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## WORKING PAPER SERIES



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

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### **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 ( $\tau_\mu$  and  $\tau_\tau$ ) and the normalized bias test. The lag length is chosen according to the formula  $\text{int}[4(T/100)^{1/4}]$ , where  $\text{int}$  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 2<sup>1</sup> 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

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<sup>1</sup>In 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		
		$\tau_\mu$	$\tau_\tau$	$\rho_\mu$	$\tau_\mu$	$\tau_\tau$	$\rho_\mu$	$\tau_\mu$	$\tau_\tau$	$\rho_\mu$
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								
		$\Delta(\text{RXY})$			$\Delta(\text{RMY})$			$\Delta(\text{RXMY})$		
		$\tau_\mu$	$\tau_\tau$	$\rho_\mu$	$\tau_\mu$	$\tau_\tau$	$\rho_\mu$	$\tau_\mu$	$\tau_\tau$	$\rho_\mu$
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  $\tau_\mu$ ,  $\tau_\tau$  and  $\rho_\mu$  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				
$H_0 :$	$\lambda_{\max}$		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

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

	$Z_{\alpha}^*$	$Z_t^*$	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.

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