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Are the US Current Account Deficits Really Sustainable?

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Abstract

We have tested for a long-run relationship between four US export measures and analogous import measures (measured in nominal and real terms, levels and deflated by GNP) in the 1967–1994 period using quarterly data. Using various econometric tests that include standard Engle-Granger cointegration tests and two tests that allow for test-determined breaks in the cointegrating relationship, we have shown that the hypothesis of no long-run relationship between exports and imports cannot be rejected. This finding contrasts sharply with earlier literature and carries the important policy implication that US current account deficits are not sustainable.

Keywords: current account deficits, cointegration, sustainability

JEL Classification: F30

1 Introduction

The size and persistence of the recent US current account deficits has been one of the most topical issues in discussions among economists and politicians alike since the early 1980s. These deficits have persisted since 1982 and despite a near balanced current account in 1991, the deficit reached $155.7 bn. in 1994, the second largest level since 1987. Moreover, as reported in Hakkio (1995), the IMF, OECD and Data Resources, Incorporated forecast the deficit to persist over the next 5–20 years. Short-run or temporary current account deficits are not "bad" as they reflect reallocation of capital to the country where capital is more productive. However, long-run or persistent deficits can have serious effects. First, they might increase US interest rates in order to attract foreign capital, and second, they might impose excessive burden on future generations as the accumulation of large external debt due to persistent deficits will imply increasing interest payments and lower standard of living.

The persistence of large current account deficits raises the issue of whether these deficits are sustainable, i.e., whether the country's intertemporal budget constraint is violated. In a recent paper, Husted (1992) suggests that the examination of the 1967–1989 period leads to the conclusion that the nominal deficits (expressed either in absolute terms or deflated by GNP) are sustainable provided a shift in the long-run relationship between exports and imports occured in the last quarter of 1983. However, the test used by Husted (1992) in deriving this conclusion is based on an exogenous choice of the structural break in the data. In this paper, we provide very strong evidence against the sustainability of U.S. current account deficits defined in various ways (in nominal and real terms, levels and deflated by GNP) for the period 1967–1994 using recently developed unit root and cointegration tests that allow for test-determined structural breaks in individual time series and the long-run relationship between pairs of series.

The paper is organized as follows: section 2 presents the background, section 3 explains our methodology, section 4 provides the results and an interpretation and section 5 concludes.

2 Background

Husted (1992) presents a simple analysis that implies a long-run equilibrium between exports and imports. The individual current-period budget constraint is:

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

where C_0 is current consumption, Y_0 is output, I_0 is investment, r_0 is the one-period interest rate, B_0 is the size of international borrowing and $(1+r_0)B_{-1}$ is the initial debt size.

Husted (1992) then makes several assumptions in order to derive a testable model which is given by the following regression:

$$EX_t = a + bMM_t + \epsilon_t \quad (2)$$

where EX is exports of goods and services, and MM is imports of goods and services plus net interest payments and net transfer payments. In order for the economy to satisfy its intertemporal budget constraint b should be equal to 1 and ϵ_t should be stationary. However, if b is less than one, the economy will fail to satisfy its budget constraint, if trade flows are expressed relative to GNP (Hakkio and Rush, 1991; Husted, 1992).

3 Econometric Methodology

A necessary condition for testing for a long-run relationship between two variables is that these variables are I(1), i.e., stationary in first differences. We, therefore, first test for a unit root using the Phillips-Perron (PP) test where a regression of the form

$$y_t = \alpha + \beta y_{t-1} + \gamma t + e_t \quad (3)$$

is run using OLS and the obtained t-statistic is corrected for autocorrelation in the errors e_t. The null hypothesis is that $\beta = 1$. If the null cannot be rejected, regression (3) is run in first differences. A rejection of the null in the regression in first differences implies that the series is I(1).

Once it is established that two series representing measures of exports and imports are I(1), we can proceed to test for a long-run relationship between the series. If such a relationship exists, the two series are cointegrated and the intertemporal budget constraint is satisfied. To test for cointegration between export and import measures we apply several different types of tests.

First, we follow the Engle-Granger (1987) methodology and use standard CRDW and ADF tests. These tests assume no structural breaks in the cointegrating relationship. Given that such a break in the long-run relationship between US exports and imports took place in the early 1980s, as many economists have suggested, the use of Engle-Granger tests is very restrictive. Therefore, we apply two tests that determine endogenously the structural break (if existing) in the long-run relationship between exports and imports. The first test proposed by Zivot and Andrews (1992) improves upon the test by Perron (1989) used in Husted (1992). The Zivot-Andrews (1992) test is a unit root test in which the breakpoint is estimated rather than fixed a priori, as in Perron (1989). This test can also be considered as a cointegration test with the cointegration parameter equal to one.

Second, we make use of the Gregory and Hansen (1996) tests for cointegration where the structural break is test-determined. These tests are more flexible than the Zivot and Andrews tests since the cointegration parameter is estimated and is not restricted to the value of one.

Gregory and Hansen (1996) consider four models of a regime shift depending on whether the shift affects the intercept, or the slope and whether a trend is included in the cointegrating regression. A level shift model (model 2 in Gregory and Hansen) takes the form

$$y_t = \mu_1 + \mu_2 D_t + \delta x_t + u_t, \qquad t = 1, \ldots, n \tag{4}$$

$$\text{and } D_t = \begin{cases} 0, & \text{if } t \leq [n\tau] \\ 1, & \text{if } t > [n\tau] \end{cases}$$

where $\tau \in (0,1)$ is an unknown parameter denoting the timing of the change point and [ ] denotes integer part. The use of the dummy variable D_t allows one to test for a structural change or regime shift. In equation (4) above, μ_1 is the intercept before the shift and μ_2 is the change in the intercept due to the shift. In the following section we also estimate models (3) and (4) in Gregory and Hansen (1996). Model (3) adds a linear trend to model (2) and model (4) extends model (2) by allowing also the slope coefficient to shift in response to a structural change.

To test for cointegration between y_t and x_t with structural change, i.e., stationarity of u_t in equation (4), Gregory and Hansen (1996) suggest the use of three tests. These tests are modifications of the test statistics Z_α and Z_t (suggested by Phillips, (1987)) and the ADF statistic. These statistics are defined as:

$$\begin{aligned} Z_\alpha^* &= \inf_{\tau \in T} Z_\alpha(\tau) \\ Z_t^* &= \inf_{\tau \in T} Z_t(\tau) \\ \text{ADF}^* &= \inf_{\tau \in T} \text{ADF}(\tau) \end{aligned}$$

where $Z_\alpha(\tau), Z_t(\tau)$ and ADF(τ) correspond to the choice of change point τ. The set T can be any compact subset of $(0, 1)$. Gregory and Hansen (1996) suggest that a reasonable choice is $T = (0.15, 0.85)$. Following Gregory and Hansen, we compute the test statistic for each break point in the interval $([0.15n], [0.85n])$. According to the definition of Z_α^*, Z_t^* and ADF*, we are interested in the smallest values of $Z_\alpha(\tau), Z_t(\tau)$ and ADF(τ) across all possible break points since small values of the statistics are required to reject the null hypothesis. Gregory and Hansen (1996) derive asymptotic critical values for alternative models. Their table 1 lists the critical values for our case. Based on Monte Carlo evidence for the model with structural break in the intercept and the slope, they also find that Z_t^* has the largest power and Z_α^* the lowest power (see Table 3 in Gregory and Hansen (1996)).

4 Results

4.1 Data

Our data are similar to those used by Husted (1992). We employ quarterly data for US exports of goods and services (EX), and US imports of goods and services plus unilateral transfers and net interest payments (MM). We also created measures of real exports and imports by deflating the nominal values by unit export and import prices. Finally, nominal and real values of GNP were used to create export/income and import/income ratios in nominal and real terms. Data on EX and MM and data on real GNP were obtained from the Survey of Current Business published by the US Department of Commerce. All other data are from the International Financial Statistics published by the IMF. The appendix provides the notation for all the series we used.

4.2 Unit root tests

Table 1 includes unit root tests in levels and first differences for the series used in this study. We report values of the PP statistic for the model with a time trend assuming 4 lags. We find that all series are I(1). The last four variables at the bottom of Table 1 are measures of the current account deficit. According to the PP test, all these variables are nonstationary in levels implying that the US current account deficits are not sustainable.

4.3 Cointegration tests

Our results for the Engle-Granger cointegration tests are presented in Table 2. We report two statistics: the CRDW and ADF(4). For all proxies of the current account deficit we cannot reject the null hypothesis of no cointegration, i.e., there is no long-run relationship between the export measure and the analogous import measure.

Table 3 reports the Zivot and Andrews (1992) statistics for the null hypothesis of a unit root in the four proxies for the current account deficit. The unit root cannot be rejected for any of the three models being estimated providing additional support to our hypothesis that the US current account deficits are unsustainable. This result contrasts with that obtained by Husted (1992) who ran Perron's test considering a structural break in 1983:IV in the net export measure that was not determined by the statistical test.

Given that the Zivot and Andrews tests impose a unit value on the coefficient of the import measure in the cointegration regression, we test for cointegration with a test-determined structural break using the approach suggested by Gregory and Hansen (1996). Our results are reported in Table 4. None of the reported statistics is statistically significant, not even at 10%. Hence, there is strong evidence, consistent across the three models and the three test statistics used, against the sustainability of US current account deficits even allowing for a structural break in the cointegrating vector.

5 Concluding Remarks

We have tested for a long-run relationship between four US export measures and analogous import measures in the 1967–1994 period using quarterly data. Using various econometric tests that include standard Engle-Granger cointegration tests and two tests that allow for test-determined breaks in the cointegrating relationship, we have shown that the hypothesis of no long-run relationship between exports and imports cannot be rejected. This finding contrasts sharply with earlier literature (Husted, 1992) and carries the important policy implication that US current account deficits are not sustainable.

Table 1: Phillips-Perron Unit Root Tests (ADF(4))
1967.I–1994.IV

	Levels	**Differences**
	τ_τ	τ_τ
EX	−0.27	−9.70*
RX	0.12	−11.90*
YX	−1.87	−9.76*
RXY	−1.13	−12.91*
MM	−0.88	−12.04*
RM	−0.26	−11.24*
YM	−3.37	−12.04*
RMY	−1.27	−13.12*
XM	−2.07	−10.61*
RXM	−1.87	−9.16*
XMY	−2.22	−10.42*
$RXMY$	−1.90	−9.36*

Note: The variables are defined in the appendix. Regressions are of the form (3) in the text. A * denotes statistical significance at 5%.

Table 2: Engle-Granger Cointegration Tests
1967.I–1994.IV

Export Measure	**Constant**	**Import Measure**	**CRDW**	**ADF(4)**
EX	19.23	0.82	0.136	−2.407
RX	0.33	0.78	0.089	−2.643
YX	0.03	0.63	0.090	−2.608
RXY	0.00	0.68	0.070	−2.669

Note: Export measures are defined in the appendix. The critical values for the CRDW and ADF(4) statistics for a sample of 100 observations are 0.38 and −3.17, respectively.

Table 3: Zivot-Andrews unit root tests
1967.I–1994.IV

Variable	**A**	**B**	**C**
XM	−3.22	−2.37	−3.27
	(0.58)	(0.29)	(0.84)
RXM	−3.75	−2.77	−3.73
	(0.58)	(0.43)	(0.58)
XMY	−3.42	−2.34	−3.84
	(0.55)	(0.67)	(0.58)
$RXMY$	−3.99	−2.89	−3.95
	(0.58)	(0.26)	(0.58)

Note: The variables are defined in the appendix. A, B and C denotes model type and corresponds to the three models in Zivot and Andrews (1992). The regressions run are (1′)–(3′) in Zivot and Andrews (1992, p. 254). The critical values are −4.80, −4.42 and −5.08 for models A, B and C respectively. The numbers in parentheses indicate the break points as a percentage of the sample size.

Table 4: Gregory-Hansen Cointegration Tests
1967.I–1994.IV

	ADF*	Z_t^*	Z_α^*
$EX - MM$			
Model (2)	−2.82	−2.93	−18.16
	(0.83)	(0.60)	(0.60)
Model (3)	−3.15	−3.17	−19.08
	(0.81)	(0.80)	(0.80)
Model (4)	−2.94	−2.91	−18.32
	(0.88)	(0.60)	(0.60)
$RX - RM$			
Model (2)	−2.56	−2.45	−12.63
	(0.62)	(0.62)	(0.62)
Model (3)	−2.79	−2.88	−17.65
	(0.58)	(0.80)	(0.80)
Model (4)	−2.62	−2.63	−13.92
	(0.61)	(0.60)	(0.60)
$YX - YM$			
Model (2)	−2.81	−2.93	−16.16
	(0.57)	(0.57)	(0.57)
Model (3)	−3.31	−3.46	−21.46
	(0.58)	(0.57)	(0.57)
Model (4)	−2.66	−2.72	−13.98
	(0.58)	(0.60)	(0.60)
$RXY - RMY$			
Model (2)	−2.44	−2.39	−9.90
	(0.83)	(0.80)	(0.80)
Model (3)	−2.72	−3.20	−20.24
	(0.84)	(0.80)	(0.80)
Model (4)	−2.48	−2.44	−10.20
	(0.77)	(0.77)	(0.77)

(See note to this table overleaf.)

Note to Table 4: Models (2), (3) and (4) are defined in Gregory and Hansen (1996). The numbers in parentheses indicate the break points as a percentage of the sample size. The asymptotic 5% critical values are (see Gregory and Hansen (1996), table 1):

	ADF*	Z_t^*	Z_α^*
Model (2):	−4.61	−4.61	−40.48
Model (3):	−4.99	−4.99	−47.96
Model (4):	−4.95	−4.95	−47.04

Appendix

EX = exports of goods and services

MM = imports of goods and services plus net interest income payments plus net transfer payments

RX = real exports = EX/PX, where PX = unit export price (1990 = 100)

RM =real imports = MM/PM, where PM = unit import price (1990 = 100)

YX = export/income ratio = EX/Y, where Y = nominal GNP

RXY = real exports/real income = RX/RY, where RY = real GNP (1990 prices)

YM = import/income ratio = MM/Y

RMY = real imports/real income = RM/RY

$XM = EX - MM$ = current account surplus in nominal terms

$RXM = RX - RM$ = current account surplus in real terms

$XMY = (EX - MM)/Y$

$RXMY = (RX - RM)/RY$

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