



Provided by the author(s) and NUI Galway in accordance with publisher policies. Please cite the published version when available.

Title	Testing for the sustainability of the current account deficit in two industrial countries
Author(s)	Fountas, Stilianos
Publication Date	1996-07
Publication Information	Fountas, S. (1996). "Testing for the sustainability of the current account deficit in two industrial countries" (Working Paper No. 011) Department of Economics, National University of Ireland, Galway.
Publisher	National University of Ireland, Galway
Item record	http://hdl.handle.net/10379/1365

Downloaded 2019-10-14T04:43:11Z

Some rights reserved. For more information, please see the item record link above.





WORKING PAPER SERIES



Testing for the Sustainability of the Current Account Deficit in Two Industrial Countries

Jyh-lin Wu¹

Stilianos Fountas²

Show-lin Chen³

r No.11

July 1996



Department of Economics
UNIVERSITY COLLEGE GALWAY
NATIONAL UNIVERSITY OF IRELAND

Abstract

The objective of this paper is to test for the sustainability of the current account deficits in the U.S. and Canada over the 1973–1994 period. Using various unit root and cointegration tests some of which allow for structural changes, we conclude that the real current account deficits-to-GDP ratios are not sustainable.

Keywords: Deficit sustainability, regime shifts, cointegration

JEL Classification: F30

1 Introduction

Large and persistent US fiscal and current account deficits represent one of the most hotly debated issues among politicians and economists over the past 10 years. The “twin deficits” as they have been aptly called, have reached unprecedented levels and have led to discussions about their sustainability. In particular, the current account 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 U.S. 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.

Recent empirical research has tackled the issue of the sustainability of the U.S. fiscal deficit (see e.g., Hakkio and Rush (1991), Haug, [1991, 1995] and Tanner and Liu, [1994, 1995]). Less emphasis has been placed on testing for the sustainability of the US current account deficit (Husted, 1992). Also, to the best of our knowledge, there has been no empirical work on the sustainability of the current account deficit in other industrial countries.

The objective of this paper is to test for the sustainability of current account deficits in two of the G-7 countries that have experienced large and persistent deficits over a number of years, namely, the US and Canada. This objective is pursued with the use of modern time-series econometric techniques that include various types of cointegration tests, some of which allow for a structural break in the cointegrating vector. We find conclusive evidence that the two countries do not satisfy their intertemporal external constraint raising the issue of the lack of sustainability of recent trends in the current account deficit.

The paper is organized as follows: section 2 provides a short theoretical background, section 3 includes our econometric results and section 4 concludes.

2 Theoretical background

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

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

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

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

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 e_t should be stationary. However, $b < 1$ is inconsistent with a finite external debt-to-GNP ratio, and hence with sustainability of external debts when exports and imports are measured relative to GNP. In this case, there is an incentive for the country to default on its international debts (Hakkio and Rush, 1991; Husted, 1992).

3 Data and Econometric results

3.1 Data

We use quarterly data for the period 1973:4 to 1994:4. Our measure of exports includes exports of goods and services and our measure of imports includes imports of goods and services plus *net* transfer payments and *net* interest payments. Both exports and imports are measured in real terms, as a percentage of real GDP, and are denoted by RXY and RMY , respectively. The current account deficit (if negative) measure is $RXMY = RXY - RMY$. All data are taken from the IMF's *International Financial Statistics*.

3.2 Results

Before proceeding to the cointegration tests, we run unit root tests. In Table 1 we report three types of these tests: ADF(3) tests without and with a time trend (τ_μ and τ_τ) and the normalized bias test. The lag length is chosen according to the formula $\text{int}[4(T/100)^{1/4}]$, where int is integer and T is the sample size, reported in Schwert (1987). According to Table 1, RXY and RMY are both $I(1)$. In Table 1 we also report unit root tests for the real deficit-to-GDP ratio, $RXMY$. These are cointegration tests with the cointegrating parameters restricted to the values zero (intercept) and one (slope). As the null of no cointegration between the real export and import-to-income ratios cannot be rejected, the current account deficit is not sustainable for both countries.

In this paper we do not test for cointegration using the ADF test suggested by Engle and Granger (1987). Instead, we make use of the Johansen estimation technique whose optimality has been shown by Phillips (1991) in terms of symmetry, unbiasedness and efficiency properties. A Monte Carlo study by Gonzalo (1994) supports the superior properties of the Johansen technique relative to several other techniques. The results of the Johansen maximum eigenvalue and trace tests are reported in Table 2¹ and provide evidence against cointegration.

To allow for possible change in the cointegrating vector over the estimation period we apply the Zivot and Andrews (1992) test which represent unit root tests on the current account deficit. The results reported in Table 3 provide conclusive evidence against the sustainability of current account deficits. The numbers in parentheses represent break points reported as a percentage of the sample size.

Since the Zivot and Andrews (1992) tests impose a priori restrictions on the cointegrating vector, we make use of the recently developed Gregory and Hansen (1996) tests that allow for an endogenously-determined shift in the cointegrating vector and do not impose untested restrictions on the cointegrating parameters. The results of these tests reported in Table 4 supply strong evidence for cointegration for Canada (at 5% level). For the US, the null of no cointegration with structural change cannot be rejected. As the statistic Z_t^* has the largest power (Gregory and Hansen, 1996, p. 114), we choose the break point according to this statistic. For Canada the break point is at the third quarter of

¹In order to implement Johansen's procedure, one needs to determine the optimal lag length in the VAR. Our approach for choosing the lag length was to test up from a general VAR(1) system until increasing the order of the VAR by one lag could not be rejected using a likelihood ratio statistic. The residuals from the chosen VAR were then checked for whiteness. If the residuals in any equation proved to be nonwhite, we sequentially chose a higher lag structure until they were whitened. This procedure led to the choice of 4 lags for the U.S. and 5 lags for Canada.

1980. As explained in section 2, for cointegration to imply sustainability, the estimated coefficient of the import variable must be equal to 1. A value of less than one would be incompatible with the sustainability of the current account deficits. We, therefore, need to test whether its value is significantly less than 1. The method of dynamic OLS (DOLS) developed recently by Stock and Watson (1993) provides more efficient estimators than other existing methods (e.g., West, 1988). We, therefore, apply this method to derive estimates of the cointegrating vector for Canada. The results are reported in Table 5. We clearly reject the null that a_2 equals 1, suggesting that the current account deficits in Canada are not sustainable.

4 Conclusions

The paper uses several recently developed techniques in the econometrics of nonstationary time series to test for the sustainability of the current account deficits in two industrial countries, the US and Canada. Cointegration tests that do not allow for regime shifts imply the lack of a long-run equilibrium relationship between exports and imports in both countries. A similar result applies even if we allow for a change in the long-run relationship between exports and imports. Hence, there is conclusive evidence to suggest that current account deficits experienced over the past several years cannot be sustained in the future since the countries included in our study violate their intertemporal external constraint.

Table 1: Unit Root Tests

		Levels								
		RXY			RMY			RXMY		
		τ_μ	τ_τ	ρ_μ	τ_μ	τ_τ	ρ_μ	τ_μ	τ_τ	ρ_μ
US		0.61	-1.07	1.14	0.78	-1.72	-1.49	-1.58	-1.99	-4.26
CAN		3.24	-0.43	9.03	0.97	-0.75	3.85	-1.07	-1.06	-4.82

		Differences								
		$\Delta(\text{RXY})$			$\Delta(\text{RMY})$			$\Delta(\text{RXMY})$		
		τ_μ	τ_τ	ρ_μ	τ_μ	τ_τ	ρ_μ	τ_μ	τ_τ	ρ_μ
US		-3.03	-3.38	-47.94	-3.89	-4.13	-79.59	-3.25	-3.23	-53.2
CAN		-3.24	-3.77	-83.83	-3.80	-4.30	-99.93	-3.99	-3.99	-101.8

Note: The 5%(10%) critical values for τ_μ , τ_τ and ρ_μ are $-2.89(-2.58)$, $-3.45(-3.15)$ and $-13.7(-11.00)$, respectively (see Fuller, 1976).

Table 2: Zivot-Andrews Conintegration Tests

Model	A	B	C
US	-3.39(0.45)	-2.64(0.58)	-3.35(0.45)
CAN	-3.30(0.31)	-2.78(0.41)	-3.29(0.31)

Note: A, B and C denote model type and correspond 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 3: Johansen Cointegration Tests

Trended Model				
$H_0 :$	λ_{\max}		Trace	
	$r = 0$	$r = 1$	$r = 0$	$r = 1$
US	11.25	1.78	13.03	1.78
CAN	5.64	2.06	7.69	2.06
95% critical value	14.07	3.76	15.41	3.76

Note: The critical values are taken from *Microfit*.

Table 4: Gregory-Hansen Cointegration Tests

$$\text{Model: } RXY_t = a_0 + a_1 D_t + a_2 RMY_t$$

	Z_{α}^*	Z_t^*	ADF*
US	-17.44(0.63)	-3.06(0.63)	-2.89(0.64)
CAN	-39.96(0.28) *	-4.89(0.28) **	-3.63(0.29)

Note: Asymptotic critical values are given in Table 1 in Gregory and Hansen (1996). ** and * denote significance at 5% and 10% respectively. The numbers in parentheses are the break points expressed as a percentage of the sample size.

Table 5: Dynamic OLS

$$\text{Model: } RXY_t = a_0 + a_1 D_t + a_2 RMY_t$$

	a_0	a_1		a_2	
CAN	0.005	0.011		0.682	
	(1.58)	(13.93)	***	(-4.27)	***

Note: The numbers in parentheses below a_0 and a_1 are t -statistics for the null that the corresponding coefficients are zero. The number in parentheses under a_2 is the t -statistic for the null that a_2 is equal to one. The t -statistics follow a students t distribution asymptotically. *** denotes significance at the 1% level.

References

- Engle, R. and C. Granger, "Cointegration and Error-Correction: Representation, Estimation and Testing," *Econometrica*, 1987, 55, 251-276.
- Fuller, W. A., *Introduction to statistical time series*, New York: Wiley, 1976.
- Gonzalo, J., "Five Alternative Methods of Estimating Long Run Equilibrium Relationships," *Journal of Econometrics*, 1994, 60, 203-233.
- Gregory, A. and B. Hansen, "Residual-based tests for Cointegration in Models with Regime Shifts," *Journal of Econometrics*, 1996, 70, 99-126.
- Hakkio, C., "The U.S. Current Account: the Other Deficit," *Economic Review, Federal Reserve Bank of Kansas City*, 1995, 80, 11-24.
- and M. Rush, "Is the Budget Deficit 'Too Large'?", *Economic Inquiry*, 1991, 29, 429-445.
- Haug, A., "Cointegration and Government Borrowing Constraints: Evidence for the US," *Journal of Business and Economic Statistics*, 1991, 9, 97-101.
- , "Has Federal Budget Policy Changed in Recent Years?", *Economic Inquiry*, 1995, 33, 104-118.
- Husted, S., "The Emerging U.S. Current Account Deficit in the 1980s: Cointegration Analysis," *Review of Economics and Statistics*, 1992, pp. 159-166.
- Phillips, P. C. B., "Optimal Inference in Cointegrated Systems," *Econometrica*, 1991, 59, 283-306.
- Schwert, G., "Effects of Model Specification on Tests for Unit Roots in Macroeconomic Data," *Journal of Monetary Economics*, 1987, 20, 73-103.
- Stock, J. and M. Watson, "A Simpler Estimator of Cointegrating Vectors in Higher Order Integrated Systems," *Econometrica*, 1993, 61, 783-820.
- Tanner, E. and P. Liu, "Is the Budget Deficit 'Too Large'? Some Further Evidence," *Economic Inquiry*, 1994, 32, 511-518.
- West, K., "Asymptotic Normality When Regressors Have a Unit Root," *Econometrica*, 1988, 56, 1397-1417.
- Zivot, E. and Andrews D., "Further Evidence on the Great Crash, the Oil-Price Shock and the Unit-Root Hypothesis," *Journal of Business and Economic Statistics*, 1992, 10, 251-270.