



The Twin Deficits Hypothesis: An Empirical Examination

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Abstract

The ‘twin deficits hypothesis’ (TDH) claims that there is a connection between fiscal and current account deficits. In its most extreme form, popularized by the ‘New Cambridge School’ in the 1970s, the argument was that, with equilibrium in the private sector, the size of the public sector deficit was proportional to, and the principal determinant of the size of the current account deficit. In softer versions, private sector equilibrium is not assumed, but it is still argued that changes in the size of the fiscal deficit result in broadly equivalent changes in the current account. If valid, the TDH has important policy implications. In this paper we critically review the theoretical rationale for the TDH. We go on to examine the empirical evidence relating to it. We find little consistent support for the hypothesis either across our sample of advanced OECD countries or members of the BRICS group, excluding Russia. An explanation of current account disequilibria requires going beyond a narrow focus on fiscal imbalances in the context of the twin deficits hypothesis.

Keywords Twin deficits · Current account balances · Fiscal deficits

JEL Classification F41 · F42

1 Introduction

The sharp increase in the size of the US current account balance of payments deficit in the first half of the 2000s, along with the severe payments problems encountered by a number of Euro-zone countries after 2009, has reawakened interest in the causes of such deficits. This has led to a re-examination of the relationship between current

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balance deficits and fiscal deficits. Most notoriously in the case of Greece, the burgeoning fiscal deficit was frequently presented as the single most significant cause of the current account deficit and the related crisis in that country. Correcting current account deficits seemed therefore to rely fundamentally on fiscal consolidation and austerity.

Although recent events have brought it back into the limelight, the connection between the ‘twin’ deficits has been studied for many years. In some way, it is scrutinized in most macroeconomic textbooks. The ‘twin deficits hypothesis’ (TDH) received close attention from economists at the IMF as early as the 1950s and 1960s (Polak 1957) and it was a defining feature of the ‘New Cambridge’ school in the 1970s and 1980s (for example, Cripps and Godley 1976).

Clearly if there is a universal and causal connection between fiscal deficits and current account payments deficits, it makes designing macroeconomic policy considerably easier. Dealing with unsustainable payments problems would, in these circumstances, become relatively straightforward. Reducing the fiscal deficit would be a sure way of reducing current account deficits. Detailed analysis of the responsiveness of the current account to changes in income and the structure of relative prices would become largely redundant and policy attention would only need to focus on the fiscal balance.

In the context of studies of global economic imbalances, recent research has also examined the twin deficits hypothesis and the extent to which current account deficits are driven by budget deficits. For example, Chinn et al. (2014) argue that much of the evidence they present is consistent with the twin deficits hypothesis, although they also argue that the two deficits move together less than proportionately. They argue that their findings are similar to those found by other researchers (Erceg et al. 2005, and Abbas et al. 2010). Against the backdrop of this overall finding, Chinn et al. also claim that the correlation between changes in the budget balance and the current account balance hold for the USA and the UK. Other studies have been less supportive of the twin deficits hypothesis and have argued that changes emanating from the private sector have been more important in influencing global imbalances than those emanating from the public sector (for example, IMF, 2004).¹

In this paper, we undertake a disaggregated empirical examination of the relationship between fiscal and current account balances by calculating a series of simple correlation coefficients. We distinguish between cyclical and structural balances and also examine different measures of the current account. We not only investigate the relationship across countries but also within countries over time. Disaggregation is important since if the relationship varies across countries, correlations based on large samples may be misleading. If the differences between countries are sufficiently substantial, then the whole notion of a universally applicable twin deficits hypothesis is undermined. We cover a period running from 1978 to 2017 and break this down into a series of sub periods. Issues of data availability and comparability force us to focus largely on

¹ Other papers that examine the twin deficits hypothesis for different individual countries and that use a range of different econometric techniques include: Baharumshah et al. (2006), Normandin (1999), Bluedorn and Leigh (2011), Miller and Russek (1989), Chinn (2005), Chinn and Prasad (2003), Chinn and Ito (2007, 2008), Corsetti and Muller (2006) and Gruber and Kamin (2007).

advanced OECD countries, although we briefly explore the twin deficits hypothesis for four of the five BRICS (Brazil, India, China and South Africa).

The paper is organized in the following way. Section 2 provides a brief theoretical discussion of the relationship between fiscal deficits and current account deficits. It analyses reasons as to why the justification for the TDH is theoretically insecure. Section 3 presents our empirical investigation of the relationship based on estimating correlation coefficients between the two deficits. Section 4 offers some additional commentary on the hypothesis in the light of our results. Section 5 presents some concluding remarks and discusses the direction of future research.

2 The Twin Deficits Hypothesis: an Analytical Assessment

The twin deficits hypothesis leads on from the so-called ‘three balances identity’. Derived from a simple income/expenditure model, the three balances relate to the current account balance (exports minus imports, $X - M$), the private sector balance between saving and investment ($S - I$), and the public sector balance between taxation and government expenditure ($T - G$). The accounting identity may be expressed as:

$$X - M = (S - I) + (T - G) \quad (1)$$

If it is assumed that the private sector balance does not change, then the implication is that a change in the size of the fiscal balance will be perfectly reflected by an equivalent change in the size of the current account balance. An increase in the fiscal deficit will, for example, lead to an equivalent deterioration in the current account. With some limited variability in the private sector balance, the connection between the fiscal balance and the current account balance will become less firm but there may still be a discernible relationship between fiscal and current account imbalances.

A harder version of the TDH is that, with domestic private sector saving equal to investment, the current account balance will strictly reflect the size of the fiscal balance. It was the assertion made by the ‘New Cambridge’ school that, in the UK, the private sector balance summed to zero that led to the conclusion that fiscal deficits would be matched by approximately similar sized current account deficits. The correlation between domestic saving and investment has frequently been taken as indicating the degree of capital account openness (see, for example, Feldstein and Horioka 1980). Thus, the harder version of the TDH is more likely to hold in countries with a low degree of capital mobility. Where there is a high degree of capital mobility, the softer version of the hypothesis that relates changes in the current account deficit to changes in the fiscal balance may still hold, unless international capital flows are volatile, with the relationship between domestic saving and investment changing over time.

What does basic macroeconomic theory tell us about the connection between fiscal and current account balances? If the twin deficits hypothesis holds in some form, what is the transmission mechanism between fiscal deficits and current account deficits? How, for example, does an increase in the size of the fiscal deficit cause an increase in the size of the current account deficit? The simple quasi Keynesian answer is that, other things being given, an increase in the fiscal deficit will lead to an increase in nominal income, depending on the value of the multiplier. If real output rises there will be a

related increase in imports. If the price level rises, there will be a loss of competitiveness and, as a consequence, imports will increase and exports will fall.

Post-Keynesian theory challenges this simple causal connection, by claiming that changes in the fiscal balance induce offsetting changes in the private sector balance. Monetarists placed the emphasis on ‘crowding out’. They claimed that a larger fiscal deficit leads to larger borrowing, an increase in the rate of interest and, as a result, a decline in private sector investment and rise in private sector saving. A rise in G relative to T , will therefore be largely offset by a broadly equivalent fall in I relative to S . The net effect on the current account will therefore be approximately zero. In the same spirit, new classical economists reactivated the idea of Ricardian equivalence and claimed that an increase in G relative to T will lead people to expect a future hike in taxes and that this will then lead them to increase current period saving. Again the effect of the increasing fiscal deficit on the current account will be neutralized.

The effect of a fiscal deficit on the current account could also, in principle, work through the monetary sector. Where a fiscal deficit is monetized rather than bond financed, the related growth in the money supply could lead to inflation, which then causes an appreciation in the real exchange rate, a loss of competitiveness and an increase in imports as well as a fall in exports.

The more recent ‘expansionary contractions hypothesis’ (see Giavazzi and Pagano 1990 and Barry and Devereux 1995) implies that an increase in the fiscal deficit could even strengthen the current account. This will occur where the increase in the fiscal deficit so undermines private sector confidence that the induced decline in private sector investment and the increase in saving results in a change in the private sector balance that is quantitatively larger than the one in the public sector balance. Here an increasing fiscal deficit is linked to a declining current account deficit.²

Two other things may disrupt the causal connection that is conventionally associated with the twin deficits hypothesis. The first relates to the impact of economic cycles. During a recession it is probable that imports will decline and that the current account will strengthen. It is also likely that tax receipts will fall and government expenditure will rise. In other words, there will be automatic tax changes and built-in fiscal stabilizers. If the fiscal deficit is not cyclically adjusted, this means that during a recession, the fiscal deficit will get larger and the current account deficit will get smaller. This is the opposite of the relationship claimed by the twin deficits hypothesis. Second, while a causal connection may exist between the twin deficits, it may run from the current account deficit to the fiscal deficit. This could be the case where a country relies heavily on export taxes. A fall in the value of exports caused by an exogenous shock may lead not only to a deteriorating current account but also to an increasing fiscal deficit. The deficits will be correlated but with the causal connection running in the opposite direction to the one assumed by the twin deficits hypothesis.

What emerges from the above discussion? The relationship between fiscal deficits and current account deficits appears to be considerably more complicated than that

² Recent debates about the effects of fiscal policy, particularly in the context of fiscal stimulus and consolidation in the aftermath of the global economic and financial crisis in 2008 are summarised in Bird (2016). Explanations of the post Keynesian approach may be found in Kahn and Posner (1974) and Meyrelles Filho et al. (2013). The monetary approach to fiscal policy is analyzed in Johnson (1977), Kreinin and Officer (1978), Shone (1980) and Whitman (1975). Barro (1974) and Seater (1983) provide succinct treatments of Ricardian Equivalence.

assumed by the simple twin deficits hypothesis. This is even putting to one side the impact that fiscal deficits may have on interest rates, indebtedness and the capital account, and thereby on the exchange rate and the current account. Since there is little reason to believe that the nature and strength of the various relationships discussed in this section will be the same for all countries, it follows that the nature of the relationship between fiscal deficits and current account deficits is likely to vary across countries. What does the empirical evidence show? Does it support the twin deficits hypothesis? However, to begin with there are measurement issues to confront.

3 Measurement Issues

As already noted, the twin deficits hypothesis is based on the national income accounting identity. However, although the data for three of the components – exports, imports and government consumption spending are readily available from the expenditure measure of national income, taxation is only measured from the income-side of the accounts. This raises two problems. The first relates to the treatment of the statistical discrepancy between income and expenditure measures of national income. The second is associated with the fact that tax revenue includes receipts raised for the payment of welfare benefits and other social transfers. Technically these need to be stripped out to give a measure of tax revenue that is consistent with the expenditure accounts. It is, however, not possible to do this accurately from the published accounts even for the OECD group of countries. Therefore we use an alternative measure of the fiscal deficit published by the OECD, which is the primary balance. This includes transfer payments made by governments, but excludes interest payments made by and received by governments. It is therefore not fully consistent with the measure of G and T incorporated in the national accounts. Having said this, the primary balance ‘can be said to provide an indicator of current fiscal effort.’ (IMF 1995, p.2.) It seems to be the most satisfactory measure of the fiscal balance, given that a reasonably long time period of data is required to provide a satisfactory test of the twin deficits hypothesis.³

There are two measures of the current account balance of payments that we could use. In this paper CAB1 is that which includes net income earned on overseas asset holdings and unilateral transfers. These are not included in the CAB2 measure, which is measured from the expenditure side of the national income accounts and consists only of the balance of expenditures on exports and imports of goods and services. Strictly speaking CAB2 is the measure that theoretically should be used in testing the twin deficits hypothesis. However, in this paper we use both measures, as one way of testing the robustness of our results.

³ Other measures of the fiscal balance include the ‘current fiscal balance’, the ‘domestic fiscal balance’, the ‘operational balance’ and the ‘overall fiscal balance’. The overall balance ‘emphasizes the extent to which the financing of government expenditure and net lending requires the assumption of debt obligations for future repayment and/or a rundown in the government’s holding of liquid financial assets.’ (IMF 1995, p6). The overall balance may therefore be a better measure when considering the potential crowding out effects of fiscal policy.

4 The Twin Deficits Hypothesis: Empirical Evidence

In this section, we examine the empirical relationship between fiscal and current account balances for 17 OECD countries, and four other major trading economies – Brazil, China, India and South Africa - over a forty-year period running from 1978 until 2017. As noted in the previous section, we use two measures of the current account balance relative to GDP, CAB1 and CAB2; the former is from the balance of payments account and the latter from the national income and expenditure accounts. We use the primary fiscal balance relative to GDP as our measure of the fiscal balance (PFB) which is our measure of the fiscal deficit to GDP ratio. Descriptive statistics are given in Table 1.

Current account surpluses dominate the sample, although the UK and USA along with Italy, Spain, Portugal, Canada, Brazil, India and Iceland have deficits. In contrast and on average the number of countries with fiscal deficits is roughly equal to those with fiscal surpluses. Although there is little evidence of skewness in the data, the kurtosis statistics suggests some heavy tails, particularly with regard to the fiscal deficits for Iceland, Korea, Portugal and the USA. The Augmented Dickey Fuller (ADF) statistics suggest that all the time series are non-stationary, since the null hypothesis of a unit root is never rejected. This is a little surprising as they are ratios of trended series, and should theoretically be stationary. This implies the rather implausible scenario that fiscal deficits and current balance deficits can grow without limit, but a more likely explanation is that the long run of the time series is characterized by structural breaks. These do not concern us here.

Table 2 shows the correlations between the primary fiscal balances and the two alternative measures of the current balance for the whole 40-year sample (Iceland 38 years) and for the four sub-period decades, delimited by the major global shocks. Hence the last sub-period exclusively covers the period since the global economic and financial crisis when policies of fiscal stimulation were followed on a global scale. Our first sub period follows the first global oil price shock and the economic crises of the mid-1970s. The two middle decades are divided either side of the 1997/8 East Asian crisis and (more approximately) the introduction of the euro.

For the twin deficits hypothesis not to be rejected we expect positive and significant correlation coefficients. Of 170 correlation coefficients reported in Table 2, 14 are negative and significant. There are only 51 that are both positive and significant (30%). At best there is only partial and weak support for the twin deficits hypothesis. Moreover, as noted earlier, a positive correlation is not necessarily evidence in favour of the twin deficits hypothesis since it may reflect reverse causality. At the same time, a negative relationship may reflect cyclicalities (see below). There is no apparent support at all for the twin deficits hypothesis in five countries: Austria, Denmark, Iceland, Netherlands and Spain, but on the other hand, strong support (defined as a positive significant correlation over the full sample), according to both of our measures of the current account balance in seven countries; Sweden, Norway, Korea, Italy, France, Canada and Belgium. There is also and weak support in Finland, where the correlation coefficient is positive and significant for only one measure of the current account balance.

Within our sample there are some individual countries where the strong form of the twin deficits hypothesis cannot always be rejected by the data. For example, for Norway

Table 1 Summary statistics

Country	Var.	Mean	Std Dev.	Min	Max	Skew.	Kurt.	ADF
Austria	CAB 1	0.64	2.01	-3.55	4.50	-0.29	2.34	0.393
	CAB2	0.29	14.04	-80.15	32.60	-4.56	29.05	0.000
	PFB	-0.65	1.28	-3.14	2.02	-0.23	2.20	0.004
Belgium	CAB 1	1.70	2.27	-2.60	5.07	-0.26	1.82	0.456
	CAB2	2.03	1.91	-2.51	5.51	-0.58	3.02	0.231
	PFB	1.06	3.83	-9.69	6.15	-0.82	3.17	0.382
Canada	CAB 1	-1.58	2.12	-4.09	2.50	0.57	1.87	0.246
	CAB2	1.31	2.31	-2.47	5.67	0.03	2.00	0.654
	PFB	-0.67	3.24	-6.27	5.78	0.25	2.22	0.478
Denmark	CAB 1	1.56	3.91	-5.08	8.92	0.20	2.15	0.881
	CAB2	4.36	2.73	-2.38	7.53	-0.91	2.85	0.146
	PFB	1.37	3.37	-6.74	8.05	-0.19	2.68	0.280
Finland	CAB 1	0.77	3.67	-5.31	8.22	0.36	2.23	0.617
	CAB2	2.74	3.66	-1.83	9.18	0.47	1.78	0.632
	PFB	0.67	3.66	-8.51	7.75	-0.59	2.82	0.262
France	CAB 1	0.13	1.35	-3.44	3.41	0.35	3.50	0.115
	CAB2	0.06	1.38	-2.46	3.01	0.42	2.18	0.411
	PFB	-1.18	1.37	-4.94	1.25	-0.66	3.75	0.087
Iceland	CAB 1	-3.95	6.58	-23.06	7.51	-1.06	4.53	0.198
	CAB2	0.50	5.60	-16.99	9.88	-0.87	4.14	0.199
	PFB	0.39	4.35	-12.98	15.34	0.22	6.97	0.003
Italy	CAB 1	-0.16	1.92	-3.42	3.3	0.11	1.87	0.182
	CAB2	0.72	1.98	-4.18	4.54	-0.07	2.80	0.422
	PFB	0.04	3.02	-6.25	5.65	-0.32	2.06	0.395
Japan	CAB 1	2.45	1.29	-0.89	4.71	-0.70	3.29	0.185
	CAB2	0.00	0.00	-0.01	0.01	0.23	2.11	0.635
	PFB	-3.31	3.4	-9.28	3.27	0.26	2.38	0.450
Korea	CAB 1	1.00	4.45	-10.48	10.88	-0.37	3.36	0.155
	CAB2	1.32	4.23	-8.67	10.79	-0.4	3.12	0.168
	PFB	0.99	1.46	-3.45	3.37	-0.95	4.06	0.001
Netherlands	CAB 1	4.59	2.92	-0.59	10.53	0.35	2.26	0.555
	CAB2	6.01	2.80	-0.54	11.10	-0.42	3.14	0.409
	PFB	-0.28	2.02	-4.9	3.64	-0.25	2.55	0.012
Norway	CAB 1	6.23	6.29	-5.96	16.47	-0.08	2.09	0.19
	CAB2	8.03	5.36	-3.39	16.94	-0.09	2.38	0.179
	PFB	5.19	5.35	-4.75	15.79	0.18	2.34	0.333
Portugal	CAB 1	-4.64	5.13	-17.57	3.61	-0.41	2.18	0.274
	CAB2	-8.85	5.27	-21.39	1.113	0.09	3.32	0.796
	PFB	-1.52	2.28	-8.47	2.12	-0.95	4.08	0.025
Spain	CAB 1	-2.21	3.05	-9.65	2.26	-0.76	3.17	0.612
	CAB2	-0.97	2.49	-5.99	3.26	-0.14	2.32	0.586
	PFB	-2.62	3.49	-9.62	3.48	0.00	2.09	0.445

Table 1 (continued)

Country	Var.	Mean	Std Dev.	Min	Max	Skew.	Kurt.	ADF
Sweden	CAB 1	2.47	3.45	-3.07	8.19	-0.14	1.71	0.706
	CAB2	3.99	2.56	-1.59	7.59	-0.49	2.11	0.518
	PFB	-0.15	3.56	-9.94	5.27	-0.83	3.31	0.280
UK	CAB 1	-2.03	1.77	-5.22	1.53	-0.09	2.08	0.413
	CAB2	-0.92	1.52	-3.23	2.83	0.65	2.63	0.259
	PFB	-1.10	2.67	-8.88	3.51	-0.7	3.59	0.340
USA	CAB 1	-2.42	1.59	-5.83	0.16	-0.34	2.55	0.579
	CAB2	-2.53	1.50	-5.58	-0.39	-0.35	2.18	0.528
	PFB	-1.81	2.95	-10.21	3.44	-0.96	4.51	0.400
Brazil	CAB 1	-1.99	1.99	-4.31	1.69	0.60	1.99	0.636
	CAB2	-0.41	1.97	-2.66	3.41	0.68	2.20	0.662
	PFB	-4.33	2.37	-10.22	-1.99	-1.31	3.60	0.721
China	CAB 1	3.64	2.65	1.30	9.95	1.38	3.57	0.686
	CAB2	3.54	1.98	1.62	8.62	1.41	3.84	0.456
	PFB	-0.90	1.28	-3.07	1.83	0.14	2.58	0.752
India	CAB 1	-1.30	1.56	-5.08	1.50	-0.37	3.32	0.437
	CAB2	-2.74	1.83	-6.73	-0.69	-0.85	2.65	0.476
	PFB	-7.61	1.48	-9.95	-4.12	0.17	2.67	0.169
South Africa	CAB 1	-2.61	2.00	-5.79	0.90	-0.11	1.90	0.518
	CAB2	0.53	1.82	-2.39	3.95	0.21	2.13	0.549
	PFB	-4.33	2.37	-10.22	-1.99	-1.31	3.60	0.283

Key: For the non-OECD countries, Brazil, China, India and South Africa the sample period is from 1995 to 2017. The ADF statistic is the augmented Dickey Fuller test showing that all time series are non-stationary in levels

the correlation coefficient for the final sub-period 2008–17, is positive, highly significant and not significantly different from unity on both measures of the current account⁴ with correlation coefficients of 0.96 and 0.979.

Table 3 reports a similar set of correlation coefficients where we have removed cyclical factors. The Hodrick-Prescott (HP) filter is applied to all series to decompose the raw series into non-linear trend and cyclical components. The correlations between the computed trend values of the fiscal deficit and current account balances are reported in Table 3. The results seem to offer stronger support for the twin deficits hypothesis in both its weaker and stronger forms. Of the 170 coefficients only 45 are negative, of which 32 (19%) are significant; 125 are positive and 99 of these (58%) are statistically significant at the 5% level. Of the five countries which initially showed no support for the hypothesis only Spain remains. Denmark and the Netherlands both have one sub-period where the twin deficits hypothesis cannot be rejected (for the period 1978–87 in the case of Denmark, and 1988–97 in the case of the Netherlands). Iceland has two

⁴ This is actually tricky since unity is an extreme value of the correlation coefficient. By using the Fisher transformation, and given our sample size the critical value for the correlation coefficient to be insignificantly different from one is estimated to be a value greater than 0.960.

Table 2 Correlations between primary fiscal balances and current account balances

OECD Countries	CAB1					CAB2				
	1978–2017	1978–1987	1988–1997	1998–2007	2008–2017	1978–2017	1978–1987	1988–1997	1998–2007	2008–2017
Austria	0.165	-0.508	0.383	-0.218	-0.091	-0.161	-0.241	0.690**	-0.063	0.128
	0.308	0.134	0.274	0.545	0.802	0.322	0.503	0.027	0.864	0.725
Belgium	0.795**	0.826**	0.353	0.649*	0.003	0.801**	0.658**	0.180	-0.280	-0.440
	0.000	0.003	0.317	0.043	0.994	0.000	0.039	0.618	0.434	0.204
Canada	0.556**	0.781**	0.706**	-0.316	0.426	0.388**	0.763**	0.693**	0.133	0.255
	0.000	0.007	0.023	0.373	0.220	0.015	0.010	0.026	0.715	0.477
Denmark	-0.032	-0.366	0.908**	0.234	-0.033	0.118	0.100	0.815**	-0.461	-0.251
	0.847	0.298	0.000	0.515	0.927	0.467	0.784	0.004	0.180	0.484
Finland	0.360**	0.345	-0.229	0.549	0.432	0.229	0.224	-0.502	0.449	0.610*
	0.023	0.329	0.525	0.100	0.212	0.167	0.594	0.139	0.193	0.061
France	0.312**	0.259	-0.418	0.576*	-0.051	0.285*	0.080	-0.492	0.338	0.070
	0.050	0.470	0.229	0.081	0.888	0.075	0.826	0.149	0.339	0.848
Iceland	0.218	-0.703*	-0.390	-0.898**	0.888**	-0.297*	-0.709**	-0.473	-0.893**	0.263
	0.188	0.052	0.265	0.000	0.001	0.070	0.050	0.168	0.000	0.463
Italy	0.380**	0.043	0.789**	0.742**	0.380	0.617**	0.207	0.843**	0.746**	0.461
	0.016	0.906	0.007	0.014	0.278	0.000	0.565	0.002	0.013	0.180
Japan	0.126	0.806**	0.050	0.651**	0.314	-0.045	-0.210	-0.893**	-0.879**	0.449
	0.440	0.005	0.890	0.042	0.376	0.785	0.560	0.001	0.001	0.194
Korea, Rep.	0.264*	0.749**	0.136	-0.457	0.159	0.286*	0.790**	0.201	-0.454	0.029
	0.100	0.013	0.708	0.185	0.662	0.073	0.007	0.578	0.187	0.937
Netherlands	-0.088	0.063	-0.134	-0.344	0.100	0.092	0.132	0.150	-0.350	0.475
	0.589	0.864	0.712	0.331	0.784	0.571	0.715	0.678	0.322	0.166

Table 2 (continued)

OECD Countries	CAB1					CAB2				
	1978–2017	1978–1987	1988–1997	1998–2007	2008–2017	1978–2017	1978–1987	1988–1997	1998–2007	2008–2017
Norway	0.782** <i>0.000</i>	0.848** <i>0.002</i>	0.461 <i>0.180</i>	0.821** <i>0.004</i>	0.960** <i>0.000</i>	0.768** <i>0.000</i>	0.762** <i>0.010</i>	0.290 <i>0.416</i>	0.836** <i>0.003</i>	0.979** <i>0.000</i>
Portugal	0.472** <i>0.002</i>	0.406 <i>0.244</i>	0.211 <i>0.558</i>	-0.093 <i>0.799</i>	0.697** <i>0.025</i>	0.166 <i>0.306</i>	0.607* <i>0.063</i>	-0.435 <i>0.209</i>	-0.188 <i>0.603</i>	0.670** <i>0.034</i>
Spain	-0.430** <i>0.006</i>	0.193 <i>0.594</i>	0.241 <i>0.503</i>	-0.938** <i>0.000</i>	0.460 <i>0.181</i>	-0.451** <i>0.004</i>	0.060 <i>0.869</i>	0.145 <i>0.690</i>	-0.924** <i>0.000</i>	0.422 <i>0.225</i>
Sweden	0.449** <i>0.004</i>	0.799** <i>0.006</i>	0.019 <i>0.958</i>	-0.056 <i>0.877</i>	0.233 <i>0.518</i>	0.365** <i>0.021</i>	0.643** <i>0.045</i>	-0.264 <i>0.462</i>	-0.186 <i>0.607</i>	0.268 <i>0.455</i>
UK	0.210 <i>0.193</i>	-0.567* <i>0.087</i>	-0.634** <i>0.049</i>	0.294 <i>0.410</i>	-0.472 <i>0.168</i>	0.047 <i>0.776</i>	-0.482 <i>0.159</i>	-0.672** <i>0.033</i>	0.673** <i>0.033</i>	0.414 <i>0.234</i>
USA	0.108 <i>0.507</i>	0.381 <i>0.277</i>	-0.532 <i>0.114</i>	0.691** <i>0.027</i>	0.264 <i>0.461</i>	0.267 <i>0.096</i>	0.346 <i>0.327</i>	-0.448 <i>0.194</i>	0.714** <i>0.021</i>	0.193 <i>0.593</i>

Key: *p*-values in italics; ** significant at the 5% level * significant at the 10% level

consecutive periods, 1998–2007 and 2008–17, which are consistent with the hypothesis. There are 37 instances where the strong form of the twin deficits hypothesis seems valid (i.e. $R > 0.960$). These apply largely to Belgium, Italy, Norway, and Portugal. For France and for the Netherlands there are only a few instances where the twin deficits hypothesis holds, while for Spain and interestingly for the UK and the USA, there are no instances where the strong form of the hypothesis is supported by the data. This contrasts sharply with the findings of Chinn et al. (2014) that were reported in the introduction.

An alternative to stripping out the cyclical effects from the data is to first difference the data set. This makes the data stationary if it were previously non-stationary, as the current ADF tests seem to show. This procedure, however, suggests that the twin deficits hypothesis is not valid in any country in our sample. Table 4 presents the results. Ninety two correlation coefficients have the wrong sign (negative) and only 77 have the correct (positive) one. Of these only 16 can be regarded as statistically significant, and these cases apply to just six countries; Austria (1988–97) Canada (final sub period only), Finland (first sub period and only 1978–88 on the basis of the CAB2 measure), Iceland (only final sub-period), Norway (all periods) and Sweden (3 of the 5 periods, but only on the basis of the CAB1 measure). Again, there is little support for the twin deficits hypothesis.

For the four large non-OECD countries in our study (Brazil, China, India and South Africa) comparable data is only available from the mid-1990s onwards. We present these correlation results separately in Tables 5 and 6. China provides support for the soft version of twin deficits hypothesis with 11 of the 12 coefficients positive and significantly different from zero; although all coefficients are different from unity. Brazil, shows no sign of complying with the hypothesis in Table 5. However, when we remove cyclical factors to expose trends in fiscal balances and current account balances, as shown in Table 6, then 5 of the 6 coefficients are positive and significantly different from zero. Indeed for the sub-period from 1995 to 2005, the correlation coefficients exceed 0.960 and are therefore not significantly different from unity. This provides support for the stronger version of the twin deficits hypothesis. For India and South Africa there is no evidence in either Tables 5 or 6 to support the twin deficits hypothesis; indeed significant negative correlations seem to be prevalent in Table 6 even in the absence of cyclical factors.⁵

5 Further Considerations and Commentary

The evidence presented in the previous section suggests that in many cases there are other contingent factors that affect the observed correlation between fiscal deficits and current account deficits. In this paper we do not analyse them in any detail. Moreover, our estimations are silent on causality. Even where a strong correlation is observed, it

⁵ The pattern of diversity that we discover empirically in this section is likely to exist in countries other than those in our sample. In related tests not reported in detail here we examined a wider array of emerging and developing countries. Data constraints prevented us from using our preferred measure of fiscal imbalances over the time period covered in this paper. Instead, by using net government borrowing as an indicator of the impact of government activity on aggregate demand, we again discovered wide diversity across a large number of emerging and developing economies.

Table 3 Correlations between the trends in primary fiscal and current account balances

OECD Countries	CAB1					CAB2				
	1978–2017	1978–1987	1988–1997	1998–2007	2008–2017	1978–2017	1978–1987	1988–1997	1998–2007	2008–2017
Austria	0.414**	0.843**	-0.900**	-0.560*	-0.970**	-0.882**	-0.359	-0.913**	-0.703**	0.436
	0.008	0.002	0.000	0.090	0.000	0.322	0.309	0.000	0.023	0.208
Belgium	0.879**	0.995**	0.990**	0.992**	0.976**	0.982**	0.989**	0.998**	0.918**	0.953**
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Canada	0.794**	-0.461	0.973**	0.434	0.827**	0.418**	-0.711**	0.959**	0.966**	0.804**
	0.000	0.179	0.000	0.210	0.003	0.007	0.021	0.000	0.000	0.005
Denmark	0.169	0.939**	-0.860**	-0.032	-0.930**	0.633**	0.997**	-0.900**	0.155	-0.892**
	0.299	0.000	0.002	0.931	0.000	0.000	0.000	0.000	0.669	0.001
Finland	0.449**	0.933**	-0.125	0.435	0.999**	0.390**	-0.977**	-0.244	-0.018	0.999**
	0.004	0.000	0.731	0.209	0.000	0.016	0.000	0.498	0.962	0.000
France	0.695**	0.696**	0.615*	0.955**	0.133	0.737**	0.705**	0.577	0.959**	0.291
	0.000	0.000	0.058	0.000	0.713	0.000	0.023	0.081	0.000	0.415
Iceland	0.639**	0.401	-0.765*	0.879**	0.979**	0.525**	0.027	-0.895**	0.084	0.898**
	0.000	0.325	0.010	0.001	0.000	0.001	0.950	0.001	0.817	0.000
Italy	0.410**	-0.790**	0.994**	0.997**	0.809**	0.749**	0.996**	0.990**	0.987**	0.793**
	0.009	0.006	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.006
Japan	-0.089	0.999**	0.954**	-0.930**	0.160	0.097	-0.558*	-0.978**	0.784**	-0.625
	0.585	0.000	0.000	0.000	0.660	0.554	0.094	0.000	0.007	0.053
Korea, Rep.	0.705**	0.991**	0.211	-0.910**	0.949**	0.824**	0.997**	-0.743**	-0.281	0.965**
	0.000	0.000	0.560	0.000	0.000	0.000	0.000	0.014	0.432	0.000
Netherlands	0.001	0.926**	0.990**	-0.990**	0.631**	0.191	0.937**	0.998**	-0.968**	0.657**
	0.994	0.000	0.000	0.000	0.050	0.238	0.000	0.000	0.000	0.028

Table 3 (continued)

OECD Countries	CAB1					CAB2				
	1978–2017	1978–1987	1988–1997	1998–2007	2008–2017	1978–2017	1978–1987	1988–1997	1998–2007	2008–2017
Norway	0.878** <i>0.000</i>	-0.213 <i>0.555</i>	0.868** <i>0.003</i>	0.995** <i>0.000</i>	0.999** <i>0.000</i>	0.891** <i>0.000</i>	0.765** <i>0.010</i>	0.810** <i>0.005</i>	0.992** <i>0.000</i>	0.999** <i>0.000</i>
Portugal	0.783** <i>0.000</i>	0.942** <i>0.000</i>	0.987** <i>0.000</i>	0.883** <i>0.001</i>	0.980** <i>0.000</i>	0.121 <i>0.458</i>	0.987** <i>0.000</i>	-0.963 <i>0.000</i>	-0.941** <i>0.000</i>	0.974** <i>0.000</i>
Spain	-0.655** <i>0.000</i>	-0.660** <i>0.038</i>	-0.990** <i>0.000</i>	0.508 <i>0.134</i>	-0.093 <i>0.798</i>	-0.599** <i>0.004</i>	-0.683** <i>0.029</i>	-0.834** <i>0.003</i>	0.371 <i>0.292</i>	-0.124 <i>0.733</i>
Sweden	0.862** <i>0.000</i>	0.979** <i>0.000</i>	-0.158 <i>0.662</i>	0.871** <i>0.001</i>	0.874** <i>0.001</i>	0.856** <i>0.000</i>	0.997** <i>0.000</i>	-0.279 <i>0.435</i>	0.990** <i>0.000</i>	0.930** <i>0.000</i>
UK	0.740** <i>0.000</i>	-0.930* <i>0.000</i>	-0.232 <i>0.519</i>	0.971** <i>0.000</i>	-0.820** <i>0.004</i>	0.510** <i>0.001</i>	-0.936** <i>0.000</i>	-0.377 <i>0.283</i>	0.815** <i>0.004</i>	0.841** <i>0.002</i>
USA	0.377** <i>0.017</i>	0.939** <i>0.000</i>	-0.730** <i>0.017</i>	0.858** <i>0.002</i>	0.793** <i>0.006</i>	0.604** <i>0.000</i>	0.960** <i>0.000</i>	-0.481 <i>0.159</i>	0.917** <i>0.000</i>	0.826** <i>0.003</i>

Key: p-values in italics; ** significant at the 5% level, coefficients also statistically insignificant different from unity (where R > 0.96) are shown in bold

Table 4 Correlations of the change in primary fiscal balances and current account balances

OECD Countries	CAB1					CAB2				
	1978–2017	1978–1987	1988–1997	1998–2007	2008–2017	1978–2017	1978–1987	1988–1997	1998–2007	2008–2017
Austria	-0.058	-0.492	0.351	-0.246	0.211	-0.037	-0.135	0.683**	0.019	0.405
	0.727	0.178	0.321	0.494	0.559	0.824	0.729	0.030	0.961	0.246
Belgium	0.245	0.201	-0.205	0.239	0.354	-0.111	-0.257	-0.157	0.094	-0.188
	0.133	0.604	0.569	0.507	0.316	0.501	0.505	0.665	0.796	0.602
Canada	0.027	-0.700**	0.193	0.461	0.767**	0.104	-0.700**	0.177	0.376	0.716**
	0.871	0.036	0.594	0.180	0.013	0.528	0.035	0.624	0.284	0.020
Denmark	-0.116	-0.250	-0.60*	0.202	0.174	-0.281*	-0.579	-0.652**	0.083	-0.093
	0.483	0.517	0.063	0.576	0.630	0.083	0.103	0.041	0.820	0.798
Finland	0.182	0.529	0.004	0.481	-0.066	0.073	0.726	-0.398	0.371	0.340
	0.266	0.143	0.991	0.160	0.855	0.666	0.065	0.255	0.292	0.337
France	-0.054	0.008	-0.340	0.161	-0.071	-0.249	-0.010	-0.630*	-0.369	-0.404
	0.746	0.984	0.337	0.656	0.847	0.127	0.979	0.051	0.294	0.248
Iceland	0.227	-0.760**	-0.630*	-0.670**	0.700**	-0.294*	-0.735*	-0.745**	-0.672**	-0.144
	0.176	0.048	0.052	0.035	0.024	0.079	0.060	0.013	0.034	0.692
Italy	0.054	0.001	-0.219	0.246	0.054	0.110	0.013	-0.207	0.353	0.202
	0.742	0.998	0.543	0.494	0.883	0.504	0.975	0.567	0.317	0.575
Japan	-0.003	-0.179	-0.167	-0.448	0.220	-0.141	-0.283	-0.115	-0.180	-0.031
	0.985	0.645	0.644	0.194	0.541	0.393	0.461	0.753	0.619	0.932
Korea, Rep.	-0.179	0.371	0.183	-0.407	-0.564*	-0.282*	0.343	0.178	-0.436	-0.684**
	0.275	0.326	0.612	0.243	0.089	0.082	0.366	0.623	0.208	0.029
Netherlands	-0.083	-0.020	-0.436	-0.016	0.101	0.176	-0.037	0.063	0.202	0.427
	0.618	0.959	0.208	0.966	0.781	0.285	0.925	0.863	0.575	0.219

Table 4 (continued)

OECD Countries	CAB1					CAB2				
	1978–2017	1978–1987	1988–1997	1998–2007	2008–2017	1978–2017	1978–1987	1988–1997	1998–2007	2008–2017
Norway	0.747**	0.790**	0.016	0.849**	0.835**	0.759**	0.774**	-0.154	0.890**	0.895**
	<i>0.000</i>	<i>0.011</i>	<i>0.964</i>	<i>0.002</i>	<i>0.003</i>	<i>0.000</i>	<i>0.015</i>	<i>0.671</i>	<i>0.001</i>	<i>0.001</i>
Portugal	0.235	0.460	-0.062	0.172	0.412	0.194	0.485	-0.339	0.330	0.261
	<i>0.120</i>	<i>0.213</i>	<i>0.864</i>	<i>0.634</i>	<i>0.237</i>	<i>0.236</i>	<i>0.186</i>	<i>0.339</i>	<i>0.352</i>	<i>0.467</i>
Spain	-0.383**	-0.126	-0.442	-0.626*	-0.448	-0.388**	-0.148	-0.448	-0.507	-0.511
	<i>0.016</i>	<i>0.747</i>	<i>0.210</i>	<i>0.053</i>	<i>0.194</i>	<i>0.015</i>	<i>0.704</i>	<i>0.195</i>	<i>0.135</i>	<i>0.131</i>
Sweden	0.391**	0.699**	0.435	-0.239	0.630*	0.181	0.523*	0.085	-0.263	0.356
	<i>0.014</i>	<i>0.036</i>	<i>0.209</i>	<i>0.506</i>	<i>0.051</i>	<i>0.271</i>	<i>0.149</i>	<i>0.815</i>	<i>0.464</i>	<i>0.313</i>
UK	-0.168	-0.401	-0.338	-0.423	0.034	-0.181	0.002	-0.418	-0.370	-0.095
	<i>0.307</i>	<i>0.285</i>	<i>0.339</i>	<i>0.223</i>	<i>0.925</i>	<i>0.270</i>	<i>0.997</i>	<i>0.230</i>	<i>0.293</i>	<i>0.794</i>
USA	-0.322**	-0.104	-0.174	-0.339	-0.700**	-0.379**	-0.282	-0.300	-0.315	-0.653**
	<i>0.046</i>	<i>0.790</i>	<i>0.632</i>	<i>0.338</i>	<i>0.025</i>	<i>0.017</i>	<i>0.462</i>	<i>0.400</i>	<i>0.376</i>	<i>0.041</i>

Key: p-values in italics; ** significant at the 5% level * significant at the 10% level

Table 5 Correlations between primary fiscal balances and current account balances

Country	CAB1			CAB2		
	1995–2017	1995–2005	2006–2017	1995–2017	1995–2005	2006–2017
Brazil	0.010 <i>0.967</i>	0.135 <i>0.773</i>	−0.051 <i>0.873</i>	0.026 <i>0.916</i>	0.088 <i>0.851</i>	−0.028 <i>0.932</i>
China	0.715** <i>0.000</i>	0.882** <i>0.004</i>	0.668** <i>0.018</i>	0.677** <i>0.000</i>	0.423 <i>0.195</i>	0.684** <i>0.014</i>
India	−0.235 <i>0.306</i>	−0.266 <i>0.490</i>	0.372 <i>0.234</i>	−0.240 <i>0.271</i>	−0.410 <i>0.211</i>	0.382 <i>0.221</i>
South Africa	−0.401 <i>0.058</i>	0.206 <i>0.544</i>	−0.306 <i>0.334</i>	−0.287 <i>0.185</i>	0.349 <i>0.293</i>	−0.288 <i>0.364</i>

Key: p-values in italics; ** significant at the 5% level * significant at the 10% level

may reflect reverse causality; current account deficits may be caused by exogenous factors that then affect fiscal balances. At the least, there may be causal connections that run in both directions. While fiscal mismanagement is likely to have consequences for the current account, exogenous balance of payments shocks are also likely to have fiscal consequences. For example, within our sample of countries, the strong correlation between fiscal imbalances and current account imbalances in Norway may, in part, reflect Norway's degree of export concentration on oil, fish products and tourism that are vulnerable to external factors. It may not provide overwhelmingly firm evidence in favour of the twin deficits hypothesis. In this regard, Norway may be representative of a number of countries world-wide.

It is also interesting to consider the relationship between fiscal and current account balances in the aftermath of the global economic and financial crisis at the end of the 2000s. For some countries, and perhaps most notably the United States, the sharp recession associated with the crisis served to reduce the size of the current account

Table 6 Correlations between the trends in primary fiscal and current account balances

Country	CAB1			CAB2		
	1995–2017	1995–2005	2006–2017	1995–2017	1995–2005	2006–2017
Brazil	0.661** <i>0.002</i>	0.993** <i>0.000</i>	0.743** <i>0.006</i>	0.711** <i>0.001</i>	0.991** <i>0.000</i>	0.788** <i>0.002</i>
China	0.897** <i>0.000</i>	0.953** <i>0.000</i>	0.938** <i>0.000</i>	0.878** <i>0.000</i>	0.856** <i>0.001</i>	0.944** <i>0.000</i>
India	−0.909** <i>0.000</i>	−0.951** <i>0.000</i>	−0.280 <i>0.379</i>	−0.780** <i>0.000</i>	−0.405 <i>0.216</i>	0.517 <i>0.085</i>
South Africa	−0.727 <i>0.000</i>	−0.844** <i>0.001</i>	−0.596** <i>0.041</i>	−0.674** <i>0.000</i>	−0.648** <i>0.031</i>	0.373 <i>0.232</i>

Key: p-values in italics; ** significant at the 5% level, coefficients also statistically insignificantly different from unity (where $R > 0.96$) are shown in bold

deficit. The recession also induced a policy response in the form of fiscal stimulation. The fiscal deficit increased to an extent well beyond that automatically linked to the downturn. As recovery occurred, so the fiscal deficit narrowed and the current account deficit increased. In short, there was much more going on than would be suggested by the simple twin deficits hypothesis.

The global crisis also demonstrates how the relationship between fiscal and current account balances in one country will be affected by what is happening in other ones. Thus, if one country in isolation goes down the path of fiscal expansion, the effects on its current account will be stronger than if all countries go down a similar path. In the latter case, the effects of fiscal expansion on the balance of payments will be neutralized. Indeed, in the immediate aftermath of the global economic and financial crisis this was used as an argument in favour of a co-ordinated approach to the design of macroeconomic policy. Once again, the issues involved in the relationship between fiscal imbalances and current account imbalances are much more complex than those suggested by the twin deficits hypothesis. The simple policy lessons that are implied by the hypothesis are largely illusory if they go beyond the observation that severe fiscal laxity is likely to bring with it negative consequences for the current account of the balance of payments.

6 Concluding Remarks

The notion that there is a close relationship between fiscal balances and current account balances has been persistent, perhaps because both balances are part of the *ex post* national income identity. This has frequently been presented in the more precise guise of the 'twin deficits hypothesis'. In its most extreme form the hypothesis claims that fiscal deficits are reflected in equivalently sized current account deficits. Softer versions of the hypothesis argue that changes in the fiscal balance lead to changes in the current account in the same direction, although the relationship may not be proportionate. From a policy point of view the hypothesis has clear attractions since it suggests that improving current account balance of payments performance can, in effect, be guaranteed by the pursuit of appropriate fiscal policy. It is against this background that policies of fiscal consolidation and austerity have recently been advocated in an attempt to reduce current account deficits in some advanced economies such as the US and the UK, as well as in crisis countries in the Euro-zone.

Theoretical analysis suggests that the relationship between fiscal and current account balances is more complicated than the twin deficits hypothesis claims, embodying a range of factors that may work in different directions and at different strengths. There is no necessary theoretical reason to anticipate that the twin deficits hypothesis will hold across the board. Depending on these contingent factors it may hold to some extent in some circumstances but not in others. But is the nexus of circumstances that is needed to make the hypothesis hold, at least in its softest form, sufficiently common to justify the idea that the hypothesis is universal. Is it in fact something of a special case and an exception rather than a general rule?

The empirical evidence that we have presented in this paper supports the conclusion that, while there are instances where the association between fiscal and current account balances is consistent with a relatively soft or weak version of the twin deficits

hypothesis, there is no universal pattern. The fact that the hypothesis does not generally hold, implies that there are other factors that drive the current account balance of payments. Further research is needed to identify what these are, and to clarify and delineate the circumstances under which the fiscal balance exerts a dominant effect.

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