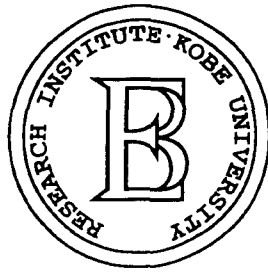


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RESEARCH INSTITUTE FOR ECONOMICS
AND BUSINESS ADMINISTRATION
KOBE UNIVERSITY

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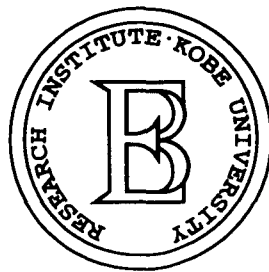
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WHAT SOUTH ASIA CAN LEARN FROM EAST/SOUTHEAST ASIA: INTERNATIONAL TRADE AND FOREIGN DIRECT INVESTMENT¹

KAZUHIRO IGAWA Kobe University

Abstract

Taking into account the experiences of East and Southeast Asia, we have recommended South Asia strategic policies. The important role of intra-regional trade, intra-industry trade, and intra-regional foreign direct investment for East Asian miracles is stressed.

JEL classification: F42

Keywords: International division of labor; Intra-industry trade; Intra-regional FDI; East and Southeast Asia

1. Introduction

In this paper, I would like to argue that both Foreign Trade and Foreign Direct Investment are key engines for economic developments of South Asian countries. I also want to discuss that the lessons from experiences of East and Southeast Asia might be useful for economic growth and poverty reduction of South Asian countries. It is a very distinctive feature in East and Southeast Asian countries that international division of labor is extended through international trade

Corresponding Address:

Kazuhiro Igawa

Research Institute for Economic & Business Administration, Kobe University

2-1 Rokkodai-cho, Nada-ku, Kobe 657-8501, Japan

E-mail: igawa@rieb.kobe-u.ac.jp

Fax: (81)-78-803-0391

1 This paper depends on the discussion of the conference held by Economic Development Institute (EDI) of The World Bank, in Colombo, Sri Lanka, from October 19 to 24, 1998. The topic is *Economic Growth and Poverty Reduction: Theory, Evidence, and Implications for South Asia*, and the title of my submitted paper is, "International Trade and Foreign Direct Investment: International Evidence and the Case of South Asia"

and foreign direct investments.

In the following sections, I will show and discuss about economic evidence in Asian countries and theory of dynamic gains from trade and foreign direct investment (FDI) and policy recommendation for South Asian countries.

In section 2, I will look at the macro-economic performance of South Asia, comparing to East/Southeast (ESE for abbreviation) Asia. There, I would like to suggest a possibility for South Asian to introduce economic development policies of ESE Asia.

In Section 3, first, arguments for the gains from foreign trade are revisited and I would like to stress the importance of dynamic gains through efficient and intensive division of labor. Then, foreign trade patterns are investigated in more detail for ESE Asian countries, where intra-regional trade and thus more intensive international division of labor has been extended. The trade patterns in South Asian countries will be mentioned briefly to suggest that the experiences in ESE Asia might be good references to South Asia.

In Section 4, arguments for gains from foreign direct investment are summarized and the importance of dynamic gains through technology transfer is stressed. FDI in ESE Asian countries are compared with those in South Asian countries. Intra-regional cross-foreign direct investments are impressive feature of ESE Asian regions, which shows extensive international divisions of labor in the regions. This also gives us some implications for South Asian countries to invite foreign direct investment.

In final section, I would like to discuss about possible economic policy strategies for South Asia in the contemporary world trends of globalization and regionalism. The regional integration of NAFTA, EU and ESE Asia will be taken into account for the policy arguments.

2. South Asia and ESE Asia in the world

In spite of the recent economic trouble in many ESE Asian countries, it is still impressive that their economic performances before Asian financial crisis were good and many countries completely cleared hurdles of early stage of economic development. It is said that policies for liberalization of international trade and foreign direct investments in those countries were successful, especially the policies to invite

foreign direct investments and to promote exports of products were right. In discussing the problems in South Asia from aspects of trade and foreign direct investment, I would like to share the argument about East Asian Miracles by the World Bank².

In the interesting paper³ of comparing Africa and East Asia, Peter Harrold, Malathi Jayawickrama, and Deepak Bhattasali suggest South Asia to lesson from economic experience of East Asia. In the paper, there are many tables, which show economic situations of South Asia relative to those of East and Southeast Asia. In Table 2 of HJB paper, per capita GDP annual growth rates are shown as follows.

Table 2

% per annum	1961-72	1973-80	1981-90	1961-93
Africa	1.3	0.7	-0.9	0.3
East Asia	7.0	7.1	9.4	7.4
Southeast A	3.2	4.9	4.3	4.3
South Asia	1.3	1.6	3.3	1.8

East Asia: Korea, Hong Kong, Singapore and Taiwan.
Southeast Asia: Indonesia, Thailand, and Malaysia

This table shows that the economic performances of Southeast Asia and South Asia are between those of East Asia and Africa, and the one of South Asia is between those of Southeast Asia and Africa. If the lessons for Africa from East Asia are relevant, the lessons for South Asia from East Asia will be relevant. In practice, the lessons for South Asia from Southeast Asia might be more relevant. This is because, South Asia is more close to East and Southeast Asia not only geographical and cultural senses but also similarity of economic development stages.

We can find the economic performances in country base data of Table A2, which is made from data tables in *Asian Development Outlook 1998* from Asian Development Bank.

2 The World Bank, *The East Asian Miracles: Economic Growth and Public Policy*, The World Bank 1993

3 Peter Harrold, Malathi Jayawickrama, and Deepak Bhattasali, "Practical Lessons for Africa from East Asia in Industrial and Trade Policies", World Bank Discussion Papers 310, The World Bank 1996. We call the paper as HJB paper for abbreviation.

Table A2 Growth Rate of Per Capita GDP

% per annum	1992	1996	1997	1998	US \$, 1996
NIEs	4.7	5.1	4.6	0.9	
Korea	4.0	6.1	4.5	-1.9	10,610
Singapore	4.1	5.1	5.7	0.4	30,550
SE Asia	4.4	5.2	1.7	-2.3	
Indonesia	5.4	6.2	2.9	-4.4	1,080
Malaysia	3.3	6.1	5.1	1.2	4,370
Thailand	6.8	4.3	-2.8	-4.7	2,960
S Asia	3.4	4.8	3.1	4.5	
Bangladesh	2.5	3.5	3.8	4.1	260
Bhutan	1.3	2.9	2.9		390
India	3.3	5.6	3.4	5.0	380
Maldives	2.8				1,080
Nepal	2.5	3.9	2.2	1.6	210
Pakistan	4.7	1.3	0.6	2.3	480
Sri Lanka	3.3	2.6	5.2	4.5	740

The level of per capita GDP in South Asian country is far below the level in Southeast Asia, this is far below the one of Asian NIEs. It is interesting that the rates of growth in per capita GDP of South Asia are expected to be higher than those in Southeast Asia in both 1997 and 1998. One reason is recent financial crisis in Southeast Asia, but as a long-term trend there are no reasons that the growth rates of catching-up countries are lower than those of the preceding countries. This will be true under conditions that government takes appropriate economic policies and private sector has sound economic incentives. Of course, political stability of the country and of the world is an important necessary condition.

Let us look at more data of economic performance in ESE Asia and South Asian regions or countries. The following data tables will be helpful to understand the development stages of South Asian countries relative to East and Southeast Asian countries, in many aspects.

For economic growth or development, a capital accumulation is necessary and thus the rate of investments relative to GDP (investment ratio: Investment / GDP) indicates the rate of growth in capacity. Looking at Table A8, made from data in *Asian Development Outlook 1998* (Asian Development Bank), the gross domestic investment rate per

GDP is low in South Asian countries relative to East or Southeast Asian countries, where economic growth rates are high. In spite of financial crisis in ESE Asia, expected investment ratio is higher in those regions than the one in South Asia.

Table A8 Gross Domestic Investment

% of GDP	1992	1996	1997	1998
Korea	36.6	38.2	34.6	26.4
Singapore	36.0	35.3	37.4	32.0
SE Asia				
Indonesia	32.4	30.8	31.6	25.0
Malaysia	35.1	41.5	42.0	40.5
Thailand	40.0	41.7	35.0	26.0
S Asia				
Bangladesh	12.1	17.0	17.4	17.2
Bhutan	47.7	48.0	47.0	
India	24.0	27.1	26.6	27.1
Maldives				
Nepal	21.2	23.2	23.4	24.9
Pakistan	19.9	18.7	18.4	20.0
Sri Lanka	24.3	24.2	25.8	26.7

A most part of domestic investments is financed by domestic saving, and thus it is necessary to check saving rate per GDP (saving ratio: Saving / GDP) when we investigate why investment ratio is low in South Asia. We can find the table of saving rate in HJB paper and We have quoted some parts of its Table 3 as follows.

Table 3: Gross Domestic Savings as a Share of GDP

	1967-73	1974-80	1981-90
SSA	15.7	20.7	12.6
East Asia	21.1	28.4	33.2
Southeast Asia	18.9	28.1	31.9
South Asia	14.4	17.1	19.1

SSA: all African countries except Algeria, Egypt, Libya, Morocco, Tunisia, and South Africa

It is well known that a recent saving ratio is high in East and Southeast Asian regions. There are many factors to determine saving ratio, for example higher growth rate of disposable income than expected rate, consumption adjustment lag to growing income, and oriental ethical behaviors. Higher per capita income and lower inflation rate will be necessary conditions for higher saving ratio. We can infer that those conditions are gradually satisfied first in East Asia and then in Southeast Asia (lower inflation rate will be discussed later). The performance in saving ratio of Southeast Asia is catching up the one of East Asia, and the one of South Asia has started to catch up the one of Southeast Asia. The saving ratio in South Asia has become higher than the one of SSA, after 1980s, but is the level of Southeast Asia in early 1970s.

Another ways to finance domestic investments are inflows of foreign funds and inflows of ODA. Inflows of foreign funds, specifically of foreign direct investments, will be discussed in Section 4 in detail and here I will briefly show ODA data as follows.

Table 1. ODA of Japan and World

ODA to developing countries and International organizations, Top 11			Bilateral ODA of Japan, Top 10 Accumulated value of 1992-1996		
1996	Million \$	Per GNP(%)	Receiving Country	Million \$	Share(%)
Japan	9439	0.20	China	6122.72	13.53
USA	9377	0.12	Indonesia	5249.72	11.60
Germany	7601	0.33	Philippine	3211.24	7.10
France	7451	0.48	India	2692.95	5.95
England	3199	0.27	Thailand	2478.04	5.48
Holland	3246	0.81	Pakistan	1156.09	2.56
Italy	2416	0.20	Bangladesh	1005.00	2.22
Sweden	1999	0.84	Egypt	908.20	2.01
Canada	1795	0.32	Sri Lanka	798.59	1.77
Denmark	1772	1.04	Mexico	501.13	1.11
Norway	1311	0.85	10 total	24123.68	53.32
DAC total	55465	0.25	World total	45242.37	100.00

Data from *Kaigai Keizai Kyoryoku Binran*, Overseas Economic Cooperation Fund 1998

The table shows that Japan is one of the top donors of ODA, and bilateral ODA of Japan goes to China and Southeast Asia and South Asia.

Economic development accompanies shift of employment in agricultural sector to those in industrial sector. However this structural change will be done successfully with the condition that a productivity of agricultural sector increases parallel to the shift of employment. Therefore it is necessary to check the productivity growth rate of agricultural sector in Asian countries. For this argument, the following Table 4 from HJB paper will be useful.

Table 4: Agricultural Income, Labor Force and Productivity

Average annual growth rate	Agricultural income	Agricultural Labor Force	Productivity
SSA	1.9	1.6	0.3
East Asia	3.2	1.0	2.2
South Asia	2.4	1.7	0.6

Increasing agricultural productivity permitted higher agricultural income and labor movements into manufacturing, that is industrialization in East Asia. The performance of South Asia is better than SSA but much worse than East Asia. It is very important for South Asian countries to increase the productivity in agricultural sector.

As I mentioned, sound policy and sound economic environment are necessary conditions for economic growth and economic development. Inflation rates show some aspects of macroeconomic stability and the situation of South Asia is not bad.

Table 9: Average Inflation Rates, 1961-91

Japan	5.6
Korea, Rep. of	12.2
All low-and-middle income economies	61.8
South Asia	8.0
SSA	20.0

From HJB paper

Using data of Asian Development Bank (*Asian Development Outlook*, 1998), we have got the following table of inflation rates and government budget conditions. There, we can find effects of financial crisis of Asia in 1998, but inflation rates (left-hand side figures) in Asia NIEs and Southeast Asia were relatively low. The government budget figures (right-hand side figures) of surplus or deficit were not bad in those regions. However, the performances of South Asia were not very bad but unsatisfactory.

Table A9 Changes in Consumer Prices &
Table A23 Overall Budget Surplus/Deficit of Central Government

%per annum & % of GDP	1992	1996	1997	1998
NIEs	5.2	4.3	3.5	6.1,
Korea	6.2, -0.3	4.9, 0.0	4.5, -0.5	9.8,
Singapore	2.3, 12.6	1.4, 6.8	2.0, 3.3	3.2,
SE Asia	7.1	6.6	5.6	12.9,
Indonesia	7.6, -0.4	7.9, 0.8	6.6, -0.2	20.0,
Malaysia	4.7, -0.8	3.5, 0.7	4.0, 1.8	5.0,
Thailand	4.1, 2.8	5.9, 0.9	5.6, -0.9	15.0,
S Asia		9.3	7.1	7.4,
Bangladesh	5.1, -6.4	4.0, -5.9	3.9, -5.5	5.5,
Bhutan	15.9, -8.5	8.8, -0.6	7.0, -4.9	
India	, -5.7	9.2, -7.0	6.5, -6.7	7.0,
Maldives	16.8, -24.2	6.2, -9.9	8.0, -8.2	
Nepal	21.0, -7.5	8.1, -5.6	7.8, -5.3	7.5,
Pakistan	9.6, -7.4	10.8, -6.3	11.6, -6.3	10.0,
Sri Lanka	11.4, -7.3	15.9, -8.9	9.6, -4.9	10.0,

Recognizing the position of South Asia in these tables is a starting point of my following discussions.

3. International trade of South Asia relative to East Asia, and Southeast Asia

International trade is an engine of economic growth, but patterns of international trade are changing. As production technologies change, market side becomes large, and competition becomes severe, international division of labor is extended through international trade.

This is reflected in the trend of trade pattern from inter-industries trade to intra-industry trade. The pattern of intra-industry trade is also changing to intra-firms trade or vertical inter-process trade within a same industry.

Typical relation between trade patterns and economic development stages might be as follows. I will pick up four cases depending on development stages or per capita income levels. When a per capita income is very low and an international comparative advantage shows that raw materials and agricultural products are exportable, inter-industry trade will prevail. Most manufactured goods or industrial products are comparative dis-advantage and will be still importable. When a per capita income is low and raw materials or agricultural products are main exports but an industrial sector has some labor-intensive exportable goods, inter-industry trade will be still dominant but some intra-industry trade might exist. When per capita income is high and a comparative advantage is in labor-intensive goods, a weight of intra-industry trade will be high. However, the typical intra-industry trade will be exchanges of labor intensive exports and capital intensive imports. When per capita income is very high, a typical pattern of international trade is intra-industry trade of capital intensive industrial products, as can be seen among developed countries or foreign affiliates in developing countries. The intra-industry trade of capital intensive industrial exports and labor intensive industrial imports will still be important. These four development stages and trade patterns are basis of the following discussion of trade policy for South Asia.

Trade is an engine of economic growth and higher growth rates of export and import imply higher economic growth. The following Table A11,13 (using data from *Asian Development Outlook 1998* of Asian Development Bank) shows that the growth rate of merchandise trade is a little bit higher in Southeast Asia than Asia NIEs in 1990s, and South Asia is catching up with those regions. However the rates in South Asia are fluctuating and this implies that trade policies to stabilize export and import will be helpful for steady economic growth. The effects of Asian currency crisis will be found in the figure of 1997 and 1998.

Table A11,13 Growth Rate of Merchandise Exports & Imports

% per annum	1992	1993	1994	1995	1996	1997	1998
NIEs	12.1, 13.1	10.7, 10.1	15.0, 17.4	20.9, 22.9	4.5, 5.2	3.4, 3.0	4.0, -0.4
Korea	8.0, 1.0	7.7, 2.3	15.7, 22.4	31.5, 32.1	4.1, 12.2	7.2, -2.3	5.8, -12.3
Singapore	8.5, 11.3	17.0, 17.8	25.8, 19.8	21.0, 21.6	6.4, 5.4	-3.1, 0.1	2.0, 2.0
SE Asia	14.7, 8.9	13.3, 14.4	19.3, 21.8	24.3, 29.7	6.0, 6.3	8.7, 2.4	8.2, -1.1
Indonesia	14.0, 7.8	8.3, 6.0	9.9, 13.9	18.0, 26.6	5.8, 8.1	11.2, 4.8	5.0, -5.0
Malaysia	18.1, 10.1	16.1, 17.8	23.1, 28.1	26.6, 30.4	7.3, 1.7	6.0, 7.0	8.0, 6.0
Thailand	13.7, 6.0	13.4, 12.2	22.7, 18.1	24.8, 31.9	-1.9, 0.6	3.2, -9.3	5.0, -15.0
S Asia	8.0, 9.2	15.4, 14.5	13.0, 18.1	20.5, 25.7	5.5, 7.7	5.1, 5.6	8.0, 8.3
Bangladesh	16.1, 0.5	19.5, 15.5	6.0, -7.5	37.2, 39.4	12.2, 17.8	13.7, 3.0	15.0, 8.0
Bhutan	-9.6, 14.0	4.9, 50.4	-4.2, -25.7	11.7, 22.1	9.3, -8.2	8.5, 25.0	
India	3.3, 10.3	20.2, 15.1	18.4, 34.3	20.8, 28.0	4.1, 5.1	5.0, 8.2	7.5, 9.9
Maldives	10.0, 18.4	-19.0, 5.9	43.1, 9.7	12.7, 20.9	8.0, 12.6	5.8, 12.0	
Nepal	56.1, 15.8	25.4, 22.2	-2.7, 14.6	-9.6, 21.9	1.7, 9.0	10.3, 10.3	4.0, 5.0
Pakistan	14.6, 7.3	0.3, 11.7	-1.4, -3.6	16.1, 18.5	7.1, 16.7	-2.7, -5.0	6.0, 0.5
Sri Lanka	20.6, 15.3	16.3, 14.6	12.0, 18.6	18.7, 11.6	7.9, 2.5	13.0, 7.0	9.0, 10.0

(Left figure is export & right figure is import)

It is interesting to see direction of exports, which shows how a region or a country depends on other regions or countries. Table A12 (from *Asian Development Outlook 1998*) indicates that NIEs was depending on USA in 1985 but now is depending on Asia (Developing Member Countries: DMCs) in 1996. Exports to Japan have decreased a little, and exports to EU have increased a little from 1985 to 1996. The share and the change of share are different among countries, but direction of exports of Southeast Asia is also changing to Asia. These facts imply that East and Southeast Asia is increasing intra-regional trade and is increasing intra-regional mutual dependency. North-South trade (trade between developed and developing countries or regions) is not main trade pattern in ESE Asia any more. However, the exports of South Asia mostly depend on USA and EU (the roll of Japan is relatively small) and exports to DMCs fluctuate. Taking into account of geographical location of South Asia, it will be natural to have more intra-regional trade of Asia. If an international trade is more liberalized and an economy is more developed, the intra-regional trade will increase. It might be possible to say that with policies to increase intra-regional trades in Asia, South Asia will develop more.

Table A12 Direction of Exports (% share)

To	DMCs		Japan		USA		EU	
	1985	1996	1985	1996	1985	1996	1985	1996
From								
NIEs								
Korea	12.9	38.4	15.0	12.3	35.6	16.8	10.4	13.3
Singapore	36.7	48.4	9.4	8.2	21.2	18.4	10.1	13.4
SE Asia								
Indonesia	17.2	31.5	46.2	28.8	21.7	16.5	6.0	18.3
Malaysia	38.1	45.9	24.6	13.4	12.8	18.2	13.6	14.8
Thailand	27.1	34.0	13.4	16.8	19.7	18.0	17.8	15.7
S Asia								
Bangladesh	14.5	7.6	7.2	3.1	18.1	31.8	13.0	45.0
Bhutan								
India	8.9	24.1	11.1	7.4	18.9	17.3	16.7	29.4
Maldives	50.8	41.9	10.1	7.0	24.3	8.5	4.0	38.0
Nepal	41.4	12.4	0.7	0.6	35.3	34.4	20.3	52.0
Pakistan	16.0	21.4	11.3	6.5	10.0	16.7	20.9	30.1
Sri Lanka	11.2	8.1	5.1	6.2	22.3	34.1	17.9	34.4

DMC: Developing Member Countries of ADB

Expansions of world trade are supported strongly by increases of intra-regional trade, and this can be seen in Table 1-9, made using data in White Paper about World Trade by JETRO.⁴

Table 1-9 Growth rates of Export among regions

Export	import	World	EU15	A. NIEs	ASEAN4	USA	Japan
World	1990-95	8.3	4.3	15.1	19.2	8.9	7.6
	1996	3.5	3.0	-1.4	4.5	5.2	5.9
EU15	1990-95	5.1	3.6	15.2	18.2	5.2	6.4
	1996	4.8	3.5	9.0	3.6	7.9	7.1
Asia NIEs	1990-95	16.4	9.9	21.2	20.4	8.8	10.6
	1996	3.9	2.1	1.0	6.1	-0.1	2.9
ASEAN 4	1990-95	17.2	15.4	20.9	24.6	18.4	10.5
	1996	6.4	7.3	1.9	23.4	4.6	8.9
USA	1990-95	8.2	3.6	12.6	17.3	--	5.8
	1996	6.9	3.2	1.9	8.0	--	5.0
Japan	1990-95	9.0	3.7	14.4	19.2	6.0	--
	1996	-7.2	-10.3	-8.3	-4.7	-7.3	--

(Average annual growth rate 1990-1995 & growth rate in 1996)

4 Sekai to Nippon no Boueki, 1997 in Japanese

Although growth rate of world trades shift down after 1996, average annual growth rate in the period of 1990-1995 was high. Especially growth rates of Asia NIEs and ASEAN 4 were very high. More interesting features of Asia NIEs and ASEAN 4 are the facts that they increase their exports or imports among themselves, that is intra-regional trade had increased among Asia NIEs and ASEAN 4. This will be the causes and results of fast economic expansion of the regions.

From 1990 to 1995, world exports had expanded 44.4% (annual average 7.6%) and, among the exports, industrial products had expanded 52.5% (annual average 8.8%) and the share of industrial products had expanded from 70.5% to 74.4%. Inside the industrial products, chemicals had expanded 58.3% (annual average 9.6%) and electronics machinery⁵ had expanded 99.5% (annual average 14.8%). The latter fact is surprising and the export share of electronics machinery among industrial products had expanded from 12.5% (1990) to 16.3% (1995). This shows that exports of electronics machinery pulled world exports in the period, and thus international division of labor and economic developments.

Now let us look at the trade matrix of the electronic machinery in the world (using data from *Sekai to Nippon no Boueki*, 1997). The exports share to Asia from EU, North America, and Asia had expanded from 1990 to 1995 and it should be noted that the share of intra-regional trade had increased from the exports share of 29.7%

Table 11-2 Trade Matrix of Electronic machinery (Export Share, left & Import Share, right: %)

export	import	World	EU		Asia		N America	
World	1990		100.0		100.0		100.0	
	1995		100.0		100.0		100.0	
EU	1990	100.0	76.4	56.1	6.5	9.4	6.7	8.4
	1995	100.0	69.1	55.9	11.5	9.8	8.0	8.7
Asia	1990	100.0	27.3	28.6	29.7	61.0	37.9	68.0
	1995	100.0	19.7	29.7	42.8	67.7	33.0	66.6
North America	1990	100.0	32.6	14.4	33.7	29.3	21.4	16.2
	1995	100.0	23.9	13.0	38.8	22.1	22.7	16.5

(EU: 12 countries in 1990, 15 countries in 1995)

⁵ Electronics machinery includes SITC cords 75,76, and 776, office machinery, computer, telecommunication machinery, semi-conductor, integrated circuit, etc.

(1990) to 42.8%(1995). The import shares of Asia and of North America from Asia are more than 60 %, and these are very high. These facts again give us some suggestions for Asian miracles.

It is well known among economists that there are net gains from international trade. However in real world, it is not easy to list all the gains and losses and, more importantly, compensations of losers with gainers do not take place in many cases. A typical theoretical way to show gains from trade is a comparison of the situations between without trade and with free trade. However, no country is autarky in the recent world, and practical problems should be net gains from trade liberalization.

However, by and large, there is some consensus among economists and policy makers that there exist net gains from trade liberalization, at least in the long run. With trade liberalization, supply side, i.e. production structures and distribution systems, will adjust for new market conditions, such as prices, market sizes, and competitions. Although adjustments take costs, we have many cases, which show larger benefits in the long run through more efficient division of labor.

Trade liberalization increases competition and changes business incentives in the larger international market. To compete with domestic and foreign firms, structural changes of firms will be called for, after trade liberalization. New investments with new technology will accompany higher skill of workers. These adjustments will be facilitated with liberalized larger international markets. The increases of opportunities to access advanced technologies and to get high quality machinery will give incentives for profits in many firms. Efforts to get competitiveness in international markets will improve efficiency of firms.

When a market become large, firms can enjoy economies of scale and economies of scope, and more efficient systems of division of labor will be adopted. Horizontal and vertical divisions of production processes (division of labor) will increase and an international trade will assist exchanging and combining of products or services of those processes. I would like to put stress on this benefits or gains of division of labor by trade liberalization as one of important factors of higher growth of EST Asian regions. Increases in intra-regional trade is a result of extensive international division labor in those regions and is a result of trade liberalization

4. FDI of South Asia relative to East and Southeast Asia

The importance of technology transfer for economic developments is increasing. Without advanced technologies, it will be difficult to join into international division of labor. As a market transaction of technologies is not easy and many technologies are enclosed within one organization, foreign direct investments play an important role for an international technology transfer. On the other hand, with decreases of transportation costs and communication costs through technology progresses, the costs of foreign direct investments has decreased and many barriers for international business are becoming lower. These enable extension of international division of labor. A country will be included in the international division of labor deeply, if transaction costs decrease and activities of firms become global.

Developing countries are competing each other to invite foreign direct investments. In the case of foreign direct investments, foreign firms bring funds, technologies, and management know-how. Therefore a country accepting foreign direct investment inflows should only make an offer of investment environments. Favorable treatments of taxes and business regulations will be short-run incentive policy and filling up social capitals and providing education for labor will be long-run incentive policy. There will be a good cycle that inflows of foreign direct investment help economic development and this in turn help inflows of foreign direct investment.

The following Table A17 shows Foreign Direct Investments in Asia NIEs, Southeast Asia and South Asia. We can find that foreign direct investment in Southeast Asia and NIEs are large and are steady increasing in the period of 1991-1996. The one of South Asia is small but is increasing rapidly, and this implies hopeful economic development in South Asia in future.

The volume of foreign direct investment is not enough to evaluate the gains of foreign direct investments, and it is necessary to get data of several activities of foreign affiliates in developing countries. In the comprehensive book⁶ by United Nations, several interesting data about foreign affiliates are shown.

The importance of activities of foreign affiliates is increasing,

6 *World Investment Report 1997* published by United Nations

Table A17 Foreign Direct Investment (gross flows)

\$ million	1991	1992	1993	1994	1995	1996
NIEs	7,876	5,861	7,858	9,664	12,347	15,650
Korea	1,180	727	588	809	1,776	2,308
Singapore	4,887	2,204	4,686	5,480	6,912	9,440
SE Asia	8,512	9,899	10,734	10,325	14,315	19,804
Indonesia	1,482	1,777	2,004	2,109	4,348	7,960
Malaysia	3,998	5,183	5,006	4,342	4,132	5,300
Thailand	2,014	2,114	1,730	1,322	2,003	2,426
S Asia	470	703	1,141	1,922	2,643	3,468
Bangladesh	1	4	14	11	2	9
Bhutan						
India	155	233	574	1,314	1,929	2,587
Maldives	7	7	7	6	5	7
Nepal	2	1	4	6	5	5
Pakistan	257	335	347	419	639	690
Sri Lanka	48	123	195	166	63	170

Data: *Asian Development Outlook 1998* from ADB

especially in developing countries, and this will be found in the following table (Annex table A.4). The ratio of gross product by foreign affiliates to GDP had increased from 5.0% (1982) to 9.0% (1994) in East, Southeast, and South Asia, and this change is much larger than the change in the world (from 5.2% to 6.0%) in the same period.

Annex table A.4. Value of the gross product of foreign affiliates and their share in GDP, by region, 1982, 1990, 1994

Billion \$, & %	Gross Product of Foreign Affiliates			GP of FA as % of GDP		
	1982	1990	1994	1982	1990	1994
Region						
Developed Countries	403	1098	1099	5.1	6.7	5.4
Developing Countries	150	283	445	6.0	7.0	9.1
Asia	74	151	248	5.6	5.9	8.6
S, E, & SE Asia	44	112	211	5.0	7.0	9.0
World	553	1383	1557	5.2	6.7	6.0

Data: *World Investment Report 1997* from UN

Foreign direct investment is not a simple substitute for international trade, and foreign direct investment usually accompanies an import of machinery and parts for products and accompanies an export of products to investing country or to third country. This implies that there exists deeper international division of labor than the case of only international trades. It will be interesting to see international activities of foreign affiliates, and export activities of foreign affiliates, shown in Annex table A.5 (using data of *World Investment Report 1997* from UN). The exports of foreign affiliates of East, Southeast, and South Asia increased more than 4 times from 1982 to 1994, and those of world increased 2.5 times in the same period. The share of exports of foreign affiliates relative to total sales of foreign affiliates in East, Southeast, and South Asia is high and increased from 49.3% (1982) to 52.0% (1994) and the one of the world decreased from 30.5% (1982) to 27.7% (1994). The share of exports to affiliated firms relative to total exports of foreign affiliates is about 50%.

Annex table A.5. Value of exports of foreign affiliates, their share in total sales, and exports to affiliated firms, by region, 1982 and 1994

Billion \$,& %	Exports of FA		Ex of FA/Total sales of FA(%)		Ex to FA/ Total ex of FA(%)	
	1982	1994	1982	1994	1982	1994
Region	1982	1994	1982	1994	1982	1994
Developed Countries	491	1225	27.7	25.1	44.2	55.1
Developing Countries	242	585	38.1	35.6	49.5	55.8
Asia	110	431	41.3	47.9	46.2	54.2
S,E, & SE Asia	95	408	49.3	52.0	40.2	54.6
World	732	1850	30.5	27.7	46.0	55.3

Here we will look at data of FDI inflows in 1980s and 1990s of the world and Asian regions. In the period of 1985-1990, large parts of FDI flowed into developed countries and it was about 5 times of the one into developing countries. However, the weight to developing countries is increasing in 1990s and will be more than 1/2 of the FDI inflows in developed countries. The share of FDI inflows into East, Southeast and South Asia was about a half of the one into developing countries in the period of 1985-1990, but it is about 2/3 in 1996. These imply the speed of foreign direct investment inflows into East, Southeast, and South

Asia has been accelerated.

Annex table B.1. FDI inflows, by host region and economy, 1985-96 (Million \$)

Host region	1985-90	1991	1992	1993	1994	1995	1996,a
World	141930	158936	173761	218094	238738	316524	349227
Developed Countries	116744	114792	119692	138762	142395	205876	208226
Developing Countries	24736	41696	49625	73045	90462	96330	128741
Asia	13492	23129	29632	50924	57507	65249	84283
S,E,SE-Asia	12357	21228	27668	47278	55718	65175	81241
Korea	705	1180	727	588	809	1776	2308
Indonesia	551	1882	1777	2004	2109	4348	7960
Malaysia	1054	3998	5183	5006	4342	4132	5300
Singapore	2952	4887	2204	4686	5480	6912	9440
Thailand	1017	2014	2114	1730	1322	2003	2426
Bangladesh	2	1	4	14	11	2	9
India	169	155	233	574	1314	1929	2587
Nepal	2	2	1	4	6	5	5
Pakistan	167	257	335	347	419	639	690
Sri Lanka	37	48	123	195	166	63	170

1985-90: Annual Average, 1996,a: Estimates

It is also noted that the share of FDI inflows into South Asia was very low in the period of 1985-1990 (less than a half of the one into Thailand), but it has increased rapidly and has become $1/5 \sim 1/6$ of the one into Southeast Asia. The one into India was 169 million \$ per year in 1985-1990 and became 2587 million \$ in 1996. The one into Sri Lanka was 37 million \$ per year in 1985-1990 and became 170 million \$ in 1996.

We are in the position to see cross-foreign direct investment among East and Southeast countries or intra-regional foreign direct investment in the regions. FDI flows into NAFTA is about twice of the one into ASEAN 4, but FDI flows into NAFTA from EU (share of $2/3$) and Japan (share of 13%) dominates. The share of intra-regional FDI in NAFTA is 15%. FDI flows into ASEAN 4 is dominated by those from Japan (share of 31%) and Asian NIEs (share of 28%). The intra-regional FDI in ASEAN 4 is 6%. The share of FDI flows into Asia NIEs from NAFTA is 31% and the one from Japan is 23%. The one from ASEAN 4 is 7% and intra-regional FDI of Asia NIEs is 7%. It

should be noted that the share of intra-regional FDI in ASEAN4 and Asia NIEs is 32%, which is much higher than the one of NAFTA.

Table 1-14 FDI Matrix in APEC Regions (1996, inflow base, Million \$)

From	To	NAFTA	Japan	Asia NIEs	ASEAN4
NAFTA		14,028	2,171	3,030	4,651
Japan		12,146		2,190	15,734
Asia NIEs		-821	1200	726	14,446
ASEAN4		90	11	683	3211
India		281	1	0	393
EU		62518	1698	1951	7666
World		91153	6841	9718	50800

Data: JETRO

In the region of East and Southeast Asia intra-regional FDI has extended and this will imply that international division of labor is extending in those regions.

A level of FDI outflows is one of index of development stage of a country. The increase of FDI outflows from Asia NIEs implies that the development stage of Asia NIEs is approaching to the stage of developed or advanced countries.

In the Table1-12, we can find that Singapore has large outflows of foreign direct investments and direction is into Malaysia, Hong Kong, and Indonesia. Taking into account of geographical locations, historical relations, and a role as an international financial center, this will be natural for Malaysia. Korea is investing into China and Indonesia, and this is a part of "wild geese flying pattern of FDI" in Asia. Following Japan, Asia NIEs invests in ASEAN, and the ASEAN invests in other developing countries in Asia such as China. This can be find in the FDI from Taiwan and Malaysia. Taiwan invests into China, Hong Kong, and ASEAN and this is not only because of historical relations but also economic incentives and differences of economic development stages. Malaysia started to invest into other ASEAN countries and also into China. ASEAN member has increased and this will increase FDI from old ASEAN members into new ASEAN members. South Asia should make use of this trend of "wild geese flying pattern of FDI". We will discuss more about this in the following final section.

Table 1-12 FDI from Asia NIEs and Malaysia (Million \$)

From To	Singapore, Stock End of 1995	Korea 1996	Taiwan 1996	Malaysia 1996
World	32623	6132	3395	2625
Korea			6	
Taiwan	404	15		36
Hong Kong	4422	112	60	232
Singapore		71	165	671
Malaysia	6855	74	94	
Thailand	884	66	71	50
Indonesia	2844	213	83	157
Philippines	441	86	74	100
China	2094	1597	1229	179
Japan	329	57	7	41
England	2326	847	6	237
USA	1859	1167	271	400
Australia	1022	47	15	169

Data: JETRO

Efficient international division of labor will be intensified with foreign direct investments. This is the most important effect of foreign direct investments and is well understood by many economists and policy makers.

The formal argument of net gains from foreign direct investments is again a comparison of the situations with foreign direct investment and without foreign direct investment. Investigating effects of international capital movements or effects of international labor migrations captures some important aspects of foreign direct investment. However one of the important elements of foreign direct investments is that they not only accompany movements of capital but also accompany movements of international business management.

The more realistic arguments for foreign direct investments are OLI theory of foreign direct investments, by Dunning. That is the theory of Ownership advantage, Locational advantage, and Internalization. In the recent world, competitiveness of firms depends on know-how or technology of business management, on technology embodied capitals, and highly educated human capitals. Market transactions of know-how and technology are difficult and thus

transactions within a same organization dominate arms length transactions in markets.

Liberalization of foreign direct investments produces many gains both owner and host countries of affiliated firms. Besides net gains of international factor movements, there are effects of international use of know-how and technology. Know-how and technology can easily (with negligible marginal costs) be duplicated and an increase of opportunities to use them will produce net gains. A firm with foreign subsidiaries can use its own know-how and technology within the same organization in different countries. As the marginal costs to use the know-how and technology are small, the firm will get large profits by increasing foreign affiliates. In receiving countries of foreign direct investments, local labors can find jobs in the foreign subsidiaries, and will be combined with the know-how and technology.

Gains from foreign direct investments are not limited to the international use of know-how and technology but are found in international technology transfers. Foreign direct investment receiving countries can access new know-how and technology and the know-how and technology will defuse to outside of the organization. The incentives of imitation and innovation or modification of the know-how and technology will become strong in the host countries. Furthermore, vertical and horizontal division of labor will be extended seeking more efficient systems. This necessitates the foreign subsidiary firms to exchange their know-how and technology to their local partner firms. Without jointly owning the know-how and technology, it will be difficult to have efficient division of labor. A group of firms similar to a single organization (KEIRETSU in Japanese) will be designed to internalize the important know-how and technology.

Anyway foreign direct investments will facilitate technology transfer and this produces big gains in the long run. With dynamic structural changes with technology transfers, foreign direct investments bring net gains, and the gains will be larger with intensive international division of labor. The degree of international division of labor will be reflected in cross-foreign direct investments, and intra-regional foreign direct investments. It is shown that extension of intra-regional foreign direct investment in ESE Asia is a possible candidate of determinant of higher growth rate in the regions.

5. Policy Strategies of South Asia

There are two big trends in economic environments of the world. One is globalization and the other is localization. The globalization is an increase of economic activities beyond geographical borders. An increase of international trade and foreign direct investment is promoted by a decrease of international transaction costs in broader sense. Technical progress in transportation and telecommunication is an important factor and a liberalization policy in many countries is another important factor. New technology of machinery and new know-how of management, which make optimum scale of a business larger, are introduced by R&D activities. With economy of scale and/or economy of scope, business activity of a firm should be extended beyond its country borders.

Localization is reflected in regionalism or movements for regional integration. In the case that optimum market size of business firm is not global and a local accumulation or concentration of business activities produces many advantages, localization or regionalism will prevail. External economies of business concentration and reduction of network costs by concentration work. Further more, regional integration improve political power of negotiation to outsiders. So far, there are three regions of economic concentration, NAFTA, EU, and East/Southeast Asia. In the case of Asia the integration is not strict and there exist many overlapping regional nets. However those regions seem to extend in near future and globalization and localization will converge in some way in future.

South Asia gets effects of globalization and localization. Without liberalization of trade and investment, South Asia will get no gains from trade and from foreign direct investment. Without access to three regions NAFTA, EC, and ESE Asia, South Asia might be discriminated as outsider. It is important for South Asia to chose policies to efficiently use the trend of globalization and localization.

It is beyond my scope of analysis in this paper to investigate economic situations of South Asian countries in detail. Here I would like to give more broad arguments of world trade and foreign direct investment, and discuss possible development policies for South Asia region in the world economic streams of globalization and localization.

As I mentioned, there are two streams in the recent world, globalization and localization. In these two streams, South Asia region can take three pure scenarios of foreign policies. The first is general liberalization of international trade and foreign direct investment, where the region does not use strategies of specific export promotion or FDI invitation. The second is regional integration of South Asia, where the region has strategic policies to be one of the economic concentrations or blocks. The third is to strategically approach one of three regions of economic integration, NAFTA, EC or East/Southeast Asia.

Each pure scenario has advantages and disadvantages. The first scenario of liberalization of trade and investment is one of necessary conditions for economic development for developing countries. The point is whether to take strategies for promotion of export and of foreign direct investment inflow. Without strategic policies, South Asia can develop in a stream of globalization. However it takes time to be involved in extended international division of labor. Further more, it is ambiguous to become one of centers of economic concentration without help of policies. That is, there is a risk to lose economies of concentration, which relate to localization.

The second scenario of regional integration or block economy is one of strategies to get benefits of economies of concentration. Once economic concentration is realized in South Asia, it will facilitate economic development in the region. The point is whether the regional integration itself can make economic concentration in the region. There are three centers of regional integration, USA in NAFTA, Germany in EU, and Japan in ESE Asia. The center will expand within their regions until an optimum degree of concentration. When their region become too small, the region will be extended outside to include more countries and/or another center will be constructed in a new region. The situations now in those three regions are not optimum degree of concentrations. NAFTA can be extended to include South America, EU can be extended to include East Europe, and ESE Asia has China and extended ASEAN. This means that it takes time for South Asia to be a concentrated region with new center. There also exist some risks to lose gains of globalization, if South Asia makes a protective economic block.

Let us investigate third scenario. As the three regions, NAFTA, EU,

and ESE Asia, have capacities to expand inside their regions, specific policy strategies should be taken by South Asia to be included in those regions. Without extended inter-dependence of South Asia with those three regions, a speed of economic development in South Asia will be slow. Therefore it is necessary for South Asia to have strong economic relations with those three regions. Furthermore, it is necessary for South Asia to be competitive with less developed countries or regions in those three regions, in exports and inflows of FDI. To manage in these difficulties, Strategic policies in South Asia for extension of international division of labor will be called for.

My final comment is that South Asia should find strategic policy in the mixture of these three scenarios, taking into account the experiences of ESE Asia. We already showed the important role of intra-regional trade, intra-industry trade, and inter-process trade, and intra-regional foreign direct investment for East Asian miracles. Strategic policies of trade and FDI liberalization, export and FDI inflow promotion, and access to EU/ESE Asia/NAFTA with favorable conditions will be more efficient with South Asian regional integration and with political stability in the region.

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RELATIONAL GOVERNANCE IN JAPANESE VERTICAL RELATIONSHIPS

KENJI KOJIMA Kobe University

Abstract

The primary purpose of the study is to characterize significant features of relational governance in Japanese vertical relationships and to provide an economic rationale. Japanese vertical relationships, particularly in automobile industry, are examined in comparison with those in the U.S. Both buyers and suppliers have recognized the need to be interdependent and have responded by developing bonding mechanisms that build mutual trust. It could reduce transaction costs and enhance efficiency in trading relationships with relationship-specific investments in long-term relationships.

JEL Classification: L14; L62

Keywords: Incomplete contracts; Japanese firms; Long-term relationships; Procurement; Relationship-specific investment; Vertical relationships

1 Introduction

Vertical trading relationships are important concerns for firms that transact intermediate goods to achieve an efficient production system. Various systems of vertical relationships have evolved in different countries to attain efficient trading relationships. While the diversity within even a single country can be enlarging, broad differences do appear to separate the relationships most commonly found in different countries. Particularly, there are significant

Corresponding Address:

Kenji Kojima

Research Institute for Economics and Business Administration (RIEB)

Kobe University,

2-1 Rokkodai-cho, Nada-ku,

Kobe, 657-8501, Japan

E-mail: kojima@rieb.kobe-u.ac.jp

Phone/Fax: (81)-78-803-0406

differences in vertical relationships between Japan and the United States. It is commonly observed that U.S. automobile manufacturers are more vertically integrated than their Japanese counterparts. Even though U.S. automakers are more vertically integrated, they contract directly with more than one thousand suppliers for the parts they do not make. The Japanese automakers, by contrast, work with approximately one-tenth that number, buying more entire subsystems from each supplier. Product development process in the U.S. is heavily influenced by the traditional system in which suppliers produce parts under short-term, arm's-length contracts and have little role in design and engineering. In Japanese vertical relationships, in contrast, suppliers are an integral part of the product development and manufacturing processes: they are heavily involved, assume significant responsibility, and communicate extensively and directly with product and process engineers. Japanese suppliers frequently play a significant role in development. Vertical relationships in Japan can be identified to have distinctive characteristics in several aspects compared with the U.S. counterpart. What are the major characteristics of vertical trading relationships in Japan making differences from the U.S.? What factors determine the differences in institutional arrangements that govern vertical relationships among the two countries? It is important to understand how efficiently Japanese vertical relationships work, and whether the Japanese practice is unique to the peculiar circumstances of the Japanese social and cultural system.

Japanese vertical relationships can be identified that both buyers and suppliers have recognized the need to be interdependent and have responded by developing bonding mechanisms that build trust between them in the long-run. Japanese firms do not rely on legal contracts to protect their interests in trading relationships. The important issue is to understand why and how firms use such flexible arrangements. Why are many trading relationships governed by flexible and long-term relationships in Japan? What factors support the long-term trading relationships in Japan? What determines the structure of long-term relationships and why are they used instead of simple long-term contracts? What governance mechanisms will emerge as the parties negotiate a mutually acceptable trading arrangement in response to anticipated transaction costs and contractual execution difficulties? It is important to understand the economic rationale of vertical

relationships in Japan. Yet many aspects are still left unknown about the process that unfolds between buyers and suppliers in Japan and the U.S.

This paper identifies major characteristics of Japanese vertical relationship in a comparative perspective. The vertical relationships in Japan, particularly automobile industry, are examined in comparison with those in the U.S. The primary purpose of the study is to identify significant features of Japanese vertical relationships and to provide economic rationale in a transaction cost perspective. In this paper, significant features of Japanese vertical relationships are characterized as follows: long-term relationships and commitments based on flexible legal contracts; significant relationship-specific investments in plant, equipment, and human capital; building mutual trust in the long-run; supporting mechanisms for trust such as cross-shareholding, extensive information sharing, and enduring personal networks, which reduce transaction costs and eliminate inefficiencies between buyers and suppliers.

This paper is organized as follows. Major characteristics of Japanese vertical relationships are discussed in order. The next section discusses long-term relationships in relational governance systems. Section 3 discusses relationship-specific investments with a viewpoint of transaction cost. Section 4 describes building trust and supporting mechanisms to sustain trust among trading partners. Finally, concluding remarks are presented.

2 Long-term Relationships

2.1 Relational Governance

Relational governance systems that facilitate the building and maintenance of stable, long-term trading relationships. These, in turn, foster investment in relationship-specific assets, and enable firm operating within an relationship to exploit transactional rent not generally available to arm's length transactions. One should understand the conditions under which close, long-term trading relationships among few firms can lead to efficient performance.

Governance of contractual relationships span a continuum bounded at one end by the writing of explicit, detailed contracts, which may them be enforced by court in the event of breach by one of the parties.

At the other end is reliance on implicit, relational governance founded on enduring trust relationships and reinforced by largely non-legalistic mechanisms structured to encourage voluntary compliance with informal agreements. The central problem of governance in trading relationships is to devise specialized systems of incentives, safeguards, and dispute-resolution processes that will promote the continuity of trading relationships that are efficient in the absence of self-interested opportunism, but which might otherwise break under forces of unassisted market contracting.

One of the most important practices supporting the preservation of long-term trading relationships is tendency of members to engage extensively in highly informal, implicit contracting. The virtue of implicit contracting as a mechanism for sustaining long-term trading relationships lies in its intrinsic flexibility. Assuming a foundation of mutual trust and shared expectations, implicit contracting among parties better enables firms to make rapid, informal, and highly refined adjustments in the terms of trade to preserve the spirit and substance of a trade agreement rather than merely the letter of a written contract. This easy mutability allows implicit contracts to withstand greater stress than formal, explicit contracts, thereby promoting the longevity of trading relationships. Where implicit contracting is widely prevalent, the reference point in any discussion regarding a trading agreement tends to be the ongoing business relationship itself rather than the agreements *per se*.

The market may provide a natural deterrent to agents behaving opportunistically and eliminate the need to rely on either vertical integration or complex contracts. There is a potential cost to breaches of writing or implied contractual promises: the loss of future business from either this buyer or other buyers. In market where buyers and sellers frequently engage in similar types of transactions, and where it is possible at low cost to distinguish behaviors, reputation constraints will mitigate incentives of opportunistic behavior and allow agents to more comfortably use market transaction, recognizing that the market provides penalties for inefficient behavior.

The execution and adaptation of trading agreements are made primarily by reference to norms and expectations built over a long history of trading. Thus, relational governance within members is of a more continuous administrative nature and relies less extensively on

legal rules, third-party assistance to effect change, or litigation as a means of resolving disputes. Managers in firms are those who understand the interests and priorities of the relationships, are alert to the network of implicit contracts binding the firm to the relationships, and can be trusted to uphold these contracts over time through changing circumstances.

2.2 Cooperation in Long-term Relationships

Repeated trade relationship can serve in place of formal contracts in developing incentives for cooperative behavior. It states the game-theoretic idea that infinitely repeated interactions permit cooperation to occur if the players are sufficiently patient (Fudenberg and Tirole, 1991). Repetition of a game allows the players to escape the prisoner's dilemma; each player's pursuing immediate gain leads to an outcome that can be improved for all of them. The vertical relationships can have the character of a prisoner's dilemma. One way of overcoming this is to write contracts, with each party promising to refrain from the mutually damaging activity and making himself subject to legal sanction if he breaks his promise. However, cooperative outcomes are enforced by the threat that any deviation will trigger switch to an outcome of a prisoner's dilemma in a repeated game. In consequence, patient parties can implicitly cooperate with any deviation triggering punishment. The cooperation is implicit in that the parties would not need to enter into binding contracts to enforce their cooperation. Instead, each party is deterred from breaking the agreement by credible fear of provoking a prisoner's dilemma. If the equilibrium outcomes are suitably focal among the parties, then cooperation might be sustainable without even communication.

In a continuing situation, people cooperate because it is in their interests to do so. The point of the repeated-game argument is that players cooperate now for fear of being cut off from profits in the future. Suppliers make efforts to produce products on behalf of the buyers. The resulting consequences depend on an environment as well as on the suppliers' efforts. The buyers cannot directly observe the suppliers' efforts. In this situation, the repetition of the game would give the buyer an opportunity to observe the results of the suppliers' effort over a number of periods, and use the idea like some statistical test to infer whether or not the supplier was making appropriate level

of efforts (Radner, 1985). The cooperative outcomes can be attained by a review that manufacturer periodically evaluates the cumulative performance of the distributors. If a review results in a satisfactory evaluation, a new phase is begun in which the outcome is efficient to all of them; otherwise, the players enter a penalty phase in which the outcome is a prisoner's dilemma. The equilibrium cooperative outcomes are self-enforcing, and thus do not need to rely on any binding contracts or other precommitments. A supplier is given a rating according to her performance and cooperation to sell products for a particular manufacturer in the Japanese vertical relationships. A supplier that performs well is given a high rating. Then, she is promoted to be higher status in which she is provided with the various menu of rebates being rewarded for target achievement, for cooperation in quality and delivery schedule (Economic Planning Agency, 1991). The manufacturer's policy of maintaining long-term relationship with suppliers is designed to encourage them in achieving good supply performance and high cooperation.

Although repetition can induce the incentive for players to cooperate, a repeated game has plethora of equilibria involving cooperation outcomes as well as non-cooperative ones; each player rationally pursues either long-term or short-term gains (Fudenberg and Maskin, 1986). Hence, repetition offers no guarantee that it will occur. None of the players can be ensured that cooperation occurs as an equilibrium outcome. The cooperation resulting from repeated relationship is not robust, so that it is necessary to have devices to support cooperative relation among players. Repeated relationship in Japanese vertical relationship is secured by mutual trust founded upon unique bonding mechanism. Bonding mechanism to facilitate partners to exchange and disseminate information and to establish personal ties among themselves. Information sharing and close personal ties may ensure every member of the trading relationship to establish and maintain goodwill and trust among them. These dominant social norms encourage members of the group to choose cooperation as one of the focal point equilibria (Schelling, 1960).

2.3 Long-term Relationships in Japanese Firms

One of the most salient and enduring characteristics of the Japanese firms is their tendency to engage in close, long-term business

relationships with other firms.¹ This particularly characterizes their trading relationships, but also their dealing with banks. Many of these in turn have long-standing relationships with one another, resulting in an intricate network of firms connected by formal and informal commitments. This corporate network maintains stable, close relationships with a network of suppliers, distributors, and creditors. Sustaining a complex network of business relations within the group may also require a narrowing of the scope for independent actions and the occasional subordination of individual corporate interests to that of the group at large.

In the trading relationships in Japanese firms, a number of common characteristics that contribute to their effectiveness as systems for controlling and coordinating the performance of members in the relationships. One of them are heavy reliance on implicit, relational contracting founded on trust. Among Japanese firms, supply contracts are established by a basic agreement which is short, written document that is little more than legal ones stipulating that the supplier and assembler are entering into a trading relationship, will operate on a basis of mutual respect for each other's autonomy, and will endeavor in good faith to maintain an atmosphere of mutual trust

1 In 1986, the Fair Trade Commission (FTC) surveyed the user-supplier relationships at 200 large non-financial firms, of which 94 firms responded (Fair Trade Commission, 1987). In regard to production goods as well as capital goods, the overwhelming response was that they had long-term relationships with all or the majority of their suppliers with maintaining over more than five years. 63% of respondents had the trade relationships with their 30 largest suppliers over more than ten years. The prevalence of those long-term relationships was explained in the FTC report as follows: a close, long-term relationship with a few suppliers affords substantial reductions in purchasing management costs as suppliers can be increasingly relied on to perform product inspections and inventory control, to protect technical secrets, and to settle transactions smoothly; in a long-term relationship, communication becomes simpler and mutual understanding develops; this is seen as a major advantage in maintaining existing purchasing relationship with trading off raising switching cost. Economic Planning Agency in Japan conducted the mail-survey on the trade practices in 1990 (Economic Planning Agency, 1991). It shows that long-term relationships seem to both foreigners and the Japanese peculiar to Japan. Moreover, it shows it works against newly entering foreign firms. Respondents are foreign businessmen in Japan and the Japanese in that survey. 82% of respondents among foreign businessmen agree that long-term relationships are peculiar to Japan; 72% of Japanese respondents agree with that. 70% of foreign respondents agree that long-term relationships are working as an entry barrier. On the other hand, 35% of the Japanese agree with that. That survey supports the claim of foreign manufacturers trying to enter the Japanese market. It is claimed that they are unfairly excluded because the Japanese distributors purchase only from their accustomed manufacturers.

in their business dealings. The contracts in Japan often do not even state definitely the transactions at stake so as not to restrict the flexibility considered necessary to modify the supply agreement over time.

It is shown that suppliers have a close and long-term relationship with their largest customer both in Japan and U.S. automobile industry by Liker, *et al* (199). They also suggests closer, more long-term relationships in Japan, though these differences are not as large as expected. It is observed that Japanese automakers have the most dedicated relationships with subsystem suppliers and the least dedicated with lower-tier suppliers. Japanese suppliers are considerably more dependent on their largest customer. Equity ownership is more prevalent in Japan. This results suggest U.S. automobile companies are as likely as Japanese companies to out-source design, given suppliers early information about product development, and allow them to develop unique design capabilities the automobile company cannot replicate.

U.S. automakers are more vertically integrated than their Japanese counterparts. Even though U.S. automakers are more vertically integrated, they contract directly with 1,500 to 3,000 parts suppliers for the parts they do not make. Toyota, by contrast, works with approximately one-tenth that number, buying more entire subsystems from each supplier. Reducing the total number of direct suppliers can lower costs while increasing quality. Using fewer suppliers can create value by providing economies of scale and benefits of experience curve that lower either transaction costs or production costs. Within most industries, as cumulative production experience in producing a product or service increases, quality is improved and costs are reduced. Japanese automakers have consolidated their business with a few highly efficient suppliers and created conditions that permit the suppliers to make the investments necessary to accelerate down the experience curve and to share the full advantage of this volume with the automakers. When a Japanese supplier wins a contract with Toyota or Nissan, it is essentially guaranteed four years of business or the life of the model. Moreover, if the supplier performs up to expectations, it can usually renew the business for the next model as well. Naturally, these practices encourage long-term plans and investments. Suppliers invest in developing ideas and plans for the next model well in advance.

Engineers from the limited suppliers have long-term experience working together, making it easier to rapidly develop designs for the next model. When the model change occurs, suppliers continue to move down the experience curve.

In contrast, U.S. automobile manufacturers have attempted to keep input prices low by maintaining size and bargaining power over suppliers. By splitting their business among many suppliers and rotating them frequently, U.S. manufacturers have repeatedly destroyed the experience curves of suppliers by ensuring that no one supplier could accelerate down the experience curve to accumulate decisive cost advantage. Thus, the U.S. suppliers typically do not develop long-term relationships and experiences with automakers. Moreover, they are unable to effectively plan long-term production and investments, which is reflected in lower average plant capacity utilization. Without long-term commitments, U.S. suppliers can not have incentives enough to make long-term investments in capital equipment. Moreover, without the ability to make long-term forecasts, it is very difficult to make maximum use of capacity and capital equipment. For example, manufacturers may involve suppliers to a greater degree in the product design process to utilize fully the value of present tools and equipment. In this way, the risk of tool obsolescence due to unilateral design changes is lowered. Naturally, the longer the parties work together under these circumstances the more likely it is for mutual trust to be developed. Trust in this case comes from reliability demonstrated over repeated interactions, as well as the shared knowledge that the parties need one another (Dyer and Ouchi, 1993).

Supplier relations in the U.S. are changing rapidly and are moving close to the those in Japan. Cusumano and Takeishi (1991) present the results of a questionnaire survey to a sample of automobile manufacturers in the U.S. and Japan during the spring of 1990. The survey provides evidence that U.S. automakers and suppliers have adopted at least some practices traditionally associated with the Japanese, thus indicating a possible convergence toward a Japanese model of vertical relationship. The evidence shows that U.S. automakers appeared to move close to the Japanese model during the 1980s in several areas. For example, U.S. firms had long, stable histories of relations with their suppliers; the average contract lengths they gave out for components after market introduction were dropping while

quality was improving; past relations and financial affiliation, such as use of internal part divisions, were becoming less important as factors in choosing suppliers, while pricing accuracy and quality seemed to be gaining importance. Where once contracts were short-term, arm's-length relationships, now contracts have increasingly become long-term. Helper and Sako (1995) shows that U.S. suppliers must provide buyers with detailed information about their processes, and buyers talk of partnerships with their suppliers. 87 percent of Japanese suppliers, compared with 68 percent of U.S. firms, thought that their customer's commitment would last more than four years, the typical duration of a model cycle. The actual record of trading with the same customer was significantly longer in Japan than in the United States.

3 Relationship-specific investments

3.1 Transaction costs

If perfectly enforceable contracts could be written, the responsibility of each party to the others in the contracts could be delineated under all possible future contingencies. Under these circumstances, there would be no scope for the opportunistic exploitation of asymmetric information and unobservable actions by any one party at the expense of others. Potential conflicts between parties lie at the transaction costs. Transaction costs include: costs of negotiation and writing contingent contracts; cost of monitoring contractual performance; costs of enforcing contractual promise; and cost associated with breaches of contractual promise.

As a fundamentally self-interested party in its own right, and one often capable of undertaking actions or exploiting information hidden from other party, one party cannot always be counted upon to act in the best interests of the other. Recognizing this possibility, rational parties are induced to develop appropriate incentives and safeguards to mitigate self-interested opportunism by other parties. The costs of designing and running these relationships, and value lost due to the residual shirking or private consumption of rents accrued in the trading relationships by one party that ultimately cannot be eliminated, are the transaction costs borne by one party.

As uncertainty and complexity become more important in a vertical relationship, the expected costs of writing, administering, and enforcing

full contingent contracts increases. A contract is incomplete in the sense that it does not specify unambiguously the obligations of each party in every possible state of nature. Contractual incompleteness sets the stage for ex post performance problems. When contingencies arise that are not fully and unambiguously covered by formal contractual provisions, one or both parties to the transaction may have incentives to take opportunistic behaviors that increase the costs or reduce gains that will be obtained by the other party. The anticipation at the contract formation stage that the possibility of opportunistic behavior when certain contingencies arise affects the structure of initial vertical relationships.

Institutional arrangements emerge to minimize the costs of making transactions. These costs include both ordinary production costs that make up the components of a cost function and certain transaction costs associated with establishing and administering ongoing trading relationships. There exists a continuum of potential governance structures for vertical relationships. Between vertical integration and arm's length market transaction, we have a wide array of potential contracting arrangements that mediate transactions through the market but involve the use of a variety of specialized contractual provisions that arise as a consequence of efforts by firm to minimize the total cost of transaction over time.

Numerous researches focus on how trading partners protect themselves from the hazards associated with exchange relationships.² Because contracts are typically incomplete, parties who invest in relationship-specific assets expose themselves to a hazard: if circumstances change, their trading partners may try to expropriate the rents accruing to the specific assets. One can try to understand how trading partners choose, from the set of feasible institutional alternatives, the arrangement that offers protection for their relationship-specific investment at minimizing costs.

Transactions differ in a variety of ways: the degree to which relationship-specific assets are involved, the amount of uncertainty about the future and about other parties' actions, the complexity of the trading arrangements, and the frequency with which the transaction

2 Shelanski and Klein (1995) summarize and assess the major findings in empirical research in transaction cost approach to trading relationships.

occurs. The efficient form of organization for a given economic relationship is a function of certain properties of the underlying transaction: asset specificity, uncertainty, complexity, and frequency. Specifically, the probability of observing vertical integration depends positively on the amount or value of the relationship-specific assets involved and on the degree of uncertainty about the future of the relationship, on the complexity of transaction, and on the frequency of trade.

Long-term contracts can facilitate trade between two parties who must make relationship-specific investments. Once the investments have been sunk and the parties have become locked-in to each other, outside competition will have little impact on the terms of their trading, and so these must be governed instead by contractual provision. The difficult task in writing a contract is to anticipate and deal appropriately with the many contingencies which may arise during the course of their trading relationships. Since it may be prohibitively costly to specify, in a way that can be enforced, the precise actions that each party should take in every conceivable eventuality, the parties are in practice likely to end up writing a highly incomplete contract. Hart and Moore (1988) consider a situation in which two contracting parties are forced to write an incomplete contract because of their inability to specify the state of the world in sufficient detail that an outsider can verify whether it has occurred. They study whether the parties can make up for this incompleteness to some extent by building into their contract a mechanism for revising the terms of trade as each party receives information about benefits and costs. For the case where the parties are risk neutral and must undertake relationship-specific investments, they show that the parties will not generally be able to sustain efficient investment levels even if messages are verifiable. They argue that contractual incompleteness, due to non-verifiability of the relevant state of the world, combined with the parties' inability to prevent *ex post* renegotiation will lead to under-investment in a hold-up problem.³

3 Tirole (1986) considers the incentive effects of *ex post* bargaining on the level of *ex ante* investment. Contracts are assumed to be incomplete in the sense that agents are unable to commit to a division of the contractual surplus before making their unobservable investment decisions. Although the bargaining process is not resource consuming *per se*, the prospect of such a redistribution distorts agent's incentives to invest and diminishes the gains from trade.

3.2 Long-term Contracts and Vertical Integration

Long-term contracts can be readily enforced by the courts if the terms and conditions of the contracts are clear, the obligations and behavior of the parties in each state of nature can be verified easily, and the court can be relied upon to enforce contractual promises through orders for specific performance and the assessment of damages reflecting the economic losses to the party that has been damaged if a breach of contractual promises occurs.⁴ Since such contracts are generally incomplete contingent claims contracts, one can not expect real long-term contracts to be enforceable by the courts with certainty or without potential cost to the damaged party. Contractual provisions may be unclear or ambiguous, obligations and behavior may be difficult to verify, and the litigation process is costly and uncertain.⁵

In what circumstances should a firm procure its needs in the market and should it internalize the market by integrating operations so as to be self-sufficient in its own capacities? Extensive reliance on market procurement permits firms to exploit the efficiencies associated

4 Crawford (1988) examines the effect of contract duration on the incentive to invest in relationship-specific assets when its parties have perfect information, and contract are complete, except that short-term contracts specify only current-period actions. Then, short-term contract distorts investment only when the efficient plan involves mainly sunk investment and the relationship plays a consumption-smoothing role. Thus sunk investments can cause under-investment only when short-term contract interferes with consumption smoothing within the relationship. It is shown that when trading parties do not need their relationship for efficient consumption smoothing, short-term contracting is equivalent to long-term contracting, so that the duration of contracts affects neither the efficiency of their relationship nor how they share its surplus. Farrell and Shapiro (1989) also examines the role of incomplete long-term contracts in a simple model of ex post lock-in in the presence of non-contractible quality. The ex post bargaining necessary for a sequence of short-term contracts may be inefficient if information is incomplete. In particular, buyers' switching costs are often unobservable to the seller. Then, without a long-term contract, the seller may be tempted ex post to raise his price or lower his quality so far that some buyers will inefficiently switch away: thus spot market interaction would not be fully efficient. A long-term contract that prevents the seller from raising the price ex post might tempt him to lower the quality instead. Because that would be inefficient, such a contract would be unattractive: buyers would prefer no long-term contract. Because the cost savings from quality reduction do not fully match the utility loss, a long-term price contracts that prevents the seller from driving away buyers with low switching costs by raising price may dissuade him from driving them away at all. Thus long-term contract can be helpful.

5 The motivation for long-term contracting as an alternative to arm's length exchange has been examined in detail by Williamson (1979, 1985), Klein, Crawford, and Alchian (1978), Goldberg (1976).

with specialization in production and the exposure of independent assets owners to high-powered market incentives. But it also exposes firms to the risks of self-interested opportunism. Opportunism refers here both to behavior that does not maximize rents when a particular contingency arises and also behavior that involves the appropriation of wealth of one party by the other in some states of contingencies. In either case, upon realization that opportunistic behavior may occur, the governance structure and the terms and conditions of any arrangement chosen are adjusted *ex ante*. Contracts that pose more serious hazards are provided with greater safeguards.

Consider a firm that invests in specialized assets used to support a particular trading relationship. By virtue of their specialization and definition to one or a few specific customers, these assets may be highly efficient and yield lower production costs than alternative general-purpose assets. But their specialized nature also means that they have much lower value in alternative use. This create the danger that investing firm's counterpart in the trading relationship might attempt to improve the terms of trade it receives by threatening to defect from the business relationship. Alternatively, there is the possibility that the counterpart will simply cease to remain in business for any of several reasons, thus saddling the investing firm with underutilized or even idle assets.

Monteverde and Teece (1982) examine the role of asset specificity in determining the structure of vertical relationships. They focus on the choice between vertical integration and market procurement of automobile components by Ford and General Motors. They use application-engineering effort as a measure of the degree of asset specificity. The hypothesis is as follows: the greater is the applications engineering effort associated with the development of any given automobile component, the higher are the expected appropriable quasi-rent, and therefore, the greater is the likelihood of vertical integration of production for that component. They find that specific components will have a higher probability of being vertically integrated. The empirical result provides support for the view that variations in an asset specificity affect the choice between vertical integration and market procurements as hypothesized.

Masten, Meehan, and Snyder (1989) attempt to distinguish among type of specific assets, comparing the relative importance of

relationship-specific human and physical capital. They also study automobile component production finding that engineering effort as a proxy for human asset specificity appears to affect the integration decision more than physical or site specificity.⁶ Klein (1988) suggests that specific human capital in the form of technical knowledge is a major determinant of General Motor's decision to buy out Fisher Body.⁷ To sum up, asset specificity and uncertainty appear to have significant effects on the vertical relationships in the U.S.

3.3 Relationship-specific Investments in Japanese Firms

If vertical integration is not economical because of diseconomies associated with internal production, contractual arrangements to govern exchange between independent agents will emerge to economize on these transaction costs. The structure of these market contracts will reflect efforts to create incentives and restrictions that reflect anticipated performance problems so that agents will perform as initially promised when different contingencies arise. Contractual arrangements should at least evolve in the shadow of the law, with recognition that court enforcement remains an option. Opportunities to specify contractual agreements in a clear and unambiguous way so as to strengthen the credibility and reduce the costs and uncertainty of legal sanctions should be taken advantage of. Given contractual incompleteness due to uncertainty and complexity, as durable relationship-specific investments become more important, the transactions costs associated with mediating vertical relationships using arm's length market increase. Relationship-specific investments generates a stream of potentially appropriable quasi-rent equal to the difference between the anticipated value in the use to which the investments were committed and the next best use. The presence of

6 Masten (1984) also provides an empirical result of make or buy decision by an aerospace firm for the components of a large system that it had contracted to provide to the government. He finds that variations in the importance of asset specificity affect the choice between vertical integration and market procurement. It suggests that contractual complexity as well as asset specificity leads vertical integration to be chosen over contracting.

7 Other studies of component procurement in the auto industry find similar support for transactional explanations of vertical relationships. Walker and Weber (1984) find that greater uncertainty about production volume raises the probability that a component is made in-house, but that the frequency of changes in product specification and the probability of technological improvements have little effect.

relationship-specific investments creates incentives for one party to hold up the other ex post and can lead to costly bargaining. When relationship-specific investments are important, governance structure will emerge ex ante to reduce the incentives either party has to exploit them ex post.

Vertical relationships in Japan are characterized long-term and highly committed, whereas they are more likely to be governed by short-term, arm's-length relationships in the U.S. One of the major benefits of the Japanese supplier involvement in design is access to highly customized design with unique features for a particular buyers' needs. Japanese automobile suppliers develop more unique parts for their customers and make greater investments in specialized assets than do U.S. suppliers. A supplier typically has contracts with an automaker both for a variety of components in a single model and for similar components in different models. There are usually several companies within the automaker's supplier group qualified to manufacture a component. The other qualified suppliers may be currently producing similar components for other models. Within an assembler's hierarchical structure of suppliers, there are two basic types - design approved (DA) and design supplied (DS). DA suppliers provide both design and production services to the automaker's specifications, while DS suppliers produce a component from drawings provided by the automaker. The DA suppliers are usually those with the close and long-term relationships with the automaker. First-tier and the DA suppliers have a greater number and more profitable contracts with the automaker. The automaker usually has less detailed knowledge of the DA supplier's production costs which give the supplier an advantage in price negotiation. There are many thousands of suppliers in the automaker's supplier hierarchy and only a few hundred at the first-tier.

The typical production cycle for a car model begins with a lengthy design and development stage followed by a 4-year production stage. The automaker usually invites several qualified firms in the supplier group to compete for a contract to design and produce a component for a new model cycle. A DA supplier will undertake the design and development as well as tooling for production with no guarantee of reimbursement by the automaker. For DS supplier, the automaker will guarantee reimbursement for specific investments such as tolling.

Whether DA or DS, the automaker makes a firm commitment to use the supplier for the 4-years production life of the model. A first-tier suppliers does not usually receive a separate payment for the investment in tools, dies, molds, and jigs that are highly customized and would need to be scrapped if the automaker cut off orders to the supplier. The suppliers' specialized capital investments make them highly dependent on the automakers, with the real possibility of hold-up problem. However, automakers are also significantly dependent on the suppliers. Most DA suppliers' parts are "black box," meaning that the automaker provides only very general specifications while the supplier does all of the detailed functional specifications and blueprints. Consequently, suppliers have significantly more knowledge about the design and manufacture of the part than does the automaker. Because black-box parts are customized to a specific model, the automaker is highly dependent on the supplier. If the supplier did not perform as desired, the automaker would have difficulty simply shifting business to another supplier, given the product's customized nature. Some DA suppliers claim that they do not provide the automakers with all of the specific functional details when they submit their design drawings for approval, but intentionally leave out certain important details such as tolerances. Because the automaker does not know the part's exact design specifications, it is difficult to change suppliers, resulting in the automaker's dependence on the supplier.⁸

Under these conditions, each party makes commitment with substantial relationship-specific investments, which creates quasi-rent only if the both parties continue working together. According to empirical studies in the U.S., highly relationship-specific investment should be avoided by buying commodities in the market and making customized products in-house where the hierarchy can be used to reduce transaction costs. By contrast, Japanese automakers increasingly pushed responsibility for design and manufacture of more complex subsystems to a close-tied group of suppliers who are willing to make significant relationship-specific investments in developing customized parts for the buyers. Moreover, Japanese automakers seem willing to allow suppliers to development capabilities to receive the

8 Most automakers in Japan restrict suppliers to sale design specification to other companies (Fair Trade Commission in Japan, 1993).

long-term advantages of cooperation. In fact, relationship-specific investment increase mutual dependence if they are made equally by both parties. Since these relationship-specific investments increase the exit costs for a party and reduce the potential for opportunistic behavior, parties are likely to be comforted and thus may increase their commitment to each other. This, in turn, creates incentives to cooperate, and the reduction in cost and improvements in quality that are gained through the cooperation outweigh the risks of opportunistic behavior from the parties involved. Japanese suppliers dedicated some of capita investments to their primary customer that these customized physical assets that could not be re-deployed if the customer terminate to purchase from them.⁹ It generally requires various types of investments in customized assets by one or both firms in order to make the production and physical distribution more efficient.

Dyer and Ouchi (1993) identify three types of customized investments employed in supplier relationship: (1) site-specific investment; (2) physical investments; (3) human capital investments.¹⁰

(1) Site-specific investments: Site specificity refers to the situation whereby successive production stages that are immobile in nature are located in close proximity to one another to improve coordination and economize on inventory and transportation costs. Plants are located so that they are dedicated largely to a particular customer in order to improve coordination and economize on inventory and transportation costs. Vertical relationships in Japan involves building a supplier plant within fifteen miles of the customer plant to reduce transportation costs, improve delivery, and generally improve coordination. It allow supplier engineers to work daily at customer technical centers with customer engineers in designing new products.

(2) Physical investments: Manufacturing equipment such as tools, dies, molds, jigs, machinery, information system and so on is customized. Physical specificity refers to relationship-specific capital

9 Clark and Fujimoto (1991) suggested that dedicated physical assets play an important role in the improvement of product integrity and thus in overall product quality.

10 Williamson (1983) identifies four different types of relationship-specific investments: Site specificity; physical asset specificity; human capital specificity; dedicated assets. Asanuma (1989) identified that transaction-specific investments are prevalent in supplier relations in Japan, and developed the notion of "relationship-specific skill."

investments. Physical asset specialization allows for developing unique feature of product and may improve quality by increasing product integrity.

(3) Human capital investments: Dedicated design to manufacturing requires engineers to develop significant customer-specific knowledge. Human capital specificity refers to relationship-specific know-how accumulated by trade partners through long-term trading relationship.

Mutual human capital increases as trade partners develop experiences working together and accumulates specialized information, language, and know-how that allows them to communicate efficiently and effectively. It involves transferring the buyer's executives or employees to the supplier to work on a temporary or permanent basis, and sending consultants to work with the supplier to improve production methods, implement just-in-time delivery systems, or assist in solving other problems. For example, Toyota and Nissan have large supplier-assistance management consulting groups with specialized expertise that work full time with suppliers to help them improve their production techniques and solve the problems on quality, cost, and delivery. Providing assistance to suppliers is a highly effective method for both helping and forcing suppliers to continuously innovate and improve to stay ahead of the competition. Each type of relationship-specific investment is likely to have differential effects on performance. For example, site-specific investments economize on inventory and transportation costs but may have little direct effects on quality. On the other hand, investments in human capital are not likely to economize on inventory or transportation costs, but could have a substantial impact on increasing quality and reducing new model cycle time. If relationship-specific investments can increase quality, reduce new model cycle times, and minimize inventory costs, then these benefits should translate into higher efficiency.

Dyer (1996) examines the relationship between relationship-specific assets and performance in the automobile industry. The survey consists of two Japanese automakers and all three U.S. automakers and a sample of their suppliers. The unit of analysis is the supplier-automaker relationship. Toyota and Nissan's supplier indicated that approximately 21 percent of their capital equipment investments were not re-deployable, compared with 20 percent for Ford suppliers, 14 percent for GM suppliers. On virtually every assets specificity measure,

Japanese automakers and their suppliers were more specialized than their U.S. counterparts. Moreover, with regard to site and human asset specificity, Toyota's supplier group was more specialized than Nissan's supplier group. More specifically, it examines the extent to which differences in supplier-automaker asset specialization may explain performance differences between Japanese automaker and the U.S. The findings indicate a positive relationship between supplier-automaker specialization and performance. In particular, the data suggest a positive relationship between inter-firm human capital specificity and both quality and new model cycle time. Moreover, site specialization is found to be positively associated with lower inventory costs. The findings suggests that in the automobile industry a tightly integrated production network characterized by proximity and a high level of mutual human capital specificity will outperform a loosely integrated production network characterized by low level of inter-firm specificity.

A firm may choose to seek efficiency advantages by creating assets, which are specialized in conjunction with the assets of a trading partner. These relationship-specific assets as the vehicle through which trading partners are able to generate relational quasi-rent. Although investments in specific assets boost productivity, the incentive to make relationship-specific investments is tempered. The contingent value of a specific resource exposes its owner to a greater risk of opportunism than the owner of generalized resources. According to the transaction cost economics perspective, if trading partners make relationship-specific investments, then they must safeguard against the hazards of opportunism. Source of advantage is contingent on the costs associated with safeguarding those investments. Relationship-specific investments are more likely to result in high performance when trade partners have developed safeguards which can control opportunism at relatively low cost and task activities are characterized by a highly degree of interdependence.

The efficient level of specificity between trade partners is likely to be contingent on the task activities and degree of interdependence. Generally speaking, the greater the interdependence, the more both parties will benefit from investments in specialized assets. The findings suggest that when working activities are highly interdependent as they are in the automobile industry, the Japanese automakers are more efficient than the U.S. These relationship-specific investments create

substantial buyer and supplier switching costs and, once sunk, make the two parties highly interdependence. This interdependent relationship can create potential contracting problems if the parties do not completely trust each other. Toyota's just-in-time (JIT) system is a good example of how customized investments can create value. Just-in-time system was designed to reduce complexity and costs by eliminating inventories and work in process and to ensure that there were no redundant buffers stocks, distribution facilities, or quality inspections. However, to implement JIT efficiently, Toyota and its suppliers had to make customized investments in information systems, plants, and flexible manufacturing systems that created mutual dependency.¹¹

4 Trust in Vertical Relationships

4.1 Building Trust

Trust in trading relationships means assuming that, when faced with the ability to undertake hidden action or to utilize hidden information, one's counterpart in an ongoing relationships can be expected to pursue those actions that would be to one's benefit and to refrain from those that would be detrimental. This does not necessarily mean that one's counterpart will always act in one's own benefit. Rather, it implies merely a sufficiently high likelihood of responsible behavior over a range of normal circumstances to warrant cooperation on an informal basis. Although none of the agreements were legally enforceable, they were not easily broken. The reputation effects and reciprocity provisions embodied in these arrangements evidently work well and provide strong safeguard for the parties involved; the short-term gains from opportunism are largely offset by long-term losses from a damaged reputation in the particular industry community.

Because the future contingencies are hard to describe, complete contracting is costly. As a result, many of these contracts are implicit, and the party must be trusted to deliver on the implicit contracts even without enforcement by courts. To the extent that long-term contracts reduce costs, such trustworthiness is a valuable asset of the party. The

11 Cremer (1995) provides a model to explain why just-in-time system can improve the incentive of suppliers.

principal reason why long-term contracts between parties are needed is to promote relationship-specific investments by parties. The necessary arrangement to ensure appropriate investment by parties is a long-term relationship, which allows them to collect some of the rewards of doing honestly. The expense of writing a complete contingent contract ensures that these long-term relationships are implicit in nature. The relationships are beneficial to both parties, as they split the ex ante gains from trade.

Although both parties benefit ex ante from implicit long-term contracts, it might pay one party to renege ex post. For example, a buyer might gain from refusing to compensate a supplier for investing in the relationship-specific investment, after investment is done. Breach of implicit contracts can therefore raise one party's gain, and the more so the greater is the burden of fulfilling past implicit contract. Conversely, the value of supplier's relationship-specific assets suffers a loss. To take advantage of implicit contracts, potential sellers must trust buyers. Otherwise, sellers would expect breach whenever it raises the buyer's value and would never enter into implicit contracts. To convince sellers that implicit contracts are good, buyers must be trusted not to breach contracts even when it is value maximizing to do so. A solution to the problem of how implicit contracts are maintained is reputation formation. Suppliers adhere to implicit contract because their adherence enables them to develop a reputation for trustworthiness, and thus to benefit from future implicit contracts. If violating an implicit contract today would make the suppliers untrustworthy in the future, they will uphold the contract as long as the option of entering into future contracts is valuable enough. Conversely, if it is not important for the supplier to be trusted in the future, they will violate the implicit contract.

Manufacturer's or supplier's efforts to promote efficient trading are especially subject to reputation effects. Reputation is defined here that a trade partner's belief that other trade partner will perform an action that is trustworthy enough to consider engaging in some form of cooperation with him. Both of parties in channel of distribution may not be able to observe the efforts directly. In such situation, the long-term relationship enables better monitoring and permits intertemporal incentives that sustain cooperation. The incentives can take the form of remuneration that depends in each period on the history of

observation; trade partners in each period take account of the effect of his efforts on his current reward and its effect on his subsequent ones. Reputation plays a key role to provide trade partners with incentives in the market. To the extent that efforts are unobservable, the long-term relationship with remuneration contingent on the history of measured performance provides incentives for the trade partners to invest effort in building a reputation for a qualified partner. The supplier's reputation for cooperative dealing is valuable to him: reneging on this contract would diminish his ability to make profitable contracts in the future. Therefore, the new entrants are required to spend time and effort to establish reputation to set up new trade relationship. It may burden the newly entering firms as a trade barrier. Once the trade relationship starts, the trading cost of each party reduces substantially due to simplified procedures. But each party must make efforts to maintain trustworthy relationship (Economic Planning Agency 1986).

The reputation accounts for strong intertemporal linkages along a sequence of otherwise independent situations. The key idea is that one's reputation is a state variable affecting future opportunities; moreover, the evolution of this state variable depends on the history of one's actions. Hence, current decisions must optimize the tradeoffs between short-term consequences and the long-term effects on one's reputation. In a game, a player's strategy is a function that assigns the action to be taken in each situation in which he might make a choice. If the player has some private information, then the choices of actions may depend on this information. In this case, other players can interpret his past actions as signals about what his private information might have been. The player's reputation is the history of his previously observed actions. Furthermore, if the information concerns something that persists over time, then these inferences about the private information can be used to improve predictions of his future behavior. To be optimal, the player's strategy must take into consideration the following chain of reasoning. First, his current reputation affects other's predictions of his current behavior and thereby affects their current actions; so he must take account of his own current reputation to anticipate their current actions and therefore to determine his best response. Second, if he is likely to have choices to make in the future, then he must realize that whatever are the immediate consequences of his current decision on his future reputation, and other's anticipation

that he will take these long-term consequences into account affects their current actions as well. The key ingredient is that a player can adopt actions that sustain the assessment made by other parties that yields favorable long-term consequences. Whenever it is feasible to imitate the behavior one would adopt if one's private information were different than it is, and this would affect other's actions favorably, there is potential role for reputation effects. The operative mechanism is the process of inference by which observed actions are taken as signals of private information. Behavior can be considered as designed to affect other's responses by sustaining or altering their beliefs (Wilson 1985).

Wilson (1980) conducts an intensive study of the New England fresh fish market. He find that underlying the smooth functioning of the market was a system of mutual dependence created by the particular trade arrangements there; reputation effects provided an enforcement mechanism. Acheson(1985) studies the Maine lobster market and find the lobster market to be characterized by long-term, informal relationships between fishermen and lobster-pound operators. They typically crafted agreements designed to reduce the costs of information and the possibility of opportunistic use of informational asymmetry. Reputation considerations and interdependencies arising from the sharing of scarce resources reinforced the arrangements.¹²

The long-term relationships with remuneration provide incentives for trade partners to build a reputation for trustworthiness that yields favorable long-term gains. The concept of reputation, however, has technical caveat of practical significance like repeated games. Reputation can explain many behaviors. It is too easy to suppose that an unobserved state variable is called reputation that explain all that happens. We should circumscribe the observations that an outside observer might make. The bonding mechanism to maintaining group goodwill and trust can reinforce the mechanism of reputation building by the rational agents.¹³ Trade partners do not rely solely on reputation available from outside parties to judge the trustworthiness of other partner in the Japanese vertical relationship. To ascertain whether other partner is trustworthy they rely additionally on their

¹² Informal agreements and norms in eighteenth- and nineteenth-century whaling have been studied by Ellickson (1989) and Gifford (1993).

own experiences. A certain periods of time and a number of personal contacts are required to update the reputation about other partners. During that period they operate in a testing process. Initially small and short-term trades are given and further trade depends upon performances and trade behaviors. Once they are satisfied with the trade, on-going trade relationship is ensured. The combination of certain types of behavior and personal contracts involving the exchange of information and giving mutual assurances, and a considerable time for the consistency of one's behavior to be observed and tested can enhance and maintain a reputation for trustworthiness. The Japanese firms have recognized the need to be interdependent and have responded by developing bonding mechanisms that build trust among them. The Japanese do not rely on legal contracts to protect their interests in trading relationships.

One can understand how Japanese firms have developed unique mechanism of relational governance to facilitate long-term relationships with flexible agreements. It would be misleading to suggest that relationship-specific investment is the primary factor that contributes to performance differences among automakers. Undoubtedly numerous other factors not captured in the model contribute to performance differences. The optimal level of relationship-specific assets will depend on the costs of safeguarding specific investments. If the safeguard costs are particularly high then the gains from specialization may be outweighed by the costs. The fact that *kankei gaisha* (affiliated suppliers) exhibit greater asset specificity than U.S. in-house division is intriguing. Trust may be a highly effective and low-cost means for safeguarding relationship-specific investments. One can argue that constraints on opportunism within the Japanese institutional environment allow Japanese firms to generate relational quasi-rent

13 In Japan, firms may choose a trade partner within a circumscribed group in which reputation about the other contracting party is readily available and in which public sanctions against opportunistic behavior exist. The Japanese are inclined to introduction. Many Japanese will deal only with parties that can submit introductions from respected third parties. The introduction verifies both that the party has acted in ways considered 'honorable' within the world of 'reputable' firms and that it will be subject to the sanctions of the third party if it tries to act 'dishonorably' in the future (Ramseyer, 1986). The trading groups which are mentioned beforehand work in a similar way. When members of a group share the trading information and hold a common code of honorable behavior and subject to the sanctions of others in the group, monitoring cost can be substantially mitigated.

more effectively.

4.2 Supporting Mechanisms in Japanese Firms

4.2.1 Cross-shareholding

Although they may be substantial, the economic incentives to maintain long-term trading relationships in Japan are not perfect. Because one party to an agreement can undertake hidden actions to its own benefit and to the detriment of the other, or make private use of hidden information, the risk of self-interested opportunism corrupting the relationship exists. That is why reciprocal equity ownership is required to sustain long-term trading relationships. An exchange of equity between two trading parties connects their economic interests, which help mitigate incentives to act opportunistically. The more equity the trading partner owns in the firm, the less sense it makes to try to exploit other shareholders' interests. Reciprocal equity ownership between any two Japanese firms, so called *mochiai*, is typically small - generally in the range of 1-3% of outstanding shares. By itself, such a bilateral exchange of shares constitutes a safeguard against abuse of the relationship. But embed two transacting firms in a larger cluster of interacting firms and multiply the percentage of bilaterally cross-held share by a factor of 20 or 30, and the safeguard become potent.¹⁴

Flath (1996) shows that cross-shareholding between non-financial firms that are trading partners does in fact serve the purpose that deters opportunistic behavior. Holding shares in a trading partner slants the bargaining over product trading in favor of the trading partner. Divesting shares accomplishes the reverse. The firm that holds shares in a trading partner can credibly threaten to divest should the trading partner behave opportunistically, withdrawing from it the bargaining advantage that the equity position had conferred. In this manner a firm may establish a partial equity position in a trading partner to deter opportunism. One trading partner of a firm deters opportunism towards itself by maintaining equity interests which it threatens to divest if it is ever deceived.

14 The recent surveys suggests that average ratio of cross-shareholding over total outstanding share is about 23% of public corporations (Fuji Research Institute Corporation, 1993). The firms in the six major keiretsu hold 14% to 38% of the total shares in the group (Fair Trade Commission, 1994).

Divesting unilateral shares in a trading partner but without ending trade, reduces the present value of the partner's future gains from the present trading relationships. Because divesting shares interests in a trading partner imposes a capital loss on the trading partner, the credible threat of divesting can be valuable in deterring opportunism. Cross-shareholding strengthens the reputation effects that will, if strong enough, forestall opportunism. The greater the ongoing stream of profits associated with trade, the more costly damage to reputation with the trading partner is also likely to be. Opportunism refers to misrepresenting the extent of one's own investment in relationship-specific assets. The keiretsu shareholding interlocks are to deter opportunism in Japanese trading relationships. A firm that holds a share interest in a trading partner weakens its own bargaining position with regard to the product transactions but precisely for this reason is capable at any time penalizing the partner by unilaterally divesting. In this manner cross-shareholding can be to strengthen the penalties for behaving opportunistically and induce a rational expectation that the other party will in fact not behave opportunistically. Opportunism by a supplier would entail substitution of products having inferior quality to what is claimed. Opportunism by a buyer would entail promising and then failing to make investments that reduce the supplier's costs. Cross-shareholding that is to deter opportunism in the manner detailed would link trading partners, and would tend to be smaller if growth in trade is expected or if each trade confers greater rent. Flath (1996) provides the evidence supporting the view that cross-shareholding deters opportunism in the six major keiretsu in Japan. Equity links are greater between keiretsu firms that by virtue of the industries to which they belong are likely to be trading partners. Also equity links are greater where opportunism would seem to be less deterred by the mere loss of reputation with the trading partner.

Firms need credible commitments if they are going to be willing to make relationship-specific investments. Cross-shareholding in Japanese automobile trading relationships represents commitments that firms have made to each other, and in many ways, it is an arrangement that is to deter opportunism. Automobile makers and their suppliers own significant portions of shares each other. This ownership stake builds trust and represents a commitment among trading partners that need an incentive to make the relationship-specific investment they require.

The incentive to breach contracts with suppliers and buyers in the interest of transferring value to shareholders, or to borrow money and then take extraordinary risks that might benefit shareholders at the expense of lenders, are reduced when the other stakeholders are themselves among the firm's principal owners. Many enduring supplying and distribution relationships throughout the Japanese industry exhibit multiple-claim ownership. A benefit derived from this tendency to hold a blend of different financial and other claims against a firm is an attenuation of friction that might normally arise among various stakeholders that each owned a separate and distinct claim. The incentives to breach contracts with suppliers and buyers in interests of transferring value to shareholders are reduced when the injured trading partners are the firm's principal shareholders.

4.2.2 Extensive Information Sharing

Another feature that helps Japanese firms forestall disputes or other problems that might destroy valuable trading relationships is extensive information sharing. The quality of information that trading partners have at their disposal is clearly different from that available to outside parties. Trading firms have learned about each other through ongoing trading relationships and through various collaborative projects and other forms of interaction that provide information not available in financial statements. If, for example, product quality begins to decline, the trading firm and other trading partners are likely to be among the first to know this through their purchasing connections. The kind of in-depth information that the firm's main bank acquires in order to extend loans is utilized as well in its decision as shareholders. How information is understood also differs. Managers in trading firms who have concrete knowledge about and experiences in running firms, may be better able to evaluate the performance of other managers. Monitoring with the relationships takes place in several ways involving formal and informal information sharing mechanisms. The practice of temporarily dispatching managers to other firms is one means by which an informal information sharing network is established within the relationship at multiple levels of the hierarchy of firm.

The Japanese supplier management suggests suppliers are trusted enough to be given model information relatively early in the design

process - often at the concept or pre-concept stage - and suppliers are expected to participate in the development, beginning at the concept stage. In the process, Japanese suppliers wield significant influence over the process of defining customers' requirements so that the product designs exploit the suppliers' unique manufacturing capabilities. Liker *et al.* (1996) indicate that almost all of the subsystem supplier in Japan receive early vehicle concept information from their customers although they do not necessarily have a great deal of influences over the setting of specifications for their subsystems. Japanese automakers provide early new model information to first-tier suppliers as the product concept is forming and issue only the minimum critical product requirements. U.S. firms are thought to provide much more detailed specifications to their suppliers, allowing suppliers little latitude on specifying the design. Japanese vertical relationships involve intense and frequent communication during the product development cycle, particularly in the early stages when the product is being defined. This includes the intense and regular sharing of technical information to improve performance and reduce cost. Because these are long-term buyer-supplier relationships, the quality and efficiency of information exchange is significantly higher than it would be in new relationships. Thus mutual human capital investment enhances information sharing and communication between buyers and suppliers.

There was considerably more frequent exchange of design information reported in the U.S. compared to Japan at all tier levels and all stages of the development process. The frequency of communication does not necessarily reflect the quality of communication. Japanese have a long and continuous history of working together with their suppliers on design that they can communicate quickly and easily between them. Direct communication and relationships developed over a long period of time made detailed and explicit written communications largely unnecessary. The result of this emphasis on communication is greater efficiency, faster product-development cycles. The greater frequency of information exchange about product development between buyers and suppliers in the U.S. may reflect less effective communication and decision making. Japanese suppliers are given specifications formally, asking to go off and do the design and return with a prototype on time. Communication has been

streamlined so it is less frequent than in the U.S. The Japanese vertical relationships in automobiles can be thought to involve intense and frequent communication during the product development cycle, particularly in the early stages when the product is being defined. This includes the intense and regular sharing of technical information to improve performance and reduce cost. When a supplier gets a notice that the concept session for a specific vehicle model is being scheduled, there is no ambiguity about what the supplier must bring to the session; approximately when the first, second, and third prototypes will be due; and what the buyer's expectations at each of those milestone events will be. One can find clear and consistent communication between suppliers and buyers in the Japanese relationships.

The evidence is provided to support that the suppliers' association continue to exist in Japan not merely out of inertia but because it is serving a useful function in delivering benefits to both the automaker and member supplier (Sako, 1995). Contrary to the bilateral contracting view, suppliers value mutual learning from other suppliers just as much as learning from their buyers, and that the majority of first-tier suppliers do not consider suppliers' associations to be of less use now than in the past. There is a considerable variation from association to association with respect to the size of membership, the proportion of members in the total supplier base, and turnover of members over time. However, as a common characteristic, association membership is much broader than the boundary of *keiretsu* groupings, particularly in recent decades when independent suppliers which stand outside the *keiretsu* have been taking up membership in multiple associations.

Tokai Kyohokai has three sectors grouped according to the type of parts that members produce. Each group meets once a month, typically to visit a member supplier's factory, and to learn from the member's presentation about problems and achievements at his company in the following month. The automakers except Honda which have an association continue to retain much control over the activities of the association. Although less common today, many of the associations required the automaker's recommendation as well as the approval of the association's administrative board to become members. Whether leading or advisory, providing support for the suppliers' association is expensive in managerial time, judging from the frequency of meetings.

Weighed against this cost are the frequently cited benefits of being able to communicate about production plans, and of soliciting good suggestions for common problems, such as parts standardization and pollution control. The most popular benefits of belonging to an association is better informational access to the buyer. Next, learning from other members through exchange of technical information is considered the second most important benefit, and more important than the receipt of technical assistance from the buyer. Many members apparently regard fellow member suppliers as a more important source of technical know-how than their buyer. The type of buyer information which is valued by members appears to be about design and development for the next model, rather than, for instance, about the certainty of production scheduling.¹⁵

The Japanese supplier management suggests suppliers are trusted enough to be given model information relatively early in the design process - often at the concept or pre-concept stage - and suppliers, particularly the DA, are expected to participate in the development, beginning at the concept stage. Japanese DA suppliers wield significant influence over the process of defining customers' requirements so that the product designs exploits the suppliers' unique manufacturing capabilities. Liker *et al.* (1996) indicate that almost all of the subsystem supplier in Japan receive early vehicle concept information from their customers although they do not necessarily have a great deal of influences over the setting of specifications for their subsystems. Contrary to the current literature that suggests Japanese automakers provide broader specifications that allow the supplier greater freedom to innovate, there were no Japanese-U.S. differences in the degree of specificity of the customer requirements. Japanese automakers were as likely as their U.S. counterparts to include actual dimensions in the requirements.

Japanese automakers provide early new model information to primary suppliers as the product concept is forming and issue only the minimum critical product requirements. U.S. automakers are thought to provide much more detailed specifications to their suppliers, allowing suppliers little latitude on specifying the design. Japanese supplier

15 These evidences can be supported by the survey conducted by Fair Trade Commission in Japan (1993).

management involves intense and frequent communication during the product development cycle, particularly in the early stages when the product is being defined. This includes the intense and regular sharing of technical information to improve performance and reduce cost. Because these are long-term automaker-supplier relationships, the quality and efficiency of information exchange is significantly higher than it would be in new relationships. Thus mutual human capital investment enhances information sharing and communication between automaker and supplier.

There was considerably more frequent exchange of design information reported in the U.S. compared to Japan at all tier levels and all stages of the development process. The frequency of communication does not necessarily reflect the quality of communication. The Japanese relations have a long and continuous history of working together with their suppliers on design that they can communicate quickly and easily between them. Direct communication and relationships developed over a long period of time have made detailed and explicit written communications largely unnecessary. The result of this emphasis on communication is greater efficiency, faster product-development cycles. The greater frequency of information exchange about product development between automakers and suppliers in the U.S. may reflect less effective communication and decision making. Japanese suppliers are given specifications formally, asking to go off and do the design and return with a prototype on time. Communication has been streamlined so it is less frequent than in the U.S. The Japanese supplier relations can be thought to involve intense and frequent communication during the product development cycle, particularly in the early stages when the product is being defined. This includes the intense and regular sharing of technical information to improve quality and reduce cost. When a supplier gets a notice that the concept session for a specific vehicle model is being scheduled, there is no ambiguity about what the supplier must bring to the session; approximately when the first, second, and third prototypes will be due; and what the buyer's expectations at each of those milestone events will be. One can find clear and consistent communication between suppliers and automakers in the Japanese relations.

4.2.3 Enduring Personal Network

The long-term duration of implicit contracts founded upon cross-shareholding arrangements depends critically on preserve continuity in the identity of specific employees interacting at the trading interface. The rotations and transfers result in the creation of an extensive network of enduring personal relationships among individual employees inside and outside the firm. These are crucial to the efficacy of implicit contracting, for the terms of such agreements are held more between individual employees interacting at the trading interface than between the firms as legal entities. It is in this individual employee that mutual obligations are formed and bonds of trust are forged. It is individual employees who ultimately adapt contracts to changed circumstances and, out of consideration for their reputations, can act against any ill-advised tendencies towards opportunism elsewhere in their organizations. Once established, the Japanese practice of long-term employment serves to preserve these personal relationships for many years. It also raises the cost to individual managers of untrustworthy, opportunistic behavior.

The practice of long-term employment within one firm is important in developing trust among individuals both within the firm as well as across firms. There is a real personal contract between the purchasing managers of manufacturers and the managers or owner of a supplier firm. Because employees can develop long-term relationships with their counterparts at the supplier or buyer, it is not surprising that the Japanese have developed significantly greater trust across firms. Furthermore, management transfers develop effective communication that ongoing relationships require. Mid-career managers or engineers may be temporarily transferred to related firms to help solve specific problems or to work on joint projects. Such transfers provide extensive networks of personal relationships between individual managers in related firms by enhancing trust between the firm's managers. Reinforcing monitoring and communication at various levels of managers are ties at the level of the board of directors. Among the most prominent features of keiretsu is a layered set of personnel connections that serve as conduit for information between firms and, occasionally, as a source of external discipline. Employee transfers are common among business partners, particularly among bank and their client firms and large manufacturers and their subcontractor. In

addition, firms in keiretsu are linked through a variety of inter-corporate executive councils that serve as a forum for managers from different levels of the firms involved. While group interaction takes place at many levels, undoubtedly the most prominent of these meetings are the presidents' councils that bring together the chief executive officers from nucleus firms in the group.¹⁶

The way that Japanese firms build trust is by requiring career paths in which employees transfer from firm to firm. Employee transfers, both temporary and permanent, are common among business partners, particularly between large manufacturers and their suppliers. In addition to permanent and temporary employee exchanges, suppliers often send guest engineers to work at their customer technical centers on an ongoing basis. Supplier and automaker engineers work jointly designing the components for a new car model. Not only do these career-path help build trust between firms, but also transferred and guest employees are better able to understand how to enhance the efficiency of the development and production processes because they know both buyer and supplier operations. Direct contact is much more important than other forms of contact in developing ways for employees to know and trust each other. Both of automakers and suppliers encourage a considerable amount of face-to-face contact between supplier salespeople and engineers and between automaker purchasing agents and supplier engineers.¹⁷

16 The *shacho-kai* is a kind of informal community council, with membership limited to a set of core members. It appears that the *shacho-kai* in practice is less a command center to determine the policies and practices of individual firms than a forum for the discussion of matters of mutual concern. It simultaneously (1) establishes an identity for the group and its participants, signifying relationships among firms, and instilling a sense of coherence; (2) creates a setting in which issues of group-wide concern may be negotiated, including protection and promoting the group name and, less often, arranging for assistance for firms in trouble, resolving conflicts among members, or disciplining deviant firms in the group; and (3) enhances the position of the group in the Japanese businesses community by presenting the image of a powerful and historically prestigious corporation. More often than not, the executive remarked, nothing of particular note is discussed and the meeting is merely an opportunity to exchange views with other chief executives and to socialize. Nevertheless, the *shacho-kai* is considerably more than an old-fashioned business customs, for it serves both to signify membership in the group and to provide a common arena for the expression of the strategic interests group firms have in one another. As such, it is significant both for its symbolism and for what it reveals about the dynamics of keiretsu relationship.

17 Tirole (1996) models the idea of group reputation as an aggregate of individual reputations.

5 Conclusion

Various systems of vertical relationships have evolved in different countries to attain efficient trading relationships. Particularly, there are significant differences in vertical relationships between Japan and the United States. It is commonly observed that U.S. automobile manufacturers are more vertically integrated than their Japanese counterparts. In Japanese vertical relationships, in contrast, suppliers are an integral part of the product development and manufacturing processes: they are heavily involved, assume significant responsibility, and communicate extensively and directly with product and process engineers. The major characteristics of vertical relationships in Japan making differences from the U. S. can be identified that both buyers and suppliers have recognized the need to be interdependent and have responded by developing bonding mechanisms that build trust between them in the long-run. Japanese firms do not rely on legal contracts to protect their interests in trading relationships.

Japanese vertical relationships are identified as follows: significant relationship-specific investments in plant, equipment, and human capital in trading relationships; long-term relationships and commitments based flexible legal contracts to create mutual trust; bonding mechanisms like cross-shareholding, extensive information sharing, and enduring personal networks, which reduce transaction costs and eliminate inefficiencies between buyer and supplier. Trust founded on bonding mechanisms among trading partners allows them to adapt terms of trade as needed in response to changing circumstances based on high degree of implicit, long-term, relational contracts. Opportunistic behavior in such relationships can be mitigated, and their longevity fostered, by the multiple claims ownership by parties doing business with each other, and by extensive mutual monitoring. The relational governance to facilitates building and sustaining stable vertical trading relationships may lead to investment in relationship-specific assets to bring appropriable rents.

For most Japanese firms, the long-term trading relationships with firms in which they invest constitute the chief value of their overall dealings with those firms. Value comes from the transaction efficiencies generated by building and maintaining long-term trading relationships, mutually beneficial trust between managers in the trading firms can be

nourished and cooperation fostered. Contracting can take place on a much less formal, more implicit basis, often an advantage when it becomes necessary to adjust rapidly to a changing environment. Adjustments in implicit agreements can be made much faster and in more highly simplified way by managers dealing at the trading interface than they can be wrestling over formal written contracts. If the trading relationship lasts long enough and becomes close enough, the trading firms can become virtual extensions of one another in a vertical production and distribution system, though without some of the management control problems that plague large operations integrated under a single corporate hierarchy. Since the relationship is arm's-length and equity ownership is restricted to minority positions, market incentives are preserved and bureaucratic disabilities held to a minimum.

Ultimate safeguard against the emergence of cooperative shirking in the group is the discipline imposed by vigorous rivalry in the product markets in which members compete. Japanese automobile industry tends to be characterized by fairly intense rivalry among vertically-related groups of firms. Preservation of high-powered market incentives arising from horizontal product-market rivalry is evident. Japanese automakers are aware of the need to show consistently their intent to persist in long-term relationships with their suppliers, thereby encouraging investments by suppliers in relationship-specific assets, while stopping well short of granting supplier an outright guarantee of trades, which would blunt incentives to manage efficiently.

Japanese vertical relationships can be identified that both buyers and suppliers have recognized the need to be interdependent and have responded by developing bonding mechanisms that build trust between them in the long-run. Japanese firms do not rely on legal contracts to protect their interests in trading relationships. It is important to understand why and how flexible trading arrangements sustain in the market transaction. What governance mechanisms will emerge as the parties negotiate a mutually acceptable trading arrangement in response to anticipated transaction costs and contractual execution difficulties? It is important to identify the economic rationale of flexible vertical relationships. Yet many interesting issues still remain unknown about trading relationships between buyers and suppliers in various countries.

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A COMPARATIVE ANALYSIS OF PULP, PAPER, AND PACKAGING COMPANIES IN CANADA, JAPAN AND UNITED STATES

AKIRA KAJIWARA Kobe University

Abstract

The United States, Canada, and Japan are the world's top three producers and consumers of pulp and paper. This paper is an analysis of the financial performances and comparative strengths of their publicly owned pulp, paper, and packaging companies. Seven variables of business activity are examined. The first area of investigation is the primary product(s) manufactured by each company. Next, the study investigates several measures of financial performance, including annual sales, return on equity, and earnings per share. Liquidity is examined in calculating each company's debt to equity ratio. Lastly, two business activities, capital expenditures and international activities, are interpreted and reported. Relative performance rankings among companies are provided and comparisons are made between 1996 and 1995 financial data. A concluding discussion suggests important trends shaping the future direction and performance of Japanese and North American pulp and paper companies.

JEL classification: L73, M49

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INTRODUCTION

The 1990's continue to challenge the Japanese and North American pulp, paper, and packaging industry. Fearful of continued price increases and potential supply shortages, many industrial buyers intentionally accumulated inventories during 1995. However, in the

Corresponding Address

Akira Kajiwara

Research Institute for Economic & Business Administration, Kobe University

2-1 Rokkodai-cho, Nada-ku, Kobe 657-8501, Japan

E-mail: kajiwara@rieb.kobe-u.ac.jp

Fax: (81)-78-803-0412

fourth quarter the price of pulp began to move downward. Buyers curbed hedging activities and instead consumed in production those accumulated inventories. By 1996, a decrease in product demand left producers with excess supply, sharply declining prices, and lower sales and profit (Stanley, 1997, p.56). Northern bleached softwood kraft market pulp, during the first quarter of 1996, fell to \$500 per ton from a record high of nearly \$1000 in the fourth quarter of 1995. Prices for fine papers and containerboard, which began to slip in the third quarter of 1995, drifted further downward throughout 1996. Newsprint, which sustained a record \$750 per ton until the second quarter of 1996, also retreated to a low of \$500 per ton by year end. Prices for most pulp, paper, and packaging grades did stabilize in the third and fourth quarters of 1996, but did so at levels substantially below those seen one year earlier.

Such market swings over the past several years have been extreme, even for an industry typically described as cyclical. Recent evidence suggests that business cycles are not only increasing in magnitude but in frequency as well. Despite such volatility, industry analysts appear optimistic about the outlook for the pulp, paper, and packaging industry over next few years (Koncel, 1997, p.74). Today, the inventory imbalances experienced in 1996 appear to have been stabilized. Many producers reduced production in 1997, and prices for all pulp and paper grades have slowly, but steadily, improved. Efforts directed toward mill modernization and company consolidation of Japanese and North American producers are expected to reap returns just as production capacity growth in other parts of the world begins to slow. One unknown factor that could challenge this optimism is the recent decline of the Asian economies; the international impact of the current financial and economic crises in Korea, Japan, and Indonesia remains to be seen.

In 1996, the United States and Japanese governments met several times to assess the ongoing implementation of the April 1992 United States-Japan Paper Agreement. The objective of the agreement is to open Japan's US\$70-billion paper and paperboard market, which is second only to the United States. The agreement requires the Japanese government to encourage Japanese distributors, converters, printers, and major corporate users to increase substantially their use of competitive foreign paper products, develop long-term buyer/foreign

supplier relations, develop company-specific nondiscriminatory purchasing guidelines, and establish and implement Anti-Monopoly Act compliance programs.

The bilateral implementation talks in 1996 were held for the second consecutive year under the umbrella of the United States trade representative placing the government of Japan on a Super 301 "Watch List," which allows the United States government to monitor trade activities of a foreign country's markets in order to determine whether discriminatory treatment was being placed against the United States and other foreign suppliers. After a year, the United States government would retain the option of either initiating a full investigation (under Super 301) or seek to impose some form of trade sanctions to ensure compliance. After two years of being on the Watch List and after four years of implementing the agreement, little has changed in terms of Japan's apparent consumption of foreign paper products. Since the agreement was signed, total Japanese paper imports have increased by only 0.5% from 3.6% to a 4.1% market share (Stanley, 1997, p.56). This is mainly because very complicated and inefficient distribution channels of pulp and paper products remain dominant in Japan. Recent mega-mergers in the industry are changing this situation.

INDUSTRY OVERVIEW

Pulp and Paper international suggests that in 1996 world production of paper and paperboard increased 1.3%, to nearly 282 million tons. The United States and Canada together accounted for 100 million tons (36%) of this production, maintaining North America's position as the world's largest producer of paper and paperboard (Table 1). Asia tied Europe for second, and Japan and People's Republic of China produced almost 80% of pulp and 68% of paper and paperboard of Asian production (Matussek, et al., 1997, pp.20-21). World production of pulp dropped 11 % during 1996, from 181 million tons to 174 million. With the exception of Latin America, which reported in 1995 more than an 8% increase in production, every region of the world showed a decline in pulp production in 1996. Even North America, where annual pulp production is more than double that of any other region, reported almost a 3% decline in production (Koncel, 1997, p.74).

	Pulp	Paper and paperboard
North America	82,586	100,256
Europe	39,060	80,949
Asia	37,579	82,081
Latin America	10,133	12,719
Australasia	2,308	3,268
Africa	2,376	2,694
World	174,042	281,968

Source: Pulp and Paper International 1997

1. 1996 World Pulp and Paper Production (1,000 tons)

UNITED STATES PULP, PAPER, AND PACKAGING INDUSTRY

United States paper and paperboard production increased by almost 1% in 1996 to roughly 82 million tons (Table 2), representing 29% of world paper and paperboard production. This increase marked the eleventh straight year of growth in United States paperboard production, but the rate of growth is down significantly from the 3% annual average of the previous ten years. United States pulp production declined over 4% in 1996 to 58 million tons (Table 3), but this still represents 32% of world pulp production (Lancey, 1997, p.59). As well as being the largest producer, the United States is the world's largest consumer of paper products. During 1996, the United States consumed 85 million tons of paper and paperboard, a decline of almost 2% from 1995, but nearly three times as much as Japan and China, the second and third largest consumers, respectively. Ninety percent of United States paper and paperboard production is consumed domestically, but exports from the United States are growing as a proportion of shipments. Since 1990, exports of paper and paperboard advanced at a 10% average annual rate and accounted for 46% of the industry's growth (American Forest and Paper Association, 1997). In 1996, the United States exported 9 million tons of paper and paperboard, almost a 127% increase over 1995. As for pulp, although exports of paper grade market pulp were up 3% in 1996, total pulp exports declined from over 12 to 6 million tons (Koncel, 1997, p.74).

	Newsprint	Printing and writing	Packaging	Total paperboard
Canada	9,025	4,689	4,705	18,419
United States	6,304	22,554	52,979	81,837
Japan	3,140	10,811	16,062	30,013

Source: Pulp and Paper International 1997

2. 1996 Japanese and North American Paper and Paperboard Production (1,000 tons)

	Mechanical pulp	Chemical pulp	Total pulp
Canada	10,973	13,379	24,352
United States	5,372	52,862	58,234
Japan	1,705	9,494	11,199

Source: Pulp and Paper International 1997

3. 1996 Japanese and North American Pulp Production (1,000 tons)

The United States is the world's largest producer, with 537 paper and paperboard mills and 190 pulp mills. The largest manufacturing areas include the North Central, Northwestern, Northeastern, and Southeastern regions. The Southeastern United States currently fulfills 72% of United States pulping capacity and 55% of primary paper and paperboard capacity. The pulp, paper, and packaging industry is the country's eleventh largest manufacturing industry and is fully diversified, producing a wide array of commodity as well as value-added products from wood, recovered paper, and cellulosic fibers (Stanley, 1997, p.56).

Pulp, paper, and packaging industry operating rates in 1996 averaged 89% of production capacity, in stark contrast to the 94% operating rates experienced in 1995, and the lowest rate reported since the 1980's (Lancey, 1997, p.59). Reflective of the drop in operating rates is a similar drop in pulp and paper mill shipments. With the exception of modest increases in tissue and containerboard, pulp and paper shipment volumes were down in 1996. Despite a 3% increase in export volumes, a 14% decrease in domestic shipments drove total shipments of chemical paper grade market pulp down in 1995 more than 2%. Printing and writing paper volumes declined 2% as publishers worked off 1995 inventories. Containerboard production rose almost 4% in response to a 35% increase in foreign demand, but domestic shipments

advanced at a less impressive rate of 0.4%. Boxboard production declined 1% in response to decreased demand for domestic milk carton stock and boxboard exports. A 6% decline in domestic newsprint shipments was partly offset by a 46% increase in exports, but overall newsprint shipments declined almost 1%. And finally, tissue, where production and demand tend to be more stable, rose 1 % (Lancey, 1997, p.59).

United States paper and paperboard production capacity increased well over 3% in 1996. This represents an increase above the almost 3% annual average reported for the ten years previous, but growth is projected to average only between 1 and 2% through the end of the decade. It is expected that 55% of the capacity gains of the next few years will be realized through efficiency increases in existing machines. The one industry segment that is projected to see significant growth through the end of the decade is recovered paper market pulp. United States mill consumption of recovered paper increased 9% in 1996 and has an average annual rate of almost 8% since 1990. As a result of this rising demand for recovered fiber, de-inked market pulp production capacity is slated to increase an average of almost 12% per year through 1999 (Lancey, 1997).

CANADIAN PULP, PAPER, AND PACKAGING INDUSTRY

Canada has a relatively large forest resource base, but the country's 102 paper and 51 pulp mills represent an industrial base that is significantly smaller than that of the United States. In 1996, Canada produced in 1995 more than 18 million tons of paper and paperboard and 24 million tons of pulp (Tables 2 and 3). However, unlike the United States, Canadian fiber production far exceeds the processing capacity of its domestic paper industry. Canada consumes less than 7 million tons of paper and paperboard annually, which means that Canada is a large net exporter of pulp (40%) and paper products (73%). In contrast to the United States, Canadian pulp and paper production is highly commodity driven with pulp and newsprint comprising the majority of production. Canada supplies 32% of the world's market pulp and 28% of its newsprint (Industry Canada, 1996). Paper and newsprint production is concentrated in eastern Canada. The central region of the country produces primarily hardwood pulp. And

western Canada, British Columbia in particular, has significant softwood pulping and milling operations.

Worldwide inventory corrections had a substantial impact on Canadian producers in 1996, resulting in a 2% drop in pulp and paper shipments. Inventory corrections were primarily responsible for a 1% drop in pulp and nearly a 5% decline in newsprint shipments. The two industry segments that recorded increased deliveries in 1996 were fine papers and paperboard. Strong demand from United States and overseas markets for boxboard, linerboard, and corrugating medium caused a 6.5% increase in paperboard shipments (Canadian Pulp and Paper Industry Association, 1996). As for fine papers, an increase of over 8% in shipments of uncoated woodfree papers resulted in a 6% cumulative increase (McElhatton, 1997, p.58). As a result of lower demand and growing inventories during the first half of 1996, Canadian mill operating rates were down 6% from 1995 to average 88% of production capacity. Shipments to domestic markets fell nearly 5% in 1996 as did exports to the United States. At the same time, overseas shipments of market pulp, newsprint, and paperboard to Asian markets increased dramatically. Exports to China more than doubled and exports to the other Asian countries, excluding Japan, rose 16% over 1995 (Canadian Pulp and Paper Industry Association, 1996).

It is expected that Canadian paper and paperboard capacity will average in 1995 more than a 2% annual growth through 1999 (Industry Canada, 1996). The industry segments experiencing the largest gains are printing and writing papers and paperboard, particularly corrugating medium and linerboard. No major capacity expansions are expected in pulp or newsprint. As a result, newsprint capacity is expected to decline slightly and annual growth in pulp capacity is expected to average only 0.3%. As is the case with the United States, the expected growth in pulp capacity is significantly lower than the previous 10 year average of 4% (Thomson, 1997, p.20).

JAPANESE PULP, PAPER, AND PACKAGING INDUSTRY

Though the Japanese economy seemed to continue its slow recovery supported by measures introduced to stimulate the economy, it has actually worsened due to the economic crises in Asian countries. In the pulp and paper industry, the pace of production and shipment growth

slackened. Nevertheless, in terms of volume, Japan surpassed previous records and production reached 30 million tons for the first time. The growth was mainly supported by advertising, and paper demand has been fairly strong. However, uncoated woodfrees and coated papers - which have been two of driving forces in this recent recovery - appear to be at a turning point and production increases have leveled off. Paperboard output was flat over 1995, but volumes were still strong.

Paper imports rose again to reach record levels, up to 1.32 million tons showing a 24.6% increase. The ratio of paper imports to domestic demand increased by 1.2 points to 7.1%. But still, market share of Japanese imports remains low in spite of the United States-Japan Paper Agreement.

For paperboard, corrugating medium imports rose 5.2 times the levels of the previous year, but other grades showed negative growth. Paper and board exports dropped 21.3% last year due to slackness in the southeast Asian markets which form Japan's main export destinations. This trend has continued since 1993 and all the paper and paperboard grades declined, except white board (Matussek, et al., 1997, pp.62).

Pulp production increased slightly last year accompanied by an increase in the use of recovered paper where consumption hit a record high. The poor performance of the board sector, which consumes more than 70% of wastepaper, meant that the wastepaper utilization rate increased by just 0.2 points to 53.6%

No new papermills have opened in Japan since 1992, but this year has seen five become operational. Three of the papermills are for printing grades, one for newsprint and the other for linerboard. This helped push expenditure for the last fiscal year up to 49.8%.

The combined sales of the seven major paper companies in fiscal 1996 ending March 1997 increased by 2% over 1995/1996. Pre-tax earnings were down 9.7% and as a result, the ratio of current profit to sales was down to 5.3% from 6.0% in 1995.

New Oji Paper and Honshu Paper merged on October, 1996 to become Oji Paper. This is now the largest paper company in Japan with about 1 trillion Yen in annual sales. Oji Paper and Nippon Paper Industries, into which Jujo Paper and Sanyo Kokusaku Pulp were merged in 1993, are two major leading pulp and paper companies in Japan. Also, Japan Paper Industry and Jujo Paperboard, both Nippon

Paper Industries' related and subsidiary companies, merged in October 1997 to become the second largest paperboard producer in Japan, Japan Paperboard. These five years have seen several big mergers and acquisitions. The Japanese pulp and paper industry is becoming more and more concentrated in order to struggle along with less advantage in international cutthroat competition.

RESEARCH OBJECTIVES

Given today's highly competitive world market, understanding the relative financial performance, investments, and liquidity of pulp and paper companies is essential to a full understanding of the industry. The first objective of this financial analysis is to analyze financial information extracted from 1996 annual reports of all publicly owned United States, Canadian and Japanese pulp, paper, and packaging companies. Annual sales, return on equity, earnings per share, and debt to equity ratios are used as measures of performance. Two other objectives are to examine the capital expenditures and international activities undertaken by these companies. The last objective is to provide a discussion of important trends that are emerging in world pulp, paper, and packaging markets.

METHODS

This research examines publicly owned Japanese and North American pulp, paper, and packaging companies, as compared to privately owned companies. These companies were identified using the 1997 *Lockwood Post's Directory of the Pulp and Paper Industry and Allied Trades*. Ownership structure of these companies, public versus private, was determined using the *Company Profiles database and Moody's Directory of International Companies*. The evaluative criteria for which companies are in the sample are that the primary product or output is comprised of a pulp or paper product. That means that companies that use fiber but whose primary product is comprised of inorganic binders such as Portland Cement are not considered a primary pulp and paper manufacturer. Two other changes in the sample are noteworthy. First, Specialty Paperboard has undergone a name change and is now known as FiberMark. Second, Weldwood is no

longer included in this analysis because this formerly publicly owned Canadian company has since become privately owned. Three recent mergers and acquisitions have occurred, namely James River and Fort Howard, Abitibi-Price and Stone Container, and Japan Paper Industry and Jujo Paperboard, but the actual restructuring to Fort James, Abitibi-Consolidated, and Japan Paperboard was realized not in 1996 but rather mid-year 1997. Therefore, this 1996 analysis conducts individual or pre-consolidation reviews. In total, the number of qualifying pulp and paper companies is 43 from the United States, 23 from Canada and 30 from Japan, for a total of 96 companies. Upon request, each of these companies sent 1996 annual reports so that an in-depth analysis could be conducted of 1996 financial performance and business activities.

Seven variables of business activity are examined in this study. The first area of investigation is the primary product(s) manufactured by each company. Presenting such a classification makes for a more meaningful analysis and comparison of financial information among companies. This study then investigates several measures of financial performance, including annual sales, return on equity, and earnings per share. Liquidity is examined in calculating and comparing each firm's debt to equity ratio. Lastly, two business activities, capital expenditures and international manufacturing and exporting, are interpreted and reported. For each of these variables, an analysis of 1996 data is first conducted; this is followed by an analysis that compares 1996 and 1995 data on per-firm and industry bases. It should be noted that the 1995 financial information used in this study reflects any restated 1995 data presented in the 1996 annual reports.

For ease of comparison, all Canadian dollars and Japanese Yen reported in the annual reports are converted to United States dollars using *Moody's International Company Data* foreign exchange rate in 1996. For 1996 data, Canadian \$1 equals United States \$0.7334 and Japanese Yen 1 equals United States \$0.0080 while the 1995 data, used to calculate the percentage change in variables, the exchange rate is Canadian \$1 equals United States \$0.7287 and Japanese Yen 1 equals United States \$0.0093.

STUDY FINDINGS

PRINCIPLE PRODUCTS PRODUCED

Many pulp, paper, and packaging companies focus on specific product markets with the intent of differentiating to secure a competitive advantage. For this reason, Table 4 and 5 presents a categorization of the companies analyzed in this study according to the

MARKET PULP		PRINTING AND WRITING PAPERS	
United States	Canada	United States	Canada
Boise Cascade	Avenor	Badger Paper Mills	Abitibi-Price
Bowater	Canfor	Boise Cascade	Alliance
Buckeye Cellulose	Cascades	Bowater	Avenor
Champion	Crestbrook	Champion	Canfor
Consolidated Papers	Doman	Consolidated Papers	Cascades
George-Pacific	Domtar	Crown Vantage	Domtar
International Paper	Donohue	George-Pacific	Fletcher Challenge
James River	Fletcher Challenge	International Paper	MacMillan Bloedel
Jefferson Smurfit	Harmac Pacific	James River	Noranda Forest
Louisiana-Pacific	MacMillan Bloedel	Kimberly-Clark	Repap Enterprises
Pope & Talbot	Noranda Forest	Mead	Rolland
Potlatch	Repap Enterprises	P. H. Glatfelter	Stone-Consolidated
Rayonier	Rolland	Potlatch	Tembec
Stone Container	Slocan	Stone Container	West Fraser
Weyerhaeuser	St. Laurent	Union Camp	Weston
Willamette Industries	Tembec	Wausau Paper	
	West Fraser	Westvaco	
	Weston	Weyerhaeuser	
		Willamette Industries	
NEWSPRINT		TISSUE PRODUCTS	
United States	Canada	United States	Canada
Boise Cascade	Abitibi-Price	Chesapeake	Cascades
Bowater	Alliance	Fort Howard	Perkins Papers
Champion	Avenor	George-Pacific	
Jefferson Smurfit	Canfor	International Paper	
Kimberly-Clark	Donohue	James River	
Media General	Fletcher Challenge	Kimberly-Clark	
Stone Container	MacMillan Bloedel	Mosinee Paper	
Weyerhaeuser	Slocan	Pope & Talbot	
	Spruce Falls	Potlatch	
	Stone-Consolidated	Proctor & Gamble	
	West Fraser		
PAPERBOARD AND PACKAGING		SPECIALTY PAPER PRODUCTS	
United States	Canada	United States	Canada
Bemis	Mosinee Paper	Badger Paper Mills	Cascades
Boise Cascade	Potlatch	Bemis	Domtar
Caraustar Industries	Republic Group	Buckeye Cellulose	Repap Enterprises
Champion	Rock-Tenn	Caraustar Industries	Slocan
Chesapeake	Sonoco	Dexter	Spruce Falls
Consolidated Papers	Stone Container	FiberMark	Weston
Gaylord Container	Temple-Inland	Greif Bros.	
George-Pacific	Tenneco	International Paper	
Greif Bros.	Union Camp	Kimberly-Clark	
International Paper	Wausau Paper	Lydall	
James River	Westvaco	P. H. Glatfelter	
Jefferson Smurfit	Weyerhaeuser	Republic Group	
Longview Fibre	Willamette Industries	Sealed Air	
Lydall		Tenneco	
Mead		Wausau Paper	

4. Principal products of United States and Canadian pulp and paper companies

MARKET PULP	PRINTING AND WRITING PAPERS
Japan Chuetsu Pulp & Paper Daio Paper Daishowa Paper Mfg. Mitsubishi Paper Mills Nippon Paper Industries Oji Paper Tokai Pulp	Japan Chuetsu Pulp & Paper Chuetsu Daio Paper Daishowa Paper Mfg. Hokuetsu Paper Mills Japan Paper Industry Kishu Paper Mishima Paper Mitsubishi Paper Mills Nippon Kakoh Seishi Nippon Paper Industries Oji Paper Sanko Paper Mfg. Tokai Pulp Tokushu Paper Mfg. Tomoe-gawa
NEWSPRINT	TISSUE PRODUCTS
Japan Chuetsu Pulp & Paper Daio Paper Daishowa Paper Mfg. Nippon Paper Industries Oji Paper Rengo	Japan Daio Paper Mishima Paper Nippon Paper Industries Oji Paper Tokai Pulp
PAPERBOARD AND PACKAGING	SPECIALTY PAPER PRODUCTS
Japan Chuetsu Pulp & Paper Chuo Paperboard Chuo Pack Dainippon Shigyo Daio Paper Daishowa Paper Mfg. Furubayashi Shiko Hokuetsu Paper Mills Japan Paper Industry Kishu Paper Mitsubishi Paper Mills Nippon Hi-Pack Nippon Paper Industries Ohishi Sangyo Oji Paper Rengo Sanko Paper Mfg. Settsu Superbag Takasaki Paper Mfg. Taihei Paper Mfg. The Pack Tokai Pulp Tomoku	Japan Chuetsu Pulp & Paper Chuo Pack General Japan Paper Industry Mishima Paper Mitsubishi Paper Mills Nippon Hi-Pack Nippon Kakoh Seishi Nippon Paper Industries Oji Paper Takasaki Paper Mfg. Taihei Paper Mfg. The Pack Tokushu Paper Mfg. Tomoe-gawa

5. Principal Products of Japanese pulp and paper companies

primary products produced. Following convention, principal paper products are divided into six categories: market pulp, newsprint, printing and writing papers, tissue, paperboard and packaging, and specialty papers.

Market pulp includes all cellulose derived pulps. It is classified by the method of manufacture and the wood species used. These factors determine the nature and condition of the fibers which effect end use properties. Companies may sell market pulp to papermaking companies or to businesses that chemically convert the pulp into non-paper products. De-inked pulp is included in this category.

Newsprint is a low grade commodity paper used for high volume, low cost publications. Newsprint producers use high yield, low cost mechanical pulps with only a small percentage of more costly chemical pulp. Newsprint sheets are characterized by printability, low cost, and ability to run on high speed printing presses. Newsprint comprises about 80% of the total United States uncoated groundwood production (Biermann, 1996).

Printing and writing papers is a general class of papers made from mechanical and purely chemical (wood free) pulps, and includes uncoated groundwood (non-newsprint), coated groundwood, uncoated wood-free, and coated wood free, that. Uncoated groundwood is used in directory paper and catalogs whereas the coated groundwood grades are typically used in magazines and newspaper inserts. The uncoated wood free papers are mainly used for writing grades, photocopy, bond, and tablet papers. The coated wood free papers are supercalendered to produce a smooth, shiny surface. This premium grade can be used for books, advertising, and annual reports.

Tissue products are lighter than other paper grades and are characterized by absorbency. Products in this class include facial tissue, sanitary tissue, toweling, napkins, etc. Due to the relatively steady demand for tissue products, the market for these items tends to be less volatile than markets for other paper products.

Paperboard and packaging is a fairly general class that includes linerboard, corrugating medium, folding carton, boxboard, and sack paper. The term paperboard stems from the boardlike characteristics of the sheet. Sheets that are greater than 0.3 mm thick are typically referred to as paperboard; however, the distinction is somewhat vague. This class also includes molded fiber products (e.g. egg cartons, drink

holders), roll cores and tubes.

Specialty papers include tobacco paper, postage stamps, filter paper, glassine, etc. Companies that manufacture such specialty papers generally serve niche markets and are able to command a higher price that reflects the value added to the product.

United States

Nineteen (44%) of the United States companies report pulp and paper products as a sole source of income. Other companies, such as Weyerhaeuser and George-Pacific, also produce other solid wood forest products like lumber and engineered wood products. Tenneco and Proctor & Gamble diversify beyond forest products producing automobile parts and a wide range of consumer goods like the fat substitute Olestra.

Canada

Seven (30%) of the Canadian companies manufacture exclusively pulp and paper products. The remaining companies produce non-paper forest products. Weston is the only Canadian company that reports producing products outside the forest products industry. It appears that Canadian companies are more involved in the sale of market pulp and newsprint, two relatively volatile markets. Only Cascades and Perkins Papers report involvement in the more stable tissue market while only six Canadian companies manufacture specialty papers.

Japan

Ten (33%) of the Japanese companies report pulp and paper products as their sole source of income. Oji is the Japan's largest general pulp and paper company and "land owner". Nippon Paper Industries and Daishowa are Japan's second and third largest general pulp and paper manufacturers and they produce other solid wood forest products such as lumber and engineered wood products. Several Japanese companies have developed product specialty markets: Japan Paper Industry, Japanese paper; Mishima, tobacco paper; Mitsubishi, photosensitive material; Tomoegawa, insulated papers. Chuo Paperboard, Ohishi, Rengo, Sanko, Settsu are specialized for paperboard and packaging.

ANNUAL SALES

The first financial measure examined in this study is annual sales,

commonly referred to as net annual sales. This number represents the amount of total annual sales revenue received by a company less discounts, returns, and allowances.

United States

As Table 6 shows, average total net annual sales decreased 6% for United States companies, to \$3.9 billion in 1996 from \$4.2 billion in 1995. The median value of net annual sales is less than half of the mean

Company	1996 Sales			1995 Sales			% Change	
	Pulp/paper annual sales	Total annual sales	Pulp/paper sales as % total sales	Pulp/paper annual sales	Total annual sales	Pulp/paper sales as % total sales	Pulp/paper annual sales	Total annual sales
International Paper	\$14,060	\$20,143	70%	\$13,825	\$19,797	70%	2%	2%
Kimberly-Clark ^a	13,149	13,149	100	13,373	13,373	100	-2	-2
Proctor & Gamble	10,196	35,284	29	9,291	33,482	28	10	5
James River ^a	5,691	5,691	100	6,800	6,800	100	-16	-16
George-Pacific	5,609	13,024	43	6,962	14,313	49	-19	-9
Stone Container ^a	5,142	5,142	100	7,351	7,351	100	-30	-30
Champion	4,962	5,880	84	6,007	6,972	86	-17	-16
Weyerhaeuser	4,648	11,114	42	5,682	11,788	48	-18	-6
Tenneco	3,602	6,572	55	2,752	8,899	31	31	-26
Jefferson Smurfit ^a	3,410	3,410	100	4,093	4,093	100	-17	-17
Sonoco ^a	2,788	2,788	100	2,706	2,706	100	3	3
Westvaco	2,753	3,045	90	2,998	3,272	92	-8	-7
Union Camp	2,716	4,013	68	3,230	4,212	77	-16	-5
Mead	2,623	4,707	56	2,672	5,179	52	-2	-9
Willamette Industries	2,344	3,425	68	2,810	3,874	73	-17	-12
Temple-Inland	2,082	3,460	60	2,198	3,495	63	-5	-1
Boise Cascade	1,873	5,108	37	2,518	5,074	50	-26	1
Bemis ^a	1,655	1,655	100	1,523	1,523	100	9	9
Bowater	1,610	1,718	94	1,884	2,001	94	-15	-14
Fort Howard ^a	1,581	1,581	100	1,621	1,621	100	-2	-2
Consolidated Papers ^a	1,545	1,545	100	1,579	1,579	100	-2	-2
Chesapeake ^a	1,159	1,159	100	1,234	1,234	100	-6	-6
Pollatch	1,079	1,554	69	1,099	1,605	68	-2	-3
Crown Vantage ^a	925	925	100	1,077	1,077	100	-14	-14
Gaylord Container ^a	922	922	100	1,051	1,051	100	-12	-12
Sealed Air ^a	790	790	100	723	723	100	9	9
Longview Fibre	636	823	77	778	986	79	-18	-17
Rayonier	602	1,178	51	540	1,261	43	11	-7
Caraustar Industries	584	603	97	528	545	97	11	11
P.H. Glatfelter ^a	566	566	100	623	623	100	-9	-9
Wausau Paper ^a	543	543	100	516	516	100	5	5
Buckeye Cellulose ^a	471	471	100	409	409	100	15	15
Mosinee Paper ^a	314	314	100	306	306	100	3	3
Rock-Tenn	281	876	32	329	903	36	-15	-3
Dexter	270	1,100	25	282	1,089	26	-4	1
Lydal ^a	253	253	100	252	252	100	0	0
Greif Bros.	246	637	39	327	719	45	-25	-11
Pope & Talbot	216	447	48	259	524	49	-17	-15
Louisiana-Pacific	177	2,486	7	334	2,843	12	-47	-13
Media General	128	765	17	140	708	20	-9	8
FiberMark ^a	125	125	100	118	118	100	6	6
Republic Group	86	118	73	63	96	66	37	23
Badger Paper Mills ^a	76	76	100	93	93	100	-18	-18
<i>Mean</i>	2,430	3,935	75	2,627	4,165	76	-8	-6
<i>Median</i>	1,159	1,554	90	1,234	1,579	92	-6	-2

^a Pulp, paper, and packaging sales not reported separately from total annual sales

6. Annual sales (millions of US\$) of United States pulp and paper companies

or \$1.6 billion in 1996. The range in net annual sales is \$20 billion to a low of \$76 million.

Many pulp and paper firms sell a multitude of forest products, both paper and solid wood, as well as nonwood products, so revenues generated by pulp, paper, and packaging sales in the table are reported separately from overall sales. Analyzing pulp and paper annual sales provides a more accurate picture of firm productivity and position in the industry. In this year of price declines, average pulp and paper annual sales fell 8%, to \$2.4 billion in 1996 from \$2.6 billion in 1995. The median value of pulp and paper annual sales is less than half of the mean value or \$1.2 billion in 1996. The range in pulp and paper annual sales is \$14 billion to \$76 million.

As the largest paper company in the world, International Paper's pulp and paper sales were over \$14 billion, followed closely by Kimberly-Clark at \$13.1 billion. Proctor & Gamble, James River, and George-Pacific rounded out the top five pulp and paper manufacturer's with pulp and paper sales of \$10.2, \$5.7, and \$5.6 billion, respectively. James River replaces Stone Container as a top five company. This may be because James River concentrates on tissue products while Stone Container focuses on the more volatile pulp and packaging markets. During industry downturns, a tissue producer is expected to fare better in terms of sales due to more stable demand than other types of pulp and paper.

Although many United States pulp and paper companies experienced record sales in 1995, 28 of the 43 companies (65%) reported a decline in pulp and paper sales in 1996. This can be attributed to lower foreign and domestic demand, lower prices driven by overcapacity, and inventory drawdowns (Stanley, 1997, p.57). Companies that had pulp and paper sales decline the most in 1996 include Louisiana-Pacific, Stone Container, Boise Cascade, Greif Bros., and George-Pacific with decreases of -47%, -30%, -26%, -25%, and -19% respectively. On the other hand, Republic Group, Tenneco, Buckeye Cellulose, Rayonier, and Carastar Industries experienced the largest gains in pulp and paper annual sales in 1996 with increases of 37%, 31%, 15%, 11 %, and 11 % respectively. Most of the sales increases appear to be due to acquisitions; for example, Buckeye and Republic Group acquired additional capacity in 1996.

Canada

Average net annual sales for Canadian companies decreased 4%, to US\$ 1.4 billion in 1996 from US\$ 1.5 billion in 1995 (Table 7). The range in net annual sales is over US\$ 1.7 billion to a low of US\$ 301 million.

Company	1996 Sales ^b			1995 Sales ^c			% Change	
	Pulp/paper annual sales	Total annual sales	Pulp/paper sales as % total sales	Pulp/paper annual sales	Total annual sales	Pulp/paper sales as % total sales	Pulp/paper annual sales	Total annual sales
Stone-Consolidated	\$1,561	\$1,677	93%	\$1,850	\$1,960	94%	-16%	-14%
Cascades	1,541	1,541	100	1,654	1,654	100	-7	-7
Domtar ^a	1,450	1,450	100	1,607	1,607	100	-10	-10
Fletcher Challenge ^a	1,364	1,364	100	1,160	1,160	100	18	18
Avenor	1,215	1,512	80	1,629	1,904	86	-25	-21
MacMillan Bloedel	1,192	3,699	32	1,423	3,828	37	-16	-3
Abitibi-Price	1,151	1,900	61	1,313	2,027	65	-12	-6
Noranda Forest	950	1,684	56	1,125	1,754	64	-16	-4
Donohue	875	1,201	73	596	819	73	47	47
Repap Enterprises ^a	853	853	100	1,092	1,092	100	-22	-22
Weston	656	9,321	7	675	9,448	7	-3	-1
Tembec	423	631	67	450	636	71	-6	-1
Canfor	355	1313	27	559	1,408	40	-37	-7
West Fraser	322	1,204	27	400	1,087	37	-20	11
St. Laurent ^a	311	311	100	326	326	100	-5	-5
Spruce Falls	239	255	94	180	183	98	33	39
Alliance	189	311	61	211	295	72	-10	5
Perkins Papers	178	178	100	108	108	100	65	65
Doman	158	499	32	306	596	51	-48	-16
Harmac Pacific ^a	155	155	100	263	263	100	-41	-41
Crestbrook	145	286	51	273	392	70	-47	-27
Slocan	137	584	23	143	628	23	-4	-7
Rolland	126	301	42	157	318	49	-20	-5
<i>Mean</i>	<i>676</i>	<i>1,401</i>	<i>66</i>	<i>761</i>	<i>1,456</i>	<i>71</i>	<i>-11</i>	<i>-4</i>
<i>Median</i>	<i>423</i>	<i>1,201</i>	<i>67</i>	<i>559</i>	<i>1,087</i>	<i>72</i>	<i>-24</i>	<i>-11</i>

^a Pulp, paper, and packaging sales not reported separately from total annual sales
^b 1996 exchange rate C\$ 1 = US\$ 0.7334
^c 1995 exchange rate C\$ 1 = US\$ 0.7287

7. Annual sales (millions of US\$) of Canadian pulp and paper companies

The Canadian pulp and paper industry is oriented more towards commodity products. One-half of the Canadian companies produce newsprint and three-quarters produce market pulp. This focus on lower margin, volatile commodity grades could explain why Canada fared worse than the United States companies in terms of pulp and paper annual sales relative to average net annual sales. Canadian pulp and paper annual sales fell 11 %, to US\$ 676 million in 1996 from US\$ 761 million in 1995. The median value of pulp and paper annual sales is about 63% of the mean value, or US\$ 423 million. Pulp and paper annual sales ranges from a high of US\$ 1.6 billion to US\$ 126 million.

Canada's largest grossing company, Stone-Consolidated, earned US\$ 1.6 billion in paper sales, follow by Cascades at US\$ 1.5 billion. Domtar, Fletcher Challenge, and Avenor followed with reported pulp and paper sales of US\$ 1.5, US\$ 1.4, and US\$ 1.2 billion respectively.

Canada's pulp and paper industry also faced a difficult year in 1996, and of the 23 publicly owned companies, only 4 (17%) reported increased pulp and paper sales. The companies with the largest decreases in pulp and paper sales are Doman (-48%), Crestbrook Forest Industries (-47%), Harmac Pacific (-41%), Canfor (-37%), and Avenor (-25%). This is compared to increases in pulp and paper sales as experienced by only four companies, Perkins Papers, Donohue, Spruce Falls, and Fletcher Challenge, with increases of 65%, 47%, 33%, and 18% respectively. The increase in sales for these companies is primarily due to an increase in capacity, similar to United States companies. For example, Perkins Papers acquired some of Cascades assets in late 1995. Spruce Falls restarted an idle paper machine and Donohue bought two newsprint mills and two sawmills.

Japan

Average net annual sales for Japanese companies decreased 13%, to US\$ 1 billion in 1996 from US\$ 1.1 billion in 1995 calculated in terms of US dollar value (Table 8). Based on Japanese Yen calculation, however, the average net annual sales for Japanese companies increased 2% to JPY 125 billion in 1996 from JPY 123 billion in 1995 (Table 8-2). This difference in the two assessments comes from the fact that there was a 16% depreciation of the Japanese Yen against the US dollar during this period. Therefore, calculated against the US dollar this depreciation makes the companies' performances look worse than they actually were, when in fact, the Japanese pulp and paper companies were experiencing slow recovery of their production mainly due to fairly strong demand for advertising and paper in Japanese domestic market.

Japanese pulp and paper annual sales also fell 13 % to US\$ 855 million in 1996 from US\$ 1,006 million in 1995 while they increased 2% to JPY 97 billion in 1996 from JPY 96 in 1995. The median value of pulp and paper annual sales is about 39% of the mean value, or US\$ 331 million. Pulp and paper annual sales ranges from a high of US\$ 6.2 billion to US\$ 11 million.

Japan's largest pulp and paper company, Oji Paper, earned US\$

Company	1996 Sales ^a			1995 Sales ^a			% Change	
	Pulp/paper annual sales	Total annual sales	Pulp/paper sales as % total sales	Pulp/paper annual sales	Total annual sales	Pulp/paper sales as % total sales	Pulp/paper annual sales	Total annual sales
Oji Paper	\$ 6,282	\$ 7,852	80%	\$ 8,051	\$ 9,046	89%	-22%	-13%
Nippon Paper Industries	4,975	5,719	87	5,677	6,525	87	-12	-12
Daio Paper	2,516	2,516	100	2,884	2,884	100	-13	-13
Daishowa Paper Mfg.	2,515	2,647	95	2,824	3,004	94	-11	-12
Rengo	1,723	1,853	93	2,019	2,147	94	-15	-14
Mitsubishi Paper Mills	1,114	1,485	75	1,310	1,679	78	-15	-12
Chuetsu Pulp & Paper	914	914	100	969	969	100	-6	-6
Hokuetsu Paper Mills	868	894	97	982	1,013	97	-12	-12
Settsu	539	539	100	628	628	100	-14	-14
Tomoku	519	617	84	562	646	87	-8	-4
Japan Paper Industry	424	424	100	491	491	100	-13	-13
Nippon Kakoh Seishi	411	462	89	481	540	89	-14	-14
Tokai Pulp	405	413	98	450	489	92	-10	-15
The Pack	399	498	80	444	563	79	-10	-11
Kishu Paper	364	414	88	418	475	88	-13	-13
Sanko Paper Mfg.	297	297	100	346	346	100	-14	-14
Chuo Paperboard	188	188	100	224	224	100	-16	-16
Tokushu Paper Mfg.	162	205	79	192	238	81	-16	-14
Takasaki Paper Mfg.	157	227	69	184	271	68	-15	-16
Mishima Paper ^a	128	128	100	143	143	100	-11	-11
Nippon Hi-Pack	127	199	64	147	226	65	-13	-12
Furubayashi Shiko ^a	123	123	100	147	147	100	-16	-16
Superbag	114	317	36	134	344	39	-15	-8
Tomoegawa	94	302	31	112	373	30	-17	-19
Dainippon Shigyo	93	151	62	105	173	61	-11	-13
Ohishi Sangyo	72	122	59	82	141	58	-12	-13
Chuo Pack	60	72	83	67	81	83	-11	-11
Chuetsu	42	118	36	62	142	44	-32	-17
Taihei Paper Mfg.	28	67	42	30	76	40	-7	-12
General	11	133	8	11	144	8	-7	-7
<i>Mean</i>	<i>855</i>	<i>997</i>	<i>78</i>	<i>1,006</i>	<i>1,139</i>	<i>78</i>	<i>-13</i>	<i>-13</i>
<i>Median</i>	<i>331</i>	<i>365</i>	<i>86</i>	<i>382</i>	<i>424</i>	<i>88</i>	<i>-13</i>	<i>-13</i>

^a Pulp, paper, and packaging sales not reported separately from total annual sales
^b 1996 exchange rate JP Yen 1=US\$0.0080
^c 1995 exchange rate JP Yen 1=US\$0.0093

8. Annual sales (millions of US\$) of Japanese pulp and paper companies

6.3 billion in paper sales, follow by Nippon Paper Industries at US\$ 5 billion. Daio and Daishowa, the third and fourth largest pulp and paper companies, followed with reported pulp and paper sales of US\$ 2.5 billion each. It can be said that these four companies dominate the Japanese general pulp and paper market. Rengo, the fifth largest, is specialized for paperboard and packaging material, and Mitsubishi Paper Mills, the sixth ranked, focuses on their production of photosensitive materials. Chuetsu Pulp & Paper increased its sales 10% by acquiring a new newsprint factory.

	1996	1995	% Change
Company	Total annual sales	Total annual sales	Total annual sales
Oji Paper	981,561	973,167	1%
Nippon Paper Industries	714,857	701,957	2
Daio Paper	314,533	310,274	1
Daishowa Paper Mfg.	330,913	323,201	2
Rengo	231,626	231,018	0
Mitsubishi Paper Mills	185,660	180,639	3
Chuetsu Pulp & Paper	114,243	104,288	10
Hokuetsu Paper Mills	111,803	108,938	3
Settsu	67,345	67,592	0
Tomoku	77,180	69,457	11
Japan Paper Industry	53,041	52,772	1
Nippon Kakoh Seishi	57,757	58,083	-1
Tokai Pulp	51,670	52,571	-2
The Pack	62,298	60,525	3
Kishu Paper	51,746	51,073	1
Sanko Paper Mfg.	37,094	37,269	0
Chuo Paperboard	23,540	24,070	-2
Tokushu Paper Mfg.	25,638	25,555	0
Takasaki Paper Mfg.	28,386	29,175	-3
Mishima Paper ^a	15,983	15,417	4
Nippon Hi-Pack	24,897	24,289	3
Furubayashi Shiko ^a	15,334	15,795	-3
Superbag	39,618	37,026	7
Tomoegawa	37,710	40,169	-6
Dainippon Shigyo	18,818	18,571	1
Ohishi Sangyo	15,271	15,147	1
Chuo Pack	9,000	8,732	3
Chuetsu	14,727	15,256	-3
Taihei Paper Mfg.	8,401	8,174	3
General	16,622	15,442	8
<i>Mean</i>	<i>124,576</i>	<i>122,521</i>	<i>2</i>
<i>Median</i>	<i>45,644</i>	<i>45,621</i>	<i>1</i>

8-2. Annual sales (millions of JPY) of Japanese pulp and paper companies

RETURN ON EQUITY

Return on equity (ROE), which compares net income to average stockholders' equity, measures how much an "investment" is earning for a stockholder based on the growth in the company's equity. Average ROE for United States pulp, paper, and packaging companies fell 64% between 1996 and 1995, while the Canadian average fell 63% and the Japanese average fell 21%.

United States

During 1996, the United States pulp and paper industry experienced a dramatic decline (-64%) in average ROE to 10.4% in 1996 from 28.7% in 1995 (Table 9). It should be noted that the decline in ROE is less (-43%) when the three companies with the largest 1995 ROE (Gaylord Container 300%, Crown Vantage 100%, and Sealed Air 90%) are excluded from the mean. This is also reflected in the median, where the ROE decline is negative 41 %, to 11.1 % in 1996 from 18.8% in 1995. Return on equity ranges from a high of 45% to a low of -71%. Thirty-six (84%) of the 43 United States pulp, paper, and packaging companies report a positive ROE.

The most successful United States company, in terms of 1996 ROE, is Sealed Air, at 45.4%. This company's income was generated primarily from strong earnings in international sales of specialty packaging materials. Sealed Air also reported the largest ROE in 1995 when the pulp and paper industry experienced outstanding profitability. The diversity of Sealed Air products, many of which do not originate from pulp or paper, appear to ensure substantial profits in both outstanding and poor pulp and paper cycles. Buckeye Cellulose is the company with the second largest ROE (38.2%) and produces wood and cotton liner-based specialty cellulose products. In 1996, Buckeye management attributed its company's near doubled income to its specialty products emphasis; another buffer that may have helped Buckeye's ROE in 1996 is that most of this company's sales (70%) are obtained in markets outside of the United States. Carastar Industries, which manufactures, converts, and markets paperboard products, enjoyed the third largest ROE (37.4%) in 1996. Kimberly-Clark with a 34.5% ROE, operates three major businesses worldwide including personal care products, consumer tissue products, and away-from-home products. Successful reorganization after a 1995 merger

Company	1996	1995	% Change
	ROE	ROE	ROE
Sealed Air	45.4%	89.9%	-49%
Buckeye Cellulose	38.2	29.4	30
Caraustar Industries	37.4	35.6	5
Kimberly-Clark	34.5	0.9	3,735
Republic	28.0	20.6	36
Procter & Gamble	27.3	27.2	0.4
Mosinee Paper	23.9	16.0	49
Lydall	22.5	25.2	-11
Bemis	18.7	18.3	2
P. H. Glatfelter	18.7	21.5	-13
Sonoco	18.6	18.8	-1
Bowater	17.7	24.9	-29
Media General	17.3	15.0	15
Wausau Paper	16.4	13.8	19
FiberMark	16.2	21.7	-25
Rock-Tenn	15.6	14.0	11
Consolidated Papers	14.8	21.5	-31
Tenneco	13.7	13.6	0
Dexter	13.1	11.4	15
Longview Fibre	12.3	17.8	-31
Greif Bros.	11.1	17.2	-36
Weyerhaeuser	10.2	18.2	-44
Willamette Industries	10.0	31.8	-68
Westvaco	9.9	14.2	-30
Mead	8.9	16.1	-45
Gaylord Container	7.6	300.2	-97
James River	6.9	5.7	21
Temple-Inland	6.7	15.0	-56
Chesapeake	6.4	21.7	-70
Pottlatch	6.1	11.7	-48
George-Pacific	4.4	33.2	-87
Union Camp	4.0	22.8	-82
Champion	3.8	23.4	-84
International Paper	3.5	16.1	-78
Pope & Talbot	2.1	-11.9	118
Boise Cascade	0.2	23.0	-99
Badger Paper Mills	-11.0	13.5	-181
Louisiana-Pacific	-13.0	-3.0	-334
Rayonier	-14.1	20.0	-171
Stone Container	-14.9	31.0	-148
Crown Vantage	-70.9	100.1	-171
Jefferson Smurfit	NM ^a	NM ^a	NM ^a
Fort Howard	NM ^a	NM ^a	NM ^a
<i>Mean</i>	<i>10.4</i>	<i>28.7</i>	<i>-64</i>
<i>Median</i>	<i>11.1</i>	<i>18.8</i>	<i>-41</i>

^a NM = not meaningful due to negative shareholders' equity

9. Return on equity of United States pulp and paper companies

with Scott Paper resulted in a strong ROE for Kimberly-Clark in 1996, increasing from less than a 1% ROE in 1995 to a 34.5% ROE in 1996. However, the low ROE in 1995 resulted from Kimberly-Clark's taking substantial charges against income in 1995 for the merger with Scott Paper. The Republic Group has the fifth largest ROE or 27.3%. This company specializes in production of gypsum wallboard and recycled paperboard as well as the collection and sale of recovered paper fiber.

Kimberly-Clark experienced the largest percent increase (3,735%) in ROE, but such an extraordinary increase would not have occurred without the reductions taken in 1995 for restructuring associated with acquiring Scott Paper. The remaining four companies with the largest percent increase in ROE are Pope & Talbot (118%), Mosinee Paper (49%), Buckeye Cellulose (30%), and Wausau Paper (119%).

The five poorest United States performers in 1996, in terms of ROE, are Crown Vantage (-70.9%), Stone Container (-14.9%), Rayonier (-14.1%), Louisiana-Pacific (-13%), and Badger Paper Mills (-11%) and all report that negative ROE resulted from losses due to declining prices aggravated by weak demand for pulp and paper commodities. For Badger, Louisiana-Pacific, and Rayonier, such losses were further intensified by charges against earnings resulting from plant closures and legal actions. Louisiana-Pacific suffered the double impacts of the closure of Ketchikan Pulp operations and the settlement of a class action lawsuit over oriented strandboard. Two United States companies, Fort Howard and Jefferson Smurfit, are shown in Table 9 as having a ROE that is not meaningful (NM) because of negative stockholders' equity. Both companies attribute a deficit in stockholders' equity to circumstances associated with reorganization of indebtedness.

The company with the largest decrease in percent change ROE is Louisiana-Pacific (-334%), followed by Badger Paper Mills (-181%), Rayonier and Crown Vantage (both -171%), and Stone Container (-148%).

Canada

Effective in 1996, the Canadian Institute of Chartered Accountants issued a recommendation that convertible debentures be segregated and reported in both the liability and equity sections of the balance sheet. However, this reporting change makes it difficult to compare United States, Canadian and Japanese companies in terms of a ratio analysis involving equity because United States and Japanese companies report

debentures in the liability section only. Therefore, it was decided that the ROE calculation for this analysis would subtract the value of debentures reported in the Canadian stockholders' equity section for meaningful comparative evaluation of ROE for United States, Canadian and Japanese companies. The calculation for ROE is net income divided by average stockholders' equity (without debentures).

During 1996, the Canadian pulp and paper industry experienced a serious decline (-63%) in average ROE, to 8.2% in 1996 from 22% in 1995 (Table 10). For median values, the decline in ROE is negative 60%, to a ROE in 1996 of 8% from 20.2% in 1995. Return on equity ranges from a high of 53% to a low of -16%. Sixteen (70%) of the 23 Canadian pulp and paper companies report a positive ROE.

	1996	1995	% Change
Company	ROE	ROE	ROE
Spruce Falls	52.7%	57.0%	-8%
Perkins Papers	34.9	9.5	267
Donohue	22.3	38.0	-41
Cascades	17.9	23.9	-25
Alliance	17.3	31.2	-44
Weston	15.3	12.9	19
West Fraser	11.8	15.3	-23
Rolland	11.8	18.8	-37
Abitibi-Price	9.9	29.1	-66
Slocan	9.8	21.6	-55
Fletcher Challenge	8.1	6.6	23
Domtar	7.8	32.2	-76
Stone-Consolidated	7.4	10.7	-31
MacMillan Bloedel	2.5	15.4	-84
Noranda Forest	1.9	16.9	-89
Avenor	0.6	32.0	-98
Tembec	0.0	21.6	-100
St. Laurent	-2.0	41.0	-105
Canfor	-8.0	6.3	-227
Doman	-12.1	12.8	-195
Harmac Pacific	-12.5	23.1	-154
Crestbrook	-16.2	8.5	-291
Repap Enterprises	NM ^a	NM ^a	NM ^a
<i>Mean</i>	8.2	22.0	-63
<i>Median</i>	8.0	20.2	-60

^a NM = not meaningful due to negative shareholders' equity

10. Return on equity of Canadian pulp and paper companies

The most successful Canadian performer, both in 1996 and 1995, is Spruce Falls with a ROE of 52.7%. This is an integrated company that produces lumber, newsprint, and specialty papers. Spruce Falls employees own 48% of the outstanding common shares and reflects the company's philosophy that shared ownership insures profitability. Perkins Papers, a new participant in the top five, has a 34.9% ROE and attributes its success to gains in productivity and efficiency augmented by strong newsprint sales. Donohue (22.3%), is a consistent performer with the third largest Canadian ROE in 1996 and fourth largest ROE in 1995. Donohue reported that strong lumber prices offset the weak performance of pulp in 1996 while in 1995 Donohue reported that record pulp prices made the company profitable in the face of disappointing lumber sales. Cascades was second in 1995 and is fourth in 1996 with a 17.9% ROE. Cascades management credits a mixture of diversified markets, specialty products, and recycling for its success. Alliance Forest Product earned a 17.3% ROE and offers a product mix of newsprint, publishing paper and lumber products.

Only three Canadian companies experienced an increase in the percent in ROE, and these are Perkins Papers (267%), Fletcher Challenge (23%), and Weston (19%).

The three poorest performing Canadian companies, in terms of reported ROE, are Crestbrook Forest Industries (-16.2%), Harmac (-12.5%), Doman (-12.1%). Each of these companies attributed poor earnings to soft pulp prices and reduced order volumes. Canfor's -8.0% ROE means another year as a bottom five performer. Canfor's annual report suggests that its lackluster performance is because of poor market conditions and losses due to foreign exchange fluctuations. St. Laurent, with a reported ROE of -2.0%, cites soft prices in container board products and production problems as the source of decline in ROE. Four of the five companies shown as reporting poor ROE are reliant on the sale of market pulp for substantial portions of sales. Repap Enterprises is reported as having an ROE that is not meaningful (NM) because of a negative stockholders' value which Repap Enterprises attributes to a large one time net loss to income from discontinued operations.

The company with the largest decrease in percent in ROE is Crestbrook Forest Industries (-291%), followed by Canfor (-227%), Doman (-195%); Harmac Pacific (-154%), and St. Laurent (-105%).

Japan

Table 11 shows remarkable characteristics of Japanese pulp and paper industry; ROE of Japanese pulp and paper industry is really low compared to US and Canadian counterparts. Furthermore, Japanese pulp and paper industry faced a serious decline (-21%) in average ROE to 0% in 1996 from 1.6% in 1995.

The most successful Japanese company, in terms of 1996 ROE, is Daishowa, at 14.5%. This company has been struggling to survive

	1996	1995	% Change
Company	ROE	ROE	ROE
Daishowa Paper Mfg.	14.5%	-10.9%	233%
Sanko Paper Mfg.	12.8	21.1	-39
The Pack	8.6	7.5	15
Ohishi Sangyo	8.3	7.6	9
Hokuetsu Paper Mills	7.0	8.2	-15
Nippon Paper Industries	7.0	6.6	6
Chuetsu Pulp & Paper	6.7	9.9	-32
Kishu Paper	6.3	5.6	13
Oji Paper	5.4	5.1	6
Daio Paper	5.0	7.2	-31
Tokushu Paper Mfg.	4.8	5.3	-9
Nippon Kakoh Seishi	4.5	12.2	-63
Tokai Pulp	3.5	2.9	21
Nippon Hi-Pack	3.4	3.4	0
Rengo	3.3	1.3	154
Chuo Pack	3.2	1.8	78
Mitsubishi Paper Mills	3.2	5.0	-36
Dainippon Shigyo	3.0	2.4	25
Chuetsu	2.7	2.1	29
Japan Paper Industry	2.6	7.6	-66
Tomoku	2.3	1.0	130
General	2.0	1.0	100
Takasaki Paper Mfg.	1.1	-5.7	119
Mishima Paper	0.9	0.6	50
Superbag	0.6	0.6	0
Furubayashi Shiko	-2.3	2.2	-204
Settsu	-28.9	-3.0	-863
Tomoegawa	-33.7	-9.9	-240
Taihei Paper Mfg.	-57.3	-53.2	-8
Chuo Paperboard	NM.	NM.	NM
<i>Mean</i>	0.0	1.6	-21
<i>Median</i>	3.3	2.9	6

NM=not meaningful due to negative shareholders' equity

11. Return on equity of Japanese pulp and paper companies

cutthroat competition among Japanese pulp and paper companies by implementing financial reconstruction. This dramatic recovery of its ROE came from sales of lands and stocks to settle its debt. Sanko Paper, one of Oji Paper's affiliated companies, is the company with the second largest ROE (12.8%) and produces pulp and crude paper for paperboard. ROE of other large companies such as Oji Paper, Nippon Paper and Daio is not so outstanding compared to other small to medium-sized pulp and paper companies.

EARNINGS PER SHARE

Earnings per share (EPS) compares net income to the weighted average number of outstanding common shares of stock, resulting in a dollar amount earned by each common share. This ratio is watched closely by investors and changes can have substantial impacts on a company's stock price. The average EPS for United States pulp and paper companies fell 50% between 1996 and 1995, while the Canadian average fell 74% and the Japanese average fell 122% (126% in Japanese Yen basis).

United States

United States pulp, paper, and packaging companies saw average EPS decline substantially (-50%) to \$1.52 in 1996 from \$3.05 in 1995 (Table 12). In terms of median values, the decline in EPS is less at -22%, to \$1.72 from \$2.19. 1996 EPS values range from a high of \$4.98 to a low of -\$3.28. Due to weak markets, 66% of US companies report a decline in 1996 EPS as compared to 1995. The range of EPS is narrower and with more negative values than the previous year. In 1996 the range is a total of \$8.26, from a high of \$4.98 to a low of -\$3.28; the range in 1995 is a total of \$13.15, from a high of \$11.29 to a low of -\$1.86.

Kimberly-Clark reports the largest 1996 EPS of \$4.98. It is interesting to note that Kimberly-Clark and Procter & Gamble (\$4.29), two consumer products companies, enjoy the first and third largest EPS in the industry. The other three most successful companies include Bowater (\$4.63), Consolidated Papers (\$4.01), and Mead (\$3.67). Between 1996 and 1995 there is a major change in the companies appearing in the top five most successful category. Of the top five companies in 1995, only Mead returns in 1996.

Company	1996	1995	% Change
	EPS	EPS	EPS
Kimberly-Clark	\$4.98	\$0.12	4,050%
Bowater	4.63	5.33	-13
Procter & Gamble	4.29	3.71	16
Consolidated Papers	4.01	5.16	-22
Mead	3.67	6.33	-42
Willamette Industries	3.48	9.34	-63
Media General	2.65	2.01	32
Mosinee Paper	2.56	1.44	78
Temple-Inland	2.39	5.01	-52
Weyerhaeuser	2.34	3.93	-40
Tenneco	2.33	4.16	-44
Fort Howard	2.32	0.25	828
Caraustar Industries	2.28	1.66	37
Westvaco	2.09	2.78	-25
Dexter	2.06	1.67	23
Buckeye Cellulose	2.04	NR ^a	NM ^b
Potlatch	2.01	3.72	-46
Bemis	1.90	1.63	17
Greif Bros.	1.87	2.49	-25
Sonoco	1.81	1.72	5
FiberMark	1.79	1.97	-9
George-Pacific	1.72	11.29	-85
Sealed Air	1.63	1.25	30
Rock-Tenn	1.50	1.21	24
Champion	1.48	8.01	-82
P.H. Glatfelter	1.41	1.49	-5
Republic	1.40	1.10	27
Lydall	1.37	1.23	11
Chesapeake	1.27	3.88	-67
Union Camp	1.23	6.45	-81
James River	1.15	0.81	42
Wausau Paper	1.12	0.85	32
Longview Fibre	1.09	1.47	-26
International Paper	1.04	4.50	-77
Jefferson Smurfit	1.01	2.19	-54
Pope & Talbot	0.29	-1.86	116
Gaylord Container	0.16	2.44	-93
Boise Cascade	-0.63	5.93	-111
Badger Paper Mills	-1.14	1.41	-181
Stone Container	-1.35	2.63	-151
Louisiana-Pacific	-1.87	-0.48	-290
Crown Vantage	-2.87	NR ^a	NM ^b
Rayonier	-3.28	4.75	-169
<i>Mean</i>	<i>1.52</i>	<i>3.05</i>	<i>-50</i>
<i>Median</i>	<i>1.72</i>	<i>2.19</i>	<i>-22</i>

^a NR = not reported because not a publicly traded company in 1995
^b NM = not meaningful due to no financial reporting in 1995

12. Earnings per share (US\$) of United States pulp and paper companies

Kimberly-Clark experienced the largest percent increase (4,050%) in EPS, but Kimberly-Clark's dramatic increase would not have occurred without the reduction of \$3.74 in EPS in 1995 due to restructuring associated with acquiring Scott Paper. Restating EPS to remove restructuring results in a more modest increase of 29%. The remaining four companies with the largest percent increase in EPS are Fort Howard (828%), Pope & Talbot (116%), Mosinee Paper (78%), and James River (42%). These four companies all attribute increasing EPS to better productivity and efficiency due to concentrating on core competencies. It is interesting, however, that Fort Howard has a negative shareholder's equity, as reported in the previous section, but had a positive increase in EPS. This positive change is due to a \$200 million reduction in cost of goods sold.

The company with the lowest 1996 EPS is Rayonier at -\$3.81, representing a decrease of 169%. Rayonier experienced weak earnings arising from one time charges attributable to mill closures and a change in accounting practices. The remaining four poorest performing EPS companies in 1996 include Crown Vantage (-\$2.87), Louisiana-Pacific (-\$1.87), Stone Container (-\$1.35), and Badger Paper Mills (-\$1.14). Crown Vantage reports weak earning as a result of interest expense related to their spin-off in 1995. Louisiana-Pacific and Badger both suffered one time charges because of mill closures and restructuring fees. Pulp producing Stone Container did poorly because of weak pulp markets. The company with the largest decrease in percent in EPS is Louisiana-Pacific (-290%), followed by Badger Paper Mills (-181%), Rayonier (-169%), Stone Container (-151%), and Boise Cascade (-111%). Badger, Rayonier, and Boise Cascade attribute the decrease primarily to expenses associated with mill closures and restructuring costs. Stone Container is effected by the weak pulp market and refinancing charges associated with long term debt.

Canada

Only two Canadian companies report EPS using both Canadian and United States GAAP, so direct comparison of the EPS values between the two countries is not possible due to the differences between United States and Canadian GAAP.

Canadian pulp, paper, and packaging companies average EPS was off sharply (-74%) to US\$ 0.47 in 1996 from US\$ 1.78 in 1995 (Table 13). In terms of median values, the decline in EPS is 69%, to an EPS in

	1996 ^a	1995 ^b	% Change
Company	EPS	EPS	EPS
Weston	\$3.81	\$2.93	30%
Alliance	2.35	3.32	-29
West Fraser	2.32	2.58	-10
Spruce Falls	1.81	1.11	63
Donohue	1.66	2.24	-26
Stone-Consolidated	1.16	1.89	-39
Cascades	1.00	1.34	-25
Fletcher Challenge	0.91	0.71	29
Rolland	0.89	1.46	-39
Abitibi-Price	0.86	2.36	-64
Perkins Papers	0.71	0.14	408
Domtar	0.50	1.69	-71
Slocan	0.42	1.17	-64
MacMillan Bloedel	0.26	1.60	-84
Noranda Forest	0.07	1.06	-93
Avenor	0.07	3.73	-98
Tembec	-0.14	2.16	-107
St. Laurent	-0.42	3.99	-111
Canfor	-0.71	0.58	-224
Harmac Pacific	-0.98	2.16	-145
Doman	-1.12	0.96	-217
Crestbrook	-1.72	0.94	-283
Repap Enterprises	-2.95	0.83	-455
<i>Mean</i>	<i>0.47</i>	<i>1.78</i>	<i>-74</i>
<i>Median</i>	<i>0.50</i>	<i>1.60</i>	<i>-69</i>
^a 1996 exchange rate C\$ 1 = US\$ 0.7334			
^b 1995 exchange rate C\$ 1 = US\$ 0.7287			

13. Earnings per share (US\$) of Canada pulp and paper companies

1996 of US\$ 0.50 from US\$ 1.60 in 1995. 1996 EPS range from a high of US\$ 3.81 to a low of -US\$ 2.95. 83% of Canadian companies report a decline in 1996 EPS over 1995. The range of EPS in 1996 for Canadian companies is broader and more negative than in 1995. In 1996 the range is US\$ 3.81 to US\$ -2.95 (a difference of \$6.76), while the range in 1995 was US\$ 3.99 to US\$ 0.14 (a difference of US\$ 3.85).

Weston earned the largest 1996 EPS or US\$ 3.81, reflecting a gain of 30% and one of only three Canadian companies to report an

increase in EPS. Weston is a diversified company that manufactures many non-forest products, thus lowering its vulnerability in a weak year in the pulp and paper markets. The other four most successful Canadian companies include Alliance Forest Products (US\$ 2.35), West Fraser Timber (US\$ 2.32), Spruce Falls (US\$ 1.81), and Donohue (US\$ 1.66). Alliance Forest Products and West Fraser Timber both report an increase in EPS due to a strong lumber market as well as productivity progress in mills and plants. Spruce Falls attributes its higher EPS to the increased capacity of paper mills. Three Canadian companies, Weston, Alliance Forest Products, and West Fraser, return in 1996 to the top five category.

The Canadian company with the largest percent increase in EPS is Perkins Papers with a change of 408%. Perkins explains this large increase as being due to productivity and efficiency increases throughout the corporation. The remaining companies with an increase in EPS are Spruce Falls (63%), Weston Industries (30%), and Fletcher Challenge (29%). As stated earlier, Spruce Falls attributes increased earnings to higher capacity, Weston is a large diversified firm, and Fletcher Challenge experienced strong sales early in their financial year. All other Canadian companies (83%) experienced decreasing EPS in 1996, which will be discussed shortly.

The company with the lowest EPS is Repap Enterprises, at US\$ -2.95. The other four companies suffering from a comparatively low EPS are Crestbrook Forest Industries (US\$ -1.72), Doman (US\$ -1.12), Harmac (US\$ -0.98), and Cantor (US\$ -0.71). Each of these companies say decreases in order volumes and weak pulp markets were a major influence on decreased earnings. Canfor also says fluctuations in exchange rates were responsible for a negative EPS.

The company with the largest decrease in percent in EPS is Repap Enterprises with a decrease of 455%, followed by Crestbrook Forest Industries (-283%), Canfor (-224%), Doman (-217%), and Harmac Pacific (-145%). Each of these companies attributes decreased earnings to the weak pulp market in 1996.

Japan

No Japanese company reports EPS using both Japanese and United States GAAP; therefore, due to the differences between Japanese and US GAAP, direct comparison of the EPS values between these countries is not possible.

As Table 14 and Table 14-2 show, average EPS decreased to US\$0.03 (JPY 3.40) in 1996 from US\$0.14 (JPY 15.38) in 1995. The median value of EPS is US\$0.09 (JPY 11.87) in 1996 and US\$0.15 (JPY 15.76) in 1995. In spite of weak markets, 50% of the companies report an increase in 1996 EPS as compared to 1995 in terms of Japanese Yen basis. The range of EPS is broader than the previous year. In 1996, the range is a total of US\$2.14 (JPY 267.51), from a high of US\$0.44 (JPY 55.21) to a low of -US\$1.70 (-JPY 212.3); the range in 1995 is a

	1996 ^a	1995 ^b	% Change
Company	EPS	EPS	EPS
Ohishi Sangyo	0.44	0.44	0%
The Pack	0.40	0.38	5
Daio Paper	0.37	0.65	-43
Daishowa Paper Mfg.	0.34	-0.29	217
Tokushu Paper Mfg.	0.27	0.34	-19
Hokuetsu Paper Mills	0.25	0.29	-14
Chuetsu Pulp & Paper	0.23	0.36	-38
Chuo Pack	0.22	0.14	54
Oji Paper	0.19	0.19	-1
Kishu Paper	0.19	0.18	1
Nippon Paper Industries	0.19	0.20	-5
Dainippon Shigyo	0.18	0.16	8
Nippon Hi-Pack	0.14	0.18	-19
General	0.12	0.07	63
Rengo	0.10	0.05	116
Mitsubishi Paper Mills	0.09	0.15	-44
Tokai Pulp	0.07	0.07	8
Tomoku	0.06	0.03	100
Japan Paper Industry	0.06	0.21	-70
Nippon Kakoh Seishi	0.06	0.17	-65
Sanko Paper Mfg.	0.05	0.08	-38
Chuetsu	0.02	0.02	11
Mishima Paper	0.02	0.02	26
Superbag	0.01	0.02	-27
Takasaki Paper Mfg.	0.01	-0.05	116
Furubayashi Shiko	-0.06	0.06	-187
Taihei Paper Mfg.	-0.21	0.40	-153
Tomoegawa	-0.39	-0.17	-138
Settsu	-0.89	-0.12	-612
Chuo Paperboard	-1.70	0.06	-2914
<i>Mean</i>	<i>0.03</i>	<i>0.14</i>	<i>-122</i>
<i>Median</i>	<i>0.09</i>	<i>0.15</i>	<i>-10</i>
^a 1996 exchange rate JP Yen 1=US\$0.0080			
^b 1995 exchange rate JP Yen 1=US\$0.0093			

14. Earnings per share (US \$) of Japanese pulp and paper companies

	1996	1995	% Change
Company	EPS	EPS	EPS
Ohishi Sangyo	55.21	47.49	16%
The Pack	49.55	40.74	22
Daio Paper	45.86	69.63	-34
Daishowa Paper Mfg.	42.25	-31.11	217
Tokushu Paper Mfg.	34.37	36.53	-6
Hokuetsu Paper Mills	30.81	30.83	0
Chuetsu Pulp & Paper	28.43	39.17	-27
Chuo Pack	26.99	15.12	79
Oji Paper	23.49	20.48	15
Kishu Paper	23.33	19.85	18
Nippon Paper Industries	23.32	21.14	10
Dainippon Shigyo	22.09	17.63	25
Nippon Hi-Pack	17.79	18.96	-6
General	14.46	7.61	90
Rengo	13.02	5.19	151
Mitsubishi Paper Mills	10.71	16.4	-35
Tokai Pulp	8.88	7.1	25
Tomoku	7.92	3.41	132
Japan Paper Industry	7.88	22.74	-65
Nippon Kakoh Seishi	7.24	17.91	-60
Sanko Paper Mfg.	6.1	8.51	-28
Chuetsu	3.1	2.41	29
Mishima Paper	2.69	1.83	47
Superbag	1.62	1.9	-15
Takasaki Paper Mfg.	0.97	-5.26	116
Furubayashi Shiko	-6.98	6.87	-202
Taihei Paper Mfg.	-26.5	43.1	-161
Tomoegawa	-49.28	-17.78	-138
Settsu	-111.07	-13.42	-612
Chuo Paperboard	-212.3	6.49	-3371
<i>Mean</i>	<i>3.40</i>	<i>15.38</i>	<i>-126</i>
<i>Median</i>	<i>11.87</i>	<i>15.76</i>	<i>5</i>

14-2. Earnings per share (JPY) of Japanese pulp and paper companies

total of US\$0.94 (JPY 100.74), from a high of US\$0.65 (JPY 69.63) to a low of -US\$0.29 (-JPY 31.11). It is interesting to note, however, that when compared to US and Canadian pulp and paper companies,

Japanese companies have a narrower range and smaller number of EPS.

DEBT TO EQUITY RATIO

Debt to equity is a measure of a company's liabilities compared to its stockholders' equity. This ratio measures the relationship between debt and equity financing. In general, most investors prefer companies with a debt to equity ratio of 1 or less; a ratio of 2 or greater suggests that a company has a fair amount of debt payments (principle and interest) to cover which could be difficult if the company or industry endures a downturn (Fisher, 1990). However, a company's debt to equity ratio should be high enough to receive a good return but not so high as to put the company at risk. Average 1996 debt to equity for United States pulp, paper, and packaging companies is 1.8 while Canadian counterparts average 1.7 and Japanese average 3.2.

United States

The pulp and paper industry is highly leveraged, in part a reflection of its capital intensive nature. Table 15 shows average debt to equity for United States companies in 1996 is 1.8, down 14% from 2.1 in 1995. Crown Vantage, with almost 32 times more debt than equity in 1996 and 23 times more in 1995, is viewed as an outlier and excluded from mean calculations. If this company had been included, average debt to equity would be 2.6 in 1996 and 1995. The range in debt to equity is from 31.5 to 0.3. The percent of change in average debt to equity from 1995 to 1996 ranges from a high of 312 to a low of -53. That mean debt to equity fell for United States companies in 1996 suggests that United States pulp and paper companies may be taking a more conservative stance toward increasing liquidity and decreasing expansions. This is impressive given that it was achieved when prices were at an all time high, which is usually characterized by major capital expansions.

Again, Crown Vantage, spun off from James River in late 1995, has the largest debt to equity ratio of 31.5. Other highly leveraged companies include Gaylord Container (7.1), Stone Container (7.0), Temple-inland (5.4), and Fibermark (3.4). The largest percent increase in leverage in 1996 are Fibermark (312%), Willamette Industries (74%),

Company	1996	1995	% Change
	Debt to Equity	Debt to Equity	Debt to Equity
Crown Vantage	31.5 ^a	23.1 ^a	37%
Gaylord Container	7.1	7.7	-8
Stone Container	7.0	5.4	30
Temple-Inland	5.4	5.5	-1
FiberMark	3.4	0.83	312
George-Pacific	2.6	2.5	5
Buckeye Cellulose	2.2	3.5	-39
International Paper	2.0	2.1	-3
Weyerhaeuser	2.0	2.0	0
Tenneco	1.9	1.4	34
James River	1.8	2.2	-16
Boise Cascade	1.8	1.8	6
Caraustar Industries	1.8	1.3	37
Badger Paper Mills	1.8	1.5	21
Chesapeake	1.8	1.5	21
Kimberly-Clark	1.6	2.1	-23
Champion	1.6	1.6	1
Sonoco	1.6	1.2	32
Rayonier	1.6	1.2	37
Dexter	1.5	1.5	-2
Longview Fibre	1.5	1.6	-5
Sealed Air	1.5	3.2	-53
Union Camp	1.4	1.3	10
Bowater	1.4	1.7	-18
Willamette Industries	1.4	0.9	74
Potlatch	1.4	1.4	-2
Procter & Gamble	1.4	1.7	-19
Media General	1.3	1.7	-24
Mosinee Paper	1.3	1.7	-24
Pope & Talbot	1.2	1.5	-18
Mead	1.2	13.5	20
P.H. Glatfelter	1.2	1.1	5
Bemis	1.1	1.0	6
Westvaco	1.0	1.0	1
Consolidated Papers	1.0	0.7	41
Louisiana-Pacific	0.8	0.7	16
Wausau Paper	0.8	0.8	-5
Republic	0.7	0.9	-22
Rock-Tenn	0.7	0.8	-16
Lydall	0.5	0.6	-17
Greif Bros.	0.3	0.3	-7
Fort Howard	NM ^b	NM ^b	
Jefferson Smurfit	NM ^b	NM ^b	
Jefferson Smurfit	NM ^b	NM ^b	
<i>Mean</i>	<i>1.8</i>	<i>2.1</i>	<i>-14</i>
<i>Median</i>	<i>1.5</i>	<i>1.5</i>	<i>0</i>

^a Not included in reported means (if included, mean is 2.6 for both 1996 and 1995)
^b NM = not meaningful due to negative shareholders' equity

15. Debt to equity ratios of United States pulp and paper companies

Rayonier (37%), Consolidated Papers (41%), and Caraustar Industries (37%). In 1996 Fibermark had two major acquisitions, Customs Paper Group and Arcon Coating Mills. These acquisitions required the company to assume an additional \$100 million in debt.

In terms of the least leveraged companies, Greif Bros. has the lowest debt to equity ratio at 0.3. Four other low debt to equity companies are Lydall (0.5), Rock-Tenn (0.7), Republic Group (0.7), and Wausau Paper (0.8). The largest decrease in percent leverage in 1996 for United States companies are Sealed Air (-53%), Buckeye Cellulose (-39%), Media General (-24%), Mosinee Paper (-24%), and Kimberly-Clark (-23%). Debt to equity ratios can decrease by either increasing shareholder equity or decreasing debt. A good example of the former is Sealed Air Corporation, which decreased the debt to equity ratio from 3.2 in 1995 to 1.5 in 1996 by increasing shareholder equity from \$106 million to \$187 million. On the other hand, Kimberly-Clark, which reduced debt to equity from 2.1 in 1995 to 1.6 in 1996, used funds generated from divesting several businesses and 1995 earnings to prematurely retire debt and finance stock buybacks.

Canada

As discussed in the previous return on equity section, Canadian accounting practices dictate that convertible debentures be reported in both the liability and equity sections, making it difficult to compare Canadian companies with US and Japanese companies. In the debt to equity calculation, debentures are subtracted from stockholders' equity and then added to liabilities for Canadian companies. The calculation for debt to equity, then, is total liabilities (including debentures) / stockholders' equity (without debentures).

Table 16 reports that both mean and median debt to equity fell for Canadian companies in 1996. Average debt to equity for Canadian companies in 1996 is 1.7, down 15% from 2.0 in 1995. The median is identical to the median for United States companies or 1.5, which is down 12% from 1.7 in 1995. The range in debt to equity is from 4.2 to 0.5. The percent of change in average debt to equity from 1995 to 1996 ranges from a high of 89 to -41. The top five Canadian companies in terms of debt to equity are Slocan (4.2), Crestbrook Forest Industries (3.7), Cascades (2.6), Doman (2.4), and Weston (2.4). Canadian companies having the largest percent increase in leverage in 1996 are Donohue (89%), Canfor (65%), St. Laurent (60%), Alliance Forest

Company	1996	1995	% Change
	Debt to Equity	Debt to Equity	Debt to Equity
Slocan	4.2	4.6	-7%
Crestbrook	3.7	3.1	12
Cascades	2.6	3.2	-18
Doman	2.4	2.0	20
Weston	2.4	2.4	-1
St. Laurent	2.2	1.4	59
Tembec	2.0	1.7	19
Avenor	1.9	1.9	-1
Canfor	1.8	1.1	65
MacMillan Bloedel	1.6	1.6	-3
Donohue	1.5	0.8	89
West Fraser	1.4	1.7	-19
Rolland	1.3	1.4	2
Spruce Falls	1.3	2.2	-41
Abitibi-Price	1.3	1.9	-34
Domtar	1.1	1.7	-38
Perkins Papers	1.0	1.6	-40
Noranda Forest	1.0	0.9	6
Stone-Consolidated	0.7	1.2	-4
Harmac Pacific	0.6	0.7	7
Alliance	0.6	0.4	45
Fletcher Challenge	0.5	0.6	-17
Repap Enterprises	NM ^a	8.3	NM ^a
<i>Mean</i>	<i>1.7</i>	<i>2.0</i>	<i>-15</i>
<i>Median</i>	<i>1.5</i>	<i>1.7</i>	<i>-12</i>

^a NM = not meaningful due to negative shareholders' equity

16. Debt to equity ratios of Canadian pulp and paper companies

Products (45%), and Doman (20%). Donohue's large increase is due to the debt financed acquisition of QUNO Corporation, about \$900 million of debt.

The least leveraged companies are Noranda Forest (1.0), Stone-Consolidated (0.7), Harmac Pacific (0.6), Alliance Forest Products (0.6), and Fletcher Challenge (0.5). Those companies having the largest percent decrease in debt to equity ratios are Spruce Falls (-41%), Perkins Papers (-40%), Domtar (-38%), Abitibi-Price (-34%), and West Fraser Timber (-19%). Spruce Falls took aggressive measures to reduce debt, prepaying US\$ 64 million and retiring US\$ 2.3 million.

Japan

Table 17 shows that mean debt to equity increased for Japanese companies in 1996. Average debt to equity for Japanese companies in 1996 is 3.2, up 4% from 3.1 in 1995. The median is 2.1, which is gained from 2.0 in 1995. The range in debt to equity is from 21 to 0.2. The percent of change in average debt to equity from 1995 to 1996 ranges from a high of 91 to -33. The top four Japanese companies in terms of debt to equity are Taihei (21.0), Tomoegawa (8.3), Daishowa (7.8), Sanko (6.9), and their names always appear in the list of the large

	1996	1995	% Change
Company	Debt to Equity	Debt to Equity	Debt to Equity
Taihei Paper Mfg.	21	11	91%
Tomoegawa	8.3	5.6	48
Daishowa Paper Mfg.	7.8	9.8	-20
Sanko Paper Mfg.	6.9	8.1	-15
Nippon Kakoh Seishi	4.6	4.8	-4
The Pack	3.5	3.8	-8
Chuetsu	3.4	3.7	-8
Tokai Pulp	3.4	3.6	-6
Superbag	3.3	3.2	3
Daio Paper	3.2	3.5	-9
Takasaki Paper Mfg.	3.2	3.7	-14
Furubayashi Shiko	2.4	2.1	14
Japan Paper Industry	2.3	1.8	28
Chuetsu Pulp & Paper	2.1	2.0	5
Oji Paper	2.1	1.9	11
Rengo	2	2	0
Nippon Paper Industries	1.9	1.9	0
Hokuetsu Paper Mills	1.7	1.7	0
Mitsubishi Paper Mills	1.6	1.6	0
Settsu	1.5	1.1	36
Ohishi Sangyo	1.3	1.3	0
Tomoku	1.3	1.3	0
Mishima Paper	1.1	1.1	0
Kishu Paper	0.8	0.8	0
Nippon Hi-Pack	0.6	0.5	20
Chuo Pack	0.5	0.5	0
Dainippon Shigyo	0.5	0.5	0
General	0.5	0.6	-17
Tokushu Paper Mfg.	0.2	0.3	-33
Chuo Paperboard	NM.	7.9	
<i>Mean</i>	3.2	3.1	4
<i>Median</i>	2.1	2.0	0

aNM=not meaningful due to negative shareholders' equity

17. Debt to equity ratios of Japanese pulp and paper companies

“financially-risky” companies in Japan (Suzuki and Takeda, 1998, p.33)

CAPITAL EXPENDITURES

Capital expenditures involve the acquisition of new assets, improvements to plant, property, or equipment, and technology and regulatory upgrades. Historically, capital expenditures have driven production capacity and, therefore, contributed to pricing cyclicity. Expenditures related to manufacturing efficiencies and production capacity are of particular interest to industry analysts in assessing forthcoming increases in industry production capacity.

United States

In the United States pulp, paper, and packaging industry, capital intensity (pulp and paper capital expenditures divided by net annual pulp and paper sales) varies by year, but overall has been approximately double that of any major manufacturing sector (Butner and Stapley, 1997, p.55). Currently, the industry seems to be adjusting the focus of expenditures from new technology to modernizing existing technology and environmental compliance. As shown in Table 18, pulp and paper capital expenditures ranges between a low of \$4 million and a high of \$1,081 million, averaging \$213 million. This average in capital spending is up slightly (5%) from 1995 when the average amount spent on capital expenditures was 203 million. Capital intensity ranges from 2% to 30%, with an average of 10%.

International Paper ranks first with more than \$1 billion in capital expenditures. Kimberly-Clark is second at \$884 million, followed by Procter & Gamble (\$804 million), Boise Cascade (\$470 million), and George-Pacific (\$452 million). The five largest investors in pulp and paper capital expenditures remain unchanged as in 1995 with the exception of Boise Cascade, new to the top five in 1996, and the exclusion of Weyerhaeuser, which now ranks seventh after reducing capital expenditures by 26%. Besides Boise Cascade, the four largest spenders are also in the top five for sales. Boise Cascade reports the large increase in spending in 1996 primarily due to a paper machine expansion project, with a cost expected to be \$400 million. The five companies reporting the largest percentage increase are Badger Paper Mills (153%), Boise Cascade (94%), Media General (92%), Consolidated Papers (81%), and FiberMark (74%).

Company	1996 Pulp and paper capital expenditures	1995 Pulp and paper capital expenditures ^c	% Change Pulp and paper capital expenditures	1996 Capital intensity ^d	1995 Capital intensity ^d
International Paper	\$1,081	\$1,157	-7%	8%	8%
Kimberly-Clark	884	818	8	7	6
Procter & Gamble	804	731	10	8	8
Boise Cascade	470	243	94	25	10
Georgia-Pacific	452	599	-25	8	9
Westvaco	438	274	60	16	9
Weyerhaeuser	415	562	-26	9	10
James River	411	440	-7	7	6
Mead	396	239	66	15	9
Willamette Industries	342	300	14	15	11
Tenneco ^a	341	316	8	9	11
Champion	339	314	8	7	5
Union Camp	296	197	50	11	6
Consolidated Papers	288	159	81	19	10
Stone Container	251	387	-35	5	5
Sonoco	232	181	28	8	7
Potlatch	196	129	52	18	12
Chesapeake	175	227	-23	15	18
Temple-Inland	148	299	-51	7	14
Jefferson Smurfit	146	154	-5	4	4
Longview Fibre	123	135	-9	19	17
Bemis ^a	110	93	18	7	6
Bowater	107	96	11	7	5
Crown Vantage	81	47	72	9	4
Fort Howard	73	47	55	5	3
Greif Bros.	73	60	21	30	18
Rock-Tenn	72	95	-25	25	29
Rayonier	71	65	9	12	12
Wausau Paper	63	66	-4	12	13
Gaylord Container	55	59	-7	6	6
P.H. Glatfelter	37	26	45	7	4
Louisiana-Pacific	36	47	-23	20	14
Buckeye Cellulose	35	25	40	7	6
Caraustar Industries	32	28	14	5	5
Mosinee Paper	21	17	26	7	5
Sealed Air ^a	17	21	-19	2	3
Lydall	11	12	-9	4	5
FiberMark	8	5	74	7	4
Republic	7	30	-75	9	47
Badger Paper Mills	7	3	153	9	3
Media General	7	3	92	5	2
Dexter ^a	4	4	10	2	1
Pope & Talbot	4	24	-85	2	9
<i>Mean</i>	<i>213</i>	<i>203</i>	<i>5</i>	<i>10</i>	<i>9</i>
<i>Median</i>	<i>110</i>	<i>96</i>	<i>15</i>	<i>8</i>	<i>7</i>

^a Pulp and paper sales not reported separately from total annual sales
^b Capital intensity is annual pulp and paper capital expenditures/pulp and paper sales

18. Capital expenditures (million of US\$) of United States pulp and paper companies

The smallest investors in pulp and paper capital expenditures in 1996 are Republic Group, Badger Paper Mills, and Media General at \$7

million each, followed by Dexter and Pope & Talbot at \$4 million. Although all five companies spent less than the 10% industry average of pulp and paper sales, the small spending levels for the most part based on the small size of the company. Only Media General and Badger Paper Mills remain the smallest spenders in 1996 as in 1995. In terms of decreasing the total amount of capital expenditures in 1996, the five companies reporting the largest percentage decrease are Pope & Talbot (-85%), Republic Group (-75%), Temple-Inland (-51%), Stone Container (-35%), and Weyerhaeuser (-26%).

Many United States companies, such as Weyerhaeuser, International Paper, and Union Camp, report spending 8 to 10% of the total capital spent on environment-related projects. In some cases, spending was in preparation of implementing the Cluster Rule. Two of the most noticeable changes in capital spending in 1996 and 1995 have been lack of spending on new technology and extremely modest growth in total industry capital expenditures in 1996. 1995 was a very profitable year for the pulp and paper industry, but there was only a 5% increase in capital spending by United States companies. Compared to the less effective capital investments made in the late 1980's, companies are showing much more caution in capital spending.

Canada

Table 19 presents capital expenditures for Canadian companies in 1996. Capital expenditures range from a low of US\$ 7 million to a high of US\$ 254 million, averaging US\$ 81 million. Average spending for capital expenditures is down 11 %. Capital intensity ranges from 4% to 53%, with an average of 12%. Companies in the United States, on average, spent 2.6 times more than Canadians. However, it should be noted that in terms of capital intensity, Canadian companies invest 20% more.

In 1996, the top five Canadian companies for total capital expenditures include Abitibi-Price (US\$ 254 million), Domtar (US\$ 246 million), Stone-Consolidated (US\$ 215 million), Avenor (US\$ 191 million), and Noranda Forest (US\$ 157 million). Abitibi-Price, Dormar, and Stone-Consolidated remain as the top five spenders compared to 1995. In terms of increasing the total amount of pulp and paper capital expenditures in 1996, the five companies reporting the largest percentage increase are Harmac Pacific (529%), Alliance (325%), Perkins Papers (252%), Tembec (62%), and Rolland (56%). Harmac

Company	1996	1995	% Change	1996	1995
	Pulp and paper capital expenditures ^b	Pulp and paper capital expenditures ^c	Pulp and paper capital expenditures	Capital intensity ^d	Capital intensity ^d
Abitibi-Price	\$254	\$238	6%	22%	18%
Domtar ^a	246	246	0	17	15
Stone-Consolidated	215	187	15	14	10
Avenor	191	143	34	16	9
Noranda Forest	157	142	10	17	13
MacMillan Bloedel	132	282	-53	11	20
Fletcher Challenge	115	83	39	8	7
Alliance	101	24	325	53	11
Cascades	86	83	4	6	5
Weston	62	50	23	9	7
St. Laurent	48	157	-69	16	48
Donohue	48	74	-36	5	12
Repap Enterprises	39	60	-36	5	6
West Fraser	34	129	-73	11	32
Tembec	31	19	62	7	4
Slocan	23	42	-45	17	29
Harmac Pacific	18	3	529	12	1
Spruce Falls	16	33	-52	7	18
Canfor	15	18	-18	4	3
Doman	10	59	-83	6	19
Rolland	9	6	56	7	4
Perkins Papers	9	3	252	5	2
Crestbrook	7	8	-7	5	3
<i>Mean</i>	<i>81</i>	<i>91</i>	<i>-11</i>	<i>12</i>	<i>13</i>
<i>Median</i>	<i>48</i>	<i>60</i>	<i>-20</i>	<i>9</i>	<i>10</i>

^a Pulp and paper sales not reported separately from total annual sales
^b 1996 exchange rate C\$ 1 = US\$ 0.7334
^c 1995 exchange rate C\$ 1 to US\$ 0.7287
^d Capital intensity is annual pulp and paper capital expenditures/pulp and paper sales

19. Capital expenditures (million of US\$) of Canadian pulp and paper companies

Pacific increased spending for cost reduction projects that are expected to have returns greater than 20%. In both years, however, Harmac Pacific is still at or below the Canadian average of expenditures as a percent of pulp and paper sales. Alliance's large increase of 325% is due to a modification for a product conversion at two of the company's paper mills.

Canadian companies reporting the smallest investments in pulp and paper capital expenditures in 1996 are Canfor (US\$ 15 million), Doman (US\$ 10 million), Rolland (US\$ 9 million), Perkins Papers (US\$ 9 million), and Crestbrook Forest Industries (US\$ 7 million). In terms of decreasing the total amount of capital expenditures in 1996, the five companies reporting the largest percentage decrease are Doman (-83%), West Fraser Timber (-73%), St. Laurent (-69%), MacMillan Bloedel (-53%), and Spruce Falls (-52%).

Japan

Table 20 and Table 20-2 show capital expenditures for Japanese companies in 1996. Capital expenditures range from a low of US\$ 0.4 million (JPY 49 million) to a high of US\$ 832 million (JPY 104 billion),

Company	1996 Pulp and paper capital expenditures ^b	1995 Pulp and paper capital expenditures ^c	% Change Pulp and paper capital expenditures	1996 Capital intensity ^d	1995 Capital intensity ^d
Oji Paper	\$ 832	\$ 296	181%	13%	4%
Nippon Paper Industries	380	272	40	8	5
Hokuetsu Paper Mills	255	116	120	29	12
Mitsubishi Paper Mills	182	222	-18	16	17
Daio Paper	150	121	24	6	4
Daishowa Paper Mfg.	140	159	-12	6	6
Chuetsu Pulp & Paper	78	40	97	9	4
Sanko Paper Mfg.	60	21	188	20	6
Rengo	59	89	-34	3	4
Japan Paper Industry	51	21	140	12	4
Nippon Kakoh Seishi	40	27	48	10	6
Tokushu Paper Mfg.	39	15	157	24	8
Kishu Paper	38	13	200	10	3
Tomoku	24	53	-56	5	10
Takasaki Paper Mfg.	23	16	42	15	9
Tokai Pulp	14	18	-23	3	4
Settsu	13	15	-11	2	2
Ohishi Sangyo	11	11	-5	15	14
Tomoe-gawa	8	9	-9	9	8
General	7	5	53	69	42
Chuo Paperboard	6	20	-68	3	9
Nippon Hi-Pack	6	2	179	5	2
Dainippon Shigyo	6	5	25	6	5
Chuo Pack	5	3	92	9	4
The Pack	5	4	22	1	1
Superbag	5	5	15	5	3
Mishima Paper	5	6	-22	4	4
Taihei Paper Mfg.	3	5	-40	10	15
Chuetsu	2	1	277	6	1
Furubayashi Shiko	0	2	-76	0	1
<i>Mean</i>	<i>82</i>	<i>53</i>	<i>51</i>	<i>11</i>	<i>7</i>
<i>Median</i>	<i>19</i>	<i>16</i>	<i>24</i>	<i>8</i>	<i>4</i>
^a Pulp, paper, and packaging sales not reported separately from total annual sales					
^b 1996 exchange rate JP Yen 1=US\$0.0080					
^c 1995 exchange rate JP Yen 1=US\$0.0093					
^d Capital intensity is annual pulp and paper capital expenditures/pulp and paper sales					

20. Capital expenditures (million of US\$) of Japanese pulp and paper companies

Company	1996	1995	% Change	1996	1995
	Pulp and paper capital expenditures	Pulp and paper capital expenditures	Pulp and paper capital expenditures	Capital intensity	Capital intensity
Oji Paper	104,028	31,841	227%	13%	4%
Nippon Paper Industries	47,555	29,196	63	8	5
Hokuetsu Paper Mills	31,869	12,456	156	29	12
Mitsubishi Paper Mills	22,735	23,857	-5	16	17
Daio Paper	18,772	13,027	44	6	4
Daishowa Paper Mfg.	17,501	17,148	2	6	6
Chuetsu Pulp & Paper	9,801	4,283	129	9	4
Sanko Paper Mfg.	7,548	2,251	235	20	6
Rengo	7,327	9,576	-23	3	4
Japan Paper Industry	6,384	2,290	179	12	4
Nippon Kakoh Seishi	4,997	2,907	72	10	6
Tokushu Paper Mfg.	4,828	1,617	199	24	8
Kishu Paper	4,721	1,353	249	10	3
Tomoku	2,938	5,742	-49	5	10
Takasaki Paper Mfg.	2,895	1,751	65	15	9
Tokai Pulp	1,770	1,978	-11	3	4
Settsu	1,677	1,222	3	2	2
Ohishi Sangyo	1,347	1,219	11	15	14
Tomoe-gawa	1,000	944	6	9	8
General	920	516	78	69	42
Chuo Paperboard	798	2,715	-63	3	9
Nippon Hi-Pack	768	237	224	5	2
Dainippon Shigyo	747	514	45	6	5
Chuo Pack	673	301	124	9	4
The Pack	666	471	41	1	1
Superbag	662	496	33	5	3
Mishima Paper	574	631	-9	4	4
Taihei Paper Mfg.	347	494	-30	10	15
Chuetsu	294	67	339	6	1
Furubayashi Shiko	49	177	-72	0	1
<i>Mean</i>	<i>10,206</i>	<i>5,705</i>	<i>75</i>	<i>11</i>	<i>7</i>
<i>Median</i>	<i>2,333</i>	<i>1,687</i>	<i>45</i>	<i>8</i>	<i>4</i>

20-2. Capital expenditures (million of JPY) of Japanese pulp and paper companies

averaging US\$ 82 million (JPY 10.2 billion). Average spending for capital expenditures increased 51% (75% in JP Yen basis). Capital intensity ranges from 0.3% to 69%, with an average of 11%.

In 1996, Japanese companies invested a lot to adjust the focus of expenditures from new technology to modernizing existing technology and environmental compliance like US and Canadian industry. Hokuetsu

(US\$ 255 million), Sanko (US\$60 million), Kishu (US\$38 million), Nippon Hi-Pack (US\$6 million) and Chuetsu (US\$ 2 million) are the companies which drastically increased their investment in pulp and paper factories and equipment. Oji and Nippon paper also made considerable investments in order to complete their reorganization by merging other companies and factories.

INTERNATIONAL ACTIVITY

The last variable investigated in this study is international business. As is the case with many other industries, pulp and paper faces the dual challenges of rising global demand and competition. Foreign companies with a lower cost of capital, faster-growing supply sources, and lower targets for return on investment pose threats to Japanese and North American companies. Theoretically, a good balance between foreign and domestic sales protects companies from cyclical market downturns. 1996 provided an excellent opportunity to test that logic, and it did hold true. Both global companies with extensive product lines and distribution networks as well as smaller companies focusing on high margin, specialty products performed well, while companies dependent on market pulp or other commodity products saw a decline in foreign sales in 1996.

United States

Table 21 highlights the 35 (81%) United States pulp, paper, and packaging companies reporting foreign sales or foreign manufacturing operations in their annual reports. The average foreign net annual sales for United States pulp and paper companies decreased 2%, to \$1.54 billion in 1996 from \$1.57 billion in 1995. The median foreign net annual sales is about the same as in 1995 or \$285 million. On average, pulp, paper, and packaging companies report that 24% of net annual sales are from foreign sources.

Proctor & Gamble ranks first in foreign sales at \$17.7 billion. International Paper, a distant runner up at \$6 billion, and Kimberly-Clark, at \$5.8 billion, formed the next tier of pulp and paper companies with extensive international business. Weyerhaeuser, with \$3 billion in foreign sales, and Tenneco, with \$2 billion, round out the top five United States pulp and paper companies. Proctor & Gamble and Kimberly-Clark have been successful due to extensive global

Company	1996 Foreign sales	Foreign sales as % of total sales	1995 Foreign sales	Change in foreign sales	Change in foreign sales as % of total sales	Foreign production ^d	Export markets ^d
Procter & Gamble ^a	\$17,682	50%	\$16,812	5%	0%	60 countries	Global
International Paper	6,032	30	5,550	8	-2	31 countries	Global
Kimberly-Clark	5,796	44	5,455	6	3	33 countries	Global
Weyerhaeuser	3,074	28	3,518	-13	-2	C	A
Tenneco	2,032	31	1,702	19	11	21 countries	Global
James River	1,693	30	1,655	2	5	C, E	Europe
Stone-Container	1,388	27	2,952	-53	-13	Global	C, E
Georgia-Pacific ^a	1,042	8	1,400	-26	-2	C	Global
Union Camp	897	22	922	-3	1	Global	A, LA
Champion	874	15	1,060	-17	0	C, B	C, B
Westvaco	700	23	695	1	2	B, C	Global
Rayonier	648	55	694	-7	0	NZ, A	Global
Dexter ^a	499	45	496	1	0	E, C, A	Global
Buckeye Cellulose	325	69	286	14	-1	C, G, IR	E, A
Sealed Air	285	36	258	11	0	Global	Global
Sonoco ^a	283	10	276	3	0	Global	Global
Louisiana-Pacific	268	11	457	-41	-5	C, UK, M	A, E
Bowater	259	15	285	-9	1	C	Global
Bemis	250	15	234	7	0	C, E	C, E, SA
Fort Howard ^b	176	11	164	7	1	UK	
Pope & Talbot ^b	168	38	172	-2	5	C	E, A
Longview Fibre	154	19	230	-33	-5	A	AE
Chesapeake	115	10	138	-17	-1	C, F, M	E, C, A
Gaylord Container	72	8	114	-37	-3		
Crown Vantage ^b	68	7	71	-4	1	S	E
P.H. Glatfelter	55	10	55	0	1	C, AU	
Rock-Tenn	53	6	51	4	1	C	C
Lydall	18	7	17	6	0	F, J	E, A
FiberMark ^a	15	12	15	0	1		A, E, LA
Greif Bros. ^c	NA	NA	NA	NA	NA	C	C
Willamette Industries ^c	NA	NA	NA	NA	NA	IR	C, E
Consolidated Papers ^c	NA	NA	NA	NA	NA	C	Global
Boise Cascade ^c	NA	NA	NA	NA	NA		AU, UK, C
Mead ^c	NA	NA	NA	NA	NA	C	Global
Temple-Inland ^c	NA	NA	NA	NA	NA	LA	LA
Mean	1,549	24	1,577	-2	3		
Median	285	19	286	-4	1		

^a Foreign sales received outside of North America
^b Sales figures reported from foreign manufacturing operations only; United States export values not available
^c Foreign sales figures are not available
^d A=Asia, AU=Australia, B=Brazil, C=Canada, E=Europe, F=France, G=Germany, IR=Ireland, J=Japan, LA=Latin America, M=Mexico, NZ=New Zealand, S=Scotland, SA=South America, UK=England

21. International activities (millions of US\$) of United States pulp and paper companies

distribution systems for consumer products. International Papers strength in international markets comes from its high-margin specialty products and a captive distribution system. Weyerhaeuser is ranked fourth but is the only company in the top five to report a decrease in foreign sales, which the company attributes to market pulp operations. Tenneco successfully pursued a dual strategy of selling non-core operations and focusing on the global development of its automotive and packaging divisions. Stone Container is notable for its absence in this group, having dropped from fifth in 1995 ranking to seventh in 1996, with a decrease of 53% in foreign sales, but this reflects Stone's divestiture of Stone-Consolidated and other low-margin Canadian

operations.

Proctor & Gamble's foreign sales rose by almost one billion dollars, a proportionally small increase (5%) relative to its total annual sales, but one that dwarfs the foreign sales of all but the top nine companies. Other companies that increased foreign sales are Tenneco (19%), Buckeye Cellulose (14%), Sealed Air (11%), and International Paper (8%). While Tenneco and International Paper focused on economies of scale, Buckeye and Sealed Air are fairly small companies that aggressively market high-margin, specialty products in lucrative markets such as Western Europe.

Among those companies experiencing the most dramatic decline in foreign sales, Stone Container experienced the largest drop (-53%), primarily due to changes in corporate structure. Louisiana Pacific (-41%) and George-Pacific (-26%) suffered losses in foreign sales because of market pulp operations. Gaylord Container cited changes in the selling prices for linerboard and unbleached kraft paper as the reason for its 37% drop in foreign sales. Exports of paper and paperboard hurt Longview Fibre's foreign sales as well (-33%).

Canada

Table 22 shows corresponding information for the 23 Canadian pulp and paper companies. All of these companies depend on foreign sales because of relatively low domestic demand in comparison to production capacity. The average foreign net annual sales for Canadian pulp and paper companies decreased 16%, to US\$ 712 million in 1996 from US\$ 844. Since Canadian companies are dependent on the market pulp and newsprint export markets, it stands to reason that the collapse in prices during 1996 had a substantial negative impact on the industry. Median foreign sales of US\$ 516 in 1996 are down 18% from 1995 foreign sales of US\$ 626. On average, these companies report that 60% of total net sales are from foreign sources, almost triple that of their United States counterparts.

MacMillan Bloedel retained its first place position with foreign sales of US\$ 2.7 billion. This company continues to lead Canadian companies in global expansion. Because it is more adventurous in newly emerging markets, such as Latin America and Southeast Asia, MacMillan Bloedel has hedged effectively against market share losses and the volatility of the market. AbitibiPrice, Avenor, and Weston, ranked second, fourth, and fifth, respectively, also maintained the same

Company	1996 Foreign sales	Foreign sales as % of total sales	1995 Foreign sales	Change in foreign sales	Change in foreign sales as % of total sales	Foreign production ^a	Export markets ^a
MacMillan Bloedel	\$2,737	74%	\$2,795	-2.0%	-1.0%	Global	Global
Abitibi-Price	1,674	88	1,826	-8.3	-1.3	US	US, A, LA, E
Fletcher Challenge	1,371	79	1,047	17.6	4.3	US	US, J, A
Avenor	1,221	81	1,659	-26.4	-6.3	US	US, E, A
Weston	1,076	12	1,518	-29.1	-4.5	US	US, E, A
Canfor	995	76	1,126	-7.8	-1.0		US, E, A
Donohue	953	79	626	52.2	2.9	US, E, A	A, LA, E, US
Noranda Forest	900	53	1,765	-49.0	8.0		US, E
West Fraser	747	62	678	10.2	-0.4	US	US, E, A
Domtar	721	50	756	-4.6	-2.7	F	US
Tembec	518	82	764	-32.2	-5.4	UK, US	US, A, I, E
Stone-Consolidated	513	31	246	108.5	11.1	US, E	UK, US
Cascades	461	30	567	-18.7	-4.4		US, E
Slocan	439	75	598	-24.9	-20.2		A, US, O
Doman	359	72	459	-21.8	-5.0	US, E, A	A, E, O, US
Repap Enterprises	345	40	472	-26.9	9.2		A, E, O, US
Alliance	238	77	230	3.5	-1.5		US
Spruce Falls	215	88	168	28.0	-3.8		O, US
St. Laurent	157	47	155	1.3	-11.9		O, US
Harmac Pacific ^b	113	73	196	-42.3	-1.6		A, E, US
Rolland	63	21	74	-14.9	-2.1		US
Perkins Papers	59	33	NA	NA	NA		A, E, US
Crestbrook ^c	NA	NA	NA	NA	NA	US	US
Mean	712	60	844	-16	-2		
Median	516	73	626	-18	-2		

^a 1996 foreign sales figures are not available
^b Foreign sales received outside of North America
^c 1996 exchange rate C\$ 1 = US\$ 0.7334
^d 1995 exchange rate C\$ 1 = US\$ 0.7287
^e A=Asia, AU=Australia, B=Brazil, E=Europe, F=France, G=Germany, I=India, IR=Ireland, J=Japan, LA=Latin America, M=Mexico, NZ=New Zealand, O=Other, S=Scotland, SA=South America, UK=England, US=USA

22. International activities (millions of US\$) of Canadian pulp and paper companies

position as in 1995 despite decreases in foreign sales (-8.3%, -26.4%, and -29.1%). Fletcher Challenge moved from seventh to third as its foreign sales increased 17.6%, to US\$ 1.4 billion in 1996 from US\$ 1.1 billion. Abitibi-Price, Avenor, and Weston all lost foreign sales in 1996 due to the collapse of the pulp market, but have taken effective strides to maintain a strong industry presence. Abitibi-Price and Avenor are developing stronger economies of scale. Abitibi-Price has merged with Stone-Consolidated, and Avenor has purchased much of Repap's assets. Weston produces lumber and specialty papers that hedge against drops in the pulp market. It is important to note that Weston's decrease in foreign sales primarily reflects its divestiture of United States supermarkets, a business unit completely independent of the pulp and paper industry. Its foreign sales of forest products actually only decreased by \$19 million.

Stone-Consolidated, Donohue, Spruce Falls, Fletcher Challenge, and West Fraser Timber have the largest increases in foreign sales in 1996. Stone-Consolidated leads the group, increasing foreign sales by 108.5%,

primarily because of record earnings from the company's United Kingdom facility. A delay in price erosion in Europe coupled with lower waste paper costs led to this success. Donohue's export sales rose 52.2% in 1996 with the purchase of QUNO, and this advanced Donohue's market share in the United States newsprint market. Three other companies that experienced an increase in foreign sales, but less dramatically so, are Spruce Falls (28%), Fletcher Challenge (17.6%), and West Fraser (10.2%).

Noranda, Harmac Pacific, Weston, Repap Enterprises, and Avenor experienced the largest decreases in foreign sales in 1996. With the exception of Weston, these companies had lower foreign sales due to newsprint and market pulp price declines. While Weston can potentially weather a poor year because of its size and product diversity, the other four companies are actively taking steps to improve their positions. Repap Enterprises sold non-core operations and is focusing on coated paper to protect its market share. Harmac Pacific has expanded into Korea in order to supply the fine paper market in China and other Asian countries.

Japan

Table 23 shows that 3 (10%) Japanese pulp, paper, and packaging companies report specific information on foreign sales or foreign manufacturing operations in their annual reports. This fact implies that Japanese pulp and paper industry is less internationally diversified especially in terms of sales, and the companies mainly focus on the small domestic market inside Japan. Even Oji and Nippon Paper, the first and second largest pulp and paper manufacturers in Japan, sell less than 10% of their total pulp and paper products outside of Japan. It can be said that the Japanese pulp and paper industry has been protected from foreign markets such as the US and Canada by a rather high entry barrier into the Japanese market. The industry has indulged itself by enjoying surplus gain in domestic market at the cost of Japanese consumers. This is why Japanese pulp and paper companies do not have to consider too seriously international diversification of their sales market.

Company	1996 Foreign sales	Foreign sales as % of total sales	1995 Foreign sales	Change in foreign sales	Change in foreign sales as % of total sales	Foreign production ^c	Export markets ^c
Settsu	\$612	53%	\$572	7%	4%	US	C,US
Daishowa Paper Mfg.	318	10	356	11	-1	C,US	C,US
General	19	14	16	21	3	A,E,O,US	US
Chuetsu Pulp & Paper	NA	NA	NA	NA	NA		
Chuetsu	NA	NA	NA	NA	NA		
Chuo Paperboard	NA	NA	NA	NA	NA		
Chuo Pack	NA	NA	NA	NA	NA	A	A
Dainippon Shigyo	NA	NA	NA	NA	NA	C	NA
Daio Paper	NA	NA	NA	NA	NA	C,US	NA
Furubayashi Shiko	NA	NA	NA	NA	NA	A	A
Hokuetsu Paper Mills	NA	NA	NA	NA	NA	NA	NA
Japan Paper Industry	NA	NA	NA	NA	NA		
Kishu Paper	NA	NA	NA	NA	NA		
Mishima Paper	NA	NA	NA	NA	NA		
Mitsubishi Paper Mills	NA	NA	NA	NA	NA	NA	A,G,US
Nippon Hi-Pack	NA	NA	NA	NA	NA	A	A
Nippon Kakoh Seishi	NA	NA	NA	NA	NA		
Nippon Paper Industries	NA	NA	NA	NA	NA	AU,E,O,US	NA
Ohishi Sangyo	NA	NA	NA	NA	NA	A	NA
Oji Paper	NA	NA	NA	NA	NA	A,AU,C,NZ,US	A,C,G,US
Rengo	NA	NA	NA	NA	NA		
Sanko Paper Mfg.	NA	NA	NA	NA	NA		
Superbag	NA	NA	NA	NA	NA		A
Takasaki Paper Mfg.	NA	NA	NA	NA	NA		
Taihei Paper Mfg.	NA	NA	NA	NA	NA		
The Pack	NA	NA	NA	NA	NA	US	US
Tokai Pulp	NA	NA	NA	NA	NA		
Tokushu Paper Mfg.	NA	NA	NA	NA	NA		
Tomoe-gawa	NA	NA	NA	NA	NA	NA	E,US
Tomoku	NA	NA	NA	NA	NA	C,E,US	US
Mean	318	26	315	6	2		
Median	318	14	356	7	3		

^a 1996 exchange rate JP Yen 1=US\$0.0080
^b 1995 exchange rate JP Yen 1=US\$0.0093
^c A=Asia, AU=Australia, B=Brazil, C=Canada, E=Europe, F=France, G=Germany, I=India, IR=Ireland,
LA=Latin America, M=Mexico, NZ=New Zealand, O=Other, S=Scotland, SA=South America, UK=England, US=USA

23. International activities (millions of US \$) of Japanese pulp and paper companies

DISCUSSION

Over the past decade, only two pulp and paper companies have outperformed the stock market average (Flicker, 1998, p.142). It is often argued that such unfavorable returns are inevitable because pulp and paper markets are mature, the products sold are commodities, capacity is chronically overbuilt, and ownership is highly fragmented. If the industry is to reverse its 20-year streak of poor stock market performance, it must overcome these obstacles. A willingness to implement innovative business strategies will enable the pulp and paper industry to earn rates of return that reward existing shareholders and

attractive new investors.

Of paramount importance to improving stock market performance is for the pulp, paper, and packaging industry to grow capacity derived from demand and not in response to ample cash flows generated by cost-driven price increases. Many industry watchers are optimistic because capacity additions have receded from traditional levels over the past few years. Even though the strong United States economy continues to increase the demand for paper, capital expenditures in the industry remain conservative.

International demand for paper has been expected to grow, with much of the new demand anticipated from Asia, but the recent financial crisis in the region has slowed consumption. North American companies exporting to Asia are experiencing a decrease in sales. In addition, weak Asian demand means that paper produced in Southeast Asian mills, primarily Indonesia, will be redirected to North American markets. The production costs for many Asian mills, including long distance transportation, is so low that they can easily compete with United States companies in their domestic markets. Market pulp, especially hardwood, and printing and writing papers industry segments in the United States will be most negatively effected by Asian excess capacity production. The financial crisis, however, is restricting capital in Asia, making it more difficult to realize planned capacity expansions. This has slowed capacity growth, which may serve to push up paper prices in the future. To compete in the Asian market over the long-term, North American companies need to exploit strategic advantages like producing paper grades for which they possess a superior fiber supply, as compared to cost competition based on low wages and supply costs. For example, due to relatively ample supplies of softwood fiber, North American companies possess a competitive advantage in producing high quality packaging grades of paper.

Japanese companies face very serious hardships domestically and internationally. Japanese pulp and paper industry has been enjoying a profitable isolated protected market protected from outside competitors by rather high entry barriers. This has enabled a large number of pulp and paper companies, from large to small, to survive at the consumers' cost. Now that this situation is drastically changing and the market they enjoyed is about to open to the competitors. In order for the Japanese pulp and paper industry to survive cutthroat competition in a

market which is now connecting to the global markets, some companies should merge to be larger and stronger players positioning themselves to move into global markets. Some companies should further develop their specialized fields which they dominate by outstanding technology with competitive prices; otherwise, they are only waiting to be weeded out.

The pulp, paper, and packaging industry must remain focused on improving capital effectiveness. The slow capacity growth model prohibits spending cash for new pulp mills and paper machines in the traditional way. Part of these funds will be used for implementing Cluster Rule requirements. It is estimated that \$2.6 billion will be required to comply with the new environmental regulation, which is considerably less than the estimated compliance cost of \$11.5 billion in 1993 for the original Cluster Rule proposal. Since the Cluster Rule was first suggested, many United States firms have already made improvements facilitating compliance. Capital might also be better spent debottlenecking or enhancing those activities devoted to continuous gains in productivity and quality. Debottlenecking provides incremental capacity increases on existing equipment that can be implemented with strategic timing.

A major expenditure of capital will be for acquisitions, individual mills or entire companies, and mergers between companies. Recent examples, include the domestic merging of James River and Fort Howard to form Fort James, New Oji and Honshu to form Oji, and, internationally, the alliance between UPM-Kymmene and Asia Pacific Resources International. Such consolidations enable firms to achieve greater economies of scale, increase market share, and access new markets, immediately and without an undesired increase in worldwide capacities.

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NON-PERFORMING ASSETS OF BANKS AND FINANCIAL INTERMEDIATION: EXPERIENCES OF JAPAN IN THE INTER-WAR PERIOD

MUNEHISA KASUYA *Kobe University*

Abstract

The Japanese banks are now holding a lot of non-performing assets as asset prices fall. The Japanese banks were also holding a large amount of non-performing assets in the inter-war period. The experiences of Japan in the inter-war period may provide useful lessons for the problem of today's Japanese banks. In this paper, we consider what effects the non-performing assets of the Japanese banks had on the financial intermediation in the inter-war period. In addition, we analyze economic meanings of those effects.

we can infer from several evidences that there were the deterioration of financial intermediation in the inter-war period. According to the experiences in the inter-war period, we can also infer that the prompt action in required collection and required redemption of non-performing assets might be effective in the recovery of financial intermediation.

JEL Classification: E51, G21, G28, N15

Keywords: asymmetric information; monetary policy; transmission mechanism; agency costs; credit channel; deposit channel; financial intermediation; Japanese banks

1 Introduction

The Japanese banks are now holding a lot of non-performing assets as asset prices fall. We are anxious about the deterioration of

Corresponding Address:

Munehisa Kasuya

Research Institute for Economic and Business Administration (RIEB)

Kobe University,

2-1 Rokkodai-cho, Nada-ku, Kobe, 657-8501, Japan

E-mail: kasuya@rieb.kobe-u.ac.jp

Fax: (81)-78-803-0407

the financial intermediation. The period between World War I and the Japan-China War (the *Nichu* War, started in 1937) is called the inter-war period. The Japanese banks were also holding a large amount of non-performing assets in the inter-war period. As a result, the Japanese banks faced a difficult situation as well as today's Japanese banks. The Japanese banks actively lent out for fixed capital investment in the period of World War I. Sales and the sales price of the borrowing firms dropped sharply immediately after World War I. Earnings of the borrowing firms have dropped, too. Consequently, a large amount of non-performing assets were generated in the banks. The amount of the bad loans was too huge. Therefore, a long term was required for the collection and the redemption of the bad loans. The huge non-performing assets caused various problems in financial intermediation: high interest rates, new loan decrease, deposit shift, and bank failures. Therefore, the financial intermediation function of the banks has deteriorated.

The experiences of Japan in the inter-war period may provide useful lessons for the problem of today's Japanese banks. In this paper, we consider what effects the non-performing assets of the Japanese banks had on the financial intermediation in the inter-war period.

In addition, we analyze economic meanings of those effects. Although both of a quantitative approach and a historical approach are tried in our analyses, we mainly use a historical approach because of the problem of data availability. In section 1, we describe the non-performing assets and the economic development in the inter-war period. In section 2, we analyze what effects performing assets of banks had on financial intermediation. In section 3, we consider possible lessons for the problem of today's Japanese economy.

2 Economic development after World War I

We take a general view of the economic development of the inter-war period first.

The outbreak of World War I¹ raised overseas prices (Figure 1). Moreover, the war has lifted up exports (Figure 2). The Japanese

1 1914-1918

Figure 1: Importing and exporting prices (dollar basis)

CY1914=1.00

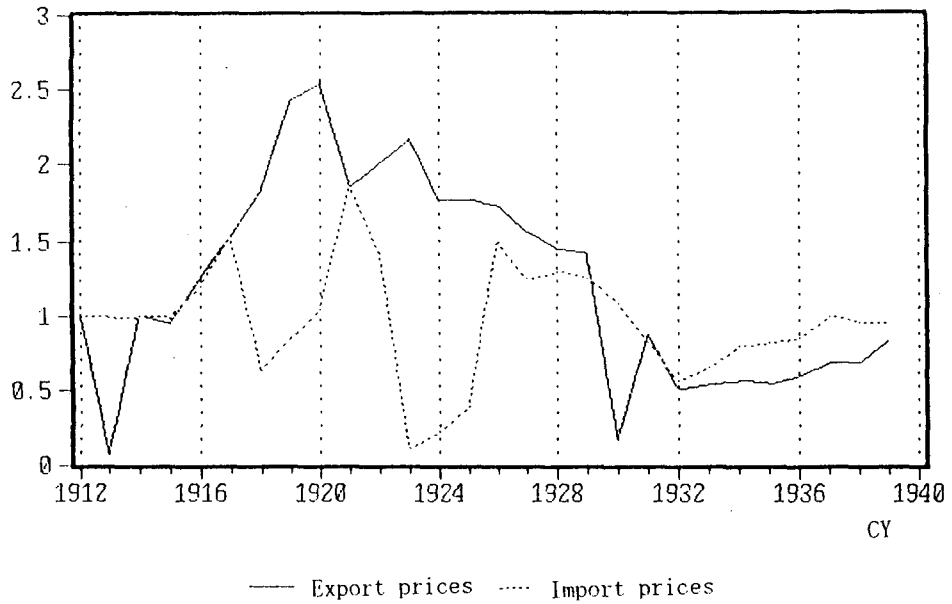
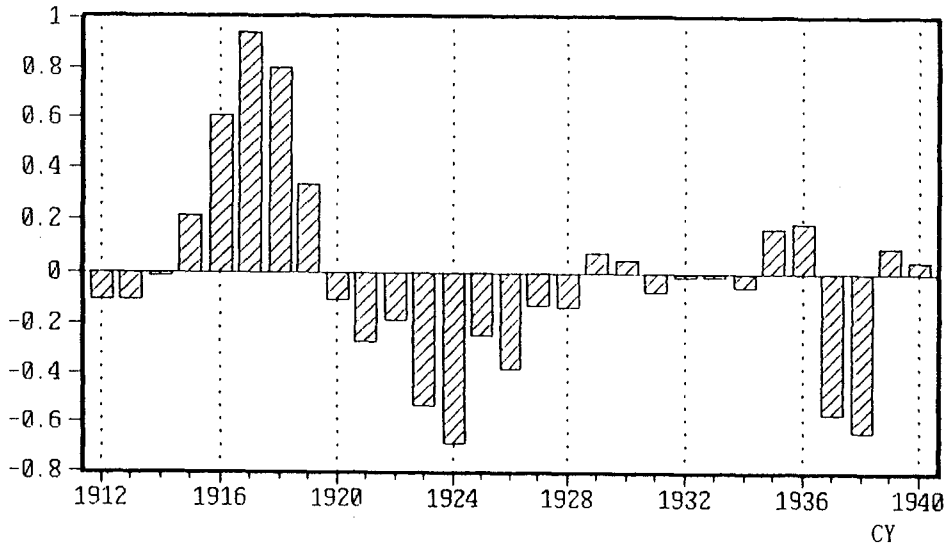


Figure 2: Current account

Million yen



economy enjoyed an unprecedented boom by the external shock of the wartime demand (figure 3 and 4). However, the World War I ended and

Figure 3: Real GNP

Change from a year ago, percent

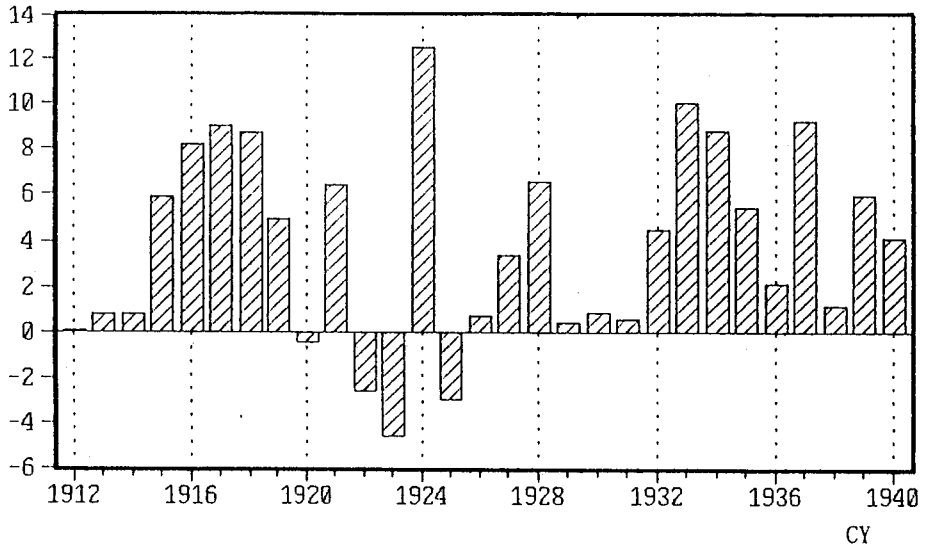
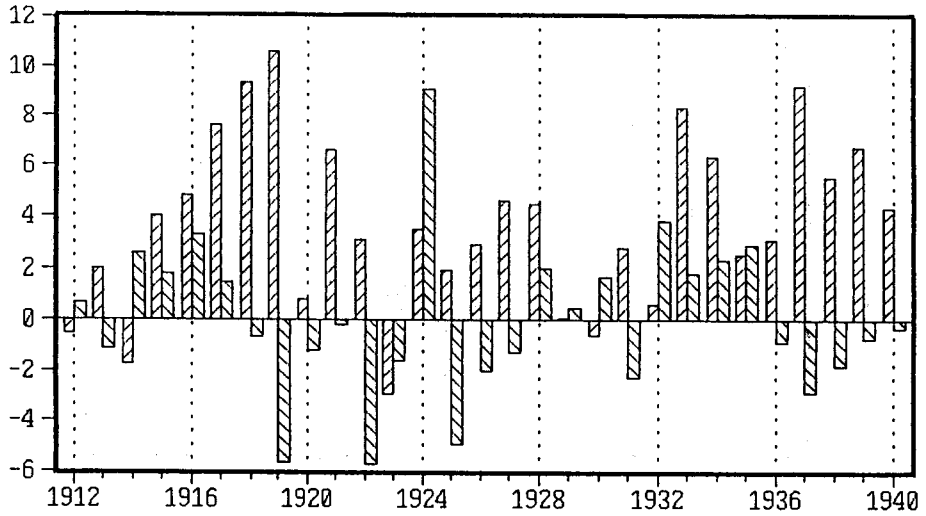


Figure 4: Contribution to changes of real GNP)

Percent

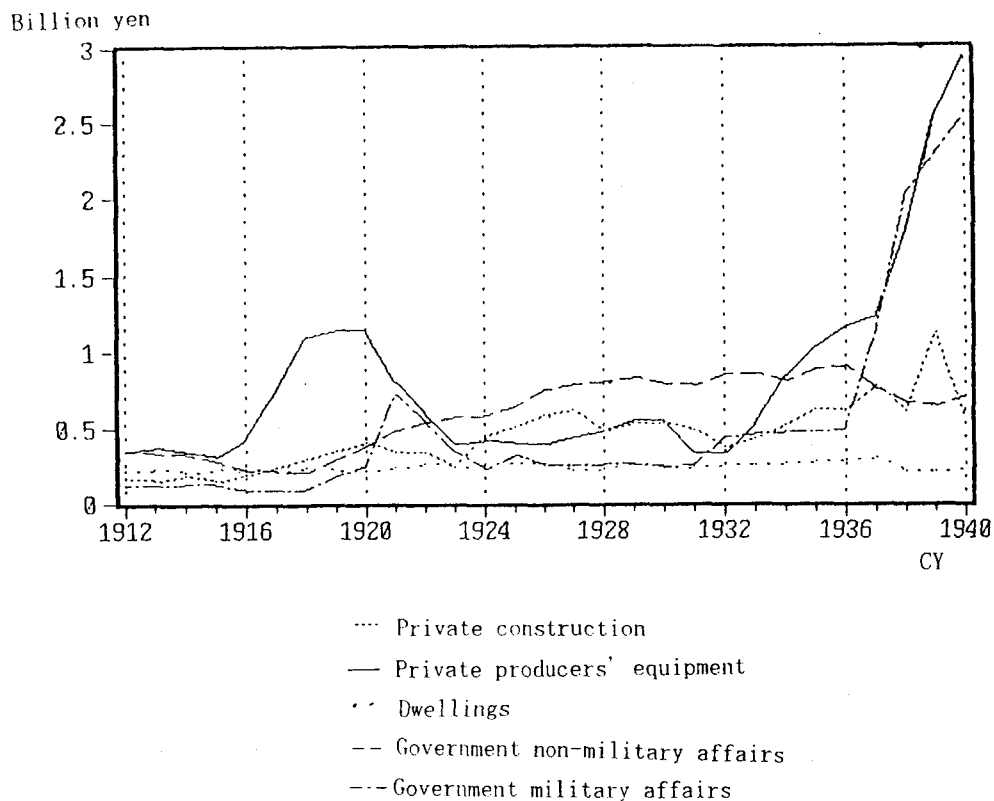


▨ Domestic demand ▩ Current overseas surplus

the reactionary crisis, occurred. Thereafter, Japanese economy was generally sluggish until the deflationary fiscal policy (since 1932) by the Minister of Finance Takahashi. It also experienced several crises in the period.

The following two are considered to be the background of such long-term depression. The first is excessive fixed capital investment during World War I. A great expansion of the private equipment investment in this period (Figure 5) was brought by the rapid increase of exports during the War. At that time, there were a lot of industries with low productivity. The low productivity equipment pay only under the war special procurements and high prices of exports. The equipment became a non-performing asset since the reactionary panic in 1920. It became a big load of Japanese economy afterwards. The second is deflationary policies, by which the Japanese government tried to go back to the gold standard system. The Japanese government

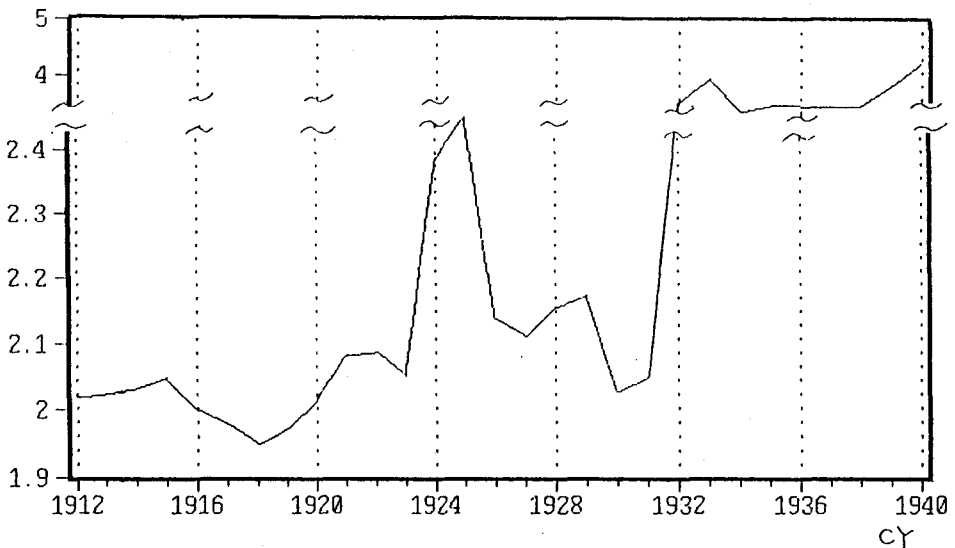
Figure 5: Gross domestic fixed capital formation (real, at the 1934-36 average price)



renounced the gold standard system at World War I. After the War, the government was planning to return to the gold standard system. In preparation for this return, the government tried to maintain the yen-dollar exchange rate, which tended to depreciate under trade deficit. That is, the government executed the tightening economic policy intermittently by selling gold specie to the private sector, which also means buying yen bills from the private sector (Figure 6 and Figure 7). We describe in detail a little more. After the end of World War I, the boom continued for a while due to the special demand for the reconstruction in Europe. In 1920, the tightening fiscal policy in Europe caused the recession of Europe and America². At the same time, the exports of Japan dropped sharply and the reactionary crisis occurred³.

This crisis was settled by an expansionary economic policy. this policy caused not only a boom but also the problem of trade deficit. The government adopted a tightening policy to deal with the problem of

Figure 6: Exchange rates (yen per dollar)

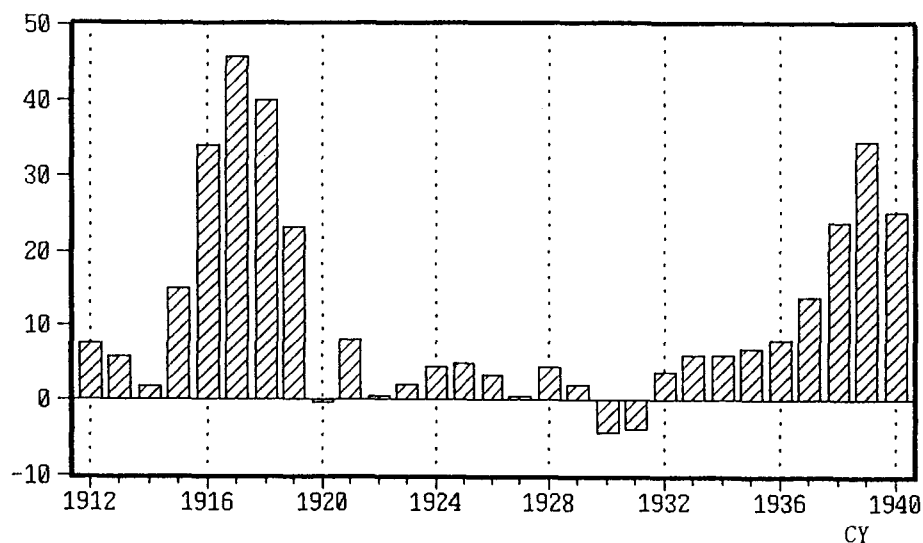


2 The boom of the United States in and just after World War I depended on exports for Europe.

3 Actually, the slump of export was becoming remarkable before the reactionary crisis occurred on March 15, 1920.

Figure 7: Money supply (M_2)

Change from a year ago, percent

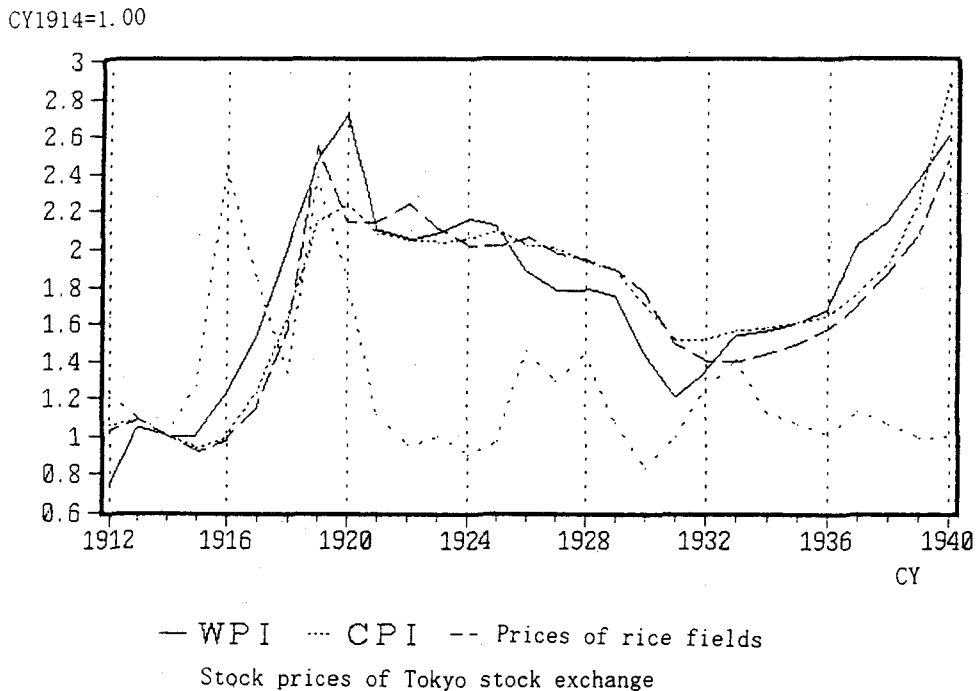


trade deficit in September, 1920. In September, 1923, the government was forced to suspend the tightening policy by the *Kanto* great earthquake. The damage of the *Kanto* great earthquake was huge. However, the earthquake measures with an expansionary economic policy caused a boom in 1924. The problem of trade deficit also returned. To deal with this problem, the government adopted the tightening economic policy of the second times of the inter-war period in October, 1925. Bankruptcies and bank failures increased gradually due to this tightening policy gradually. After about two years, the financial crisis occurred in March, 1927. The Diet speech of the Minister of Finance concerning the *Tokyo Watanabe* bank failure triggered the financial crisis. In the financial crisis, the credit and payment networks collapsed in the chain. Bank runs occurred frequently. The government was again forced to suspend its tightening economic policy by this crisis. The financial crisis is settled by this policy change, which caused a boom. In the mean time, trade deficit increased. Therefore, the government started the tightening economic policy in July, 1929, which was the third and the most severe policy of the inter-war period. This tightening policy brought the *Showa* crisis (1930-1931). The *Showa* crisis is called the fiercest crisis in the history of Japan'. The *Showa*

crisis was worsened by the world depression, which triggered by the crash of the New York stock exchange market on October 24, 1929. These three deflationary policies made a large amount of potential non-performing assets exposed intermittently. At the end of 1931, the government adopted the expansionary policy called "the *Takahashi* fiscal policy". The *Takahashi* fiscal policy caused a boom with the supports of the colonial policy in the continent of Asia and the government control of economic system.

Now, we trace the transition of main economic indicators in this period. Domestic prices greatly rose during World War I. Afterwards, domestic prices showed the decrease tendency because of the reactionary crisis and the several deflationary policies (Figure 8). The figure 8 shows that the decrease tendency becomes strong at the tightening policy period of three times (1920, 1925-1926, 1930-1931).

Figure 8: General prices and assets prices



The land prices show the decrease tendency, which became strong at the tightening period of three times as well as domestic prices⁵. Stock prices rose during World War I (1916) and just after World War I (1919) from the expectation for the wartime special demand and the reconstruction demand. However, stock prices kept sluggish over a long period of time since the reactionary crisis. In the mean time, the figure also shows that the rise and the fall of stock prices are observed just before and at the financial crisis (1927) as well as just before and at the *Syowa* crisis (1930-1931).

From the latter half of 1980's to the first half of 1990's, the asset prices changed greatly while general prices are stable in Japan. The movements of assets prices and general prices in the inter-war period are greatly different from the situation at the present age.

That is, the change of the wholesale prices was larger than the asset price movements. This means that investing in products and production facilities was more profitable than investing in land and stocks. Actually, "upstarts by Ship" and "upstarts by Iron" were typical example of persons who had raised big profits at that time.

Many industrial corporations found in financial difficulties under such a situation. The number of bankruptcy stayed in the high level since the reactionary crisis (Figure 9).

As for the banking section, bank lending financed many of private equipment investments during World War I (Figure 10). Moreover, the banks often indirectly help firms to issue stocks by making stock collateral loans to the stockholder⁶. Under such the structure of the funds flow, the increase of the non-performing assets of industrial corporations necessarily led to the increase of bad loans of banks. One reason of much money flow to industrial corporations was the existence of the special type of banks, "*Kikan* banks", which had intimate relations with specific industrial corporations. These *Kikan*

5 General land prices are not available. Therefore, we use the land prices of rice fields. However, the share of "lending secured by fields and forests" in the lending of all banks reached 41 percent at the end of 1926. This means land prices of rice fields was considered to reflect land prices used for collateral approximately.

6 "Fixed equipment investments of big firms (excluding financial clique *Zaibatsu* firms) were financed mostly by stocks. However, it is proved that the bank often indirectly helped stock firms to issue stocks by making stock collateral loans to the stockholder." (Kato(1983)p.394)

Figure 9: Bankruptcy

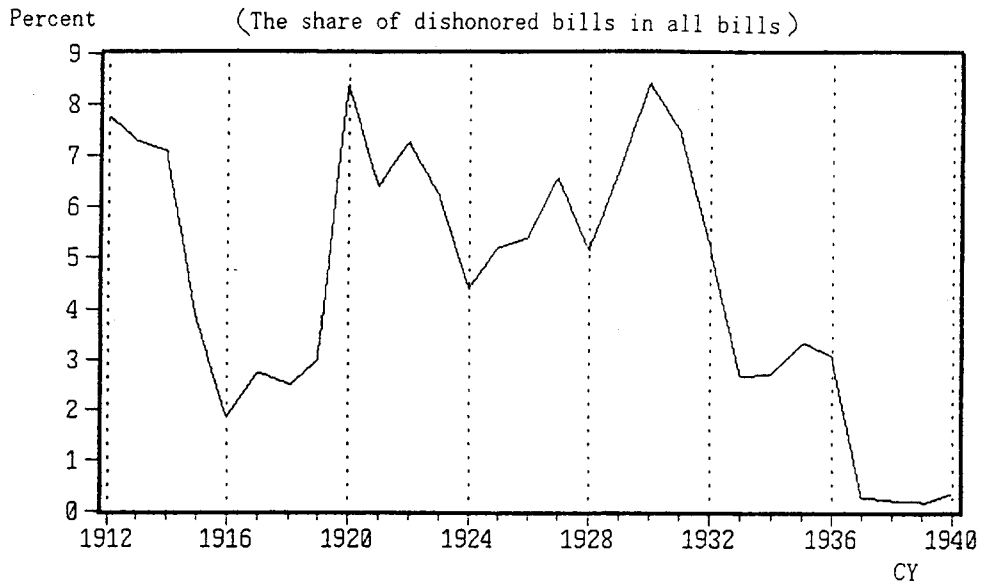
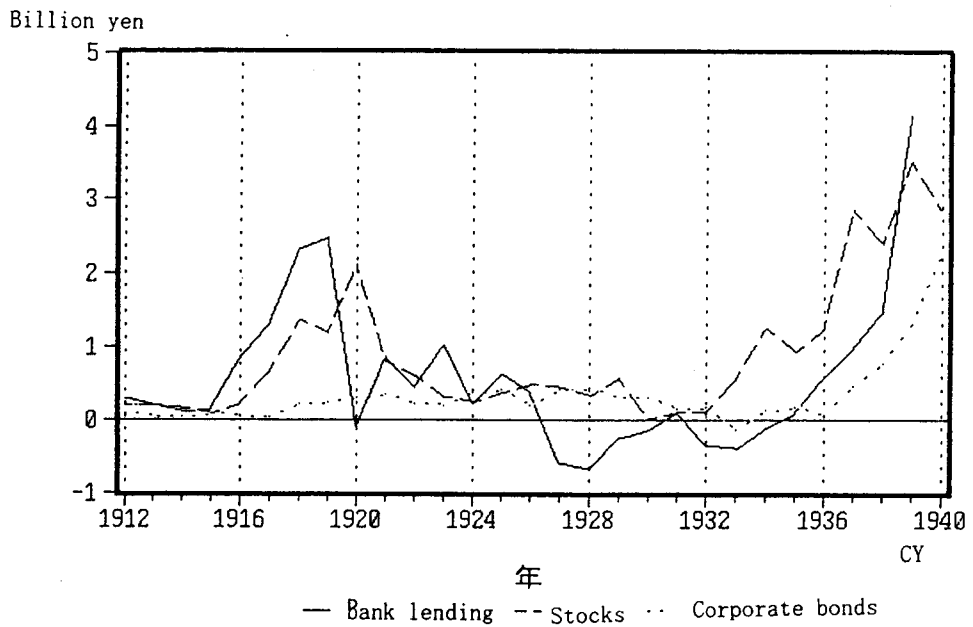


Figure 10: Industrial funds supply



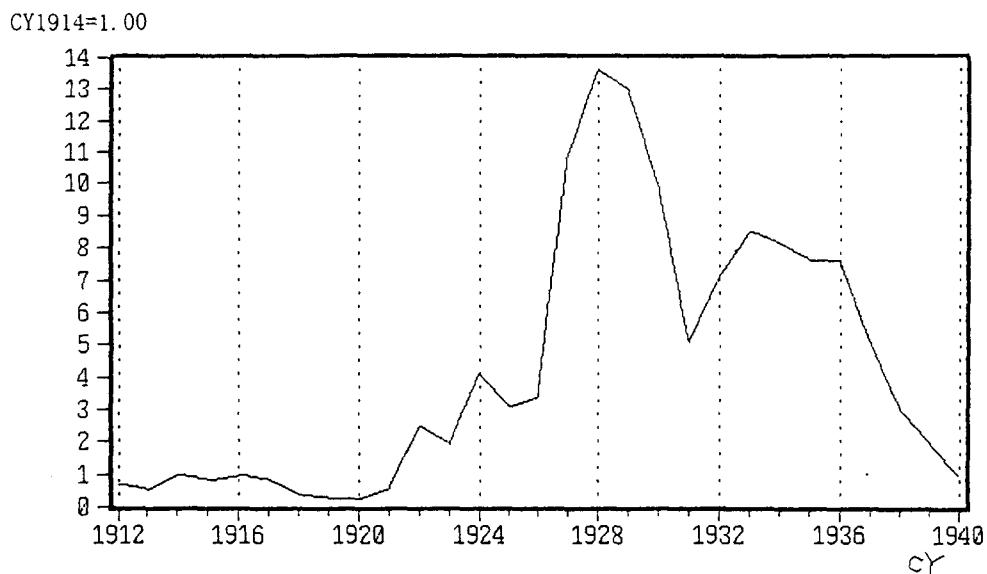
banks supplied investment funds to allied industrial corporations as they demanded. In addition, those banks often made "fiduciary loans",

that is, loans with no collateral⁷.

After World War I, earnings of banks decreased and bad loans of banks increased (Figure 11 and Figure 12). The share of real estates in bank assets rose because of the increase in attached real estates (Figure 13).

We describe the banking management in detail. The growth rate of deposits and loans tended to decrease in the inter-war period (Figure 14). The reason was basically the depression of the real economy. In addition, the growth rate of deposits was influenced by the shift to risk-less assets like the postal savings. Moreover, the growth rate of lending was influenced by the shift to safer securities like government bonds. In the mean time, the deposit-loan ratio (loans/deposits) rose temporarily immediately after the reactionary crisis. This is because banks made additional loans to defective borrowers to whom loans were non-performing loans. After about 1927, the deposit-loan ratio decreased almost consistently. The reasons are (i) funds demand decline due to economic stagnation, (ii) the shift from loans to bonds, (iii) redemption of bad loans, (iv) liquidation and merger of defective

Figure 11: Total net loss of all banks (deflated by GNP def.)



7 The share of fiduciary loans in all bank loans reached about 30 percent at the end of 1926.

banks and so on (Figure 15) .

Figure 12: Ratio of banks with loss or non-dividend in all banks

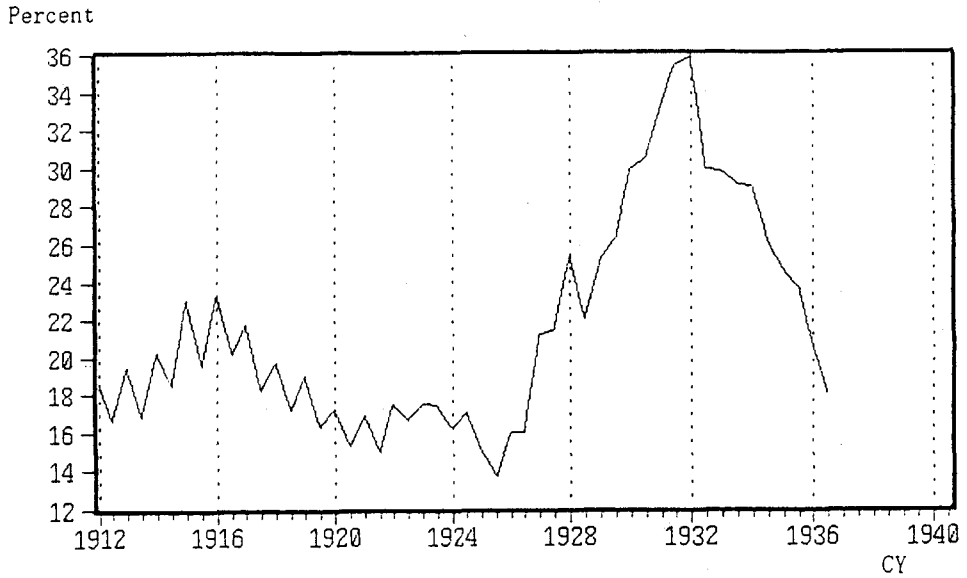


Figure 13: Ratio of real estates in bank assets



Figure 14: Deposits and loans

Change from a year ago, percent

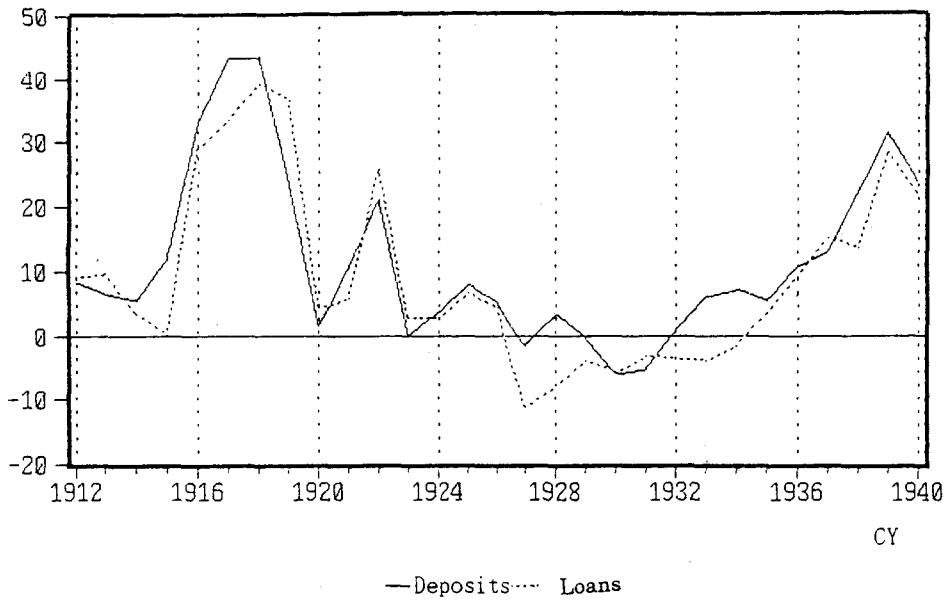
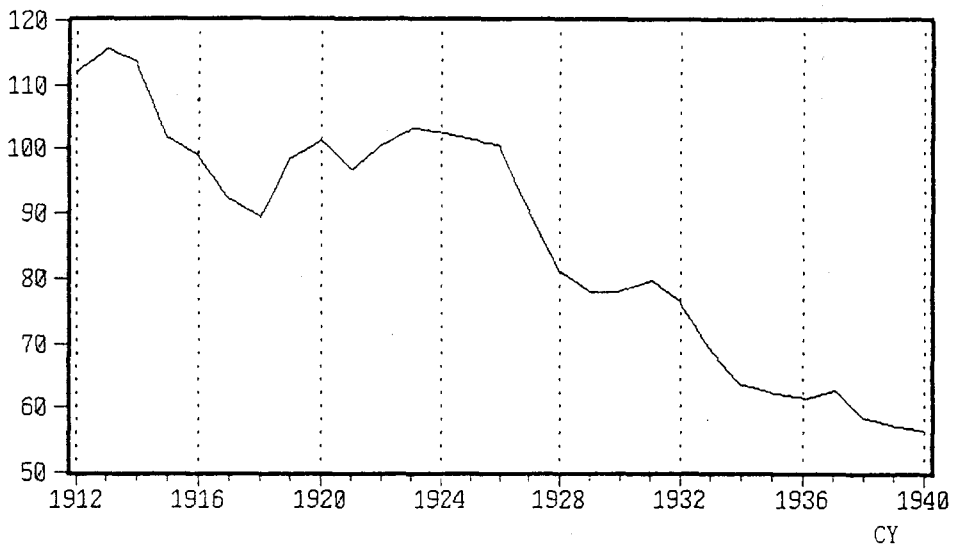


Figure 15: Deposit-loan ratio

Percent



Next, we describe the movements of interest rates. The inter-bank money market interest rates (call rates) maintained the high level from the reactionary crisis (1919) to the *Kanto* great earthquake (1923)(Figure 16). The reasons are (i) the increase of the call money demand due to the increase of bad loans, (ii) the increase of risk premiums and so on. Moreover, the interest rates of lending to industrial corporations also maintained the high level (Figure 17). However, the interest rates traced the decrease tendency as a whole. The reasons are (i) the decline of funds demand of industrial corporations due to business contraction, (ii) the increase of special lending by Bank of Japan, (iii) progress of liquidation and reconstruction of defective banks that borrowed much call money and so on.

Figure 16: Interest rates I

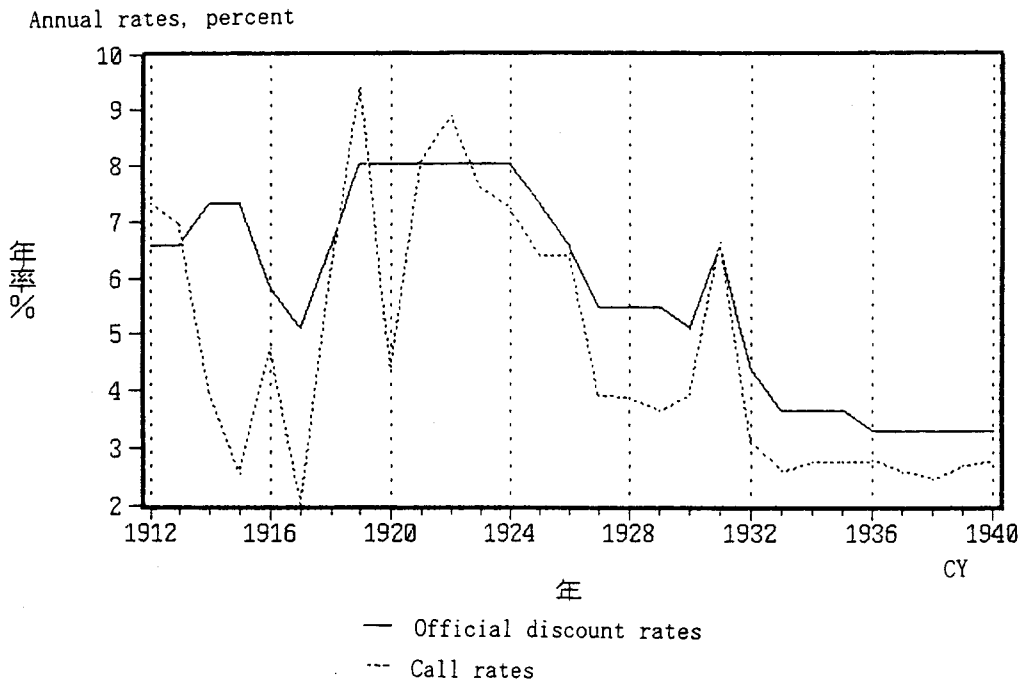
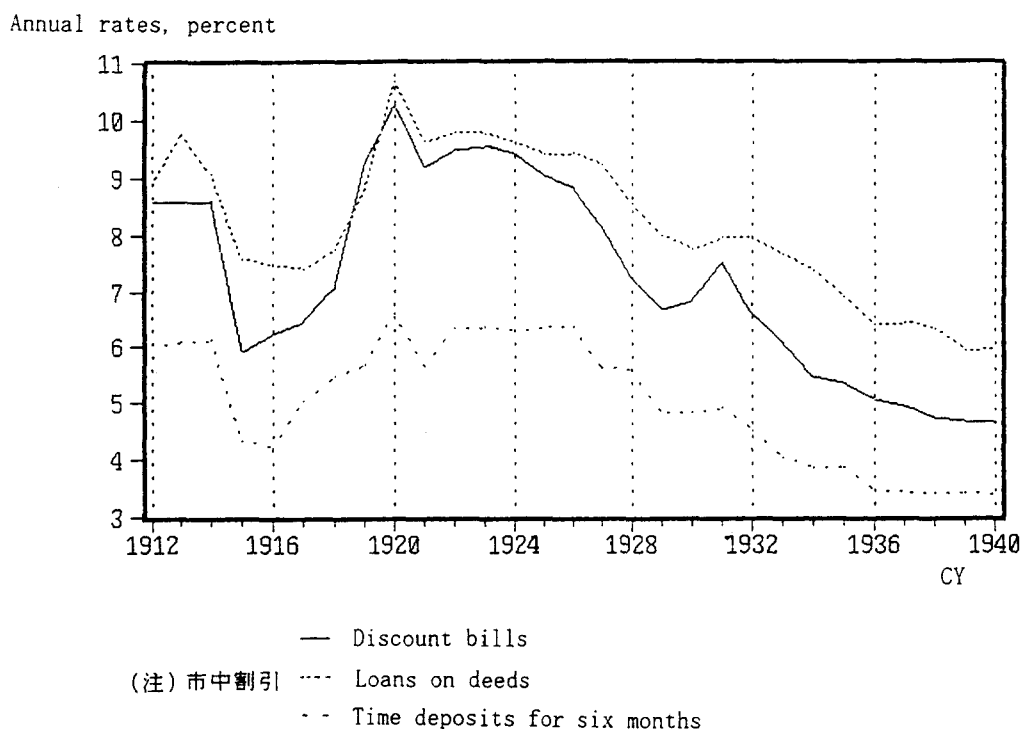


Figure 17: Interest rates II



3 The deterioration of financial intermediation

As we described, non-performing assets of banks increased intermittently after the reactionary crisis. In this section, we analyze the influence of the non-performing asset on the financial intermediation.

3.1 Economic meanings of the deterioration of financial intermediation

First of all, we analyze the economic meanings of the financial intermediation and the deterioration of it from the viewpoint of the contemporary economic and financial theory⁸.

The financial institutions have the role to intermediate funds from ultimate lenders to ultimate borrowers smoothly and efficiently. Then,

⁸ In the contemporary economic theory, various concepts are developed. However, those are developed in mathematical forms. Therefore, those are not digested enough in usual finance theories. Refer to Bernanke (1983) and so on.

the financial institutions can be regarded as institutions for minimizing "the cost of financial intermediation". Here, "the cost of financial intermediation" can be defined as the cost of channeling funds from the ultimate lenders into the hands of good borrowers.

Banks usually minimize "the cost of financial intermediation" between banks and borrowers by using several special things: the good customer's relationship with customers, the ability of screening and monitoring, and the collateral system and so on. The good customer's relationship and the screening and monitoring ability are, so to speak, invisible assets. The collateral system is, so to speak, a kind of financial technology. On the other hand, banks minimize "the cost of financial intermediation" between banks and depositors by the invisible asset of "reputation". As a result, the total amount of "the cost of financial intermediation" by banks can be smaller than that by direct channel from ultimate lenders to ultimate borrowers. The deterioration of financial intermediation can be defined as the condition that financial institution cannot minimize "the cost of financial intermediation". Under the condition, the entire cost of financial intermediation rises as a result. The deterioration of financial intermediation can be considered as productivity decrease of invisible assets (the ability of screening, monitoring and so on) and financial technology (collateral system and so on). It also means the waste of resources of the entire real economy. Moreover, it distorts the micro-allocation of resources. On the other hand, the decrease in money supply causes imperfect use for economic resources. From this viewpoint, the effect of the money supply decrease on the real economy is different from that of the rise of "cost of financial intermediation". The decrease in money supply is known well as a negative effect of the financial sector on the real economy. The effect is called the monetary effects. Friedman and Schwartz (1963) pointed out that the decrease of money supply, that is, the monetary effects, made the Great Depression more severe and prolonged.

On the other hand, Bernanke (1983) emphasized the negative effects of the deterioration of financial intermediation on the real economy. The deterioration was caused by the financial panic of 1929. He called the effects "the non-monetary effects."

If the financial market is imperfect and there are no well-functioning banks, the required cost of financial intermediation between

lenders and borrowers is supposed to be so large that we cannot ignore it.

Collapse of credit system like the financial panic of 1929 means the increase the cost of financial intermediation. He regressed the real output on the monetary effects and the non-monetary effects. His empirical results suggest that the non-monetary effects improve the explanation of the movement of the real output.

As already described, a large amount of defective lending claims were generated in the inter-war period. This means the productivity decrease of invisible assets like the screening and monitoring ability, and the risk diversifying ability. It also means the deterioration of financial technology like the collateral system. If bad loans were generated by firm-specific factors unrelated to the movement of the real economy, the collateral system would be effective to save "the cost of financial intermediation". However, if bad loans were generated by the fluctuations of the real macro-economy and the collateral prices were highly correlated with the real economy, collateral system would not be effective to save the cost. This is because the collateral prices would fall if the bad loans were generated by a recession.

In a depression of the real economy, the ability of screening, monitoring and diversifying risks would deteriorate. As a result, the cost of financial intermediation between banks and industrial corporations would rise. The deterioration of financial intermediation is also considered as the deterioration of the banking function as the incentive compatible scheme under asymmetric information.

In addition, although Bernanke (1983) is not pointed out, the non-performing assets had also a negative effect on the real economy through the delay of required collection and required redemption of non-performing assets.

First, the delay would work as a restriction on the cost minimization behavior in the portfolio selection by banks. It means the rise of the cost of financial intermediation. Second, the delay of required collection and required redemption of non-performing assets would deteriorate the invisible assets of the bank reputation because depositors would have the anxiety about the safety of deposits.

It also means the rise of the cost. However, we can not observe directly the deterioration of financial intermediation: changes of the ability of screening, monitoring and the financial technology of the

collateral system. Then, in this section, we verify indirectly the change in the lending market and the deposit market. First, in the lending market, if the ability of screening, monitoring and the financial technology of the collateral system deteriorated, then lending supply curve would shift upward. In other words, banks would supply fewer loans at higher interest rates. However, we could not observe the decrease of lending precisely because the total amount of loans would include the non-performing assets, which often grow due to the accrued interest. Second, in the deposit market, the increase of liquidity demand due to the non-performing assets would have an effect of an upper shift of deposit demand (the acceptance of deposits by banks). However, the productivity decrease in the financial intermediation would have an effect of a lower shift of deposit demand. That is, the movement of the deposit demand would be ambiguous. On the other hand, as already described, the deterioration of the bank reputation would make the deposit supply (depositors' depositing) curve shift upward. As a result, the movement of the amount of deposits would be ambiguous without any special assumptions. However, the agreement of the deposit rates was made between banks at that time. In a word, the deposit rate is considered to be maintained under the equilibrium level that would clear the deposit market. As a result, the amount of the deposit can be assumed to be decided by the deposit supply function. The deterioration of financial intermediation would cause the decrease of deposits by an upward shift of deposit supply curve even if the deposit demand curve shifted upward.

Moreover, when the outflow of deposits is extremely large, it would lead to bank failure. Based on such a framework, we analyze the four indicators of the deterioration of financial intermediation: the rise of lending interest rates, the decrease of new loans, the shift of deposits, and bank failures.

3.2 The rise of lending rates

The deterioration of financial intermediation would cause the rise of interest rates by an upper shift of the supply function of new loans. In general, the rise of the lending rates would have a negative effect on the real economy through the increase of production costs. Such a rise of the lending rates is caused by the rise of risk premiums requested by lenders and the under liquidity of borrowers with bad loans.

In the following, we consider the movement of the risk premium. It is not easy to extract only the risk premium from the level of interest rates observed in the lending market. Some are considered as methods of extracting the risk premium of the interest rate. First, if there were two loans that had the same conditions except the expected loss by borrower's default, the interest rate spread of them would reflect the difference of risk premiums⁹. Moreover, if one borrower could be assumed to be free from default, the interest rate spread of two would mean the level of the risk premium of the lending to the other borrower. However, the problem of this method is that obtaining of the data with the conditions as described is very difficult in general¹⁰. Actually, the data required for such a method did not exist in the inter-war period. Therefore, the risk premium in the period cannot be extracted by this method. Second, the risk premium is guessed from the movements of the interest rates. It is assumed that the interest rate is composed of three parts: the real interest rate, the expected inflation rate, and the risk premium. Then, the change of the interest rate can be decomposed in the change in the real interest rate, the expected inflation rates, and the risk premium.

Therefore, the movement of the risk premium can be guessed from the movements of the actual interest rates, the real interest rates, and the expected inflation rate if there is no substantial influences of regulations and control by the government on interest rates. Of course, the change in the real interest rates and the expected inflation rates cannot be observed directly. Therefore, it is also difficult to guess the movement of the risk premium by this method in general. However, the transition immediately after the reactionary crisis can be guessed by this method to some degree. The interest rate stayed in the high level at a while after the reactionary crisis as shown in Figure 16 and Figure 17. At that time, the real economic growth rate and prices have decreased greatly. Therefore, the potential growth rates, the real interest rate, and the expected inflation rate cannot be considered to go up just after the reactionary crisis. In other words, it is natural for us to consider those rates to fall after the crisis¹¹.

9 The conditions are the amount of money, maturity, collateral, lenders, and so on.

10 Even if the observed conditions, which should be the same, were different, the theoretical conditions could be estimated by using related information. However, such a method cannot be used if there is no related information.

Moreover, there was substantially neither interest rate control policy nor financial regulation¹².

Based on these facts, we can infer that the high lending rates immediately after the reactionary panic should mean high-risk premiums that lenders requested. Such a guess is indirectly proven by there are the following descriptions about the financial conditions of the period.

"Although the demand for lending declines and the liquidity of bank became abundance, the lending rates kept in the high level." (BoJ(1958)p.675).

That is, the interest rate kept in the high level though the liquidity held by banks became abundant. It can be interpreted that the lenders requested larger risk premiums due to the anxiety about borrower's default. The interest rates showed the decrease tendency after the Kanto great earthquake.

However, this does not mean a decrease of the default risk of borrowers. It should rather mean that the high-risk borrowers were excluded from the money market. That is, the great earthquake and the deflationary policies made industrial corporations get in more serious financial difficulties.

As a result, the risk premium rose so high that borrowers and lenders could not agree to any lending contracts.

As Stiglitz and Weiss (1981) discussed, under asymmetric information, high-risk borrowers are willing to borrow the higher interest money. Because lenders cannot distinguish safe borrowers from high-risk borrowers, even safe borrowers can not help borrowing at higher interest rates. If the asymmetric information problem were solved, that is, lenders could tell which borrowers were safe borrowers, the interest rate would fall. The call market in the inter-war period was a typical example.

At the financial crisis, as the call money to the *Taiwan* bank, a typical bank of high risk, was called back by lender banks, the call rates fell.

11 The real interest rate is considered to take a value close to the economic growth rate in the future if general economic structures are assumed

12 At that time, the policy operation in the period was basically the gold standard system type. In a word, the monetary authority did not control the interest rates unlike today's policy operation.

3.3 The decrease of new loans

Another effect of an upper shift of the lending supply function due to the deterioration of financial intermediation is a decrease of the new loans. The upper shift of lending supply function would make the amount of the new loans fewer than that of the normal case without the deterioration of financial intermediation. If the upper shift were due to the rise of risk premium, the lending refusal might also happen. Such a decrease or refusal of new loans would have a negative effect on the real economy in the respect of the availability of the capital. However, the decrease of lending demand was also considered to cause the decrease of the amount of lending. Moreover, the additional lending to defective borrowers was considered to cause the increase of lending. Consequently, we cannot observe directly the decrease of new loans compared with the normal case without the deterioration of financial intermediation.

Here, we examine several methods to extract the decrease of new loans compared with the normal case without the deterioration of financial intermediation. First, we consider the estimation of the lending supply function and the lending demand function. In this case, we assume that the change in the lending supply function due to the deterioration of financial intermediation is a structural change, that is, the change of parameters. After we estimate the structural change, we evaluate the influence of the structural change on new loans¹³.

Such a method has the problem that we cannot exclude the influence of the bad loans and the additional loans to defective borrowers unless we can use the data of the bad loans and the additional loans.

Actually, such a data in the inter-war period is not available so far. In addition, some of the basic data required for the estimation in the inter-war period are not available. As a result, this method is practically very difficult. The second method is consideration of the

13 Additionally, there is a method of assuming the deterioration of financial intermediation to be an omitted variable in estimation. That is, it is a method of comparing "the estimated amount of the equilibrium lending" with "the actual amount of the lending (errors + effects by the omitted variable)" and of evaluating the effect of deterioration. However, this method suffers from a fundamental contradiction in its procedure. That is, if the influence of the omitted variable is large, the estimate becomes difficult. On the other hand, if the influence of the omitted variable is small, identifying the influence of the omitted variable to the influence of the errors becomes very difficult.

description concerning the individual matter of new loans. If the amount of the new loans decreased compared to that of the usual case or the new loans did not happen, it would become the evidence of the new loan decrease. The merits of this method are (i) that a lot of data is not needed, and (ii) that the exclusion of the influence of bad loans and the additional loans is relatively easy¹⁴. Now, it was also difficult for most persons in the period to identify the decrease of the amount of new loans compared with the normal case without the deterioration of financial intermediation. However, it can be relatively easy for observers to identify that the loan that would be done in the normal case is not done, that is, a refusal of lending. In his method, we can not necessarily grasp the perspective of the market. At least, however, we could examine whether there existed some evidences of the deterioration of financial intermediation or nor. We look some descriptions about "refusing new loans in the period. The following descriptions can be interpreted as the data that proves the decrease of new loans compared to that of the normal case.

At the reactionary crisis, lenders were reluctant to offer not only long-term lending but also call money. ...Banks were not willing to lend to the borrowers who have good customers' relationship and to whom the banks would have lent in the usual case (BoJ(1958)p.536.)

3.4 The deposit shift

3.4.1 Economic meanings of the deposit shift

If "the cost of financial intermediation" between depositors and bank, or, the risk premiums requested by deposits, rose greatly, depositors would refuse to deposit. This can explain the deposit shift from small and unsound banks in rural areas to large and sound banks in city areas. It had following effects on the real economy. First, it caused the availability problem of credit in specific regions, especially rural areas. Especially, the degree of the segmentation of financial markets was higher at that time than that of today. The deposit shift meant the decrease of credit availability in the area from which

¹⁴ In many cases, it is clear whether loans are new or not. Moreover, it also usually clears whether loans are bad loans or not.

deposits flowed. Second, it caused an additional increase of “the cost of financial intermediation”.

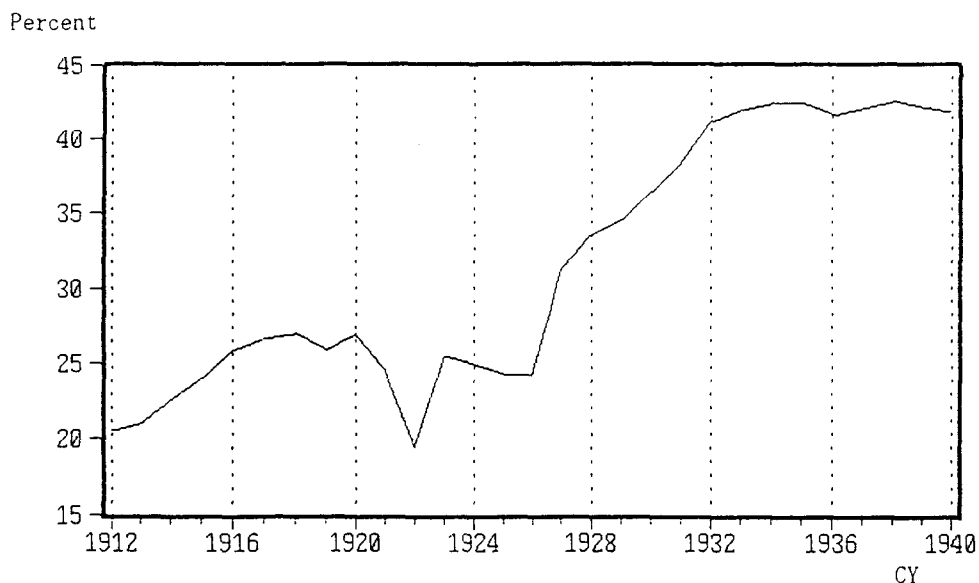
Now, we assume that sound firms borrowed from the defective banks from which deposits flowed. Besides, we also assume that those defective banks could not continue to lend to those sound firms. Even if borrowers were sound, it would be very difficult for them to borrow newly from other banks. Because, without additional costs of screening, other banks could not tell whether those sound firms were really sound or not.

The additional cost of financial intermediation would be required if new combinations of banks and industrial corporations started.

3.4.2 Examples of the deposit shift

Actually, the deposit shift from small and defective banks in rural areas to safe and large banks in city areas happened intermittently in the inter-war period. Figure 18 shows the share of the deposits of the five major banks (*Mitsui*, *Mitsubishi*, *Yasuda*, *Sumitomo*, and *Daiichi*) in the total deposits of all banks. The share rises rapidly from 1922 to 1923, and from 1926 to 1927. The first rise corresponds to the period of the first deflationary policy and the *Kanto* great earthquake. The second rise corresponds to the period of the second deflationary policy

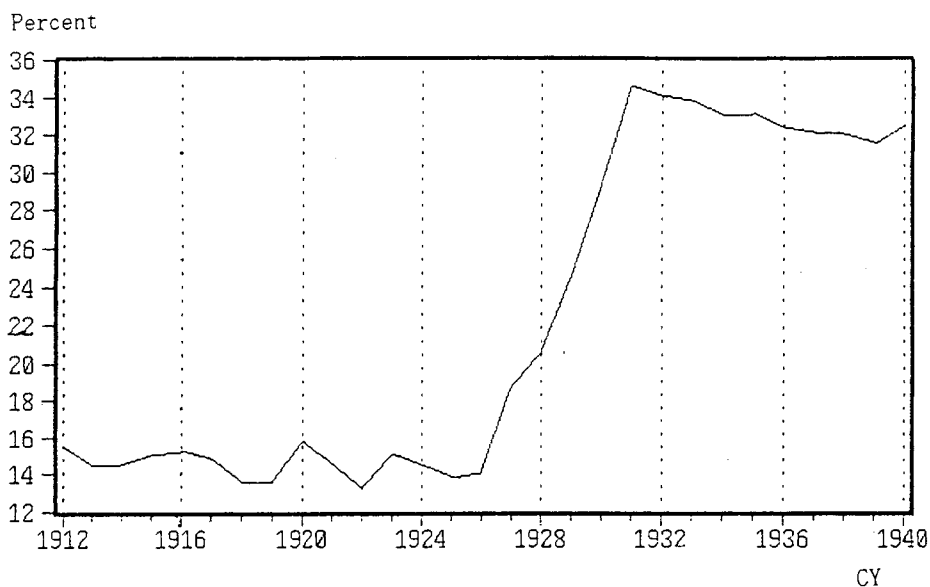
Figure 18: The share of the five major bank deposits in the total deposits of all banks



and the financial crisis. In addition, the share rises gradually from 1927 to 1932. Thus, the share of the five major banks which were about 20 percent at 1912 to about 40 percent in 1933¹⁵.

The deposit flowed not only to the major banks but also to the postal savings. As a result, the deposit ratio of the postal savings to that of all banks rose rapidly from 1927, the year of the financial crisis, to 1931 (Figure 19).

Figure 19: The ratio of the postal savings to total deposits of all banks



¹⁵ Whenever any bank crisis happened since the rapid increase of the number of banks in the period of the Japan-China War (the *Nisshin* War, 1884-1885), the government tried to rationalize the banking industry. That is, the government established several laws; the Bank Merger Law (1896), the limitation policy of bank establishment (1901), the reinforcement of bank branch regulation and the Banking Law (1923). However, it is after 1927 that the number of banks decreased remarkably. On the other hand, It was before 1927 that the deposit shift happened remarkably. Based on these facts, we can infer that, even if there had been no bank-elimination policy of the government, the deposit shift due to the increase of the cost of financial intermediation would have been supposed to be a size so that we won't ignored it.

3.5 Bank failures

3.5.1 Economic meanings of bank failures

It is bank failures that the deterioration of financial intermediation appears most remarkably. The bank failures remarkably deteriorate financial intermediation. That is, the rapid rise of “the cost of financial intermediation” between banks and depositors could cause bank runs. The rapid rise of the cost between banks in the inter-bank market also could cause the callback of call money from lender banks. Those could lead to bank failures at last. At this stage, the banks would stop the function of financial intermediation. The bank failures would make the channel of funds from ultimate lenders (household) to ultimate borrowers (industrial corporations) narrow. As a result, bank failures would have a negative effect of the fund availability on the real economy. Moreover, as already described in the section of the deposit shift, bank failures would also cause the additional cost of financial intermediation. Because, due to bank failures, the industrial corporations that borrowed from failing banks would have to find other banks.

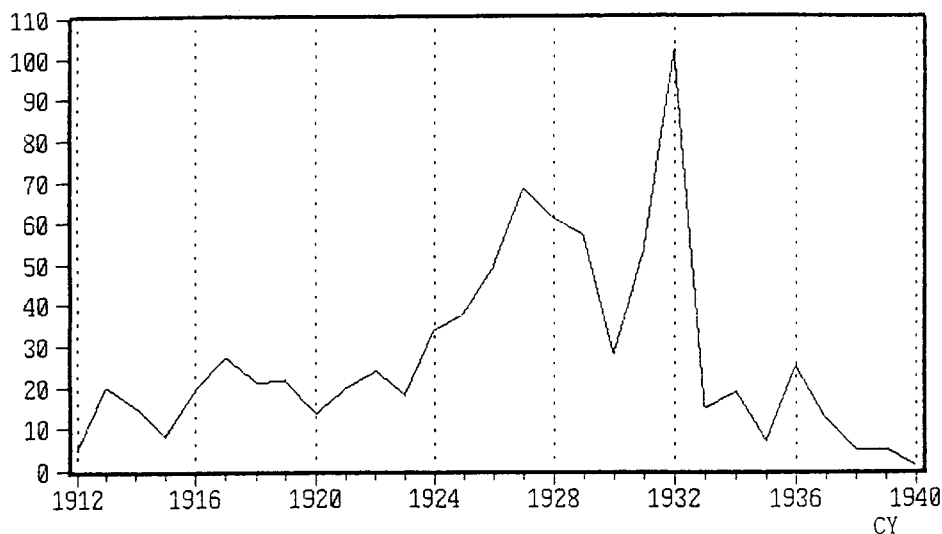
Bank failures would cause such a rise of the cost of financial intermediation in the short run. In the long run, however, bank failures would have a positive effect on the efficiency of financial intermediation as a whole. It is because unsound banks would be eliminated.

3.5.2 The data of bank failures

Figure 20 shows the situation of bank failures in the inter-war period. The number of bank failures has increased as the non-performing assets of banks increases. The number of banks that gave up their business, went bankrupt, and dissolved reached to the first peak at the financial crisis of 1927. It reached to the second peak in 1932. The reason for the second peak, however, is that the government made the small-scale banks with less capital than the regulated capital level, called “unqualified bank”, give up their business according to the Banking Law promulgated in 1927. Therefore, this is, so to speak, an orderly elimination of banks based on the law. That is, it is considered to be at the financial crisis that the number of bank failure related to the rise of the cost of financial intermediation reached to the peak substantially.

Figure 20: The number of failing banks

Number of failing banks



The number of banks that gave up their business, went bankrupt, and dissolved.

Afterwards, Japanese economy was faced to the serious crisis, called “*Showa crisis*” (1930-1931) due to the return to the gold standard and the world depression. At the end of 1931, the government shifted from the gold standard system to the managed currency system. Moreover, it also adopted the expansionary fiscal policy, called “the *Takahashi fiscal policy*.” The *Takahashi* fiscal policy caused a boom with supports of the colonial policy in the continent of Asia and the government control of economic system.

4 Implications

As already described, we can infer from several evidences that there were the deterioration of financial intermediation in the inter-war period. According to the number of bank failures and the deposit shift, the deterioration of financial intermediation started gradually at the early stage of the inter-war period, reached to the peak at the financial crisis. Then, after the crisis, financial intermediation of Japan recovered gradually. As Bernanke (1983) suggested, the deterioration of financial intermediation is considered to be caused by the deterioration of abilities of screening, monitoring, and the financial technology of the

collateral system and so on. Those things are supposed to solve the incentive problem in the normal case under asymmetric information.

In addition, we pointed out that the delay of required collection and required redemption of non-performing assets would cause (i) the rise of the cost of financial intermediation between banks and depositors, and (ii) the inefficiency of portfolio selection by the existence of uncollected funds of collectible part of non-performing assets.

Then, we consider the situation in the inter-war period from such a viewpoint. The required collection and required redemption of non-performing assets did not progress easily. It is at the financial crisis (1927) after all that it progressed remarkably.

On the other hand, we cannot find any evidence that there were any economic factors that could improve the screening ability, the monitoring ability, and the financial technology of the collateral system at the crisis. Therefore, we can infer that the rise of the cost by the delay of required collection and required redemption should be a size so that we could not ignore it as a factor to explain the peak of the deterioration of financial intermediation at the financial crisis.

Next, we consider the relation between the financial intermediation and macroeconomics.

The real economy became the worst at the *Showa* crisis (1930-1931) unlike the peak of the deterioration of financial intermediation. As a result, it might not have been the main factor of the real economy depression in the inter-war period even though the deterioration of financial intermediation have had negative effects on the real economy as Bernanke (1983) pointed out. This inference is consistent with the empirical result of Shikano (1993).

Now, what implication does the experiences of Japan in the inter-war period have for the present financial crisis?

It seems that the deterioration of the financial intermediation, which could be observed indirectly in the inter-war period, has also occurred at the present age. That is, not only deposit shift but also bank failures have happened in the 1990s.

According to the experiences in the inter-war period, we can infer that the prompt action in required collection and required redemption of non-performing assets might be effective in the recovery of financial intermediation.

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