

CHINA: SOLOW, MINSKY

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BEHOLD THE MIRACLE
THAT CHINA HAS BEEN

CHINA - 10% GROWER

	NIEs (%)	China, People's Republic of (%)	Others (%)
1992-1997			
Growth in output	6.99	9.79	5.64
1997 - 2002			
Growth in output	2.57	7.69	3.16
2002 - 2007			
Growth in output	5.48	12.20	6.58

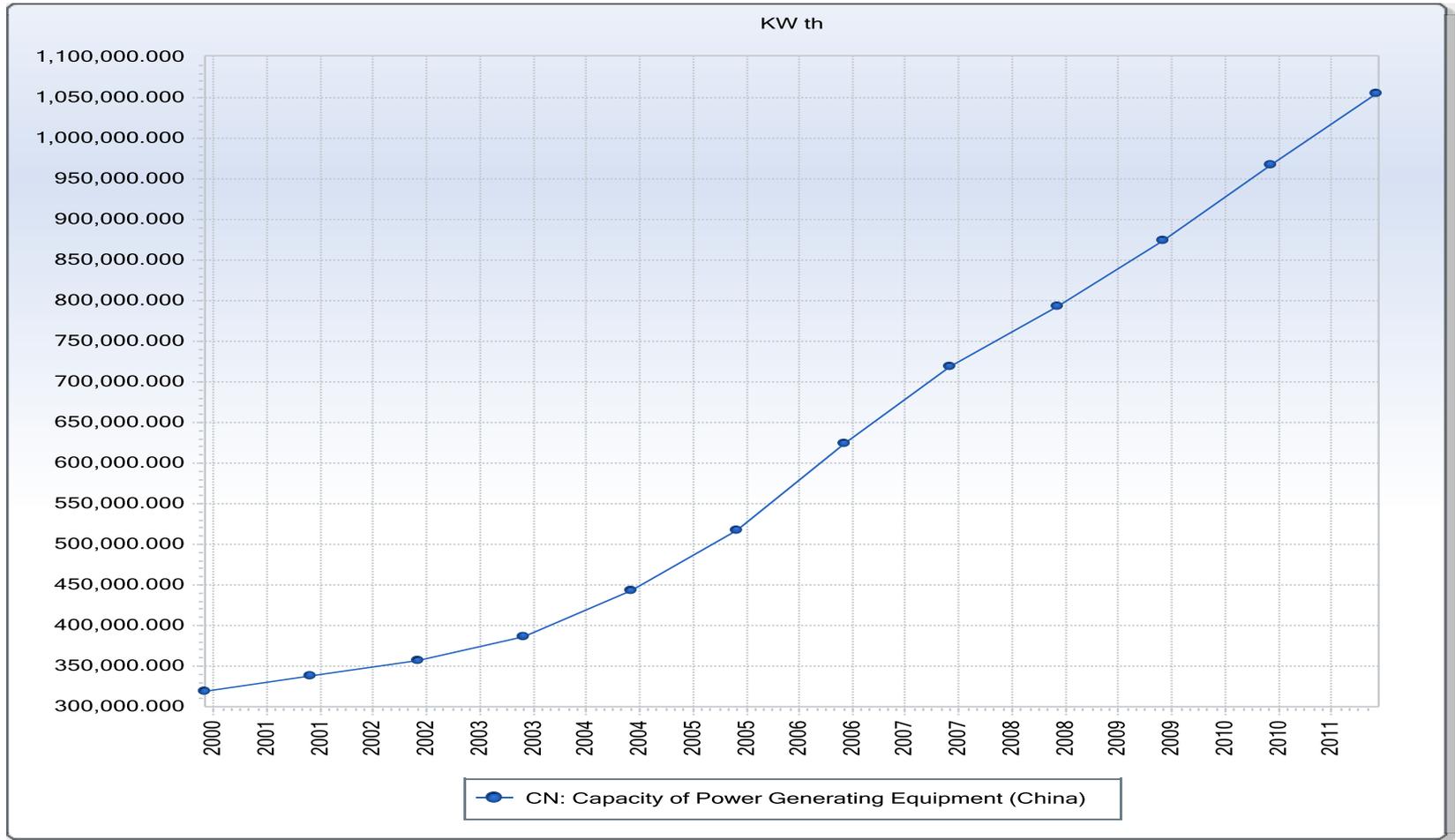
CHINA - GDP: EXCHANGE RATE VALUATION - WORLD BANK

Country	1991	2010
China	379,468	5,930,529
Euro Area	5,905,958	12,057,572
United States	5,930,700	14,447,100

CHINA GDP – PPP VALUATION – IMF

GDP: Based On PPP Valuation - IMF				
Country		2010	2012	2017
China		10,128,313	12,387,048	20,336,086
Euro area		10,845,702	11,344,642	13,215,413
United States		14,526,550	15,609,697	19,704,590

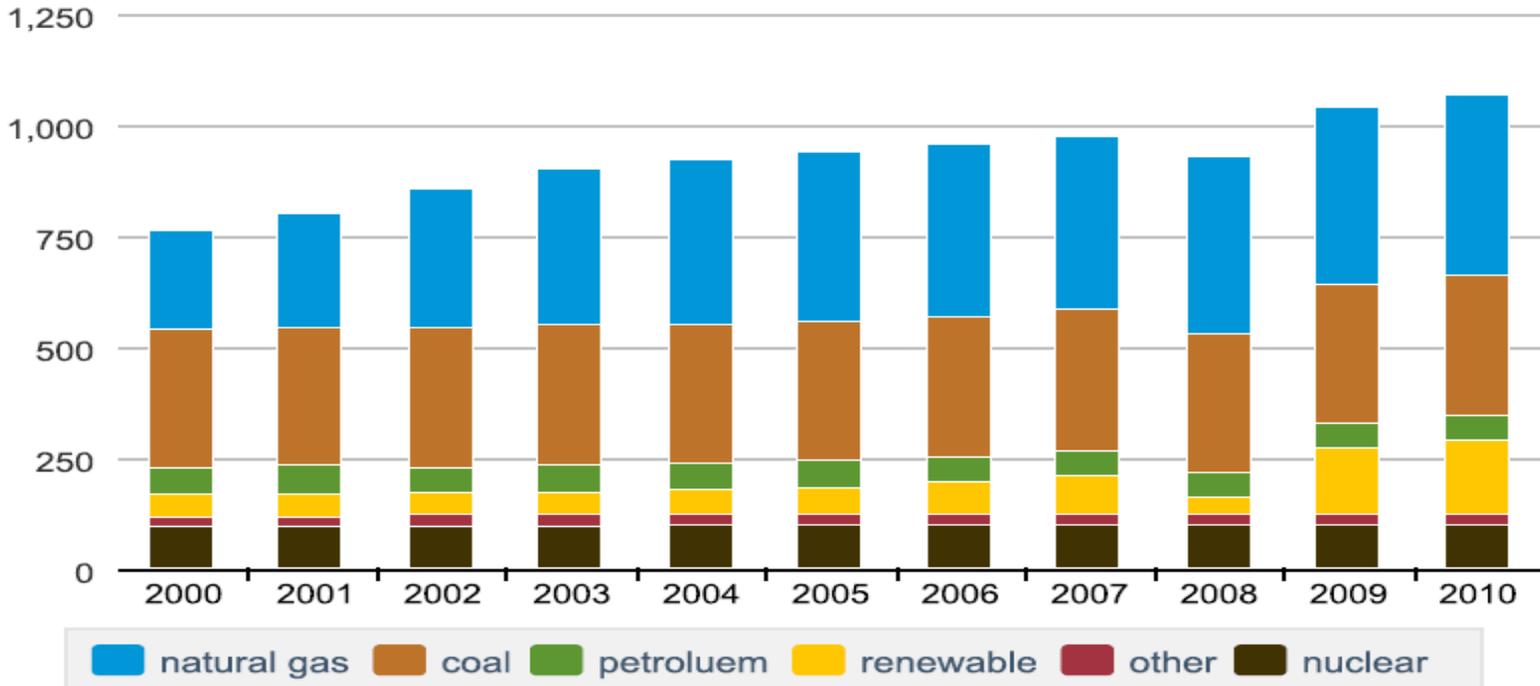
CHINA POWER GRID



U.S. POWER GRID

Total net summer capacity by fuel type, 2000-2010

gigawatts



U.S. Energy Information Administration, Form EIA-860, Annual Generator Report

CHINA - HALF THE WORLD'S PRODUCTION AND CONSUMPTION OF CEMENT, STEEL

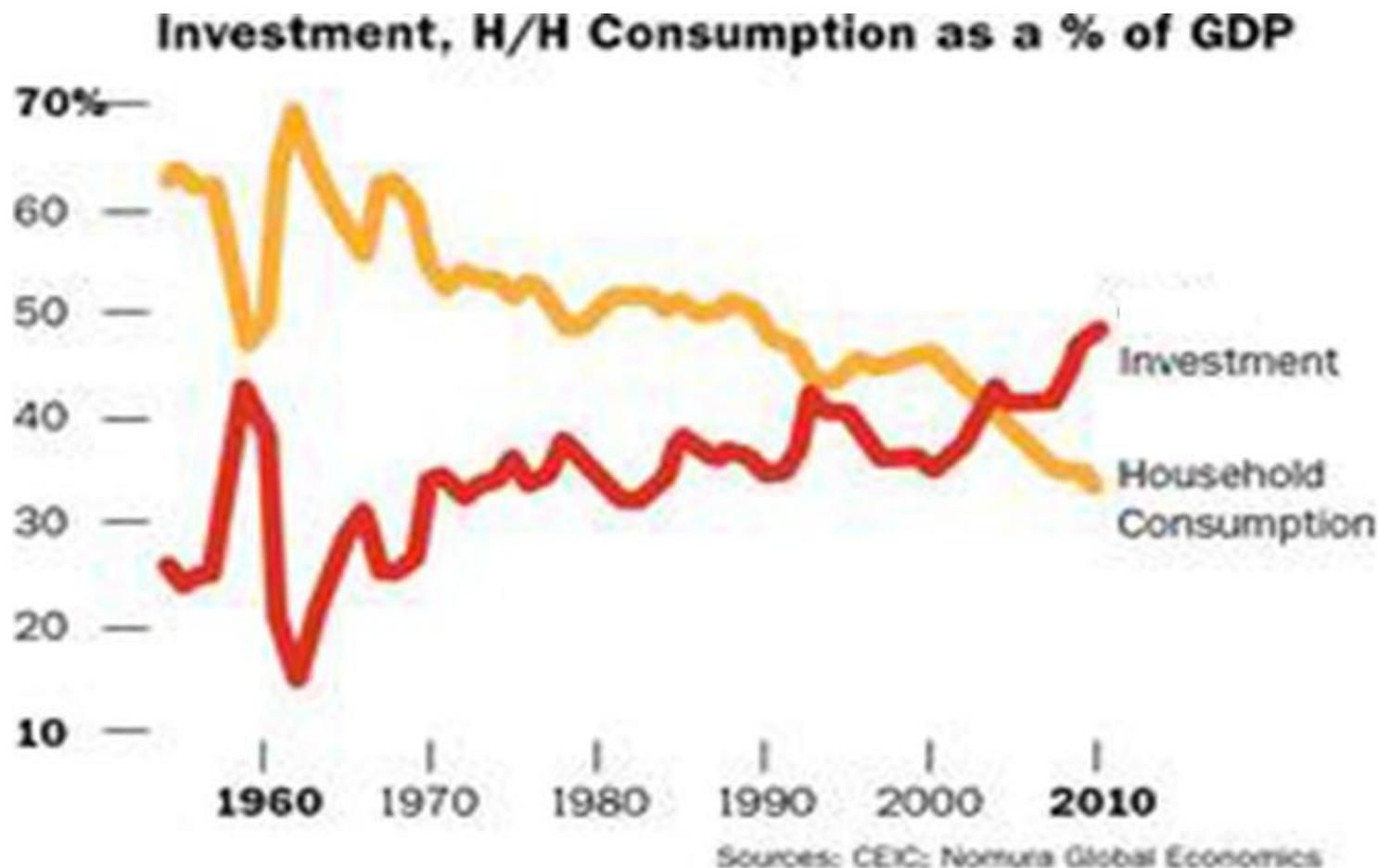
Commodity	China % of World
Cement	53.2%
Iron Ore	47.7%
Coal	46.9%
Pigs	46.4%
Steel	45.4%
Lead	44.6%
Zinc	41.3%
Aluminum	40.6%
Copper	38.9%
Eggs	37.2%
Nickel	36.3%
Rice	28.1%
Soybeans	24.6%
Wheat	16.6%
Chickens	15.6%
PPP GDP	13.6%
Oil	10.3%
Cattle	9.5%
GDP	9.4%

CHINA - WORLD RECORD TOTAL FACTOR PRODUCTIVITY

	NIEs (%)	China, People's Republic of (%)	Others (%)
1992-1997			
Contribution of TFP to output	1.93	3.91	0.65
1997 - 2002			
Contribution of TFP to output	-0.71	3.09	-0.31
2002 - 2007			
Contribution of TFP to output	2.60	7.01	2.74

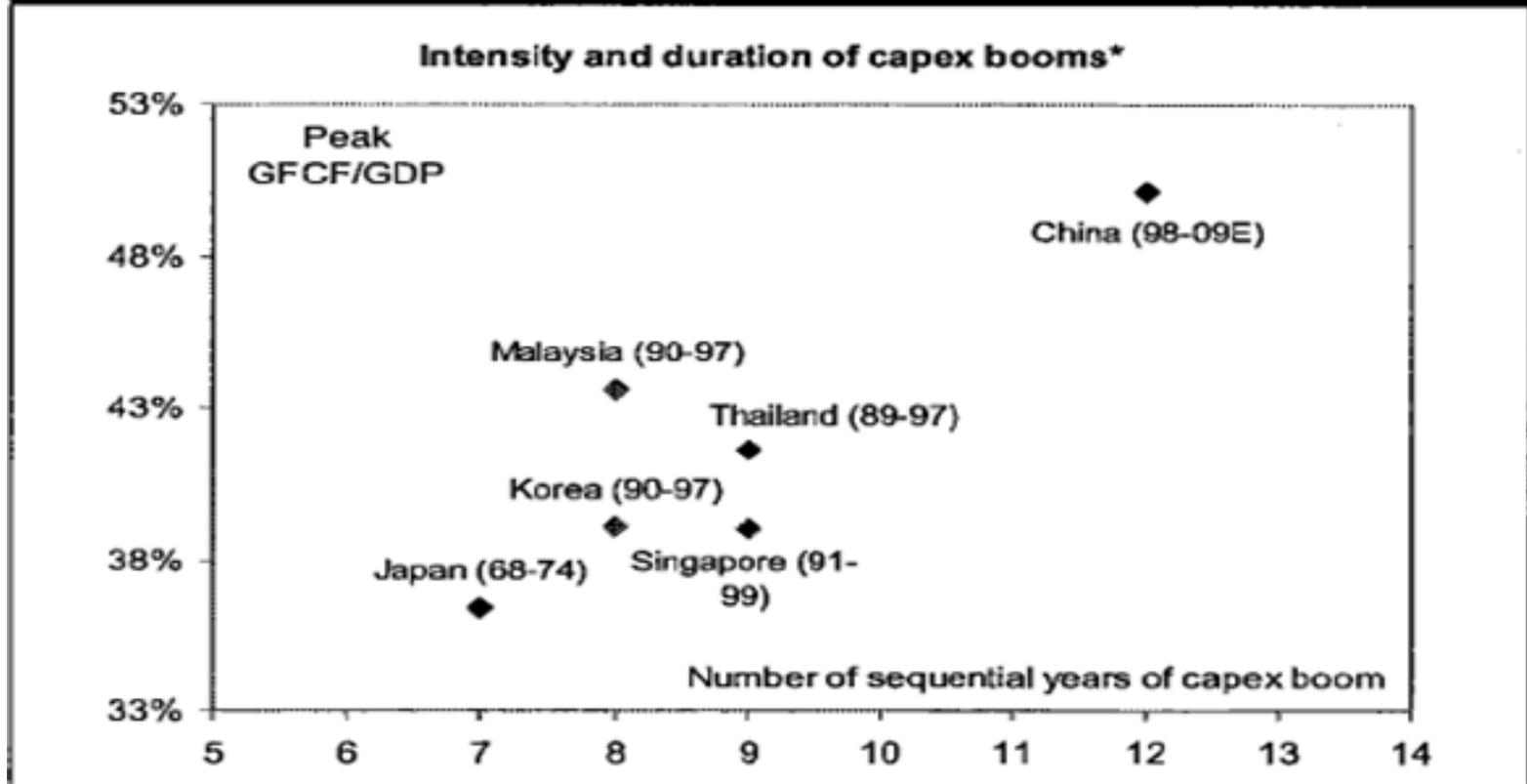
CHINA - CAPITAL ACCUMULATION AT WARP SPEED

CHINA - RECORD INVESTMENT RATIO



CHINA - RECORD INVESTMENT RATIO

3. China's Capex boom breaking all records



Source: IMF, Pivot

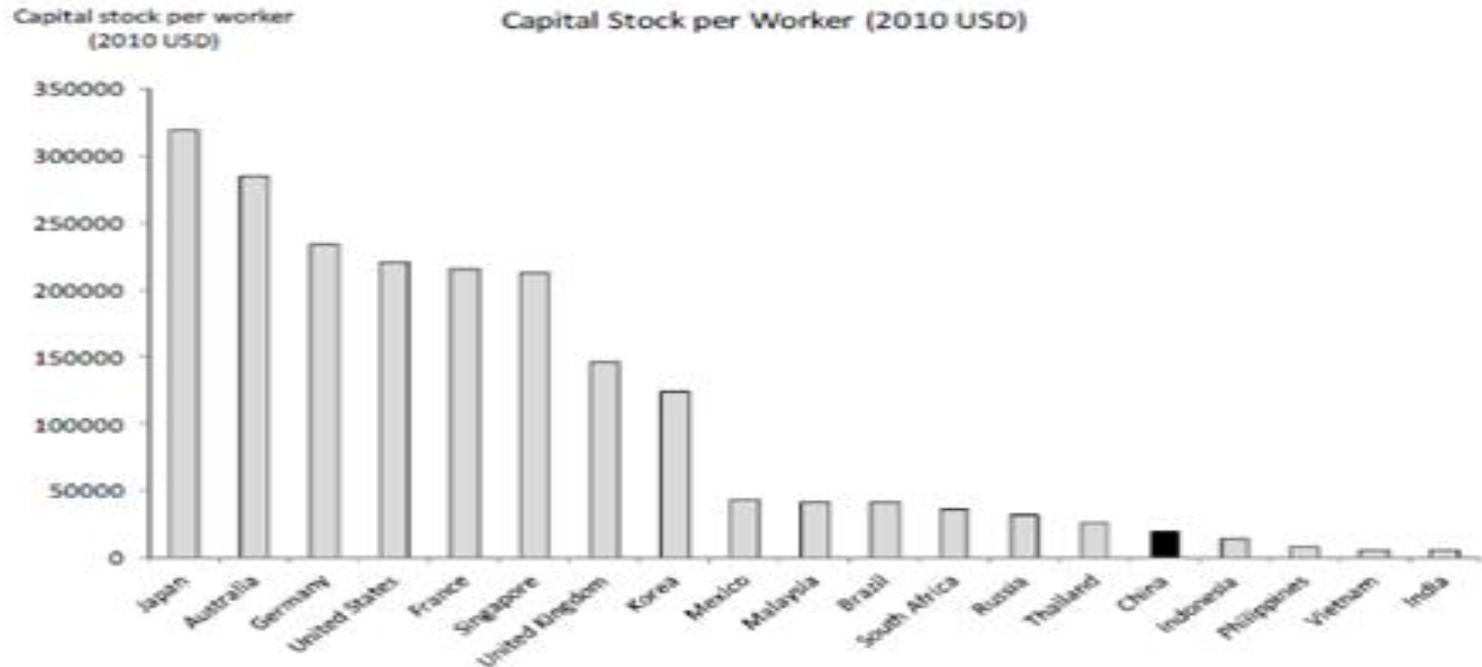
* Capex boom is defined as sequential years with GFCF/GDP in excess of 33%

CHINA - DEEP CAPITAL/OUTPUT



Source: CEIC, GS Global ECS Research.

CHINA - SHALLOW CAPITAL/WORKER

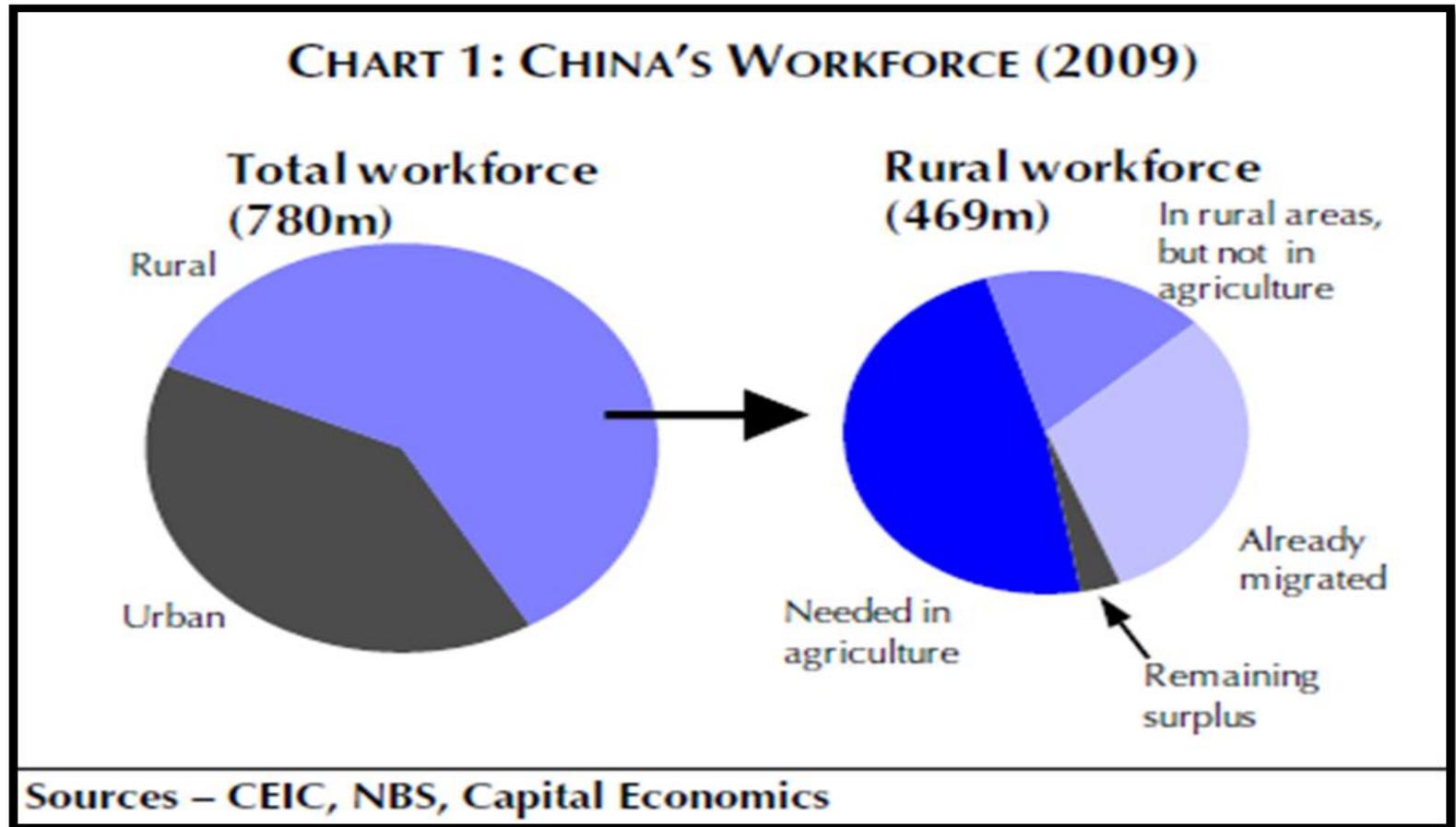


Note: For the initial capital stock in the first year, we used investment/(average investment growth + depreciation [4%]). From the initial stock, we use the formula $K_t = I_t + (1-d)K_{t-1}$ to calculate the capital stock in each period; Total number of worker is the number of working age population (age 15 to 64)

Source: Penn World Tables, Haver, GS Global ECS Research.

CHINA: THE LEWIS TURNING POINT AND THE TFP COLLAPSE

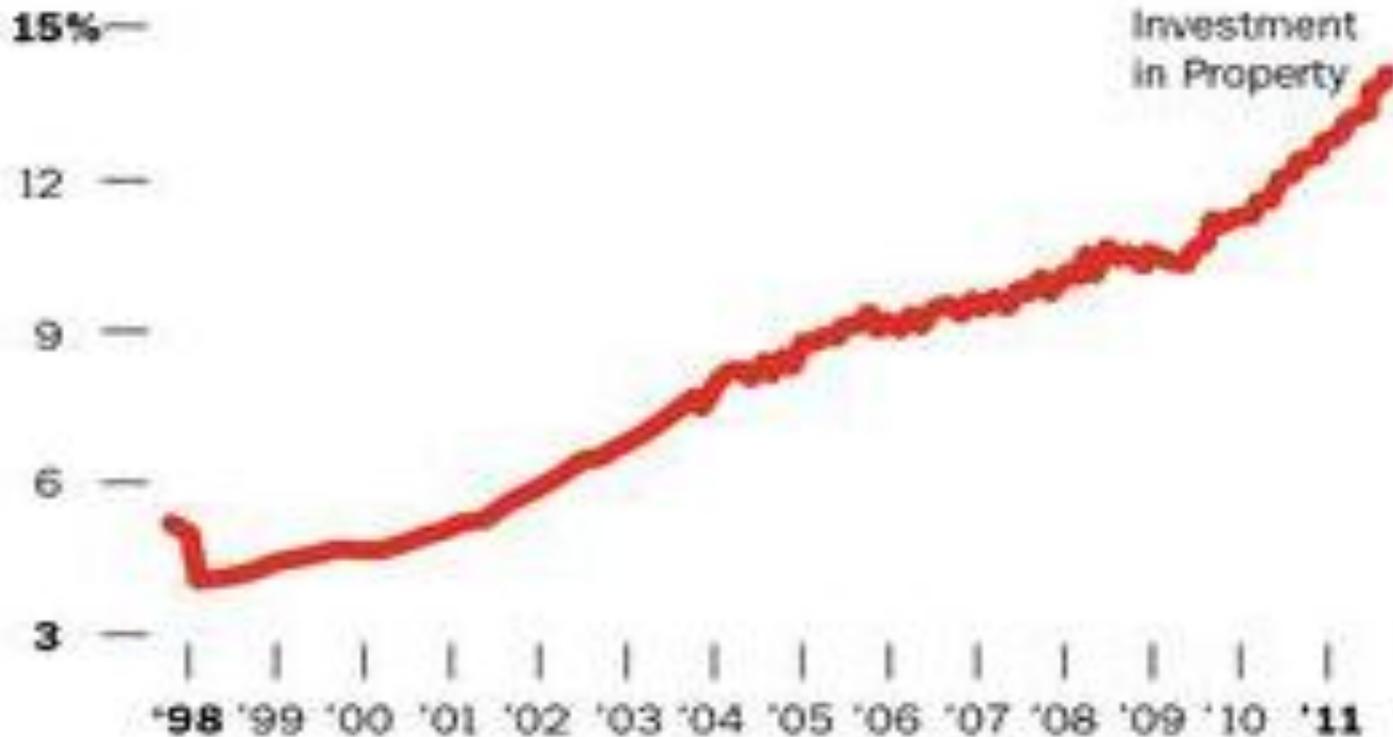
CHINA - DEPLETING RURAL LABOR SURPLUS



CHINA - OVERINVESTMENT

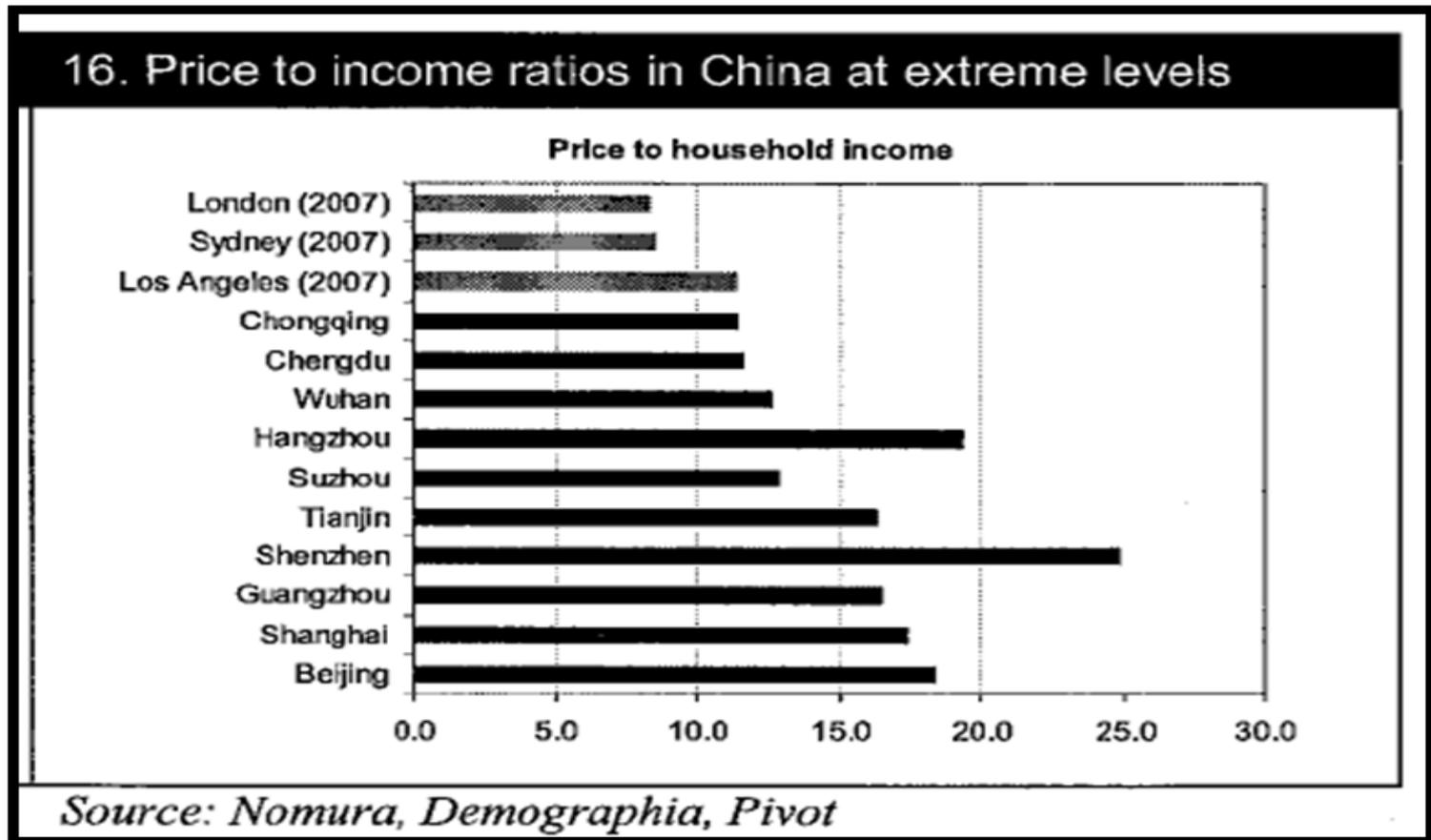
CHINA RESIDENTIAL OVERINVESTMENT

New Residential Real Estate as a % of GDP



Sources: China's NBS; Nomura Global Economics

CHINA HOUSE PRICE BUBBLE



CHINA INDUSTRIAL OVERINVESTMENT

CHINA: MASSIVE OVERINVESTMENT IS LEADING TO GLUTS IN INDUSTRIAL TRADEABLES

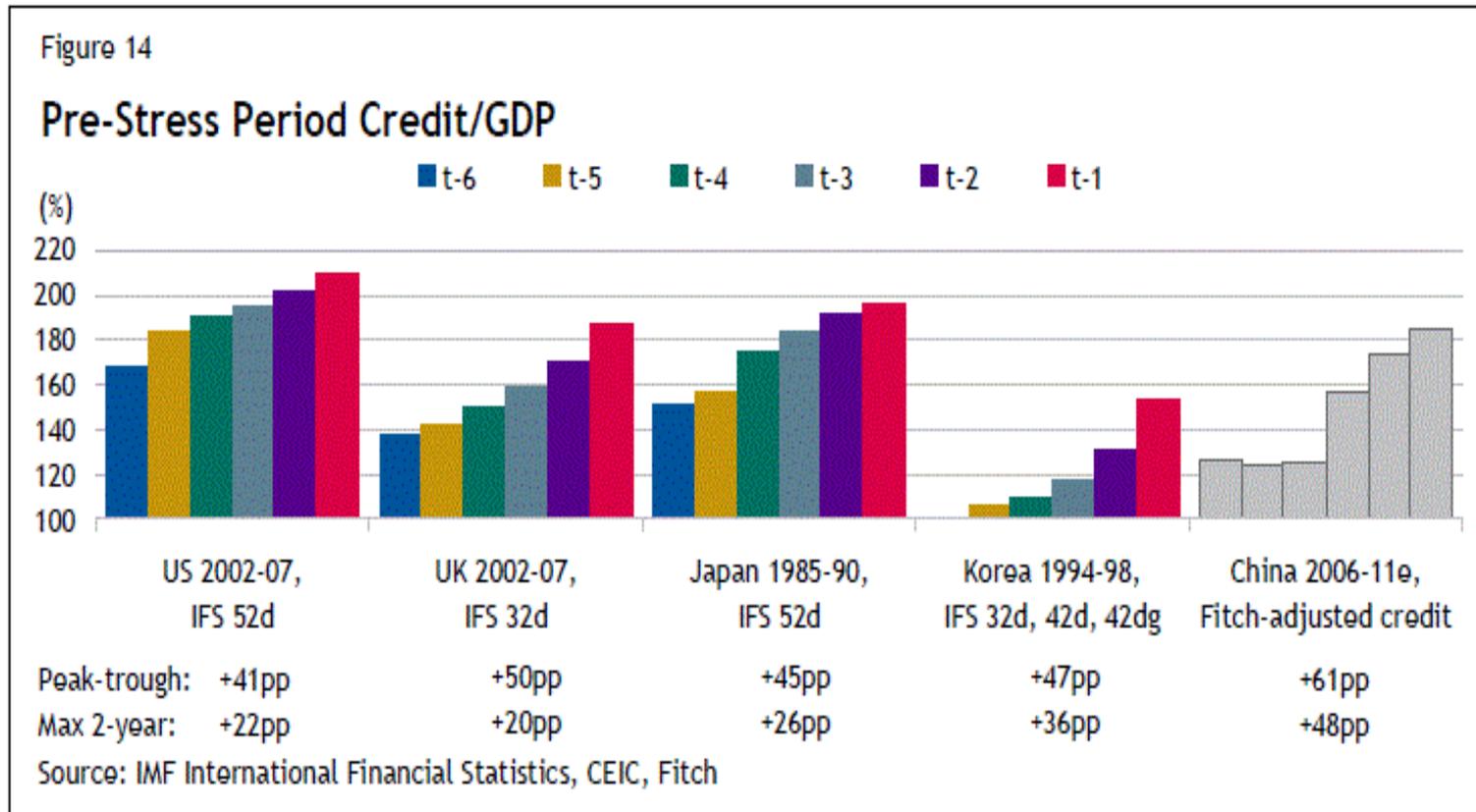


EXAMPLE: THE VAST MAJORITY OF THE COMING MEGA OVER INVESTMENT IN GLOBAL SOLAR CAPACITY IS CHINA DRIVEN

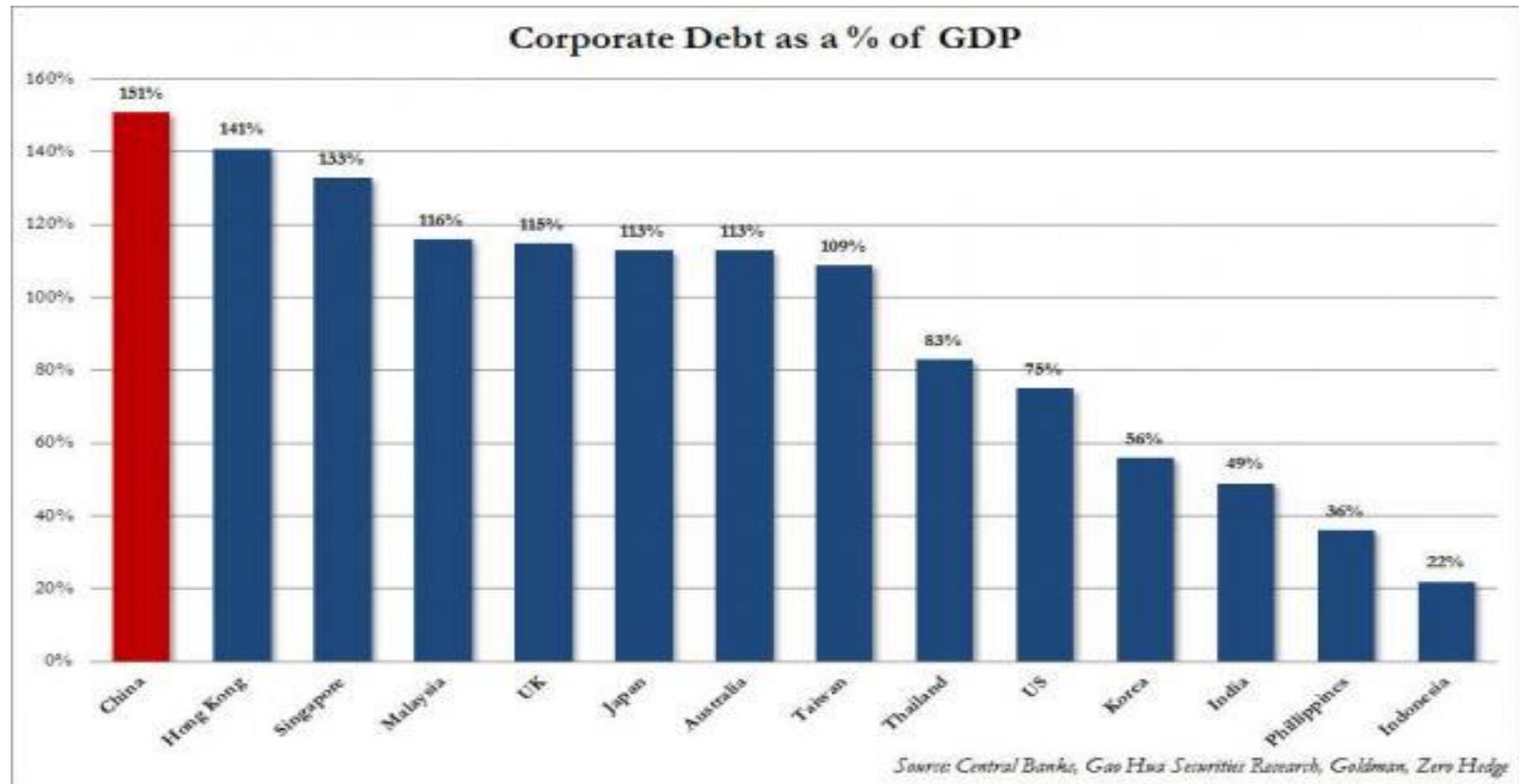
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CHINA - DIMINISHING
RETURNS, RISING DEBT
DEPENDENCE, BEYOND THE
MINSKY MOMENT

CHINA - RECORD DEBT DEEPENING

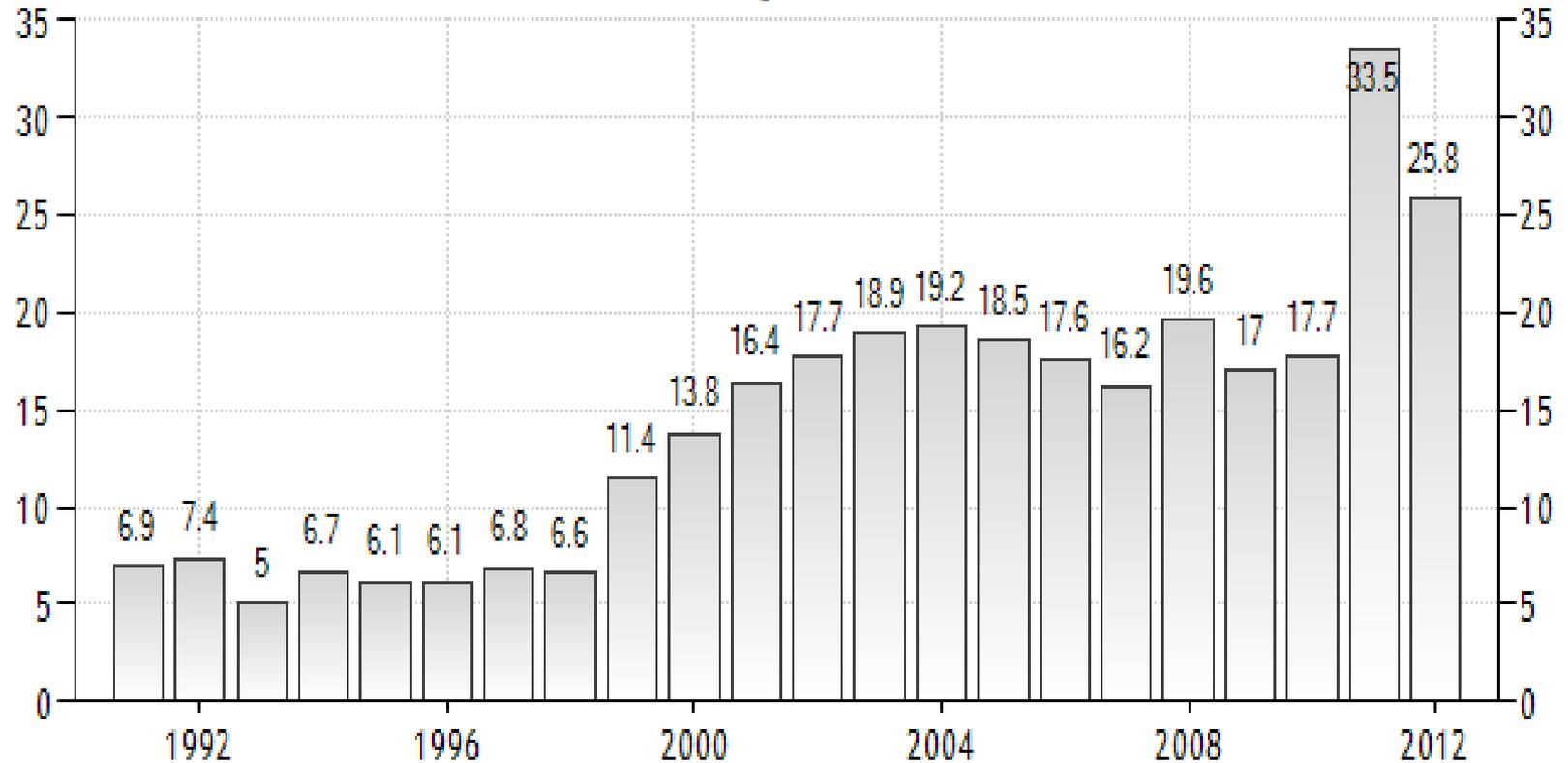


CHINA - THE ULTIMATE MINSKY EVENT



CHINA GOVERNMENT DEBT TO GDP

Percentage of the GDP



SOURCE: WWW.TRADINGECONOMICS.COM | INTERNATIONAL MONETARY FUND

Solow Growth Equilibrium Condition

$$s_a = m + n$$

s = savings - investment ratio

a = output capital ratio

n = labor force growth

m = rate of increase in labor
productivity

Solow

The Rosenstein-Rodan Development Model

“That is what I called “embodiment,” the fact that much technological progress, maybe most of it, could find its way into actual production only with the use of new and different capital equipment. Therefore, the effectiveness of innovation in increasing output would be paced by the rate of gross investment. A policy to increase investment would thus lead not only to higher capital intensity, which might not matter much, but also to a faster transfer of new technology into actual production, which would. Steady - state growth would not be affected, but intermediate -run transitions would, and those should be observable.”

Growth Theory: An Exposition,
Robert M. Solow, 1987

Solow

The Arthur Lewis Development Model

“Suppose the first problem can be evaded. This might happen, for instance, in a developing country with a large pool of rural labor. It could then have an industrial labor force growing at whatever the required rate, $sa-m$, happens to be; the consequences of a mismatch would be seen only in the waxing or waning of the rural population. Such an economy could jack up its long-term rate of industrial growth merely by increasing its investment quota. Under the influence of this model, that policy was sometimes prescribed. It makes general sense.”

Perspectives On Growth Theory
Robert M. Solow, 1994

Keynes: Uncertainty And Investment

“The outstanding fact is the extreme precariousness of the basis of knowledge on which our estimates of prospective yield have to be made. Our knowledge of the factors which will govern the yield of an investment some years hence is usually very slight and often negligible. If we speak frankly, we have to admit that our basis of knowledge for estimating the yield ten years hence of a railway, a copper mine, a textile factory, the goodwill of a patent medicine, an Atlantic liner, a building in the City of London amounts to little and sometimes to nothing; or even five years hence.”

John Maynard Keynes, “Chapter 12: The State Of Long Term Expectations”,
The General Theory of Employment, Interest and Money,

Minsky: Uncertainty → Adaptive Expectations

“Since investment deals preeminently with decisions that involve time, in order to explain investment it is necessary to come to grips with the meaning and significance of uncertainty in economics. Uncertainty deals with that class of events for which the outcome of actions cannot be known with the same precision as the average outcome at a roulette table, or even of a mortality table, is known. In a word, uncertainty in economics does not deal with risks that are insurable or analogous to gambling risks. Uncertainty is largely a matter of dealing today with a future that by its very nature is highly conjectural. In a world with uncertainty, units make do with and react to the often surprising fruits of past decisions as they ripen.”

Stabilizing An Unstable Economy,
Hyman P. Minsky, 1986

Minsky Made A Distinction Between Three Types Of Finance

Hedge finance, in which cash flows are sufficient to meet both payments of interest and principal on debts.

Speculative finance, in which cash flows can meet interest payments but not principal payments. In this case borrowers must refinance the outstanding principal of their debts, but their debts need not increase.

Ponzi finance, in which cash flows are insufficient to meet both interest and principal payments. In this case borrowers must refinance their debts to meet both interest and principal payments due. Such refinance involves the “capitalization” of interest due and leads to an increase in total debt.

MINSKY

Adaptive expectations drive the short/kitchin/juglar debt cycle

MINSKY

Mega moral hazard drives the
long kondratiev debt cycle

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Ponzi finance frees the interest rate from the limit imposed by the marginal efficiency of capital

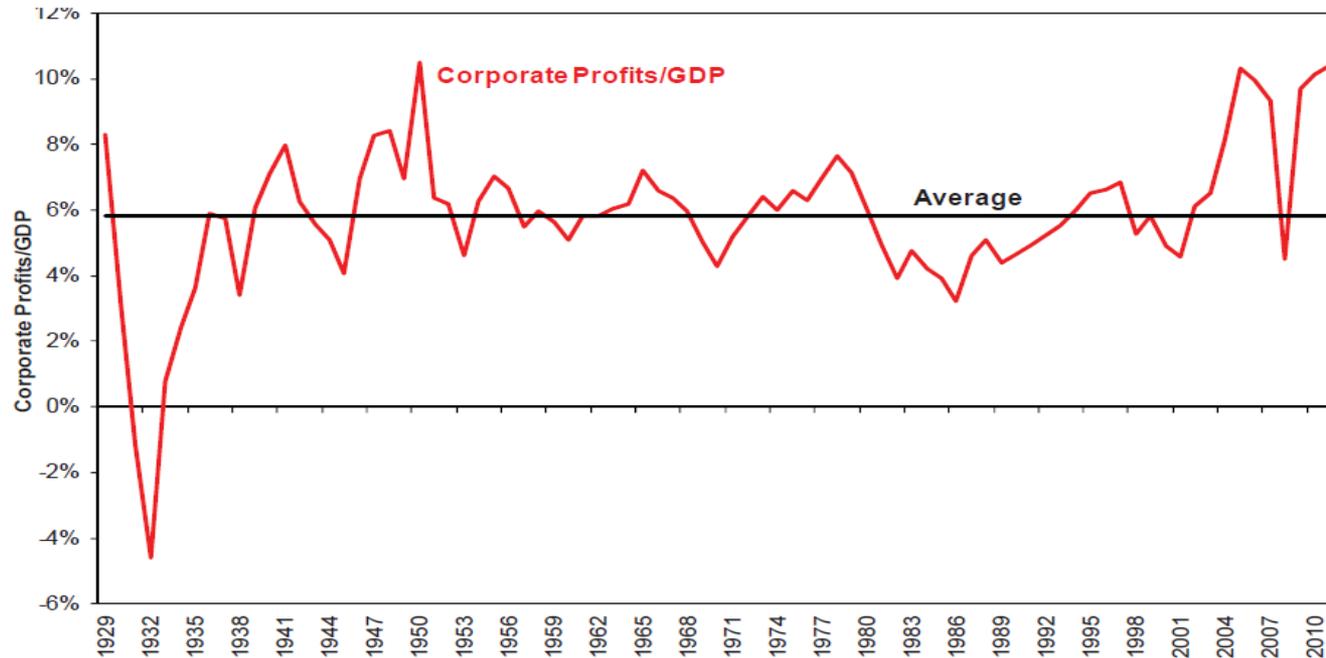
MINSKY

Moral hazard allows ponzi finance
to escalate.

This is the engine of the great
kondratiev credit crisis.

ADDENDUM: THE
NONEXISTENT STYLIZED
FACT, DISCARD KALECKI
FROM MINSKY

U.S. PROFIT TO GDP RATIO



Source: BEA As of 12/31/11

THE POSTWAR INVESTMENT BOOMS PEAKED
IN 1980 AND 2000. TODAY THERE IS AN
INVESTMENT BUST.