



# Measuring Economic Performance in Transition Economies: Some Lessons from Chinese Experience

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## Slide 1

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## **Transition countries experience huge challenges in transition to System of National Accounts**

- › Measurement of economic growth
- › Measurement of levels of economic performance relative to other countries
- › Measurement of the sources of growth
- › Growth projections



## Titles of books

- › Angus Maddison (1998), *Chinese Economic Performance in the Long Run*, Development Centre Studies, OECD, Paris.
- › Angus Maddison (2007), *Chinese Economic Performance in the Long Run, 960-2030 AD*, Development Centre Studies, OECD, Paris, second edition.
- › Angus Maddison (2007), *Contours of the World Economy, 1-2030 AD: Essays in Macroeconomic History*, Oxford University Press.



## A comparativist approach to economic growth

- › Does not take official estimates of GDP for granted
- › Construction of national accounts in western countries has benefited from independent estimates by scholars and institutions (e.g. OEEC/OECD)
- › Similar scrutiny for long term growth estimation in many advanced economies (Maddison, 1995)
- › Groningen Growth and Development Centre does carefully assess national accounts measures world wide
- › Transition countries can also benefit from independent scholarly work



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# Measurement of economic growth in China



## Measurement of growth before transition

- › Material Product System excluded “non-productive” service activities
- › Two measures of performance:
  - Total product of society  $\approx$  gross output
  - Net material product excludes intermediate inputs except non-material services
- › Measurement of real output in terms of “comparable prices”  $\neq$  constant prices





## **Western style measures of GDP growth used by the CIA for former communist economies**

- › Abram Bergson converted Soviet material product into western style GDP measures for the USSR
- › Real GDP former USSR, 1950-1990, average growth, official: 6.1% vs. CIA: 3.5% per year (1950-1990)
- › Similar techniques used for East European countries by Thad Alton
- › CIA measures of Chinese economic performance were never comprehensive and of poor quality

## Maddison's measures of GDP in China

- › Agriculture: prices and quantities for 125 crop and livestock items; fisheries and forestry on official series; deducting intermediate input to arrive at value added
- › Industry based on Wu (1997, 2002) using physical quantities and value added weights from 1987 I/O table
- › Construction uses official estimates
- › Transport & communication, commerce and restaurants: Liu and Yeh (1965) for 1952-57 linked to pre-2006 revision of official estimates from 1957-2003
- › Non-material services based on employment estimates, using zero-productivity assumption (SNA, 1993)  $\leftrightarrow$  NBS estimate of 5.1% productivity growth from 1978-2003
- › 1987 I/O weights to obtain aggregate at constant prices



## Comparison of Maddison's and Official Estimates of GDP (1987 yuan)

	Agriculture	Industry	Commerce	Transport & Comm.	Commerce & Restaurants	Non-material services	Total GDP
1952 Maddison	127,891	17,796	3,658	5,183	14,272	45,486	214,286
Official	112,038	11,111	3,658	3,637	11,225	13,879	155,548
Maddison/Official	1.14	1.60	1.00	1.43	1.27	3.28	1.38
1978 Maddison	225,079	219,314	22,292	23,617	33,383	131,448	655,133
Official	190,577	188,214	22,292	23,617	33,383	58,972	517,055
Maddison/Official	1.18	1.17	1.00	1.00	1.00	2.23	1.27
2003 Maddison	679,821	2,246,790	231,926	305,202	356,931	514,495	4,335,165
Official	572,302	2,836,009	231,926	305,202	356,901	801,926	5,104,266
Maddison/Official	1.19	0.79	1.00	1.00	1.00	0.64	0.85

Official estimates for 1952-1978 are based on NBS & Hitotsubashi University estimates (1997); 1978-1993 official from NBS, China Statistical Yearbook



## Comparison of Maddison's and Official Estimates of GDP Growth Rates (annual average)

		Agriculture	Industry	Commerce	Transport & Comm.	Commerce & Restaurants	Non-material services	Total GDP
1952-1978	Maddison	2.2	10.1	7.2	6.0	3.3	4.2	4.4
	Official	2.1	11.5	7.2	7.5	4.3	5.7	4.7
Diff. Official - Maddison		-0.1	1.4	0.0	1.5	1.0	1.6	0.3
1978-2003	Maddison	4.5	9.8	9.8	10.8	9.9	5.6	7.9
	Official	4.5	11.5	9.8	10.8	9.9	11.0	9.6
Diff. Official - Maddison		0.0	1.7	0.0	0.0	0.0	5.4	1.7

Official estimates for 1952-1978 are based on NBS & Hitotsubashi University estimates (1997); 1978-1993 official from NBS, China Statistical Yearbook



## Assessment of economic growth

- › Maddison estimates are below official production-based GDP estimates mainly due to lower estimates for industry and in non-material services
- › Official expenditure GDP shows faster growth than official production-based GDP estimates, but lacks volume series and has inadequate breakdown of investment
- › Production estimate is more reliable, and the true series is likely to be lower than official series
- › Overestimation of official GDP series is largely due to remnants of pre-transitional statistical system
- › Official estimates should not be used by international agencies, press and in political discourse without a cautionary note



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# Measurement of levels of economic performance



## Comparative levels require adjustment for relative price levels between countries

- › Use of exchange rates is misleading:
  - assumes no differences in relative price levels
  - reflects prices of traded items only
  - does not correct for undervaluation of China's currency
- › Multilateral expenditure-based purchasing power parities (PPPs) from ICP are not available for China in 1990
- › Maddison used bilateral China-US expenditure-based PPP from Ren for 1986, updated to 1990 and multilateralised
- › 1990 yuan/\$ exchange rate for China was more than 5 times higher than PPP



## 1990 Exchange Rates, Geary-Khamis PPPs & ER/PPP Deviations (units of national currency per US \$)

	Exchange Rate	PPP	ER/PPP
China	4.7832	0.9273	5.158
Japan	144.79	185.27	0.782
India	17.5040	4.8769	3.589
Russia	1.059	0.520	2.037
USA	1.000	1.000	1.000





## Comparison of GDP and GDP per capita levels in 1990 PPP dollars

	GDP levels in billion 1990 PPP dollars				GDP per capita levels in 1990 PPP dollars			
	1990	China as % of	2003	China as % of	1990	China as % of	2003	China as % of
China	2124		6188		1871		4803	
Russia	1151	185%	914	677%	7779	24%	6323	76%
Japan	2321	92%	2699	229%	18789	10%	21218	23%
India	1098	193%	2267	273%	1309	143%	2160	222%
USA	5803	37%	8431	73%	23201	8%	29037	17%



## PPP valuation of GDP is substantially higher than exchange rate valuation

- › In China the difference is more extreme than elsewhere at more than 5:1 ratio between PPP converted GDP and exchange rate converted GDP
- › Japan is not second largest economy but only half of China's GDP
- › Carbon emissions are not 0.63 tons per 1000 dollar GDP, but 0.17 – which is below the USA (at 0.19)



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# Measurement of the sources of growth



## Measurement of sources of growth based on growth accounting technique

- › Growth accounting based on pioneering work by Abramovitz, Denison, Jorgenson & Griliches and Maddison
- › Requires careful measurement of output and inputs:
  - Labour input
  - Quality of labour
  - Capital inputs
- › Total factor productivity is a residual measure which is influenced by better resource allocation, structural change and technological progress



## Break in employment series complicates sources of growth analysis

	Population (1)	3-sector employment (2)	16-sector employment (3)	Maddison's employment (4)	Employment- population ratio (5)=(4)/(1)
	<i>(millions)</i>				
1978	956.2	401.5	401.5	400.7	0.419
1992	1165.0	661.5	594.3	592.0	0.508
2002	1280.4	737.4	637.8	634.2	0.495
	<i>(average annual growth rate)</i>				
1978-1992	1.4	3.6	2.8	2.8	1.4
1992-2002	0.9	1.1	0.7	0.7	-0.3



## Impressive improvement in China's human capital beyond India and faster than in Korea and Japan

	1950	1973	1992
China	1.60	4.09	8.50
India	1.35	2.60	5.55
Japan	9.11	12.09	14.86
Korea	3.36	6.82	13.55
Taiwan	3.62	7.35	13.83



## Transformation from state-led investment to investment from household savings and FDI

	Gross fixed non-residential investment (a), bln. current yuan	Investment-output ratio	Gross fixed non-residential capital stock (b), bln. 1987 yuan	Index (1952=100)	Capital-output ratio
1952	4.88	0.070	254.00	100	1.2
1978	73.09	0.203	1,756.33	691	2.7
1992	594.63	0.216	4,244.55	1,671	2.4
2003	3,798.78	0.279	11,293.88	4,446	2.6

(a) excluding 10% of value as proxy for military investment and repair and excluding housing

(b) The end year capital stock is derived by the perpetual inventory method, assuming a 25 year asset life, uniform retirement pattern, and zero valuation of scrapped assets (see Maddison, 1995, pp. 137-66 for a detailed application of this method). The initial stock of 254 billion yuan in 1952 was estimated by conjecture.

## Macroeconomic growth accounts show striking similarity between China 1978-2003 and Japan 1952-1978 growth paths

	China		Japan	
	1952-78	1978-2003	1952-78	1978-2003
Population	2.02	1.20	1.10	0.41
GDP	4.39	7.85	7.86	2.53
Per Capita GDP	2.33	6.57	6.69	2.11
Labour Input	2.57	1.89	1.12	0.07
Education	4.49	2.63	1.19	1.12
Quality adjusted labour input	4.87	3.23	1.72	0.63
Non-residential fixed capital	7.72	7.73	9.57	5.03
Labour productivity	1.78	5.85	6.67	2.46
Capital productivity	-3.09	0.11	-1.56	-2.39
Capital per person employed	5.02	5.73	7.97	4.38
Total factor productivity	-1.37	2.95	3.32	0.36





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# Growth projections



## Comparison of GDP and GDP per capita levels in 1990 PPP dollars

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## Assumptions on growth projections 2003-2030

- › Continuation of catch-up process, supported by forward move of technological frontier.
- › But closer to frontier, catch-up growth will slow 5.6% (to 2010), 4.6% (2010-2020) to 3.6% (2020-2030) in terms of GDP per capita growth (4.5% for 2003-2030)
- › Significant deceleration of population growth and reduction in working hours
- › Six-fold increase in educational attainment from 1952-2003 reduced to three-fold increase from 2003-2030
- › Quality-adjusted labour input to grow by 0.5% from 2003-2030



## Projection of GDP and GDP per capita levels in 1990 PPP dollars to 2015 and 2030

	GDP levels in billion 1990 PPP dollars				GDP per capita levels in 1990 PPP dollars			
	2015	China as %of	2030	China as %of	2015	China as %of	2030	China as %of
China	12271		22983		8807		15763	
Russia	1300	944%	2017	1139%	9554	92%	16007	98%
Japan	3116	394%	3488	659%	24775	36%	30072	52%
India	4665	263%	10074	228%	3663	240%	7089	222%
USA	11467	107%	16662	138%	35547	25%	45774	34%



## **Reasons for China's superior performance compared to other transition economies**

1. Priority to agricultural reforms
2. No political disintegration
3. Beneficial effect from overseas population
4. Large catch-up potential because of initial low income
5. Family planning policy altering age structure
6. Sound macroeconomic policies
7. Cautious reform of state owned enterprises
8. Integration in world economy



## Remaining problems to be resolved

- › Strengthen fiscal resources to enhance social expenditure on education and health
- › Reduce dependence on coal consumption
- › Mitigation of regional inequality through investment in infrastructure, improved education opportunity, removal of barriers to migration and elimination of SEZ tax credits.
- › Reduce rural-urban inequality by changing discriminatory registration system
- › Substantial strengthening of property rights



## Transition economies and the world economy

- › China followed path of “conditional convergence” of other Asian economies
- › Realisation of catch up potential by:
  - high rates of investment in physical and human capital
  - increased labour force participation
  - opening up to foreign trade and specialisation
  - sound macroeconomic policies
  - microeconomic policies promoting efficiency of resource allocation
- › Growth theory provides little help in explaining 1978-2003 growth experience of transition economies, notably disintegration of USSR
- › Comparativist approach helps to understand success and failure