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The MITI and Hi-Technology: Practical Verification of a thesis about Active Role of Government in Japan

Abstract

This article presents an overview of cases of administrative guidance Japan's Ministry of International Trade and Industry along with Ministry of Finance applied in hi-tech companies after World War II. First (point 1) I will examine the role of financial promotion, then (point 2) I will discuss consequences of protecting ineffective companies and later (point 3,4,5) I will analyse the role of cartels in development of hi-technology. The conclusion is that the role of the state in this area was limited.

Introduction

The Japanese and the whole world seem to believe that in all the years following World War II Japan's Ministry of International Trade and Industry (MITI) largely contributed to promotion of high technology in Japan. The aim of this article is to verify this view by referring to the thesis of the so-called Governed Market school of economic thought¹. I will also attempt to answer the question whether the central state administration employing various tools of selective industrial policy (preferential credits, tax relief, customs duties, import quotas, subsidies etc.) really stimulated development of priority

¹ The examples of works in this school include Ch. Johnson, *MITI and the Japanese Miracle: The Growth of Industrial Policy, 1925–1975,* Stanford University Press, Stanford 1982; J. Zysman, *Governments, Markets and Growth: Financial Systems and the Policies of Industrial Change,* Ithaca, Cornell University Press, New York 1983; W. Nestler, *Japanese Industrial Targeting: the Neomercantist Path to Economic Superpower,* Mc Millan London 1991.

sectors of economy. I will also analyse some cases of state aid and protection provided for unprofitable business entities. And finally, I will discuss antirecession and research cartel as well as investment limits regarded to be tools that have been or still remain an important strategy applied to intervene in advanced technology industries.

Decisions made by micro businesses, banks and companies are largely influenced by *administrative guidance* that is not obligatory but effective way of pressure exerted by the superior authorities, i. e. the MITI and MOF (Ministry of Finance) and Central Bank².

1. Preference system for priority industries – empirical approach

The strategy of Ministry of Finance implemented in co-operation with the MITI was meant to apply promotional tools of industrial policy (preferential credits, duties and tax relief) in selected *hi-tech* sectors. This postulate needs to be verified.

Japanese economists K. Hamada and A. Horiuchi (1988) in their analysis of the amounts of funds the state allocated in 1954–1967 to finance equity of companies point out that the government did not give any priorities to *hi-tech* industries. Obviously under political pressure, according to "me too" principle, the government provided resources not only for various growth industries but also for different other sectors. As a result most funds went to mining industry (49,8% of all expenditure for this industry), agriculture (50%), sea transport (41,8%) and power industry (26,8%). All these were either stagnant or declining industries in the era of accelerated growth.

Similar results were obtained by R. Beason and D. Weinstein (1996). Unlike the common opinion the research shows that the government subsidised the spheres of low growth rate and of diminishing economies of scale rather than so-called industries of the future as it could be expected. The authors made a quantitative analysis of financial resources allocated in 1955–1990 to thirteen sectors of Japanese manufacturing and mining industries, shown according to the average growth rate, considering following most frequently used promotional

² More information on this method can be found in: J. O'Haley, Administrative Guidance versus Formal Regulation: Resolving the Paradox of Industrial Policy in: Law and Trade Issues of Japanese Economy. American and Japanese Perspectives (eds.) G. Saxonhouse, Y. Yamamura, University of Tokyo Press, Tokyo 1986; M. Ramseyer, The Cost of the Consensual Myth: Antitrust Enforcement and Industrial Barriers to Litigation in Japan, "Yale Law Journal" no 94, 1985.

tools: preferential credits from the Japan Development Bank (JDB), subsidies, customs barriers and tax allowances. The biggest beneficiaries were two last industries on the performance list i.e. mining and textile industries. Mining industry took the biggest advantage of low-interest loans, subsidies and tax savings. Only customs barriers did not play crucial role as a promotional tool and as Beason and Weinstein suggest (p. 29) the reason was the lack of resources in Japan. Textile industry was the second to receive effective protection as well as to obtain tax allowances and the third domain to get subsidies. Other sectors that received substantial state aid such as oil and coal, chemicals and basic metals do not belong to modern industries, either.

Three the most rapidly developing segments of economy namely electric machine industry, machine industry and transport industry (mainly car industry) nearly always received assistance below the average. Moreover the allocation of resources was not always coherent as some priority industries derived large profits due to the received aid tools and thus were neglected in allocation of other forms of assistance. Apart from the lack of consistency in case of resource industries, oil and coal mining, for instance, benefited from constant loans from the JDB but at the same time were liable to extremely high taxes. Textile industry, on the other hand, got special protection against import competition in form of subsidies and tax allowances, but to a little extent was included in the scheme of low-interest government loans. H. Patrick (1986) points out that the preferences prove that the allocation of resources between sectors was not due to the special policy implemented for *hi-tech* industry but due to other reasons (social, political etc.)

As for the influence taxes exerted on profitability of companies of various sectors it can be assumed that the degree of differentiation of effective tax rates was in the given period more levelled out than the Governed Market school of thought suggests. However, the differentiation was still lower than in the USA or Great Britain (Saxonhouse 1986; Patrick 1986). Another conclusion that can be drawn on the basis of the research is that traditional industries like iron and steel industry and perhaps engineering and car industry that invested in new plants and production facilities benefited most (if at all) from the preferential treatment. It is assumed (Pechman and Kaizuka 1976, p. 372) that the equivalent of tax allowances granted to chosen branches in 1954–1971 was not impressive. Throughout thirty years period (1950–1980) absolute and relative amounts main state banks devoted to support selected industries were quite small e.g. the JDB, the only state bank owing special mandate for promoting *hi-technology*, issued all in all 13 billion USD low-interest loans in the first two decades and 16 billion USD in the third decade. The loans were not granted for development of new industries but for implementation of projects in

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the area of public infrastructure, transport and agriculture (Trezise, Suzuki 1976). Nevertheless the loan strategy of state banks evolved along with allocation of financial resources within FILP (Fiscal Investment and Loan Program), the second budget managed by the Ministry of Post and Telecommunications. On average in 1953–1973, 23.6% of resources were given for the development of key industries whereas in 1976–1981 only 2,9% Anezaki, 1989).

Japan like the USA followed the idea of "small government". In 1950-1960 government spending amounted to 21% GNP whereas in the USA to 30% (Lincoln 1984). Although in the next decade it increased quickly and reached 34% in 1981, no considerable changes can be noticed until 1990s. Share of subsidies in Japanese GNP was also small and according to Boltho (1985) following OECD (1978) it was lower than in four richest EU countries. Subsidies were crucial for politically important declining industries like coal mining, textile and petrochemical industry (Okimoto 1989) but they played marginal role in growth industries e.g. electronics. Financial support the state granted for investments in early 1960s amounted to 2.5% of all expenditures and only 0.8% in late 1970s. The total share of government resources in information industry was also small (Friedman 1988). The GM literature formulates a hypothesis that small JDB loans set out guidelines for city banks and long-term credit banks for the preferences of the state administration and as such were respected in form of immense influx of funds from the mentioned private institutions (Boltho 1985; Johnson 1982). Nevertheless the empirical verification I have made suggests that city banks granted preferential credits mostly to industries other than *hi-tech*. As for the investment credit banks we can hardly speak of any obvious signal effect. It is hard to say on what basis it is assumed that banks followed selected state guidelines as for instance Industrial Bank of Japan in 1964-1965 granted low-interest loans to 73% of all joint-stock companies (Lincoln 1984, p. 25).

To sum up the role of public finance in Japan in years 1950–1990 we can say that the state aid was of great importance for stagnant industries of great political power (coal mining, petrochemical and textile industry), for social and economic infrastructure (power and transport industry) and especially in 1950s for industries that were at their peak at that time (iron and steel, aluminium, shipbuilding industry). On the other hand the assistance had no influence on new industries of high growth rate (Trezise 1983, Noguchi 1988, Beason and Weinstein 1996).

2. Protection policy for non-profitable firms entities and its results

The main reason for the protection of non-profitable firms in Japan after the World War II till the crisis in 1990s, was adherence to the rule of permanent employment and connected with it lack of institution of bankruptcy, but first and foremost struggle of governing powers to maintain the belief in reliability of financial system. There are at least four cases of *bail-out* of bankrupt companies: 1) due to social and economic reasons government write off debts and combat unemployment (Sasebo Heavy Industries) 2) bank upon the request from the MOF comes to the rescue of another bank (Nippon Trust), 3) bank on its own initiative, organises a bail-out instead of bankruptcy and eventually liquidation (Ataka & Co.) 4) bank bears financial effects of company mismanagement and comes to its rescue (Toyo Kogyo).

The case of Sasebo shipyard in 1970s is a rare example of discontinuance, but only after the intervention of Prime Minister. The decision about liquidation was cancelled because Sasebo was at the time one of the main sources of employment in the region and its closure would have resulted in limited number of jobs. The shipyard managed to survive as it received various preferential credits and tax relief. Another example is a take over of state owned Nippon Trust whose debt amounted to about 4,9 billion USD in 1994 by Bank Mitsubishi, one of eleven city banks (The Economist, 1994). Mitsubishi spent nearly 2 billion USD to acquire 64% of Nippon Trust shares and in this way owned 69% of the whole packet. The question arises why Ministry of Finance using the administrative guidance channel asked Bank Mitsubishi to help to rescue state financial institution and why the bank agreed. At the time of transaction, the potential buyer already possessed some trust shares (not being in serious debts itself) and in the past had sent the unwanted employees to Nippon Trust. However, the offer was accepted due to a different prevailing reason. The planned deregulation of finance was based on the assumption that city banks could compete with stockbrokers as for industry insurance and with trust banks as for investment management (except pension funds). The last point did not refer to Bank Mitsubishi that in fact by acquiring trust bank, acquired its licence. Administration of pension funds resources, especially in the context of lack of commercial competitors, was a fair reward for a bail-out.

The impact BOJ (Central Bank of Japan) had on stability of Japanese financial system is clearly seen in case of bankruptcy of huge Japanese trading house *sogo shosha* Ataka and restructuring of Toyo Kogyo, the producer of Mazda. In 1975 Ataka was on the ninth position as for turnover among ten largest trading houses in Japan. Its annual turnover amounted to 4 billion USD with debts of nearly 2 billion USD. Ataka employed about 3.700 people or 20 thousand if considering all companies involved in this joint venture. Ataka had 106 agencies, 25 of them abroad, and co-operated with 35.000 other companies. At that time Ataka was in bad debt of around 337 million USD that was incurred by Ataka America as a result of wrong decisions made by the management and oil shock of 1973. But the heaviest losses (674–1011 million USD) sogo shosha suffered from irrevocable trade and investment credits. Many borrowers were in default as a result of energy crisis and recession (Sheard 1985). Despite tremendous losses, Ataka legally has not gone bankrupt. No bankruptcy proceedings began, official receiver was not called yet, nor distribution of healthy part of the firm between its creditors was made. The decisive role in the whole process was played by the main *keiretsu* bank, Bank Sumitomo, the company belonged to (Miyashita and Russel, 1994).

Sumitomo concentrated on three main issues i.e. preventing immediate threat of bankruptcy, reorganisation to facilitate take-over by other companies and compensation for Ataka creditors. The rescue was made by implementation of drastic personnel changes and secondment of own employees to fulfil chief functions in the company. The first task of the newly formed team was to pay back bad debts incurred by Ataka America. They managed to do it by creating a paper company and five biggest banks that co-operated with Ataka (including Sumitomo) paid necessary capital to the company account. At the same time it should be stressed that the "official authorities" showed great determination in persuading the society that the existing system was secure and big companies did not go bankrupt in traditional way. On the day when the press published the news about Ataka & co. problems a press conference was held in Bank of Japan with the management of Sumitomo Bank and Kyowa Bank who expressed their official support for the ailing company.

Reorganisation carried out by and on the initiative of Bank Sumitomo management resulted in partial absorption of Ataka & co. by other trading houses. Its competitor C. Itoh (now Itochu) got the largest share taking over sales of steel and engineering products. Itoman assumed textiles trading and Okura Shoji appropriated import of machine tools. The problem of remaining debt (after partial acquisition of assets) was solved in the following way: Sumitomo as the main bank paid off 57%, Kyowa Bank 24%, Sumitomo Trust & Banking and three other banks Tokyo, Mitsubishi and Mitsui 17% and ten other big banks 2%. It is interesting to compare loss coverage by first two financial institutions and their involvement in generating all loans for Ataka. In 1975 their involvement was 14.6% and 7.8% respectively. In "normal" finance world shareholders bear main burden in case of bankruptcy and creditors are threatened by insolvency. But in case of Ataka two main creditors overpaid immensely and the sums exceeded the company debts on credits and all this was possible without putting the unprofitable company into liquidation. Shareholders, on the other hand, could escape by investing capital in C. Itoh (Sheard 1985).

The latest case concerns Toyo Kogyo. The direct cause of its financial problems in 1974-1975 paradoxically was Wankel engine that contributed so much to brisk sales of Mazda on American market as it fulfilled strict American requirements of environmental protection. However, high fuel consumption along with incoming energy crisis undermined sales profitability. Whereas other competitors reacted immediately and cut down on deliveries, Mazda continued sales on the same scale for a year which only made the situation worse (Sheard 1985). Moreover, mismanagement was a crucial factor that led to the company decline. In April 1975 Mazda Motors of America incurred losses of 740 billion USD and Toyo Kogyo of 56 billion USD. In this case the main bank of the bankrupting company used a strategy that helped Ataka trading house to recover. It was based on direct protection against bankruptcy, public declaration of support and vast reorganisation scheme. Therefore Sumitomo arranged sale of Toyo Kogyo agencies in Tokyo and Osaka and emission of its Sumitomo Bank and Sumitomo Trust & Banking shares, gaining 108 billion USD. However, there was still deficit of 114 billion USD, 70% of which i.e. 81 million USD, were covered by two Sumitomo banks in this way coming to the bankrupt's rescue. Other strategic measures involved delegating own managers to Mazda board and implementing the programme of job cuts and transfer of employees to dealing network. This strategy helped to economise 121 million USD over 7 years (Pascale and Rohlen, 1983). Sumitomo put considerable effort and as a result Mazda Motors of America was divided into two and then taken over by Sumitomo Corporation and C. Itoh. The bank insured also assistance from other group companies e.g. Sumitomo Metal, Nippon Steel Glass, Sumitomo Electric and Sumitomo Corporation that maintained preferential terms on deliveries of materials (Sheard, 1985). In 1976 and succeeding years the concern generated profits. The crowning point of its operation was a tie-up with Ford that in 1979 had 25% holding in Toyo Kogyo.

Unlike Toyo Kogyo, other countries applied completely different solutions to such problems. In "normal" circumstances the result would be either actual bankruptcy or company take-over by the state due to social and political reasons (Mazda in 1974 employed 37,000 workers directly and 80,000 including all subcontractors and dealers). The concern could also seek additional funds though it might have been hard to obtain them. Japanese scenario turned out to be completely different. Bank Sumitomo made use of the internal capital market between closely related companies and provided the troubled company with financial and organisational assistance. The presented solutions of banks covering losses incurred by unprofitable companies were implemented throughout many years and created excessive sense of security both on the side of "givers" and "recipients" and led to the crisis of the banking system in 1990s.

3. Anti-recession cartel and the phenomenon of excessive competition

State interference in Japanese economy was possible to a great extent due to so-called "market failure" that created destroying excessive competition among dynamically developing companies of large scale production. New companies, the exporters of the 60s, amazed the world with their cheap products. They were able to produce long batches because of high concentration of production. At first it concerned only textile industry then also shipbuilding and steel industries and finally involved production of semiconductors, cars and computers. In those days in Japan economies of scale was a prevailing myth, though it always implied dangers connected with merchandising. So in the extreme case accumulated and steeply increasing supply could lead to excessive demand (on internal and foreign market) causing an avalanche of bankruptcies. The situation could become critical during recession. Anticipating economic need (according to economists approving of the Governed Market school of thought) to assure constant cost lowering and price hammering, Japanese industrial policy as if automatically applied, within its range of measures, antirecession cartel i.e. state adjustment of prices and production as well as investments (investment limits in given industries) (Zysman 1983; Murakami 1988). Without deep research into these mechanisms the authors approve of GM opinion i.e. they idealise the role the MITI played in promoting intensively developing hi-tech companies. Detailed analysis, however, does not confirm such conclusions.

Although in Japan government used to base in practice its policies on the idea of excessive competition, only few Japanese economists tried to explain its underlying theory. For instance Morozumi (1973), representative of the GM school of thought, suggests the following definition: excessive competition is when losses in economy exceed benefits deriving from this competition". It does not provide satisfactory explanation and the terms "losses" and "benefits" are too vague. Morozumi's definition refers to earlier definition given by Bain (1968). He has in mind the industry of small degree of concentration where majority of companies realise little profits or do not generate any profits at all,

there is a slow transfer of production resources (and firms) for other applications all this leading to small profitability or long-lasting state of incurring losses.

Some voices could be heard to limit excessive competition not only in case of low concentrated industries but also or perhaps mainly in case of oligopolistic sectors. Such demands were generally in accordance with MITI interests, its belief in advantages of economies of scale and its desire to remain influential at the time of opening Japanese commodity and capital market. Finally, it is also important that growth forecast (so called economic visions) made by Japanese government generally did not match actual economic results. On one hand it was a proof of dynamic development of private investment, on the other it showed that it will be hard to prevent excessive competition in the future (thus the need for co-ordination of interindustrial development was inevitable).

Let us examine how anti-recession cartel functioned in practice. In 1953 the amended anti-trust bill allowed for temporary cartel (from 3 to 9 months with the possibility of extension) in industries of fast growing productive capacity that faced demand barrier. Cartel was possible only when following MITI criteria were fulfilled:

- 1) over 50% companies of given industry experienced serious financial problems, that might lead to insolvency;
- whole industry experienced excessive capacity in relation to existing demand;
- 3) at least 2/3 of companies submitted such request.

Only when these conditions were fulfilled did the MITI start to work out stabilisation programme for a given industry. First the MITI along with concerned companies prepared a forecast of supply and demand for given commodities (including import and export volume), then estimated abundant productive capacity so as to determine degree of its reduction and assign limits for various companies. The criterion of commercial efficiency was the key to establish the limit as it was based on the assumption that generally small enterprises are less profitable and therefore they first need to reduce production (Młodawska 1994). The MITI did not impose any sanctions to make companies accept the stabilisation programme, but once they implemented the programme the MITI enjoyed numerous privileges like limit monitoring, deciding when the least profitable companies should withdraw from the market and control over compensations companies were entitled to.

Japanese experience of cartels implemented in chosen industries in 1950–1970 (Sekiguchi 1990):

1) By inflating internal prices cartels almost did not contribute to price increase on international market. Japanese shipbuilding industry was exceptional as in late 60s being under jurisdiction of Ministry of Transport³ it realised 50% of world orders;

- 2) The reduction was not always carried out according to the criterion of commercial efficiency e.g. in shipbuilding and paper industry where under political pressure most production cuts were made in big enterprises. In case of synthetic fibres due to the same reasons equal limits were introduced without regard to the size of given company. It seems probable that despite temporary cut in production, safety measures i.e. cartel was conducive to economy overinvestment.
- 3) Some industries e.g. shipbuilding and textile successfully made use of compensation scheme for small enterprises under liquidation. They took advantage of special *non-profit* institution created on the basis of compulsory payments from profitable companies. However, it was not always possible to define and obey individual restrictions (companies refused to join a cartel, exceeded production norms). It is important since it was the main reason given by the MITI praising its procartel activity.

The above mentioned examples let us assume that anti-recession cartel played less influential role in the development of export than it is stated by GM school. Maintaining bottom limit for domestic prices did not assure better *terms of trade*. Besides there were some irregularities in the functioning of the cartel although all in all it contributed to the economy stability⁴. What needs to be examined is the scope of the state instrument. Unlike common opinion, anti-recession cartels did not exist in leading technological industries, but in growth industries as well as restructuring and bankrupting sectors. Throughout 20 years

⁴ Export cartel is different since by the definition an increase of internal prices in the context of lack of competition on the closed internal market might become a source of oligopolistic profits and low prices on world market. Then the company can be accused of dumping that was the case of Japanese companies e.g. cartel in colour TV at Matsushita leadership in the 1970s.

³ At the moment of implementation of anti-recession cartel Japan was still separated from the outside world by quantitative import restrictions and imposed allocation of foreign currency. Thus the mechanism of maintaining artificially inflated prices during temporary overproduction proved effective. The more internal market integrated with international market, first by diminishing the role of export quotas in favour of customs duties, and since 1964 due to gradual reduction of duties (Kennedy Round), the more importance of cartels declined. In fact in 1950–1960 and after two energy crises there were still some cartels at the end of every financial year (Annual Report of FTC of Japan, 1989), but volume of import to suit the needs of Japanese industry was quite small. As for export, only textile industry played an essential role in foreign trade over the examined period of time. In late 60s steel and ships became important in foreign export markets. Figures concerning foreign sales were important as long as they were big, otherwise limits imposed on internal production led to further decrease in sales (first case). However, when sales turned out to be significant (second case), internal cartel could increase the world price. In 1950–1960 Japan experienced the first case.

1950–1960 iron and steel, cement, chemical, engineering and textile industries that created cartels experienced fast growth. Cartels (legal cartels) increased from 162 in 1955 to about 1000 until the end of 1960s. However, gradual liberalisation of trade was marked by slower growth rate (Iyori 1986). According to Porter and Takeuchi (1999) the number of registered cartels in 1973–1990 (1,379 cartels) proves that they were more often used in stagnant economic segments rather than in internationally successful branches like manufacture of cars, semiconductors, electronics, numerically controlled machines, robots. In the last field if there were any to be found at all they were connected with export and then a dramatic increase of prices could be noticed e.g. in case of semiconductors cartel – Strategic Trade Agreement I (STA I). However, the importance of cartels in development of *hi-tech* industries is not recognised. For instance Friedman (1988) does not recognise it in case of numerically controlled machines, Porter (1990) in case of industrial robots and Lincoln (1984) and Fransman (1995) in case of computers.

Therefore, in contrast to the opinion of economists favouring Governed Market school of thought, anti-recession cartels, though widely used in Japanese economy, did not exert any influence on dynamics and condition of *hi-tech* industries. On the contrary, all the time lots of *hi-tech* companies were set up and went bankrupt in accordance with cruel market mechanisms, and finally only the best survived. Moreover, the analysis of well-known conflicts of interests in the light of *administrative guidance* shows that the declining or growth industries were given special treatment (Upham 1987, on Sumitomo Metals and Upham 1982, on cartel in refineries).

4. Investment limits as a potential tool for controlling economic growth

Investment limits constituted another method applied within administrative guidance scheme. In 1959–1969 in the period of investment boom, the MITI Industrial Structure Council, mainly Industrial Capital Subcommittee, issued a written recommendation on allocation of investment in key industries. The directive character of set limits perhaps was not that great. The policy of investment co-ordination was carried out without any special authorisation by law. It was based only on the assumption that companies should co-operate in order to keep social order. Only refinery industry had its Petroleum Industry Law that was the basis for MITI decisions. In case of other sectors it was unofficial interference based indirectly on other legal provisions e.g.

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Foreign Capital Law that regulated the access to foreign technologies. In petrochemical industry this act was in force until 1972 (Miwa 1996).

In 1960s the MITI suggested limiting new models of numerically controlled machines while maintaining certain quantities of machines of a given type. Despite the fact, that the companies did not adhere to these recommendations, they did not become liable to any penalties (Tsuruta 1988). MITI efforts were most significant in 1961–1964 and after 1969 MITI recommendations disappeared from the most important published materials at all. Specialists in this area believe that since that time we can speak of liberalisation in the policy towards companies. Table 1 shows the reduction of "private investments appetites" suggested by the MITI.

Table 1. Suggested reduction of planned capital expenditures by various industries in 1959–1969 (in per cents)

Industry	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
Petrochemical	19.1	37.3	30.6	13.8	28.8	20.7	12.3	5.3	19.6	31.3	5.9
Synthetic fibres	19.0	13.4	1.7	10.5	27.2	11.1	5.8	Lin-	5.2	-	-
Fertilizers	17.2	8.3	16.2	11.4	12.9	9.0	11.6	-	-	-	
Cars	-	6.2	10.4	3.8	20.3	20.1	4.4		-	-	-
Steel	16.6	7.1	5.0	4.0	23.0	7.8	4.1	4.5	8.6	17.2	-
Oil processing	13.2	16.0	8.4	27.5	40.1	28.6	2.0		8.5	7.5	3.5
Coal	8.9	-	-	3.1	0.2	8.7	1.7	-	2.6	-	
Paper industry	8.8	6.4	8.2	0.2	14.4	24.8	12.5	4.8	11.9	12.3	5.3
Power engineering	1.8	0.7	0.2	1.2	8.4		-	-	4.8	4.0	1.5
Electronics	-	7.1	-	-	-	-	-	-	-	-	-
Electric machines		5.0	9.0		18.9	10.5	-	-	-	-	
Cement	-	-	16.5	6.4	- 1	-	-	-	-	-	-
Non-ferrous metals			3.2	15.5	16.9	28.0	2.5	-	-	14.5	
Electric cable	-	ar an the	-	-	2	4.3	3.5	-	-	2.3	ni co-l

Source: K. Calder, Strategic Capitalism. Private Business and Public Purpose on Japanese Industrial Finance, Princeton University Press, Princeton 1993, p. 131.

The above table indicates that MITI policy towards private sector, remaining under ministerial jurisdiction, entailed only reduction of capital expenditures, and still explicitly did not encourage investment in *hi-tech*

industries. For example investment projects in the emerging export car industry in 1960-1965 were consequently cut down. Officials used a lot of energy to limit investment of small enterprises such as Honda, Toyo Kogyo (i.e. today Mazda) and Isuzu. These companies remained in good relations with the MITI. Moreover, the MITI stated that they stood no chance of becoming competitive on the market. Eventually, mainly Honda and Mazda became most innovative Japanese car manufacturers. The analogy to steel industry seems obvious where the MITI in vain was trying to "knock out" dynamic, new outsiders such as Kawasaki Steel, Sumitomo Metals and Amagasaki Steel. At the same time MITI proved to be extremely tolerant towards declining industries, especially those it was in good long-standing relations. The necessity to substitute coal with oil was obvious in Japan in late 50s, but it was only in 1962-1965 that the Ministry ordered reduction of investment plans though still on a much smaller scale that in case of car industry. Oil refinery, on the other hand was recommended to implement reductions throughout 1960s. The biggest cuts the MITI ordered for petrochemical industry and oil processing owned by big keiretsu Mitsui, Mitsubishi and Sumitomo and foreign capital. These companies were beyond political and personal MITI control.

Detailed analysis of data depicted in table 1, leads to astonishing conclusions. Generally speaking, at the time of fast growth MITI role was rather stabilising than strategic (picking up less, a more promising industries followed by promotional and discouraging policy) with regard to specific industries and mutual relations (Calder 1993; Komiya 1990). MITI function in the relations between sectors was not to predict the future, as it remained a task of companies but to create favourable conditions to realise aims companies set on their own. Within economic segments the MITI lessened oligopolistic competition (by encouraging mergers) and delayed entrance of new companies both domestic and foreign. This phenomenon occurred in majority of dynamically developing industries. However, the MITI and existing companies did not manage to avoid excessive production capacity. For instance, in 1959-1967 the MITI applying plant building permit raised minimum amount for production of ethylene from 40,000 to 300,000 tons per year. However, there were still companies that complied with the technological and financial requirements (Tsuruta 1988). It was a paradox that the MITI with all its controlling powers could not use them effectively and replaced the policy of limiting licences with unlimited issue of them. Table 1 shows MITI recommendation for reduction of capital expenditure whereas table 2 displays more interesting data concerning actual investment.

Industry	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
1	2	3	4	5	6	7	8	9	10	11
Petrochemical	1.1	-8.7	4.0	-14.9	-16.9	-15.5	-8.7	-10.0	0.1	38.8
Synthetic fibres	-19.7	-1.1	-1.5	3.3	11.7	47.6	-19.7	12.0	9.3	13.1
Fertilizers	-14.2	9.5	-5.4	-	-4.3	-2.4	-13.1	-8.6	-1.7	3.3
Cars	29.3	27.2	-7.3	-4.4	-0.1	-1.7	-1.8	0.7	18.4	13.6
Steel	-2.2	21.4	-9.5	-2.1	-0.4	-5.9	-4.9	15.5	13.9	22.0
Oil processing	3.9	32.0	-13.5	-7.2	-4.6	2.4	-8.9	0.0	2.6	4.8
Coal	-5.4	-8.6	indi 51	ulo fe	-15.3	5.2	4.1	-5.1	13.5	-4.9
Paper industry	17.7	1.6	-21.1	-14.1	-8.4	-	0.0	6.5	-2.7	11.5
Power engineering	4.5	6.3	-3.9	-8.5	-6.6	-4.0	0.4	0.0	1.2	10.8
Electric machines	11 2	37.4	5.7	7.9	-18.1	60.6	-20.9	5.2	-29.5	40.4
Electronics	-	19.5	-9.8	-12.9	-2.5	4.1	-2.7	29.5	12.5	24.0
Cement	-	13.3	-11.9	-11.9	5.7	-7.2	20.0	1.7	13.7	30.0
Non-ferrous metals	aubp- (25.9	nd 9-0	11 8 - N	- 10	-19.9	-0.7	11.1	3.6	21.5
Electric cable	-	-	-	-	-	-22.7	4.9	-10.9	3.6	34.3
Car tyres	-	-	-	-	-	21.8	-6.5	-15.9	11.2	28.6
All industries	11.5	6.9	0.8	-1.2	-5.6	-1.6	-7.3	2.7	10.4	17.2

 Table 2. Discrepancy between actual capital expenditures and recommendations of Industrial Capital Subcommittee (in per cent)

Source: as in table 1

The above table indicates that MITI recommendations were often ignored or sabotaged. Expenditure for fixed assets build-up often exceeded set limits and it was "golden era" of MITI activity. The biggest discrepancy can be noticed in two cases. Firstly in capital-intensive sectors of oligopolistic competition and strong tie-ups with private *keiretsu* banks. At the time of economic expansion of 1959–1960 and late 60s sectors like steel, petrochemical and cement industry rapidly started to compete for market shares neglecting MITI recommendations. These were the sectors of "excessive competition", the MITI complained about.

Immense discrepancy was also to be noticed in case of companies from sectors that for a long time had "tense but necessary" relations with the MITI and remained in very good relations with private banks offering long-term credits. It refers mainly to cars, electric machines, computers, and electronics i.e. the most buoyant sectors of Japanese economy. These industries based on strong and independent sources of financing could treat recommendations less seriously and freely react to market signals even against the ministerial wishes. Nevertheless, sectors like power industry for instance, with no well – established *keiretsu* relations and very little competition within the sector very seldom neglected ministerial guidelines. The analysis so far indicates that the MITI did not exert so evident influence on company decisions, as the Governed Market school of thought would suggest, at least not in case of companies from sectors commonly regarded as innovative and dynamic since they constantly exceeded investment limits. Therefore we can say that the MITI despite its intentions, did not hinder "excessive competition".

5. Research cartel and its role in hi-tech promotion

The third method of administrative guidance applied by the MITI was its pressure to form cartels in R&D (especially in information industry). Individual companies could not supply sufficient funds to finance serious scientific research and its further application. It generally concerns research that requires substantial sums of long gestation period and dubious final results. Besides business do not get engaged enough in the theoretical laboratory process of finding new solutions since the way from formulating the idea to its actual implementation is quite long and does not ensure commercial success. This and many other reasons like spill-over effect make governments feel predestined to interference (e.g. Japan, France). Many economists representing the Governed Market school of thought praise research cartel as a modern tool of state interference that reduces uncertainty and guarantees additional funds for companies. For instance L. Thurow (1992) points out that research cartel not only helps to raise funds for developing knowledge but also allows for transmission of technology and inventions. It is believed that there is a better chance to spread an innovation in society if the patent is granted to an institution rather than individual, egoistic creator of invention. Moreover, it is also important that small enterprises should become members of such cartels.

In my opinion financial aid starting in 1980s was not so crucial for big companies as they had substantial own recourses. In 1966–1989 the state spending of 43 million USD per year covered less than 10% of R&D expenditure in Japanese information industry as a whole. The remaining 90% was financed by private companies (Okimoto, 1986). Two kinds of government grants exist in Japan i.e. non-refundable and refundable, the latter being in fact

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loans that need to be repaid if project happens to be successful. In his book Okimoto states that in 1976–1982 more than 60% of government grants were refundable. However, 43.6% of subsidies given in 1974–1978 by AIST at the MITI were written off by 1982 (p. 62–63). A good example is VLSI cartel, a group of companies producing very large-scale integrated circuits, which in 1976–1979 consisted of 5 big semiconductor manufacturers (Fujitsu, Hitachi, Mitsubishi Electric, Nippon Electric, Toshiba). In 1979–1987 the group managed thousands of patents and used profits they generated to refund the grants. Only after full repayment, patents became company and inventors' properties.

Non-refundable grant became more widely used after 1980. Although R&D expenditures were completely covered by government, companies reluctantly participated in government projects for various reasons: a bunch of paper work, detailed regulations, strict accounting procedures, constant controls, unalterable technical specification and lack of certainty there will be a market for new goods. I think the most important fact is that cartel companies could not be given property rights to their inventions. Patents automatically go to government agency, a sponsor that makes research results available for a certain fee to anyone who asks for it. It is clearly visible in case of four big R&D projects in Japanese information industry in 1980s (Fransman 1990⁵).

Other economists, favouring MITI cartels, besides easier transmission of inventions and material support for research in private companies, give also other advantages of this policy such as work division, avoiding duplication of research, creative exchange of ideas (Tabb 1995), reducing risk of being overtaken by competitors and avoiding their use of research results on freeriding basis (Yamamura 1986). Tabb's argument often appears in literature and is logical, but untrue since given the unconventional way inventions are made, it is hard to decide which group of creators are privileged to work in a given field and which technology is most promising. Besides state officials may decide to choose unappropriated areas of research which was the case of some R&D projects in information and electronic sector, mainly proposed by two consortiums: Supercomputer and Fifth Generation, in 1980-1990. Supercomputer which existed in 1981-1989 included 5 companies NEC, Fujitsu, Hitachi, Toshiba, Mitsubishi and Oki and its capital amounted to 92 million USD. The other consortium functioning in 1982-1992 grouped all companies that had realised Supercomputer project and Matsushita, Sharp and

⁵ The author stresses high transaction costs when forming such big organisation. It is due to the fact that companies are unwilling to share own technological achievements. Until 1990 there were only two cases of spontaneous co-operation in the field of R&D without participation of the state (p. 279–280). However, they did not result in any spectacular achievements.

a telecommunication concern NTT. Overall the whole undertaking cost 305 million USD. In case of both cartel programs independent companies being subject to MITI pressure decided to withdraw already allocated funds and make some employees redundant (Callon 1995).

Another example is a joint initiative of the MITI and Ministry of Education (TRON) in 1984 that aimed to create new, original IT system for schools. The MITI, not officially engaged in the works of the consortium, was a grey eminence that made NEC participate in the program. NEC had a monopoly on personal computers in Japan and fearing the competition, it was against the idea for a long time. In my opinion the main reason why companies did not want to support MITI research aspirations in 1980s, was that the MITI was rather interested in basic research that so far was domain of other government agencies (Ministry of Education and Ministry of Health). Huge companies did not approve of the change and refused to offer funds they used to provide for research cartel. As a result MITI financial resources and a range of research projects shrank. Allocation of resources only to few projects became risky as the selected projects might prove to be abortive.

The formula of non-refundable grants (Supercomputer, Fifth Generation, TRON) means that members of the consortium did not feel obliged to work more efficiently (they did not risk own resources after all) and that their proposals did not meet enough concern. Quite contrary assumptions were made on the basis of evident (actually the only) MITI success i.e. VLSI research program. The state covered 40% of the costs, the remaining 60% covered private enterprises. As for Supercomputer and Fifth Generation, they did not achieve equally good results within the formed cartel, fully financed by the MITI, due to insufficient engagement of the partners and lack of direct, verifying contact with the market and its requirements.

Whereas in 1980s central administration promoted studies on big next generation computers, IBM launched personal computers that turned to be a tremendous success. Japanese government, unlike the business world, were not aware of consumer needs and competition and could not select the project that would become a technological success. The MITI favoured futuristic and spectacular project because of their interests in so called "big science". Japanese officials were not under any political pressure either from parliament or a lobby, which happens very often in other countries. Historically, Japanese state administration rather than politicians were held in high esteem, at least till 1990s. Besides, the strongest groups of interests functioned in heavy industry and agriculture, not in *hi-technology* sector. Therefore research into "big machines" indicated only ministry aspirations.

Tabb and Yamamura present other benefits research cartels brought about such as concerted intellectual effort in solving new problems and reduction of risk of being taken over by competitors that instead "easily" join a cartel. In practice the theory did not work. A company possessing the latest achievements would not willingly share them with its competitors. Moreover, it is assumed that final results are always more fruitful in case of co-operation rather than competition. This is vital assumption and requires empirical justification. Is co-operation always possible? Let us examine the experience of companies that participated in Supercomputer program. Three companies Hitachi, NEC and Fujitsu were given a task of creating a big computer. In the last year of the project when the MITI asked Hitachi and NEC engineers to assemble the computer, Fujitsu forbid them the access to the computer they had worked on. They were allowed to check the parts they had designed only in presence and by Fujitsu employees and it was the way they could find out whether their efforts were fruitful or not. Generally speaking, relations between the companies seemed satisfactory only on the surface. In the final stage in order to prevent surveillance, Fujitsu did not allow Hitachi and NEC employees to eat at Fujitsu canteen and go to work by Fujitsu bus. Therefore it is impossible to call it and example of good co-operation.

VLSI consortium, on the other hand, proved successful because of good financial not technological solutions. The project concerned application rather than development of new technologies since IBM and other American companies already knew how to create RAM. VLSI is generally perceived as a proof of superiority of Japanese team-work over American dispersed efforts in the area of R&D but it needs to be pointed out that only 20% of funds were spent on joint work of a hundred scientists from 5 companies (consortium members and MITI laboratory). 80% of expenditures went for research carried out in laboratories of individual companies. Besides 20% given for shared laboratory were spent on program that turned out to be a failure (technology of lithography with the use of electron beams as the basis for future VLSI production) (Fransman 1990). Not only examples of Fifth Generation, Supercomputer, TRON but also VLSI program confirms predominance of competition over co-operation. In case of VLSI consortium most financial resources were consumed by private laboratories that functioned as separate firms since formal cartel members refused to co-operate in the area of key technologies and wanted to stay competitive. Research problems partially overlapped and similar projects were carried out simultaneously in different institutes. Because of turf struggle between the MITI and NTT (Nippon Telegraph and Telephone), that at that time belonged to public sector, some organisation structures grew immensely and overlapped. An important factor that relaxed inward tendencies was a challenge posed against IBM. Such an element cannot be found in other joint projects and shared laboratory was found only in Fifth Generation program (overall around 20% funds).

In evaluation of research cartel as an MITI instrument for promoting technological progress we should bear in mind that VLSI is a special case. The key of its success was ministerial money. In 1975 companies in Japan went through financial crisis after the oil shock. Besides in 1975–1976 the MITI opened Japanese market for American semiconductors that the ministry had announced before energy crisis of 1973. In this context government funds and creation of consortium contributed to Japanese semiconductor technology.

To sum up I would like to stress some facts. In 1960–1980 important changes took place in Japanese economic and political situation. Firstly, big financially independent companies refused to contribute to financing MITI cartels. Secondly, the MITI realised that the era of hegemony of traditional capitalistic powers was over and selective industrial policy became more complicated. And thirdly, trade and technological conflicts with the USA to a great extent limited use of measures for supporting Japanese companies.

Thus research cartel in the examined period was not a basic instrument of R&D stimulation⁶.

Conclusion

The presented analysis of basic forms of financial assistance provided by the state in 1955–1990 shows that alleged promotion of *hi-tech* industry was in fact substituted by assistance provided for transforming or declining sectors. Institutions like cartels or investment limits either were not applied in case of *hitech* (anti-recession cartels) or proved not effective (investment limits, research cartels). Conclusions made on the basis of this analysis contradict basic assumptions of the Governed Market school of thought, though in order to reject them completely or not, deeper analysis is needed.

⁶ In 1996, twenty years after VLSI cartel, MITI created similar big institution ASET (Association of Super Advanced Electronics Technologies), that involved 21 private companies and existed 5 years. Such a long break in the ministry activity was due to American conflict until the USA created similar consortium SEMATECH. In the same year ten biggest Japanese semiconductor manufacturers set up a *private* consortium SELETE (Semiconductor Leading-Edge Technologies, Inc.) where competitive companies co-operated in same areas. This incredible event (a decision by independent private companies) is justified by difficult situation of Japan in this field. (I. Koike, R&D Consortis in the 1990, 1998).

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