

What can the discrepancy between Chinese national and regional input-output tables tell us?

Topic: MRIO Innovations

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Background and upward-bias hypothesis revisited

China's official GDP growth estimates have been criticized for being upward biased because of both methodological and institutional problems. Methodologically, the "comparable price system", which was adopted together with the Soviet Material Product System (MPS) in the early 1950s, introduces segmented price weights with overlong intervals in growth indexing, hence inevitably underestimating price changes while exaggerating the real growth (Maddison, 2007). This problem can be well explained by the Gerschenkron effect (Gerschenkron, 1951), i.e., a comparison of two situations, weighted at the base-year prices, can be expected to be biased upwards because the price movements are inversely related to the quantity movements when the normal demand relationship is held. It is also known as the substitution bias. As for institutional deficiency, the output and price data are collected and processed through a long-established statistical reporting system at various levels of the government. It can be easily influenced by GDP growth-motivated local officials and the managers of state-owned enterprises to provide upward-biased data.

This hypothesis has been empirically investigated in studies using different approaches ranging from physical output or commodity indicator (Maddison 1998; Wu, 1997, 2002 and 2011; Maddison and Wu, 2008), energy consumption (Adams and Chen, 1996; Rawski, 2001), food consumption (Garnaut and Ma, 1992), to foreign price approximation (Ren, 1997). Despite different results, all alternative measures appear to be strongly supportive to the hypothesis. For example, for the period 1978-97, compared with the official GDP growth rate of 9.8 percent per annum, it is estimated as 4.8 percent by the energy approach, 6.8 to 8.5 percent by alternative price indices and between 7.0 and 7.5 percent by volume movement approach.

Conjecture based on new observations

However, previous studies have mainly focused on the flaws contained in the real growth rate estimates and gauged possible biases directly based on alternative growth estimates that are arguably more plausible. Our new adventure as proposed in this study is motivated by significant discrepancies found between Chinese national and regional (provincial) input-output accounts found in an exercise that attempts to reconcile regional input-output tables with those of the national. This may allow us to investigate the problem from a new but more fundamental perspective. First, instead of gauging what the "real growth" might be, which is inevitably related to biases in both real terms and prices, we can examine the problem directly in nominal terms holding the price effect constant. Second, assuming the national accounts are correct in nominal terms, we can separate regional and industrial effects in the discrepancies to see to what extent they have deviated the regional accounts from the national accounts. We conjecture that industries that play a key role in the local growth through a stronger impact effect tend to be exaggerated. This however is more likely to happen in regions which are under pressure to compete with their peers of the same group, given the stage of development as defined by per capita real GDP.

Methodology

This study is designed in an input-output framework. We start with a few key indicators in line with the output upward-bias hypothesis, mainly growth output (GO), intermediate input (II) and value added (VA) by industry (j) and by region (province) (k). Under the input-output framework, we set up an accounting identity for each key indicator between the national total and the sum of industries and between the same national total and the sum of regions. This is then followed by a

decomposition of the aggregate-industry and aggregate-region discrepancies to identify those industries of specific localities that have played a significant role in the measured GO, II and VA discrepancies. The standard input-output impact analysis with measured multipliers will be performed to test our industry-impact and regional competition conjectures.

Organization

This paper will be organized in six sections as follows. Section 1 first revisits the upward-bias hypothesis and then discusses the research problem from the observation of the discrepancies between the national and regional input-output accounts. Section 2 begins with the accounting identity between the national and industry accounts and the national and regional accounts and then conceptually decomposes discrepancies between the aggregate and industry by region measures for each indicator. Section 3 provides and discusses the results of decomposed discrepancies. Section 4 reviews and provides the standard impact analysis that is further developed by adding a regional dimension. This is followed by Section 5 discussing the results of the impact analysis. We finally conclude the study in Section 6.