machines produced domestically with quality equal to those in (a) and could improve product quality, expand outputs or contribute to considerable cost cuts or (c) vessels for ocean liners or those with equivalent capacities. This accelerated depreciation scheme was followed by the introduction of first-year write-offs in 1952. When firms in 32 industries specified in advance by the government acquired designated machines or equipment, they could depreciate half the value of the equipment in question during the first fiscal year under the new scheme.<sup>12</sup> Machines and equipment covered by this scheme were considered to contribute to rationalizing the production process. Although the legal bases of these two types of special depreciation were different, their function was said to be similar (Ishi 1990).<sup>13</sup>

The special depreciation schemes were gradually expanded in terms of both coverage and volume. The finance minister was authorized to specify machines and equipment for special depreciation through a decree. The initial number of designated machines for accelerated depreciation was 430, which ballooned to 1,300 in 10 years (Ishi 1977; Ogura and Yoshino 1987).

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<sup>10</sup> According to an interview with Jiro Yoshikuni, who had a long experience at the Tax Bureau of the MOF, the then head of the Tax Bureau gave the basic design of these tax incentives, which was modelled after British and German tax devices (Ito *et al.* 1976a, 1976b).

<sup>11</sup> Fundamental tax reform was conducted to reflect the recommendations by the Shaup mission. The mission, headed by Carl S. Shaup, a professor at Columbia University, visited Japan in 1949 and submitted the “Report on Japanese Taxation” on 15 September. The tax reform based on the report was intended to establish a new tax system that relied on direct taxes such as the income tax. The neutrality and fairness of the tax system were its key principles. Those principles prevented the authorities from using tax tools for particular policy purposes but were gradually “eroded or patched and tattered” because the incentives for the government to adopt tax tools to enhance development were very strong (Ishi 2008).

<sup>12</sup> These included steel, railway car manufacturers, machinery for textiles and electric power industries, chemical fiber spinning industry and chemical fertilizer manufacturers.

<sup>13</sup> The introduction of special depreciation for designated machines was achieved through an amendment to the Act on Special Measures Concerning Taxation, whereas the special depreciation for rationalization of 1957 had its legal basis on the Industry Rationalization Law (Wada 1992).



That of the designated machine and equipment for first-year write-offs was 259 when it started, which increased to more than 500 in a decade.<sup>14</sup> In 1952, an accelerated depreciation scheme for newly built houses to be lent out was introduced, and some firms enjoyed the benefit when constructing houses for their employees. As a result, the total tax savings from special depreciation for designated machines and equipment showed upward trends. Between 1956 and 1960, the total was 38.3 billion yen, which reached 117.1 billion yen between 1966 and 1970 (Tsuruta 1982; Table 3-1).

One of the reasons for the expansion of special depreciation schemes was that they could be more desirable than tax credits from the viewpoint of the principle of tax neutrality because special depreciation enabled firms to simply postpone tax payments, whereas tax credits had the effect of a tax exemption (Ishi 1990).

The need for the reform of expanded special depreciation gradually became a policy agenda as the scheme flourished (Ishi 2008). In the early 1960s, several shortcomings of special depreciation were discussed. First, these incentives could provide benefits only to limited industries. According to figures estimated by the MOF, steel and watch producers in 1960 enjoyed more than 30 per cent special depreciation to total depreciation, whereas the average was 12 per cent. Second, the benefits were said to be available only for large firms. In 1958, according to MOF estimates, the accelerated depreciation for designated machines of large firms (more than 10 million yen in capital) accounted for 2.3 per cent of total depreciation, whereas that of small and medium-sized firms accounted for only 0.6 per cent. Third, the system became too complicated as the schemes developed (Ogura and Yoshino 1988). Even the Tax Institution Council, which was the central body for tax policy coordination, claimed in its report that “only the specialist with high skills can tell if a machine or a tool is subject to the special depreciation as standards for the application are set in details.” The number of machines in 1960 subject to special treatment exceeded 2000 (Ishi 2008). Fourth, the tax savings merits of special depreciation became too large and were sometimes even larger than the taxable incomes of the firms applying for the schemes (Ishi 2008).

The special depreciation system underwent a major reform in 1961. Accelerated depreciation of 150 per cent for designated machines was abolished to simplify the scheme. At the same time, the first-year write-off ceiling for rationalization was decreased from half to one-third the value of the machines and equipment in question. A simultaneous shortening of the statutory useful life was considered to compensate for the lost benefits to firms induced by the reform (Ishi 1990).<sup>15</sup>

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<sup>14</sup> The Notification No. 839 of the Ministry of Finance, 13 May 1952; Ogura and Yoshino (1987).

<sup>15</sup> The statutory useful lives were shortened by an average of 20 per cent (Ishi 1990).

Early types of special depreciation schemes were compressed. Ishi (2008) summarizes the process of institutional changes as follows: “for special depreciation, the 1950s are the era of establishments of a number of new schemes and then the 1960s and the 1970s are the periods for reforms and abolishment.”<sup>16</sup> However, from the early to the late 1960s, a series of new types of special depreciation, especially those for exporters, was introduced and expanded. The special depreciation scheme for exporters was first introduced in 1961; firms whose exports exceeded those of the previous year and whose export share to total sales increased from previous year levels could add the special depreciation to ordinary depreciation at a pre-determined ratio to the increase in their export share.<sup>17</sup> The purpose of this new scheme was to mobilize special depreciation for export enhancement (Shiraishi 1989). Unlike its predecessors, the new scheme did not specify machines and equipment as a policy target—any depreciable assets were subject to this scheme (Ogura and Yoshino 1987).<sup>18</sup> In 1964, this special depreciation was reformed, and firms could enjoy benefits according to the share of exports to total sales, rather than the increase in export shares, expanding the targets from firms which contributed export increases to companies which exported. In that sense, 1964 was the year of the expansion of the export-enhancing tax devices.<sup>19</sup> This change was accompanied by the abolishment of tax credits for exporters which were introduced in 1953.<sup>20</sup> In the beginning, added depreciation was 80 per cent of the export share multiplied by ordinary depreciation, and then, the ratio was raised to 100 per cent in 1966 (Shiraishi 1989).<sup>21</sup> In 1968, the ratio for calculating the special depreciation ceiling was raised for companies approved by the MITI from 100 per cent to 160 or 130 per cent. In the late 1960s, Japan’s external balances, especially current accounts, started recording consecutive surpluses, and their sizes gradually attracted international attention. Thus, the expanded ratios of 160 and 130 per cent were abolished in

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<sup>16</sup> Sawai (1990) also supports the view and states, “the tools for special tax treatments in general were in the direction of rationalization.”

<sup>17</sup> A similar system had already been introduced in France (Shiraishi 1989).

<sup>18</sup> Some categories of depreciable assets were excluded from other types of special depreciation (Zeimu Kenkyu Kai 1965).

<sup>19</sup> Previous studies, such as Hall (1981), point out asymmetric effects of accelerated depreciation on machine/equipment and structures—they have stronger incentives for the former. The pre-reform special depreciation schemes in Japan might have a more serious bias than those in the United States because only the former categories were the subject to favorable accelerated depreciation treatment.

<sup>20</sup> Behind the abolishment of export tax credits was the fact that they were criticized by the member countries of the General Agreement on Tariffs and Trade (GATT) as being a type of export subsidy that was prohibited by the GATT (Ishi 2008).

<sup>21</sup> In 1967, a technical reform in the accounting system regarding special depreciation was conducted. A reserve for special depreciation was introduced, and firms could choose the special depreciation treatment between recognizing it as an expense or allocating it as a reserve. The change was made to harmonize the operation of special depreciation between the commercial law and tax laws (Mitsubishi Economic Research Institute 1968).

1971, and special depreciation for exporters was abolished in 1972 (Shiraishi 1989; Ogura and Yoshino 1988). The special depreciation for exporters was said to play a central role among the special depreciation schemes in the late 1960s (Ogura and Yoshino 1988).

### **III. Application of Special Depreciation Schemes to Each Firm**

#### **A. New Sources of Information**

As described in Section I, studies on empirical analyses of the effects of tax incentives on capital investments are limited, especially for Japan, where the government actively employed tax incentives. One reason is the scarcity of the data on special depreciation. Aggregated data on special depreciation by industry are only available after 1961 by the Financial Statement Statistics of Corporations (*Hojin Kigyo Tokei*). Previous narrative studies rely on statistics compiled by the MOF using components of types of special depreciation figures, but those figures are only snapshots compiled for discussions at the Tax Institution Council (they are available in the official history of the MOF). To examine the impact of special depreciation on capital investments, firm-level data are essential because early devices were linked to particular types of machines or equipment specified by the government, and components of capital investments likely differed across firms. For the late 1960s and the early 1970s, special depreciation could be affected by the export share of each firm, which is likely diversified across firms. For example, the export share to total sales of Nippon Steel in fiscal 1971 was 30.3 per cent, whereas that of Azuma Steel was 0.9 per cent. Both were classified as being in the steel industry. In such a case, the analysis using aggregated data by industry could lead to results that are far from reality.

We construct a database for firm-level special depreciation on a semi-annual basis for 190 manufacturing firms between fiscal 1956 and 1972 to fill the discrepancy in existing statistics.<sup>22</sup> The figures are manually collected from financial statement reports for stockholders and investors. We first select firms whose business reports are available in either the financial statement reports collection of the Library of Economics, University of Tokyo,<sup>23</sup> or the Hitotsubashi University collection. To match these data with capital investment figures, we then extract companies whose data are available in the statistics compiled by the Mitsubishi Economic Research Institute (*Mitsubishi Keizai Kenkyu Sho*). These statistics are compiled by

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<sup>22</sup> Although most previous studies rely on aggregated data sets for Japan, Gummins *et al.* (1996) is an exception that examines the effects of tax reforms using firm-level data. However, they use tax reforms as common independent variables for all firms and do not consider the differences in the amounts of tax incentive benefits across firms.

<sup>23</sup> The list of firms in the collection is available at the following site:  
[https://www.i-repository.net/il/meta\\_pub/G0000381eigyo](https://www.i-repository.net/il/meta_pub/G0000381eigyo)

relying on figures originally published in financial statement reports. The number of companies by industry is indicated in the first column of Table 1. These samples account for 0.1 per cent of the total number of firms and for 33.1 per cent of the total capital stock covered by the Financial Statements Statistics of Corporations at the end of fiscal 1970.

[Table 1]

Unified practices regarding the accounting method for special depreciation during the sample period have never existed. Companies had choices between deducting special depreciation from profits or retained earnings. In the former case, some companies deducted these amounts from operational income, and others treated them as non-operational expenses. In either case, the special depreciation affects ordinary profits. When a firm deducts special depreciation from retained earnings, ordinary profits are not affected. After the institutional reform of 1967, firms could include the special depreciation in reserves in addition to the previously described methods. Reflecting such verified practices, special depreciation appears in various tables in financial statements, typically in profit and loss statements, surplus statements, schedules of reserves and footnotes to depreciation schedules. In some cases, the figures appear in footnotes to the balance sheet or to schedules of the costs of goods manufactured. For details of the definition of special depreciation extracted from the sources, see the Data Appendix.

## **B. Development of Special Depreciation**

The development of aggregated special depreciation in our sample firms is shown in Figure 1. For the period to the left side of the dotted line, the development of special depreciation is first revealed by our work. For that period—between 1956 and 1960—special depreciation on an aggregated basis was stable at the beginning and then increased towards the second half of 1960. The amounts then started decreasing in the early 1960s and rapidly increased in 1966. They peaked in 1970 and then declined sharply towards the end of the sample period.

[Figure 1]

Because depreciation tends to trend upwards when capital investments are continuously active, we normalize these amounts with tangible fixed assets (Figure 2). Special depreciation had two major peaks, one around 1960 and the other from the late 1960s to the

early 1970s. The latter had a pause between the second half of 1967 and the first half of 1968.

[Figure 2]

Figures 1 and 2 show that the expansion of special depreciation schemes for designated machines and equipment increased volume during the 1950s. The reform in 1961, which was intended to shrink special depreciation schemes, had short-lived effects in terms of volumes. However, another expansionary period came with the extension of special depreciation designed to promote exports. To be precise, the introduction of special depreciation in 1961 for exporters did not bring an immediate increase in volume, and the later reform that enabled exporting companies—not export-increasing companies—to utilize the scheme in 1964 was key to inflating this volume.

Our sample number is relatively small, and we compare our results with larger coverage statistics, namely, the Financial Statements Statistics of Corporations, for the period during which special depreciation data are available for the latter. The comparison shown in Figure 3 indicates that the two series moved in the same direction in the 1960s and the early 1970s, although our sample experienced broader fluctuations.

[Figure 3]

Table 1 provides figures by industry. The special depreciation between 1956 and 1972 vary across sectors according to the figures in the second column. Steel and transport equipment account for large shares, at a combined 68 per cent of the total, whereas wooden products, rubber, leather and non-steel metals together account for only 0.8 per cent.

The aggregated amounts depend on the number of sample firms, and we calculate the amounts per firm by industry in the third column. Steel, transport equipment and electric machinery are the top three industries, whereas wooden products, foodstuff and chemicals are the bottom three.

Depreciation also depends on capital investment volumes, and the figures in the fourth column are ratios of special depreciation to capital investments. Transport equipment is again in the top group, whereas precision instrument takes second place even though its amount per firm belongs to a smaller group. Steel is in the average area, and wooden products, non-steel metals and pulp and papers are in the lowest group.

The unbalanced benefits of special depreciation by industry previously shown are consistent with the findings of previous studies. However, industries which could enjoy more substantial benefits are not identical as specified in previous studies. Ishi (2008) picks up steel

and watch manufacturers as the most benefited industries in the late 1950s, whereas the former's benefits are only average in our samples. Ogura and Yoshino (1985) point out that textiles, steel, metal products, general machinery and transport equipment enjoyed more than 10 per cent of special depreciation to the total depreciation between 1961 and 1973, whereas textiles in our samples do not obtain higher than average benefits. Textile, pulp and paper, chemicals, oil refining and steel are often considered major targets of the government's economic policies,<sup>24</sup> but their degrees of benefits are average or less than average in terms of special depreciation schemes.

One of the strong points of our data series is the availability of data by firm. The results of our data collection are provided in Table 2.

[Table 2]

Out of 190 firms, 179 adopted special depreciation during the sample period. The usages of special depreciation prevailed at least among the listed companies.<sup>25</sup> For reference, we examine the number of firms with a record of borrowing from the Japan Development Bank (JDB), which was the major public lending channel often referred to as an important policy tool. The number of firms enjoying borrowing from the JDB is 123 out of 190. Among two major investment stimulus policy tools, in this sample, a tax device had a broader reach than public lending. The issue of coverage of these two channels is treated in the next section.

The volume of special depreciation overwhelms that of the lending from the JDB. The aggregated amount of the former is more than five times that of the latter (Table 3). This finding is consistent with the narrative in the previous literature which notes that special depreciation supported funding for capital investments by adding sources for internal funds (Takeda 2019).<sup>26</sup>

[Table 3]

Figure 4 indicates that the development of the distribution of special depreciation normalized by the capital stock of 190 sample firms. The solid line indicates the median and

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<sup>24</sup> Tsuruta (1988) notes that the government intervened in the decision-making process of capital investments for these industries during the high-growth era.

<sup>25</sup> The financial statements collections of the University of Tokyo and Hitotsubashi University consist of those for listed companies.

<sup>26</sup> Hirai (2010) notes that a series of favorable tax treatments on capital investments supported funding for investments in the steel industry.

similar movements as aggregated amounts with two peaks. Each band contains five per cent of the samples. The fringe of the palest grey zone indicates the 80th percentile. The palest grey zone together with the other grey area include 80 per cent of the samples. The second palest greyed area with the inside zones cover 70 per cent of the samples. The distribution has long tails whose shapes change over time. When normalized depreciation increases, the degree of diversity among the samples inclines to be larger and then tends to be smaller when these amounts decrease. This trend indicates strong upward biases throughout the sample period, which means that the impact of special depreciation varied across firms, and some firms enjoyed much more substantial benefits than the median. This diversification among sample firms strongly justifies the analysis based on firm-level data sets.

[Figure 4]

Some firms disclose the components of special depreciation for a certain period. Only a few firms continue to provide such information throughout the sample period, and details for such examples are shown in Figure 5. Although these three cannot be treated as representative cases, they indicate that the application of special depreciation may differ across firms in terms of components. Nikon, an optical instrument manufacturer, applied special depreciation for machines and equipment from the 1950s to the mid-1960s, and then, the volume was inflated after 1965 mainly because of special depreciation for exporters (Figure 5a). For Matsushita Electric Works, an electrical equipment and components manufacturer, considerable amounts were spent for newly built employee housing throughout the period. After the 1964 reform, special depreciation for exporters became an important component and was replaced in the 1970s by that for machines and equipment for rationalization (Figure 5b). Some sample firms indicate spikes in volumes when they rapidly expanded their production capacity, often by setting up new factories. Tokyo Kikai Seisakusho, a producer of printing machines, followed that pattern in the early 1960s and subsequently applied a modest volume of special depreciation for exporters (Figure 5c).

[Figure 5]

The special depreciation schemes were designed to give discretion to each firm regarding the extent to which they apply the scheme. First, it was not compulsory. Second, firms could carry over special depreciation for five years in the early days and subsequently for three years. Reflecting such flexible designs, firms sometimes decided the depreciation at their discretion. For example, traces in footnotes of financial statements exist, which indicate that,

occasionally, some firms did not fully depreciate assets subject to special depreciation. Teikoku Chemical Ind. disclosed in 1967 and 1968 that they only used special depreciation schemes to the 85 per cent of the ceiling. Teikoku Rayon capped the special depreciation for exporters in 1967 and the first half of 1968, consuming only 47 per cent of the amounts allowed by tax laws. In the second half of 1968, Teikoku Rayon declared that it would fully use the amount allowed by law from then on.<sup>27</sup>

We examine the extent to which the special depreciation system for machines and equipment was designed in detail by contemporary sources. Behind the reform in 1961 was the perception that the system had become too complicated as the schemes developed. One of the often claimed reasons for the complexity is that the specification for applicable machines and equipment was too detailed (Ishi 2008).

The finance minister specified machines and equipment for special depreciation through MOF notifications published in official gazettes. Specification results usually have two-layer structures. In the first layer, categories of machines and equipment are chosen as suitable ones for special depreciation. The capabilities and features of each type of machine or equipment are specified in the second layer. For example, for automobile components, two categories, namely, metal cutting machine tools and other machines, are specified in the first layer through notification of MOF No. 235 dated 31 October 1957. Ten types of machines are listed for metal cutting machine tools in the second layer at the same time, and one type of machine is for other machines.

Previous studies (Ogura and Yoshino 1988; Ishi 2008) treat increases in the number of designated machines and equipment as evidence of the complexity of the schemes. To observe them, we collect MOF notifications on the specification of machines and equipment suitable for special depreciation and then manually collect the number of first and second layer

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<sup>27</sup> In theory, applying special depreciation to the ceiling where the law allows is a rational behavior of firms as it maximizes their profits by reducing tax burden. In reality, insufficient depreciation is often observed on aggregate basis (Ogura and Yoshino 1987). Though searching the reasons for insufficient depreciation is beyond the scope of this paper, previous literature suggests several factors. Edgerton (2010) points out the asymmetries in responses to tax incentives between taxable firms, having enough profits to be taxed, and non-taxable firms, experiencing losses. Non-taxable firms do not have motivation to use tax incentives. Ogura and Yoshino (1987) hint that firms have enough reason to keep certain levels of profits because profit figures published in financial markets are likely to have some kinds of signals. If it is the case, firms with low profits or losses have incentives to push up profit levels by avoiding additional depreciations, and it is rational for them to skip special depreciation, even taking disadvantages in tax treatments. Whether companies can control profit levels or not through special depreciation depends on accounting practices. When firms recorded them in profit and loss statements, they could increase profits through insufficient depreciation. If they recorded special depreciation in the statement of retained earnings, these depreciation amounts had nothing to do with profits reported in the markets. Table 2 shows where firms record special depreciation. It turns out that accounting practice for this matter varies across firms and even in one firm according to time period. 39 per cent of our samples for special depreciation are recorded in retained profits statement, 54 per cent are in profits and losses statements, and the rest are in both. More than one third of cases have no relation to profit levels. Therefore, controlling profits can be a reason for insufficient profits but cannot explain completely the phenomena.



categories. Figure 6 shows the development of the number of designated machines and equipment at the second layer. The number hit its peak in the late 1950s, at more than 1000. Reflecting the reform in 1961, it decreased by half or even more. Textiles, chemicals and steel accounted for a considerable share from the beginning, and machinery and transport equipment gradually took over the majority status. On the top of the chart is “general machinery,” which is the category of general-use machine tools applicable for manufacturers. This category contributed to increases in the numbers until the 1961 reform and disappeared after the institutional change.

[Figure 6]

Increases and decreases in the number of designated machines could reflect the complexity of the scheme, as referred to in the previous literature, but could also simply show the changes in the coverage of the special depreciation schemes. For example, no designated machines existed for precision machines in 1951 even though the precision machine industry existed. In 1953, five categories of machines and equipment were designated for special depreciation for this industry, indicating that the precision machine had become the target of supportive policies.

Prior studies also note that specifications for suitable machines and equipment for special depreciation had become excessively detailed, causing complicated schemes. As a result, only high-skilled experts could judge whether or not a machine is subject to special depreciation (Ishi 2008). To gauge in detail the degree of machine specifications, we calculate the ratio of the numbers of second layer categories to those of first layer categories. For example, if two types of machines or the capacities of a particular machine are designated in the second layer against one category of a machine in the first layer, the ratio is two. If 10 are specified against one, the ratio is 10. We assume that the degree of details in the second case is higher than that in the first case. Figure 7 shows the ratios by industry. The average fluctuates at approximately four throughout the period. For machinery and precision instruments, specifications tend to be more detailed than the average, and the ratio increases as time goes on. Some industries, such as electric machinery and transport equipment, experience a declining ratio.

[Figure 7]

## **IV. Empirical Analysis**

### **A. Purpose and Methodology**

In this section, we examine the factors that affected special depreciation for each firm and firms' responses towards the schemes using the newly collected data sets as described in the previous section. The following factors listed in previous studies or deduced from the detailed structure of the special depreciation schemes are examined.

First, we estimate whether the government treated a particular industry or a firm in more favorable ways through tax incentives. Although the extent of the government's controls on firms in target industries was weaker through tax incentive schemes than that through subsidies or public lending,<sup>28</sup> existing studies conclude that the benefits of special depreciation did not spread universally as it did in some industries. For example, steel, machinery and precision instruments enjoyed a larger share of special depreciation to total depreciation. Such a perception is one of the driving forces of the 1961 reform (Ogura and Yoshino 1987; Ishi 2008).

Second, we estimate whether the share of capital to labor had some effects on the application of special depreciation. The purpose is to examine whether tax incentives could encourage rationalization of firms, as intended. As described in Section II, accelerated depreciation for designated machines and first-year write-offs for rationalization were introduced in the early 1950s to encourage "rationalization of industries." The MITI (1955) defines "rationalization of industries" for each firm level as a "reduction in unit production costs, improving labor productivity and changes in employment structure."<sup>29</sup> If capital could substitute labor as a production factor and firms with a lower capital-to-labor ratio tended to achieve larger special depreciation for introducing new machines and equipment, this tax incentive scheme can be interpreted as having the probability to meet its policy goal of increasing labor productivity.

Third, we test whether the complexity of the special depreciation schemes hampered firms' responses to these because that criticism was behind the 1961 reform. On an anecdotal basis, we have one example in business reports in which Sumitomo Machinery Co. recorded negative special depreciation in the first half of 1957. The reason for the negative figure is that it deducted the previous term's special depreciation because it failed to obtain a certificate from

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<sup>28</sup> Yoshikuni (1965) suggests that special depreciation can skip a detailed examination by the government when applying the scheme to each case, and information about to whom each benefit of each deal belongs is not available for the government in advance. By contrast, applying subsidies and public lending require strict examination processes in advance for each case.

<sup>29</sup> The MITI and the MOF drafted the Promoting the Rationalization of Firms Law, which was the legal basis of the first-year write-offs (Sawai 1990).

the MITI for a machine suitable for the scheme. This situation hints that a firm may have faced uncertainty regarding whether or not a machine is suitable for special depreciation. We require statistical tests because not many cases similar to that of Sumitomo Machinery Co. are reported in financial statements.

Fourth, we test whether firm size mattered for the application of special depreciation schemes. Previous studies note that, the larger the firms were, the more likely they enjoyed the benefits of special depreciation based on the snapshot data sets (Ishi 2008).

Finally, we examine whether a firm's export dependency or exports affected special depreciation because special depreciation for exporters—introduced in 1961 and remarkably expanded in 1964—was designed to be affected by these figures, as described in Section II.

To examine the previously mentioned first three factors, we estimate an equation of the form:

$$\frac{sd_{it}}{k_{it-1}} = \alpha + \beta pt_{it} + \gamma kl_{it} + \delta cs_{it} + \varepsilon_{it}, \quad (1)$$

where

sd: special depreciation throughout each period,

k: capital stock at the end of each period,

pt: proxies indicating whether a firm is a target of stimulating policies,

kl: capital stock to number of employees at the end of each period and

cs: proxies indicating the degree of complexity of special depreciation schemes.

In equation (1), we first assume that a factor which could affect special depreciation influences the dependent variables in the same term. Then, we estimate the equations for each firm  $i$  with one- and two-term lags for independent variables to capture the probable delayed effects. Because the data collected are semi-annual, special depreciation regarding capital investments in this term could appear in the next term as allowances for special depreciation are determined on a fiscal-year basis. In addition, the effects of special depreciation for designated machines and equipment lasted for three years by design.

To test the impact of firm size and exports, we estimate ordinary least square models on a cross-sectional basis.

## **B. Data and Variables for the Estimates**

For the special depreciation for the dependent variable, we draw on data sets that we

collect from the financial statements of each firm, as shown in Table 2. For data on capital stock to normalize the special depreciation, we use the Mitsubishi statistics.<sup>30</sup>

To judge whether a firm belongs to an industry which the government intended to promote, we consider as a proxy variable the share of borrowing outstanding from the JDB to total long-term borrowing outstanding. The figures for borrowing outstanding from the JDB are obtained from financial reports of each firm, and those for total borrowing are extracted from the Mitsubishi statistics. The following comparison between automobile and automobile components industries suggests that borrowings from the JDB can be a proper proxy. Ogura and Yoshino (1988) note three channels for promoting industrial activities by the government during the high-growth era: first is fiscal expenditures for industrial infrastructure, the second is special depreciation to raise investment incentives, and the third is public loans with low interest rates. The targets of the last two are private enterprises.<sup>31</sup> Although the JDB retained the power to decide to whom and how much it would lend, its lending policy followed economic policy plans by the government (Takeda 2009; Okazaki 2009). In 1956, the JDB started to lend to firms in the automobile components industry backed by the Machinery Industry Promotion Temporary Measures Law, which was binding throughout the high-growth period (Hashimoto 1990). For the automobile industry, the report of the financial sub-committee of the Industrial Structural Research Council (*Sangyo Kozo Chosakai*) suggested introducing new lending schemes to improve major industries' competitiveness in the international markets in 1962 (Hidaka 2002). Reflecting on the report, lending to automobile industries started in the following year (Maeda 1990). Figure 8 indicates the shares of JDB borrowing to total long-term borrowing in our sample firms that belong to these two industries. The solid line indicates the shares of automobile industries, which increased only during the latter part of the high-growth era, whereas those of the automobile parts industry (the dotted line) were high from the beginning, which is consistent with the government's intentions.

We also treat the share of borrowing outstanding from the Export-Import Bank of Japan (ExIm Bank) to total long-term borrowing as a proxy variable for targeted firms by the government for the period during which policy tools for export enhancing, including special depreciation, flourished—from the late 1960s to the early 1970s.<sup>32</sup> The figures for borrowing outstanding from the ExIm Bank are obtained from financial reports of each firm.

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<sup>30</sup> For details of the capital stock calculation, see the Data Appendix.

<sup>31</sup> Hatase and Matsubayashi (2019) examine the effects of JDB loans and other policy devices and find that, to some extent, JDB lending had positive impacts on capital investments by firms.

<sup>32</sup> The Export-Import Bank of Japan was first established in 1950 as the Export Bank of Japan to support exports of equipment and components for large plants by providing long-term funds for exporters. In 1952, the bank was renamed to the Export-Import Bank when its business expanded to supports for importers (Japan Bank for International Cooperation 2003).

[Figure 8]

For estimating the ratio of capital to labor, first, we calculate the capital stock relying on the Mitsubishi statistics. For details, see the Data Appendix. Next, we divide the capital stock by the number of employees; the number after 1964 is based on the Mitsubishi statistics, and that before 1963 is collected from each firm's financial reports.

For the effects of the complexity of the schemes, we apply the number of designated machines and the ratio of the numbers of second layer categories to those of first layer categories as proxies to indicate the degree of complexity. Both data sets are collected by industry. Until the reform of 1961, some machine and tool categories were specified as designated machines for all industries, in addition to those for a particular industry. The shares of such generally applicable machines were approximately 20 per cent or even more and may have dominated the development of the variables used in this study. To remove such effects, we construct data both with and without general machines. Data are extracted from the notifications of the MOF.

For firm sizes, we select capital, sales and number of employees as indicators. Capital, sales and number of employees from 1964 are extracted from the Mitsubishi statistics, and the number of employees before 1963 are collected from financial reports.

The export dependency data are extracted from financial reports. If those are not available, exports divided by sales in business reports are calculated. Exports are collected from the same sources.

## **C. Effects of Each Factor on Firms' Special Depreciation**

### **1. Government intentions, complexity of special depreciation schemes and capital-to-labor ratio**

We regress the equation with pooled ordinary least squares (OLS) and with panels in both fixed and random effects models to test whether the three factors, namely, the government's explicit intentions to promote particular industries, capital-to-labor ratios and complexity of the schemes, had effects on special depreciation.<sup>33</sup> The sample period is between 1956 and 1972. The collected data shown in Figures 2 and 4 suggest that the institutional change in 1964 expanded the benefits for exporters and had a significant impact on special depreciation.

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<sup>33</sup> The dependent variable here may have a heteroscedasticity problem. The application of proper techniques such as GMM or quantile estimation for panel data sets is a remaining issue for the estimation.

To examine the effects of the reform, we also estimate equations with samples before 1963 and after 1964. The results of the estimate are provided in Table 4.

The results with full sample periods are shown in Table 4-1. The shares of borrowing from the JDB are statistically insignificant in all cases, suggesting that it has no relation to special depreciation. Together with the fact that the number of samples enjoyed special depreciation benefits, 4,513 is larger than the number of those borrowed from the JDB, at 2,414, this result could indicate that special depreciation schemes covered a broader array of firms than public lending as a policy tool for promoting capital investments. The capital-to-labor ratio is statistically significant and negative, except for one case, which hints that a firm with less relative capital to labor enjoyed more benefits. Because one of the goals of the introduction of the special depreciation scheme was to encourage rationalization of firms, such as increasing labor productivity, one interpretation of the results is that the tool could probably achieve the policy targets to some extent. For the proxies of the complexity of the schemes, the results of the OLS are significant with positive signs in most cases,<sup>34</sup> whereas only one out of 12 cases using the random effect models indicates significant results with positive signs for the estimates.<sup>35</sup> Judging from these results, an overstatement is that the complexity of the scheme affects the actual special depreciation.<sup>36</sup>

The perception previously described can be changed when examining the results of the estimation for sub-sample periods. The results for the period between 1956 and 1963—just before the institutional reform that expanded special depreciation for exporters—are shown in Table 4-2. The insignificant results for the borrowing from the JDB are the same as those using the full samples. For the capital-to-labor ratio, only two out of 12 cases with panel estimations show negative significance.<sup>37</sup> During this period, the effects of replacing labor by capital were weak. By contrast, the majority (11 cases out of 12 with panel models) of the proxies of the complexity of the institution are statistically significant with positive signs. Against contemporary criticism, increasing the number of designated machines and specifying capacities, designs or other characters of machines or tools in greater detail enhanced rather than hampered the usage of special depreciation schemes.

For the period between 1964 and 1972, when special depreciation for exporters was said to play an important role, the results are shown in Table 4-3. Because special depreciation

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<sup>34</sup> It is statistically significant with positive signs in 11 cases out of 12.

<sup>35</sup> The results of the Hausman test suggest that the random effect models are appropriate in all cases.

<sup>36</sup> We also conduct tests by adding macroeconomic control variables, such as industrial production and interest rates, to control for the effects of business cycles. We obtain similar results for these independent variables.

<sup>37</sup> Again, the results of the Hausman test suggest that the random effect models are appropriate in all cases.

for designated machines available for all industries was abolished in 1961, independent variables for the proxies of the complexity of the schemes have only two patterns: the number of designated machines and the share of the sub-categories of designated machines of the main categories. The results of borrowing from the JDB are mixed and not statistically significant in the case of simultaneous and one-period lagged estimations in random effects models but are significant and negative for independent variables with two-period lags.<sup>38</sup> Firms which are not public lending targets could enjoy the benefits of the special depreciation schemes more than other firms.<sup>39</sup> Because the latter period was an era of export-enhancing policies, we replace the JDB borrowing figures by the ExIm Bank borrowing, and the results are shown in Table 4-4. The proxy variables are significant and positive in simultaneous cases but are not statistically significant for cases with lags. These results may be interpreted as industries or firms targeted for export-enhancing government policies enjoying to some extent the merits for special depreciation more than other firms.<sup>40</sup> In the simultaneous equation, the capital-to-labor ratios are insignificant; however, all of the ratios are significant and negative in terms of lagged variables. This indicates that the scheme likely encouraged replacement of labor by capital to some extent. For the proxies of the complexity of the schemes, in the panel estimates, five out of six cases are statistically significant and positive. Increasing the number of designated machines and specifying capacities, designs or other characters of machines or tools in greater detail promoted the special depreciation schemes during this period.<sup>41</sup>

The differences in the results of the estimations for the sub-sample periods indicate that the effects of the schemes changed over time in accordance with institutional changes. The impact of institutional reform that expanded export-enhancing special depreciation in 1964

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<sup>38</sup> The results of the Hausman test suggest that the random effect models are appropriate in all cases.

<sup>39</sup> To obtain a solid interpretation for this period, we need to investigate in greater detail whether gaps exist in policy goals between public lending and tax incentives.

<sup>40</sup> For other variables, the results of the capital-to-labor ratio do not change the subsequent interpretation. The proxy for the complexity of institutions indicates more cases that are positively significant, confirming the concept that a higher number of designated machines (or the more the details for specification of machines) results in greater usage of special depreciation by firms.

<sup>41</sup> The major reforms in special depreciation started in 1961, as described in section II. Therefore, the period between 1961 and 1964 could be interpreted as transitional. To capture the effects of the first reform, we conduct estimations for sub-sample periods divided by the end of 1960. The subsequent results should be interpreted with reservation because of the small sample size for the period between 1956 and 1960. The results diverge slightly from the baseline estimations, wherein sub-sample periods are divided by the end of 1963. Generally, the effects of the capital-to-labor ratio are weakened or contradict the baseline estimation; significant cases with negative signs are reduced from two to none—two significant cases with positive signs appear for the first half period (1956–1960). Significant negative cases are reduced from four to two for the second half period (1961–1972). For the complexity of the institution, the designated machinery numbers have positive effects on special depreciation, which is similar to the baseline estimations for the first half period. By contrast, significant and negative results appear for the second half period contradictory to the baseline estimations. These negative results indicate that too much detailed conditions for the application could hamper the merits of special depreciation.

could be considerable.

[Table 4]

## 2. Firm size

To test whether firm size mattered, we estimate OLS models on a cross-sectional basis for three time points—the first half of 1956, which is when the data sets begin; the second half of 1960, just before the institutional reform in 1961; and the second half of 1972, which represents the end of the data series.

Table 5 provides the results. Capital and sales are statistically significant with positive signs in 1956 and 1960, whereas the number of employees in 1956 and 1960 are insignificant. All values for 1972 are not significant. The contemporary criticism and findings in previous studies based on snapshot figures point out that larger firms were more likely to enjoy benefits before the reform of 1961. Because the standard for classifying firm size in such debates was usually capital, these results are consistent with contemporary views. In the late high-growth era, firm sizes did not affect benefits.

[Table 5]

## 3. Export dependency and exports

We test the effects of export dependency and exports on a cross-sectional basis because these figures are not available throughout the high-growth period. We use the year 1971 for the tests because it comes just before the special depreciation for exporters was abolished. Among the 190 sample firms, some did not disclose export figures, and thus, the sample for this estimate comprises 123 firms, smaller than that for other estimates.<sup>42</sup>

Table 6-1 provides the results. Both export dependencies and exports are statistically significant and positive, indicating that a firm with stronger export dependency or larger exports could obtain greater benefits from special depreciation. These results could be interpreted as

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<sup>42</sup> Some firms that produce products for domestic customers do not disclose export figures. Typical cases are flour milling companies, producers of oxygen and nitrogen gases, oil refining firms, manufacturers of refractory bricks for blast furnace facilities and companies in automobile parts industries.



special depreciation working to some extent as a rewarding tool for exporters.<sup>43</sup>

[Table 6-1]

[Table 6-2]

## V. Conclusion

This study uses newly collected data sets between 1956 and 1972 to reveal facts about the special depreciation schemes intended to encourage capital investments of firms in Japan.

These firm-level data series show that the volume of special depreciation had two peaks in terms of aggregated amounts when the schemes for promoting investments for rationalization of industries were expanded until the reform in 1961 and when that for supporting exporters ballooned from 1964 to 1970. Applying special depreciation prevailed among listed companies on a broader basis than public lending, indicating the importance of tax incentives for investment-promoting policies at the time. The actual amounts varied across firms with strong upward biases, supporting the importance of firm-level analysis when testing the effects of tax incentives. The records in financial statements suggest that each firm retained discretion for using special depreciation.

According to the outcomes of the empirical analysis on the factors that affected special depreciation, cases exist in which firms having relatively less capital to labor tended to apply larger special depreciation, hinting that the government had a suitable tool for one of its policy goals and thus improving labor productivity. Another finding is that increases in the number of designated machines for the scheme—often considered as representing the inefficiency of the scheme—actually activated the application of this tax incentive by firms. The results that test the effects of a company's status as an explicit target of promoting policies by the government on special depreciation are mixed, and further studies are needed to obtain reliable conclusions. The results of the estimations during the sub-sample periods indicate that the effects of the schemes changed over time in accordance with institutional changes; the impact of institutional reform that expanded the export-enhancing special depreciation in 1964 is considerable.

Remaining issues exist regarding the examination of the role of tax incentives in Japan

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<sup>43</sup> We also estimate panel equations for the period between 1967 and 1971 using a limited number of samples. The results using data for 72 firms, for which export dependency and export amount information are available, are shown in Table 6-2. Although the results for exports are mixed, those for export dependency are significant and positive, confirming that firms with a larger share of exports could enjoy greater benefits from special depreciation schemes.

during the high-growth era. First, the roles of other types of favorable tax treatments, such as various reserves and changes in corporate tax rates, need to be examined because the results shown in this study are one of several policy tools. To determine whether these tools actually affected capital investments, considering explicit channels through which decreasing tax burdens increase investments using formal models is necessary. Second, whether tax incentives increase capital investments in the case of Japan using the new firm-level data sets is worth testing. The comparison with the results of existing empirical studies for the United States could be helpful in more deeply understanding the effects of tax incentives. Third, room exists for further numerical examinations to determine whether or not government intentions were actually achieved, which was already done to some extent in this study. If the government's intentions were met, the extent to which would be another issue. Some empirical tests would bring new evidence for these unanswered questions.

## Data Appendix

### a) Special depreciation

As mentioned in Section III, unified practices have never existed regarding the accounting method for special depreciation during the sample period and special depreciations appear in various tables in the financial statements. We collect the following data as “special depreciation.”

- a)-1. Amounts recorded in the non-operational cost section of the profit and loss statement as “special depreciation,” “fixed assets special depreciation” and “additional depreciation.”
- a)-2. Amounts recorded in surplus statements as “special depreciation,” “additional depreciation,” “inclusion in special depreciation allowance” and “inclusion in special depreciation reserve.”
- a)-3. Amounts recorded in the depreciation schedule as “special depreciation” and “additional depreciation.”
- a)-4. Amounts mentioned in footnotes to the depreciation schedule as “special depreciation” and “additional depreciation.”
- a)-5. Amounts mentioned in footnotes to the balance sheet as “special depreciation” and “additional depreciation.”
- a)-6. Amounts mentioned in footnotes to the cost of goods schedule as “special depreciation” and “additional depreciation.”
- a)-7. Amounts recorded in the schedule of reserves as “inclusion in special depreciation allowance” and “inclusion in special depreciation reserve.”

When a firm suggests that it applied special depreciation but does not disclose the exact amounts, we exclude the firm from our sample list. For example, when a firm says “figures for depreciation include those for the special depreciation scheme” in a footnote to the depreciation schedule but does not specify the figures for special and non-special depreciation, we do not include that firm in our estimate because the exact amounts needed for the estimation are not available.

When a firm does not disclose whether or not it applied special depreciation and an examination of the information available in a business report indicates no evidence that the firm actually used special depreciation schemes, we assume that the special depreciation amount is zero.

b) Capital stock

From the Mitsubishi statistics, we collect amounts for sub-categories of fixed assets. Then, we sum up the figures belonging to two categories: b)-1. buildings, machines or equipment and others and b)-2. construction in progress, as capital stock.

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Table 1 Number of Firms for Special Depreciation Data Sets and Aggregated Amounts by Industry

Industry	Number of Samples	Amounts of Special Depreciation	Amounts of Special Depreciation per firm	Ratio of Special Depreciation to Capital Investments
		(million yen)	(million yen)	(%)
Foodstuff	16	14,893	931	2.5
Textiles	20	46,826	2,341	6.3
Wooden Products	1	1	1	0.0
Pulp and Paper	9	12,961	1,440	2.2
Chemicals	41	41,573	1,014	3.1
Oil	5	12,383	2,477	2.7
Rubber and Leathers	3	4,958	1,653	8.5
Ceramics	19	27,393	1,442	5.0
Steel	18	342,193	19,011	6.7
Non-steel Metals	1	2,451	2,451	2.1
General Machinery	15	28,228	1,882	9.9
Precision Instrument	9	10,438	1,160	10.6
Electric Machinery	14	91,930	6,566	7.3
Transport Equipment	19	269,435	14,181	11.2
Total/All Industry	190	905,663	4,767	6.7

Note: Data for special depreciation and capital investments are sum of the sample period (1956-1972).

Sources: Special depreciation data; Financial Statement Report, each issue; Capital investments; Mitsubishi Economic Research Institute (Mitsubishi Keizai Kenkyusho), Analysis of Domestic Economic Activities (Honpo Jigyo Seiseki Bunseki), each issue.

Figure 1

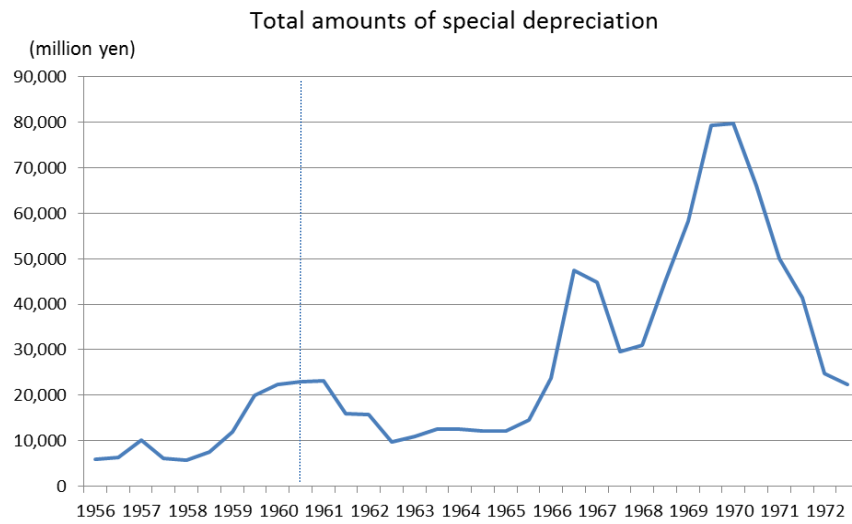


Figure 2

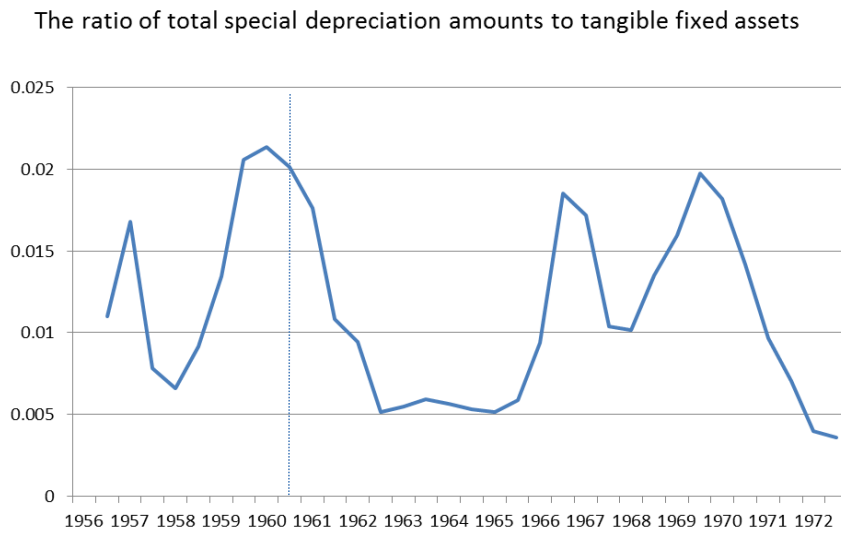


Figure 3

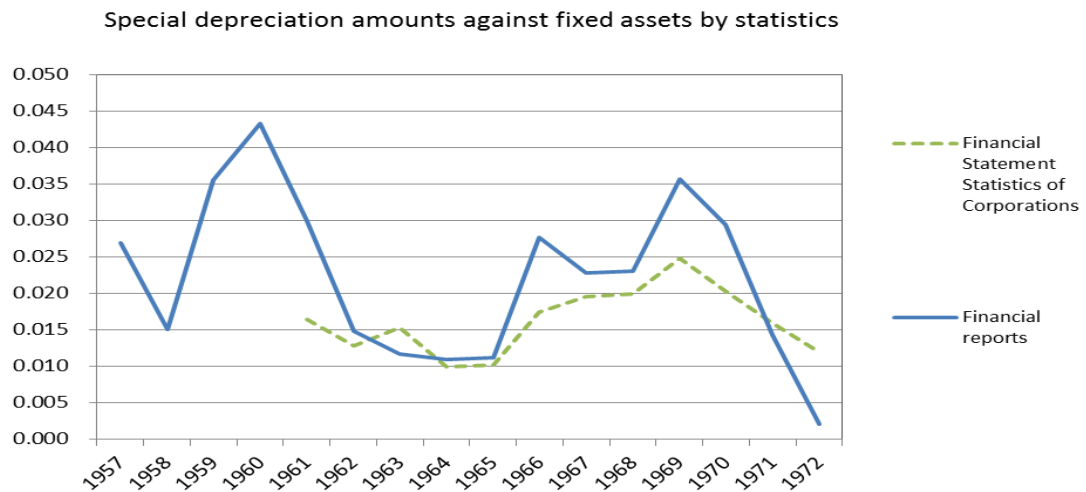


Table 2-1 Special Depreciation Amounts: Foodstuff

(thousand yen)

Firm Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	15(Meiji Seika)	15(Meiji Shoji)	16	
1956	1	0	13,041	0	0	0	0	0	0	2,215	0	30862	0	0	0	0	0	814	
	2	0	12,169	0	0	0	0	0	0	7,172	0	32355	0	0	0	0	0	540	
1957	1	0	17,755	0	0	0	0	0	0	8,011	0	1070	0	0	0	0	0	487	
	2	0	20,207	0	1170	0	0	2,925	0	1,080	36085	1234	0	0	4,998	4,101	897	479	
1958	1	0	20,344	0	1168	0	0	2,726	16	101	34823	6105	0	0	4,678	4,678	0	291	
	2	0	20,851	0	2,253	0	0	2,866	274	0	28431	16596	0	0	5,150	5,150	0	334	
1959	1	4,030	23,366	0	5,053	0	0	2,716	1,494	0	5009	1121	0	171,941	7,206	7,206	0	200	
	2	7,316	23,093	0	13,482	0	0	2,693	2,326	0	10,129	5888	1158	0	34,169	10,002	10,002	0	190
1960	1	11,041	24,158	0	12,393	0	2,348	785	2,163	0	804	1918	0	20,832	9,445	9,445	0	277	
	2	12,804	26,864	0	12,219	20,000	2,986	785	2,280	0	9,950	13,470	18965	0	262,956	7,671	7,671	0	279
1961	1	25,644	37,107	0	15,118	0	3,966	839	2,948	163,419	0	634	2649	0	146,953	10,063	10,063	0	2,026
	2	28,257	63,337	27,576	14,222	0	8224	1,001	2,192	9,151	0	545	2553	0	352,180	12,287	12,287	0	4,195
1962	1	25,696	64,905	25,189	12,932	0	6917	54,998	2,295	18,520	0	81	2,576	0	91,453	7,634	7,634	0	3,940
	2	25,168	53,768	9,620	9,791	0	7871	1,766	2,492	21,784	0	5,173	2,248	0	190,172	7,206	7,206	0	7,605
1963	1	19,435	48,078	7,601	9,443	0	7225	3,491	2,354	7,944	0	2,954	1,945	0	171,773	9,141	9,141	0	12,152
	2	16,141	38,992	0	6,408	0	6649	12,506	1,316	6,620	0	3,395	1,590	0	62,963	22,796	22,796	0	12,597
1964	1	21,933	24,051	20,070	6,214	0	6387	13,313	1,799	3,616	0	0	1,226	0	180,613	47,895	47,895	0	11,265
	2	23,355	48,256	21,925	4,706	0	5504	6,308	0	2,146	0	0	7,899	0	175,625	35,640	35,640	0	10,744
1965	1	22,622	173,289	22,187	5,546	0	5868	7,644	0	4,904	0	0	3,220	0	194,299	40,713	40,713	0	10,782
	2	22,865	111,470	21,958	3,593	0	3995	21,466	0	6,095	0	34,762	1,553	0	163,550	40,953	40,953	0	9,783
1966	1	24,388	45,558	22,716	2,566	0	1139	20,270	0	4,850	0	7,874	2,692	0	186,536	36,503	36,503	0	9,225
	2	23,954	80,737	26,042	2,044	0	995	50,358	0	4,957	0	10,724	4,639	0	156,816	65,003	65,003	0	8,691
1967	1	30,641	31,376	30,143	1,746	0	886	55,529	0	8,350	0	n.a.	5,417	0	190,859	53,628	53,628	0	13,403
	2	24,762	59,437	36,988	568	0	762	99,340	0	15,591	0	17,234	4,000	0	201,123	26,148	26,148	0	11,642
1968	1	49,562	28,204	49,541	0	0	669	75,818	0	63,651	0	7,354	7,782	0	285,938	43,261	43,261	0	9,310
	2	40,932	116,849	45,529	0	0	588	66,192	0	29,893	0	21,595	11,093	0	294,808	25,635	25,635	0	13,392
1969	1	43,376	25,969	42,287	0	0	518	75,244	0	27,100	0	9,840	8,423	0	411,121	32,794	32,794	0	13,392
	2	47,302	97,474	42,570	0	0	458	74,982	0	25,592	0	6,616	6,000	0	348,361	54,090	54,090	0	6,766
1970	1	47,834	134,288	44,625	16,261	0	0	61,088	0	219,991	0	33,100	6,500	0	236,862	77,466	77,466	0	4,686
	2	112,938	329,030	43,299	13,060	0	0	55,480	0	139,168	0	14,600	5,500	0	223,176	65,860	65,860	0	7,263
1971	1	132,839	238,698	41,673	0	0	0	21,363	0	26,607	0	0	4,000	0	279,886	203,048	203,048	0	6,753
	2	73,129	400,493	36,204	3,137	0	0	53,708	0	29,379	0	0	38,700	0	208,545	86,638	86,638	0	5,845
1972	1	126,434	659,723	25,232	1,182	0	0	72,408	0	29,615	0	0	800	0	7,000	28,130		3,424	
	2	202,976	443,334	34,709	0	0	0	53,708	0	43,754	0	0	1,700	0	80,000	27,247		2,756	

Note 1: For the name of each firm, see Table 2-15.

Note 2: Cells in blue indicate that special depreciation amounts are recorded in other than surplus statements, those in reddish-brown are in surplus statements and those in orange are in both.

Note 3: Firm names in parenthesis show the firms before the merger.

Table 2-2 Special Depreciation Amounts: Textiles

(thousand yen)

Firm Number	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
1956	1	0	50,845	8,491	1,347	0	22,080	0	47,192	6,865	7,597	2,764	15,924	20,949	26,085	10,810	69,675	12,300	478	0	0
	2	0	60,304	7,559	3,770	0	20,148	0	35,467	6,881	11,848	2,932	28,459	33,236	42,979	11,789	74,375	27,251	450	0	0
1957	1	0	27,601	19,659	2,009	0	72,707	3,679	34,862	8,613	9,003	4,385	31,388	0	0	4,314	89,404	15,644	1,046	0	0
	2	0	121,295	6,688	0	0	15,881	3,450	0	11,022	5,616	n.a.	21,360	0	0	0	116,941	12,793	1,599	0	0
1958	1	0	18,503	7,987	0	0	45,043	3,339	0	10,941	5,707	n.a.	22,541	0	0	46,164	104,085	3,000	1,488	0	0
	2	0	20,647	n.a.	3,842	0	28,838	436	0	10,896	10,765	n.a.	11,174	0	0	0	108,793	3,000	6,390	0	0
1959	1	0	16,988	n.a.	3,163	0	31,351	6,388	0	9,977	4,365	3,119	12,169	16,875	0	0	89,540	11,623	8,094	1,113	2,202
	2	0	143,142	11,117	1,570	13,037	66,639	1,060	47,529	12,613	4,168	2,604	12,007	3,019	0	29,657	72,137	13,452	33,863	2,082	2,502
1960	1	0	34,760	3,400	88	10,836	45,464	657	160,362	13,513	5,383	1,258	9,341	3,870	0	8,798	73,218	19,531	6,864	2,521	2,366
	2	0	17,911	5,168	81	10,435	51,531	1,067	22,735	12,813	6,630	1,232	9,497	4,703	0	4,003	105,573	5,549	6,561	3,745	1,619
1961	1	0	74,854	4,172	3,967	12,773	35,724	1,465	28,034	19,263	5,976	2,853	32,291	0	65,680	3,876	148,525	15,647	2,532	2,016	1,716
	2	0	27,675	3,698	1,074	21,019	36,674	1,379	26,843	11,013	5,052	2,553	11,779	0	124,848	1,452	138,534	14,431	6,495	2,675	2,459
1962	1	0	18,042	4,090	930	18,170	17,355	1,683	0	10,632	5,651	2,506	35,080	0	47,153	1,314	167,106	15,204	177	2,535	2,098
	2	0	16,361	5,195	0	0	45,138	2,356	0	5,680	6,594	1,967	9,878	0	59,429	19,244	197,209	49,243	16	2,402	1,757
1963	1	4,410	39,613	6,103	997	18,128	18,031	35,084	18,582	8,782	6,017	1,684	10,148	0	47,465	380,531	303,738	3,372	9,903	2,894	2,168
	2	0	37,524	8,283	509	13,756	9,834	1,816	15,300	4,084	5,515	1,313	14,475	0	52,854	15,103	209,664	13,102	0	3,360	3,655
1964	1	0	17,631	48,659	1,201	15,627	35,883	7,306	13,377	3,915	10,697	4,875	40,351	10,542	254,267	2,139	569,219	1,653	5,312	1,113	0
	2	0	17,988	29,978	4,716	12,520	164,974	1,630	7,240	3,146	4,576	7,694	73,789	0	196,265	2,887	516,410	7,896	7,405	2,082	5,899
1965	1	0	12,479	17,356	4,655	10,200	159,558	48,169	7,301	2,939	3,747	1,769	79,810	1,657	199,229	2,885	446,356	9,531	8,112	2,521	7,464
	2	0	12,252	12,954	0	15,970	147,308	16,659	0	2,356	2,633	10,403	72,753	0	202,787	2,101	419,341	11,308	7,400	3,745	7,311
1966	1	0	12,492	11,916	0	0	165,480	22,672	0	9,148	6,151	1,617	79,745	0	196,616	2,569	395,920	11,091	10,053	2,086	8,375
	2	0	120,929	46,724	0	0	196,253	0	0	9,732	2,044	1,621	63,397	0	207,121	2,959	687,268	38,796	5,322	2,675	7,687
1967	1	0	135,287	53,306	15,020	0	228,391	0	51,160	35,784	21,153	7,042	80,210	0	345,224	7,460	671,448	46,776	8,657	2,535	7,361
	2	0	114,450	64,337	18,100	0	430,530	17,957	144,108	34,281	15,615	2,795	63,871	0	390,736	16,879	655,139	52,075	6,566	2,402	7,335
1968	1	3,810	160,120	78,584	3,855	0	274,066	58,752	58,332	20,755	14,606	2,550	64,205	0	466,519	35,226	1,350,000	52,075	4,290	2,894	8,882
	2	2,118	341,294	57,524	3,151	0	181,815	71,820	97,042	19,140	10,640	2,328	65,290	19,332	487,285	26,076	1,482,500	59,787	1,358	3,360	6,407
1969	1	0	291,000	157,321	24,018	0	181,361	20,975	115,000	50,000	33,033	1,497	102,773	0	1,224,500	74,541	1,545,000	89,623	7,199	3,685	5,854
	2	13,704	304,805	118,710	24,633	200,000	336,580	0	115,000	32,500	28,311	1,307	107,777	0	1,231,650	77,277	1,805,000	84,757	7,362	5,023	5,568
1970	1	20,178	280,000	57,203	8,126	369,137	427,133	0	120,000	11,750	34,429	1,168	104,068	0	1,216,300	158,509	1,340,775	73,568	9,772	0	5,562
	2	1,856	84,971	55,247	5,921	250,506	616,809	0	0	12,000	25,913	1,019	71,424	0	1,423,400	171,165	1,889,175	111,652	21,663	0	2,786
1971	1	6,381	204,495	50,982	3,788	79,867	454,797	44,568	0	8,000	12,852	942	84,930	0	635,000	165,096	1,419,000	117,776	10,682	0	2,783
	2	6,342	157,200	41,955	3,215	61,332	462,807	32,465	0	11,398	11,629	870	60,419	0	748,000	105,500	0	83,140	10,305	0	3,383
1972	1	6,342	246,230	5,928	330	70,000	408,052	0	0	12,997	8,401	268	53,258	0	173,000	64,600	99,000	77,634	6,105	0	5,716
	2	6,342	251,174	61,291	44,614	10,000	194,233	0	0	4,500	40,546	0	108,146	0	137,000	159,900	47,000	91,294	5,345	0	1,957

Note 1: For the name of each firm, see Table 2-15.

Note 2: Cells in blue indicate that special depreciation amounts are recorded in other than surplus statements, those in reddish-brown are in surplus statements and those in orange are in both.

Note 3: 'n.a.' are for the periods which data are not available because of the missing issues of business reports either in University of Tokyo or Hitotsubashi University collections.

Table 2-3 Special Depreciation Amounts: Wooden Products

(thousand yen)		
Firm Number		37
1956	1	0
	2	0
1957	1	0
	2	0
1958	1	0
	2	0
1959	1	0
	2	0
1960	1	0
	2	0
1961	1	0
	2	324
1962	1	469
	2	290
1963	1	390
	2	0
1964	1	0
	2	0
1965	1	0
	2	0
1966	1	0
	2	0
1967	1	0
	2	0
1968	1	0
	2	0
1969	1	0
	2	0
1970	1	0
	2	0
1971	1	0
	2	0
1972	1	0
	2	0

Note 1: For the name of each firm, see Table 2-15.

Note 2: Cells in blue indicate that special depreciation amounts are recorded in other than surplus statements.

Table 2-4 Special Depreciation Amounts: Pulp and Paper

(thousand yen)

Firm Number	38	39	39(Sanyo Pulp)	39(Kokusaku Pulp)	40	40(Jujo Paper Mfg.)	40(Tohoku Pulp)	41	41(Oji Paper Co.)	41(Kita Nippon Seishi)	42	43	44	45	46	
1956	1	10,467	43,613	5,261	38,352	31,247	12,048	19,199	19,982	15,224	4,758	0	0	4,047	1,660	10,475
	2	120,000	17,058	8,774	8,284	34,982	15,926	19,056	32,091	28,066	4,025	0	0	4,741	1,560	9,130
1957	1	0	18,363	10,845	7,518	37,615	20,782	16,833	38,895	34,886	4,009	0	0	9,671	3,441	6,207
	2	139,334	20,415	19,854	561	24,604	24,604	0	69,251	69,251	0	0	0	7,602	3,587	8,707
1958	1	15,171	1,154	0	1,154	55,944	55,944	0	65,190	65,190	0	0	0	8,251	0	8,905
	2	0	49,431	48,121	1,310	51,958	51,958	0	71,645	71,645	0	0	0	11,306	9,687	9,590
1959	1	0	12,160	11,238	922	47,553	47,553	0	67,204	67,204	0	0	0	12,036	7,698	11,062
	2	29	12,596	11,033	1,563	40,605	40,605	0	64,696	64,696	0	3,173	0	104,936	23,041	31,024
1960	1	259	23,346	21,147	2,199	36,757	36,757	0	54,745	54,745	0	10,720	16,182	45,723	486	91,112
	2	22	11,390	10,171	1,219	34,632	34,632	0	97,700	75,200	22,500	6,689	31,125	50,503	1,337	83,728
1961	1	0	105,580	20,076	85,504	16,501	16,501	0	108,516	95,016	13,500	12,063	38,141	59,868	64,810	93,689
	2	1,078	75,759	114	75,645	19,241	19,241	0	66,064	66,064	0	11,471	17,501	65,207	25,267	81,538
1962	1	9,643	123,859	59,673	64,186	19,383	19,383	0	0	0	0	7,738	8,191	69,691	28,214	70,616
	2	1,367	54,633	108	54,525	13,581	13,581	0	100,000	100,000	0	0	8,001	74,457	17,185	0
1963	1	478	75,945	25,000	50,945	10,805	10,805	0	57,925	57,925	0	0	0	74,588	10,456	8,880
	2	1,274	44,796	20,232	24,564	11,061	11,061	0	36,222	36,222	0	24,099	3,938	321,435	12,158	329,111
1964	1	821	14,816	9,572	5,244	10,387	10,387	0	90,456	90,456	0	1,890	934	112,611	10,568	227,123
	2	659	4,713	0	4,713	9,701	9,701	0	53,812	53,812	0	1,789	1,234	46,058	12,516	42,816
1965	1	1,015	3,609	0	3,609	8,114	8,114	0	56,157	56,157	0	1,735	2,564	108,069	11,170	3,243
	2	2,777	61,950	57,503	4,447	6,064	6,064	0	64,066	64,066	0	2,940	0	90,588	10,155	0
1966	1	2,878	31,941	27,915	4,026	13,224	13,224	0	90,837	90,837	0	1,427	0	86,126	21,693	92,540
	2	0	25,657	18,623	7,034	12,010	12,010	0	123,464	123,464	0	0	0	58,029	35,507	89,950
1967	1	0	157,084	115,551	41,533	20,330			113,438	113,438	0	0	0	48,227	64,878	39,689
	2	0	49,200	20,575	28,625	18,746			90,430	90,430	0	16,800	0	32,892	62,393	41,579
1968	1	0	49,449	21,061	28,388	20,273			103,920	103,920	0	55	0	25,834	36,399	68,406
	2	0	60,112	34,000	26,112	17,989			88,386	86,268	2,118	47,084	0	25,672	295,648	52,385
1969	1	0	44,234	39,459	4,775	17,231			187,169	187,169	0	0	0	17,876	117,519	144,801
	2	0	52,099	47,022	5,077	20,340			142,943	142,943	0	7,683	0	28,393	138,202	164,475
1970	1	0	91,924	87,000	4,924	25,292			136,523			11,627	0	0	155,480	127,567
	2	0	28,658	24,926	3,732	39,214			169,049			6,474	0	0	121,369	0
1971	1	0	28,564	24,926	3,638	33,705			227,792			2,618	0	0	91,730	0
	2	0	224,000			31,514			408,700			2,419	0	0	128,447	217,976
1972	1	0	130,000			32,754			255,759			0	0	0	0	184,548
	2	0	800,000			32,896			94,872			0	0	0	0	13,661

Note 1: For the name of each firm, see Table 2-15.

Note 2: Cells in blue indicate that special depreciation amounts are recorded in other than surplus statements, those in reddish-brown are in surplus statements and those in orange are in both.

Note 3: Firm names in parenthesis show the firms before the merger.



Table 2-6 Special Depreciation Amounts: Oil

(thousand yen)

Firm Number		88	89	90	91	92
1956	1	693	2,760	320,312	0	2,915
	2	948	3,307	43,430	807,246	3,269
1957	1	805	4,734	43,430	110,000	3,072
	2	1,251	5,197	44,739	115,923	4,040
1958	1	1,772	6,495	23,668	12,133	4,800
	2	1,682	6,162	146,504	13,357	55,571
1959	1	1,584	6,449	107,123	15,975	422,147
	2	178,741	6,085	96,314	14,809	4,634
1960	1	160,900	7,315	94,932	109,906	6,265
	2	182,302	7,743	91,288	16,158	5,967
1961	1	8,514	9,202	94,763	18,149	13,900
	2	8,402	8,052	15,560	23,478	0
1962	1	8,135	8,127	40,631	31,724	0
	2	6,988	8,498	39,563	63,215	0
1963	1	7,151	6,957	37,641	33,423	3,786
	2	7,892	6,072	34,853	33,097	3,577
1964	1	24,454	5,115	0	63,360	3,565
	2	32,076	6,116	0	47,615	3,509
1965	1	29,997	0	0	45,891	3,253
	2	27,852	0	0	51,060	4,452
1966	1	46,285	0	0	42,017	2,790
	2	64,366	0	0	61,677	2,594
1967	1	38,808	0	0	59,946	6,349
	2	36,225	0	0	52,461	6,349
1968	1	66,356	0	9,321	36,280	6,349
	2	74,493	0	9,160	662,873	6,349
1969	1	32,874	0	10,671	101,775	18,283
	2	650,343	8,439	8,689	1,867	50,835
1970	1	21,166	10,127	7,093	126,106	6,926
	2	30,126	10,127	7,434	309,209	4,764
1971	1	56,031	23,285	6,869	718,199	69,000
	2	7,629	145,033	5,526	3,220,000	261,000
1972	1	6,202	23,285	7,154	0	105,000
	2	1,784	24,567	6,611	0	731,000

Note 1: For the name of each firm, see Table 2-15.

Note 2: Cells in blue indicate that special depreciation amounts are recorded in other than surplus statements, those in reddish-brown are in surplus statements and those in orange are in both.



Table 2-7 Special Depreciation Amounts: Rubber and Leather Products

		(thousand yen)		
Firm Number		93	94	95
1956	1	0	21,773	0
	2	0	30,000	0
1957	1	0	36,569	0
	2	0	0	0
1958	1	0	0	0
	2	0	0	0
1959	1	0	0	0
	2	0	0	0
1960	1	0	0	0
	2	0	0	0
1961	1	0	50,000	0
	2	0	15,000	0
1962	1	0	19,202	0
	2	0	42,250	0
1963	1	0	36,200	0
	2	0	40,000	0
1964	1	0	0	0
	2	0	186,895	0
1965	1	0	0	0
	2	0	0	4,823
1966	1	0	100,000	0
	2	0	100,000	0
1967	1	0	81,492	0
	2	0	402,242	0
1968	1	0	285,828	0
	2	0	343,589	0
1969	1	0	425,720	0
	2	0	638,154	0
1970	1	0	518,726	0
	2	0	462,365	0
1971	1	0	537,931	0
	2	0	310,283	0
1972	1	0	219,637	0
	2	0	46,156	2,701

Note 1: For the name of each firm, see Table 2-15.

Note 2: Cells in blue indicate that special depreciation amounts are recorded in other than surplus statements, those in reddish-brown are in surplus statements and those in orange are in both.

Table 2-8 Special Depreciation Amounts: Ceramics

		(thousand yen)																		
Firm Number		96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114
1956	1	284,372	5,337	24,672	5,543	143,116	0	0	0	1,796	97	1,573	0	0	0	0	n.a.	0	0	0
	2	30,445	6,513	16,429	30,923	13,147	0	0	0	3,550	70	2,041	0	0	0	980	n.a.	0	0	0
1957	1	46,413	44,023	11,110	23,151	45,285	0	0	345	1,053	0	27,896	770	0	0	0	n.a.	0	0	0
	2	24,936	7,021	14,236	4,755	29,082	0	0	3,464	6,807	0	3,784	0	2,216	29,293	0	0	0	3,092	0
1958	1	28,369	33,618	1,357	5,682	303,910	0	0	3,539	6,830	0	4,733	0	0	2,024	0	0	0	3,028	0
	2	88,281	4,998	941	4,960	127,894	0	0	3,838	8,839	413	0	0	0	0	0	124	0	2,789	4,038
1959	1	18,883	12,488	9,936	27,938	115,262	0	0	3,464	3,407	810	0	0	0	28,887	0	10,811	845	2,482	1,312
	2	853,334	4,784	2,901	1,969	30,470	0	0	3,539	1,668	742	30,589	0	156	18,110	0	198	620	2,210	894
1960	1	91,656	4,021	2,454	1,724	23,268	863	524	4,396	1,959	680	6,791	0	158	6,838	0	17,351	181	1,439	939
	2	184,026	4,429	21,148	3,830	21,306	632	995	5,520	1,640	21,516	8,989	0	12,039	0	12,488	432	389	354	1,017
1961	1	147,178	4,797	1,380	25,853	31,074	1,172	2,042	6,050	8,526	29,100	14,309	8,000	1,232	0	0	716	941	38,134	456
	2	94,957	7,730	1,340	3,332	50,455	1,345	2,956	6,050	5,000	19,100	31,794	7,700	1,712	0	0	652	940	37,676	29,654
1962	1	68,562	4,133	800	3,038	66,419	2,370	2,521	7,328	5,000	17,146	34,359	0	1,908	0	0	251	867	8,171	0
	2	0	3,780	131	2,771	40,880	1,270	2,336	10,183	5,000	7,573	8,054	0	539	0	0	76	577	2,514	134,025
1963	1	0	31,341	124	3,033	28,215	1,195	2,187	10,927	24,198	7,168	5,899	0	933	0	0	9,018	214	2,136	0
	2	25,001	9,009	0	1,555	54,264	834	16,958	12,952	30,316	6,789	4,716	0	785	0	0	0	574	2,983	0
1964	1	156,428	38,688	0	1,038	113,016	1,556	17,249	24,302	19,700	21,420	99,701	0	643	0	0	0	632	17,648	0
	2	277,687	29,092	0	1,354	29,541	15,720	53,187	45,478	29,208	53,313	125,924	0	592	0	0	0	608	20,995	12,000
1965	1	292,915	35,583	0	1,677	26,346	21,133	59,656	56,313	29,839	64,168	162,586	0	1,081	0	0	0	441	28,756	43,500
	2	249,087	25,853	0	1,295	27,240	20,287	82,826	64,848	15,103	61,486	117,975	0	2,272	0	0	0	476	6,619	33,520
1966	1	318,264	31,668	0	1,166	95,266	19,351	68,286	51,411	24,127	58,863	141,218	n.a.	2,348	0	0	0	291	8,372	33,000
	2	340,032	17,079	0	2,819	20,000	5,104	75,197	62,024	26,441	86,284	233,136	0	2,687	0	0	0	289	9,306	48,000
1967	1	427,112	30,249	0	2,974	103,682	0	60,092	60,060	60,169	93,042	173,532	0	2,935	0	16,568	0	37,938	65,280	49,000
	2	272,549	33,431	0	2,686	113,042	0	95,412	73,354	43,023	89,500	189,090	0	3,147	0	14,289	4,845	1,176	58,321	48,000
1968	1	286,722	36,620	221,559	2,265	107,539	0	52,501	75,088	102,640	80,354	317,790	0	3,579	0	12,925	9,019	1,211	52,851	46,000
	2	483,715	0	129,994	3,041	175,550	0	61,264	85,423	108,840	118,269	320,761	0	6,880	0	14,416	8,860	1,313	46,381	46,000
1969	1	557,504	0	103,810	2,717	181,684	0	48,713	174,740	139,930	110,563	171,483	0	5,795	0	18,911	11,422	5,006	55,880	45,000
	2	681,958	10,900	95,576	2,459	123,772	0	49,560	126,688	136,960	121,711	155,204	0	0	25,238	19,101	10,416	4,732	80,409	47,000
1970	1	710,408	23,386	104,549	2,202	122,185	0	43,684	65,907	141,370	141,356	137,605	0	0	64,446	15,119	13,242	4,579	79,469	48,000
	2	615,077	22,813	146,670	2,032	280,859	0	38,316	46,880	157,390	155,795	147,817	0	0	45,639	22,552	13,617	3,893	59,850	55,000
1971	1	546,403	20,000	104,000	1,875	240,373	0	66,658	64,254	166,750	131,163	148,545	0	0	49,105	249,388	14,145	3,781	61,977	65,000
	2	684,000	45,303	114,000	830	82,000	0	61,531	70,058	229,570	69,779	157,525	0	0	31,616	164,004	11,800	3,483	73,703	40,000
1972	1	917,000	56,446	21,000	588	161,000	0	18,715	39,850	43,080	61,873	18,733	0	0	0	38,633	20,954	7,151	55,833	0
	2	512,000	60,000	19,000	13,045	69,000	0	112,824	35,407	60,100	1,574	30,289	0	0	0	30,369	45,791	2,326	10,056	0

Note 1: For the name of each firm, see Table 2-15.

Note 2: Cells in blue indicate that special depreciation amounts are recorded in other than surplus statements, those in reddish-brown are in surplus statements and those in orange are in both.

Note 3: 'n.a.' are for the periods which data are not available because of the missing issues of business reports either in University of Tokyo or Hitotsubashi University collections.



Table 2-10 Special Depreciation Amounts: Non-steel Metals

(thousand yen)

Firm Number	133	
1956	1	0
	2	0
1957	1	0
	2	106,164
1958	1	172,069
	2	441,461
1959	1	80,242
	2	109,476
1960	1	172,905
	2	161,717
1961	1	68,225
	2	21,054
1962	1	0
	2	0
1963	1	92,808
	2	0
1964	1	7,998
	2	38,827
1965	1	27,552
	2	143,612
1966	1	358,607
	2	115,178
1967	1	110,565
	2	66,505
1968	1	36,441
	2	19,435
1969	1	100,000
	2	0
1970	1	0
	2	0
1971	1	0
	2	0
1972	1	0
	2	0

Note 1: For the name of each firm, see Table 2-15.

Note 2: Cells in blue indicate that special depreciation amounts are recorded in other than surplus statements, those in reddish-brown are in surplus statements and those in orange are in both.

Table 2-11 Special Depreciation Amounts: Machinery

(thousand yen)

Firm Number		134	135	136	137	137 (Sumitomo Machinery Co.)	137 (Uruga Heavy Industry)	138	139	140	141	142	143	144	145	146	147	148
1956	1	2,603	0	1,767	1,618	0	1,618	0	0	0	0	134	0	8,731	5,449	2,328	0	55,298
	2	33,017	0	2,715	32,862	27,267	5,595	0	6,306	0	0	12,033	0	25,835	3,947	925	0	45,141
1957	1	0	0	38,207	-3,268	-5,775	2,507	0	0	0	0	3,801	0	15,952	5,757	559	0	48,200
	2	373	34,498	28,732	113,652	72,646	41,006	0	0	0	0	4,291	0	28,649	4,975	4,423	96,396	71,259
1958	1	20,806	36,971	7,295	56,952	19,207	37,745	0	0	0	7,739	33,952	0	6,989	0	4,104	0	51,360
	2	24,972	49,938	7,950	75,014	75,014	0	0	0	0	0	4,878	0	4,584	0	89	7,832	52,761
1959	1	44,013	37,782	9,478	50,137	50,137	0	0	0	0	28,201	4,044	5,099	30,580	0	1,119	24,961	90,101
	2	37,036	43,997	55,942	87,892	87,892	0	0	1,086	0	1,004	27,014	25,000	11,288	0	59	25,798	134,023
1960	1	57,091	85,879	38,128	82,364	82,364	0	27,137	1,024	0	2,356	32,099	25,000	16,107	23,480	59	100,516	304,915
	2	55,283	81,356	44,717	166,547	85,269	81,278	29,434	4,364	0	342	33,812	1,880	63,033	18,598	192	120,120	317,878
1961	1	63,932	49,577	76,359	99,128	87,941	11,187	26,714	23,313	0	365	25,977	28,000	80,997	7,150	587	120,560	171,975
	2	57,237	142,674	186,669	156,418	156,418	0	22,350	3,833	0	3,851	39,375	70,000	27,612	0	507	146,000	171,189
1962	1	88,036	118,367	107,457	190,374	189,297	1,077	78,736	416	0	60	38,260	50,000	45,924	0	423	100,000	209,486
	2	33,265	54,670	32,520	145,162	143,045	2,117	14,930	416	0	640	52,378	15,000	3,860	0	359	200,000	203,789
1963	1	59,151	21,476	45,154	64,610	62,605	2,005	32,440	0	0	853	29,750	10,000	81,118	0	303	200,000	153,705
	2	14,710	6,363	26,677	76,265	74,365	1,900	3,960	0	0	814	6,395	70,000	16,944	0	147	30,000	130,937
1964	1	26,360	0	11,369	73,857	72,057	1,800	25,025	665	0	778	6,592	11,000	0	0	0	154,241	80,918
	2	48,918	0	8,779	40,454	38,748	1,706	5,733	4,960	0	734	16,932	13,000	0	0	0	107,650	95,629
1965	1	5,894	0	10,416	49,172	47,556	1,616	0	2,345	0	914	16,007	6,700	0	0	0	100,538	101,778
	2	22,571	0	8,892	47,124	45,593	1,531	0	16,831	0	2,058	30,575	6,500	0	29,696	0	92,773	74,676
1966	1	5,804	0	9,763	63,574	59,918	3,656	0	7,049	0	1,945	36,290	5,500	0	129,660	0	83,187	39,405
	2	4,681	0	13,374	296,436	87,129	209,307	0	6,432	0	2,083	33,789	5,000	0	8,216	22,386	73,863	38,143
1967	1	17,515	0	34,960	268,745	64,278	204,467	0	5,445	0	2,183	32,355	53,227	0	11,937	8,881	66,452	138,007
	2	15,850	35,428	17,052	98,135	50,046	48,089	0	6,560	0	1,565	29,699	29,480	0	10,825	36,461	752,151	291,568
1968	1	996	42,879	27,296	240,579	64,068	176,511	0	6,062	0	1,230	41,540	18,396	0	22,223	76,245	188,269	414,980
	2	20,341	62,822	185,705	200,187	67,256	132,931	2,546	5,601	0	1,136	61,712	26,250	23,435	17,358	101,314	265,000	460,044
1969	1	9,736	130,610	246,676	145,699			1,157	4,978	0	13,908	75,683	12,940	0	22,404	167,269	215,948	492,531
	2	9,235	51,440	32,904	441,441			5,148	3,565	0	17,167	42,813	88,470	23,538	29,998	208,666	330,385	532,234
1970	1	28,694	28,086	171,554	227,330			9,844	5,984	0	12,324	36,551	79,780	0	29,008	279,267	422,530	658,634
	2	26,902	35,870	120,740	311,575			1,542	5,341	0	4,296	33,472	39,010	0	19,190	301,363	386,630	550,000
1971	1	0	69,759	52,997	232,000			2,499	7,239	0	2,866	46,958	35,050	0	25,474	190,000	438,727	550,000
	2	0	59,869	65,164	122,000			15,947	10,274	0	6,285	59,024	33,640	0	73,434	213,000	277,000	521,125
1972	1	0	10,238	44,591	862,000			0	9,310	0	3,542	48,419	0	0	9,299	26,000	247,000	400,000
	2	0	13,043	53,221	285,000			0	12,021	0	1,565	112,240	0	0	22,046	22,000	45,000	700,000

Note 1: For the name of each firm, see Table 2-15.

Note 2: Cells in blue indicate that special depreciation amounts are recorded in other than surplus statements, those in reddish-brown are in surplus statements and those in orange are in both.

Note 3: Firm names in parenthesis show the firms before the merger.

Note 4: 'n.a.' are for the periods which data are not available because of the missing issues of business reports either in University of Tokyo or Hitotsubashi University collections.

Table 2-12 Special Depreciation Amounts: Precision Instruments

(thousand yen)

Firm Number		149	150	151	152	153	154	155	156	157
1956	1	1,666	31,674	2,967	0	0	981	0	0	0
	2	2,083	3,252	5,225	4,665	0	3,403	0	0	0
1957	1	10,585	23,515	1,976	18,150	0	5,284	0	0	0
	2	17,777	35,417	17,588	16,080	0	3,500	0	4,616	7,025
1958	1	6,673	34,566	1,941	10,205	0	1,671	0	867	210
	2	13,140	27,963	3,097	0	0	2,339	0	2,375	191
1959	1	9,609	63,995	3,161	0	0	2,631	0	3,389	188
	2	14,802	19,441	11,239	0	0	1,493	0	3,567	248
1960	1	13,999	34,762	15,172	15,433	0	1,542	0	53,564	256
	2	17,080	35,919	4,053	1,779	24,516	1,901	0	37,523	126
1961	1	37,543	27,516	613,283	1,334	24,746	1,875	0	6,898	3,764
	2	32,551	15,634	4,773	2,780	0	1,660	0	43,841	11,356
1962	1	32,731	25,769	0	4,220	0	1,240	0	27,230	26,357
	2	18,450	20,855	0	3,232	0	1,034	0	28,960	14,056
1963	1	6,975	8,433	0	854	0	695	0	5,453	14,876
	2	10,574	9,253	130,000	0	28,000	261	0	12,380	9,268
1964	1	9,578	0	47,634	18,728	20,015	105	0	11,224	15,397
	2	3,857	22,188	89,643	1,637	24,704	17,076	0	9,058	7,849
1965	1	9,133	16,709	68,132	41,551	0	17,241	0	9,798	1,405
	2	2,083	14,325	69,134	58,875	0	24,453	0	9,405	1,093
1966	1	2,752	18,323	0	41,338	34,637	17,168	0	9,783	1,405
	2	2,176	28,526	0	45,519	34,099	39,216	0	9,172	1,279
1967	1	4,632	36,005	0	51,548	349,349	28,130	0	0	8,727
	2	4,833	49,874	0	78,360	130,700	39,441	0	0	1,533
1968	1	5,124	118,287	0	130,301	128,960	29,431	0	0	5,115
	2	11,162	116,137	48,399	140,473	155,537	53,598	0	50,000	136
1969	1	11,297	83,744	111,394	153,666	170,974	58,230	0	20,000	3,918
	2	12,104	174,161	115,213	185,568	192,798	75,667	0	15,000	1,614
1970	1	14,186	241,472	194,473	219,390	198,404	92,485	0	10,000	1,463
	2	10,613	241,000	207,293	259,358	184,385	116,491	0	5,000	1,002
1971	1	1,693	163,919	607,000	173,433	189,772	132,492	0	6,000	822
	2	2,003	186,849	271,000	192,304	14,599	71,705	0	5,000	3,478
1972	1	0	143	144,000	25,733	21,778	65,113	0	0	645
	2	0	0	17,000	16,981	41,235	12,492	0	0	572

Note 1: For the name of each firm, see Table 2-15.

Note 2: Cells in blue indicate that special depreciation amounts are recorded in other than surplus statements, those in reddish-brown are in surplus statements and those in orange are in both.

Table 2-13 Special Depreciation Amounts: Electric Machinery

(thousand yen)

Firm Number		158	159	160	161	162	163	164	165	166	167	168	169	170	171
1956	1	0	0	453,752	61,951	0	446	0	2,232	0	0	0	698	0	1,232
	2	0	0	159,306	24,391	0	0	0	7,471	0	0	0	1,256	0	12,125
1957	1	42,360	552	269,243	41,236	1,486	0	30,136	1,554	0	0	2,823	1,792	0	7,999
	2	44,897	619	548,856	121,243	0	0	43,391	39,885	0	0	3,341	2,309	0	3,457
1958	1	87,211	1,888	458,835	59,281	0	0	42,547	13,934	0	0	4,301	2,795	0	3,490
	2	136,476	3,377	366,633	56,226	0	0	22,161	n.a.	0	0	4,431	8,798	0	3,261
1959	1	286,821	6,003	455,091	64,852	0	0	17,303	32,938	0	0	4,260	5,035	0	8,069
	2	361,417	7,860	563,954	62,054	0	0	25,825	45,327	0	0	8,519	5,861	0	3,492
1960	1	174,238	10,249	708,162	100,957	0	0	22,142	68,159	0	0	10,897	38,200	0	3,146
	2	265,611	13,970	757,431	220,968	0	1,125	20,254	31,319	0	0	8,733	66,119	0	3,006
1961	1	230,558	28,661	994,377	170,719	0	0	34,076	34,675	0	0	10,752	32,582	0	3,870
	2	167,924	40,155	666,511	264,242	0	0	28,865	96,880	0	0	10,822	38,718	0	6,952
1962	1	122,835	32,839	1,107,744	201,526	0	0	27,742	76,816	0	0	9,230	41,466	0	8,375
	2	185,740	16,043	461,954	138,147	0	0	37,564	86,636	394	0	9,139	18,120	0	8,935
1963	1	105,941	11,215	296,405	150,967	0	0	46,340	45,010	1,518	0	9,541	11,677	0	9,741
	2	83,896	11,557	588,466	136,914	0	0	41,920	33,930	2,120	0	4,505	8,194	0	14,235
1964	1	30,805	14,018	613,323	106,612	0	0	55,075	199,273	1,904	0	9,461	11,306	0	23,572
	2	29,505	12,910	1,026,251	110,917	0	0	57,857	161,612	3,013	0	11,516	24,981	0	49,761
1965	1	25,811	13,253	849,423	145,464	0	0	59,555	200,944	5,241	0	16,835	17,710	0	54,101
	2	30,425	16,368	862,892	862	0	0	215,464	220,147	7,045	0	15,725	10,080	0	61,332
1966	1	140,720	14,770	1,335,236	180,557	0	0	124,649	294,422	9,511	0	16,115	7,612	0	69,107
	2	462,353	12,590	1,496,443	189,019	0	0	166,999	274,986	11,076	0	22,160	8,899	0	83,117
1967	1	954,379	9,589	2,378,353	252,363	0	0	372,534	512,876	12,480	0	19,914	11,901	0	72,669
	2	927,300	11,507	1,361,518	325,299	0	0	434,716	996,815	9,453	0	16,149	7,499	0	80,545
1968	1	1,512,216	14,591	1,702,391	471,588	0	0	75,568	234,404	8,042	0	16,372	13,146	0	79,752
	2	1,396,912	17,546	2,280,109	491,694	0	0	60,799	307,334	6,893	0	17,127	19,788	0	96,630
1969	1	1,841,169	25,760	2,574,366	647,979	0	0	100,089	629,972	5,815	0	27,993	14,368	0	91,322
	2	1,708,837	37,527	3,479,589	787,925	0	0	129,620	949,018	4,821	0	33,592	22,853	0	97,238
1970	1	2,207,410	37,133	4,808,105	858,664	0	0	123,869	1,270,896	3,641	0	35,569	13,142	0	121,862
	2	2,170,994	15,139	4,449,989	744,288	0	0	206,156	529,576	2,373	0	39,694	28,726	0	118,433
1971	1	1,150,000	29,090	3,961,000	625,000	0	0	255,150	490,387	5,176	0	23,173	14,764	0	135,161
	2	1,499,000	19,030	3,067,000	730,000	0	0	227,000	429,000	4,777	0	33,647	17,548	0	83,470
1972	1	234,000	13,910	1,846,000	307,000	0	0	181,000	259,000	4,297	0	2,234	3,890	0	110,710
	2	200,000	19,573	1,557,000	219,000	0	0	229,000	159,000	3,970	0	2,004	1,341	0	125,182

Note 1: For the name of each firm, see Table 2-15.

Note 2: Cells in blue indicate that special depreciation amounts are recorded in other than surplus statements, those in reddish-brown are in surplus statements and those in orange are in both.





**Table 2-15 The list of firms in Table 2**

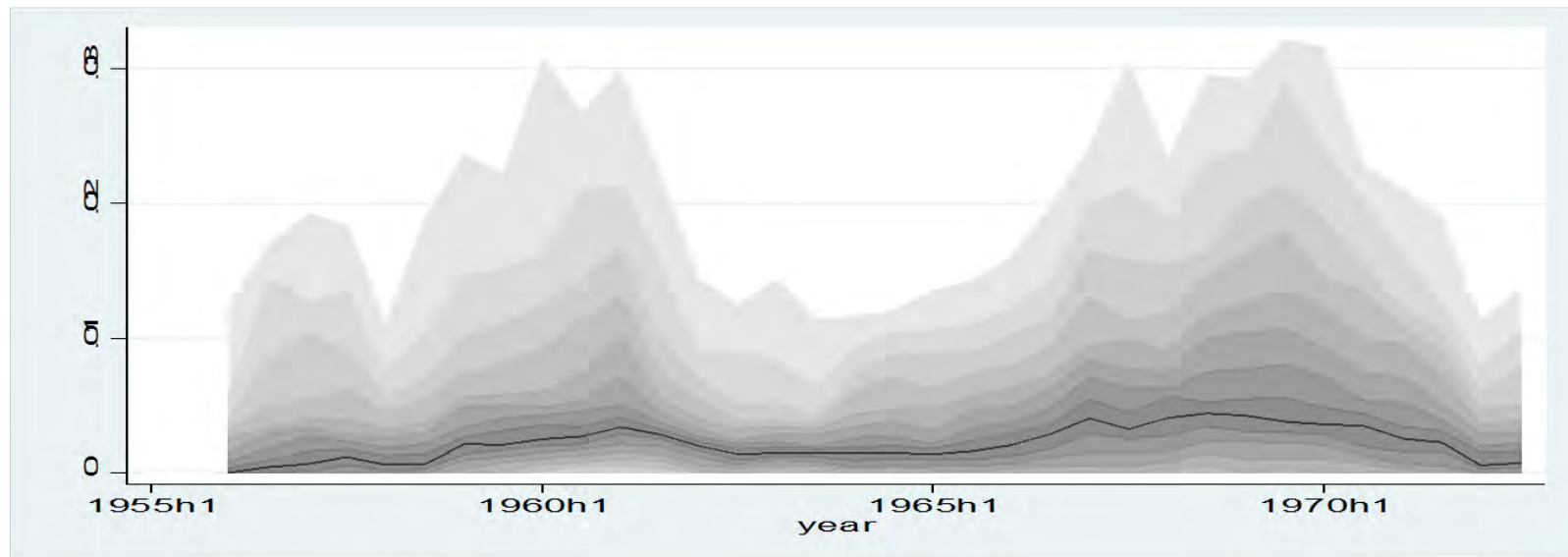
Firm number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50		
Name of each firm	Nippon Breweries	Kirin Breweries	Asahi Breweries	Taito Co.	Toyo Seito Co.	Meiji Sugar Mfg. Co.	Nissin Flour Milling Co.	Nippon Flour Milling Co.	Showa Sangyo Co.	Nikka Fats & Oils Co.	Nissin Oil Mills	Yoshihara Oil Mill	Meiji Milk Products Co.	Ajinomoto Co.	Meiji Seika Co.	Nippon Reizo K.K.	Kitanihon Spinning Co.	Kurashiki Spinning Co.	Kowa Spinning Co.	Shinnaigai Textile	Daiwa Spinning Co.	Nissin Cotton Spinning Co.	Hirata Spinning Co.	Fuji Spinning Co.	Daito Woolen Spinning & Weaving	Daido Worsted Mills	Chuo Keori K.K.	Japan Wool Textile Co.	Teikoku Sangyo Co.	Teikoku Rayon Co.	Toho Rayon Co.	Toyo Rayon Co.	Sakai Textile Mfg. Co.	Nippon Felt Co.	Suminoe Textile Co.	Fukusuke Tabi Co.	Nissan Forestry & Match Mfg. Co.	Kokoku Rayon & Pulp Co.	Sanyo Kokusaku Pulp Co.	Jujo Paper Mfg. Co.	Oji Paper Co.	Nippon Kakoh Seishi K.K.	Japan Paper Ind. Co.	Honshu Paper Mfg. Co.	Mitsubishi Paper Mills Co.	Kanzaki Paper Mfg. Co.	Taoka Chemical Co.	Sekisui Chemical Co.	Dainippon Celluloid Co.	Japan Carlit Co.		
Firm number	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100		
Name of each firm	Nippon Kayaku Co.	Japan Catalytic Chemical Ind. Co.	Sumitomo Bakelite Co.	Nittetsu Chemical Industrial Co.	Tohoku Metals & Chemicals Co.	Kanegafuchi Chemical Ind. Co.	Dainippon Ink and Chemicals	Toyo Linoleum K.K.	Showa Denko K.K.	New Japan Nitrogenous Fertilizer Co.	Ishihara Sangyo Kaisha	Teikoku Kako Co.	Tekkoshi Co.	Sumitomo Chemical Co.	Nitto Chemical Ind. Co.	Nippon Chemical Industrial Co.	Rinkagaku Kogyo Co.	Ibigawa Electric Ind. Co.	Sakai Chemical Industry Co.	Toyo Sanso K.K.	Nippon Sanso K.K.	Tokuyama Soda Co.	Nippon Soda Co.	Kao Soap Co.	Nippon Oils and Fats Co.	Sankyo Co.	Shionogi & Co.	Daichi Saiyaku Co.	Tanabe Seiyaku Co.	Yamanouchi Pharmaceutical Co.	Fujisawa Pharmaceutical Co.	Kansai Paint Co.	Shinto Paint Co.	Dai Nippon Toray Co.	Nippon Paint Co.	Shiseido Co.	Oriental Photo Industrial Co.	Koa Oil Co.	Showa Oil Co.	Daikyo Oil Co.	Toa Nanyo Kogyo K.K.	Mitsubishi Oil Co.	Daiichi Engineering Co.	Yokohama Rubber Co.	Meiji Seikaku	Asahi Glass Co.	Osaka Yogyo Cement Co.	Onoda Cement Co.	Daichi Cement Co.	Nihon Cement Co.		
Firm number	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150		
Name of each firm	Danto Co.	Ina Seito Co.	Toyo Toki Co.	Nippon Tokusyu Toyo Kaisha	Nippon Toki Kaisha	Nippon Gaiishi Kaisha	Osaka Yogyo Co.	Osaka Yogyo Fire Brick Co.	Kurosaki Yogyo Co.	Shinagawa Fire Brick Co.	Harima Fire Brick Co.	Daido Reinforced Concrete Work	Tokai Electrode Mfg. Co.	Nippon Carbon Co.	Kawasaki Steel	Kobe Steel Works	Sumitomo Metal Industries	Nippon Steel Tube Co.	Nippon Steel	Nakayama Steel Works	Japan Steel Works	Azuma Steel Works	Daido Steel Co.	Daido Coated Sheet Co.	Toyo Kohan Kaisha	Mitsubishi Steel Mfg. Co.	Nippon Koshu Steel Co.	Nippon Yakin Kogyo Co.	Yodogawa Steel Works	Nippon Kinzoku Co.	Tokyo Drop Forging Co.	Kurimoto Iron Works	Nippon Light Metal Co.	Ikegai Iron Works	Okuma Machinery Works	Toyota Machine Works	Sumitomo Machinery Co.	Tokyo Machinery Works	Mitsubishi Chemical Machinery Mfg.	Tsukishima Kikai Co.	Ishii Iron Works	Ebara Mfg. Co.	Osaka Kiko Co.	Niigata Engineering Co.	Riken Piston Ring Industrial Co.	Ricoh	Fujikoshi Steel Ind.	Koyo Seiko Co.	K. Hattori & Co.	Citizen Watch Co.		
Firm number	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190												
Name of each firm	Canon Camera Co.	Nippon Kogaku K.K.	Chiyoda Optical & Fine Mechanical Co.	Olympus Optical Co.	Tokyo Optical Co.	Shimazu Seisakusho	Aichi Tokai Denki Co.	Tokyo Shibaura Electric Co.	Shinko Electric Co.	Hitachi	Mitsubishi Electric Mfg. Co.	Toyo Denki Seizo K.K.	Nippon Electric Ind. Co.	Matsushita Electric Ind. Co.	Nippon Electric Co.	Nippon Signal Co.	Kyosan Electric Mfg. Co.	Yokogawa Electric Works	Hitachi Koki Co.	Toko Electric Corp.	Matsushita Electric Works	Nissan Motor Co.	Isuzu Motor Co.	Toyota Motor Co.	Hino Motors	Toyo Kogyo K.K.	Fuji Heavy Industries	Aichi Machine Ind. Co.	Nippon Densetsu Co.	Toyota Auto Body Co.	Kayaba Ind. Co.	Tokyo Kiki Engineering Co.	Diezel Kiki K.K.	Ishikawajima Harima Heavy Industries	Kawasaki Dockyard Co.	Namura Shipbuilding Co.	Mitsubishi Heavy Industries	Hakodate Dock Co.	Araya Kogyo	Miyata Works												

Table 3

## Amounts of special depreciation and lending by the JDB

	thousand yen	thousand yen	per cent
	Special Depreciation	Lending from the JDB	the share of Special Depreciation
1956-72	905,716,822	164,616,773	84.6

**Figure 4 Distribution of ratio of total special depreciation amounts to tangible fixed assets**

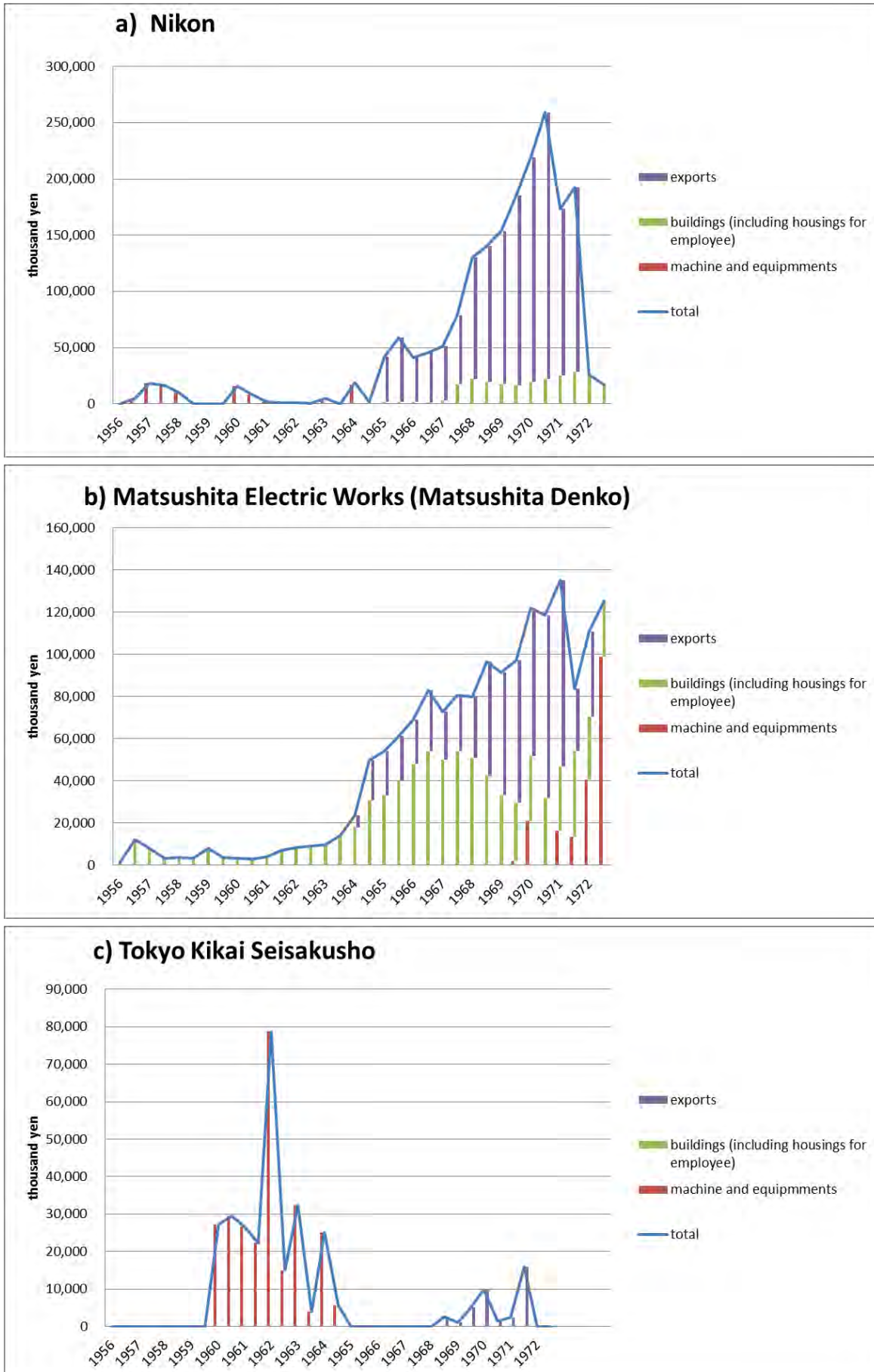


Note 1: The solid line indicates the median.

Note 2: Each band contains five per cent of samples. The fringe of palest grey zone shows 80 percentile.

Sources: See the text.

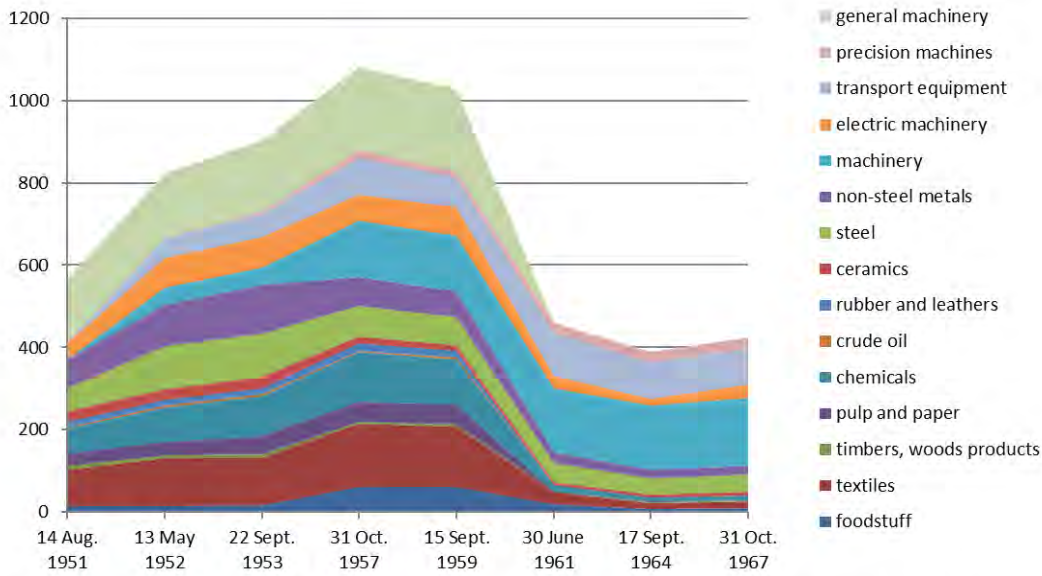
**Figure 5 Special depreciation amounts by subject**



Sources: Financial statement reports for each firm

**Figure 6**

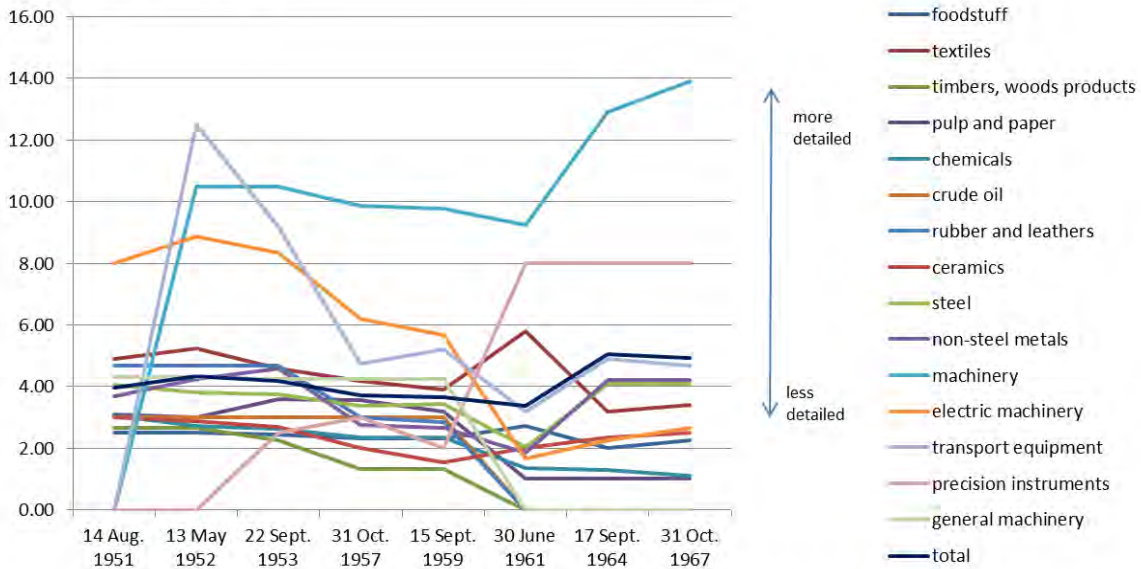
The number of designated machines subject to special depreciations by industry



Sources: Notifications of the Ministry of Finance; No. 1018, 14 Aug. 1951; No. 839, 13 May 1952; No. 1807, 22 Sept. 1953; No. 234, 31 Oct. 1957; No. 235, 31 Oct. 1957; No. 169, 15 Sept. 1959; No. 185, 30 June 1961; No. 186, 30 June 1961; No. 316, 17 Sept. 1964; No. 114, 31 Oct. 1967.

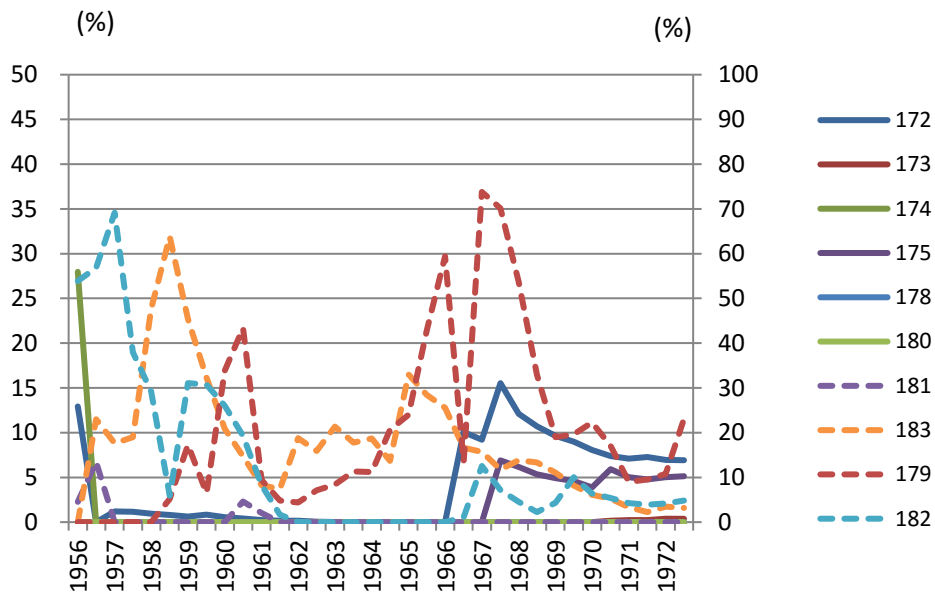
**Figure 7**

The share of sub-categories of designated machines for special depreciation to main categories by industry



Sources: Notifications of the Ministry of Finance; No. 1018, 14 Aug. 1951; No. 839, 13 May 1952; No. 1807, 22 Sept. 1953; No. 234, 31 Oct. 1957; No. 235, 31 Oct. 1957; No. 169, 15 Sept. 1959; No. 185, 30 June 1961; No. 186, 30 June 1961; No. 316, 17 Sept. 1964; No. 114, 31 Oct. 1967.

**Figure 8 Share of borrowing outstanding from the JDB to total long-term borrowing for automobile and automobile parts industries**



Sources: See the text.

Note 1. Solid line shows automobile industry, dotted line does automobile parts industry.

Note 2. Right hand scale is for sample number 179 and 182, left hand scale is for others.

Table 4-1. Probable Factors Affecting Amount of Special Depreciation: 1956:Q1 to 1972:Q2

		Fixed Effects				Random Effects			
<i>Estimated Cases</i>		1-1-1	1-1-2	1-1-3	1-1-4	1-1-1	1-1-2	1-1-3	1-1-4
<i>Independent Variables t</i>	Constant	0.01 <9.89>	0.01 <11.20>	0.01 <7.52>	0.01 <8.99>	0.01 <5.16>	0.01 <5.52>	0.01 <6.55>	0.01 <7.93>
	Ratio of borrowing from JDB to total long-term borrowing	0.00 <0.88>	0.00 <0.85>	0.00 <0.71>	0.00 <0.83>	0.01 <1.16>	0.01 <1.15>	0.01 <1.17>	0.01 <1.13>
	Capital-to-labor ratio	-0.03 <-2.38**>	-0.03 <-2.53**>	-0.03 <-2.43**>	-0.03 <-2.31**>	-0.03 <-3.00***>	-0.03 <-2.98***>	-0.03 <-2.92***>	-0.03 <-2.79***>
	Number of designated machines with general machinery	-0.00 <-0.70>				-0.00 <-0.32>			
	Number of designated machines without general machinery		-0.01 <-1.41>				0.00 <0.49>		
			-0.51 <-1.81*>				0.10 <0.36>		
				-0.35 <-1.48>				0.36 <1.67*>	
<i>Estimated Cases</i>		1-2-1	1-2-2	1-2-3	1-2-4	1-2-1	1-2-2	1-2-3	1-2-4
<i>Independent Variables t-1</i>	Constant	0.01 <10.77>	0.01 <12.33>	0.01 <6.70>	0.01 <5.07>	0.01 <5.54>	0.01 <5.51>	0.01 <5.31>	0.01 <4.79>
	Ratio of borrowing from JDB to total long-term borrowing	0.01 <1.01>	0.00 <0.98>	0.00 <0.75>	0.00 <0.93>	0.01 <1.18>	0.01 <1.20>	0.01 <1.19>	0.01 <1.20>
	Capital-to-labor ratio	-0.03 <-2.78***>	-0.05 <-3.72***>	-0.05 <-3.23***>	-0.04 <-3.07***>	-0.04 <-4.36***>	-0.04 <-4.17***>	-0.05 <-3.70***>	-0.04 <-3.48***>
	Number of designated machines with general machinery	0.00 <0.45>				0.00 <0.71>			
	Number of designated machines without general machinery		-0.02 <-2.72**>				-0.00 <-0.31>		
			-0.85 <-2.46**>				-0.17 <-0.69>		
				-0.69 <-1.46>				0.16 <0.63>	
<i>Estimated Cases</i>		1-3-1	1-3-2	1-3-3	1-3-4	1-3-1	1-3-2	1-3-3	1-3-4
<i>Independent Variables t-2</i>	Constant	0.01 <10.32>	0.01 <11.78>	0.01 <6.50>	0.01 <4.54>	0.01 <5.08>	0.01 <5.34>	0.01 <5.09>	0.01 <4.24>
	Ratio of borrowing from JDB to total long-term borrowing	0.00 <0.62>	0.00 <0.57>	0.00 <0.34>	0.00 <0.56>	0.00 <0.84>	0.01 <0.87>	0.01 <0.86>	0.00 <0.85>
	Capital-to-labor ratio	-0.03 <-2.87***>	-0.05 <-3.65***>	-0.05 <-3.05***>	-0.04 <-2.76***>	-0.03 <-3.69***>	-0.05 <-3.79***>	-0.05 <-3.37***>	-0.04 <-2.89***>
	Number of designated machines with general machinery	0.00 <0.65>				0.00 <0.87>			
	Number of designated machines without general machinery		-0.02 <-4.82***>				-0.01 <-1.19>		
			-0.96 <-2.76***>				-0.25 <-0.96>		
				-0.51 <-1.07>				0.27 <1.08>	

Note 1: t-Statistics are in parentheses.

Note 2: Figures in italics indicate results rejected by Hausman tests.

Note 3: Coefficients for borrowing from JDB and designated machines multiplied by 1,000 from original figures.

\*Significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Table 4-2. Probable Factors Affecting Amount of Special Depreciation: 1956:Q1 to 1963:Q2

		Fixed Effects				Random Effects			
<i>Estimated Cases</i>		2-1-1	2-1-2	2-1-3	2-1-4	2-1-1	2-1-2	2-1-3	2-1-4
<i>Independent Variables t</i>	Constant	0.01 <3.94>	0.01 <4.89>	0.00 <1.39>	0.01 <2.61>	0.01 <2.63>	0.01 <2.84>	0.01 <0.30>	0.00 <2.18>
	Ratio of borrowing from JDB to total long-term borrowing	0.00 <0.56>	0.00 <0.55>	0.00 <0.67>	0.00 <0.54>	0.01 <1.04>	0.01 <0.98>	0.01 <1.04>	0.01 <0.81>
	Capital-to-labor ratio	-0.03 <-0.68>	-0.02 <-0.54>	0.00 <0.09>	-0.03 <-0.49>	-0.03 <-0.83>	-0.01 <-0.51>	0.03 <0.93>	0.02 <0.75>
	Number of designated machines with general machinery	0.00 <0.44>				0.00 <0.62>			
	Number of designated machines without general machinery		0.03 <2.25**>				0.04 <3.08***>		
Ratio of sub-categories of designated machines to main categories with general machinery			1.06 <1.89*>				1.76 <3.11***>		
Ratio of sub-categories of designated machines to main categories without general machinery				0.46 <0.75>				1.33 <2.44**>	
<i>Estimated Cases</i>		2-2-1	2-2-2	2-2-3	2-2-4	2-2-1	2-2-2	2-2-3	2-2-4
<i>Independent Variables t-1</i>	Constant	0.01 <7.01>	0.01 <6.86>	0.01 <3.24>	0.01 <4.05>	0.01 <4.52>	0.01 <3.25>	0.00 <2.00>	0.00 <2.18>
	Ratio of borrowing from JDB to total long-term borrowing	0.00 <0.82>	0.00 <0.87>	0.00 <0.89>	0.00 <0.89>	0.01 <1.08>	0.01 <1.08>	0.01 <1.14>	0.01 <1.26>
	Capital-to-labor ratio	-0.04 <-1.22>	-0.08 <-1.89*>	-0.09 <-1.68*>	-0.11 <-2.13**>	-0.05 <-2.55***>	-0.06 <-2.46**>	-0.04 <-1.55>	-0.04 <-1.40>
	Number of designated machines with general machinery	0.01 <2.46**>				0.01 <3.13***>			
	Number of designated machines without general machinery		0.02 <1.81*>				0.03 <2.14**>		
Ratio of sub-categories of designated machines to main categories with general machinery			0.08 <0.18>				1.07 <2.80***>		
Ratio of sub-categories of designated machines to main categories without general machinery				-0.38 <-0.79>				0.92 <2.36**>	
<i>Estimated Cases</i>		2-3-1	2-3-2	2-3-3	2-3-4	2-3-1	2-3-2	2-3-3	2-3-4
<i>Independent Variables t-2</i>	Constant	0.00 <6.26>	0.01 <4.99>	0.01 <2.99>	0.01 <3.03>	0.00 <3.58>	0.01 <2.86>	0.00 <2.07>	0.00 <1.48>
	Ratio of borrowing from JDB to total long-term borrowing	0.00 <0.39>	0.00 <0.47>	0.00 <0.47>	0.00 <0.49>	0.01 <0.78>	0.01 <0.81>	0.01 <0.87>	0.01 <0.70>
	Capital-to-labor ratio	-0.00 <-0.12>	-0.06 <-1.06>	-0.08 <-1.04>	-0.07 <-1.12>	-0.04 <-1.20>	-0.06 <-1.52>	-0.05 <-1.29>	-0.03 <-0.71>
	Number of designated machines with general machinery	0.01 <4.32***>				0.02 <5.68***>			
	Number of designated machines without general machinery		0.02 <1.38>				0.03 <1.90*>		
Ratio of sub-categories of designated machines to main categories with general machinery			-0.22 <-0.41>				0.89 <2.24**>		
Ratio of sub-categories of designated machines to main categories without general machinery				-0.13 <-0.26>				1.16 <2.72***>	

Note 1: t-Statistics are in parentheses.

Note 2: Figures in italics indicate results rejected by Hausman tests.

Note 3: Coefficients for borrowing from JDB and designated machines multiplied by 1,000 from original figures.

\*Significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.



Table 4-3. Probable Factors Affecting Amount of Special Depreciation: 1964:Q1 to 1972:Q2

		Fixed Effects		Random Effects	
<i>Estimated Cases</i>		3-1-1	3-1-3	3-1-1	3-1-3
<i>Independent Variables t</i>	Constant	<i>-0.00</i> <-0.21>	<i>0.00</i> <0.85>	0.01 <3.26>	0.00 <4.21>
	Ratio of borrowing from JDB to total long-term borrowing	<i>-0.01</i> <-0.79>	<i>-0.00</i> <-0.79>	-0.01 <-1.16>	-0.01 <-1.13>
	Capital-to-labor ratio	<i>-0.01</i> <-0.45>	<i>-0.01</i> <-0.50>	-0.01 <-1.03>	-0.01 <-0.99>
	Number of designated machines	<i>0.25</i> <2.00**>		0.06 <2.38**>	
	Ratio of sub-categories of designated machines to main categories		<i>1.40</i> <1.56>		0.91 <2.21**>
<i>Estimated Cases</i>		3-2-1	3-2-3	3-2-1	3-2-3
<i>Independent Variables t-1</i>	Constant	<i>0.01</i> <1.62>	<i>0.00</i> <4.24>	0.01 <3.78>	0.01 <4.63>
	Ratio of borrowing from JDB to total long-term borrowing	<i>-0.01</i> <-1.52>	<i>-0.01</i> <-1.11>	-0.01 <-1.40>	-0.01 <-1.28>
	Capital-to-labor ratio	<i>-0.02</i> <-1.25>	<i>-0.02</i> <-1.44>	-0.02 <-2.08**>	-0.02 <-2.13**>
	Number of designated machines	<i>0.08</i> <0.80>		0.05 <2.00**>	
	Ratio of sub-categories of designated machines to main categories		<i>0.99</i> <2.58***>		0.86 <2.15**>
<i>Estimated Cases</i>		3-3-1	3-3-3	3-3-1	3-3-3
<i>Independent Variables t-2</i>	Constant	<i>0.01</i> <3.48>	<i>0.00</i> <3.98>	0.01 <3.94>	0.01 <3.91>
	Ratio of borrowing from JDB to total long-term borrowing	<i>-0.02</i> <-2.17**>	<i>-0.01</i> <-1.37>	-0.01 <-1.81*>	-0.01 <-1.74*>
	Capital-to-labor ratio	<i>-0.03</i> <-1.89*>	<i>-0.03</i> <-2.14**>	-0.03 <-2.56**>	-0.03 <-2.65***>
	Number of designated machines	<i>-0.01</i> <-0.17>		0.04 <1.63>	
	Ratio of sub-categories of designated machines to main categories		<i>1.12</i> <3.04***>		0.92 <2.39**>

Note 1: t-Statistics are in parentheses.

Note 2: Figures in italics indicate results rejected by Hausman tests.

Note 3: Coefficients for borrowing from JDB and designated machines multiplied by 1,000 from original figures.

\*Significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Table 4-4. Probable Factors Affecting Amount of Special Depreciation with Ratio of Borrowing from ExIm Bank to Total Long-Term Borrowing: 1964:Q1 to 1972:Q2

		Fixed Effects		Random Effects	
<i>Estimated Cases</i>		3-1-1	3-1-3	3-1-1	3-1-3
<i>Independent Variables t</i>	Constant	-0.00 <-0.36>	0.00 <2.18>	0.01 <7.11>	0.00 <5.30>
	Ratio of borrowing from ExIm Bank to total long-term borrowing	0.44 <1.74*>	0.44 <1.73*>	-0.45 <1.78*>	0.45 <1.80*>
	Capital-to-labor ratio	-0.01 <-0.75>	-0.01 <-0.78>	-0.01 <-1.40>	-0.01 <-1.28>
	Number of designated machines	0.24 <4.52***>		0.06 <4.59***>	
	Ratio of sub-categories of designated machines to main categories		0.12 <3.29***>		0.86 <5.29***>
<i>Estimated Cases</i>		3-2-1	3-2-3	3-2-1	3-2-3
<i>Independent Variables t-1</i>	Constant	0.01 <3.16>	0.00 <4.53>	0.01 <7.95>	0.01 <6.15>
	Ratio of borrowing from ExIm Bank to total long-term borrowing	-0.11 <-0.71>	-0.07 <-0.43>	-0.11 <-0.66>	-0.07 <-0.41>
	Capital-to-labor ratio	-0.02 <-1.88*>	-0.02 <-2.05**>	-0.02 <-2.55**>	-0.02 <-2.49**>
	Number of designated machines	0.07 <1.67*>		0.05 <3.83***>	
	Ratio of sub-categories of designated machines to main categories		0.89 <2.99***>		0.80 <5.15***>
<i>Estimated Cases</i>		3-3-1	3-3-3	3-3-1	3-3-3
<i>Independent Variables t-2</i>	Constant	0.01 <5.62>	0.00 <4.97>	0.01 <8.51>	0.01 <6.25>
	Ratio of borrowing from ExIm Bank to total long-term borrowing	-0.22 <-1.22>	-0.14 <-0.76>	-0.20 <-1.11>	-0.14 <-0.79>
	Capital-to-labor ratio	-0.03 <-2.62**>	-0.03 <-2.81**>	-0.03 <-3.20***>	-0.03 <-3.11***>
	Number of designated machines	-0.01 <-0.34>		0.04 <3.20***>	
	Ratio of sub-categories of designated machines to main categories		1.04 <4.10***>		0.86 <5.77**>

Note 1: t-Statistics are in parentheses.

Note 2: Figures in italics indicate results rejected by Hausman tests.

Note 3: Coefficients for borrowing from ExIm Bank and designated machines multiplied by 1,000 from original figures.

\*Significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Table 5 Effects of firm sizes on special depreciation

	1st half of 1956	2nd half of 1960	2nd half of 1972
Constant	0.39 <3.44>	0.91 <5.72>	0.46 <7.45>
Capital	0.09 <1.94*>	0.04 <2.36**>	-0.00 <-0.47>
Constant	0.39 <3.50>	0.95 <5.38>	0.46 <6.97>
Sales	0.02 <2.05**>	0.01 <1.78*>	0.00 <0.06>
Constant	0.60 <4.64>	0.82 <4.82>	0.37 <6.08>
Number of employees	-0.00 <-0.54>	0.00 <1.45>	0.00 <0.77>

Note 1: t-Statistic in parenthesis.

Note 2: The unit for dependent variables (special depreciation normalised by capital stocks) is per cent. That for capital and sales is million yen.

\*significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Table 6 -1. Effects of export dependency and exports on special depreciations:  
estimates by cross-sectional data for 1971

	export dependency	exports
Constant	0.18 <3.78>	0.62 <6.63>
Export variables	82.81 <21.38***>	0.00 <2.61**>

Note 1: t-Statistic in parenthesis.

Note 2: The units for dependent variables (special depreciations normalised by capital stocks) and export dependency are per cent.  
That for export amounts is million yen.

\*significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Table 6 -2. Effects of export dependency and exports on special depreciation:  
estimates by panel data between 1967 and 1971

	export dependency			exports		
	OLS (pooling data)	Fixed Effects	Random Effects	OLS (pooling data)	Fixed Effects	Random Effects
Constant	0.28 <3.08>	<i>1.35</i> <6.36>	0.61 <3.43>	1.24 <16.64>	<i>1.37</i> <19.22>	1.32 <7.61>
export variables	0.07 <15.20***>	<i>-0.00</i> <-0.05>	0.05 <5.93***>	0.00 <3.25***>	<i>-0.00</i> <-0.67>	0.00 <0.32>

Note 1: t-Statistic in parenthesis.

Note 2: The units for dependent variables (special depreciations normalised by capital stocks) and export dependency are per cent.  
That for exports is million yen.

Note 3: Figures in italics indicate results rejected by Hausman tests.

\*significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.