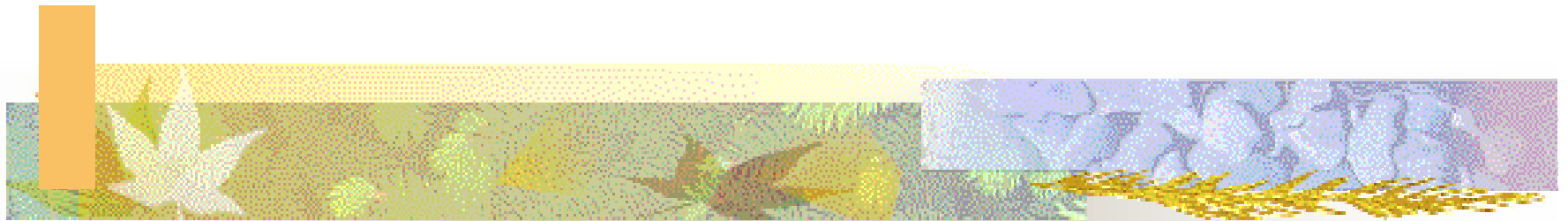


Statistics In China



Ai-Chu Wu, Ph. D



Outline

- **Introduction:**
Past & Present
- **My Experiences:**
Business & Personal
- **Other Perspectives:**
Convenient Samples
- **Conclusions**

Past: $\pi = ?$

Zu Chongzhi
(429-500)

“ $\pi \sim 3.1415926$.”

“Rough est. $\sim 22/7$
 $= 3.142857143$.”

“Close est. $\sim 355/113$
 $= 3.14159292$.”



Present: Growth

THE NEW YORK TIMES, THURSDAY, JANUARY 26, 2006

China Reports Another Year of Strong (or Even Better) Growth

By KEITH BRADSHER

HONG KONG, Jan. 25 — China's economy surged 9.9 percent last year, government statisticians said in Beijing Wednesday, amid signs that growth may have been stronger still.

For a third consecutive year, China reported growth that nearly grazed the 10 percent mark. That left some economists wondering if the figures had been deliberately kept beneath that level to avoid drawing the anger of other industrialized nations and furthering calls for a higher yuan.

Over the last two years, China has shown a penchant for issuing quarterly and annual growth statistics barely under 10 percent, and then revising them upward many months later, when few are paying attention.

This month, China revised upward the growth in 2003 and 2004, previously set at 9.5 percent in both years, to 10 percent in 2003 and 10.1 percent in 2004.

The statistics for 2005, showing national economic output of \$2.26 trillion, sent China soaring past France, Britain and Italy to become the world's fourth-largest economy, after the United States, Japan and Germany. Some economists, however, adjust China's figures for the low value of its currency and its modest domestic prices to suggest that at comparable prices, the actual value of China's output has surpassed Germany's as well.

Given the clumps of tall cranes that dot the skylines of Chinese cities; the shopping malls packed with buyers; and the containers full of exported shirts, toys and other goods that clog Chinese docks, the economy is growing so fast that some experts suggested Wednesday that China is perhaps again underestimating the true level of growth.

The country may well have reason to do that. A figure of 10 percent or higher might send prices for oil and other commodities that China imports even higher, and might prompt the United States to make even stronger demands that China's currency be permitted to rise appreciably in value against the dollar, said Stephen Green, a China economist with Standard Chartered Bank.

China, like most countries, calculates its economic output mainly from data supplied by factories and other producers. But the government's own data on spending by the government, investors, consumers and foreign buyers suggest that the true rate of growth last year may have been as high as 15 percent, Mr. Green said.

Rising exports in particular have helped lift China to an average annual growth rate of 9.6 percent over the last quarter of a century. But economists said that Wednesday's figures showed that consumer spending was becoming increasingly important.

Liang Hong, an economist in the Goldman Sachs office in Hong Kong, noted that retail sales in China



Natalie Behring/Bloomberg News

A couple buying decorations in Beijing for the Chinese New Year. Economists say consumer spending is becoming more important to growth.

climbed 12.5 percent last year.

"We believe domestic demand will increasingly become a much more important driver for growth, and China will become a more positive force for global demand in the coming years," she said in a research report.

Some experts continue to question whether China is too reliant on investment spending. They also ask whether too much of that investment involves ill-considered splurges on new factories and the latest equipment, even in industries like auto manufacturing and steel making,

where overcapacity is becoming a serious problem.

China has been gradually whittling away at the serious problem of bad loans at state-owned banks. But China remains heavily dependent on continued borrowing by companies to build ever more factories and apartment buildings, even as they struggle to earn enough from existing operations to repay past loans.

"Given the evidence of deteriorating investment efficiency, China needs to rebalance its growth by shifting away from investment toward consumption," said Qu Hongbin, the

senior economist for China at HSBC.

Strong Chinese demand for new power plants, cranes, high-speed locomotives and trucks has fed a boom in Chinese imports of these and other kinds of capital equipment from Germany and Japan in particular. Tao Dong, chief Asia economist for Credi Suisse, said a detailed analysis showed that exports to China played a critical role in recent signs of a revival in the German and Japanese economies. "China has become one of the forces lifting these two countries out of recession," he said.

The economic figures released Wednesday are so strong that they suggest the Chinese economy may even be reaccelerating this winter despite the government's efforts to discourage property speculation through tax changes and administrative measures, Mr. Tao said.

One reason for the economy's strength is that the People's Bank of China, the central bank, has raised its benchmark interest rate only slightly more than a quarter of a percentage point in three years, even as the Federal Reserve has pushed through 13 quarter-point increases.

Many consumer-oriented service businesses are now palpably running at capacity as a result. Mr. Tao said that when he visited Beijing last week, he had to call seven high-end restaurants before he could find one with a table free for dinner.

"After six restaurants turned me down," he recalled, "I said, 'Gee, the economy is booming.'"

Present: NY Times



Present: NY Times

C2 Y1 THE NEW YORK TIMES, WEDNESDAY, DECEMBER 21, 2005

That Blur? It's China, Moving Up in the Global Pack

Continued From First Business Page

far in front, with a value of about \$11.7 trillion last year. And for all China's fast growth and its rapid ascension to the major leagues among national economies, it remains a relatively poor country.

Even with the expected revision, China's output per person will climb to a little more than \$1,700 this year. It ranked 134th in income per person in 2003, according to the World Bank.

Though its statisticians are highly trained, China is still quite secretive about its methods and means for gathering economic data. This has long generated debate among economists, much as the Soviet Union's economic figures did: some economists think China's figures disguise weakness, while others think they hide strength.

The figures for China's national accounts — the numbers that measure gross domestic product, including spending and trade — are supplied by its National Bureau of Statistics.

The bureau publishes several sets of statistics — some as often as monthly — based either on its own estimates or upon numbers supplied by China's local governments. But those figures can vary widely. Totting up regional gross domestic product in 2003, for example, gives a figure of \$1.6 trillion, 12 percent to 15 percent higher than the bureau's

own estimates.

The discrepancy also underscores a difference in incentives. Provincial and municipal authorities want to impress Beijing and limit any embarrassments, as the delays in reporting bird flu cases and the chemical spill in Jilin Province have shown.

Beijing worries more about its reputation in the rest of the world, where accuracy is paramount.

There are other reasons that huge swathes of the Chinese economy are unreported, said Frank Gong, the chief China economist for J. P. Morgan Chase.

"The way they collect the G.D.P. is really from supply-side, production-based statistics," he said.

Mr. Gong suggested that collecting data from the demand side — what consumers actually spend — would be more telling.

In a system left over from when China was almost entirely a planned economy, however, all the factories and supermarkets report their own sales and spending.

"That's problematic," he said. "The service part — the cash component of the economy — can be omitted easily. That's why the statistics tend to understate the actual level of activity."

Economists say the new figures provide good news for China, suggesting that the economy is healthier, more diversified and more sustainable than previously believed.

The revised figures, for instance, show that a much stronger services sector has emerged in the Chinese economy, taking some weight off

manufacturing. Dong Tao, an economist at Credit Suisse First Boston, said Tuesday in a statement that China might still be underestimating the size of its services sector by about \$200 billion.

The new figures also relieve some worries that the economy was too heavily dependent on investment and could overheat. And they show that there are more small and medium-size companies in the country. Stephen Green, a senior economist at Standard Chartered Bank, said the

ed States Bureau of Economic Analysis, pointed out a fundamental problem with China's numbers.

Most wealthy nations use a changing base for their gross domestic product series, to allow for differences over time in the basket of goods and services that consumer demand: experts don't want to use the price of a 1985 home computer for example, in calculating today's gross domestic product.

But China uses a fixed base for several years at a time, Mr. Gu said, which results in a growing bias. Like the underreporting of the service sector, this issue is especially serious, because it could affect the accuracy not just of the gross domestic product but also of its growth rate over time.

The statistics bureau has acknowledged several of these problems and unlike the old Soviet scorekeepers, it is eager to improve the quality of its statistics.

The bureau is working with the World Bank to develop a plan for its statistical apparatus, which would include reconciling the national and local figures.

Ms. Hong at Goldman Sachs offered an analogy to explain why the new figures were important.

"Does China have some structural illness or cancer, or is there an error with the X-ray?" she asked rhetorically.

"The last few years, so many famous economists cited the very high investment-to-G.D.P. ratio as a serious problem. Now it looks like the X-ray machine had a problem, not the patient."

A flawed statistical system may have low-balled China's economy to the world.

new figures calm some fears about imbalances in the economy.

"It's all good," Mr. Green said. "A bigger economy means all the dangerous ratios, such as investment as a percentage of G.D.P., all fall. And they are usually cited as showing the Chinese economy is in danger or headed for a fall."

The new figures are also expected to affect government planners and policy makers, altering things like monetary policy and inflation forecasts, or how government officials allocate money in the economy.

On a more technical note, Jiemin Guo, a senior economist at the Unit-

David Barboza reported from Shanghai for this article, and Daniel Altman from Hong Kong.



My Business Experiences

- 1994, HP (Agilent)
- Shanghai ~ 200 customers
- Beijing ~ 100 customers
- Chengdu ~ 50 customers
- Quality System: ISO 9000



Why did HP choose me?

- Technical Knowledge
- Practical Experience
- Writing Chinese Handbook
- Speaking Mandarin
- Translating Other Two Speakers' Talks and Q & A's



What did HP expect?

- **Announce the ISO9000 certification to customers.**
- **Share with customers the quality systems at HP**
- **Listen to the voice of customers.**



My Business Experiences

- 2004, Agilent
- Shanghai
- 40 engineers and managers
- Statistical Training with Applications



Why did they invite me?

Bring statistical concept & application knowledge to R&D and MFG Engineering:

- Understand the theory, and
- Apply SPC & DOE in daily work effectively.



Hot Issues: More, Faster, Better

- Quality Mindset.
- Statistical Process Control.
- Design of Experiments.
- Sampling Plans.
- Displaying & Analyzing Data



What did they expect?

1. Introduction to Statistical Process Control
2. Examples of how SPC is used
3. Basic statistical concepts
4. Types of data and how best to visualize them
5. Tests of significance
6. What is a control chart?
7. Different types of control charts
8. How to construct a control chart
9. How to use a control chart
10. Design of experiments

Welcome to the P.U.B. of Statistics!



- *Power*
- *Use of*
- *Beauty*

- *Collecting data*
- *Analyzing data*
- *Making conclusions*

My Favorite Recipe:



- Objective
- Question
- Data
- Analysis
- Conclusion



“Responsibility of engineers and people close to the job:

- Decide what quality characteristic to plot.
- Decide what kind of chart might be helpful.
- Decide on plan for collection of data.
- Decide scales for format of chart. Start chart.
- Consider revision of plan.
- Decide whether to continue the chart, or to revise the plan.
- Work on special cause indicated by a point out of control.
- With good luck, reach statistical control.



Responsibility of Management:

- Work on some definite change in the process for improvement (Less variation; Different level)
- Consideration of economics may lead to a decision not to make any change at this time, in which case, drop the chart, restore it from time to time to learn whether statistical control continues.

“Flow Diagram for a Control Chart”

W. E Deming, 10 Jan 1987



Introducing them to:

- JMP
- Minitab
- Six Sigma



My Personal Experiences

- **1984: One month**, Hong Kong, Guangzhou, Shanghai, Anqing, Hefei, Tongcheng, Beijing
- **1994: Three weeks**, Xian, Suzhou, Honngzhou, Yellow Mountain, Wuhan, Yangtze River Gorge, Chongking
- **1998: Five days**, Macau, Chongshan
- **2004: Three months**, ~30 cities, e.g. Silk Road
- **2005: Two months**, ~20 cities , e.g. Shangri-La
- **2006: Two months**, ~20 cities, e.g. Northeast, Inner Mongolia, Tibet

My 2005 Experience: \$25/day/person





Other Perspectives: **Software company CTO**

- **Quality and productivity** are evolving in **software** industry
- **Statistics** is taught and applied in **software** in China

Where Are The Largest Firms?

City	Numbers
Beijing	17
Shanghai	13
Shenzhen	6
Hangzhou	7
Jinan	3
Nanjing	3
Others	10
Total	69

- > 100 M yuan
(\$12.5M) sales
- Total = \$3,600 M
<Half of industry.

(source: CSIA, 2000)



Quality and Productivity

- Outsourcing Industry ~ India
- Improving Processes ~ SEI CMM certificate for winning projects
- Process Maturity
- Business Model
- Quality Policy



Roles of Statistics:

- Build Business Intelligence
- Empower Decision Makers:
Overloaded by Information
- Streamline The Process:
Raw Data -> Information
-> Knowledge -> Decision



On Line Analytical Processing:

- Quick, analytical queries - dimensional.
- Extract-transform-load, relational reporting, data mining.
- Applications of OLAP - reporting for sales, marketing, management, finance, business performance management, budgeting and forecasting
- The term OLAP was modified from the traditional database term OLTP (On Line Transaction Processing).



Other Perspectives:

China Software Industry Association:

- **China Software Growth:**

Sales Revenue RMB 59.3B in 2000 to
RMB 160B in 2003

Export from USD 0.25B in 2000 to
USD 2B in 2003.

- **Six Key Words for 2005:**

Zero-duty, Standard, Innovation
Capability, Marketing Channel, Capital
Operation and Resource Consolidation



**Other Perspectives:
2-June-2006, Weekly International
Briefing, Major Finance Company:**

**“As China now comes of age,
its focus is shifting away from
the quantity to the quality
dimension of the growth
experience.”**



Conclusions:

- Growing market.
- Exciting opportunities.
- Shocking barriers.
- You can make a difference.



Walter A. Shewhart:

"... the long range **contribution of statistics** depends not so much on getting a lot of highly trained statisticians into industry as it does in creating a statistically minded generation of physicists, chemists, engineers, and others who in any way have a hand in developing and directing the productive processes of tomorrow."



Questions or Comments?