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Research

Since my last academic review in 2001/02, for substantiation (Associate Professor), I have worked on three related issues: (a) profitability of state-owned enterprises (SOEs) in China, a continuation of earlier work; (b) the quality of Chinese statistics; and (c), most recently, economic growth in China. The three issues are related in that work on the profitability of state-owned enterprises raised a number of questions about the quality of the underlying data. In subsequent work on the quality of Chinese statistics I investigated Chinese GDP data, which then led me to inquire further into economic growth in China. Much of my research is relevant both to the technically-oriented economist working on China and to the China specialist (whether or not an economist).

I pursued the three issues of SOE profitability, quality of Chinese statistics, and economic growth because I perceived substantial gaps in the literature. It is not technical efficiency that determines the creation and survival of a firm, but profitability is. Research that uses Chinese statistics can only be as good as the data are, and the data are often not well understood. China's economic growth is a phenomenon that will likely stay with us for a long time, and may have a far-reaching impact on economies and societies around the world, yet systematic analysis of China's growth prospects and of the characteristics of China's economic growth has not gone far beyond production function estimations for the past.

My work has gained some prominence. Senior scholars engaged with my research. Angus Maddison replied to my analysis of his manipulations of Chinese data (and the reader may judge for him/herself whose arguments are more convincing). Gregory Chow published a comment on the capital series that I constructed for China. Thomas Rawski has repeatedly discussed the quality of Chinese statistics with me. The spatial deflators created in joint work with Loren Brandt have found widespread application. My SOE book received favorable and encouraging reviews. Work on the changing wealth of the state was awarded a prize by *The China Quarterly*. In 2003/04 I was able to spend a year at Stanford University as a Visiting Scholar, and in 2007/08 I will be employed by Princeton University as a Visiting Research Scholar and Visiting Associate Professor. The response to my work affirms the importance of the topics that I have taken up and is an encouragement to continue work along these lines.

Below, I outline my research achievements and future research plans. A list of abstracts of all research since 2001/02 is appended.

Work to date

a. SOE profitability

My 2003 SOE book provides a systematic analysis of industrial SOE profitability in the reform period. In comparison to the literature, the book has three major innovations:

- It focuses on profitability. Profitability is what matters in practice, rather than the theoretical construct of efficiency frequently examined in the literature.

- It is able to explain the decline in industrial SOE profitability during the reform period with arguments that are not intrinsic to state ownership.
- It finds that the different profitability levels of SOEs vs. non-SOEs can be explained by two government policy and historical factors.

This does not imply that SOEs are without shortcomings, and the book lays those out. The findings, however, contradict the widely held view that SOEs are categorically inferior and should all be privatized quickly.

This is recognized by reviewers who write that the book “debunks a number of preconceived notions about the performance of the state-owned industrial sector” (Charles Harvie, University of Wollongong), that it “represents a welcome challenge to the orthodox view” on privatization (Russell Smyth, Monash University), and that the results of my SOE vs. non-SOE comparison are an “extraordinary finding” (Stephen Green, then head of the Asia Programme at The Royal Institute of International Affairs in London).

The reviewers judge the book “a very useful addition to the literature on China’s experience” (Smyth). It “should be essential reading for scholars of contemporary industrial SOEs in China. It makes a welcome, thought-provoking, and refreshing contribution to the literature.” (Harvie) The book is a “hugely detailed and statistically sophisticated volume” and the “author has clearly made a very important contribution to our understanding of SOE performance and the fact that in terms of profitability they have done much better than commonly thought” (Green).

Selections from this book are now required reading in relevant courses at a number of universities. For example, Jean Oi made the book required reading in her graduate-level course on Chinese politics at Stanford, and Thomas Lyons requires selected chapters in his course on the Chinese economy at Cornell.

SOEs are also subject of a 2002/03 joint book chapter and journal article with Tim Zhu that moves beyond the separate analysis of nonperforming loans, SOE losses, and fiscal deficits to evaluate the most recent developments in the state sector as an aggregate.

b. Quality of Chinese statistics

Working with industry data in my SOE book, I became sensitive to the question of what the official data mean and how reliable they are. Chinese official statistics are widely used in research on contemporary China. Yet reading through the literature I often find fault with the use of Chinese data, and therefore doubt the robustness of the findings.

This led me to explicitly ask how reliable are Chinese statistics? How suitable are they for economic analysis? In 9 papers, 2 responses to senior scholars’ comments, and 3 short pieces, I address these questions and engage with debates in the profession about the quality of Chinese statistics.

Three papers examine how Chinese statistics are produced in order to evaluate how reliable these data are:

- A 2002 paper in *China Information* documents how key national accounts data are compiled and evaluates the limitations inherent in these compilation procedures.
- A 2004 paper in the *Review of Income and Wealth* identifies the challenges that economic reforms posed for China's statistical system, the resulting problems, and the response to the challenges. It derives an approximate margin of error for GDP data.
- An OECD Statistics working paper of 2005 describes the institutional arrangements for the production of statistics in China and infers implications for the compilation of reliable data. A slightly shortened version appeared as a chapter in the OECD book *Governance in China* (2005).

In 1998, Angus Maddison presented a new set of GDP data for China that exhibits considerably lower real growth rates in the reform period than the official series. His data were subsequently incorporated into the Penn World Tables. Other researchers have not gone as far as to construct alternative series but have questioned the reliability of specific Chinese data. In four papers I directly examine the accuracy of specific official data series, question researchers' evidence of data falsification, and examine Maddison's alternative series:

- In a 2003 paper in *The China Quarterly* I assess the evidence of data falsification at the national level and conclude that this evidence is either not valid or not compelling.
- In a 2004 paper in the *China Economic Review* I reconstitute the GDP component household consumption following official explanations of how these data are derived, contrast the reconstituted values with the official ones, and interpret the poor match.
- In a 2006 paper in the *Review of Income and Wealth* I argue that Angus Maddison's data adjustments and replacements are not justified. Maddison disagreed and wrote a reply. I disagreed with the reply and responded (all in the same journal).
- In a forthcoming article in *The China Quarterly* I uncover and explain problems in the post-economic census benchmark revision of 1993-2004 GDP values.

Researchers at times need data that are not routinely compiled by statistical authorities. This also applies to China. I argued for a conceptually correctly defined capital series for China, constructed it, and showed its superiority in comparison to existing series. Gregory Chow and I then discussed the issue in print. (*China Economic Review*, 2006)

Together with Loren Brandt I constructed spatial deflators that can be used to obtain provincial-level (including rural-urban) income measures adjusted for purchasing power. These spatial deflators came into widespread use even before the paper was published. (*Economic Development and Cultural Change*, 2006)

Three short pieces on Chinese statistics are (i) a 2003 article on the reliability of China's GDP growth rates in the *China Economic Quarterly*, a business-oriented journal; (ii) a 2006 report on some problems with the results of the economic census of 2004 in the *China Economic Quarterly*, and (iii) a less technical version that elaborates on the implications of the economic census revisions in the *Far Eastern Economic Review* (2006).

My work on Chinese statistics has led to frequent interaction with fellow researchers. Once or twice a month I receive an e-mail inquiring about some aspect of Chinese statistics, or some particular Chinese time series. Sometimes a discussion ensues. Often I learn something new.

c. Economic growth

My work on Chinese statistics, in particular GDP statistics, led to an examination of China's future economic growth prospects. If Chinese official GDP data are approximately correct, which I think they are (with a large margin of error and possibly politically determined smoothing), will this kind of growth continue into the future, and if it does, what are the implications?

In a paper resubmitted to *World Development* I use two different approaches to examine China's future growth prospects: one is to apply core economic development concepts, the other to conduct a modeling exercise with forecasts based on the facts about the future that are available today (demographic information). The findings, on continued first rapid and then gradually slowing growth, have a wide range of implications (including for my private investment strategy). I have presented this paper a dozen times at the most diverse occasions to invariably great interest. A short article in the *Far Eastern Economic Review* of April 2006 combines the findings of this research project with further thoughts on implications.

In one piece of most recent research I try to explain China's economic growth at a level beyond the usual factor input and technological progress argument. To what extent could China's economic growth be driven—or retarded—by government policies on direct state involvement in the economy? I apply Albert Hirschman's (1958) unbalanced growth hypothesis, rephrased for a transition economy, to the question.

An issue that combines my interest in China's economic growth and in Chinese statistics is regional fragmentation. In spring 2004 I sat in on Pete Klenow's economic growth course at Stanford and was struck by the fact that he took Alwyn Young's claim of increasing inter-provincial trade barriers in China seriously. I subsequently examined each of Alwyn Young's five arguments in turn to conclude that neither argument nor evidence are compelling. I am currently revising the paper for resubmission to the *Review of Economics and Statistics*.

Plans

As China becomes an area of research for more and more discipline-focused scholars without China background, and as researchers face an increasing supply of official Chinese statistics, accessibility and an understanding of Chinese data become ever more important.

- China's National Bureau of Statistics has introduced a range of sample surveys to contribute to the compilation of national income accounts data and other statistics. I want to know how widely used sample surveys are and how good they are. I have completed a first round of fieldwork and written fragments of a paper.
- The spatial deflators constructed in earlier work are based on consumption data. To make spatial deflation even more widely applicable to current research, Loren Brandt and I would like to extend them into spatial GDP deflators.
- A book-length manuscript on measuring productivity in China needs to be revised and updated. Three sections on output/ labor/ capital describe data availability, discuss data quality, and recommend specific data series for use in growth and productivity measurement. A fourth section uses some of these data to calculate indicators of

productivity. A first version of the paper is on my homepage and on the SSRN, where it has been downloaded, as of June 2007, 93 times.

A Competitive Earmarked Research Grant of the Hong Kong government that I was awarded end-June 07 continues with regional fragmentation and (now regional) economic growth. I am interested in the extent of local protectionism (supported with direct, quantitative analysis rather than by disproving another researcher's argument), regional specialization and the impact on regional growth, trickle-down effects between provinces, and the effects of central development policies. I plan to get started on this project while at Princeton University in 2007/08, with full implementation then awaiting my return to HKUST.

Grants and awards

Since 2001 I have received 3 Competitive Earmarked Research Grants of the Hong Kong government and 2 Direct Allocation Grants of HKUST. For details please see my CV.

In 2002, my article "Economic Reforms and State Sector Bankruptcy in China" was awarded the 2001 Gordon White Price for "the most original article or research report published in *The China Quarterly* in the relevant year."

Enclosed

List of abstracts of research from 2002 through July 2007.

Copies of all three reviews of my SOE book that I am aware of.

Copies of six research products (all since the previous review in 2001/02):

“‘Fast, Clear and Accurate:’ How Reliable Are Chinese Output and Economic Growth Statistics?” *The China Quarterly*, no. 173 (March 2003): 122-63.

China’s State-owned Enterprises between Profitability and Bankruptcy. Singapore: World Scientific, August 2003.

“Deconstructing China’s GDP Statistics.” *China Economic Review* 15, no. 2 (2004): 164-202.

“China’s Reform Period Economic Growth: How Reliable Are Angus Maddison’s Estimates?” *Review of Income and Wealth* 52, no. 1 (March 2006): 85-119.

+ Maddison, Angus. “Do Official Statistics Exaggerate China’s GDP Growth? A Reply to Carsten Holz.” *Review of Income and Wealth* 52, no. 1 (March 2006): 121-6.

+ [CH] “China’s Reform Period Economic Growth: How Reliable Are Angus Maddison’s Estimates? Response to Angus Maddison’s Reply.” *Review of Income and Wealth* 52, no. 3 (Sept. 2006): 471-5.

“New Capital Estimates for China.” *China Economic Review* 17, no. 2 (2006): 142-85.

+ Chow, Gregory C. “New Capital Estimates for China: Comments.” *China Economic Review* 17, no. 2 (2006): 186-92.

+ [CH] “Response to Gregory C. Chow’s ‘New Capital Estimates for China: Comments’.” *China Economic Review* 17, no. 2 (2006): 193-97.

“Spatial Price Differences in China: Estimates and Implications.” With Loren Brandt. *Economic Development and Cultural Change* 55, no. 1 (Oct. 2006): 43-86.

Abstracts of Research (2002 – July 2007)

“No Razor’s Edge: Reexamining Alwyn Young’s Evidence for Increasing Inter-Provincial Trade Barriers in China.” (Dec. 2005; as of June 2007 to be revised for resubmission to *The Review of Economics and Statistics*)

Alwyn Young (2000) provided evidence for distortions begetting distortions in a partially reformed economy by examining barriers to inter-provincial trade in China. His findings of increasing barriers to inter-provincial trade are based on five arguments. This paper critically examines each of the five arguments and their evidence in turn, and concludes that in all five instances neither argument nor evidence are compelling. Furthermore, if inter-provincial trade barriers cause the specific consequences advocated by Alwyn Young, then evidence for the U.S. indicates a recent history of severe inter-state trade wars in the U.S.

“Measuring Chinese Productivity Growth, 1952-2005.” (July 2006; under revision)

Three sections on output, labor, and capital each describe data availability, discuss data quality, and recommend specific data series for use in productivity measurement. A fourth section provides indicators of labor productivity, unit labor costs, and total factor productivity growth.

“The Unbalanced Growth Hypothesis and the Role of the State: the Case of China’s State-owned Enterprises.” (June 2007; submitted)

Albert Hirschman’s unbalanced growth hypothesis suggests that a developing economy can promote economic growth by initially investing in industries with high backward and forward linkages. Due to a history of planned (balanced) development under state ownership, the issue of unbalanced growth in China is one of strategic withdrawal of the state from low-linkage sectors and the continued presence of the state in high-linkage sectors. The evidence suggests that while the degree of linkage plays an important role in generating economic growth in China, current province-specific withdrawal strategies for the state sector may have no effect on economic growth.

“China’s Economic Growth 1978-2025: What We Know Today about China’s Economic Growth Tomorrow.” (Resubmitted to *World Development*, July 2007)

Extrapolation of past growth into the future suggests that China’s GDP, in purchasing power terms, exceeds that of the U.S. around 2010. This paper explores China’s future growth prospects and the potential drivers of future growth. A first approach examines in how far China’s recent economic development matches standard growth patterns identified in development economics and trade theory. In a second approach, GDP is decomposed into its income components, which in turn are explained, for the reform period, by the quantity and quality of labor; future GDP can then be re-composed from data on the future quantity and quality of labor that are available today. Overall, China’s economic growth is likely to continue at current rates through 2015 before it gradually slows. Economic growth in China on this scale has a number of implications for China itself and for the world.

“Revisions to China’s GDP Data Following the 2004 Economic Census: More Questions Than Answers?” (April 2007; forthcoming in *The China Quarterly*)

On 9 January 2006, China’s National Bureau of Statistics announced a benchmark revision of national income and product accounts statistics based on the findings of the 2004 economic census. The benchmark revision covers the years 1993-2004 and comprises revised nominal values of economy-wide and of sectoral output (value added), as well as revised real growth rates. The new data have three implications. (i) Despite all the hype only a few years ago about data falsification by local statistical authorities in China, the 2004 economic census results validate the local aggregate output values and invalidate the center’s national ones. (ii) While economy-wide as well as sectoral nominal values were revised, real growth rates of some sectors remained

unchanged. That is not plausible, and in some instances outright erroneous. (iii) The revisions raise questions about the quality of a large body of related statistics.

“Spatial Price Differences in China: Estimates and Implications.” With Loren Brandt.
(*Economic Development and Cultural Change*, 2006)

Prices differ across space: from province to province, from rural (or urban) areas in one province to rural (or urban) areas in another province, and from rural to urban areas within one province. Systematic differences in prices across a range of goods and services in different localities imply regional differences in the costs of living. If high-income provinces also have high costs of living, and low-income provinces have low costs of living, the use of nominal income measures in explaining such economic outcomes as inequality can lead to misinterpretations. Income should be adjusted for costs of living. We are interested in the sign and magnitude of the adjustments needed, their changes over time, and their impact on economic outcomes in China. In this article, we construct a set of (rural, urban, total) provincial-level spatial price deflators for the years 1984-2004 that can be used to obtain provincial-level income measures adjusted for purchasing power. We provide illustrations of the significant effect of ignoring spatial price differences in the analysis of China’s economy.

“New Capital Estimates for China.” (*China Economic Review*, 2006)

Data on physical capital are an indispensable part of economic growth and efficiency studies. In the case of China, economy-wide fixed asset series are usually derived by aggregating gross fixed capital formation (net of depreciation) over time, and sectoral/ownership-specific series by correcting the limited official fixed asset data available. These procedures, to varying degrees, ignore that (i) gross fixed capital formation does not equal investment, (ii) investment does not equal the value of fixed assets newly created through investment, (iii) depreciation is an accounting measure that bears no necessary relation to changes in the production capacity of fixed assets, (iv) official fixed asset data, where available, incorporate significant revaluations in the 1990s, and (v) “net fixed assets” do not measure the contribution of fixed assets to production. This paper derives economy-wide fixed asset values for 1953-2003, correcting for these shortcomings. It uses both the traditional, cumulative approach and a new, so far unexplored method of combining economy-wide depreciation values and an economy-wide depreciation rate to directly yield economy-wide fixed assets. The derived fixed asset time series are evaluated in a comparison with each other as well as with series in the literature, leading to the recommendation of a specific choice of fixed asset time series.

In the same issue of the journal, Gregory Chow wrote a comment and I responded to his comment.

“China’s Reform Period Economic Growth: How Reliable Are Angus Maddison’s Estimates?”
(*Review of Income and Wealth*, 2006)

Chinese economic growth statistics are controversial. In recent years they have been challenged on technical grounds as well as on suspicions of data falsification. Angus Maddison in a 1998 OECD study goes further in that he questions China’s long-run growth statistics and proceeds to provide an alternative time series. His average annual real GDP growth rate for China in the reform period (1978 through 1995) is 2.39 percentage points below the official one. Angus Maddison’s revisions were subsequently incorporated into the Penn World Tables; his GDP estimates for China, thus, have found their way into numerous cross-country studies. This paper critically examines the validity of Angus Maddison’s revisions to official data.

Angus Maddison wrote a response in the same issue of the journal, to which I then replied in a later issue.

“The Institutional Arrangements for the Production of Statistics – OECD: China Governance Project.” (*OECD Statistics Working Paper* STD/DOC(2005)1; Chapter 5 of the OECD’s *Governance in China*)

The purpose of this working paper is to provide an overview of recent discussions on the quality of Chinese data and to describe and evaluate the institutional organization and methods of data

compilation in China. The first part outlines key criticisms of Chinese data and examines their validity. The second part describes the institutional organization of statistical data compilation in China—with a focus on the National Bureau of Statistics as China’s statistical authority—and the latest innovations in data collection. The third part evaluates institutional aspects and data collection methods with reference to the data problems noted in the first part by pointing out some shortcomings and discussing various reform proposals.

“China’s Statistical System in Transition: Challenges, Data Problems, and Innovations.”
(*Review of Income and Wealth*, 2004)

While China’s official statistics are often regarded as of questionable quality, critics are rarely aware of just how difficult it is to compile accurate statistics in a developing and transition economy. This paper traces the challenges economic reforms pose for the development of China’s statistical system, establishes a typology of the resulting data problems in official Chinese statistics today, and examines how these challenges and data problems are being addressed through institutional innovations in data compilation. Analysis of China’s data compilation methods allows broad judgments on data quality. Special attention is given to GDP data as the aggregate measure of productive activities in China.

“Deconstructing China’s GDP Statistics.” (*China Economic Review*, 2004)

China’s National Bureau of Statistics has on repeated occasions explained in great detail how its GDP statistics are derived from underlying data. Based on these explanations, this article reconstructs Chinese official household consumption, which accounts for half of GDP. The findings are condemning. Not only do the various official explanations offered between 1997 and 2001 differ from each other, but none allows the researcher to reconstruct household consumption. Furthermore, the relationship between the GDP component household consumption and the underlying data varies from year to year, which suggests that time series comparisons of Chinese GDP may be invalid.

China’s Industrial State-owned Enterprises: Between Profitability and Bankruptcy.
(Monograph, 2003)

After decades of declining profitability, China’s industrial state-owned enterprises appear to be obsolete. This book utilizes extensive data and qualitative as well as quantitative analyses to examine the reasons for the decline in the profitability of these industrial state-owned enterprises, to determine their current profitability patterns across various dimensions, and to account for profitability gaps between these enterprises and those managed under other ownership forms. China’s recent enterprise reform measures are also evaluated. A differentiated picture emerges that clarifies past developments and illuminates future prospects of the reform of industrial state-owned enterprises in China.

“‘Fast, Clear and Accurate:’ How Reliable Are Chinese Output and Economic Growth Statistics?” (*The China Quarterly*, 2003)

China’s statistics are widely viewed as unreliable, with data falsification in order to meet economic growth targets increasingly the norm. This paper examines some of the most recent criticism of statistics on China’s industrial value-added and Gross Domestic Product, and shows this criticism to be unfounded as it is based on misunderstandings about the meaning and coverage of particular data. A lack of evidence on data falsification does not mean that China’s statistical system is necessarily honest in its statistical reporting, but recent developments in China’s statistical system further suggest that data falsification at the higher levels of the statistical bureaucracy is unlikely. Nevertheless, even if data are not being purposefully falsified by the National Bureau of Statistics, the margin of error in much of the published data is likely to be sufficiently large to allow the statistical authority a choice of final value from a relatively wide range of equally correct values.

“Institutional Constraints on the Quality of Statistics in a Developing and Transitional Economy: the Case of China.” (*China Information*, 2002)

Obtaining comprehensive and accurate statistics in a rapidly developing economy with a large informal sector is necessarily difficult. A simultaneous process of systemic transition does not facilitate the task. In the case of China’s gross domestic product, some data are currently not collected because the necessary institutions are not in place, while various imputations severely challenge the capabilities of the statistical personnel. Central-local conflicts and reliance on other government departments for many statistics further complicate the compilation of comprehensive and accurate statistics. Nevertheless, China’s statistical authority has successfully implemented a series of institutional innovations throughout the 1990s that brought drastic improvements. The example of the industrial sector shows a credible commitment to meaningful statistical work.

“Assessment of the Current State of China’s Economic Reforms.” With Tim Zhu. (*The Chinese Economy*, 2002, and book chapter, 2003)

Despite two decades of economic reform, China’s transition to a well-functioning market-oriented economy is as yet incomplete. The currently most pressing issues are the financial crises in the state sector, i.e., in the state-owned enterprises, the state banks, and in government finances. We identify the reform measures taken to resolve these crises and analyze their effectiveness. On a World Bank list of reform measures for transition countries, China ranks particularly low on enterprise and property rights reform. We evaluate the importance of accelerated property rights reform in light of the three financial crises and the reform measures currently under way in China. Our overall conclusion on the current state of reform in China is cautiously positive; the set of reform measures that are being implemented may well be optimal in the long run, given the various reform constraints.

Omitted:

- three journal articles that appeared in 2002 but work on which was completed around the time of the previous academic review of fall 2001 / spring 2002
- articles in the *China Economic Quarterly* and in the *Far Eastern Economic Review*