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The Sustainability of Trade Balances in China

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Abstract

This study uses nonstationary time series approach to test the sustainability of the current account deficits in China over the period from 1982 to 2009. Our empirical results suggest that, despite the cointegrating relationship between imports and exports in China, the intertemporal external constraints may be violated. Thus, the trade balance surplus experienced over the past several years cannot be sustainable in the future. It is therefore necessary to ensure that an effective policy for controlling changes in trade accounts is established.

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1. Introduction

Following Deng Xiaoping's historical tour of South China in 1992,[1] China became increasingly integrated into the world economy. Meanwhile, China's large and persistent "twin surpluses" (capital and financial account surpluses) represent one of the most hotly debated issues among politicians and economists over the past ten years. In particular, the yawning trade surplus against the United States and European Union has strained China's foreign trade environment, triggering more frequent trade friction. Figure 1 shows the movements of China's exports, imports, and trade balances. As is clear from the figure, the China's trade balance surplus has increased in recent years. The problems that arise are not caused by the rising exports but by the imbalance between export and import growth. Without a stable balance between the two, newly emerging trade imbalances will tend to increase (Hamori, 2009).

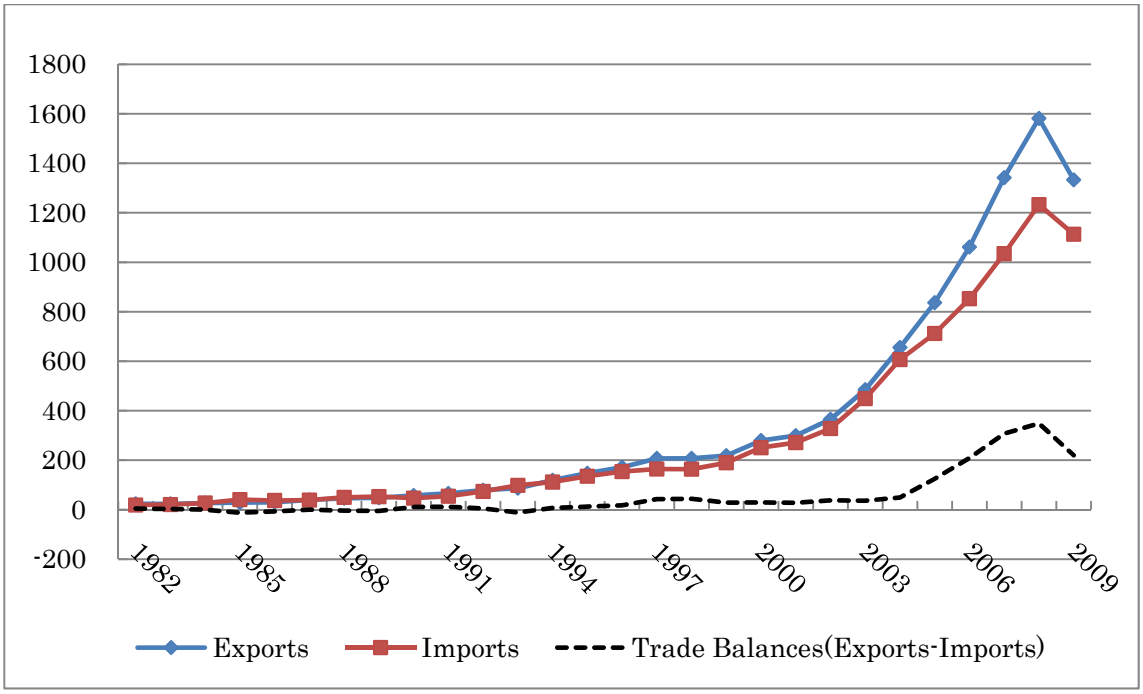

Figure 1: Exports, Imports, and Trade Balances in China (Billion US Dollars)

Data Source: World Development Indicators (World Bank)

Note: "Imports" are the imports of goods and services; "Exports" are the exports of goods and services; and "Trade Balances" refer to the difference between "Exports" and "Imports."

Husted (1992) was the first important empirical study on trade balance sustainability. He developed a theoretical model that explains the existence of a long-run equilibrium relationship between exports and imports. The model implies that

[1] Deng Xiaoping (1904 – 1997) was a Chinese politician and served as the Paramount leader of the People's Republic of China from 1978 to 1992. He was well known as a reformer to lead China towards a market economy.

if intertemporal budget constraints are valid in an open economy, exports and imports have a cointegrating relationship, and thus, trade balance is sustainable. Husted analyzed this relationship between exports and imports by employing the US quarterly data for 1967–1989 and concluded that the two series are cointegrated, and hence, US trade deficits are a short-run phenomenon.

Following this seminal work by Husted (1992), many researchers have empirically analyzed the long-run relationship between exports and imports (trade balance sustainability) for various countries. (See Wu, 2000; Arize, 2002; Baharumshah et al., 2003; Irandoust and Ericsson, 2004; Wu et al., 1996; Hamori, 2009; Konya, 2009; and Greenidge et al., 2011).

While a large number of countries have been analyzed, to the best of our knowledge, there has been no empirical investigation of China's trade account balances using the nonstationary time series approach.[2] This paper aims to empirically analyze the sustainability of trade balances in China, which is being criticized for the considerable trade surplus.

2. Model and Data

2.1 Model

Following Husted (1992), we examine the intertemporal budget constraints to analyze the trade balance the dynamics. Suppose that "the representative agent of a small open economy, that produces and exports a single composite good and has no government, can borrow and lend in international markets at the world interest rate using one-period financial instruments and aims at maximizing lifetime utility subject to budget constraints" (Husted, 1992, p.160).

The current period budget constraint is shown as follows:

$$C_0 = Y_0 + B_0 - I_0 - (1+r_0)B_{-1}, \tag{1}$$

where C_0, Y_0, B_0, and I_0 denote current consumption, output, net borrowing (borrowing minus lending), and investment, respectively; r_0 is the one-period interest rate; and $(1+r_0)B_{-1}$ is the initial external debt of the economy.

Next, the intertemporal budget constraint is given as follows:

$$B_0 = \sum_{t=1}^{\infty} \mu_t TB_t + \lim_{n\to\infty} \mu_n B_n, \tag{2}$$

where $TB_t = EX_t - IM_t (= Y_t - C_t - I_t)$ represents the trade balance in period t (i.e.,

[2] The only exception is Tiwari (2011), which examined the long-run relationship between exports and imports for the Chinese and Indian economies using monthly data from 1992 to 2010. Tiwari used recent time series econometric methods and showed that trade deficit is sustainable in the case of India but not in the case of China.

income minus absorption), $\mu_t = \prod_{j=1}^{t} 1/(1+r_j)$ is the discount factor, EX_t represents the exports of goods and services at time *t*, and IM_t represents the imports of goods and services at time *t*. When the last term of Equation (2) is zero, i.e., $\lim_{n\to\infty} \mu_n B_n = 0$, the net international borrowing of the economy is equal to the present value of the future trade balance. When it is nonzero, whether B_0 is positive or negative, the economy is not sustainable.[3]

After some manipulation, equation (2) becomes as follows:

$$Z_t + rB_{t-1} = EX_t + \sum_{j=1}^{\infty} \lambda^j (\Delta EX_{t+j} - \Delta Z_{t+j}) + \lim_{n\to\infty} \lambda^{n+1} B_{t+n}, \tag{3}$$

where $Z_t = IM_t + (r_t - r)B_{t-1}$ and Δ is the difference operator, that is, $\Delta x_t = x_t - x_{t-1}$.

Assuming that EX_t and Z_t follow random walks with drift,

$$EX_t = \alpha_1 + EX_{t-1} + \varepsilon_{1t}\ , \quad Z_t = \alpha_2 + Z_{t-1} + \varepsilon_{2t}\ , \tag{4}$$

where ε_{1t}, and ε_{2t} are I(0) error term. Then we obtain

$$EX_t = \beta_0 + \beta_1 MM_t + u_t, \tag{5}$$

where $MM_t = IM_t + r_t B_{t-1}$ and u_t is the disturbance at time t. This model implies that if EX_t and MM_t are I(1), the sufficient condition for the intertemporal budget constraint is the existence of a $(1,-1)$ cointegrating vector between EX_t and MM_t. To satisfy the economy's intertemporal budget constraint, the coefficient of MM_t in equation (5) should be equal to one and u_t should be stationary.

2.2 Data

This study uses annual data for China from 1982 to 2009. This sample period is based on the availability of the data. Both real exports of goods and services (EX_t) and real imports of goods and services plus net transfer payments and net interest payments (MM_t) are measured in constant local currency units. The data source is the World Development Indicator published by the World Bank.

As a preliminary analysis, we conducted the augmented Phillips–Perron test (Phillips and Perron, 1988) for the exports and imports. We found that each export and import (MM_t) may be an I(1) variable with a unit root.

[3] See the discussion in Husted (1992), Konya (2009), and Greenidge et al. (2011) for details.

3. Empirical Results

3.1 Cointegration Tests

If exports and imports (MM_t) possess cointegrating vectors of the form (1, –1), then the trade balance will be stationary. Thus, we perform Johansen type cointegration tests (Johansen, 1991) on exports and imports (MM_t).

Table 1 presents the results of the cointegration tests. Because the Johansen test depends on the lag order, we use alternative lag orders, that is, two and three periods, to examine the robustness of the test results. Under the null hypothesis of no cointegration, the trace test statistic and its *p*-values are 35.544 and 0.000 respectively when the lag length is equal to one and 38.473 and 0.000 respectively when the lag length is equal to two. The maximum eigenvalue test and its *p*-values are 35.009 and 0.000 respectively when the lag length is equal to one and 30.300 and 0.000 respectively when the lag length is equal to two. As the table shows, the null hypothesis may be rejected. Thus, there is likely to be a cointegrating relationship between exports and imports (MM_t).

Table 1: Results of Cointegration Tests $(EX_t,\ MM_t)$

Lag	Null hypothesis	Trace test	Maximum eigenvalue test
1	$r = 0$	35.544 (0.000)	35.009 (0.000)
2	$r = 0$	38.473 (0.000)	30.300 (0.000)

Notes: r is the hypothesized number of the cointegrating vector.
The numbers in parentheses are MacKinnon–Haug–Michelis (1999) *p*-values.

3.2 DOLS Estimation

Having thus supported the existence of the cointegrating relationship, we move on to estimate the cointegrating vector. When estimating the cointegrating vector, the endogeneity of regressors prevents us from using the ordinary least squares method. To work our way around this problem, we apply the dynamic ordinary least squares (DOLS) method developed by Stock and Watson (1993). The cointegrating vector in Equation (5) is estimated by adding ΔMM_t, and its leads and lags are as follows:

$$EX_t = b_0 + b_1 MM_t + \sum_{i=-K}^{K} \gamma_i \Delta MM_{t-i} + u_t \qquad (6)$$

Here, all variables are as previously defined.The estimation results are presented in Table 2. As shown, the import coefficient is estimated to be 1.558 for $K=1$ and 1.593 for $K=2$, and statistically significant.

Table 2: Results of the DOLS Method

$$EX_t = b_0 + b_1 MM_t + \sum_{i=-K}^{K} \gamma_i \Delta MM_{t-i} + u_t$$

Lead and lag	Variable	Estimate	SE	*t*-statistic	*p*-value	$\bar{R}^2$
$K=1$	MM_t	1.558	0.026	60.547	0.000	0.999
$K=2$	MM_t	1.593	0.048	32.858	0.000	0.999

Note: SE is the Newey–West HAC (Heteroskedasticity Autocorrelation Consistent) standard error.

3.3 Hypothesis Testing for Cointegrating Vector

Finally, the test results of the cointegrating vector are shown in Table 3. Since we want to test whether the (EX_t, MM_t) has a cointegrating vector of $(1,-1)$, we need to analyze if $b_1 = 1$ in Equation (5). As Table 3 shows, the test statistic and its corresponding *p*-values are 21.46 and 0.000 respectively for $K=1$ and 12.35 and 0.000 respectively for $K=2$. Thus, the null hypothesis is rejected for both cases. That is, export and import (MM_t) does not have a cointegrating vector of $(1,-1)$.

Table 3: Results of the Coefficient Tests

$$H_0 : b_1 = 1,\ H_A : b_1 \neq 1$$

Lead and lag	Test statistic	*p*-value
$K=1$	21.46	0.000
$K=2$	12.35	0.000

4. Conclusion

This study uses nonstationary time series approach to test the sustainability of the current account deficits in China over the period from 1982 to 2009. It is essential to know whether imports (MM_t) and exports are cointegrated or not in order to design and evaluate the current and future macro policies aimed at achieving trade balance (Arize, 2002).

Our empirical results suggest that, despite the cointegrating relationship between imports (MM_t) and exports in China, the intertemporal external constraints may be violated. Thus, the trade balance surplus experienced over the past several years cannot be sustainable in the future. It is therefore necessary to ensure that an effective policy for controlling changes in trade accounts is established.

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