Empirical Exercise 1 on the product and income equality

April 14th, 2014

I. In the system of national account, the following deflator, called an export/import price deflator (\( \tilde{P} \)), is used to convert nominal net exports in real terms with due consideration for a change in terms of trade (\( P^{IM} \) relative to \( P^{EX} \)).

\[
\tilde{P} = \frac{EX}{EX + IM} P^{EX} + \frac{IM}{EX + IM} P^{IM}
\]

Then, the trading gains/losses (\( TG \)) is defined as follows.

\[
TG = \frac{P^{EX} EX - P^{IM} IM}{\tilde{P}} - (EX - IM)
\]

Given \( TG \), real GDI (gross domestic income) is equal to real GDP plus \( TG \). Once \( EX - IM \) is replaced by \( \frac{P^{EX} EX - P^{IM} IM}{\tilde{P}} \) in GDI, the real income is adjusted for changes in terms of trade.

Answer the following questions.

1. Prove that if \( P^{EX} < P^{IM} \), then \( P^{EX} < \tilde{P} < P^{IM} \), and \( TG < 0 \). Note that \( P^{EX} = P^{IM} = \tilde{P} = 1 \) at a base year.

2. The attached EXCEL file provides the seasonally-adjusted quarterly SNA data of the Japanese economy for the period between the first quarter of 1994 and the fourth quarter of 2012.

2.1 Using this spreadsheet, compute the trading gains/losses for the corresponding period.

2.2 Compare the size and sign of real net exports (\( EX - IM \)) with that of the trading gains/losses (\( TG \)).

2.3 Draw the time-series of real GDP and real GDI in a graph, and discuss the difference between the two series in the following periods:

2.3.1 The boom period between 2002 and 2007

2.3.2 The period after the Lehman shock (a severe financial crisis taking place in September 2008)