



# **Interdependency in East Asia and the Post-Crisis Macroeconomic Adjustment in Korea**

**Hak K. Pyo**

**Seoul National University**



# Contents

1. Introduction
2. International Linkage and Interdependency of the Korean Economy
3. The 1997 Financial Crisis in Korea : A Retroactive Assessment
4. Macroeconomic Adjustment in the Post-crisis Recovery in Korea
5. The Post-crisis Structural Reforms in Korea
6. Conclusion



# 1. Introduction

- Asian Crisis - Recovery
- Resolution Strategy
- Korean model of economic development
  - Government Role
- Sustainability of Korean type



## **2. International Linkage and Interdependency of the Korean Economy**

- Volatility of investment and net exports
- Structure of interdependency
- Nam and Pyo(1997)
- Lee and Okamoto(2002) – HEM

**Table 1 Volatility Persistence, and Cyclical of Major Macroeconomic Indicators  
: Korea, US and Japan(1970 I – 1991 II)**

Volatility of Real Macroeconomic Indicators				
	$\sigma(y)$	$\sigma(c)$	$\sigma(i)$	$\sigma(NX/Y)$
Korea	2.72	1.24	8.94	1.80
US	1.85	1.37	5.87	0.49
Japan	1.33	1.22	3.63	0.92
	$\sigma(c)/\sigma(y)$	$\sigma(i)/\sigma(y)$	$\sigma(NX/Y)/\sigma(y)$	
Korea	0.46	3.29	0.66	
US	0.74	3.17	0.26	
Japan	0.92	2.73	0.69	

**Table 1 - Continued**

First Order Correlation Coefficients				
	$\rho(y)$	$\rho(c)$	$\rho(i)$	$\rho(NX/Y)$
Korea	0.65	0.67	0.68	0.68
US	0.88	0.87	0.92	0.77
Japan	0.80	0.69	0.87	0.85
Coefficients of Correlation with GDP				
	$\rho(c,y)$	$\rho(i,y)$	$\rho(NX/Y,y)$	
Korea	0.71	0.66	-0.13	
US	0.88	0.93	-0.47	
Japan	0.68	0.78	-0.26	

## Table 2 Changes in Trade Linkage Effects in East Asia

		Extracted Country		
		China	Japan	Korea
1985	China	41%	24%	1%
	Japan	59%	63%	69%
	Korea	0%	12%	31%
	Trade Linkage	100%	100%	100%
1990	China	60%	25%	0%
	Japan	36%	56%	66%
	Korea	4%	19%	33%
	Trade Linkage	100%	100%	100%
1995	China	47%	25%	15%
	Japan	39%	60%	48%
	Korea	14%	15%	37%
	Trade Linkage	100%	100%	100%

### **3. The 1997 Financial Crisis in Korea : A Retroactive Assessment**

- Necessity of Crisis prediction framework
- Model
  - Moral Hazard
  - Excess Competition



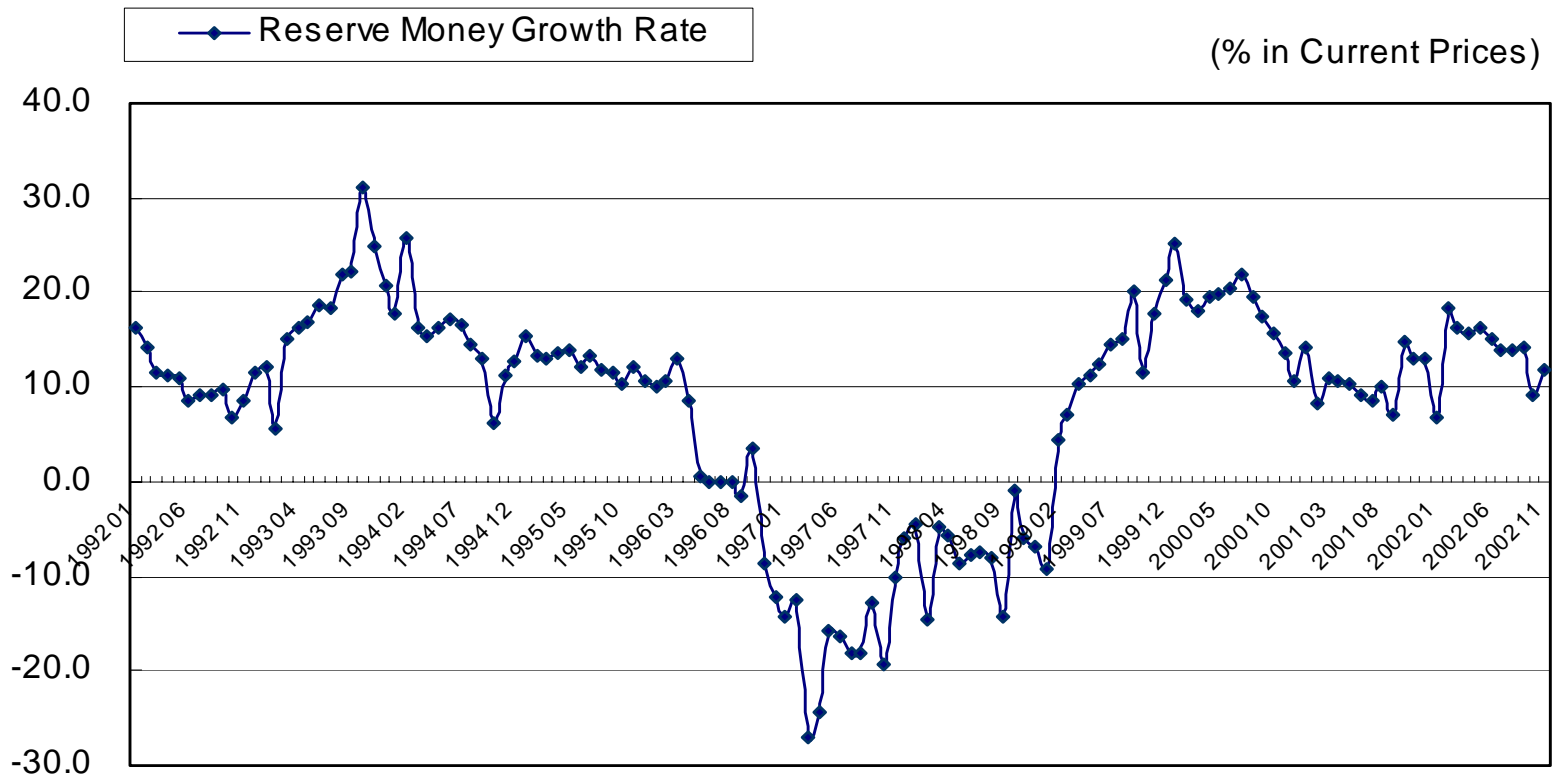


## **4. Macroeconomic adjustment in the Post-crisis Recovery in Korea**

- V-shaped Recovery
- Massive injection of public funds
- Depreciation of Won
- Structural Break



<Figure 2> Reserve Money: Growth Rate (1992.1~2002.11)



### Table 3 Summary Macroeconomic Indicators, Korea: 1993-2002

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
<b>Real GDP(percent change)</b>	5.5	8.3	8.9	6.8	5.0	-6.7	10.9	9.3	3.1	6.3
<b>Final domestic demand</b>	5.7	8.4	9.5	7.3	1.2	-13.8	7.4	7.7	2.5	5.8
<b>Consumption</b>	5.4	7.1	8.2	7.2	3.2	-10.1	9.4	6.7	3.7	6.2
<b>Gross fixed investment</b>	6.3	10.7	11.9	7.3	-2.2	-21.2	3.7	11.4	-1.8	4.8
<b>Saving and Investment(in percent of GDP)</b>										
<b>Gross national saving</b>	36.2	35.5	35.5	33.8	33.4	33.9	32.9	32.4	29.9	29.2
<b>Gross domestic investment</b>	35.4	36.5	37.3	38.1	34.4	21.3	26.9	28.3	26.8	26.1
<b>Prices(percent change)</b>										
<b>Consumer prices(average)</b>	4.8	6.3	4.5	4.9	4.4	7.5	0.8	2.3	4.1	2.7
<b>Consumer price(end-period)</b>	5.8	5.6	4.8	4.9	6.6	4.0	1.4	2.8	3.2	3.7
<b>GDP deflator</b>	7.0	7.6	7.2	3.9	3.2	5.0	-2.0	-1.1	1.3	1.7
<b>Employment and wages</b>										
<b>Unemployment rate</b>	2.8	2.4	2.0	2.0	2.6	6.8	6.3	4.1	3.7	3.1
<b>Wages, manufacturing (annual percent change)</b>	10.9	15.5	9.9	12.2	5.2	-3.1	14.9	8.6	5.8	12.0

**Consolidated central government(in percent of GDP)**

<b>Revenues</b>	18.6	19.1	19.3	20.4	20.6	21.8	22.4	26.0	26.4	26.6
<b>Expenditure</b>	18.3	18.7	19.0	20.2	22.1	26.0	25.1	24.8	25.1	22.9
<b>Balance</b>	0.3	0.4	0.3	0.3	-1.5	-4.2	-2.7	1.3	1.3	3.7

**Money and credit(end of period)**

<b>M3</b>	19.0	24.7	19.1	16.7	13.9	12.5	8.0	7.1	11.6	13.6
<b>Yield on corporate bonds</b>	12.6	12.9	13.8	11.9	13.4	15.0	8.9	9.3	7.0	6.56

**Trade(percent change)**

<b>Export volume</b>	14.5	13.6	22.3	17.4	14.8	19.2	12.0	20.6	0.7	14.9
<b>Import volume</b>	6.1	22.5	24.1	15.6	2.0	-25.1	29.0	19.0	-2.3	16.4
<b>Terms of trade</b>	-1.6	3.4	1.2	-9.5	-2.6	-4.5	-2.2	-12.4	-4.5	-0.6

**Balance of payments(in billions of U.S. dollars)**

<b>Exports, fob</b>	82.1	95.0	124.6	130.0	138.6	132.1	145.2	175.9	151.4	162.5
<b>Imports, fob</b>	79.8	97.8	129.1	144.9	141.8	90.5	116.8	159.1	138.0	152.1
<b>Current account balance</b>	1.0	-3.9	-8.5	-23.0	-8.3	40.4	24.5	12.2	8.2	6.1
<b>Current account balance (in percent of GDP)</b>	0.3	-1.0	-1.7	-4.4	-1.7	12.7	6.0	2.7	2.0	1.3

**Usable gross reserves**

<b>In billions of U.S. dollars (end of period)</b>	18.3	22.4	29.4	29.4	8.9	48.5	74.1	96.2	102.8	121.4
--	------	------	------	------	-----	------	------	------	-------	-------

<b>In months of imports of goods and services</b>	2.7	2.7	2.7	2.3	0.7	6.5	7.6	7.1	8.7	8.2
---	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

**External debt**

<b>In billions of U.S. dollars</b>	43.9	97.4	127.5	163.5	159.2	148.7	137.1	131.7	118.8	131.0
------------------------------------	------	------	-------	-------	-------	-------	-------	-------	-------	-------

<b>In percent of GDP</b>	12.7	24.2	26.0	31.4	33.4	46.8	33.8	28.5	27.9	27.5
--------------------------	------	------	------	------	------	------	------	------	------	------

**Exchange rate(period average)**

<b>Won per U.S. dollar</b>	802.7	803.4	771.0	804.8	951.1	1398.9	1189.5	1130.6	1290.8	1251.2
----------------------------	-------	-------	-------	-------	-------	--------	--------	--------	--------	--------


<b>Nominal effective exchange rate (1995=100, W/\$)</b>	100.4	100.5	100.0	98.7	108.0	144.7	131.1	123.3	132.6	n.a.
---	-------	-------	-------	------	-------	-------	-------	-------	-------	------

<b>Real effective exchange rate (1995=100, W/\$)</b>	102.9	100.9	100.0	97.9	106.8	133.7	122.3	114.6	121.7	n.a.
--	-------	-------	-------	------	-------	-------	-------	-------	-------	------

# 5. The Post-crisis Structural Reforms in Korea

## 1) Financial Restructuring Reforms

- Korean Public Fund Oversight Committee(KPFOC)
- Korea Deposit Insurance Corporation (KDIC)
- Korea Asset Management Corporation (KAMCO)

- 
- P & H Method
  - NPL
  - ROA, ROE
  - BIS



**Figure 3. Labor Productivity**

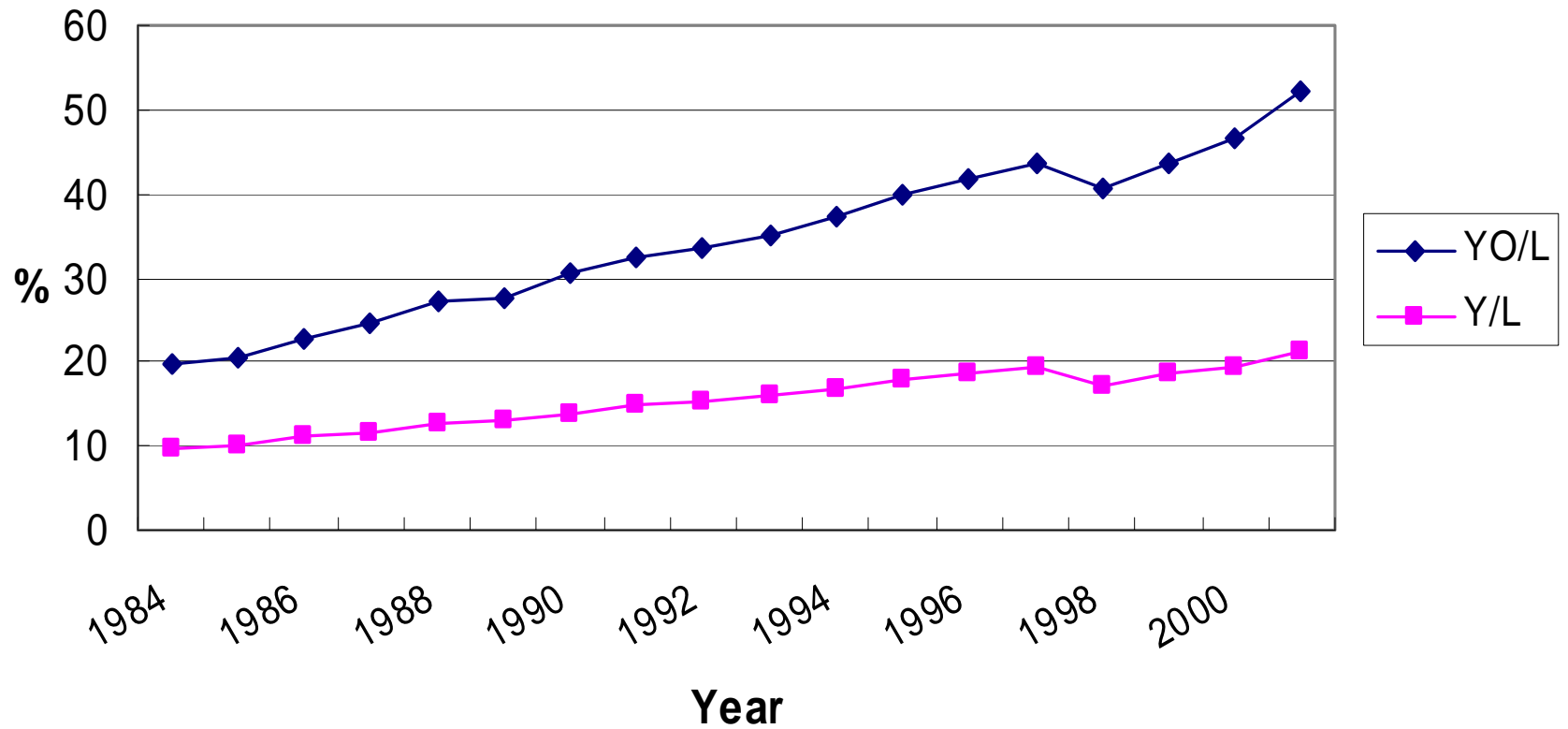
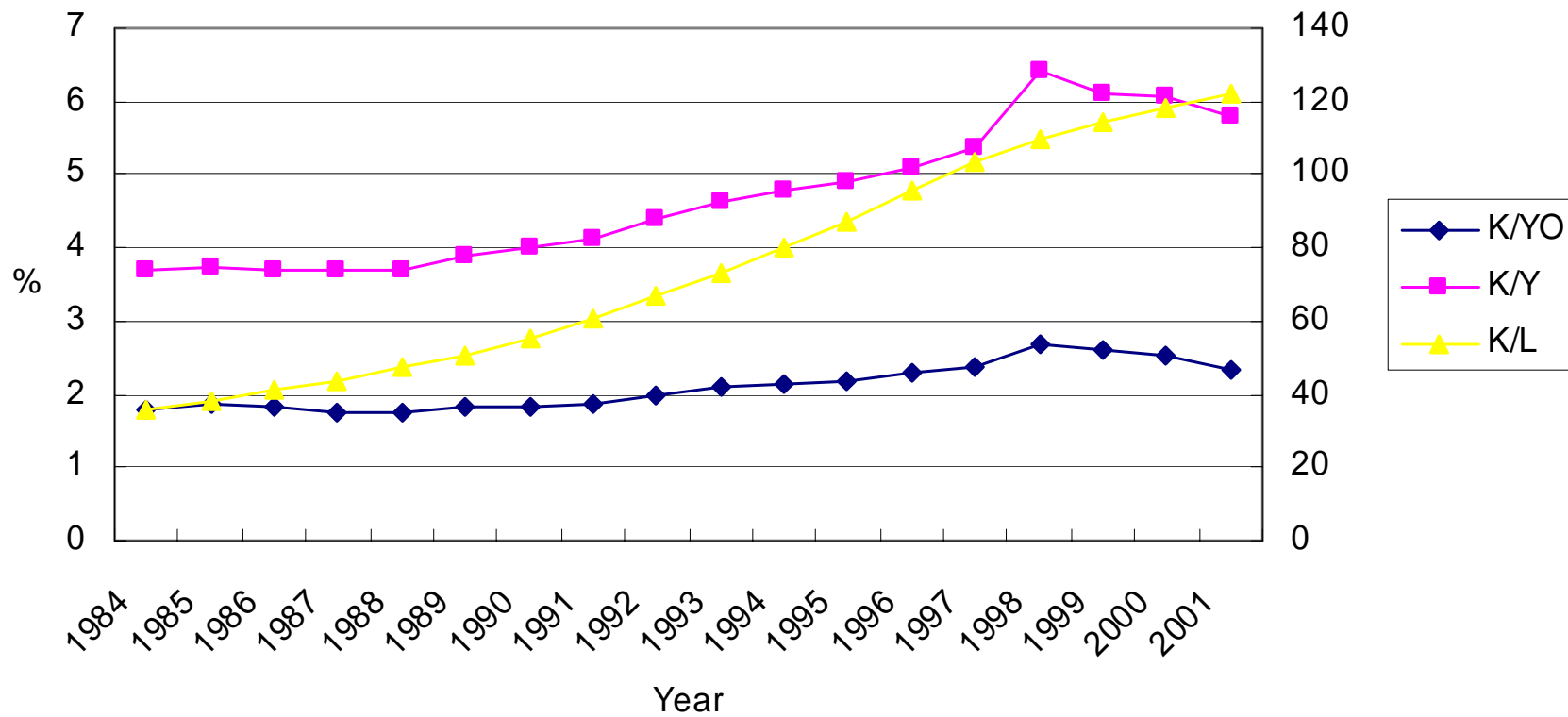


Figure 4. Capital-Output Coefficient / Capital-Labor Ratio



## Table 4 Gross Output Growth Accounting for Korea(1984-2000)

		Gross Output (YO)	GDP (Y)	Capital Input (K)	Labor Input (L)	Energy Input (E)	Intermediate Input (M)	TFP
1	<b>Agriculture</b>	2.21	1.46	7.29	-2.41	-15.69	2.82	-1.04
2	<b>Coal Mining</b>	-2.27	0.50	-0.14	-11.10	6.64	-3.42	-3.25
3	<b>Metal and Non-Metal</b>	-11.08	-8.22	-8.85	-32.68	-54.67	8.14	-9.04
4	<b>Oil and gas</b>	-1.09	2.83	-0.61	0.00	12.72	0	-9.47
5	<b>Construction</b>	6.21	4.53	13.08	2.55	15.16	10.47	-2.24
6	<b>Food</b>	4.87	4.51	7.61	1.71	10.63	7.42	-1.89
7	<b>Textile</b>	0.14	-2.05	5.1	-3.57	5.98	3.05	-1.98
8	<b>Apparels</b>	4.18	2.26	4.01	3.51	11.72	13.44	1.06
9	<b>Lumber and Wood</b>	4.03	3.26	4.76	-4.35	-6.5	6.05	0.10
10	<b>Furniture</b>	7.11	6.07	10.15	-0.33	-14.8	10.51	-0.74
11	<b>Paper Allied</b>	7.93	7.21	12.96	-4.22	1.97	7.41	0.97
12	<b>Printing,Publishing,Allied</b>	8.52	7.85	8	3.36	6.97	9.31	0.92
13	<b>Chemicals</b>	11.24	11.21	11.37	-3.82	10.45	8.48	1.46
14	<b>Petroleum Products</b>	9.48	9.69	11.71	-6.98	0.48	8.35	2.13
15	<b>Leather</b>	-1.00	-2.83	1.39	-8.49	-4.68	3.87	4.10
16	<b>Stone,Clay,Glass</b>	8.39	7.38	9.09	0.70	16.18	9.97	-0.18
17	<b>Primary Metal</b>	10.36	4.90	8.96	-1.48	6.43	8.79	2.68

<b>18</b>	<b>Fabricated Metal</b>	9.50	4.22	11.87	5.14	8.65	10.69	-0.19
<b>19</b>	<b>Machinery</b>	8.41	9.52	7.6	5.82	10.91	10.03	-0.30
<b>20</b>	<b>Electrical Machinery</b>	13.72	14.82	14.38	-22.60	7.17	15.05	3.30
<b>21</b>	<b>Motor</b>	18.55	17.49	11.96	3.43	9.61	16.57	6.81
<b>22</b>	<b>Transportation Equipment</b>	15.34	11.40	21.71	4.32	-4.74	5.74	4.78
<b>23</b>	<b>Instrument</b>	11.89	12.72	10.96	0.68	22.8	15.49	1.51
<b>24</b>	<b>Rubber</b>	14.77	14.76	11.98	-0.93	16	11.25	5.91
<b>25</b>	<b>Miscellaneous Manufacturing</b>	3.11	2.17	19.89	-0.73	15.96	4.47	-2.95
<b>26</b>	<b>Transportation</b>	8.38	6.98	7.23	3.31	1.81	9.62	1.04
<b>27</b>	<b>Communication</b>	13.31	12.43	12.68	3.44	12.9	12.02	2.55
<b>28</b>	<b>Electric Utility</b>	10.51	10.92	8.21	7.18	11.36	9.83	2.25
<b>29</b>	<b>Gas and Water Utility</b>	20.32	21.04	18.33	6.76	36.84	20.66	0.68
<b>30</b>	<b>Trade</b>	7.51	8.44	12.37	2.30	2.63	2.56	41.03
<b>31</b>	<b>Finance and Real Estate</b>	10.15	9.06	8.29	5.86	9.8	16.72	-2.55
<b>32</b>	<b>Ether Private Service</b>	9.73	9.65	12.03	4.94	7.86	6.82	2.57
<b>33</b>	<b>Public Service</b>	4.75	2.45	11.6	4.88	0	-16.6	0.80
	<b>Total</b>	8.51	7.76	9.96	1.54	3.16	8.68	2.17

## Table 5 Restructuring of Financial Institutions

Classification	No. of Inst. (1997.12)	Restructuring						
		Licenses Revoked	Mergers	Dissolutions	Total (B)	(B/A) (%)	New Entry	No. of Inst.
Banks	33	5	9	-	14	42.4	1	20
Non-Banks	2,068	121	150	361	632	30	62	1,498
MB	30	18	6	4	28	93.3	1	3
SC	36	5	3	1	9	25.0	17	44
IC	50	7	6	2	15	30.0	11	46
ITC	30	6	1	-	7	23.3	8	31
MS	231	74	27	26	127	55.0	12	116
CU	1,666	2	105	328	435	26.1	9	1,240
LC	25	9	2	-	11	44.0	4	18
Total	2,101	126	159	361	646	30.7	63	1,518

## Table 6 Uses and Sources of Public Funds

Use Source	Equity Participation	Capital Contribution	Deposit Payoffs	Asset Purchase	NPL Purchase	Total
Bonds	42.7	15.2	20.0	4.2	20.5	102.1
Recovered	3.9	1.2	6.1	4.4	16.6	32.2
Public Money	14.1	-	-	6.3	0.5	20.9
Otherwise	-	0.1	0.7	-	1.1	1.9
<b>Total</b>	<b>60.2</b>	<b>16.5</b>	<b>26.8</b>	<b>14.9</b>	<b>38.7</b>	<b>157.1</b>
<b>Classification</b>						
Banks	33.9	13.6	-	14.0	24.4	85.9
MB	2.7	-	17.2	-	1.6	21.5
SC, ITC	7.7	-	0.01	-	8.3	16.0
IC	15.9	2.8	-	0.3	1.8	20.8
CU	-	-	2.4	-	-	2.4
Savings Bank	-	0.1	7.2	0.6	0.2	8.1
Non-Banks	26.3	2.9	26.8	0.9	11.9	68.8
Foreign Banks	-	-	-	-	2.4	2.4
<b>Total</b>	<b>60.2</b>	<b>16.5</b>	<b>26.8</b>	<b>14.9</b>	<b>38.7</b>	<b>157.1</b>



## 2) Corporate Reforms

- Promoting greater competition
- Improving corporate governance
- Improving capital structure and profitability

**Table 7 Selective Indicators of Commercial Banks**

Year	No. of Employees	No. of Branches	NPLs	NPL Ratio	Operating Income	ROA	ROE	BIS Ratio
1996	103,913	5,105	118,739	4.1	0.33	0.3	3.8	9.1
1997	113,994	5,987	226,521	6.0	0.21	-0.9	-14.2	7.0
1998	75,677	5,056	212,160	7.4	-0.62	-3.3	-52.5	8.2
1999	74,744	4,780	273,938	8.3	0.26	-1.3	-23.1	10.8
2000	70,559	4,709	238,912	6.6	1.07	-0.6	-11.9	10.8
2001	68,360	4,776	109,760	2.9	1.35	0.8	15.9	10.8



**Table 8 30 Large *Chaebols'* High Debt-equity Ratios and Accounting Profitability**

	1995	1996	1997	1998	1999	2000
Average debt/equity ratio	347.5	386.5	519.0	369.1	306.6	218.7
Groups with debt/equity $\geq$ 1000%	3	3	4	2	2	2
Groups with negative equity	0	0	2	8	5	3
Groups with loss	13	12	18	n.a.	n.a.	n.a.

**Table 9 Manufacturing Sector Performance: 1990-2000**

	90-96. Avg.	97	98	99	2000
Debt-equity ratio	301.7	396.3	303.0	214.7	210.6
Operating income to sales ratio	7.6	7.4	8.8	7.8	8.6
Financial expenses to sales ratio	5.8	6.2	9.3	7.4	5.1
Ordinary income to sales ratio	2.6	1.4	-0.4	4.2	5.1

### **3) Reforms in Labor Relations**

- Labor market reform
  - Honorary Retirement
- Unemployment Policy
  - Subsidy for Job sharing
  - Reemployment

**Table 10 Statistics of Union Activity and Employment in Sectors with Strong Unions**

(A) Strikes by Issue in the 1990s						
	1991	1993	1997	1998	1999	2000
Wage increases	132	66	18	28	40	27
Unpaid wages/layoffs	12	12	3	26	22	9
Collective agreements	90	66	57	67	136	194
(Employment Issues) <sup>1</sup>	34	14	6	10	47	27
(B) Union Activity, 1995-2000						
	1995	1996	1997	1998	1999	2000
Number of Unions	6605	6424	5733	5560	5637	5698
Union Membership <sup>2</sup>	1615	1599	1484	1402	1481	1527
Strikes	88	85	78	129	198	250
Strike Participants <sup>2</sup>	50	79	44	146	92	178
Workdays Lost <sup>3</sup>	393	893	445	1452	1366	1894
(C) Employment in Sectors with Strong Unions (1,000 persons) <sup>4</sup>						
	1995	1996	1997	1998	1999	2000
30 Largest <i>Chaebols</i>	893	940	937	808	763	741
Public Enterprises	250	255	260	253	237	232
Financial Sector	418	441	450	411	392	388

**Table 11 Size of the Middle Class****(Unit: %)**

Year	Definition 1			Definition 2			Definition 3			Definition 4		
	Lower Class	Middle Class	Upper Class	Lower Class	Middle Class	Upper Class	Lower Class	Middle Class	Upper Class	Lower Class	Middle Class	Upper Class
1993	33.5	32.5	34.0	26.0	44.0	30.1	17.4	59.6	23.0	17.4	72.2	10.4
1994	35.7	31.2	33.2	26.6	45.0	21.2	17.8	61.2	28.5	17.8	72.6	9.9
1995	38.2	29.1	30.5	28.6	41.8	26.4	19.3	58.5	20.2	19.3	70.8	9.0
1996	36.0	31.0	33.0	22.8	43.7	28.6	18.1	60.8	21.2	18.1	73.9	8.0
1997	36.8	30.5	32.7	27.5	13.6	29.0	18.7	58.7	22.5	18.7	71.6	9.6
1998	38.8	24.6	36.6	31.8	35.9	32.3	21.0	53.0	26.0	21.0	66.6	13.4

**Table 12 Inequality of Wealth Distribution (Gini coefficient)**

Year	Including Insurance Policy Holdings				Excluding Insurance Policy Holdings	
	Net Wealth	Total Wealth	Real Wealth	Financial Wealth	Total Worth	Financial Assets
1993	0.571	0.451	0.689	0.593	0.451	0.578
1994	0.573	0.492	0.675	0.633	0.501	0.667
1995	0.577	0.488	0.657	0.600	0.499	0.634
1996	0.570	0.470	0.633	0.593	0.479	0.624
1997	0.600	0.488	0.652	0.610	0.501	0.648
1998	0.655	0.462	0.602	0.630	0.473	0.678