Does government promote or hinder capital accumulation? Evidence from Japan's high-growth era

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Abstract

Governments occasionally intervene in private sector economic activities to promote specific industries and enhance economic growth. During Japan's high-growth era, the government used various policy tools to intervene in private sector capital investments. We examine the effects of these policy tools on capital accumulation. We employ firm-level data sets, identify policy actions using historical records and find that they were applied intensively to specific sectors and firms and that government intervention partially affected those firms' capital investment decisions. For some industries, such as steel, chemicals and textiles, investment-promoting policy tools resulted in accelerating capital investments or relatively higher resource allocations of capital to labour. There were also cases in which policy actions aimed at curbing investments resulted in slower investments or lower allocations of capital to labour, but the effects were weak and small. Discouraging policy tools had contradictory effects on some industries and enhanced capital investments. The latter phenomenon was observed when the government attempted to control private sector capital investments based on the current share of production or production capacities.

JEL classification: E22, N15, O25
Keywords: capital accumulation, industrial policy, capital distortion, high-growth era

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1. Introduction

Public entities often intervene in private sector economic activities for various reasons, and economic growth tends to be the motivating factor behind such interventions. The effects of industrial policy—defined as the government's actions to intervene in private economic activities such that they affect industrial structure[1]—on economic growth have been examined for decades in a significant number of studies. Some previous studies were sceptical about the overall effects of industrial policy on economic growth. For example, the World Bank (1994) found that industrial policy generally increased growth rates by less than one per cent. Despite such negative views, the role of government in enhancing economic growth has been a regular theme in policy debate.[2]

To conduct effective policies, it is necessary to examine the effects of each policy intervention tool. Governments attempting to intervene in industrial activities frequently rely on a wide range of methods, from direct instructions to incentive mechanisms.

The results of empirical studies on the effects of such policy tools on targeted industries are mixed. For example, Beason and Weinstein (1996) reported that industrial policy tools in Japan affected growth, capital investments and outputs, but they did not increase productivity. Noland (1993) found that they affected trade specialisation. Lee (1993) concluded that industrial policy affected the industrial structure through scale economies, whereas Noland and Pack (2003) noted that considering the aggregate data sets used, this outcome through the calibration of a general equilibrium model was not plausible. Yamawaki (1988) stressed that the decisions of each firm dominated capital investments in the steel industry in Japan during the high-growth era, even though that industry is known as a target of an aggressive industrial policy. Tsuruta (1988) stated that policies were influential in the

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[1] The World Bank (1993) distinguished industrial from trade policy and defined it as 'government efforts to alter [the] industrial structure to promote productivity-based growth. Productivity-based growth may derive from learning, technological innovation, or catching up to international best practice' (p. 304). The definition by Komiya (1984) states, 'the central mission of industrial policies is to solve market failures regarding resource allocations' (p. 5). Okuno and Suzumura (1986) stated, 'industrial policy is defined here as the totality of governmental policies undertaken with the object of changing the allocation of resources among industries from what it would otherwise be, or intervening in the industrial organisation of a specific industry, in order to enhance a country's economic welfare when unrestricted functioning of the competitive market mechanism is seen to fail in serving that end' (p. 24). Noland and Pack (2003) stated, 'we define selective intervention or industrial policy briefly as an effort by a government to alter the sectorial structure of production towards sectors it believes offer greater respect'.

[2] The Industry Committee of the OECD compiled a report about Japan's industrial policy after sending a mission to Japan in 1972. In it, the chairman of the committee states, 'industrialised, as well as developing, countries have reasons to look with inquisitive interest at Japanese industrial policy. Many governments would like to derive—or ought to seek—inspiration and guidance in the Japanese experience when formulating their own policies' (Organisation for Economic Co-operation and Development, 1972, p. 5). The report concludes, 'in summary, it is clear that Japan's outstanding economic performance since the war is attributed largely to the close, purposeful co-operation between government, industry, the financial institutions and labour. Under MITI's guidance, the nation's productive resources have been effectively marshalled towards the achievement of national economic objectives, leading to build-up of internationally competitive industrial capacity in certain sectors' (Organisation for Economic Co-operation and Development, 1972, p. 170).

petrochemical industries because the ceiling for capital investments was binding on the surface but might have had effects that contradicted the original intent of the policy goal because they provoked unnecessary investments. Kiyota and Okazaki (2013) found that the effects of removing foreign exchange quotas, which occasionally worked as industrial policy tools, did not affect productivity, concluding that the effects of industrial policy in the 1960s were fairly small. Ogura and Yoshio (1985) estimated the amount by which interest payments and taxes reduced inexpensive public lending and special depreciation for capital investments. They concluded that government support to the shipping, electricity and shipbuilding industries had a crucial effect on capital investments, whereas support to other industries increased capital stock by only a small percentage during a recession.

However, the debate on the effectiveness of policies with respect to targeted industries' investments has yet to be settled because the entire industrial policy system is complicated (Komiya 1988). It frequently seems impossible to identify the effect of each detailed policy action taken by the government among the group of policy tools utilised at the same time in the same industry. For example, adopting measures that have opposite effects on overall investments, such as simultaneously allowing only designated machines for work and subsidising the introduction of new machines with new technology for a particular industry, makes it difficult to scale the effects of each tool.

This study aims to re-examine the contribution of government actions that intervene in private sector investment decisions regarding the accumulation of capital stock using newly constructed data sets at the firm level during the high-growth era in Japan, information on policy actions extracted by employing the narrative approach and an indicator showing resource-allocation bias. Previous studies, such as those by Noland (1993), Lee (1993) and Beason and Weinstein (1996), relied only on macro-level data sets for empirical studies. However, policies are usually detailed for a targeted industry and, thus, tests using macro-level data sets cannot effectively capture its effect. In contrast, we believe applying firm-level data will enable us to scale the effects quantitatively and more accurately. Although Kiyota and Okazaki (2013) were among the few to use micro-level data, they examined the effects of policies on productivity rather than on capital stock. Another issue encountered in previous studies is the endogenous bias problem. Some proxy variables for policy action in previous studies could be both a cause and a result of a policy action, and the selection of such a variable could raise endogenous bias problems. The narrative approach, following Romer and Romer (2007), allows us to avoid this problem. In addition, the continual upward trend in capital investments may have been the cause of ambiguous results in empirical studies because such a trend can mask the negative effects of policies on capital accumulation. Hsieh and Klenow (2009) focused on the effects of government interventions on relative resource allocations, estimating the extent of relative allocation of capital against labour in an industry in which intervention was prevalent and comparing it with an industry that was subject to no such intervention. The ratio between the marginal cost of capital and that of labour shows whether there was a 'misallocation' of resources caused by external factors in an industry.

As a first step, it is essential for the public sector to test the results of government interventions in capital stock if it wants to achieve economic growth through the use of policies. We take Japan's high-growth era as an example because it helps showcase policy tools for government intervention, from the formally institutionalised intervention to informal moral suasions and from the heavily controlled interventionist and paternalistic policy tools to those that rely on market mechanisms.

The remainder of this paper is organised as follows. Section 2 provides a historical background of Japan's industrial policy, primarily during the 1950s and 1960s. Section 3 investigates the effect of policy actions on the capital accumulation of sample industries. Section 4 concludes the paper.

2. Historical Background

2.1 Japan's high growth, capital investments and industrial policy

In the 1950s and 1960s, Japan achieved high economic growth. The country's GNP increase between 1955 and 1971 averaged 9.3 per cent per annum. The GNP components that contributed to such rapid growth were capital investments and private consumption (Figure 1).

[Figure 1]

Capital stocks expanded by more than five per cent per annum in the late 1950s and enjoyed double-digit growth during the 1960s, according to figures from Long-Term Economic Statistics (Ohkawa et al. 1966). The leading industries that contributed to this rapid growth of capital investments were steel, which accounted for more than one-third of total investments among large firms, and chemicals and transport equipment, which accounted for approximately 10 per cent during the high-growth era. Textiles, paper and pulp also occasionally accounted for a double-digit share (Table 1).

[Table 1]

One of the driving forces behind this rapid capital development was said to be government policies, represented by the directions of the Ministry of Trade and Industry (MITI). These aggressive policies were dubbed 'Japan Inc'. strategies. Through them, the government was believed to play a significant role in economic growth, although the extent of its contribution varies across studies.

The goals and means of industrial policy changed over time. Policies implemented immediately following the Second World War were designed for reconstruction. Because of the shortages of crucial resources and funds, the occupation authorities and the Japanese government directly controlled resource allocation. Directives and guidance were used frequently to control the

economy (Komiya 1988). The major economic policy-making tools used were material rationing, price controls and loans by the Reconstruction Finance Bank, which was owned by the government (Kosai 1988).

Once the economic recovery was on track in the early 1950s, policy goals and their means of implementation shifted. Japan experienced chronic current-account deficits during this period. The country relied on the temporary military demands caused by the Korean War, which were considered a type of aid from the United States. The primary purpose of the industrial policy at the time was to achieve economic independence aimed at maintaining external balances without temporary military demands (Takeda 1989). The intermediate target was the rationalisation of industry, particularly through the provision of inexpensive coal and steel, which were considered prerequisites for continuing economic growth. This method was known as the Priority Production System; under it, the coal and steel sectors were given top priority in resource allocation (Kosai 1988).

Around this onset of the high-growth period, one of the goals of the previous period—independence from military demands—was perceived as having been reached to some extent (Takeda 1989). The new goals were accelerating growth, raising living standards and achieving full employment. Strict controls on economic activities, such as trade, were eventually eased, and the intermediate goal was to improve the competitiveness of Japanese industries. The primary aim immediately following independence from the Allied Powers in 1951 was export promotion; however, from the mid-1950s, the focus shifted to promoting investments. Increases in exports were gradually seen as having been realised because of investments (Takeda 1989). To bring about their rationalisation, the targeted industries were given public financial support, such as exemptions from import tariffs and loans from the government and public financial institutions at relatively low interest rates. At the same time, the government took the initiative of developing medium-term investment plans for those industries considered important. The prevailing thought in government was that allowing private firms to decide on their investments was insufficient as a means to avoid recession, and interventions by the government in the decision-making process of the private sector were justified. It was considered necessary to promote investment through the provision of incentives to important industries. The major targeted industries for rationalisation were coal, steel, copper mines, chemical fibres and electricity (Takeda 1989). The steel industry was subject to three government-led rationalisation plans (Kosai 1988). The textiles industry was also sometimes viewed as a priority industry for industrial promotion (Takeda 1989).

Changes in the international environment during the 1960s led to a shift in the goals and methods of industrial policy. Improving Japanese industries' competitiveness to a level sufficient for survival in international markets was prioritised in economic policy (Tsuruta 1988). Trade liberalisation continued globally during this period. In such an environment, Japan started subjecting itself to obligations under Article 8 of the Agreement of the International Monetary Fund (IMF) in

1964, and it was required to abolish all types of controls on current-account transactions. Japan became a member of the Organisation for Economic Co-operation and Development (OECD) in 1964. Although the IMF allowed its members to impose restrictions on capital-account transactions, the OECD required free capital transactions for its members and asked Japan to liberalise its direct investments in 1965 (Washizawa 1991). Joining such international organisations meant integrating the Japanese economy with international markets and receiving less protection from the government. Domestic firms were expected to face fiercer competition once restrictions protecting domestic industries were lifted. Improving the competitiveness of important industries became the goal of economic policy. Steel was considered an export industry and the basis of other export industries. Machineries and chemicals were expected to increase export volumes and thus were also treated as important (Takeda 1989).

To adapt to changes in international environments, the government pursued the liberalisation of economic activity. Direct policy tools, such as foreign-exchange rationing, were seen as ineffective. Industrial policy tools changed accordingly; direct-control policy tools, such as setting investment ceilings, gave way to indirect means to control incentives that relied on market mechanisms (Takeda 1989). Except for designated cartels, the major tool of industrial policy was inexpensive lending by the Japan Development Bank (JDB) and other public financial institutions. Many of the policy initiatives in the general machinery, electric machinery and transport equipment industries—the leading industries from the late 1960s described in the official history of the MITI—were funded by the JDB or other public financial institutions. Even for the steel industry—one of the major targets of intensive intervention by the government—only three out of eight policies called for direct means, and the others represented inexpensive funding to rationalise the industry. The JDB had access to the Fiscal Investment and Loan Programme, which collected public deposits through the Postal Savings system and mobilised the public pension system's resources. In addition, given its higher credibility through its government guarantee as opposed to a private bank, the JDB could raise money inexpensively, even in overseas markets. For instance, the JDB could float bonds in New York in 1961. Its role was to supplement private funds, and its lending practices were not very different from commercial lending in terms of borrower credibility. The interest rates offered by the JDB could be lower than those of private banks, but they had to be at a level sufficient to cover funding costs, operational costs and losses caused by its lending activities (Hidaka 2009). Following an era of high growth, the content of industrial policy changed significantly (Komiya 1988).

2.2 Institutional features of industrial policy

Policies in the 1960s at the time tended to be planned and implemented by sector rather than covering all industries. One of the reasons for this was the role played by the institutions. The major controller of industrial policy was the MITI. Primary decision-making bodies within the MITI were

bureaus for each industry (industrial branch bureau). For example, the steel division in the heavy and chemical industry bureau dealt with matters related to the steel industry. The policies planned by a bureau covered only the sectors over which the bureau had administrative powers. Inter-sector policies were sometimes made, but this was not widespread.

The other major player was the Fair Trade Commission (FTC) because the policy instruments frequently took the form of permissions from the commission to form designated cartels or to coordinate capital investment plans and become exempt from the purview of antitrust legislation. Occasionally, formal legislation was behind such actions, such as the Machinery Industry Promotion Temporary Measures Law (MIPTM Law), which was passed by the Diet in 1956; this law contained a clause permitting cartels as an exception to the antitrust law.

Credits by the JDB and the Japan Finance Corporation for Small and Medium Enterprise (JFCSME) were the major tools aimed at encouraging investment. Some lending schemes were backed by law. For example, based on the MIPTM Law, machine tool firms could borrow from the JDB at relatively lower rates. The Electric Machinery Industry Promotion Temporary Measures Law, similar to the one for general machineries, was enacted in 1957.

Councils set up to coordinate opinions of the government and private firms were the central bodies for policy formation. Under the policy council system, important policies were first discussed in a council. Reports were then sent to the ministries responsible for the industry in question. The system became established as the main protocol in the 1960s, and the Industrial Structure Council (ISC) sat at the top of the hierarchy. Members of the ISC were usually former bureaucrats, journalists and representatives from private sectors. Steel was one of the active areas discussed by the ISC.

Policy enforcement was sometimes based on the law; however, in many cases, policies were conducted informally. In the case of the steel industry, the government attempted to coordinate capital investment decisions among private firms by relying on administrative guidance rather than on legal grounds.

3. Empirical Analysis

Using the facts laid out in the previous section, we analyse whether the policy actions affected private capital investments and achieved the intended effects.

3.1 The target industries

The industrial policy was often implemented by sector. Steel, textiles, chemicals and pulp and paper were the sectors targeted for intensive government intervention (Itoh et al. 1988, Tsuruta 1988).[3] We focus on these sectors to examine the effects of policy actions.

[3] The MITI had an industrial branch bureau specialising in the chemical industry. Other branch bureaus specialised in the heavy; textiles and general merchandise; public utilities; and minerals, oil and coal mining industries (OECD, 1972).

3.2 Data

A detailed analysis of the policies on capital investments requires firm-level data sets. For the corporate side, we construct semi-annual data sets from 1964 by drawing on the statistics compiled by the Mitsubishi Economic Research Institute (Mitsubishi Keizai Kenkyu Sho). These statistics are business figures originally published in financial statements for stockholders or investors. One of the advantages of using these figures is their quality; the financial reports were compiled in compliance with regulations, and the variability in data arising from differences in the definitions used by firms is expected to be small. We collected firm-level data sets for capital stocks and sales from Mitsubishi statistics. The coverage of Mitsubishi statistics for capital investments against the survey for the financial statements statistics of corporations by industry, which is used for estimating GDP statistics, is 47.8 per cent in the manufacturing sector in 1965. We also rely on this statistic when defining sub-sectors for chemicals, textiles and pulp and paper to divide these sectors into categories that are more detailed and to analyse the effects of policy actions.

We draw on industry-level data when firm-level data are not available. For wages, we use data from the monthly labour survey by industry. For variables representing policy actions, we apply the narrative approach introduced by Romer and Romer (2007). They used narrative records, such as presidential speeches, executive-branch documents and Congressional reports, to identify the size, timing and principal motivation for tax policy actions. This approach enables researchers to identify exogenous policy actions in various fields. Some previous studies used the gap between average lending rates and rates for one particular industry as a proxy for public lending if the latter were lower than the former. On the one hand, such a gap can be interpreted as a policy action. On the other, it can show the results of public lending because lower interest rates could be an outcome of the supply of extra funds through public lending. These types of problems force us to adopt a cautious approach to interpreting the results of estimates. In contrast, taking one policy action in a historical record as a variable enables us to avoid an endogenous bias. We utilise the official history of the MITI, the JFCSME and the annual reports of the FTC to determine the historical records from which to extract policy actions. The advantage of relying on these official histories is that they cover all types of tools, regardless of formality and intent. The types of policy tools aimed at private capital investments were wide ranging, from formal orders backed by law to informal moral suasions by ministries and from investment-stimulating ones to investment-discouraging ones. The policies that attempted to control capital investments frequently had motivations that contradicted each other. Some industries were subject to both investment-stimulating and investment-discouraging methods. Therefore, we need records that cover both categories of policy tools with information on the direction of the expected effects to examine their outcomes accurately.

We pick all policy actions that attempted to control the amount of capital investments for a

particular industry and classify them into two categories: those that aimed at encouraging investments and those that aimed at curbing them. For example, inexpensive public funds were provided to special steel manufacturers in 1964 to increase productivity. We classify this action as an investment-promoting policy action. The MITI and the FTC frequently issue orders prohibiting additional investments for a particular industry, such as textiles, to maintain 'orderly competition'. We classify these actions as investment-discouraging actions. The list of both types of policy tools we use as variables is available in the appendix.[4]

3.3 The implementation of policy actions

We first examine how policy tools were applied to each firm in the four major targeted industries using the Mitsubishi data and historical records mentioned in the previous section. Table 2 shows when the policies were applied to each firm between 1964 and 1972.[5]

[Table 2]

Policy actions, regardless of whether they were investment discouraging or encouraging, were inclined to be applied intensively by period and sub-sector in an industry. Unlike the stereotypical description of Japanese industrial policies, sometimes labelled as the Japan Inc. model hinting at government intervention in private economic activities, only a limited number of firms and sectors were subject to such intensive policies in the 1960s.[6] For instance, in the steel industry, the investment-discouraging actions aimed at controlling the volume of investment, such as postponing

[4] Apart from the instruments in the appendix, direct subsidy and special depreciation were frequently mentioned as major policy tools. We exclude these two tools from our variables. The former primarily represented measures used during the reconstruction period rather than the high-growth era. For the latter, accurately determining the point at which one policy action was applied to one industry is difficult because the special depreciation system was complex due to its inclusion of a series of institutional changes. Even the Tax Institution Council for the government claimed in a report that 'only the specialist with high skills can tell if one case is subject to the special depreciation as standards for the application was set in details', and the number of industries to receive special treatment exceeded 2,000 (Ogura and Yoshino 1988).

[5] With respect to controlling investment plans for blast furnace steel manufacturers, the list of target firms is available from the Japan Iron and Steel Federation (1969). For other policy actions, we assume that a firm producing a particular product, subject to some kind of intervention by the government, was a target company for a policy action. For example, a company producing polyvinyl chloride pipes is assumed to be the subject of restrictions for capital investments since November 1967. We collect information about products for each company from financial statements for the first half year of 1965 for each firm; if that is not available, we use one closest to that period to specify the products.

[6] To interpret the phenomena that appear in this table, the following facts should be noted; the Mitsubishi statistics only cover listed companies, and the results in the table could underestimate the coverage of government actions as small and medium sized companies, which are excluded from samples of the Mitsubishi data series, were often subject to stimulative policies.

investments for a specified period, were applied mainly to blast furnace steel manufacturers, whereas those aimed at encouraging investments were mainly applied to non-blast furnace steel producers. For chemicals, pervasive official controls were only imposed for sectors producing specific products, such as ammonia, polyvinyl chloride products and petrochemicals; manufacturers producing final consumer goods were rarely covered by policy actions.[7] The spinning industry was the major target in textiles in this period, while woollen manufacturers, who were frequently subject to various policy actions in the 1950s, were free from government interventions in this period. For pulp and paper, paperboards and core base papers were the major targets of industrial policy.

3.4 Effects of policy actions on capital investment levels

The conclusions of previous studies on the effectiveness of policies are mixed. Some studies say policy actions had the intended effects. Other studies are sceptical for various reasons, including the overwhelming characteristics of each firm's decision and the small share of public funding in total capital investments. In this section, we estimate the effects of policy actions on each industry using firm-level data sets for the steel, chemicals, textiles and pulp and paper industries. These four industries meet the conditions of having been subject to more than three initiatives during the sample periods and of being named a major target of industrial policy. These four industries accounted for over half the total capital investments for major firms during the high-growth era (Table 1). Investments in these four industries increased rapidly, particularly during the 1960s and the early 1970s (Figure 2). The target sectors for industrial policy were both growing and declining (Noland 1993). The four industries mentioned above fall in either category. The steel industry and chemical industry are considered samples of growing industries, whereas the textiles and pulp and paper industries are samples of declining industries.

[Figure 2]

As shown in Table 2, policy actions were applied to a limited number of firms producing specific products or relying on specific technologies; therefore, we divide these four sectors—steel, chemicals, textiles and pulp and paper—into sub-sectors. For steel industries, we categorise firms as either blast or non-blast furnace steel manufacturers to estimate the effects of official interventions because these two types of manufacturers tended to be treated differently for industrial policy.[8] For example, MITI implemented the rationalization plan for non-blast furnace steel producers (Hira-denro

[7] Companies categorized as 'other chemical products' in Table 2-2 are mainly those producing consumer goods.

[8] We classify a firm as a blast furnace steel producer if it is listed as having blast furnace facilities in the Japan Iron and Steel Federation (1969) table of firms.

meka gourika taisaku) in 1965 (MITI, 1990). For other industries, we follow the definition of the Mitsubishi statistics or historical records. As a result, we analyse the effect of policy actions for seven sub-sectors: blast furnace steel manufacturers with seven firms, non-blast furnace steel manufacturers with 18 firms, organic chemicals with 13 firms, inorganic chemicals with 16 firms, cotton and staple fibres with nine firms, pulp with four firms and paper with 11 firms. We estimate the following equation:

$$IK_t = \alpha + \beta PK_t + \gamma IP_t \quad (1)$$

where IK_t is the capital investment ratio, calculated as the semi-annual changes in capital stock (the sum of buildings, machinery and other fixed capital) plus depreciation divided by the amount of capital stock (fixed capital) at the end of the previous term; $PK_t$is the profit ratio, calculated as semi-annual net profits divided by the amount of capital stock (fixed capital) at the end of the previous term; and $IP_t$is an industrial policy action, which takes the value 1 when an action is taken and null otherwise. Previous studies that stressed each firm's decision often noted that policies capping investments were not effective because the original investment plans by the MITI often ended in larger investments breaking the ceilings. To clarify the effects of the intentions, we then estimate the equations with two types of investment policies: discouraging policies (IP1) and encouraging policies (IP2).

We estimate equations without lags, with a one-period lag and with two-period lags because introducing new equipment or building a factory after an investment decision is made usually takes time.[9] The sample period is between 1964 and 1972 because data on the number of employees are available from 1964 and 1972 was the last year in the high-growth period without a two-digit price increase before the first oil shock.

We regress the equation using pooled ordinary least squares (OLS) and panels in both fixed- and random-effects models. The results of the estimate are presented in Table 3.

[Table 3]

For the steel industry, profits are significant and positive in all cases with one exception, the estimation with two-period lagged variables of fixed-effect estimation in non-blast furnace steel. These results confirm that capital investments increase when profits expand.

For the effects of investment curbing policy tools (IP1), current or one-period lagged actions are not significant, whereas those for two-period lags are significant and positive in the case of blast

[9] At the time, Japanese firms generally planned investments six months ahead (Okazaki 2002). Some empirical studies, such as Noland (1993), confirmed that lagged variables tend to be significant, unlike current variables.

furnace steel manufacturers.[10] These results indicate that tools intended to discourage investments did not have an effect in the short term and may have had an effect on the policy goals in the long run in the case of larger manufacturers with blast furnace facilities. The estimates for non-blast furnace steel manufacturers for the same kinds of actions are mixed. The simultaneous effects are not significant in both fixed- and random-effects estimations.[11] For one-term lagged periods, it is insignificant but positive.[12] The effects are positive and insignificant in the fixed-effects method and significant in the random-effects method in the case of two-term lags.[13] Investment-discouraging actions by the government do not seem to have had any solid effects, judging from these inconclusive estimations. The results of investment-encouraging tools (IP2) appear sceptical for the effects of interventions by the government because there is no case with significant variables.

For chemicals, profits are significant and positive in all cases for both organic and inorganic chemicals; capital investments increase when profits expand. Policy tools applied to dampen investments (IP1) are significant with a negative sign only in a system of simultaneous equations for organic chemicals, suggesting that government interventions worked successfully only in the short run.[14] In other cases, they are insignificant with positive or negative signs. The investment-discouraging efforts by the government had a very short-term limited effect on private investments. For investment-stimulating policies (IP2), simultaneous cases are significant with positive signs only for inorganic chemicals, whereas others are insignificant with positive signs for both organic and inorganic chemicals. Again, government actions had limited, short-lived intended effects.

Unlike these two sectors, profits are not significant in all cases for textiles (cotton and staple fibres) and pulp and paper.

For policy variables in the case of textiles, the effects of discouraging tools (IP1) changed over time; it is significant with negative signs simultaneously, then becomes insignificant with negative signs with one-period lag and finally turns out to be significant with positive signs.[15] This shows that government interventions to curb investments worked well in the short term but had the opposite effects in the longer term. Investment-enhancing policies resulted in success because IP2 is significant with positive signs; capital investment increased when encouraging tools were applied.

For pulp and paper, actions by the government for calming down investments were generally in vain because policy variables appear insignificant except in one case—current variable for pulp sector—which is significant and positive, indicating that it had short-lived undesirable effects.

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[10] The results of the Hausman test suggest that fixed-effects models are reliable for this sector.

[11] The results of the Hausman test for this period are inconclusive.

[12] The Hausman test suggests the fixed-effects models.

[13] The results of the Hausman test are inconclusive.

[14] The results of the Hausman test support the fixed-effects models.

[15] The Hausman test suggests random-effects models.

Our tentative conclusion is that government efforts to influence the volume of capital investments had limited weak effects or, in some cases, undesirable effects. Only one sector—textiles—warranted industrial policy for capital growth, although discouraging policies had only short–lived effects. Actions for chemicals influenced current investment volumes for direction in organic chemicals and enhancing investments in inorganic chemicals. The efforts to cap investments in the steel sector may have had opposite results six months later or one year later. The same phenomenon was observed in the pulp sector in the short term, and other actions to influence investment volumes ended in failure.

3.5 Effects of policy actions on resource allocations

3.5.1 *'Distortion' in resource allocations*

One of the disadvantages of using a high-growth era as a sample is that determining the effects of tools aimed at curbing investments is not straightforward because the effects, if any, might have been masked by overall increasing trends in investments. Although capital investments in an industry increased under government interventions that discouraged them, the policy action should be evaluated as effective if the growth rate was slower compared with the case without a policy action. Another example of the difficulty of evaluating policy effects is when growth in investment continues but slows down. If the shrinkage of the growth rate was smaller compared with the case in which there was no investment-supporting government activities, the policy conducted should be assessed as effective. These types of evaluations require counterfactual tests; however, proper instruments were not available (Turuta 1988). Thus, the views of previous studies on the effectiveness of government interventions are mixed.

Instead of conducting counterfactual tests, we apply an indicator introduced by Hsieh and Klenow (2009) to gauge the extent of the 'distortion' of resource allocations between capital and labour. When some 'distortion' exists for capital, firms in an industry tend to allocate more capital relative to labour than when a firm is in a perfectly competitive final output market. This indicator can be an effective tool in determining the effects of policy actions because the 'distortion' can mean the gap between a relative allocation ratio with and without government interventions. If such gaps are observed, policy actions are proven to affect the relative allocation between capital and labour.

3.5.2 *Theoretical model*

This section introduces a basic theoretical model to capture the effect of a firm's resource 'misallocation'. Hsieh and Klenow (2009) argued that misallocation of resources between firms within industries can be crucial to investigate differences in total factor productivity across countries. First, we provide a brief outline of the Hsieh and Klenow (2009) model.

At the aggregation level, final output Y is produced by combining output from manufacturing

industries Y_s using the Cobb–Douglas production technology:

$$Y = \prod_{s-1}^{S} Y_s^{\theta_s} \quad (2)$$

where θ_s is the value-added share of sector s and S is the total number of manufacturing industries. In an industry, heterogeneous firms exist with monopolistic competition. In this case, industry output Y_s is a constant elasticity of substitution (CES) aggregate of M_s differentiated products:

$$Y_s = \sum_{i=1}^{M_s} \left(Y_{si}^{\frac{\sigma-1}{\sigma}} \right)^{\frac{1}{\sigma-1}} \quad (3)$$

where Y_{si} is a differentiated product by firm i in industry s and σ is the elasticity of substitution among factor inputs in Y_{si}. Each differentiated product is produced by firms with heterogeneous productivity A_{si}, labour L_{si} and capital K_{si} using the Cobb–Douglas technology.

$$Y_{si} = A_{si} K_{si}^{\alpha_s} K_{si}^{1-\alpha_s} \quad (4)$$

where α_s is the input share of capital and is assumed to be different between industries.

The main characteristic of their model is that each firm is not heterogeneous with respect to productivity and each firm faces idiosyncratic distortions to input and output prices. In their model, two types of distortions are considered. The first represents output distortions that affect the quantity of production but leave the input mix unaffected. This type is modelled as a tax on production that is independent of factor use. The second type represents the capital distortions that affect the use of capital relative to labour. This type forms the tax on capital and thus affects the input mix decision. Both distortions are exogenous, calculated from actual data and subsequently discussed. In this framework, profits depend on not only prices but also two types of distortions. The profits of each firm are described as follows:

$$\pi_{si} = P_{si}(1 - \tau_{Ysi}) Y_{si} - w L_{si} - (1 + \tau_{Ksi}) r K_{si} \quad (5)$$

where π_{si} is the profit, w is the wage rate, r is the rental price of capital, τ_{Ysi} is the output distortion and τ_{Ksi} is the capital distortion. This model assumes that the wage rate and the rental price of capital are the same across firms. Profit maximisation leads to the standard first condition for which price is a fixed mark-up over its marginal cost. In addition, the optimal capital-to-labour ratio is given as follows:

$$\frac{K_{si}}{L_{si}} = \frac{\alpha_s}{1-\alpha_s}\frac{w}{r}\frac{1}{(1+\tau_{Ksi})} \quad (6)$$

Isolation of τ_{Ksi} yields the following condition:

$$\tau_{Ksi} = \frac{\alpha_s}{1-\alpha_s}\frac{wL_{si}}{rK_{si}} - 1 \quad (7)$$

3.5.3 *Measurement of capital distortion*

Following the Hsieh and Klenow (2009) model, we attempt to calculate capital 'distortion' in Japanese companies using actual data. The previously noted condition indicates that capital distortion is affected by two factors: input share of capital (α_s) and the labour income–capital income ratio ($\frac{wL_{si}}{rK_{si}}$). L and K are extracted from the Mitsubishi statistics for each firm (for details, see Section 3.1), and w represents average wages in an industry from the monthly labour survey. αs are the same across industries and are based on calculations in previous studies, and αs is set as 0.5 based on Harada and Hino (2002), who estimated the labour share from the 1950s to the 2000s and noted that it was a stable 50 per cent during the high-growth era. r is the sum of real interest rates and depreciation rates (Hsieh and Klenow 2009). Real interest rates were the same across industries, and they are average nominal bank rates applied to new lending in the final month of each term less the inflation rates of capital goods. Depreciation ratios are calculated by industry, relying on figures in Financial Statement Statistics of Corporations by Industry; depreciation allowances for fixed assets, excluding intangible and other assets, are divided by stocks of fixed assets, excluding intangible and other assets. The average level of τ_{Ksi} for the four industries is shown in Table 4.

[Table 4]

The development of the average τ_{Ksi} shows remarkable differences among industries. When τ_{Ksi} is above one, the industry in question is in a state of undercapitalisation, while it is in a state of excess capital when the ratio is less than one. Steel, inorganic chemicals and pulp and paper were mostly in a state of excess capital throughout the period (with some exceptions in 1972). Organic chemicals was in a state of excess capital before becoming undercapitalised. Cotton and staple fibres were always undercapitalised.

3.5.4 *Effects of policies on capital 'distortion'*

We regress allocation gaps against their one-period lag and investment-discouraging and investment-promoting policy actions by industry. The equations are specified as follows:

$$\tau_t = \alpha + \beta\tau_{t-1} + \gamma IP_t \quad (8)$$

where τ_t is a 'distortion' of relative capital to labour and IP_t is an industrial policy action, taking the value of 1 if an action is taken and null otherwise. We estimate the equations in both fixed and random models. For comparison purposes, we also estimate the OLS using pooled data.[16]

Again, the seven sub-sectors of steel, chemicals, textiles and pulp and paper are selected, and the results are shown in Table 5. We find that the results give a different story from the regressions with the investment ratio as an independent variable.

[Table 5]

The results of one-term lagged independent variables are identical across sectors in all cases, and they are significant with positive signs.

With regard to the effects of policy actions, those for blast furnace steel manufacturers and non-blast ones show differences. Investment-discouraging policy tools (IP1) are significant with negative signs for one- and two-period lags for the former, indicating that government actions curbing capital investment resulted in larger allocations of capital and thus had the opposite effects of what it was designed for.[17] By contrast, the discouraging actions are insignificant with positive signs for non-blast furnace steel manufacturers, suggesting that government actions did not have any effect. For investment-enhancing policies (IP2), they are mostly significant with negative signs, indicating that they increased firms' allocation of capital relative to labour in some cases. These results, together with the results shown in Table 4, suggest that investment-enhancing devices were not strong enough to raise investment volumes but were effective enough to increase relative capital allocations to some extent in the steel industry.

For the chemical industry, discouraging tools (IP1) are insignificant with negative signs in organic and inorganic chemicals. Encouraging policy tools (IP2) are significant with negative signs for organic chemicals from current to two-period lags, suggesting that these tools induced higher shares of capital to labour even though the capital investments did not seem to increase in the longer term. For inorganic chemicals, IP2 is not significant; thus, the short-lived effects of increasing investment volumes were not large enough to be gauged by this indicator.

For textiles, discouraging tools (IP1) are not significant, whereas policy-enhancing tools are

[16] The OLS estimator for the dynamic panel model used in our estimation is well known to be biased because the lagged dependent variable generates a correlation with the disturbance term. A solution is to employ the instrumental variable method, known as the system of generalized method of moments (GMM) estimator, proposed by Arellano and Bond (1991). However, in our estimation, the sample size t is small, and setting adequate instrumental variables to obtain stable estimation results is difficult. To overcome this difficulty, we specify both the fixed- and random-effect models.

[17] The results of the Hausman test suggest that the fixed-effects models are reliable for this sector.

significant simultaneously with positive signs. For lagged policy, the variables are insignificant. These results show slight divergence from that for investment volumes because IP2 shows positive effects for lagged cases. This could mean that policy-encouraging tools had a strong effect in the very short term, increasing capital allocation in firms to which the policy tool was applied, but the positive effects gradually faded to a level that could not be captured by this indicator. Therefore, the probable undesirable results of capping capital investments, which caused an increase in the volume later, were not serious.

For the pulp industry, policy actions are insignificant in all cases, suggesting that government efforts to control capital investments were in vain. In the paper industry, the short-lived desirable effects of hampering allocation of capital are observed because the discouraging tools are significant with positive signs in the system of simultaneous equations.

In a nutshell, investment-discouraging policies had short-lived weak effects in line with the original goal of the paper industry, but they were generally unsuccessful because in almost all cases, the policy tools failed to show significance. Investment-encouraging actions, in contrast, worked well in terms of the direction in steel and organic chemicals. Firms in these industries allocated relatively more capital to labour when the government employed investment-stimulating policies. Judging from the level of 'distortions', these policies accelerated excess capital. For cotton and fibres, the target of intensive government interventions, policy actions had weak, short-lived intended effects, and they corrected the undercapitalised structure of this industry.[18]

For some industries, such as non-blast furnace steel manufacturers and cotton, fibre and paper, policy actions introduced to cap investments might have acted as catalysts for promoting capital investments. The government's attempts to achieve 'orderly competition' were in vain.

Determining the reasons for the investment-accelerating effects of easing antitrust rules is beyond the scope of this study. However, some assumptions suggested by previous studies, such as Tsuruta (1988), could provide an interpretation for our findings. According to Tsuruta (1988), restrictions on capital investments usually resulted in the allocation of additional capital investments to each firm based on current shares. A firm with a relatively larger current share in production volume or production capacity was likely to obtain a larger investment share in the future, and this system provided advantages to the haves and disadvantages to the have-nots. Under such circumstances, each firm had to obtain certain shares to leave room for future growth. In other words, firms had the incentive to accumulate as much capital stock as possible when applications of investment ceilings were expected in the future. Industries that experienced significant policy device variables with opposite effects of what it was designed for were frequent targets of these ceilings. For example, cotton and staple fibres faced such restrictions seven times, and pulp and paper faced them nine times during the high-growth era (1955–1973); therefore, the hypothesis could apply to these industries.

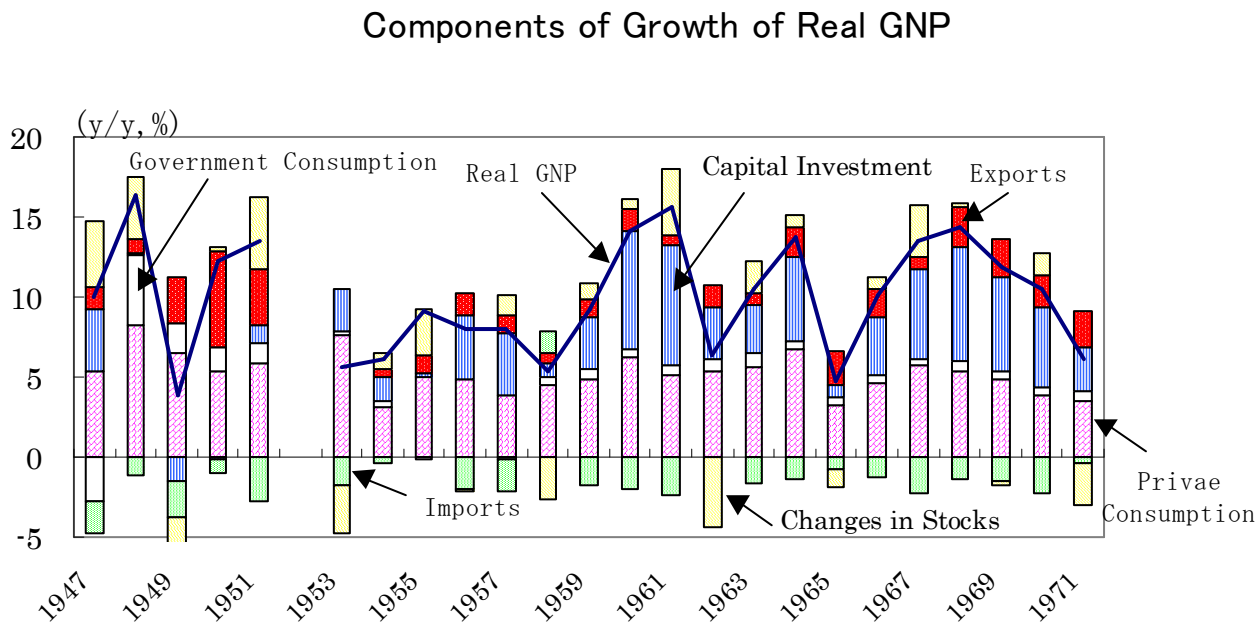
[18] This interpretation is suggested by Tsutomu Miyagawa.

In short, the empirical tests for the four sectors often identified as targets by the government for intensive policy actions confirm that government interventions were successful for steel, chemicals and textiles to promote investments, although their effects were sometimes weak or faded easily. Successful tools often took the form of cheap lending, and investment decisions were usually in the hands of private sectors. In contrast, investment-discouraging tools, generally taking the form of government orders or collective actions by private firms belonging to the same association, were not effective in general or were short lived even if they were effective. In some cases, investment-curbing actions had unintended effects in terms of direction if the industry in question was often targeted for direct control of volume, although the adverse effects were usually not serious.

4. Conclusion

The Japanese government is said to intervene actively in investment decisions of private sectors during high-growth eras, and our search of historical records finds that policy tools for controlling capital investments tended to be applied intensively to particular sectors and firms. These interventions affected firms' capital investment decisions to some extent. For some industries, such as steel, chemicals and textiles, the investment-promoting policy tools—frequently in the form of inexpensive funding—led to accelerated investments or relatively higher resource allocations of capital to labour. Policy actions aimed at curbing investments by directly deciding the investment volumes resulted in slower or decreased capital investments in limited cases but rarely achieved lower allocations of capital to labour. They did have contradictory effects on some industries, enhancing capital investments. The latter phenomenon was observed in industries that were often a target of controls by the government, such as chemicals, textiles and pulp and paper, where the government attempted to control private sector capital investments based on the current share of production or production capacities. To avoid unexpected results, the overall conditions of the industry in question should be considered, and the mean of highly effective policies and policies without serious adverse effects should be carefully selected.

Figure 1



(Source) Estimate of Long-Term Economic Statistics I, National Income

Table 1

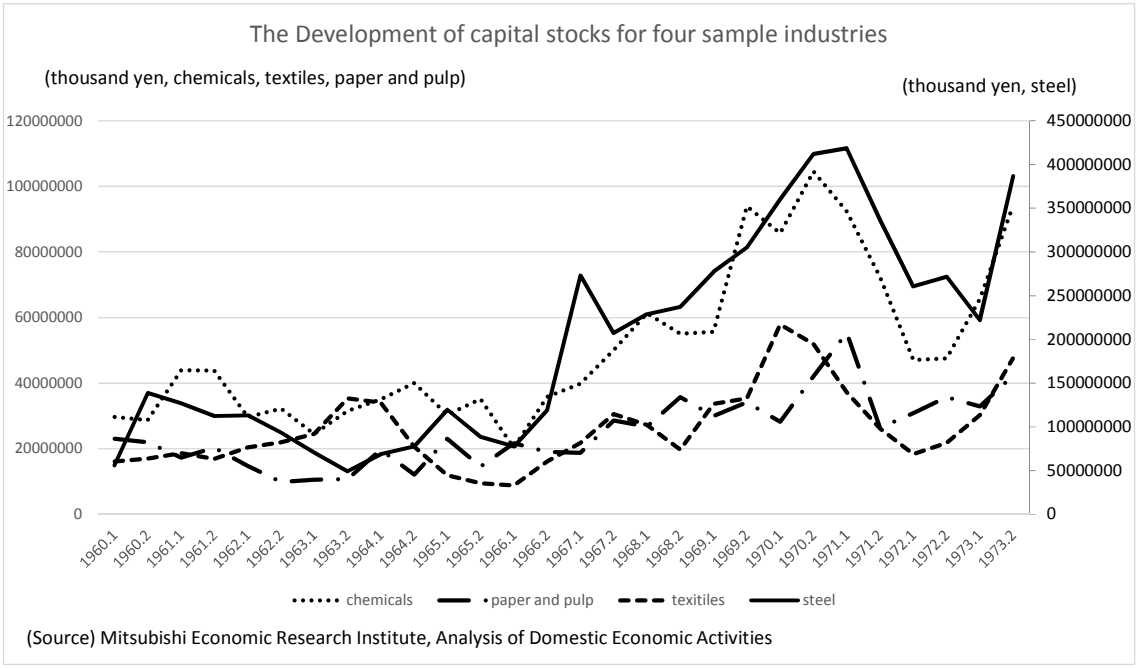
The share of capital investments by industry (%)

	General machinery	Chemicals	Paper and pulp	Food	Precision Instruments	Petroleum	Textiles	Steel	Electric Machinery	Non-ferrous metal	Transport equipment	Ceramics
1960.1	2.92	13.29	10.31	4.18	0.97	2.83	7.20	25.09	14.84	1.25	11.88	5.24
1960.2	2.78	8.65	6.63	3.37	0.83	2.70	5.12	41.88	12.44	1.25	11.14	3.21
1961.1	3.36	11.88	4.67	4.52	1.19	3.24	5.05	34.31	12.90	-0.03	14.38	4.54
1961.2	3.57	11.96	5.53	6.39	1.02	2.21	4.60	30.67	14.71	2.05	12.76	4.50
1962.1	3.21	8.51	4.24	6.89	1.51	2.08	5.85	32.50	14.62	1.05	15.24	4.29
1962.2	2.46	11.61	3.55	6.26	1.82	1.82	7.93	33.71	11.54	0.96	13.24	5.12
1963.1	2.98	10.41	4.45	6.37	2.29	3.27	10.40	29.85	9.32	0.49	15.85	4.33
1963.2	3.35	12.31	4.18	3.59	3.29	2.72	13.84	19.22	9.85	0.43	22.08	5.13
1964.1	2.14	11.43	6.45	4.42	1.57	3.30	11.12	22.48	8.31	0.75	22.92	5.10
1964.2	2.27	13.07	3.93	5.40	1.53	3.31	6.72	25.28	8.71	1.26	25.62	2.91
1965.1	1.50	9.56	7.28	6.46	1.13	4.29	3.76	37.65	5.40	-3.06	23.49	2.55
1965.2	1.46	13.30	5.50	4.53	1.00	2.99	3.58	33.56	13.44	5.18	12.48	2.98
1966.1	2.41	10.74	11.48	4.25	1.69	4.86	4.66	41.02	-4.39	1.75	17.85	3.68
1966.2	2.12	11.46	6.08	2.96	1.28	2.42	5.16	38.14	7.96	1.57	19.07	1.79
1967.1	2.08	7.61	3.58	2.80	1.00	1.85	4.17	52.20	6.34	1.08	14.85	2.43
1967.2	2.01	9.25	5.27	2.19	1.11	2.65	5.65	38.29	8.10	1.18	21.38	2.93
1968.1	2.28	9.98	4.36	2.53	0.99	3.62	4.44	37.28	7.46	1.45	22.64	2.97
1968.2	2.86	8.69	5.64	2.85	1.22	5.74	3.11	37.41	8.52	1.33	18.86	3.77
1969.1	3.25	7.72	4.16	2.86	1.20	3.76	4.68	38.51	10.59	1.96	17.64	3.67
1969.2	3.23	11.52	4.19	2.54	1.42	3.56	4.34	37.43	10.34	1.09	17.39	2.94
1970.1	3.20	10.16	3.34	2.58	1.94	2.84	6.85	42.68	11.02	1.74	9.94	3.71
1970.2	2.45	10.23	4.11	1.85	1.08	3.60	5.08	40.31	7.55	2.23	18.92	2.58
1971.1	2.16	9.71	5.82	2.70	0.90	3.95	3.90	43.99	7.00	1.45	16.02	2.39
1971.2	2.10	9.13	3.33	3.60	1.12	3.27	3.31	42.51	7.24	1.84	19.51	3.03
1972.1	2.68	7.67	5.03	4.80	1.43	3.23	3.00	42.50	8.30	1.14	16.44	3.77
1972.2	1.87	6.57	4.94	5.81	1.13	3.16	3.01	37.54	8.09	1.43	22.02	4.43
1973.1	2.82	9.11	4.56	3.50	1.33	3.26	4.19	30.77	12.26	1.46	22.62	4.12
1973.2	2.37	8.60	3.87	2.82	0.93	2.76	4.35	35.38	10.79	1.24	21.20	5.69

(Source) Mitsubishi Economic Research Institute, Analysis of Domestic Economic Activities

Note: The amount of capital investments is the sum of the differences in capital stocks (the sum of buildings, machinery and other fixed capitals) of the current and previous term and depreciation amounts

Figure 2



(Source) Mitsubishi Economic Research Institute, Analysis of Domestic Economic Activities

Table 2-1-1

Applications of policy actions to each firm for steel industry, actions to curb capital investments

		Blast Furnace Steel Manufacturess							Non-Blast Furnance Steel Manufactures																
		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
1963	1																									
	2																									
1964	1																									
	2																									
1965	1																									
	2																									
1966	1			x	x	x	x																			
	2			x	x	x	x																			
1967	1	x	x	x	x	x	x											x		x						
	2	x	x	x	x	x	x											x		x						
1968	1	x	x	x	x	x	x											x		x						
	2	x	x	x	x	x	x											x		x						
1969	1	x	x	x	x	x	x											x		x						
	2	x	x	x	x	x	x											x		x						
1970	1	x	x	x	x	x	x											x		x						
	2	x	x	x	x	x	x											x		x						
1971	1	x	x				x											x		x						
	2	x	x				x											x		x						
1972	1	x	x				x											x		x						
	2	x	x				x											x		x						
1973	1	x	x				x											x		x						
	2	x	x				x											x		x						

x: policy actions were applied to a firm in question.

Note: the name of the firms are as follows. 1 Nissin Seiko, 2. Kawasaki Seitetsu, 3. Kobe Seikousyo, 4. Sumitomo Kinzokukogyo, 5. Nippon Kokan, 6. Nippon Steel, 7. Nakayama seikousyo, 8. Nihon Seikousyo, 9. Azuma seikousyo, 10. Amagasaki Seikousyo, 11., Kantou Seikou, 12. Daido Kouhan, 13. Mitsubishi Kozai, 14. Toyo Kohan, 15. Mitsubishi Seikou, 16. Nichia Seikou, 17. Nihon Kosyuha Kogyo, 18. Yahata Kokan, 19. Nihon Yakin Kogyo, 20. Yodogawa Seikousyo, 21. Nihon Kinzoku, 22. Nihon Teppan, 23. Daidou Seikou, 24. Tokyo Tankousyo, 25., Kurimoto Tekkosyo

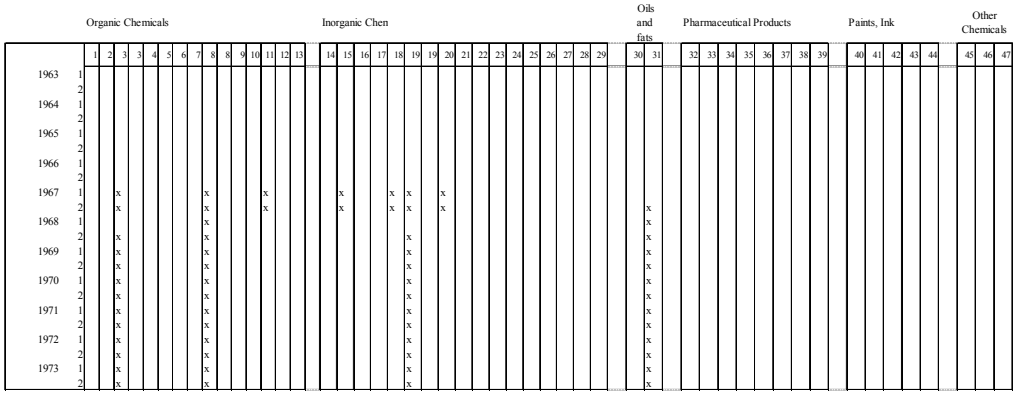
Table 2-1-2

Applications of policy actions to each firm for steel industry, actions to enhance capital investments

		Blast Furnace Steel Manufacturess							Non-Blast Furnance Steel Manufactures																
		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
1963	1			x	x		x							x											x	x
	2			x	x		x							x											x	x
1964	1	x		x	x	x	x					x	x	x				x	x	x		x		x	x	x
	2	x		x	x	x	x					x	x	x				x	x	x		x		x	x	x
1965	1	x		x	x	x	x					x	x	x				x	x	x		x		x	x	x
	2	x		x	x	x	x					x	x	x				x	x	x		x		x	x	x
1966	1	x		x		x	x					x	x	x				x	x	x		x		x		
	2	x		x		x	x					x	x	x				x	x	x		x		x		
1967	1	x		x		x	x					x	x	x				x	x	x		x		x		
	2	x		x		x	x					x	x	x				x	x	x		x		x		
1968	1	x		x		x	x					x	x	x				x	x	x		x		x		
	2	x		x		x	x					x	x	x				x	x	x		x		x		
1969	1	x		x		x	x					x	x	x				x	x	x		x		x		
	2	x		x		x	x					x	x	x				x	x	x		x		x		
1970	1	x		x		x	x					x	x	x				x	x	x		x		x		
	2	x		x		x	x					x	x	x				x	x	x		x		x		
1971	1																									
	2																									
1972	1																									
	2																									
1973	1																									
	2																									

Table 2-2-1

Applications of policy actions to each firm for chemical industry, actions to curb capital investments

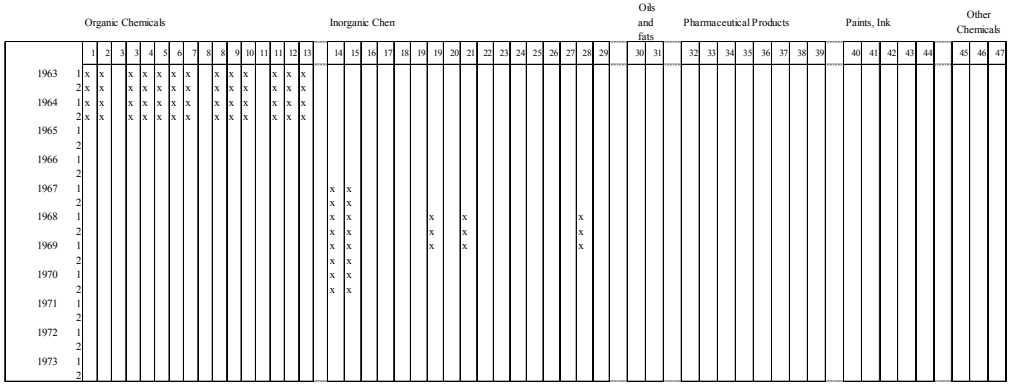


x: policy actions were applied to a firm in question.

Note: The name of the firms are as follows. 1 Taoka Cheicals, 2. Showa Chemicals, 3. Sekisui Chemicals, 4.Daiseru, 5. Nihon Carlit, 6. Nihon Kayaku, 7. Nihon Syokubai Kagaku, 8. Sumitomo Bakelite, 9. Nittetsu Kagaku Kogyo, 11. Kanegafuchi Chemicals, 12. Dainihon Ink, 13. Toyo Linoleum, 14. Showa Denkou, 15. Chisso, 16. Ishihara Sangyo, 17. Teikoku kakou, 18. Tekkousya, 19.Toa Gousei Kagaku, 20. Sumitomo Chemicals, 21. Nitto Chemicals, 22. Nihon Chemichals, 23. Rin Chemicals, 24. Ibigawa Denki Kogyo, 25. Sakai Chemicals, 26. Toyo Sanso, 27. Tokuyama Soda, 28, Nihon Soda, 30. Kao Sekken, 31. Nihon Yushi, 32. Sankyo, 33. Shionogi Seiyaku, 34. Daiichi Seiyaku, 35. dainihon Seiyaku, 36.Tanabe Seiyaku, 37. Nihon Shinyaku, 38. Fujisawa Yakuhin, 40. Kansai Paint, 41. Shinto Toryo, 42. Dainihon Toryo, 43. Toa Paint, 44. Nihon Paint, 45. Shieido, 46. Lion Hamigaki, 47. Oriental Shashin Kogyo

Table 2-2-2

Applications of policy actions to each firm for chemical industry, actions to enhance capital investments



x: policy actions were applied to a firm in question.

Note: The name of the firms are as follows. 1 Taoka Cheicals, 2. Showa Chemicals, 3. Sekisui Chemicals, 4.Daiseru, 5. Nihon Carlit, 6. Nihon Kayaku, 7. Nihon Syokubai Kagaku, 8. Sumitomo Bakelite, 9. Nittetsu Kagaku Kogyo, 11. Kanegafuchi Chemicals, 12. Dainihon Ink, 13. Toyo Linoleum, 14. Showa Denkou, 15. Chisso, 16. Ishihara Sangyo, 17. Teikoku kakou, 18. Tekkousya, 19.Toa Gousei Kagaku, 20. Sumitomo Chemicals, 21. Nitto Chemicals, 22. Nihon Chemichals, 23. Rin Chemicals, 24. Ibigawa Denki Kogyo, 25. Sakai Chemicals, 26. Toyo Sanso, 27. Tokuyama Soda, 28, Nihon Soda, 30. Kao Sekken, 31. Nihon Yushi, 32. Sankyo, 33. Shionogi Seiyaku, 34. Daiichi Seiyaku, 35. dainihon Seiyaku, 36.Tanabe Seiyaku, 37. Nihon Shinyaku, 38. Fujisawa Yakuhin, 40. Kansai Paint, 41. Shinto Toryo, 42. Dainihon Toryo, 43. Toa Paint, 44. Nihon Paint, 45. Shieido, 46. Lion Hamigaki, 47. Oriental Shashin Kogyo

Table 2-3-1

Applications of policy actions to each firm for chemical industry, actions to curb capital investments

		Cotton, Staple Fibers									Wool				Linens			Chemical Fibers				Other Textiles					
		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
1963	1																										
	2																										
1964	1																										
	2																										
1965	1																										
	2	x	x	x	x	x	x	x	x	x																	
1966	1	x	x	x	x	x	x	x	x	x																	
	2	x	x	x	x	x	x	x	x	x																	
1967	1	x	x	x	x	x	x	x	x	x																	
	2																										
1968	1																										
	2																										
1969	1																										
	2																										
1970	1																										
	2																										
1971	1																										
	2																										
1972	1																										
	2																										
1973	1																										
	2																										

x: policy actions were applied to a firm in question.

Note: The name of the firms are as follows. 1 Kitanihon Boseki, 2. Kurashiki Boseki, 3. Kyowa Boseki, 4.Shin Naigaimen, 5. Daiwa Boseki, 6. Nisshin Boseki, 7. Hirata Boseki, 8. Fuji Boseki, 9. Wakabayashi Boseki, 10. Daito Bosyoku, 11. Daido Keori, 12. Chuo Keori, 13.Nihon Keori, 14. Teikou Seni, 15. Teikoku Sangyo, 16. Teikoku Seima, 17. Teijin, 18. Toho Rayon, 19. Toray, 20. Sakai seni Kogyo, 21. Soto Kogyo, 22. Nihon Felt, 23. Dynik, 24. Sumie Orimono, 25. Ashimori Kogyo, 26. Fukusuke

Table 2-3-2

Applications of policy actions to each firm for chemical industry, actions to enhance capital investments

		Cotton, Staple Fibers									Wool				Linens			Chemical Fibers				Other Textiles					
		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
1963	1																										
	2																										
1964	1																										
	2																										
1965	1																										
	2																										
1966	1																										
	2																										
1967	1	x	x	x	x	x	x	x	x	x																	
	2	x	x	x	x	x	x	x	x	x																	
1968	1	x	x	x	x	x	x	x	x	x																	
	2	x	x	x	x	x	x	x	x	x																	
1969	1	x	x	x	x	x	x	x	x	x												x					
	2	x	x	x	x	x	x	x	x	x												x					
1970	1	x	x	x	x	x	x	x	x	x												x					
	2	x	x	x	x	x	x	x	x	x												x					
1971	1																					x					
	2																					x					
1972	1																					x					
	2																					x					
1973	1																					x					
	2																					x					

x: policy actions were applied to a firm in question.

Note: The name of the firms are as follows. 1 Kitanihon Boseki, 2. Kurashiki Boseki, 3. Kyowa Boseki, 4.Shin Naigaimen, 5. Daiwa Boseki, 6. Nisshin Boseki, 7. Hirata Boseki, 8. Fuji Boseki, 9. Wakabayashi Boseki, 10. Daito Bosyoku, 11. Daido Keori, 12. Chuo Keori, 13.Nihon Keori, 14. Teikou Seni, 15. Teikoku Sangyo, 16. Teikoku Seima, 17. Teijin, 18. Toho Rayon, 19. Toray, 20. Sakai seni Kogyo, 21. Soto Kogyo, 22. Nihon Felt, 23. Dynik, 24. Sumie Orimono, 25. Ashimori Kogyo, 26. Fukusuke

Table 2-4

Applications of policy actions to each firm for pulp and paper industry, actions to curb capital investments

		Pulp					Paper										
		1	2	3	4		5	6	7	8	9	10	11	12	13	14	15
1963	1																
	2																
1964	1																
	2																
1965	1	x	x	x	x			x	x	x		x	x		x	x	
	2	x	x	x	x			x	x	x		x	x		x	x	
1966	1	x	x	x	x			x	x	x		x	x		x	x	
	2	x	x	x	x			x	x	x		x	x		x	x	
1967	1	x	x	x	x			x	x	x		x	x		x	x	
	2	x	x	x	x			x	x	x		x	x		x	x	
1968	1	x	x	x	x			x	x	x		x	x		x	x	
	2	x	x	x	x			x	x	x		x	x		x	x	
1969	1	x	x	x	x			x	x	x		x	x		x	x	
	2	x	x	x	x			x	x	x		x	x		x	x	
1970	1	x	x	x	x			x	x	x		x	x		x	x	
	2	x	x	x	x			x	x	x		x	x		x	x	
1971	1	x	x	x	x			x	x	x		x	x		x	x	
	2	x	x	x	x			x	x	x		x	x		x	x	
1972	1	x	x	x	x			x	x	x		x	x		x	x	
	2	x	x	x	x			x	x	x		x	x		x	x	
1973	1	x	x	x	x			x	x	x		x	x		x	x	
	2	x	x	x	x			x	x	x		x	x		x	x	

x: policy actions were applied to a firm in question.

Note: The name of the firms are as follows. 1 Koujin, 2. Sanyo Pulp, 3. Kokusaku Pulp, 4.Tohoku Pulp, 5. Kitanihon Seishi, 6. Jujo Seishi, 7. Daisyowa Seishi, 8. Oji Seishi, 9. Nihon Kakou Seishi, 10. Nihon Shigyo, 11. Honsyu Seishi, 12. Hokuetsu Seishi, 13. Mitsubishi Seishi, 14. Kanzaki Seishi, 15. Tokyo Cellophane

Table 3

The effects of intervention tools on resource allocations

steel

blast furnace steel manufacturers

	OLS (pooling data)			fixed effects			random effects			Hausman statistic		
	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)
Constant	0.07	0.06	0.05	0.07	0.06	0.05	0.07	0.06	0.05	0.80	0.73	0.81
	<2.98>	<2.59>	<1.85>	<2.71>	<2.27>	<1.56>	<2.94>	<2.54>	<1.82>	<0.85>	<0.87>	<0.85>
PK	1.35	1.52	1.76	1.52	1.69	1.94	1.35	1.52	1.76			
	<2.63***>	<2.96***>	<3.33***>	<2.67***>	<2.98***>	<3.35***>	<2.59**>	<2.91***>	<3.27***>			
IP1	0.04	0.04	0.05	0.04	0.04	0.05	0.04	0.04	0.05			
	<1.49>	<1.50>	<2.04**>	<1.36>	<1.35>	<1.91*>	<1.47>	<1.47>	<2.00**>			
IP2	0.01	0.02	0.02	0.00	0.01	0.01	0.01	0.02	0.02			
	<0.63>	<0.82>	<0.76>	<0.10>	<0.28>	<0.19>	<0.62>	<0.81>	<0.75>			

non-blast furnace steel manufacturers

	OLS (pooling data)			fixed effects			random effects			Hausman statistic		
	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)
Constant	0.10	0.10	0.11	0.11	0.11	0.12	0.10	0.10	0.11	2.68	3.04	2.88
	<7.87>	<7.89>	<7.64>	<6.61>	<6.95>	<6.66>	<7.75>	<7.77>	<7.51>	<0.44>	<0.38>	<0.51>
PK	0.44	0.48	0.47	0.42	0.42	0.37	0.44	0.48	0.47			
	<2.44**>	<2.75***>	<2.61***>	<1.69**>	<1.75**>	<1.50>	<2.41**>	<2.71***>	<2.57**>			
IP1	0.06	0.08	0.09	0.01	0.02	0.04	0.06	0.08	0.09			
	<1.65*>	<2.04**>	<2.21**>	<0.20>	<0.30>	<0.72>	<1.63>	<2.01**>	<2.18**>			
IP2	-0.02	-0.03	-0.04	-0.00	-0.03	-0.05	-0.02	-0.03	-0.04			
	<-0.71>	<-1.09>	<-1.57>	<-0.09>	<-0.84>	<-1.23>	<-0.70>	<-1.07>	<-1.54>			

chemicals

organic chemicals

	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)			
Constant	0.09	0.09	0.09	0.08	0.07	0.08	0.09	0.08	0.08	33.88	51.98	55.66
	<6.61>	<6.12>	<5.77>	<5.56>	<4.90>	<4.68>	<4.75>	<5.00>	<4.57>	<0.00>	<0.00>	<0.00>
PK	1.07	1.11	1.14	1.23	1.29	1.30	1.17	1.19	1.22			
	<5.71***>	<5.76***>	<5.72***>	<5.79***>	<5.84***>	<5.61***>	<5.82***>	<5.90***>	<5.77***>			
IP1	-0.06	-0.04	-0.04	-0.06	-0.03	-0.03	-0.06	-0.04	-0.04			
	<-2.62***>	<-1.85*>	<-1.71*>	<-2.02**>	<-0.92>	<-0.96>	<-2.24**>	<-1.47>	<-1.35>			
IP2	0.02	0.02	-0.01	0.02	0.03	-0.00	0.02	0.03	-0.00			
	<0.67>	<0.81>	<-0.36>	<0.93>	<1.06>	<-0.01>	<0.85>	<0.96>	<-0.18>			

inorganic chemicals

	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)			
Constant	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	1.07	0.40	0.85
	<13.41>	<12.90>	<12.43>	<13.33>	<12.64>	<12.08>	<9.79>	<9.50>	<9.16>	<0.78>	<0.94>	<0.84>
PK	0.56	0.56	0.53	0.50	0.53	0.51	0.54	0.55	0.53			
	<3.90***>	<3.76***>	<3.50***>	<3.02*:*>	<3.06***>	<2.88***>	<3.51***>	<3.46***>	<3.25***>			
IP1	-0.02	0.01	0.01	-0.03	0.02	0.03	-0.03	0.01	0.02			
	<-0.71>	<0.33>	<0.41>	<-1.02>	<0.48>	<0.81>	<-0.88>	<0.41>	<0.62>			
IP2	0.05	0.03	0.03	0.07	0.04	0.04	0.06	0.04	0.04			
	<1.91*>	<1.13>	<1.07>	<2.33**>	<1.38>	<1.37>	<2.14**>	<1.26>	<1.23>			

Textiles

cotton, staple fibres

	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)			
Constant	0.09	0.08	0.06	0.09	0.08	0.06	0.09	0.08	0.06	0.01	0.00	0.00
	<8.32>	<7.16>	<5.92>	<7.78>	<6.80>	<5.81>	<8.25>	<7.12>	<5.48>	<1.00>	<1.00>	<1.00>
PK	0.15	0.28	0.21	0.14	0.30	0.21	0.15	0.28	0.21			
	<0.81>	<1.51>	<1.25>	<0.61>	<1.38>	<1.07>	<0.81>	<1.50>	<1.20>			
IP1	-0.03	-0.01	0.03	-0.03	-0.01	0.03	-0.03	-0.01	0.03			
	<-1.93*>	<-0.48>	<1.88*>	<-1.91*>	<-0.49>	<1.84*>	<-1.91*>	<-0.48>	<1.88*>			
IP2	0.04	0.05	0.07	0.04	0.05	0.07	0.04	0.05	0.07			
	<2.86***>	<3.51***>	<5.25***>	<2.79***>	<3.37***>	<5.21***>	<2.84***>	<3.49***>	<5.27***>			

Pulp and paper

pulp

	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)			
Constant	0.08	0.09	0.09	0.07	0.10	0.09	0.07	0.09	0.08	1.14	0.60	0.64
	<5.05>	<5.71>	<5.39>	<2.90>	<4.14>	<3.40>	<2.89>	<3.80>	<2.67>	<0.57>	<0.74>	<0.73>
PK	-0.58	-0.15	-0.37	-0.68	-0.73	-0.95	-0.67	-0.41	-0.77			
	<-0.73>	<-0.18>	<-0.43>	<-0.67>	<-0.67>	<-0.84>	<-0.73>	<-0.43>	<-0.73>			
IP1	0.03	0.01	0.02	0.05	0.00	0.03	0.04	0.01	0.03			
	<1.65>	<0.39>	<1.13>	<1.89*>	<0.16>	<1.20>	<1.82*>	<0.29>	<1.22>			

paper

	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)			
Constant	0.14	0.15	0.14	0.12	0.14	0.13	0.14	0.15	0.14	2.23	0.67	1.92
	<9.84>	<10.21>	<9.83>	<6.10>	<7.00>	<6.55>	<9.75>	<10.07>	<9.73>	<0.33>	<0.72>	<0.38>
PK	-0.32	-0.20	-0.13	-0.30	-0.21	-0.16	-0.32	-0.20	-0.13			
	<-0.84>	<-0.50>	<-0.31>	<-0.73>	<-0.49>	<-0.36>	<-0.83>	<-0.49>	<-0.31>			
IP1	-0.02	-0.03	-0.02	0.02	-0.01	0.01	-0.02	-0.03	-0.02			
	<-0.91>	<-1.43>	<-1.10>	<0.66>	<-0.18>	<0.45>	<-0.91>	<-1.41>	<-1.09>			

Note: t-Statistic in parenthesis.

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

Table 4

The average level of τ among firms

	steel		*chemicals*		*textiles*	*pulp and paper*	
	blast furnace steel manufacturers	*non-blast furnace steel manufacturers*	*organic chemicals*	*inorganic chemicals*	*cotton, staple fibres*	*paper*	*pulp*
1963	-0.628	-0.262	0.578	0.069	2.293	0.284	-0.121
1964	-0.633	-0.367	0.612	0.063	2.173	0.256	-0.017
1965	-0.535	-0.116	0.852	0.256	3.495	0.629	0.359
1966	-0.583	-0.183	1.03	0.591	4.252	0.665	0.563
1967	-0.605	-0.132	0.847	0.527	3.399	0.667	0.563
1968	-0.567	-0.054	0.969	0.393	3.806	0.583	0.473
1969	-0.598	-0.036	1.345	0.521	4.806	1.006	0.804
1970	-0.62	-0.093	1.038	0.534	5.132	0.931	0.729
1971	-0.605	0.005	1.606	0.54	5.662	0.801	0.633
1972	-0.497	0.394	2.09	1.53	9.37	1.369	1.151

Sources: Financial Statement Statistics of Corporations by Industry, (Hojin Kigyou Toukei Kihou Syuran, Mof, Securities Bureau) 1977, One Hundred Year History of the Bank of Japan, Volume of collection of historical materials, Hundred-Year Statistics of Wholesale Price Indexes in Japan, Mitsubishi Economic Research Institute (Mitsubishi Keizai Kenkyuusho), Analysis of Domestic Economic Activities (Honpo Jigyo Seiseki Bunseki), each issue, Ministry of Labour, Monthly Labour Survey, each issue.

Table 5

The effects of intervention tools on resource allocations

steel

blast furnace steel manufacturers

	OLS (pooling data)			fixed effects			random effects			Hausman statistic		
	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)
Constant	-0.07	-0.07	-0.08	-0.24	-0.24	-0.26	-0.07	-0.07	-0.08	24.14	23.52	29.93
	<-2.22>	<-2.30>	<-2.42>	<-4.98>	<-5.08>	<-5.38>	<-2.34>	<-2.42>	<-2.60>	<0.00>	<0.00>	<0.00>
τ(-1)	0.83	0.83	0.81	0.55	0.54	0.48	0.83	0.83	0.81			
	<15.75***>	<15.56***>	<14.70***>	<7.01***>	<6.94***>	<5.91***>	<16.62***>	<16.38***>	<15.83***>			
IP1	-0.03	-0.03	-0.03	-0.02	-0.02	-0.03	-0.03	-0.03	-0.03			
	<-2.36**>	<-2.54**>	<-2.65***>	<-1.55>	<-1.95*>	<-2.83***>	<-2.49**>	<-2.68***>	<-2.85**>			
IP2	-0.02	-0.01	-0.02	-0.03	-0.02	-0.04	-0.02	-0.01	-0.02			
	<-1.64>	<-1.26>	<-1.95*>	<-1.98**>	<-1.31>	<-2.28**>	<-1.73*>	<-1.32>	<-2.10**>			

non-blast furnace steel manufacturers

	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)
Constant	0.05	0.05	0.05	0.06	0.04	0.05	0.05	0.05	0.05	46.61	41.51	46.14
	<2.52>	<2.28>	<2.46>	<2.43>	<1.74>	<2.02>	<2.67>	<2.40>	<2.61>	<0.00>	<0.00>	<0.00>
τ(-1)	0.92	0.93	0.92	0.55	0.57	0.53	0.92	0.93	0.92			
	<24.17***>	<24.27***>	<23.27***>	<8.38***>	<8.58***>	<7.77***>	<25.61***>	<25.50***>	<24.71***>			
IP1	0.06	0.05	0.05	0.02	0.07	0.08	0.06	0.05	0.05			
	<0.88>	<0.67>	<0.62>	<0.12>	<0.73>	<0.81>	<0.93>	<0.70>	<0.66>			
IP2	-0.07	-0.05	-0.04	-0.27	-0.20	-0.19	-0.07	-0.05	-0.04			
	<-1.70*>	<-1.07>	<-0.84>	<-3.93***>	<-3.03***>	<-2.81***>	<-1.80*>	<-1.13>	<-0.90>			

chemicals

organic chemistry

	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)			
Constant	0.45	0.41	0.44	0.83	0.99	1.07	0.45	0.41	0.44	33.9	52.0	55.7
	<4.84>	<3.77>	<3.76>	<7.54>	<7.79>	<7.93>	<5.20>	<4.25>	<4.28>	<0.00>	<0.00>	<0.00>
τ(-1)	0.75	0.67	0.66	0.40	0.20	0.17	0.75	0.67	0.66			
	<13.95***>	<11.31***>	<10.75***>	<4.87***>	<2.42**>	<1.88*>	<14.98***>	<12.74***>	<12.25***>			
IP1	-0.33	-0.21	-0.17	-0.32	-0.30	-0.30	-0.33	-0.21	-0.17			
	<-0.94>	<-0.52>	<-0.41>	<-0.93>	<-0.82>	<-0.80>	<-1.01>	<-0.59>	<-0.47>			
IP2	-1.45	-0.15	-0.09	-1.14	-0.53	-0.47	-1.45	-0.15	-0.09			
	<-6.15***>	<-0.60>	<-0.36>	<-4.97***>	<-2.28**>	<-1.98**>	<-6.60***>	<-0.68>	<-0.41>			

inorganic chemistry

	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)			
Constant	0.11	0.11	0.10	0.18	0.18	0.19	0.11	0.11	0.10	8.37	8.50	9.88
	<2.74>	<2.66>	<2.44>	<3.82>	<3.78>	<3.74>	<2.72>	<2.64>	<2.42>	<0.04>	<0.04>	<0.02>
τ(-1)	1.05	1.05	1.05	0.89	0.88	0.85	1.05	1.05	1.05			
	<26.81***>	<26.72***>	<25.55***>	<12.43***>	<12.38***>	<11.22***>	<26.58***>	<26.50***>	<25.39***>			
IP1	-0.19	-0.13	-0.04	-0.17	-0.12	-0.03	-0.19	-0.13	-0.04			
	<-1.09>	<-0.74>	<-0.22>	<-0.95>	<-0.67>	<-0.18>	<-1.08>	<-0.73>	<-0.22>			
IP2	-0.13	-0.12	-0.08	-0.13	-0.12	-0.08	-0.13	-0.12	-0.08			
	<-1.01>	<-0.93>	<-0.64>	<-0.87>	<-0.80>	<-0.49>	<-1.00>	<-0.92>	<-0.63>			

textiles

cotton, staple fibres

	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)			
Constant	0.05	0.05	0.05	0.06	0.04	0.05	0.05	0.05	0.05	0.00	0.00	0.00
	<2.52>	<2.28>	<2.46>	<2.43>	<1.74>	<2.02>	<2.67>	<2.40>	<2.61>	<1.00>	<1.00>	<1.00>
τ(-1)	0.92	0.93	0.92	0.55	0.57	0.53	0.92	0.93	0.92			
	<24.17***>	<24.27***>	<23.27***>	<8.38***>	<8.58***>	<7.77***>	<25.61***>	<25.50***>	<24.71***>			
IP1	0.06	0.05	0.05	0.01	0.07	0.08	0.06	0.05	0.05			
	<0.88>	<0.67>	<0.62>	<0.12>	<0.73>	<0.81>	<0.93>	<0.70>	<0.66>			
IP2	-0.07	-0.05	-0.04	-0.27	-0.20	-0.19	-0.07	-0.05	-0.04			
	<-1.70*>	<-1.07>	<-0.84>	<-3.93***>	<-3.03***>	<-2.81***>	<-1.80*>	<-1.13>	<-0.90>			

pulp and paper

pulp

	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)			
Constant	0.07	0.10	0.09	0.10	0.17	0.22	0.07	0.10	0.09	9.33	7.33	10.83
	<1.07>	<1.58>	<1.42>	<1.06>	<2.13>	<2.56>	<1.12>	<1.63>	<1.50>	<0.01>	<0.03>	<0.00>
τ(-1)	1.02	1.03	1.02	0.67	0.71	0.58	1.02	1.03	1.02			
	<19.73***>	<19.75***>	<18.80***>	<5.35***>	<5.17***>	<3.92***>	<20.65***>	<20.38***>	<19.94***>			
IP1	0.01	-0.05	-0.02	0.24	0.10	0.17	0.01	-0.05	-0.02			
	<0.12>	<-0.51>	<-0.23>	<1.42>	<0.67>	<1.21>	<0.13>	<-0.53>	<-0.25>			

paper

	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)	simultaneous	lag (-1)	lag (-2)			
Constant	0.10	0.12	0.13	0.19	0.26	0.30	0.10	0.12	0.13	32.46	28.88	37.89
	<1.97>	<2.53>	<2.46>	<2.72>	<4.22>	<4.63>	<2.07>	<2.64>	<2.62>	<0.00>	<0.00>	<0.00>
τ(-1)	0.95	0.94	0.94	0.66	0.67	0.61	0.95	0.94	0.94			
	<31.54***>	<31.70***>	<30.28***>	<11.28***>	<11.29***>	<9.86***>	<33.14**>	<33.05***>	<32.31***>			
IP1	0.01	-0.02	-0.00	0.21	0.07	0.12	0.01	-0.02	-0.00			
	<0.24>	<-0.40>	<-0.05>	<1.91*>	<0.78>	<1.24>	<0.25>	<-0.42>	<-0.06>			

Note: t-Statistic in parenthesis.

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

Appendix: The list of policy actions for the steel , textile and paper and pulp industry between 1964 and 1972

	IP1	IP2
steels	restrictions on new investments by the moral suasion for stainless steel plates (six firms only allowed to introduce new equipment's by rotation), April 1967-March 1971	lending by the Japan Development Bank for special steels, 1966
	the coordination of capital investments in steels under the administrative guidance by the MITI, May 1967-March 1970	public lending for changes in industrial structure of special steels, 1967-1970
	designated cartels in special steels, November 1971-June 1973	public lending for alloy iron, 1968-1970
		lending by the JDB for special steels, 1964, 1965, 1967-1969
		public lending for the improvement of industrial structure for other textile products, 1967-1970
chemicals	restrictions on new investments by the moral suasion for sodium sulphide, 1957	lending by the JDB, 1963-1964
	postponing new investments decided by the Council for Financial Institution Funding for synthetic organic chemistry, 1957	public lending for the improvement of industrial structure for ammonia, 1968-1970
	setting the standards for approving investments increasing production capacity by the council for polyethylene, 1967	lending by the JDB, 1966
	restrictions on new investments backed by the antitrust law for vinyl chloride resin, January 1967-September 1967	public lending for the improvement of industrial structure for petrol-chemical products, 1967-1968
	restrictions on new investments backed by the antitrust law for polyvinyl chloride pipe, November 1968-	
textiles	restrictions on new investments backed by the antitrust law for cotton rayon staple fiber, October 1965-March 1967	public lending for industrial for other textile products, 1967-1970
pulp and paper	restrictions on new investments for white paper under the designated cartel in a recession, February 1967-December 1967	
	restrictions on new investments for corrugating medium core paper, November 1965 July 1966, February 1967-July 1967	
	restrictions on new investments for lining papers, November 1965-March 1967	

Note: IP1 actions for curbing investments, IP2 actions for promoting investments

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