

Econ 196: The View from China

Illustration by Jon Berkeley (with apologies to Steinberg and *The New Yorker*)

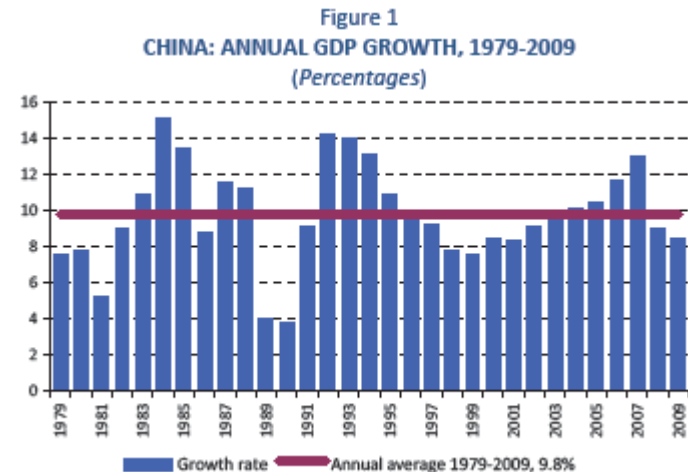


Probably the single most important event at the end of the 20th century

- China's rapid growth has had a direct, dramatic impact on the living standards of a quarter of the world's population.
 - It implies far-reaching changes in the balance of economic, financial and political power.
 - It has major environmental impacts.
 - And drives food, fuel and commodity prices globally.
 - It has a variety of important impacts on the world economy.
 - The increase in urban employment in China is equivalent to adding another middle sized industrial country to the world economy each year.
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- Raising the question of whether the rest of us have been handling this well...

China, to remind you, has been the world's fastest-growing economy since 1979

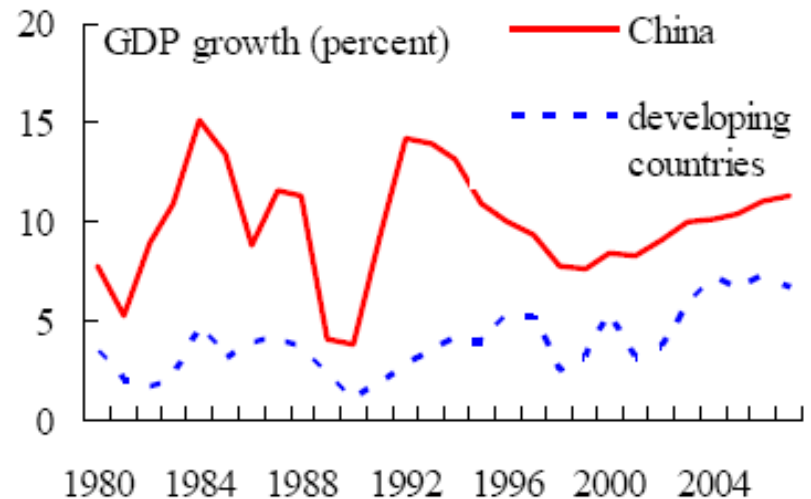
- In the 30 years since, China moved from having a per capita GDP equal to India's (PPP corrected, for the cognoscetti) to now having one twice as high.



That growth has been accompanied by dramatic structural change

- The share of the labor force in agriculture has fallen from 70 to less than 50 per cent over the 30+ year period.
- The share of industrial output produced by State-Owned Enterprises (SOEs) has fallen from 80% to 30%.
- Exports + Imports as a share of GDP are up from essentially 0 in 1979 and only 10% in 1989 to 50% today.
- Infant mortality has declined dramatically, indicative of rising living standards.

Figure 1. Economic growth has been rapid.



Source: World Bank WDI and authors' estimates.

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- Standards of living have increased to the point where the World Bank no longer classifies China as a poor country.
 - The United Nations ranks it among countries with a “medium level of human development”
 - The UN’s Human Development Index looking at other measures of human welfare in addition to income.
 - China is second behind only US in value of its foreign trade.
 - It is now the single largest destination for foreign investment.

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- What explains this outstanding economic performance?
 - Large question, now with a gigantic literature.
 - We can usefully start with some basic facts.

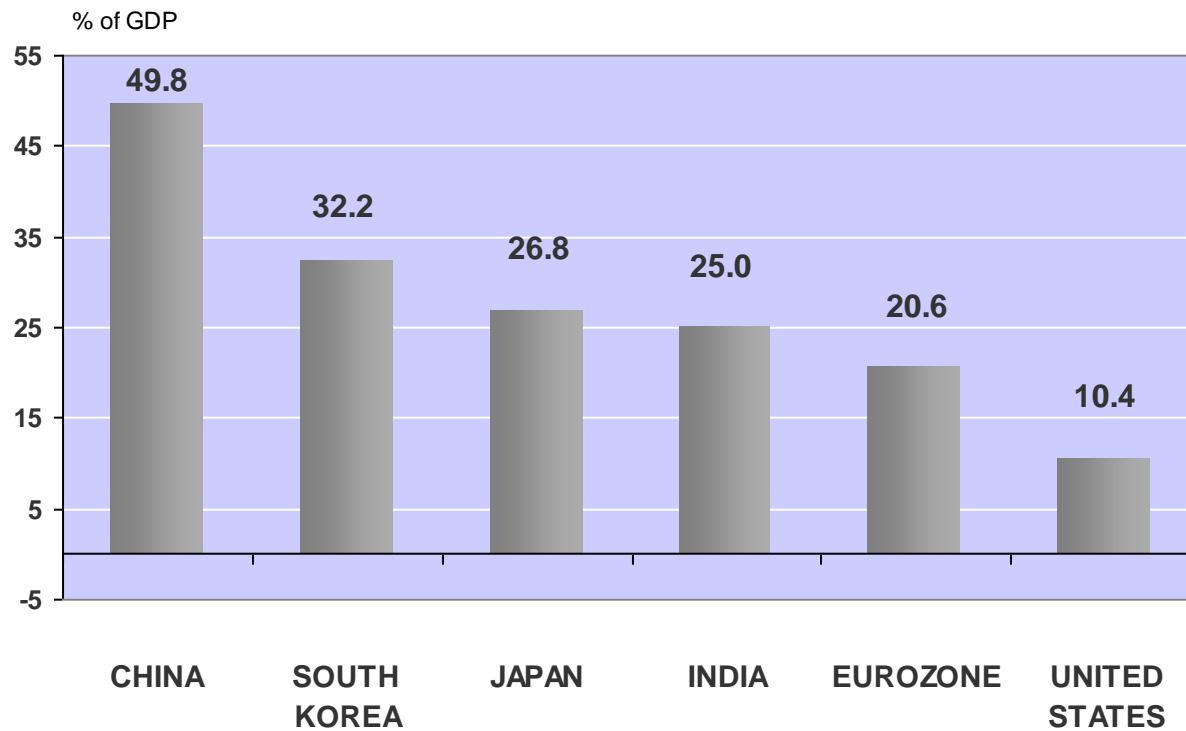
Fact (1): Chinese growth is driven by a combination of high investment and TFP growth, as we would expect of a catch-up economy

- But note how capital accumulation has been the most important contributor in the most recent period and the role of TFP has declined.
- This is “extensive growth” with a vengeance.....

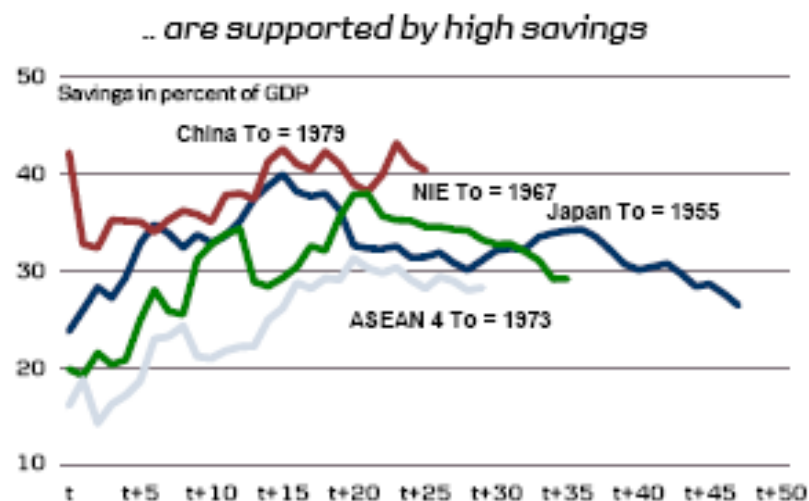
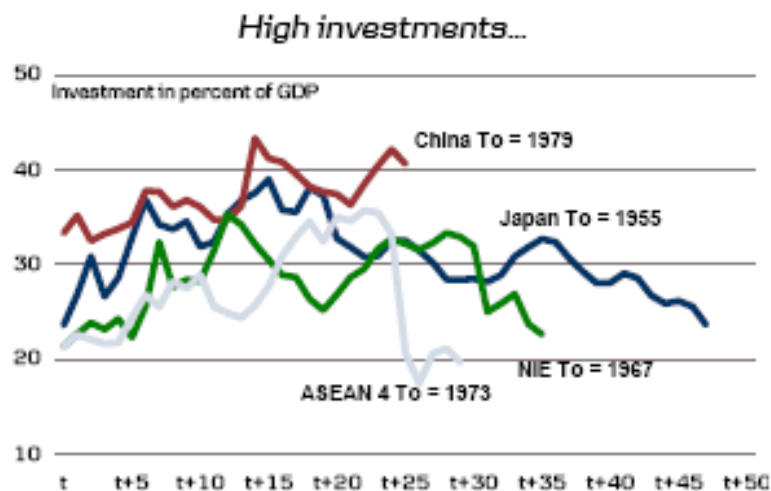
Sources of China’s Economic Growth Using Simple Solow Growth Accounting

	1978-2008	1978-1999	1999-2008
<i>Contribution to GDP growth (%)</i>			
Physical capital stock	44.96%	36.35%	67.62%
Labor	8.50%	10.78%	3.97%
TFP	46.54%	52.87%	28.41%

Fact (2): China's high investment is supported by extraordinarily high savings rates

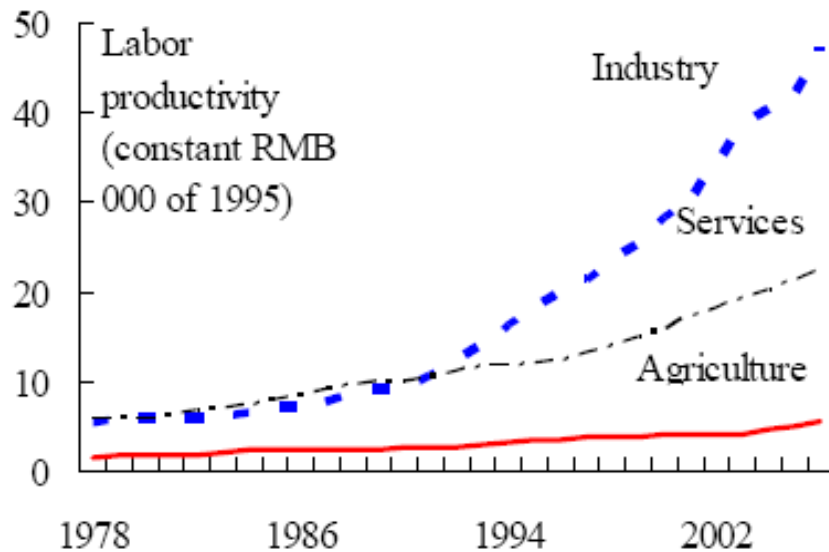


These saving and investment are unusual even by the standards of other fast growers (Here are some comparisons, where everything here is expressed in “takeoff time”)



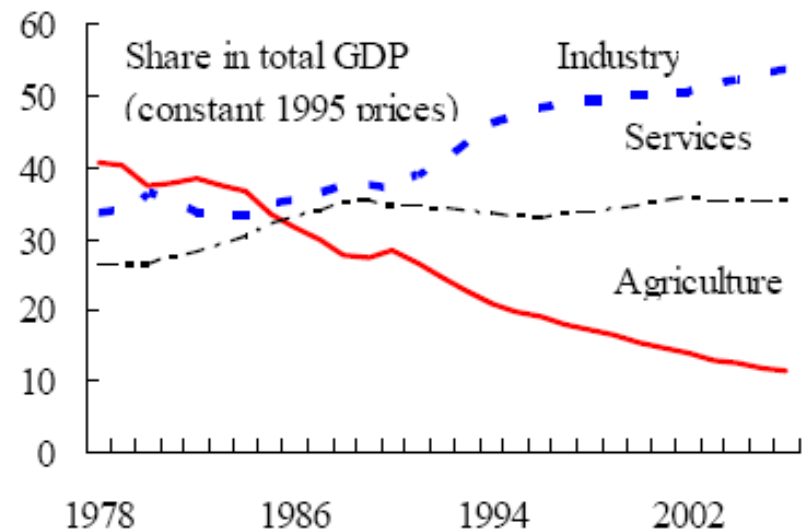
Fact (3): Since productivity is higher in industry than agriculture, structural change is especially important for growth

Figure 3. Labor productivity in industry has soared



Source: NBS, authors' calculation.

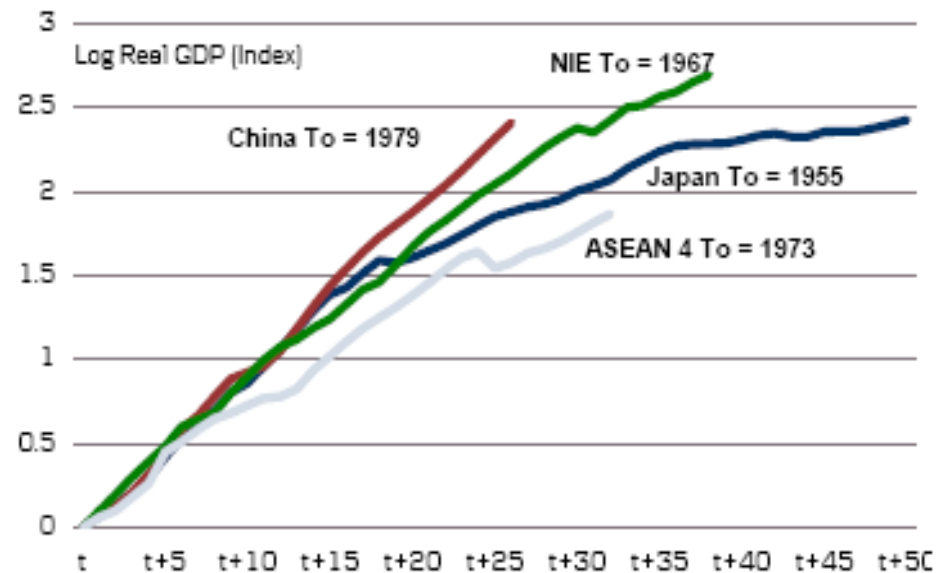
Figure 2. Industry has driven growth



Source: NBS, author's estimates.

Comparisons help to shed light on China's performance

- Following its “takeoff” in 1979, China grew at the same rate as post-1955 Japan and the post-1967 NIES (newly industrializing East Asian states) for a decade.
- “Just another catch-up case.”
- But, after that, its experience seems to have diverged.
- Other high-growth late-developing economies slowed down, but China did not.
- Raising the question: is China sui generis? Or might a slowdown now be coming?
- You will know from the readings that this is where I'm heading...



So we might usefully ask:

- Can high saving and investment (even if that investment is productive) sustain high growth indefinitely?
 - What does the Solow growth model you discussed last time say about this?
- Can so much saving be invested productively?
- Does the decline in the share of growth accounted for by productivity growth portend bad news to come?
- Can productivity advance through structural change continue as the shift is not from agriculture to manufacturing but from manufacturing to services?

To better understand the future, it
may help to look to the past

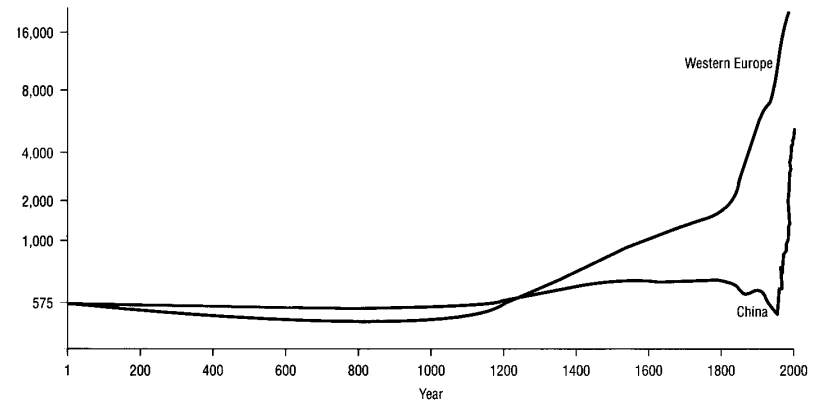
Some Potted History

- Circa 1000, China probably had highest per capita income in the world. Angus Maddison's estimates at right are indicative of this.
- China developed gunpowder, compasses, clocks (see right), other modern technologies.
 - It was the technological leader in the period 1000-1400.
- It was first to develop a civil service based on competitive examinations.
- It was first to have an efficient system of public finance.
- Yet the country fell behind starting in the period of the Ming Dynasty (1368-1644). It was not able to move to sustained modern growth.

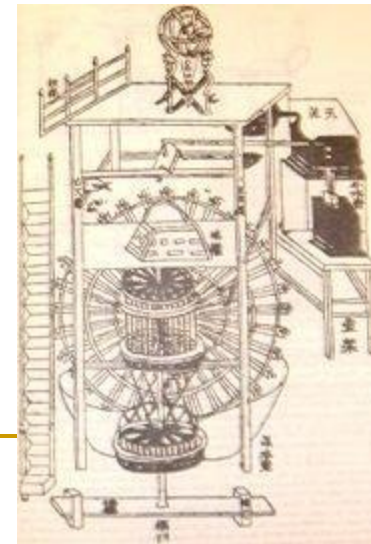
Chart 1

GDP per Capita: China and Western Europe, 1–1998 A.D.

2002 dollars

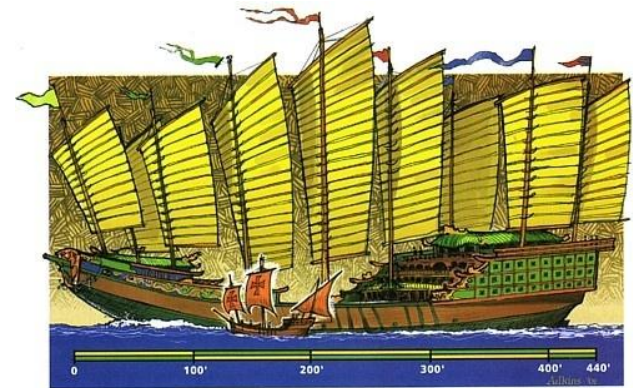


SOURCES: Maddison, Angus (2001), *The World Economy: A Millennial Perspective*, Organization for Economic Cooperation and Development, p. 42; authors' calculations.



So why did China fall behind?

- Another grand question to which we can't really do justice here.
- But the literature suggests two explanations (depicted at right...)



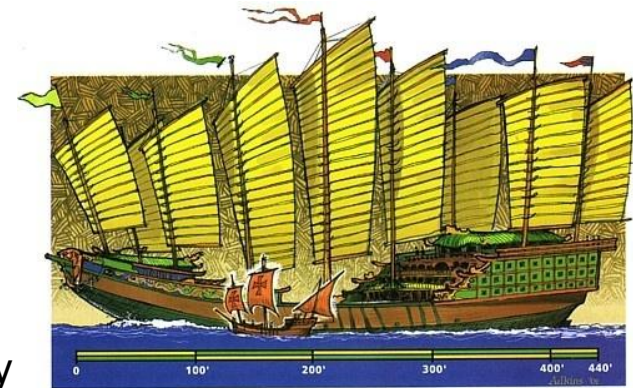
So why did China fall behind?

- One is that a centralized state was needed for large-scale hydraulic and defense projects (think of the Great Wall). This was not conducive to a European-style scientific revolution or to economic and technical innovation, which became increasingly important to growth after 1750.



- How Europe differed...

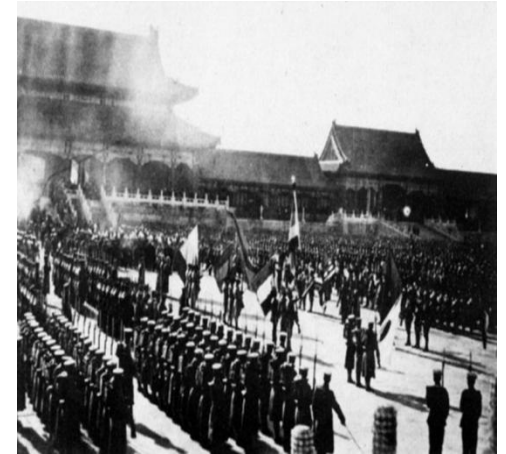
- Another explanation is that the state responded to foreign incursions by turning inward (it dismantled the ocean-sailing fleet of the great admiral Zheng He, compared here to Columbus' ships).



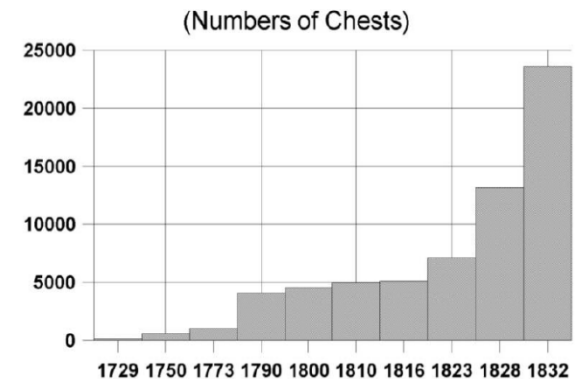
- This contrasted with the “industrial policies” of Henry the Navigator, the Portuguese prince who established a naval observatory, sponsored navigational tables, fostered the caravel.

Of course, China had outside help with its relative decline

- Renewed foreign incursions then disrupted the economy (Opium Wars starting in 1839, Treaty Ports after defeat in 1842, Western military action in response to Boxer Rebellion of 1898 (shown at right), Japanese invasion and colonial conquest of part of the country, etc.).
- In the course of a century, China lost 2 wars with Japan, was invaded 3 times by Britain and France and once by Russia and the U.S. It then suffered a debilitating civil war.



BRITISH OPIUM SALES TO CHINA



Transition period

- Collapse of Qing Dynasty in 1911-12.
- Followed by a period of warlord domination.
- Unification of the nation by the Nationalist Party in 1927.
- Invasion by Japan in 1937.
- This weakened the Nationalists, as the Communists gained ground by using guerilla tactics against the Japanese.
- Leading to the evacuation of the Nationalists under Chiang Kai-Shek to Taiwan in 1949.

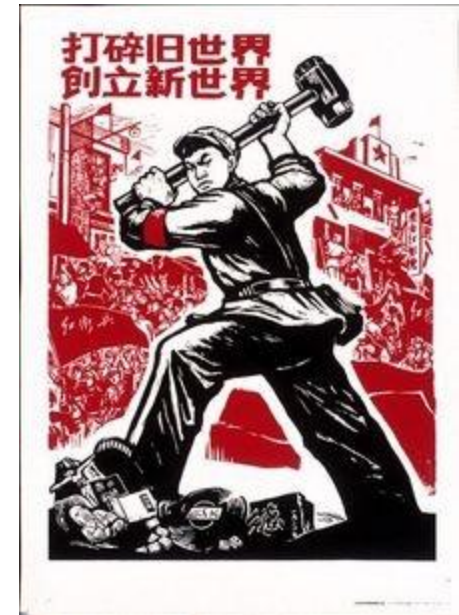


This led to the Communist seizure of power

- Consolidation (1949-52): private enterprises were placed under government control. Foreign enterprises were nationalized
- First 5-Year Plan (1953-57): Heavy dependence on cheap Soviet loans. Construction of modern industrial facilities by Soviet experts, who trained Chinese technicians to run them.
- Great Leap Forward (1958-60): Designed to harness the country's abundant labor by making use of socialist ideology. Mass mobilization. Backyard steel mills. Soviet technicians withdrawn. Low quality of output (emphasis on targets rather than results) and lack of coordination caused the Great Leap to fail.



- Cultural Revolution Period (1966-69): Triumph of socialist ideology over economic rationality. Those with moderate, revisionist views were purged. Technical excellence was denegated. Ideological polarization. Growth rate of -2.5% p.a. and cumulative fall in industrial output of 20%
- Post-Cultural Revolution Period (1970-6): Turn from class struggle to modernization, emphasizing acquisition of foreign technology. Ten-year plan envisaged rapid growth of both agriculture and industry.
 - Economic performance was mixed (better than in the preceding period but still pretty dismal in absolute terms).



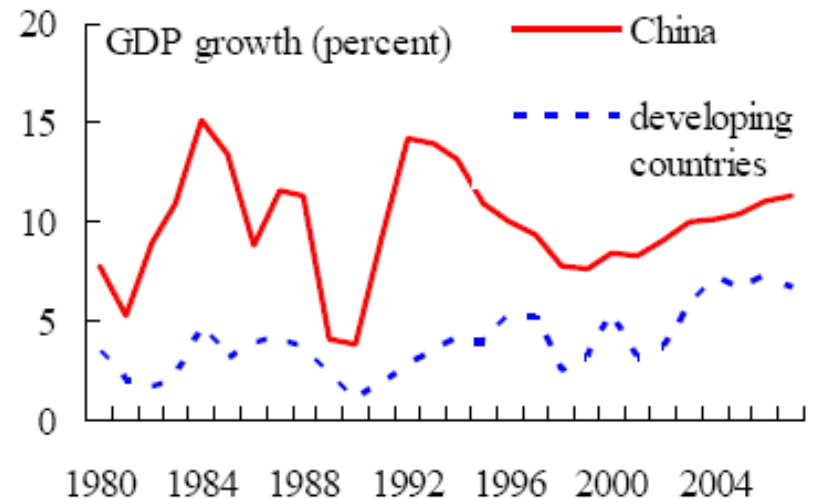
Then came reform and liberalization

- Launching the modern Chinese growth miracle.
- So why was reform initiated at this time?
 - There was growing appreciation that a new approach was needed in order to jump-start the economy (the approach taken in the post-Cultural-Revolution period not having produced significant growth).
 - In addition, there was growing evidence of the Soviet economy (still China's model) falling behind.

Then key growth-initiating reforms were undertaken starting in 1978

- Small state enterprises were transformed into collectives, giving workers a say and a stake.
- Small private enterprises allowed.
- Small enterprises were given some freedom to set prices.
- Farmers allowed to lease land and keep and sell surplus production.
- Functions of central government and state enterprise were more clearly distinguished, with the intent of giving the latter more autonomy.
 - These were only modest and limited reforms.
 - Still, the initial impact was decidedly positive.

Figure 1. Economic growth has been rapid.

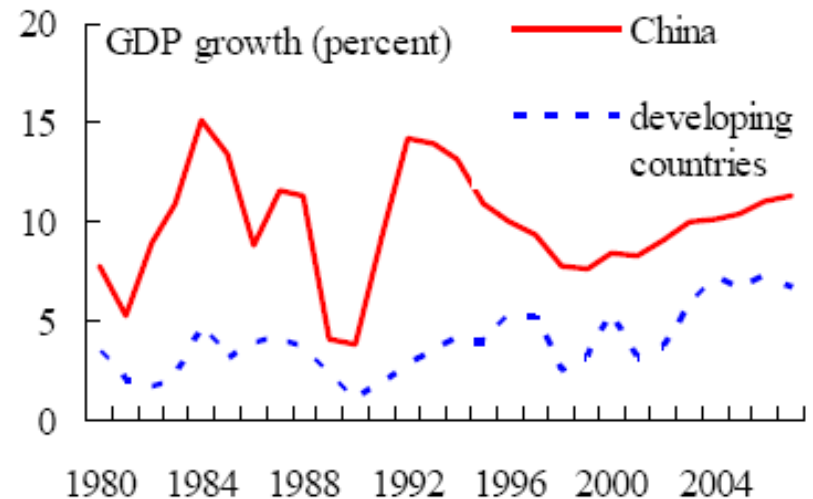


Source: World Bank WDI and authors' estimates.

While early reforms produced results, they also suffered from problems

- In agriculture, limited term (15-year) leases provided no incentive for farmers to improve irrigation, preserve fertility of soil, etc.
- In industry, managers had incentives to, inter alia, overpay themselves and underinvest in other changes that might have raised productivity (since liberalization was not accompanied by privatization).
- This was liberalization without privatization. It delivered improved but not perfect results.
- Indeed, we can see at right signs that the initial growth spurt was beginning to peter out in the later 1980s.

Figure 1. Economic growth has been rapid.



Source: World Bank WDI and authors' estimates.

A little more detail on the commercialization and privatization of state-owned enterprises

- In particular, China commercialized and privatized state-owned enterprises slowly by the standards of the former Soviet Bloc economies that took Western advice. It did more commercialization than privatization.
 - 1979-: managers could make decisions regarding bonuses, how and what to produce, market and how to price. Prices of outputs liberalized.
 - 1983: Managers would sign contracts about taxes and profits to be turned over, but losses were forgiven.
 - 1985-: prices of inputs were liberalized. Small SOEs were collectivized.
 - 1990s: Privatization of small SOEs. 175 property rights exchanges were established to transfer ownership.
 - 1995-: Control of remaining SOEs was transferred to local and regional governments. These saw no particular advantage to having SOEs as opposed to a thriving local economy. They therefore privatized them at an accelerating pace.
 - They turned large SOEs into joint stock companies to strengthen market discipline on managers. But shareholders in these firms have few rights. Raising the question: Can corporate governance be effective in this setting?

So why not go faster on SOE reform?

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So why not go faster on SOE reform?

- SOEs remain important employers (although SOE employment has fallen by 50 m.).
- In a country where only 1 in 6 workers has some form of social insurance, more rapid downsizing of SOEs could fan political unrest.
- SOEs provide housing, health care, schooling, other social services.
- Absent a social safety net, SOE reform threatens essential protections for many families.
- And until the private sector ramps up further and the government enhances its revenue raising capacity, there are few alternative ways of providing these services.

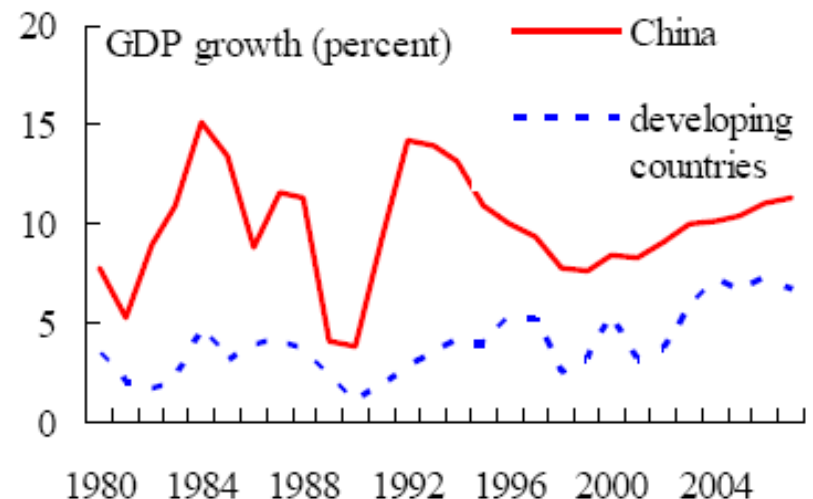
Further reform starting in the late 1980s addressed evidence of mounting problems

- Earlier slide described gradual commercialization and privatization of SOEs in this period.
- In addition, the exchange rate was stabilized and unified. Inflation was brought down.
- The yuan exchange rate was then pegged to the dollar in 1997.
- Further steps were taken to encourage exports and inward foreign direct investment. It became easier to establish new private enterprises. In 1999, for the first time, private enterprises did not have to go through state trading companies in order to export.

Results now came quickly

- Exports surged ahead (growing by as much as 40% per annum).
- Ongoing shift of labor from rural to urban employment, from interior to coast, from agriculture to export-oriented manufacturing.
- Overall economic growth accelerated again and, this time, the acceleration was sustained.

Figure 1. Economic growth has been rapid.



Source: World Bank WDI and authors' estimates.

With all this discussion of liberalization, it is important to remember that China was and still is a mixed economy

- We hear about new private enterprises, mainly foreign-investment enterprises along the coast, that act like companies in market economies, setting their own prices, hiring workers freely.
- But planning remains important over much of the economy.
 - The prices of utilities, public transport, coal, natural gas, oil, gas and indirectly food (due to state-sponsored agricultural inventory management programs) are set by the state. So are interest rates, exchange rates, bank credit lines and bond prices. These are set by the authorities through the agency of the National Development and Reform Commission, contemporary counterpart to the old planning agency.
 - Similarly, many investment decisions are still taken by the National Development and Reform Commission, which directs resources to state-owned enterprises (and by managers of those enterprises, who equate scale with success), and financed by state banks.
 - Tax breaks and subsidies for exporters remain widespread (although they are now being adjudicated by the WTO in response to cases brought by the US).
- So, increasingly, China has a hybrid system of private ownership and administered pricing. The question is whether this hybrid system can continue to allocate resources efficiently.

How then should we interpret China's growth and reform experience?

- Facts are clear: small scale (agrarian) liberalization and privatization (or collectivization), but slower liberalization and privatization of large (industrial) enterprises. Partial but not complete price liberalization.
 - *Two-track reform*, in other words.
- Interpretation is less clear (there exist two interpretations (as you will see from the readings for today, namely):
 - The *experimental* interpretation or view
 - The *convergence* view

Experimental Interpretation

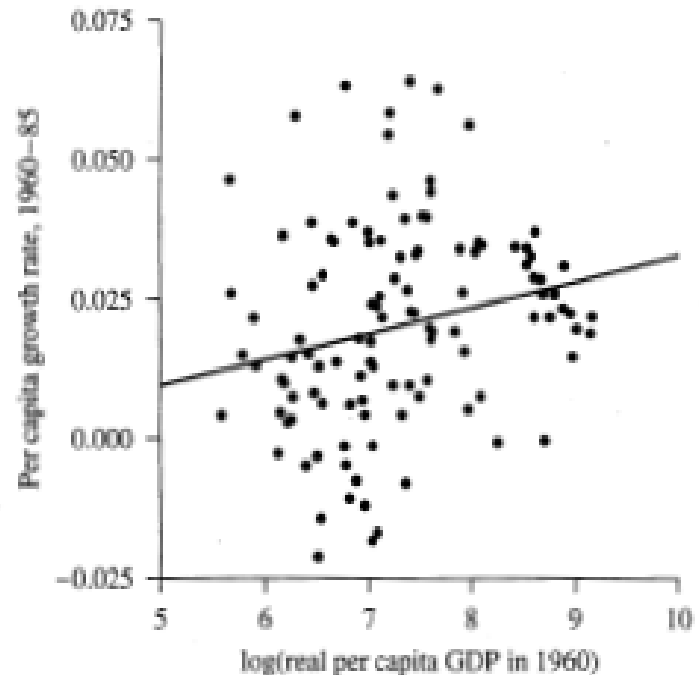
- The authorities are groping toward a unique kind of Chinese social market economy.
- Reforms have been gradual and incremental.
- Slow reform has minimized social conflict and instability.
- Incremental approach has allowed the authorities to avoid mistaken policies.
- It has enabled the populace to learn about the advantages of reform.
- Implication drawn by exponents of this interpretation is that the model could also have been used successfully by other transition economies.

Convergence Interpretation

- China is gradually converging to the standard model of market capitalism.
- Its growth was fast despite the slow pace of reform, not because of it.
- The gradual nature of reform and periodic reversals reflect conflict within the country over direction of reform, not some grand experimentalist theory.
- Special circumstances (factors like unusually large share of agriculture, small size of SOEs in heavy industry especially, favorable access to ocean shipping lanes) made possible rapid growth despite slow reform.
- Implication is that the model would not have worked in other transition economies.

Which interpretation is right continues to be debated

- A cross-country growth model can entirely explain Chinese growth from 1979 through 1995 simply by invoking:
 - initial per capita income,
 - favorable physical access to sea lanes
 - export orientation,
 - proportion of labor force in low-wage agriculture
 - stable monetary and fiscal policies
- **In other words, opening and following stable policies (plus some favorable preconditions) explain everything.**
- **So maybe what has mattered for China's economic success is not a superior economic policy strategy but simply different (favorable) initial conditions.**



Strong implication (is it right?)

- Distinctive Chinese institutions and policy strategies added (and subtracted) nothing.
- They were neither the source of the country's rapid growth nor a significant barrier to it.
- Looks like support for the convergence interpretation.

For how long, then, is China's growth model sustainable?

- In pursuing a model of export led growth sustained by a stable, undervalued currency and high rates of capital formation, China is following the same model as Japan, Korea, Taiwan, Hong Kong, and Singapore.
- I have referred to this as “extensive growth.”
- But China's emphasis on this approach appears to have been rising over time, which is troubling.
- At some point, China will have to move to more intensive growth. It is already beginning to move up the product ladder.
- Productivity numbers to the right do not look promising from this standpoint.
- And China faces further challenges:...

Sources of Economic Growth in China Incorporating Human Capital Using Barro-Lee Approach

	1978- 2008	1978- 1999	1999- 2008
<i>Contribution to GDP growth (%)</i>			
Physical capital stock	44.96%	36.35%	67.62%
Labor	8.50%	10.78%	3.97%
Human capital stock*	11.74%	14.95%	9.60%
TFP	34.80%	37.93%	18.81%

*average years of schooling as the proxy for human capital stock

A very short list would include:

- Inequality
 - Ageing (a stagnant labor force, growing demands for health care, pensions)
 - Heavy resource and energy dependence
 - The need to move away from export led growth to a more balanced pattern of production and spending (larger service sector).
 - The need accommodate the demand for political freedom commensurate with economic freedom.
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- Time is limited, but let me talk about at least a couple of these challenges.

Inequality problem

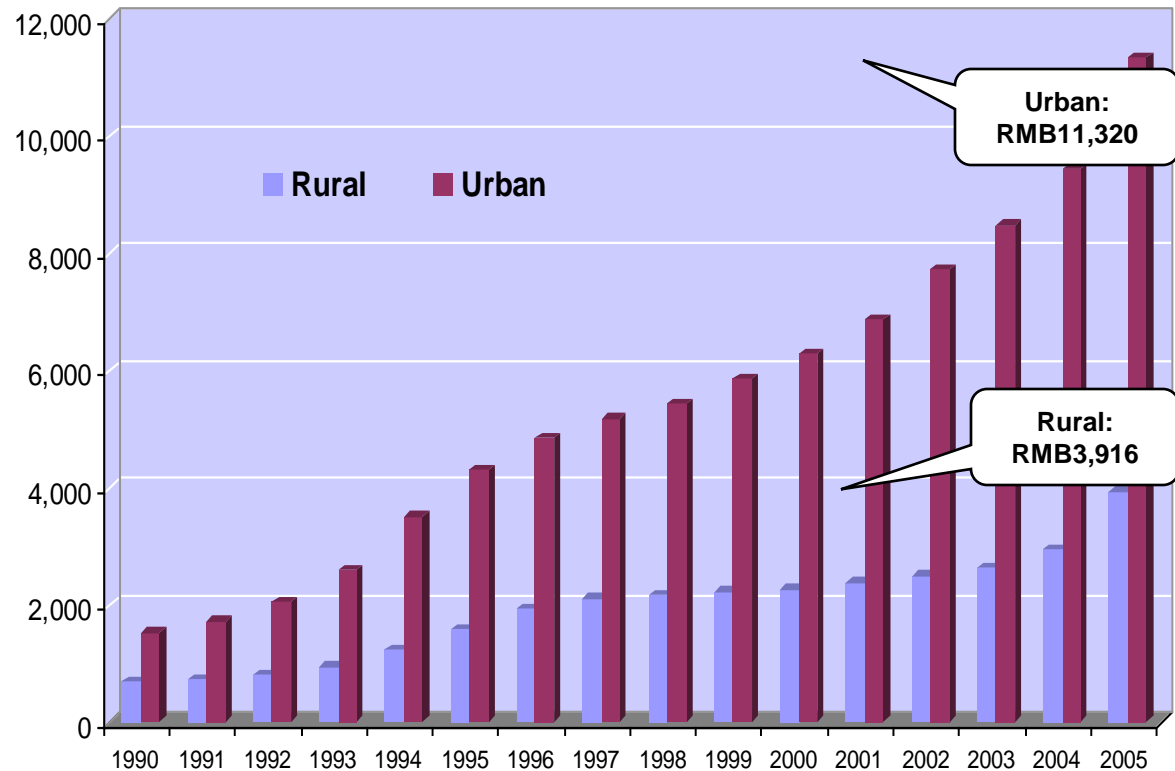
- Different regions have benefited differentially.
- The map at right compares per capita incomes in 2010 with those in foreign countries.
- Living standards in Xinjiang in the West are equivalent to those in Cape Verde, while those in Shanghai average the same as in Chile.
- In turn, this fuels internal migration, aggravating social tensions.



Associated with this is the urban-rural divide

- Urban real incomes have been growing by 12 per cent a year, but rural real incomes have been growing by only 6 per cent.
- China's urban-rural income gap is one of the largest in the world.

Per Capita Income of Urban and Rural Households (RMB)



- Rural incomes in 2005 were 35% of urban incomes.
- Most recent GINI index high at 0.53. (Chinese Academy of Social Sciences).

Source: China Statistical Yearbook

The bulk of the population is benefiting less than one might expect

- Consumption is not rising as fast as GDP (since investment rates are so high and rising).
- Consistent with this, infant mortality has been falling more slowly than in other Asian countries (than in the Philippines, Bangladesh and Vietnam, all of which have been growing more slowly).



What might be done:

- Spend more on public health (China spends only 2/3 as much per head as other countries with its per capita GDP).
 - Spend more on public education (China spends only half as much as other countries with its per capita GDP).
 - Ensure better treatment of farmers whose land is being alienated in order to reallocate it to expanding urban uses (presently they get little when displaced).
 - Provide better infrastructure for the interior of the country.
-
- All of which is part of the latest five-year plan...

Energy problem

- China has coal, but little oil and natural gas.
- Its imports of energy are growing by 30 per cent a year.
- Much of this comes from politically unstable countries, so it is a source of vulnerability.

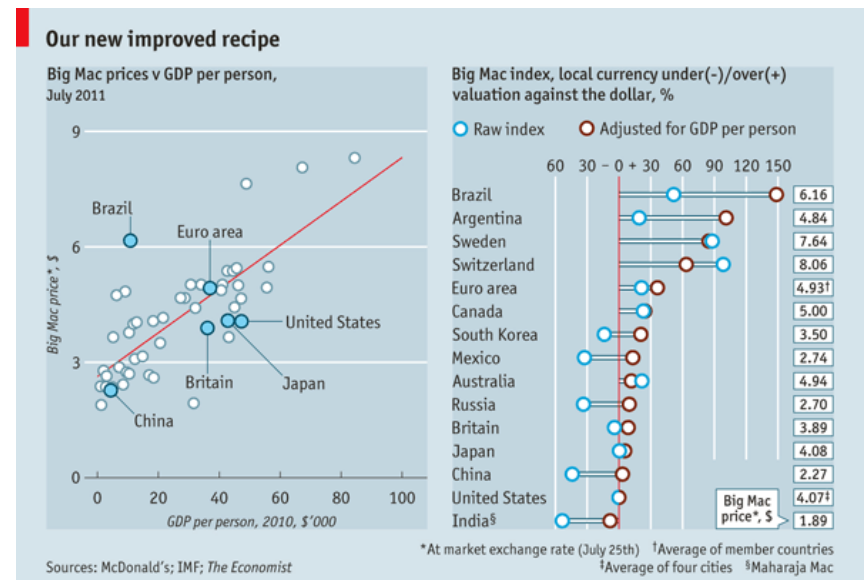


What to do:

- Increase the efficiency of residential heating: better standards could be applied to new residential construction.
- Raise gas prices. The retail price of gas is below even US levels; this encourages motorization.
- Adopt a form of tradable permits and taxes on enterprises emitting greenhouse gases could be taxed.
- Invest in green technologies (as the authorities are beginning to do).
 - China is now the largest producer of solar panels.
 - It has the largest wind turbine manufacturing complex in the world. (Partly as a result of government subsidies, since halted.)
 - It was moving very rapidly to construct nuclear plants before Fukushima.

Rebalancing

- Sometimes this is posed as whether the yuan is undervalued, inflating China's exports and current account surplus.
 - After all, a Big Mac costs 40% less in China than here.
- Other times it is posed as whether China needs to raise spending relative output.



But the two points are related

- China needs to raise household consumption from an abnormal $1/3$ of GDP toward the international norm of $2/3$ of GDP.
- This will require a change in relative prices.
 - Chinese people disproportionately consume Chinese stuff. As they consume more, the relative price of Chinese stuff will have to rise.
- And that in turn will require a real exchange rate change (implying either more inflation in China or yuan appreciation).

Is a changing of the guard coming?

- What would it take China's GDP to overtake the United States in aggregate GDP in, say, 20 years?
- Answer: China would have to grow by 10% a year over that 20 year period, while the US grew by only 2 per cent.
- Is this plausible? Is it likely to happen?

-
- In fact, the U.S. traditionally has grown in excess of 3% per annum.
 - That said, it is conceivable that U.S. growth capacity has been impaired by the crisis.
 - And what about Chinese growth? Can China maintain a 10% per annum growth rate? Or will its economy slow down? And if so when?

International/historical evidence may be helpful

- It was, in fact, this question about China that motivated the Eichengreen/Park/Shin paper that you read for this week.

What do we do?

- We look at international experience since 1950.
 - We identify an episode as a growth slowdown if the rate of GDP growth satisfies three conditions:
 - Growth is at least 3.5 per cent over the initial 7 year period.
 - Income per capita is at least \$10,000 US (2007 PPP prices).
 - The growth slowdown between successive 7 year periods is at least 2 percentage points.
 - All of these thresholds are somewhat arbitrary?
 - What should one do about this? Sensitivity analysis.
 - We do some (described on next slide). You could do more as your research paper...
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- Note that our data end in 2007, which accounts for the absence of potential recent slowdowns some people may have in mind.
 - Recall that we need a 7 year window.
 - Note that we do extensive sensitivity analysis.
 - Alter the 7 year window.
 - Lower the \$10,000 per capita income threshold designed to exclude chronic slow-growth poor economies.
 - Treat oil exporters separately.
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- Table 1 in the paper lists all the slowdowns identified by this approach.
- In some cases the methodology identifies a string of consecutive years as growth slowdowns.
 - For Greece, for example, all years between 1969 and 1978 are identified as a slowdown.
- One way of dealing with this is to employ a Chow test for structural breaks to select only one year out of the consecutive years identified.
 - For Greece we would then select 1973 as the year of growth slowdown because the Chow test is most significant for that year.

Table 2.9. Episodes of Slowdown by Decade and Magnitude of Deceleration

Decade	Country	Year	Growth before, (t-7 through t)	Growth after (t through t+7)	Difference in growth	Per capita GDP at t	
1960s	Denmark	1964	5.0%	2.9%	-2.1%	13,800	
	New Zealand	1965	4.1%	0.9%	-3.2%	14,073	
	United States	1968	4.0%	1.5%	-2.5%	17,073	
1970s	Denmark	1970	3.9%	1.5%	-2.4%	16,584	
	Finland	1970	4.7%	2.3%	-2.4%	11,981	
	Netherlands	1970	4.5%	2.0%	-2.4%	15,205	
	Israel	1972	5.5%	1.2%	-4.3%	13,215	
	Japan	1972	8.8%	2.8%	-6.0%	12,556	
	Austria	1973	4.8%	2.7%	-2.0%	14,806	
	Belgium	1973	4.7%	2.5%	-2.2%	14,371	
	Greece	1973	7.4%	1.4%	-6.0%	10,747	
	Netherlands	1973	3.6%	1.6%	-2.1%	16,294	
	Spain	1974	5.5%	0.2%	-5.2%	11,703	
	Finland	1974	5.3%	1.7%	-3.5%	14,308	
	France	1974	4.1%	1.8%	-2.4%	15,487	
	Italy	1974	4.3%	2.3%	-2.1%	13,494	
	Belgium	1976	3.9%	1.3%	-2.6%	15,472	
	Greece	1976	4.8%	0.1%	-4.7%	10,997	
	Austria	1977	3.9%	1.6%	-2.4%	16,788	
	Hong Kong	1978	6.5%	4.4%	-2.1%	11,761	
	Ireland	1978	3.7%	0.8%	-2.9%	10,292	
	1980s	Singapore	1980	5.6%	2.8%	-2.8%	13,032
		Hong Kong	1982	7.4%	5.4%	-2.0%	14,519
United Kingdom		1989	3.6%	1.4%	-2.2%	19,800	
1990s	Puerto Rico	1990	4.8%	2.4%	-2.4%	15,087	
	Portugal	1991	5.1%	2.1%	-3.0%	12,884	
	Taiwan	1992	7.3%	5.1%	-2.2%	12,743	
	Japan	1992	3.6%	0.6%	-3.0%	22,437	
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- With this break point in hand, we next assign the value of 1 to the three years centered on the year of the growth slowdown, i.e. the dummy equals 1 for and zero otherwise.
- The comparison group consists of the countries that did not experience a growth slowdown in that same year.

Table 2.9. Episodes of Slowdown by Decade and Magnitude of Deceleration

Decade	Country	Year	Growth before, (t-7 through t)	Growth after (t through t+7)	Difference in growth	Per capita GDP at t
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	Finland	1970	4.7%	2.3%	-2.4%	11,981
	Netherlands	1970	4.5%	2.0%	-2.4%	15,205
	Israel	1972	5.5%	1.2%	-4.3%	13,215
	Japan	1972	8.8%	2.8%	-6.0%	12,556
	Austria	1973	4.8%	2.7%	-2.0%	14,806
	Belgium	1973	4.7%	2.5%	-2.2%	14,371
	Greece	1973	7.4%	1.4%	-6.0%	10,747
	Netherlands	1973	3.6%	1.6%	-2.1%	16,294
	Spain	1974	5.5%	0.2%	-5.2%	11,703
	Finland	1974	5.3%	1.7%	-3.5%	14,308
	France	1974	4.1%	1.8%	-2.4%	15,487
	Italy	1974	4.3%	2.3%	-2.1%	13,494
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	Hong Kong	1978	6.5%	4.4%	-2.1%	11,761
Ireland	1978	3.7%	0.8%	-2.9%	10,292	
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Some more comments on the list

- This list passes the smell test: many of the cases are well known.
- In the majority of the countries experiencing slowdowns, this event is centered at a single point in time and a particular level of per capita income.
- Oil exporters are unusual in that they are able to maintain high rates until higher per capita incomes are reached than is customary for other countries.

Table 2.9. Episodes of Slowdown by Decade and Magnitude of Deceleration

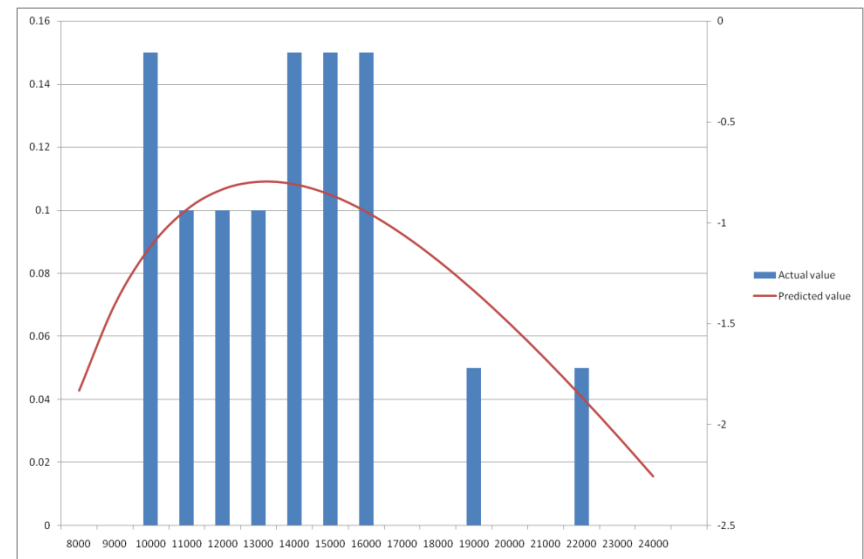
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- So we focus on average values for all non-oil-exporting countries. On average, high growth came to an end at a per capita GDP of \$16,740, in 2005 constant international prices.
 - The median is \$15,058.
- At that point the growth rate slowed from 5.6 to 2.1 per cent per annum.
 - For purposes of comparison, note that China's per capita GDP, in constant 2005 international prices, was \$8,511 as of 2007, India's \$3,826, Brazil's \$9,645. These are the latest compatible figures provided by Penn World Tables.

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- But around the average of \$16,740 there is considerable variation, as shown at right.
- Economic structure and policy variables presumably have their own separate effects.
- There are some anomalies: UK (second slowdown), Japan (second slowdown), Norway (natural gas), Hong Kong and Singapore (city states seem to be immune from early slowdowns, for some reason).



Growth accounting results

- Question: what grows more slowly around times of slowdowns: capital, labor or productivity?
- Answer (in Table 2): 85 per cent of the slowdown in the rate of growth of output is explained by the slowdown in the rate of TFP growth.
- Evidently, slowdowns coincide with the point in the growth process where it is no longer possible to boost productivity by shifting additional workers from agriculture to industry and where the gains from importing foreign technology diminish.
 - The real exchange rate may also be relevant for this (ability to move into the production of more technologically sophisticated goods) – more on this in a moment.

Why do countries slow down?

- **Probit regressions on a panel of nonoverlapping five-year averages suggest:**
 - Because they approach the technological frontier defined by the per capita income of the lead country.
 - Because dependency ratios rise, causing their labor forces to grow more slowly.
 - Because easy growth by shifting labor from low productivity agriculture to high productivity manufacturing comes to an end.
 - A higher manufacturing share “helps” early on but not as the manufacturing share grows.

Table 2.10. Predicting Growth Slowdown (Multiple episodes allowed for one country)

	Deceleration			
Per capita GDP	78.062** [25.759]	101.867** [38.648]	142.396** [39.291]	146.528** [41.121]
Per capita GDP ²	-4.113** [1.349]	-3.343* [1.415]	-7.440** [2.046]	-7.651** [2.142]
Ratio	17.998* [7.223]	-109.535 [91.881]		
Ratio ²	-14.872** [5.708]	36.905 [34.966]		
Dependency			-60.008* [23.514]	-62.432* [25.750]
Dependency ²			46.988* [21.363]	50.648* [23.186]
Fertility			0.962* [0.483]	0.465 [0.544]
Manufacturing employment share				85.107* [39.976]
Manufacturing employment share ²				-192.426* [83.380]
Pseudo R-square	0.21	0.20	0.24	0.28
Observations	265			
Country	20			

Some more observations about the probit regressions

- Per capita GDP is consistently the most important variable: both per capita GDP and its squared are highly significant.
- If we use the regression result in column (1), the peak probability of slowdown occurs when the per capita GDP reaches \$15,389 in 2005 prices, broadly in line with the simple statistics discussed earlier.
- Column 2 suggests that a growth slowdown typically occurs when per capita income reaches 58 per cent of that in the lead country.
- The manufacturing employment share and the manufacturing employment share squared are also significant. The peak probability occurs when manufacturing accounts for 23 per cent of total employment.
- The likelihood of a growth slowdown increases as well with the speed of growth in the seven-year pre-slowdown period (not shown here).
- Interestingly, the dependency-ratio variables are not statistically significant, although higher old-age dependency ratios are when we enter these separately.

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-
- Note that China's share of manufacturing in total employment was 11.3 per cent in 2002, the latest year for which data are available.
 - In the absence of further figures we assume that this fraction has been growing at one per cent per annum. If this is right, it suggests that the share of employment in manufacturing is now within hailing distance of the 23 per cent where historical comparisons suggest that growth slows down.
-

Sensitivity analysis

- We can consider other specifications:
 - Add trade openness
 - Add policy variables (policy outputs like inflation, inflation variability, consumption and investment shares of GDP, real exchange rate undervaluation)
 - What you could do? (Think of other variables that we've ignored?)

-
- We can use a selection of our estimated equations together with 2007 values of the independent variables to estimate the likelihood of a Chinese slowdown.
 - Using the regressions where the key independent variables are per capita income, the pre-slowdown rate of growth, demographic structure and trade openness and the composition of spending puts the probability in the next five years at 77 and 73 per cent.
 - Where the independent variables are policy measures (inflation, inflation variability and real undervaluation), this procedure puts the probability of a slowdown at 71 per cent.
 - These are non-negligible odds.
-

When we add structural and policy variables

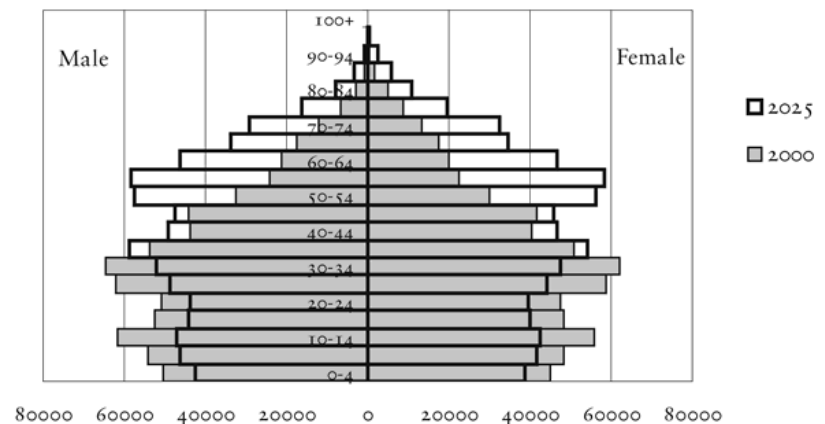
- Slowdowns are more likely in countries with
 - Increasingly unfavorable demography.
 - Sounds like China.
 - Population aged 15-24 will *fall* by 21% over the next decade.
 - Very high investment rate.
 - Sounds like China.
 - Undervalued currency.
 - Sounds like China.
-

What lies behind the demography result?

- Higher share of the elderly in population means that you can't grow simply by increasing the share of the population working.
 - Elderly require more public spending on social services (health care and the like).
 - Savings rates will be lower, other things equal.
 - Slower labor force growth will mean more upward pressure on wages.
 - All these factors will operate with a vengeance in China owing to its long-standing One Child Policy.
-

China's demographics suggest: "soon"

- ❑ China's dependency ratio begins rising significantly as soon as 2011. Labor force growth slows sharply.
- ❑ In 2030, China's working age population will be a negligible 10 million greater than today.
- ❑ With the labor force growing more slowly, output growth will slow.
- ❑ With higher old-age dependency ratios, savings and investment rates will fall.
- ❑ China's age pyramid 2000 vs. 2025 is at right (lots more old dissavers are coming).



What explains investment result?

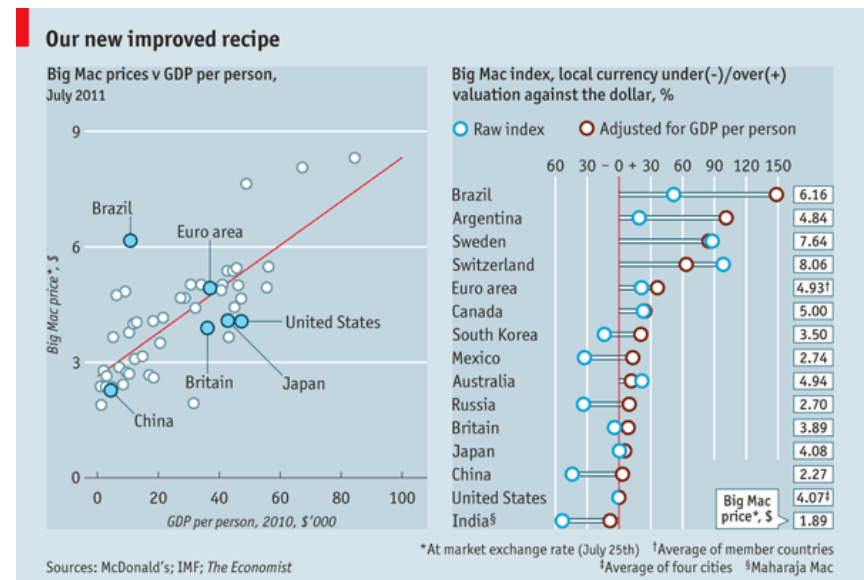
- Quite simply, no country can invest 50 per cent of its GDP, as China does currently, productively for an extended period.
 - We have all heard the tales of ghost towns, idle airports, empty bullet trains, excess capacity in cement, aluminum, steel, auto parts.
 - A high investment supports growth now but causes financial vulnerabilities to build up.
 - It also creates the façade of prosperity, allowing the authorities to put off needed reforms.
-

What explains undervaluation result?

- A cheap (“undervalued”) currency is good for promoting the growth of unskilled labor-intensive manufacturing.
 - But this same reliance on cheap labor weakens the pressure to move up the ladder into the production of more technologically sophisticated products.
 - Eventually the pool of cheap rural labor is drained, and other even cheaper-labor countries come along.
 - Hence undervaluation can boost growth for a time but becomes a liability as a country approaches Chinese levels of per capita income.
-

Note: how we measure undervaluation

- Like this, but using overall price index rather than just the price of a Big Mac.



Imagine that over the next 20 years :

- TFP growth rate remains stable at the current level: 3%.
 - This is a very respectable rate for any country
- Investment rate is 35 per cent rather than 45%.
 - Then the rate of growth of the capital stock will slow from 12% to 7%.
- A labor force that grows by 0.25% per year.
- A stock of human capital that continues to grow by 2% a year.
 - Add it all up, and growth then slows to 7 ½% per annum.

-
- But say that TFP growth also falls from 3 to 0-1 per cent, as is typical of previous slowdown cases.
 - Then China's growth slows to just 4 ½ - 5 ½ %

Alternative conclusions

- Conclusion 1: there are many reasons to be cautious about extrapolating international experience in the past to China in the present (“China is sui generis”).
 - Conclusion 2: look out below.
-