Proposalfor IARIW-UNSW Special Conference on "Productivity Measurement, Driver and Trends"

Title:Productivity growth in China from 1981 to 2011: Industrial and aggregate measures, drivers and international comparisons in Asia

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Extended Abstract:

Based on our previous work on China's productivity measures[2], we extend and update our China KLEMS database to the period of 1981-2011 with 33 industries covering the entire Chinese economy using a time series of input–output tables. In this research, we will introduce our detailed methodologies for Input-Output table time series construction, capital, labor, energy and intermediate inputs measures, estimation and aggregation of China's industrial and total-economy TFP. Then based on our results for 1981-2011 productivity measures, we will also decompose aggregate GDP growth into industrial contributions and source of growth to locate the drivers of China's thirty-year economic growth "miracle". In the last part, we will run an international comparison between our China KLEMS results and other Asia countries from newly released Asia KLEMS dataset, to identify China's performance benchmarking with other advanced and emerging economies in the same region.

Our China KLEMS database is based the Input-Output table time series of 1981-2011. Before 1987, China's statistical system is under Material Product System (MPS), and after 1987, China gradually adopted System of National Accounts (SNA), which leads to a huge challenge to compile a consistent and comparable Input-Output table series. We set up a joint-project with China's National Bureau of Statistics (NBS) to make all the necessary adjustments for the definition and coverage issues along the transformation, as well as the gap between China' s National Accounts and IO Accounts. The underlying statistical materials we depend on are: 1) China's official Benchmark IO tables: 1987, 1992, 1997, 2002, and 2007; 2) China's official Extended IO tables: 1990, 1995, 2000, 2005 and 2010 (upcoming); 3) National Accounts aggregate statistics; 4) Gross Output, Value-added, and other information from Industrial statistics; 5) detailed information for China's Final Use, such as customs trade volumes by commodities; 6) Price indices and related information, especially from the State Planning Commission in earlier stage of China's Reform. We use a 3-dimension Cross-checking Approach (Consistency, Comparability, IO-Balancing) to construct the IO series, and for the period after 2007, we collaborate with World Input-Output Database[3] to get the estimation for the recent years.

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[2]Presented on the 1st World KLEMS conference, Harvard University, August 2010, http://www.worldklems.net/conferences/index.htm

[3]Marcel Timmer (2012), The World Input-Output Database (WIOD): Contents, Sources and Methods, http://www.wiod.org/database/index.htm

Our Capital Input Index is based on a cross-classified the capital of each sector by 2 types of assets: structure and equipment. We estimate the capital stock under the Perpetual Inventory Method (PIM). We use the property compensation from the input-output series to estimate the capital rental price. Then we aggregate of capital services over different asset types with the weights of capital rental price. Since the deflator for investment in fixed asset is only available since 1992, the structure investment deflator for 1980-1991 was construction ex-factory price index, which is from the IO time series price index. The equipment investment deflator for 1980-1991 was from the NBS. We adjust the "fixed asset investment" to "gross capital formation" of each industry, estimate the land capital stock for agriculture. Furthermore, we consider the self-employed compensation problem during the internal rate of return estimation.

Our Labor Input Index is a Divisia aggregate over workers distinguished by sex, age and education attainment using wages as weights, with the following breakdowns: 1) Sex: male, female; 2) Educational attainment: college, high school, junior high school, elementary school, no schooling; 3) Age: 16-34, 35-54, 55+. The underlying statistical materials are: 1) Population surveys, including Population census for every 10 years (1982, 1990, 2000, 2010), 1% population sample survey at middle of any two successive population years (1987, 1995, 2005), and annual 1‰ population movement sample survey; 2) "Three-in-one" statistics, including Labor statistics of urban units, Administrative registration of private enterprises and "Getihu" (an unique business unit during China's Reform), and Rural employment statistics; 3) Other labor statistics, including Industrial census, Service census, Economic census, Agricultural census, Statistics on Township and Village Enterprises (TVEs) by Ministry of Agriculture, and Labor force survey.

Our Energy, Materials and Services inputs are calculated by applying shares of E, M and S from the IO-tables. Then we build up a Domar-Weighted approach to measure the aggregate TFP, industrial contributions and source of growth to Gross Output growth. This analysis will help us to understand the drivers for China's thirty-year economic growth "miracle".

In the last part of our research, we are comparing China's TFP performance with other advanced and emerging countries for a newly built-up Asia KLEMS database[4], which is an Asian regional research consortium to promote building database and conduct international productivity comparison among Asian countries based on KLEMS methodology adopted by EU KLEMS project.Since our China KLEMS dataset is a part of the Asia KLEMS database, the consistency of the measurements will be able to make sure the international comparisons within the database build up on a comparable basis. With the current progress, we will present the comparisons with the following Asia countries:Japan, Korea, Taiwan,India, Indonesia, Malaysia, Vietnam, Philippines. The results will be helpful to benchmark China's performance in Asia for the last 30 years.

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[4]Professors Hak K. Pyo, Kyoji Fukao and Tsutomu Miyagawa (2010 &2012), http://www.asiaklems.net