

# *Elites in the Industrialization of China and Japan, 1850-2000*

*Carl Mosk*

*March, 2009*

## *Abstract*

Countries commencing industrialization with relatively low levels of agricultural productivity, hence low wages, enjoy advantages that can also prove host to daunting challenges. The chief advantage is a relatively elastic supply of labor for manufacturing; the chief challenge is how to free up farm labor for factory employment through the raising of labor productivity in farming. Key to raising agricultural labor productivity is providing incentives to increase effort levels including hours worked – access to markets being crucial - and improving the quality of labor as measured by health indicators and educational attainment. The willingness of elites to promote improvements in infrastructure – physical infrastructure in the form of roads and railroads and hydroelectric systems; human capital enhancing infrastructure augmenting the educational attainment and health of populations in rural areas; and financial infrastructure – and to invest directly in factories is crucial to the process by which labor is transferred from farming to manufacturing activities. During the period 1850 to 1935 elites in China tended to resist the requisite changes while elites in Japan did not. This legacy played a crucial role in shaping the nature of post-1950 economic development in the two countries.

## *Outline*

### ***I The Fundamental Transformation of Labor Surplus Economies***

#### ***I.A The Growth Accounting Equation***

Table 1

#### ***I.A Agriculture***

- Surplus labor in terms of redundant workers not hours worked
- Increase in hours worked per worker releases labor from farming
- Increase in efficiency of work per hour worked releases labor
- From land augmentation to labor augmentation: from increasing use of irrigation, fertilizer input and high yield seed varieties to substituting machines and fixed capital for labor
- Landlordism is a problem
  - Partible inheritance in China
  - Impartible inheritance in Japan

Tables 2 and 3.

#### ***I.B Infrastructure and Manufacturing***

- Government, hence politics, plays a role through regulation, coordination, and direct investment and ownership
- Scale economies (e.g.: urbanization) plays an important role in driving total factor productivity (TFP) growth
- TFP growth important to the pace at which manufacturing absorbs surplus labor from the agricultural sector

### ***II Elites***

#### ***II.A Elites***            Chart 1

#### ***II.B Elites in the Response of China and Japan to “Opening Up” by the Western Powers, 1839-1916***

#### ***II.C Political Fragmentation and Militarization, 1920-1945***

#### ***II.D Elites in Decline, 1945-1955***

#### ***II.E Similarities and Dissimilarities between China and Japan, 1955-2000***

Tables 4 and 5.

**Table 1**

***Growth Accounting Equation and the Aggregate Production Function***

From the basic multiplicative aggregate Cobb-Douglas Production Function that assumes constant returns to scale (or rather captures them in the A variable):

$$Q = A(K^*)^\alpha(L^*)^\beta(LA^*)^{[1-(\alpha+\beta)]}$$

where:

Q = flow of output (GDP); K\* = flow of services from augmented capital;  
 L\* = flow of services from augmented labor; and LA\* = flow of services from augmented labor; and A = index of total factor productivity

We can derive the basic growth accounting equation:

$$G(Q) = G(A) + \alpha G(K^*) + \beta G(L^*) + [1-(\alpha+\beta)] G(LA^*).$$

In the table we discuss issues involving the measurement and interpretation of each of the five major variables, Q, A, K\*, L\* and LA\*.

Variable	How is the Variable Augmented or Adjusted?	Comments on Interpretation of Augmentation
G(Q) Aggregate Output Growth	Adjust the flows of commodity and service output for quality	Adjustment involves index number problems and assumptions about the values of components of products and services
G(A) Total Factor Productivity Growth		Underlying growth in total factor productivity are (1) scale economies (stemming from geographic externalities and those internalized by firms); (2) structural change in the composition of output; and (3) technological and organizational change. It is possible that all three factors are correlated with G(K*).
G(K*)	Through changes in the quality of capital, for instance due to the changing vintage (age) of capital.	Controversy surrounds the question of whether changes in technology are embodied in K*.

**Table 1 [Continued]**

Variable	How is the Variable Augmented?	Comments on Interpretation of Augmentation
$G(L^*)$	Raw labor input is augmented by changes in the efficiency of labor $e(L)$ . Underlying changes in the efficiency of labor are (1) changes in the demographic, educational composition of the labor force; and (2) changes in the health of the labor force; and (3) changes in hours worked (H) per worker; and (4) changes in incentives that impact work intensity per hour worked.	The four factors underlying efficiency of labor may be shaped by (1) the organization and management of production units; (2) the quality of managers; (3) the range of opportunities open to workers (shaped by geographic barriers and barriers to achieving socioeconomic mobility, for instance through acquiring education, hence by public policy)
$G(LA^*)$	Land – for instance agricultural land – is augmented through the application of fertilizers and irrigation. Land is also augmented by converting it from one use to another, for instance from wasteland or forest to arable land	Technological progress in agriculture may have a land augmenting bias due to the relative price of land services relative to labor services or due to the elasticities of supply of labor and land (e.g.: inelastically supplied land tends to promote augmentation of land.

In principle in analyzing the sources of growth it is important to decompose the growth of each of the three factors of production into their components, namely:

$G(K^*) = G(q_K) + G(K)$  where  $q_K$  captures the average quality of capital services and  $K$  is the flow of raw unadjusted capital services.

$G(L^*) = G[e(L)] + G(L)$ , where the average efficiency of labor  $e(L)$  depends upon hours worked  $H$ ; intensity of work effort per hour worked; the demographic structure of the labor force (shaped by age and gender composition); the level of education and health of the population, especially those employed in the labor force; and barriers to exploiting potential opportunities (e.g.: geographic isolation from markets may be a barrier); and incentives provided by the way production units are managed.  $L$  is raw labor input.

$G(LA^*) = G(q_L) + G(LA)$  where  $q_L$  is the average quality of land that depends upon land use practice.

*Table 2*

*Labor Force Supply and Demand in China and Japan, 1880-2004*

*A Japan*

<b>A.1 Workdays per Worker (wdpw) and per Male Equivalent Worker (wdpmew) in Japanese Agriculture, 1880-1940</b>					
Item	1880	1900	1920	1930	1940
wdpw	113	131	163	151	163
wdpmew	131	150	187	173	192

<b>A.2 Means and Standard Deviations for Hours Worked per Worker Unit (HPW) and for Consumption per Consumer Unit (CPC) in Yen for Farm Households in Japan Surveyed in 1929: Classified by the Ratio of Consumer Units to Worker Units (C/W) and by the Number of Worker Units per Cultivated Land Area (W/CL)</b>				
Group	HPW		CPC	
	Mean	Standard Deviation	Mean	Standard Deviation
<b>Classified by the C/W Ratio</b>				
$C/W < 1.1$	3020	988	267	107
$1.1 \leq C/W < 1.2$	3092	1127	230	69
$1.2 \leq C/W < 1.3$	2947	642	230	69
$1.3 \leq C/W < 1.4$	3177	977	204	57
$1.4 \leq C/W < 1.6$	3369	922	212	94
$1.6 \leq C/W$	3650	1043	187	61
All families	3170	959	219	81
<b>Classified by W/CL Ratio</b>				
$W/CL \leq .015$	3329	1094	264	110
$.015 \leq W/CL \leq .02$	3296	905	213	68
$.02 \leq W/CL \leq .025$	3243	970	233	94
$.025 \leq W/CL \leq .03$	3203	983	215	67
$.03 \leq W/CL \leq .035$	2896	796	214	74
$.035 \leq W/CL \leq .04$	3299	1460	201	69
$.04 \leq W/CL$	2779	767	177	54

*Table 2 [Continued]*

<b>A.3 Real Daily Wages: Nominal Wages Deflated by the Consumer Price Index (CPI), 1934-36 = 1, and Wage Differentials, Japan, 1885-1914</b>						
Period	Real Daily Wages				Wage Differential: Manufacturing/Agriculture	
	Agriculture		Manufacturing		Males	Females
	Males	Females	Males	Females		
1885-89	0.73	0.48	0.86	0.39	1.18	0.81
1890-94	0.87	0.59	0.80	0.40	0.92	0.68
1895-99	0.96	0.71	0.82	0.40	0.85	0.56
1900-04	0.91	0.70	0.91	0.42	1.00	0.60
1905-09	0.82	0.66	0.89	0.41	1.09	0.62
1910-14	0.88	0.67	0.90	0.44	1.02	0.66

<b>A.4 Nominal Daily Wages (Yen) Deflated by Price Index for the Sector (1934-36 = 1), Japan, 1885-1914</b>				
Period	Agriculture		Manufacturing	
	Males	Females	Males	Females
1885-89	0.65	0.42	0.51	0.23
1890-94	0.67	0.45	0.50	0.25
1895-99	0.75	0.55	0.54	0.26
1900-04	0.77	0.59	0.62	0.28
1905-09	0.72	0.58	0.60	0.33
1910-14	0.77	0.59	0.67	0.32

<b>A.5 Nominal Daily Wages (w), Nominal Labor Productivity (q) and Labor's Share in Value Added (S%), Japan, 1895-1914: Cotton Spinning and Cotton Weaving</b>								
Period	Cotton Spinning				Cotton Weaving			
	Wages (w)		q	S%	Wages (w)		q	S%
	Male	Female						
1895-9	0.22	0.14	0.63	25.7 %	0.24	0.13	1.53	9.8 %
1900-4	0.34	0.21	0.51	46.6	0.37	0.22	1.32	18.2
1905-9	0.43	0.26	0.92	32.1	0.44	0.27	1.06	27.6
1910-4	0.49	0.31	0.88	39.8	0.53	0.34	1.90	19.2

*Table 2 [Continued]*

<b>A.6 Percentage Shares of the Labor Force in Three Broad Sectors of the Economy (P = Primary, S = Secondary, and T = Tertiary) and Relative Labor Productivity in the Sector (Calculated as Percentage of GDP in the Sector Divided by Percentage of Labor Force in the Sector, Times 100), Japan, 1951-2000</b>						
Period	Percentage of the Labor Force in:			Relative Labor Productivity in:		
	P	S	T	P	S	T
1951-55	38.5 %	24.5 %	37.0	47.9	141.3	126.8
1956-60	32.9	26.7	40.4	45.2	142.0	117.0
1961-65	26.2	30.9	42.9	40.5	132.6	112.9
1966-70	19.8	33.8	46.3	39.1	121.4	110.5
1971-75	13.9	35.9	50.0	38.9	115.6	106.4
1976-80	11.5	34.7	53.6	38.7	109.5	107.4
1981-85	9.3	34.3	56.1	34.8	107.1	107.0
1986-90	7.9	33.6	58.0	33.2	106.6	106.0
1991-95	6.1	33.6	59.9	32.8	97.1	109.1
1996-2000	5.3	31.7	62.5	28.4	91.7	111.0

**B China**

<b>B.1 Percentage of Population of China in Agriculture and Non-Agriculture, 1933: Working, Students, Elderly or Unemployed and Idle</b>	
Category	Percentage of Total Population (or Percentage of Category if Noted)
Agricultural	
Agricultural	73.00 %
Working in Agriculture	42.46
Working Only in Agriculture	23.76
Children Under Age 7	14.24
Students	1.02
Persons Over Age 65	2.20
Unemployed or Idle	13.07 % (17.90 % of Agricultural Population)
Non-Agriculture	
Working Ages 7 – 64	27.0
Working in Factories	0.2 %
Working in Handicrafts	2.4
Children Under Age 7	5.3
Students Age 7 and Over	1.15
Unemployed or Idle	10.39 % (38.48 % of Non-Agricultural Population)

*Table 2 [Continued]*

<b>B.2 Percentage of China's Labor Force in Three Broad Sectors of the Economy (A = Agriculture or Primary, I = Industry or Secondary, and S = Services or Tertiary) and Relative Labor Productivity in the Sector, 1952-2000 <sup>(b)</sup></b>						
Year	Percentage of the Labor Force in;			Relative Labor Productivity in:		
	A	I	S	A	I	S
1952	84.0 %	7.0 %	9.0 %	59.5	300.0	322.2
1970	81.0	10.0	9.0	49.4	460.0	144.4
1980	69.0	18.0	13.0	43.5	272.2	161.5
1985	62.0	21.0	17.0	45.2	204.8	170.6
1990	60.0	21.0	19.0	45.0	200.0	163.2
1995	52.0	23.0	25.0	38.5	213.0	124.0
2000	50.0	51.0	27.5	32.0	226.7	120.0

<b>B.3 Percentage of Employed Labor Force in China in Primary (P), Secondary (S) and Tertiary (T) Sectors of the Economy; Percentage of the Employed Labor Force That is Urban (U) or Rural (R); and Percentage of the Employed Urban Labor Force in State Owned Enterprises (USOE), 1978-2004</b>						
Period	Percentage of the Employed Labor Force in:					SOE % of Urban Labor
	P	S	T	U	R	
1978-89	70.2 %	17.5 %	12.4 %	-	-	-
1980-84	67.2	18.5	14.3	-	-	-
1985-89	60.5	21.8	17.7	-	-	-
1990-94	57.8	21.9	20.3	27.0 %	73.0 %	60.5 %
1995-99	50.5	23.3	26.2	29.7	70.3	49.7
2000-04	49.2	22.1	28.7	33.6	66.4	29.6

**Notes:** See the heading in Panel A.6 above for the method of computing labor productivity in the sectors. Basically the A sector in Panel B.2 corresponds to the P sector in Panel A.6; the I sector in Panel B.2 corresponds to the S sector in Panel A.6; and the S sector in Panel B.2 corresponds to the T sector in Panel A.6. However these correspondences may not be exact.

**Sources:** Panel A.1 from page 61 of Mosk (1995). Panel A.2 from various tables in Mosk (1983). Panels A.3 – A.5 from page 113 in Mosk (2008). Panel A.6 from page 359 in Mosk (2008). Panel B.1 from pages 10-1 in Feuerwerker (1977). Panel B.2 from page 272 in Bramall and page 482 of Huang, Otsuka, and Rozelle (2008). Panel B.3 from page 168 in Cai, Park and Zhao (2008).



*Table 3*

*Agriculture in China and Japan, 1400-2006*

*A Land Use Patterns, Circa 1993*

Country	Land area (000 ha)	Arable land & permanent crop area	Proportion Arable (%)	Population (000s)	Arable Land per head of population
<b>A.1 Eurasian Regions with Long-standing Settled Agriculture</b>					
China	959,696	95,975	10.0 %	1,178,440	.08
Europe	487,696	135,705	27.8	506,910	.26
India	328,759	169,650	51.6	899,000	.19
Japan	37,780	4,463	11.8	124,753	.04
<b>A.2 Countries of Settlement</b>					
United States	980,943	187,776	19.1	293,172	.73
Canada	997,614	45,500	4.6	28,386	1.58
Australia	771,336	46,486	6.0	17,769	2.62
Brazil	851,197	48,955	5.8	158,913	.31

*B Agriculture in Japan, 1910-2004*

<b>B. 1 Indices (1960-64 = 100)</b>					
Period	Arable Land Area (IALA)	Paddy Fields Actually Planted (IPP)	Farm Households (IFH)	Adult Farm Household Members Fully Engaged in Farming (IFW) <sup>(a)</sup>	Rice Output (IRO)
1910-19	95.9	91.8	93.1	n.a.	63.6
1920-29	98.5	95.3	93.3	n.a.	69.5
1930-39	98.6	97.0	94.0	n.a.	74.3
1940-44	95.8	94.3	n.a.	n.a.	71.7
1955-59	96.7	98.9	n.a.	n.a.	93.0
1960-64	100.0	100.0	100.0	100.0	100.0
1965-69	97.8	99.4	93.4	79.2	106.9
1970-74	93.9	82.8	89.1	66.3	94.1
1975-79	90.9	81.2	82.9	55.5	98.3
1980-84	89.4	70.0	78.2	51.6	82.5
1985-89	87.9	67.0	73.4	49.9	85.1
1990-94	85.1	64.4	49.4	38.2	79.3
1995-99	81.6	58.7	43.9	32.6	77.3
2000-04	78.6	51.9	38.5	31.3	69.0

**Table 3 [Continued]**

<b>B.2 Relative Indices, Percentage of Arable Land in Paddy (ALP%) and Adult Farm Household Members Fully Engaged in Farming per Farm Household (FWPFH)</b>					
Period	Relative Indices (in Rice Production)			ALP%	FWPH
	Land Productivity (IRO/IPP)	Farm Household Productivity (IRO/IFH)	Adult Farm Worker Productivity (IRO/IFW)		
1910-19	69.3	68.0	n.a.	50.5 %	n.a.
1920-29	72.8	73.0	n.a.	51.1	n.a.
1930-39	76.6	77.7	n.a.	53.8	n.a.
1940-44	n.a.	n.a.	n.a.	53.9	n.a.
1955-59	n.a.	n.a.	n.a.	55.3	n.a.
1960-64	100.0	100.0	100.8	55.9	1.9
1965-69	107.5	114.6	135.6	57.5	1.6
1970-74	113.7	105.7	143.1	58.2	1.4
1975-79	121.1	118.6	177.3	56.7	1.3
1980-84	117.9	105.6	160.1	55.5	1.3
1985-89	127.1	116.0	170.5	54.6	1.3
1990-94	123.0	160.8	209.3	54.3	1.5
1995-99	131.8	176.0	237.1	54.6	1.4
2000-04	132.8	179.3	220.5	54.7	1.6

<b>B.3 Percentage Growth Rate for Inputs (Labor)</b>				
Period	Number of Workers		Workdays	
	Male	Female	Total	Per Worker
1935-45	-1.7	2.0	-0.9	-1.0
1945-55	1.5	0.3	1.3	0.4
1955-65	-3.5	-2.5	-2.7	0.3

<b>B.4 Percentage Growth for Inputs (Variable and Fixed Capital)</b>				
Period	Fixed Capital		Variable Capital (Current Inputs)	
	Machinery & Implements	Total	Fertilizers	Total
1935-45	-0.2	-1.4	-5.0	-6.6
1945-55	3.1	2.0	13.5	15.0
1955-65	11.5	7.8	3.6	8.5

**Table 3 [Continued]**

<b>B.5 Percentage Growth Rates of Relative Prices for Inputs Relative to Agricultural Output Price</b>						
Period	Labor and Land		Fixed Capital		Variable Capital (Current Inputs)	
	Labor Wages	Cultivated Land Prices	Machinery & Implements	Total	Fertilizer	Total
1920-30	1.9	2.9	0.3	1.3	-1.7	-1.2
1955-65	6.1	4.3	-3.2	-0.9	-5.0	-4.5
1960-70	7.2	-1.1	-7.1	-1.1	-5.4	-5.0

<b>B.6 Percentage Growth Rates of Productivities of Labor and Land</b>						
Period	Labor Productivity		Land Productivity		Relative Contribution to Labor Productivity Growth of Land Productivity Growth (%)	
	Per Male Equivalent (1)	Per Workday (2)	Per Paddy-field equivalent (3)	Per Hectare of Crop Area (4)	(3)/(1)	(4)/(2)
1935-45	-1.7	-0.9	-1.5	-0.7	88 %	78 %
1945-55	2.2	1.9	2.9	2.1	132	111
1955-65	6.9	6.5	3.4	4.3	49	66

**C Agriculture in China, 1400-2006**

<b>C.1 Growth Accounting for Growth in China's Grain Output, 1400-1957 (Assuming a Constant Level of Per Capita Grain Consumption)</b>						
Period	Annual Compound Growth Rates					Share of Total Factor Productivity
	Output	Labor	Land	Capital	Total Factor Productivity	
1400-1770	0.32 %	0.19 %	0.05 %	0.06 %	0.01 %	4 %
1700-1850	0.59	0.35	0.06	0.05	0.12	21
1850-1957	0.45	0.27	0.06	0.07	0.04	10

**Table 3 [Continued]**

<b>C.2 Indices (1950-54 = 100) for Agricultural Output and Grain Consumption, 1950-78</b>			
Item	1950-56	1957-63	1964-78
Sown Area			
Grain	102.5	100.8	98.2
Cotton	105.1	94.8	97.0
Yield per Hectare			
Grain	103.5	106.3	160.7
Cotton	105.6	125.6	217.1
Grain Output, Population, and Per Capita Output			
Grain Output	106.4	107.3	157.8
Population <sup>(b)</sup>	102.3	116.1	146.5
Per Capita Output	103.8	92.6	107.3

<b>C.3 Value Added (in 1987 Yuan)</b>					
Item	1933	1952	1957	1978	1995
Per Head	277	225	241	235	439
Per Worker	789	748	812	781	1591
Per Hectare Cultivated	1353	1185	1374	2265	5563

<b>C.4 Indices (1955 = 100) for Fertilizer Output, Fertilizer Consumption, and Fertilizer Imports (Tons)</b>			
Item	1955-59	1960-64	1965-66
Output	286.9	690.1	1345.6
Consumption	172.4	306.8	617.5
Imports	127.5	156.8	332.6

<b>C.5 Growth Rates for Value Added and Tons of Grain Produced</b>				
Period	Value Added (1980 Prices)		Value Added (Comparable Prices)	Tons of Grain
	Farming	Agriculture		
Collective Farming				
1955-81	2.8 %	3.2 %	2.6 %	2.8 %
1963-81	3.3	3.6	2.9	3.5
Family Farming				
1981-2006	4.5	5.6	4.2	1.3
1984-2006	4.3	5.5	3.9	1.0

**Table 3 [Continued]**

<b>C.6 Growth Rates of Farm Output, Input, and Total Factor Productivity</b>				
Item	1952-57	1957-78	1978-87	1987-94
Gross Farm Output	3.70 %	2.32 %	5.77 %	4.28 %
Farm Gross Value Added	3.05	1.72	5.52	3.62
Farm Inputs	6.36	2.54	4.35	4.83
Non-Farm Inputs	12.12	8.98	8.43	6.67
Farm Employment	1.35	1.92	0.49	0.58
Farm Labor Productivity	1.66	-0.19	4.99	3.05
Irrigated Area Cultivated	6.46	2.41	-0.16	1.32
Non-irrigated Land Cultivated	-0.79	-2.08	-0.6	-1.49
Augmented Land	1.79	0.18	-0.32	0.34
Other Capital	7.81	4.43	5.00	3.48
Total Factor Productivity	0.63	0.57	4.56	2.67

<b>C.7 Indices for Industrial Inputs into China's Rural Economy (1965=100)</b>			
Item	1962-64	1970-74	1975-78
Kilowatts of Power	64.6	300.0	646.9
Millions of Tons of Chemical Fertilizer	54.8	264.0	399.6
Cement (Millions of Tons)	37.7	311.1	575.9
Irrigation/Drainage Equipment	69.2	270.0	572.1
Tractors	75.8	328.2	704.6
Power Tillers	n.e	273.3	1222.2
Total Horsepower per Cultivated Hectare	76.7	310.0	692.5

**Table 3 [Continued]**

<b>C.8 Growth Rates for Agricultural GDP and Value Added Produced in Various Sub-sectors of Agriculture, 1970-2000</b>				
Item	1970-78	Reform Period		
		1978-84	1985-95	1996-2000
GDP	4.9 %	8.8 %	3.8 %	4.2 %
Grain	2.8	4.7	1.7	0.03
Rice	2.5	4.5	0.6	0.3
Wheat	7.0	8.3	1.9	-0.4
Total Cash Crop Area Sown	2.4	5.1	2.1	-0.4
Cotton	-0.4	19.3	-0.3	-1.9
Meat (pork, beef, poultry)	4.4	9.1	8.8	6.5
Fishery	5.0	7.9	13.7	10.2

**Notes:** (a) Farm household members aged 15 and over who work full time in farm production.

(b) The population estimates used here are those appearing in Maddison (2006: pg. 292).

n.e. = not estimated.

**Sources:** Panel A data from page 28 of Maddison (1998). Panel B.1 and Panel B.2 data from various tables in Japan. Ministry of Internal Affairs and Communications and Statistical Research and Training Institute (2009). Panel B.3 – Panel B.6 data from pages 248-9 in Mosk (2008). Panels C.1 and C.4 from pages 74 and 82 in Perkins (1969). Panels C.2 and C.8 from pages 472 and 479 in Huang, Otsuka and Rozelle (2008). Panels C.3 and C.6 from pages 71 and 75 in Maddison (1998). Panel C.5 from page 228 in Bramall (2009). Panel C.7 from pages 80-1 in Rawski (1979).

# *Elites*

## *Elites in Different Arenas May Overlap*

*Political/military*  
*Economic*  
*Cultural*

## *Competition and Cooperation*

*Elites compete with one another – within groups, between groups  
(elite solidarity is a myth)*

*As well, elites cooperate (in part for strategic reasons)*

## *Resistance, Disappearance, Transformation and Creation in Transition from One Regime of Elites to the Next*

*Resistance*                      *Depending on the opportunity cost of loss of  
power/economic benefits, elites resist the  
transformation from one regime of elites to the  
next*

*Disappearance*                *Some (most) elites lose elite status in the  
transition from one regime to the next*

*Transformation*              *Some elites from the old regime transform  
themselves into the new elites of the next regime*

*Creation*                        *New elites emerge in the next regime*

**Chart 1: Key Elites in the Industrialization of Japan and China, 1850-2000**

<i>Elites</i>	<i>Comments</i>
<b><i>Tokugawa Japan, circa 1850</i></b>	
Samurai, daimyo and shogunate (military/bureaucratic/political/ cultural elites)	Fundamentally hereditary not a meritocracy; competition between fiefs and between fiefs and shogunate; strong incentives to create and maintain infrastructure; lower samurai poor, thereby willing to jettison the system; relatively high taxation due to the costs of maintaining samurai and infrastructure; Samurai as warrior-officials.
Merchant house owning families and managers (economic/cultural elite)	Internal labor market system of recruitment; merit important
Rural landlords and merchants	Local elite; limited political clout outside of immediate jurisdiction
<b><i>Japan, 1870-1945</i></b>	
<i>Zaibatsu</i> owners and their high level managers; other entrepreneurs establishing a national presence (economic elite)	Some former samurai join the ranks of this group; some former merchant houses of late Tokugawa also join these ranks (the <i>fukoku</i> faction of <i>fukoku kyohei</i> “consensus agenda”; declining status during the 1930s as the militarists promote “command and control” policies, especially in the empire, promoting the <i>shin-zaibatsu</i> (new industrial groups like Nissan)
Military commanders	Former samurai play an important role in promoting military agenda (the <i>kyohei</i> faction of <i>fukoku kyohei</i> ); during the 1930s increasingly important in political decision making
Meiji oligarchs and architects of party system	Competition between oligarchs an important factor in the promotion of party government; other factors – <i>zaikai</i> and rural landlords; declining elite as democracy spreads with the extension of the franchise during the 1920s



**Chart 1 [Continued]**

<i>Elites</i>	<i>Comments</i>
<b><i>Japan, 1870-1945 [Continued]</i></b>	
Landlords	Play an important role in the diffusion of higher yield seed varieties and the promotion of rural infrastructure improvements (irrigation, railroads); after 1910 increasingly disengaged from rural affairs, increasingly becoming “parasitic” absentee landlords during the 1920s and 1930s, therefore finding their interests and landlord status under attack by tenant unions
Imperial Officials	Factionalized bureaucracy into conservative and liberal wings; responsive to political pressure from oligarchs, party leaders, and military commanders; cognizant of bureaucratic practices abroad, especially in Europe and North America
<b><i>Japan, 1945-2000</i></b>	
<i>Keidanren</i> and <i>Nikkeiren</i> leadership; high level managers of <i>keiretsu</i> and major owners/managers of highly successful companies like Toyota, Honda, Sony	Economic elite
Major Politicians	Highly factionalized; during the period of so-called “Miracle Growth” (1955-1970) leaders of factions in the Liberal Democratic Party strongly entrenched in rural Japan; declining status of the Liberal Democratic Party in the post-“Miracle Growth” period, in part due to political scandals, in part due to a shift of voting power from rural to urban districts
High Level Ministry Officials	Highly factionalized; declining status in the post-“Miracle Growth” era; responsive to political pressure from major politicians

*Chart 1 [Continued]*

<i>Elites</i>	<i>Comments</i>
<i>Qing China, 1850-1911</i>	
Imperial Officials (political/cultural elite)	Few in number; selected on the basis of intense competition in examinations; meritocracy though ranks of imperial officials largely drawn from gentry; economic and cultural elite as well as political elite committed to Confucian style government; very high opportunity cost to jettisoning Confucian based rule; benefit relatives through sharing of resources and influence in lineages; of declining importance in the final years of the Qing dynasty with changes in the examination system; officials as scholar-officials
Gentry (political/cultural elite)	Relatively numerous, often but not always a local economic elite owning and renting land; expected to mobilize resources to suppress local rebellions and banditry and to build and maintain infrastructure; due to competition and free-riding amongst gentry, infrastructure maintenance an on-going problem in a low taxation environment; committed to Confucian rule because gentry members tended to participate in the “lottery” to gain imperial official status for at least one member of their lineage
Compradors and Treaty Port Entrepreneurs (economic elite)	Employees of foreign owned enterprises active in the treaty ports; mainly located on China’s coastline, especially in south and in the Yangzi delta region (Shanghai, elite)
Military commanders, heads of banners and warlords	Military officers defending the dynasty’s interests mainly but not exclusively Manchu; warlords operated at the regional level
Manchu Court	Seat of imperial power; foreign dynasty exercising power primarily through imperial official bureaucracy and military garrisons

*Chart 1 [Continued]*

<i>Elites</i>	<i>Comments</i>
<b><i>Republican China, 1911-1949</i></b>	
Officials (cadres)	Operating with a combination of Confucian values and Western learning especially in science and engineering; factionalized
Landlords	Former gentry many still committed to Confucian values due to the importance of Confucian values for promoting local consensus and lineage practices; limited commitment to investing resources in financial institutions outside of their lineages
Warlords	Many committed to Confucianism; some aligned with Nationalist ( <i>Guomindang</i> ) politicians; some aligned with anti-landlord/anti-Confucian Communist Party, some aligned with the Japanese Army (in Manchuria after 1931, in Northern China after 1937)
Major Entrepreneurs	Especially concentrated in (former) treaty ports, especially in Shanghai, typically allied with Nationalist politicians although reluctantly due to onerous <i>likin</i> taxation imposed on them by the Nationalists
<b><i>Communist China, 1949-2000</i></b>	
Officials (Local and National Level State Officials)	Distrusted to a degree throughout Maoist period (1949-1976) and subjected to extreme criticism during Cultural Revolution with its strong anti-Confucian/anti-urban intellectual ideology;
Communist Party Political Leadership and Rural Cadres	New elite, factionalized along ideological and regional lines; after the late-1970s increasingly becoming both an economic and political elite; rural cadres instrumental in promoting the development of rural infrastructure, increasing hours worked, and attempting to enhance efficiency per hour worked in agriculture during the Maoist period (beginning with the attack on landlordism and the collectivization of agriculture during the 1950s)

***Selected Political/Military Responses to “Opening Up” by the Western Powers, China and Japan, 1839-1916***

Event	Comments
China	
First Opium War (1839-42)	(1) China forced to tolerate opium trade; (2) Under Treaty of Nanking treaty ports granting British extraterritorial rights signed; (3) Annexation of Hong Kong by British
Taiping Rebellion (1850-1862)	(1) Large scale revolt in China led by a convert to Christianity (promoted revision of examination system, redirecting from Confucian classics to the Bible), abolition of foot binding for women, socialization of land holdings; (2) Suppressed by Qing military aided by British and French; (3) Loss of life extensive, perhaps 20 million or more deaths
Second Opium War (1856-1860)	(1) Under Treaty of Tianjin British extraterritorial rights in treaty ports extended to all major powers; (2) new treaty ports created
First Sino-Japanese War (1894-1895)	(1) In Treaty of Shimonoski China recognized independence of Korea; ceded Liaodong Peninsula to Japan; (2) The Triple Intervention by France, Germany and Russia forced Japan to cede the territory back to China (Japan secured the territory after the Russo-Japanese War of 1904-1905); (3) Japan gains extraterritorial rights in Chinese treaty ports
Boxer Rebellion (1900-1901)	Anti-foreign, anti-Christian movement led to attack on foreign embassies and missionaries; (2) Suppressed by French, Russian, British, German, Italian and Austrian troops.
Reform of Examination System (1901-1905)	New subjects injected into civil service examinations
Collapse of Qing Dynasty (1911-1916)	Republic created followed by dictatorship by Yuan Shi-Kai
Twenty One Demands (1915-1916)	Demands made by Japanese government made in five groups, the Fifth Group effectively making China a dependency of Japan

***Selected Political/Military Responses to “Opening Up” by the Western Powers, China and Japan, 1839-1916 [Continued]***

Event	Comments
Japan	
Opening up in the 1850s	(1) Japan forced to sign Unequal Treaties according extraterritorial rights to Westerners and creating treaty ports
Civil War Leading to Meiji Restoration (1868)	Civil war between defenders of the shogunate government and those promoting the Restoration of the Emperor; Meiji oligarchy consists of small elite of samurai largely from Satsuma and Choshu fiefs (the Sat-Cho faction); the fiefs and the delineation of four different status groups was abandoned.
Meiji Constitution (1889)	Created Diet system, paved the way for parliamentary system with political parties; represented a compromise under the <i>fukoku kyōhei</i> (Wealthy Country/Strong Military) ideological umbrella between those promoting industrialization and those promoting military aggrandizement (the drive to regional hegemonic power) in Asia
Anglo-Japanese Treaties (1894, 1895)	(1) Brought to an end system of extraterritoriality enjoyed by British subjects, paving way for abolition of treaty port system; (2) guaranteed British neutrality in the event that war between Russia and Japan broke out
Russo-Japanese War (1904-1905)	Under the Treaty of Portsmouth (1905) Japan’s special position in Korea was acknowledged; Japan secured part of Sakhalin Island and became leaseholder over the South Manchurian Railway and the Kwantung Leased Territory in the southern portion of the Liaodong Peninsula including Port Arthur and Dalian (Dairen)

## ***The Opportunity Cost of Being a Successful Competitor in the Civil Service Examination System in Qing China was High:***

“An official’s position was also one of great power and prestige. From the district magistrate who .... held a vast authority in carrying out the orders of the central government, to the high court official, who influenced the formulation of imperial policy, the official represented the absolute power of the emperor. This position offered also the greatest opportunity for the rapid accumulation of wealth. Of all the activities open to the gentry, the holding of office was not only the most distinguished career but was also almost the only way to amass a large fortune. In imperial Chinese society it was taken for granted that officeholding and wealth usually went together. There was a common saying: ‘May you be promoted in office and become rich.’”

Chung-li Chang, *The Income of the Chinese Gentry* (Seattle: University of Washington Press, 1962, page 7.

Approximate Average Incomes of Selected Elites in Late 19<sup>th</sup> Century China

Position	Number	Average Income (in Taels)
Key provincial and local officials	1,701	36,918
Court officials	2,622	3,110
Military officers	7,464	1,257
Educational officials	5,043	1,500
Other provincial and local officials	6,000	4,500

**Source for data:** Page 42 of Chang (1962).

# *Prominent Amongst the Elites of Early Meiji Japan Were Members of the Old Elite*

## *Economic Elites*

*According to Hirschmeier (1964: pages 248-9) of the fifty leading entrepreneurs of the early Meiji period, 23 (46%) were former samurai, 12 were merchants (24%) and 13 (26%) were peasants*

*Two of the major financial cliques (zaibatsu) were powerful during the Tokugawa period (Sumitomo and Mitsui); the new Mitsubishi zaibatsu was the creation of a former samurai*

*Most of the paid-in capital for the new national banks consisted of bonds that had been issued to former samurai during the early Meiji period*

*Landlords were crucial in promoting rice improvement associations, the diffusion of the best practice planting and irrigation techniques, and the traditional seed varieties that generated the highest per hectare yields; as well they lobbied for the construction of roads and railroads leading in and out of their districts*

## *Political Elite*

*The Meiji oligarchs were former samurai*

*Former samurai were active in the newly created Army and Navy*

*The political parties were largely peopled by wealthy farmers and headed up by former samurai*

*Many of the bureaucrats during the Meiji period were former samurai*

## *Cultural Elite*

*Samurai were active in the “Dutch learning” phase at the close of Tokugawa Japan*

*Former samurai were numerous in the ranks of students of higher education (including at the University of Tokyo and at newly created academies that became private universities)*

*Elites in Decline, 1945-1955*

*Japan: Military Elites (To a Degree Using Command and Control Approaches in Manchuria during the 1931-1945 period)*

*Landlords (in decline from early 1920s)*

*Zaibatsu (in decline from the 1930s)*

*China: Landlords and gentry*

*Confucian officials*

*Compradors and capitalists*

*Warlords*



## ***The Chinese Communists Inherited a Low Productivity Agricultural Sector in Which Famine was Not Uncommon***

### **I Quotes from Walter Mallory, *China: Land of Famine* (New York: American Geographical Society)**

**Page 19:** “There is a tremendous labor surplus. With only an acre and a half to an average family of 5.7 members hundreds of labor days per family are wasted in the course of a year. Village industries tend to help matters somewhat; but poor transportation, lack of capital and lack of initiative have prevented their development to any substantial extent.”

**Page 68:** “It is said that the contents of the granaries were sold in 1912 in order to ‘defray the expenses of the revolution;’ but the granaries have not been restocked by the republican government, and this most important system is now abandoned.”

### **II Quotes from Philip Huang, *The Peasant Economy and Social Change in North China* (Stanford: Stanford University Press, 1985):**

**Page 190:** “For a capitalist enterprise, it could make no sense to continue investing in labor past the break-even point, resulting therefore in a negative return. For a poor peasant family farm with surplus labor and struggling on the margins of hunger, however, it made sense to continue using that labor as long as the marginal product of labor remained above zero. A person nose deep in water, we might say, would do almost anything to rise above the surface.”

**Page 195:** “The problem facing the poor peasants of the North China plain in the twentieth century, however, was not a scarcity of labor relative to employment opportunities, but the reverse: underemployment and an overabundance of labor.”

**Page 237:** “The reach of all the lineages described above was limited to the village community itself. The absence of well-elaborated lineage organizations also meant the absence of a critical integrative unit that might have cut across the boundaries between town and country, and between the gentry and the village commoners.”

*Selected Policy Shifts in China, 1950-1978*

Impact on Rural China		Impact on Urban China	
Policy	Comments	Policy	Comments
Transition to the Command and Control Economy, 1950-1955			
Agrarian Reform Law (1950) sets out land reform policy	Hours worked per worker increase; reduction in infant mortality (inoculation, midwives, public health campaigns)	Nationalization of some manufacturing establishments	Share of State Owned Enterprises (SOEs) increases in manufacturing; many of the new factories created in inland areas; emphasis on heavy industry, not textiles
The Command and Control Economy, 1955-1963			
Great Leap Forward and collectivization of agriculture	Great famine occurred in a number of districts of China; mortality increased overall (1958-1963); iron and steel production increased; land augmentation takes place due to scale economies in communes (e.g.: irrigation); transport infrastructure improved; mortality falls after early 1960s		
The Command and Control Economy, 1963-1978			
Socialist Education Movement (1963-1966) and Cultural Revolution (1966-1968)	Rural education promoted; commune and brigade industry promoted through industrial subsidies; chemical production increases and mechanization picks up; green revolution rice strains developed	During the Cultural Revolution rates of return on urban education fall; between 1968-1971 army suppresses Red Guards	Third Front movement promotes industry in interior regions; SOEs increase their share of manufacturing

*Table 4*

*Population, Education and Human Development in China and Japan, 1640-2004*

**A Population Size and Dynamics**

<b>A.1 Estimates of China's Population Size by Maddison, Various Indices, and Alternative Official Estimates (for the Period 1750-1850), 1640-2000</b>					
Year	Maddison Estimates				Alternative Official Estimate
	Number (1000s)	Index (1950 = 100)	Index (1760 = 100)	Index (1640 = 100)	
1650	123,000	22.5	44.8	94.6	-
1700	138,000	25.2	50.3	106.2	-
1750	260,000	47.6	94.7	200.0	179,539
1800	341,600	62.5	124.4	262.8	295,273
1850	412,000	75.4	150.0	316.9	429,931
1860	377,000	69.0	137.3	290.0	-
1870	358,000	65.5	130.4	275.4	-
1880	368,000	67.3	134.0	283.1	-
1890	380,000	69.5	138.4	292.3	-
1900	400,000	73.2	145.7	307.7	-
1910	423,000	77.4	154.0	325.4	-
1920	472,000	86.3	171.9	363.1	-
1930	489,000	89.4	178.1	376.2	-
1940	518,770	94.9	188.9	399.1	-
1950	546,815	100.0	199.1	420.6	-
1960	667,070	122.0	242.9	513.1	-
1970	818,315	149.7	298.0	629.5	-
1980	981,235	179.5	357.3	754.8	-
1990	1,135,185	207.6	413.4	873.2	-
2000	1,275,392	233.2	464.5	981.1	-

<b>A.2 Population Totals (P), Birth (b) and Death Rates (d) per thousand population, the Natural Rate of Increase (nri = b - d), and Urbanization (u%), China, 1950-84</b>					
Period	P (1,000s)	b	D	nri	u%
1950-54	570,328	37.3	16.7	20.6	12.1 %
1955-59	644,294	30.5	12.2	18.3	15.6
1960-64	677,974	31.7	14.3	17.4	18.3
1965-69	765,306	35.2	8.6	26.7	17.7
1970-74	870,816	29.3	7.4	21.9	17.2
1975-79	949,824	19.6	6.8	12.8	17.8
1980-84	1,012,576	19.1	6.6	12.5	20.8
2000	n.e.	n.e	n.e	n.e	36.2

*Table 4 [Continued]*

<b>A.3 Life Expectancy for Males (LFM) and Females (LFF), Infant Mortality Rate for Males (imrm) and Females (imrf), Total Fertility Rate (TFR), and Mean Household Size (MHS), China, 1929/31-2000</b>						
Date(s)	LEM	LFF	Imrm	imrf	TFR	MHS
1929-31	25.0	24.0	n.e.	n.e.	n.e.	n.e.
1950	42.2	45.6	145.9	130.2	n.e.	n.e.
1955	n.e.	n.e.	n.e.	n.e.	6.3	n.e.
1960	n.e.	n.e.	n.e.	n.e.	4.0	n.e.
1982	66.5	69.4	36.5	34.5	2.9	4.41
1990	66.9	71.0	32.2	36.8	2.3	3.96
2000	71.0	74.8	20.8	29.2	1.6	3.44

<b>A.4 Infant Mortality Rate (imr), Life Expectancy for Males (LEM) and for Females (LEF), Gross Reproduction Rate (grr) and Net Reproduction Rate (nrr), Japan, 1891/95 – 1996/2000</b>					
Period	imr	LEM	LEF	grr	nrr
1891-95	-	42.8	44.3	-	-.
1901-05	152.0	43.9	44.9	-	-.
1911-15	156.7	44.3	44.7	-	-.
1921-25	159.3	42.3	43.2	n.e.	n.e.
1926-30	136.6	44.8	46.5	n.e.	n.e.
1931-35	120.4	46.9	49.9	n.e.	n.e.
1946-50	65.3	54.8	58.4	2.06	1.69
1951-55	48.0	63.6	67.8	1.34	1.20
1956-60	35.9	65.3	70.2	1.01	0.95
1961-65	23.4	67.7	72.9	0.98	0.95
1966-70	15.4	69.3	74.7	0.99	0.96
1971-75	11.2	71.7	76.9	1.01	0.98
1976-80	8.4	73.4	78.7	0.87	0.86
1981-85	6.3	74.8	80.5	0.87	0.85
1986-90	4.8	75.9	81.9	0.80	0.79
1991-95	4.3	76.4	82.9	0.72	0.71
1996-2000	3.5	77.7	84.6	0.67	0.67

*Table 4 [Continued]*

<b>A.5 Population (P) and an Index for Population with 1950 = 100 (INDP), Birth (b) and Death Rates (d), the Natural Rate of Increase (nri), Urbanization (u%), Proportion of Population in the Six Big Cities (b6c%), Japan, 1600-2000</b>							
Period/Year	P (1,000s)	INDP	B	D	nri	u%	b6c%
1600	12,000	14.3	-	-	-	-	-
1650	17,180	20.4	-	-	-	-	-
1700	27,690	32.9	-	-	-	-	-
1720	31,280	37.2	-	-	-	-	-
1730	32,080	38.1	-	-	-	-	-
1750	31,100	37.0	-	-	-	-	-
1800	30,650	36.4	-	-	-	-	-
1850	32,280	38.4	-	-	-	-	-
1872	33,110	39.4	-	-	-	-	-
1886-90	39,130	46.5	28.8	20.8	8.0	-	-
1891-95	40,864	48.6	29.0	21.4	7.6	-	-
1896-1900	42,906	51.0	31.7	21.1	10.5	12.4	n.e.
1901-05	45,525	54.1	32.5	21.0	11.5	15.0	n.e.
1906-10	48,031	57.1	33.6	21.5	12.1	17.3	n.e.
1911-15	51,305	61.0	34.5	20.7	13.9	17.5	n.e.
1916-20	54,673	65.0	33.7	24.1	9.6	18.9	9.8
1921-25	58,158	69.1	34.7	21.9	12.8	21.6	11.1
1926-30	62,581	74.4	33.4	19.3	14.1	24.0	11.8
1931-35	67,377	80.1	31.6	17.9	13.7	33.0	18.3
1936-40	71,014	84.4	28.8	17.3	11.5	38.3	20.0
1941-45	73,116	86.9	31.2	16.3	14.9	n.e.	n.e.
1946-50	79,948	95.1	32.2	12.3	20.0	35.3	11.9
1951-55	80,065	95.2	21.9	8.7	13.2	56.3	15.9
1956-60	91,962	109.3	17.7	7.7	9.9	63.5	16.5
1961-65	96,403	114.6	17.5	7.2	10.3	68.1	17.3
1966-70	101,553	120.7	17.8	6.8	11.0	72.2	18.1
1971-75	109,062	129.7	18.7	6.5	12.2	75.9	16.9
1976-80	115,133	136.9	14.9	6.1	8.7	76.2	16.0
1981-85	119,342	141.9	12.6	6.2	6.4	76.7	15.7
1986-90	122,692	145.9	10.7	6.4	4.3	77.4	15.5
1991-95	124,888	148.5	9.8	7.0	2.7	77.4	15.0
1996-2000	126,216	150.0	9.5	7.5	2.0	78.7	15.2

*Table 4 [Continued]*

<b>A.6 The Pace of the Demographic Transition in Japan, 1930-1960: Values of Age Standardized Death Rates (asdr), Infant Mortality Rates (imr), and the Hutterite Index of Marital Fertility (<math>I_g</math>) for the Prefectures of Japan Classified by Percentage of Male Labor Force Engaged in Primary Industry in 1930 (pmlpi)</b>						
Mortality						
pmlpi	Age Standardized Death Rate (asdr)				Infant Mortality (imr)	
	1908	1930	1950	1960	1920	1960
Under 30 %	2572	1897	1075	712	184	24
30%-49%	2213	1921	1131	848	161	32
50%-54%	2404	1969	1184	765	169	35
55%-59%	2119	1825	1145	755	158	34
60% and over	2065	1985	1277	815	163	38
Fertility ( $I_g$ )						
pmlpi	Rural			Urban		
	1930	1950	1960	1930	1950	1960
Under 30 %	0.52	0.50	0.30	0.43	0.44	0.28
30%-49%	0.54	0.50	0.29	0.43	0.45	0.28
50%-54%	0.57	0.50	0.28	0.46	0.44	0.28
55%-59%	0.58	0.53	0.30	0.48	0.45	0.28
60% and over	0.60	0.56	0.42	0.50	0.49	0.29

**B The Biological Standard of Living and the Human Development Index**

<b>B.1 Male Standing Height (msh) at Ages 6, 12 and 18 and Estimates of the Human Development Index (HDI), Japan, 1901-2000</b>					
Male Standing Height (msh) at Ages:				Human Development Index	
Period	6	12	18	Year	HDI
1901-10	106.7	133.6	159.2	1910	0.61
1911-20	106.9	134.4	160.8	1920	0.64
1921-30	107.7	136.2	161.6	1930	0.65
1931-40	108.8	138.2	162.9	1940	0.70
1941-50	108.5	138.2	162.9	1950	0.69
1951-60	110.3	139.3	165.0	1960	0.75
1961-70	113.4	144.9	157.7	1970	0.83
1971-80	115.3	148.6	169.0	1980	0.89
1981-90	116.4	150.4	170.6	1990	0.90
1990-2000	116.8	152.2	171.1	2000	0.92

*Table 4 [Continued]*

**C Education**

<b>C.1 Average Years of Schooling in China and Japan (Years of Education per Person Aged 15-64) and the Ratio (Japan/China), 1950-1992</b>			
Year	China	Japan	Japan/China
1950	1.60	9.11	5.69
1973	4.09	12.09	2.96
1992	8.50	14.86	1.75

<b>C.2 Indices (1960 = 100) for the Number of Senior and Junior Middle Schools in Cities, Towns, and Rural Districts, China, 1964-78</b>						
Period	Senior Middle Schools			Junior Middle Schools		
	Cities	Towns	Rural	Cities	Towns	Rural
1964-65	99.3	100.0	100.0	105.2	94.5	94.4
1971-75	328.7	175.1	3,369.7	91.3	104.6	701.9
1976-78	540.6	277.3	7,483.9	77.9	133.1	1,250.9

<b>C.3 Years of Schooling Completed (SCY) and Estimated Rates of Return on Schooling: High School to College (COLR), High School to Technical School (TECR), Junior High to High School (HSR) and Primary to Junior High (JHR): Urban China, 1988-2001</b>					
Period	SCY	Estimated Rates of Return			
		COLR	TECR	HSR	JHR
1988-89	4.3	13.3 %	4.5 %	11.3 %	15.6 %
1990-94	5.2	20.3	9.9	11.4	14.2
1995-99	7.6	28.4	13.6	17.1	14.3
2000-01	10.2	38.0	17.0	21.0	15.1

<b>C.4 Estimated Rates of Return to Schooling by Ownership Sector, China, 1988-2001</b>			
Period	State Sector	Urban Collective Enterprises	Non-public Enterprises
1988-89	3.4 %	4.6 %	8.4 %
1990-94	4.3	4.1	9.4
1995-99	6.6	6.4	10.6
2000-01	8.8	8.0	11.6

**Table 4 [Continued]**

<b>C.5 Advancement Rates from One Level to the Next Higher, China, 1980-99</b>					
Period	From Primary to Junior Secondary	From Higher Secondary Schooling to Institutions of Higher Education			Total [1] + {2}
		From General Secondary [1]	From Technical Secondary, Teaching Training Secondary and Vocational Training Secondary [2]		
1980-84	68.3 %	12.4 %	9.9 %		22.3 %
1985-89	68.9	26.6	17.6		44.3
1990-94	78.3	34.0	19.3		53.3
1995-99	89.6	48.4	22.5		22.5
From Junior Secondary to Higher Secondary					
Period	To General Secondary	To Other Higher Secondary			Total
		Technical Secondary	Teaching Training Secondary	Vocational Training Secondary	
1980-84	30.0 %	2.7 %	1.9 %	5.5 %	40.1 %
1985-89	23.1	4.5	2.1	10.6	40.2
1990-94	21.5	6.2	2.3	13.4	43.4
1995-99	22.9	8.8	2.2	14.2	48.1

<b>C.6 School Enrollment Rates for Children Aged 12-18 in China, 1989 and 2000</b>				
Age (Group)	1989		2000	
	Male	Female	Male	Female
12-13	93.1 %	92.7 %	96.8 %	92.2 %
14-15	77.4	68.9	84.9	82.9
16-17	38.3	31.2	64.7	57.9
18	17.2	16.1	34.5	40.0



*Table 4 [Continued]*

<b>C.7 Growth in the Number of Teachers and the Number of Students in Various Types of Schools, Japan, 1886-1940</b>						
Type of School	Teachers			Students		
	1886-1900	1901-20	1921-40	1886-1900	1901-20	1921-40
Elementary	0.1 %	4.0 %	2.4 %	2.4 %	3.6 %	2.0 %
Middle (Male)	12.7	6.0	19.4	17.5	5.8	5.3
Middle (Female)	19.4	20.2	7.3	40.7	21.1	8.9
High School (Male)	28.7	1.3	8.7	18.1	2.2	6.2
University	2.9	9.9	13.5	6.9	9.0	15.0
Vocational (Regular)	23.3	13.4	8.0	31.0	15.0	9.2
Vocational (Continuance)	n.e.	24.5	24.5	n.e.	59.9	6.3

<b>C.8 Estimates of the Demand and Supply of Engineers in Japan, 1891-1940</b>				
Period	Supply: Students of Higher Education in Science and Engineering		Estimated Growth in Demand <sup>(a)</sup>	Estimated Demand Growth minus Supply Growth
	Percentage of All Higher Education Students	Estimated Growth Rate of Graduates in Science and Engineering		
1891-95	15.8 %	-13.7 %	20.5 %	+34.2
1896-1900	10.9	3.1	4.3	+10.5
1900-05	7.7	12.1	14.4	-5.7
1906-10	7.8	17.6	16.9	-8.8
1911-15	10.2	11.5	13.3	-4.5
1916-20	13.1	10.1	16.1	-1.7
1921-25	14.2	17.3	11.4	-11.2
1926-30	15.7	2.1	7.1	-0.1
1931-35	11.8	8.3	6.1	-8.1
1936-40	14.3	3.7	13.9	+4.3

*Table 4 [Continued]*

<b>C.9 Enrollment Rate for Compulsory Schooling (COENR), and Advancement Rates: From Upper Secondary Schools to High Schools (HSAD); From High Schools to Universities (UNAD); From High Schools to Junior Colleges (JCAD); and From High Schools to Universities or Junior Colleges (UNJCAD), Japan, 1950-2004</b>					
Period	COENR	Advancement Rates			
		HSAD	UNAD	JCAD	UNJCAD
1950-54	99.7 %	47.0 %	7.9 %	2.1 %	10.0 %
1955-59	99.8	52.7	8.3	2.1	10.4
1960-64	99.8	64.0	11.0	3.1	14.1
1965-69	99.8	74.7	13.3	5.0	18.3
1970-74	99.9	86.9	21.3	8.3	29.6
1975-79	99.9	93.0	26.8	11.3	38.1
1980-84	100.0	94.1	25.3	11.0	36.2
1985-89	100.0	93.9	24.9	11.4	36.3
1990-94	100.0	95.0	26.9	12.5	39.4
1995-99	100.0	95.9	35.0	12.2	47.2
2000-04	100.0	96.0	40.8	8.3	49.0

**Notes:** n.e. = not estimated.

(a) Growth in demand for engineers is based on combining growth in the number of employees in railroads and public utilities with the growth in prime mover horsepower installed in manufacturing.

**Sources:** Panel A.1 from page 169 of Maddison (1998) and from pages 281-82 of Ho (1959). Panel A.1 from page 15 of Poston and Yaukey (1992) and from page 138 of Wang and Mason (2008). Panel A.3 from page 295 of Bramall (2009), from page 228 of Poston and Yaukey (1992) and from page 138 of Wang and Mason. Panel A.4 from pages 357-8 in Mosk (2008). Panel A.5 from page 38 of Miyamoto (2004) and page 357 in Mosk (2008). Panel A.6 from page 296 in Mosk (2008). Panel B.1 from page 366 in Mosk (2008). Panel C.1 from page 63 in Maddison (1998). Panel C.2 from page 188 in Bramell (2009). Panel C.3 from page 186 in Cai, Park and Zhao (2008). Panel C.4 from page 207 in Cai, Park, and Zhao (2008). Panel C.5 from page 231 in Hannum, Behrman, Wang and Liu (2008). Panel C.6 from page 236 in Hannum, Behrman, Wang and Liu (2008). Panel C.7 from pages 46-7 in Mosk (1995). Panel C.8 from page 83 in Mosk (1995). Panel C.9 from Japan. Ministry of Internal Affairs and Communications and Statistical Research and Training Institute (2009).

*Table 5*

*Growth Accounting for Japan, Hong Kong, South Korea, Taiwan and China, Mainly Post-1950*

*A Japan*

*A.1: Long-Run Estimates, 1888-1990 for the Growth in Labor Productivity*

Period	[1] Capital- Income Share	[2] Labor Productivity	[3] Capital- labor ratio	[4] Total Factor Productivity (TFP) Growth	[5] Contribution of TFP Growth [4]/[2] (%)
<b>A.1.1 Pre-World War II</b>					
1888-1900	0.33	2.08	5.74	0.19	9 %
1900-20	0.39	2.68	6.07	0.31	12
1920-37	0.43	2.29	2.75	1.11	48
1928-37	0.47	3.04	2.23	1.99	65
<b>A.1.2 Post-World War II</b>					
1958-70	0.33	8.19	11.60	4.36	53
1970-90	0.28	3.78	7.44	1.70	45

*A.2 Estimates of Sources of Growth of National Income, 1953-71*

<b>A.2.1 Growth in Income, Total Factor Input and Capital</b>						
National Income (Output)	Total Factor Input	Capital				
		Total	Inventories	Nonresidential Structures & Equipment	Dwellings	International Assets
8.81	3.95	2.10	0.73	1.07	0.30	0.00
<b>A.2.2 Growth in Land and Labor</b>						
Land	Labor					
	Total	Employ- ment	Hours of Work	Age-Sex Composition	Education	Unallocated
0.00	1.85	1.14	0.21	0.14	0.34	0.02
<b>A.2.3 Total Factor Productivity Growth</b>						
Total (Growth in Output per Unit of Total Input)	Advance in Know- ledge & Innovat- ion	Economies of Scale	Improved Resource Allocation			
			Contraction of Agricultural Employment	Contraction of Non- Agricultural Self Employment	Reduction of International Trade Barriers	
4.86	1.97	1.94	0.64	0.30	0.01	

*Table 5 [Continued]*

**A.3 Sector Specific Estimates of Total Factor Productivity Growth, 1961-1995**

<b>Top Ten (Over 1961-95 Period)</b>			<b>Bottom Ten (Over 1961-95 Period)</b>		
Sector	1961-73	1961-95	Sector	1961-73	1961-95
Air Transportation	6.95 %	3.11 %	Water Supply	-3.92 %	-2.12 %
Electric Machinery	4.18	2.93	Other Industries	-2.85	-2.05
Gas	2.86	2.36	Publishing	-2.32	-1.49
Trade	4.54	2.32	Agriculture	-2.24	-1.43
Precision Machinery	3.39	2.19	Education	2.32	-0.63
Communications	1.79	2.01	Railway Transportation	0.67	-0.59
Other Mining (Not Coal)	5.45	1.73	Coal	-0.63	-0.52
Chemicals	2.91	1.65	Building & Construction	-0.94	-0.34
Vehicles	2.47	1.53	Foods	-0.08	-0.29
Public Services	3.91	1.46	Medical Services	0.25	-0.22

*Table 5 [Continued]*

**B** *Estimates for the Growth in Labor Productivity: Hong Kong, South Korea and Taiwan, 1960-1999*

Period	[1] Capital- Income Share	[2] Labor Productivity	[3] Capital- labor ratio	[4] Total Factor Productivity (TFP) Growth	[5] Contribution of TFP Growth [4]/[2] (%)
<b>B.1 Hong Kong</b>					
1966-70	0.34	4.1	5.9	2.1	51 %
1970-80	0.358	6.0	5.4	4.0	67
1980-90	0.399	5.7	6.5	3.2	55
1990-99	0.391	1.9	6.5	-0.7	-36
<b>B.2 South Korea</b>					
1970-80	0.478	3.6	9.6	-1.0	-27
1980-90	0.429	6.2	8.7	2.5	40
1990-99	0.389	4.4	8.6	1.1	25
<b>B.3 Taiwan</b>					
1960-70	0.485	7.0	10.9	1.7	24
1970-80	0.476	5.4	10.7	0.3	2
1980-90	0.435	6.2	6.7	3.2	52
1990-99	0.417	6.3	8.6	2.7	43

*Table 5 [Continued]*

**C China**

**C.1 Growth Accounting Estimates for China, 1952-2005  
Contributions to Growth of National Domestic Product (GDP)**

<b>C.1.1 Growth of Output and Inputs</b>					
Period	Growth in GDP	Average Growth of Inputs			
		Capital	Raw Labor	Education-Enhanced Labor	Total Factor Productivity Growth (TFP)
1952-2005	7.0	7.7	1.9	2.6	2.1
<b>1952-78</b>					
1952-78	4.4	5.8	1.9	2.5	0.5
1952-57	6.5	1.9	1.2	1.7	4.7
1957-78	3.9	6.7	2.0	2.7	-0.5
1957-65	2.4	5.2	1.5	2.1	-1.0
1965-78	4.9	7.7	2.4	3.1	-0.2
<b>1978-2005</b>					
1978-2005	9.5	9.6	1.9	2.7	3.8
1978-85	9.7	9.2	3.4	4.5	3.2
1985-90	7.7	6.9	2.5	2.9	3.1
1990-95	11.7	9.1	1.4	1.9	6.7
1995-2000	8.6	10.5	0.9	1.6	3.2
2000-05	9.5	12.6	1.0	1.8	3.1
<b>C.1.2 Percentage Shares of GDP Growth Attributable to:</b>					
	Capital	Education-Enhanced Labor	Total Factor Productivity Growth (TFP)		
1952-2005	47.7 %	21.4 %	30.9 %		
1952-78	56.3	32.7	11.0		
1978-2005	43.7	16.2	40.1		

**C.2 Various Estimates of Total Factor Productivity Growth, 1980s and 1990s, Range <sup>(a)</sup>**

Data Used	1980s	1990s
National Level GDP Data	2.1 – 3.7 (4 estimates)	0.3 – 2.8 (4 estimates)
Provincial Level GDP Data	0.4 – 5.5 (4 estimates)	1.8 – 6.3 (3 estimates)
Industry Level Data	3.1 – 6.5 (2 estimates)	0.5 – 3.8 (2 estimates)

*Table 5 [Continued]*

**C.3 Estimates of Total Factor Productivity Growth in Independent-Accounting Industrial Enterprises, 1980-1996 <sup>(b)</sup>**

Period	State Owned Enterprises	Collectively Owned Enterprises	Other Domestic Enterprises	Foreign Invested Companies
1980-84	2.1	3.1	n.a.	n.a.
1984-88	3.8	5.2	n.a.	n.a.
1988-92	2.1	3.1	2.1	1.1
1992-96	-1.1	4.3	3.1	0.7
1980-96	1.7	3.9	n.a.	n.a.

**Notes:** (a) Some of the estimates for the 1980s cover the period from the late 1970s until the early 1990s. For the 1990s estimates for the second half of the decade tend to be lower than those for the first half of the decade.

(b) n.a. = not available.

**Sources:** For Panel A.1 page 34 of Kim (2001). For Panel A.2 page 98-9 of Denison and Chung (1976). For Panel A.3 pages 173-4 of Nakajima, Nomura, and Matsuura (2004). For Panel B page 36 of Kim (2001). For Panel C.1, page 839 of Perkins and Rawski (2008). For Panel C.2 page 416 of Bramall (2009). For Panel C.3 page 540 of Huang (2008).