"TWINS" OR JUST "SIBLINGS''? BUDGET AND CURRENT ACCOUNT DEFICITS IN EUROPE, 1870-2013
Georgios KARRAS*

Abstract
Using data for twelve European countries over the period 1870-2013, the response of the current account balance to the budget deficit is found to be inverse-hump-shaped: an increase in the budget deficit results in a current account deterioration that is sizeable but less than one-to-one (so the two balances are “siblings” rather than “twins”), and persistent but temporary. Specifically, an increase in the fiscal deficit by 1% of GDP results in deterioration of the current account that peaks at about 0.25% of GDP but dies out after a maximum of ten years.
JEL classification: E62, F41
Keywords: Twin Deficits, Budget Deficit, Current Account, Europe, 20th century history

1 Introduction
Recent macroeconomic developments have combined an increased reliance on fiscal policy with greater trade openness and interdependence among national economies. The former is, at least partly, due to the weakening of conventional monetary policy by the “zero lower bound” limitations in the aftermath of the global financial crisis; while the latter is reinforced by an increase in international business-cycle synchronization.¹

This combination has revitalized interest in the relationship between the government budget and the current account balances. While there is widespread consensus that the two should move together, the precise nature of the relationship is unclear. One extreme prediction, suggested by simple open-economy national income accounting, is that deficits in the government budget and the current account should have a one-to-one relationship: we refer to this as the “twin deficits” hypothesis. More fully specified theoretical models still predict that the two balances would move together, but their relationship will not be one-to-one: we refer to this as the “sibling deficits” hypothesis.

The issue therefore needs to be resolved empirically, and a very large literature has developed on the subject, utilizing different data sets and econometric techniques. Recent examples include Corsetti and Müller (2006), Kim and Roubini (2008), Bluedorn and Leigh (2011), IMF (2011), Forte and Magazzino (2013), Eldemerdash, Metcalf, and Maioli (2014), Auerbach and Gorodnichenko (2016), and Forni and Gambetti (2016). While results differ widely, a broad consensus appears to be that increases in budget deficits do worsen the current account balance, but less than one-to-one, consistent with the “sibling” version of the hypothesis. Focusing on the influential IMF (2011) study, for example, a fiscal consolidation of 1% of GDP improves the current account balance by a little more than 0.5% of GDP, and the effect is found to be permanent.

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¹ Eusepi and Preston (2018) discuss some of the monetary policy issues, while Perri and Quadrini (2018) investigate the global synchronization of business cycles.
The goal of the present paper is to scrutinize this relationship empirically using a unique data set of twelve European countries over the period 1870-2013. The main advantage of using such a long data set is that it includes a variety of government budget and current account experiences that are not typically (or not at all) found in more commonly used post-World War II data sets.

Our first finding with this data set is that the “sibling” hypothesis is better supported than the stricter “twin” deficits version. In particular, an increase in the budget deficit by 1% of GDP deteriorates the current account balance, but never by more than about 0.25% of GDP. This is about half of the IMF (2011) estimate, but consistent with the prediction of the theoretical model of Erceg, Guerrieri, and Gust (2005).

In addition, the effect is found to be temporary (contrary to the findings of IMF, 2011), dying out after a maximum of ten years. These results are largely robust to the estimation technique and even to estimation over just the post-war period.

Overall, the paper’s findings can be summarized in Figure 1, one of the estimated Impulse Response Functions of the current account balance (as a % of GDP) to a budget deficit shock of 1% of GDP. The solid line shows that the response is inverse-hump-shaped: an increase in the budget deficit results in a current account deterioration that is sizeable but less than one-to-one, and persistent but temporary. It appears the two deficits are “siblings” rather than “twins”.

Figure 1. Response of the Current Account Balance (as a percent of GDP) to an exogenous shock to the Budget Deficit of 1% of GDP. Dashed lines are two-standard-error confidence intervals.

The rest of the paper is organized as follows. Section 2 discusses the conceptual framework, presents the data, and defines the variables to be used in the estimation. Section 3 outlines the estimation methodology, derives the main empirical results, and implements a number of robustness checks. Section 4 discusses the findings and concludes.

2 Section 3 below presents the full range of estimates.
2 Conceptual Framework and Data

The simplest way to think about the relationship between the balances of the current account and the government budget is the open-economy national accounting identity, \( CA \equiv S - I \), which simply says that the current account balance (\( CA \)) equals the difference between national saving (\( S \)) and domestic investment (\( I \)).

National saving is the sum of private saving (\( S_p \)) and government saving (\( S_g \)), so that \( S = S_p + S_g \). Defining government saving as the difference between net tax revenue (\( T \)) and government spending (\( G \)), we have \( S_g = T - G \), which is just the government budget surplus. Substituting in the current account identity, we get

\[
CA \equiv S_p - I - (G - T),
\]

or

\[
CA + (G - T) \equiv S_p - I
\]

which simply says that the sum of the current account balance and the government budget deficit equals the difference between private saving and investment.

Equation (1) is the origin of the “twin” deficits hypothesis: given private saving and investment, there should be an exact one-to-one relationship between the budget deficit and the current account deficit: an increase in \( (G - T) \) by $1 must be accompanied by a decrease in \( CA \) by exactly $1 in order to satisfy (1). Under these assumptions, the two deficits are “twins”.

Economically, of course, neither private saving nor investment are likely to be unaffected when fiscal policy changes, so the theoretical relationship between the two balances depends on the theoretical model one employs. Obstfeld and Rogoff (1996) argue that in most realistic theoretical settings government budget deficits will induce current account deficits, so the two will continue to move together, but their relationship will not necessarily be one-to-one: we call this the “sibling” deficit hypothesis. The next section will quantify the strength of the relationship in order to distinguish empirically between the “twin” and “sibling” alternatives, while the remainder of this section will discuss data sources and definitions.

All data are from the Jordà-Schularick-Taylor Macrohistory Database (see Jordà, Schularick, and Taylor, 2017). Using \( i \) to index over countries and \( t \) over time, the current account balance as percent of GDP is simply defined as \( ca_{i,t} = \frac{CA_{i,t}}{GDP_{i,t}} \cdot 100 \), where \( CA_{i,t} \) is the current account balance (nominal, local currency), and \( GDP_{i,t} \) is Gross Domestic Product (nominal, local currency). Similarly, the government budget deficit as percent of GDP is defined as \( d_{i,t} = \frac{G_{i,t} - T_{i,t}}{GDP_{i,t}} \cdot 100 \), where \( G_{i,t} \) is government expenditure (nominal, local currency), and \( T_{i,t} \) is government revenues (nominal, local currency).

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3 The theoretical literature is vast, and the theoretical predictions vary considerably. For example, Erceg, Guerrieri, and Gust (2005) develop a dynamic general equilibrium model which predicts that a rise in the fiscal deficit by 1% of GDP would deteriorate the trade balance by 0.2% of GDP or less (a “sibling” result). On the other hand, Roubini (1988) shows that if both consumption smoothing and tax smoothing apply, the theoretical relationship between the budget and current account deficits should be one-to-one (the “twin” result).
The data set consists of annual observations covering the period 1870 – 2013 for each of twelve European countries. Figures 2a and 2b plot the two deficits, $d_{i,t}$ and $ca_{i,t}$, for each of the countries over the entire period. Figures 2a and 2b clearly show the generally inverse relationship between the two variables: increasing budget deficits tend to coincide with deteriorating current account balances, while diminishing budget deficits tend to overlap with increasing current account balances.

Visually, at least, the overwhelming majority of episodes appear to be qualitatively consistent with the “sibling” deficit hypothesis. The most striking examples include the sizable World War I and World War II fiscal expansions which were accompanied by current account deteriorations in most countries. Even peace-time current account balances, however, usually move in the opposite direction from budget deficits (such as in Belgium, Italy and Portugal in the 1970s, or Denmark and Sweden in the 1980s, or Norway since the 1990s), as dictated by the “sibling” deficits hypothesis. Nevertheless, exceptions are also easy to identify (as in Denmark in the 1990s and Spain the 2000s), when budget deficits and current account balances moved in the same direction, contrary to the “twin deficit” (or even the “sibling deficit”) hypothesis.

As the visual evidence is not unanimous, a formal statistical approach is necessary for testing the validity of the twin deficits hypothesis and for quantifying its strength. This is the objective of the present paper and the subject of the next section.

### 3 Empirical Evidence

#### 3.1 Benchmark Relationship

We start with a simple dynamic relationship to estimate the responses of the current account balance to changes in the government budget deficit. Using the local projection method of Jordà (2005), the basic specification is:

$$
ca_{i,t+h} = w_i^h + v_t^h + \beta_h d_{i,t} + \sum_{j=1}^{H} \beta_j^h d_{i,t-j} + \sum_{j=1}^{H} \alpha_j^h ca_{i,t-j} + u_{i,t} \tag{2}
$$

where $i$ is indexing over countries and $t$ over time; $h$ indicates the horizon (years after time $t$) considered; the $w$s and $v$s are, respectively, country- and time-specific fixed (or random) effects; and the $\alpha$s and $\beta$s are parameters to be estimated. The impulse response function consists of the estimated $\beta_h$s, which capture the dynamic responses of the current account balance to a change in the budget deficit.

Table 1 and Figures 3 and 4 present the impulse response functions estimated over the entire period, 1870-2013, with fixed or random effects. Beginning with the fixed-effects estimates (Figure 3 and top row of Table 1), an increase in the budget deficit by 1% of GDP is found to reduce the current account balance contemporaneously (i.e., within the year) by 0.14% of GDP. This impact is modest, but statistically significant.

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$^4$ The 12 countries are: Belgium, Germany, Denmark, Spain, Finland, France, Great Britain, Italy, the Netherlands, Norway, Portugal, and Sweden.
Table 1. Responses of the Current Account to an Increase in the Budget Deficit

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<tr>
<th>Horizons (in years)</th>
<th>maximum response year</th>
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<tr>
<td>0</td>
<td>1</td>
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<td>5</td>
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Fixed Effects
-0.138** -0.280** -0.083 -0.010 -0.280** 1
(0.026) (0.033) (0.046) (0.005) (0.033) (0.026)

Random Effects
-0.123** -0.236** -0.130** -0.023 -0.236** 1
(0.023) (0.029) (0.039) (0.044) (0.029) (0.029)

Notes: Response of the Current Account Balance (as a percent of GDP) to an increase in the Budget Deficit by 1% of GDP. Estimated standard errors in parentheses. ‘**’ and ‘*’ denote statistical significance at the 1% and 5% significance levels.

Figure 3
Notes: Response of the Current Account Balance (as a percent of GDP) to an increase in the Budget Deficit by 1% of GDP. Models estimated over the full 1870-2013 period with country and time fixed effects. Dashed lines are two-standard-error confidence intervals.

Figure 4
Notes: Response of the Current Account Balance (as a percent of GDP) to an increase in the Budget Deficit by 1% of GDP. Models estimated over the full 1870-2013 period with country and time random effects. Dashed lines are two-standard-error confidence intervals.
Figures 2a and 2b in the Annex present the evolution of budget deficits and current account balances in each country. One year later, however, the deterioration in the current account is much larger, at 0.28% of GDP (and statistically significant). The current account effect then gradually declines in (absolute) size, but remains statistically significantly negative even for the sixth year after the shock. By the tenth year after the increase in the budget deficit, however, the current account response has effectively died out – both economically and statistically. The random effect estimates (Figure 4 and second row of Table 1) paint a very similar picture, so the results appear to be robust to the modeling of the country-specific and time-specific effects.

Overall, the full-period evidence suggests that the response of the current account balance to the budget deficit is inverse-hump-shaped: an increase in the budget deficit results in a current account deterioration that is sizeable but less than one-to-one, and persistent but temporary. It appears the two deficits are “siblings” rather than “twins”. Could this picture be driven entirely by the WWI and WWII observations? To investigate this possibility, specification (1) is next estimated over the post-WWII period, 1950-2013. Table 2 and Figure 5 present the results.

Table 2. Responses of the Current Account to an Increase in the Budget Deficit

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<th>Horizons (in years)</th>
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<tr>
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<tr>
<td>5</td>
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Fixed Effects

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<td>–0.155</td>
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Random Effects

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Notes: Response of the Current Account Balance (as a percent of GDP) to an increase in the Budget Deficit by 1% of GDP. Estimated standard errors in parentheses. ‘**’ and ‘*’ denote statistical significance at the 1% and 5% significance levels.

Figure 5

Notes: Response of the Current Account Balance (as a percent of GDP) to an increase in the Budget Deficit by 1% of GDP. Models estimated over the postwar 1950-2013 period with country and time fixed effects. Dashed lines are two-standard-error confidence intervals.
Starting again with the fixed-effects estimates (Figure 5 and top row of Table 2), an increase in the budget deficit by 1% of GDP is found to reduce the current account balance by 0.15% of GDP within the year, and by 0.18% of GDP after a year (both statistically significant). This is qualitatively similar with the full-period evidence. After that, and unlike the full-period results, the effect fluctuates around 0.18% for the better part of a decade. By the tenth year, however, the effect again has died out, as in the full period results. Once again, the results are quite robust to the random effect estimates (see second row of Table 2). It appears therefore that, while the post war response of the current account to the budget deficit is less decidedly reverse-hump-shaped, the main conclusions remain valid: a higher budget deficit is followed by a worsening of the current account that is sizeable but less than one-to-one, and persistent but temporary.

### 3.2 An extension

The budget deficit variable, $d_{i,t}$, is unlikely to be exogenous. Because of this, the estimated $\alpha$s and $\beta$s in model (2) may be biased. To allow the budget deficit to react to the level of economic activity, we specify the following equation

$$d_{i,t} = x_i + z_t + \sum_{j=1}^{J} \gamma_j d_{i,t-j} + \sum_{j=1}^{J} \theta_j g_{i,t-j} + \psi_{i,t} \tag{3}$$

where $g_{i,t} = \frac{RGDP_{i,t} - RGDP_{i,t-1}}{RGDP_{i,t-1}} \cdot 100$ is the growth rate of real GDP (RGDP), the $x$s and $z$s are country- and time-specific effects, and the $\gamma$s and $\theta$s are parameters to be estimated. The $\theta$s capture the role of the economy’s real growth rate in determining the budget deficit, while the $\gamma$s capture persistence.

We interpret $\psi_{i,t}$ as the exogenous budget deficit “shock” in country $i$ at time $t$ — that is, the part of the deficit that is not explained by past economic activity or persistence.

We then revise the current account specification:

$$ca_{i,t+h} = w_i^h + v_t^h + \beta^h \hat{\psi}_{i,t} + \sum_{j=1}^{J} \beta_j^h \hat{\psi}_{i,t-j} + \sum_{j=1}^{J} a_j^h ca_{i,t-j} + u_{i,t} \tag{4}$$

where $\hat{\psi}_{i,t}$, the residual from regression (3), is the estimated budget deficit “shock”.

The system of equations (3) and (4) is estimated for the full (1870-2013) and post war (1950-2013) periods, and with fixed or random effects. Results are in Table 3 and Figure 6.

Table 3 shows that our findings are little affected when model (2) is replaced by the system of (3) and (4). A budget-deficit shock of 1% of GDP is shown to reduce the current account by 0.13% to 0.15% of GDP within the same year. This impact effect is statistically significant and robust across the two periods and estimation techniques. What happens next, depends on the specification. For the entire period, 1870-2013, the current account deterioration worsens one year after the budget deficit shock to about 0.27% of GDP (also statistically significant, and robust between fixed and random

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*As the fixed- and random-effects results are quite similar (note Table 2), the graph of the random-effects impulse response is not included in order to preserve space.*
The effect then gradually dies out, basically disappearing by the tenth year. For the post-war period, 1950-2013, the current account effects are more persistent, peaking in the fourth year after the shock (to about 0.2% of GDP), but again prove to be temporary, dying out by the end of a decade. We note that 0.2% is consistent with the theoretical predictions of the Erceg, Guerrieri, and Gust (2005) theoretical predictions.

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**Table 3. Responses of the Current Account to a Budget Deficit Shock**

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<th>Fixed Effects</th>
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Notes: Response of the Current Account Balance (as a percent of GDP) to an exogenous shock to the Budget Deficit of 1% of GDP. Models estimated over the full period 1870-2013 or the postwar 1950-2013 period, and with fixed or random effects, as indicated. Dashed lines are two-standard-error confidence intervals.

**Figure 6**

Notes: Response of the Current Account Balance (as a percent of GDP) to an exogenous shock to the Budget Deficit of 1% of GDP. Models estimated over the full period 1870-2013 or the postwar 1950-2013 period, and with fixed or random effects, as indicated. Dashed lines are two-standard-error confidence intervals.
Figure 6 visualizes these results. The two graphs in the left-hand column show the impulse response functions for the entire period under fixed and random effects: the inverse-hump-shaped pattern is obvious, and both qualitatively and quantitatively similar to the previous results. The two graphs on the right-hand column of Figure 6 plot the impulse responses for the post-war period. These are shown to be more persistent, but similar in magnitude, especially in the short-run.

Summing up, this subsection’s alternative way of measuring the budget deficit shock has established that robustness in not lacking. The evidence shows that an increase in the fiscal deficit by 1% of GDP results in a persistent but temporary deterioration of the current account, that peaks at about a quarter of a percentage point of GDP but dies out after a maximum of ten years.

4 Discussion and Conclusions

This paper investigated the relationship between the balances on the government budget and the current account. While the theoretical and empirical consensus is that they move together (the “twin deficit” hypothesis), there is wide disagreement on the strength and dynamic properties of the relationship.

The present paper begins by distinguishing between the “twin deficits” and “sibling deficits” hypotheses. While both hypotheses maintain that the two balances move together, the relationship between them is exactly one-to-one in the “twin” version, but less than one-to-one in the “sibling” hypothesis.

Using a unique data set of twelve European countries over the period 1870-2013, we find that the “sibling” hypothesis is much better supported than the stricter “twin” deficits version. In particular, while an increase in the budget deficit by 1% of GDP deteriorates the current account balance, as predicted by both versions, the deterioration does not exceed about 0.25% of GDP. The magnitude of this effect is about half of the IMF’s (2011) estimate, but consistent with the prediction of the theoretical model of Erceg, Guerrieri, and Gust (2005). In addition (and again, contrary to the findings of IMF, 2011), the effect is found to be temporary, dying out after a maximum of ten years. Interestingly, these results remain valid if the model is estimated over the post-war period only: the only substantive difference is an increase in persistence – both the magnitude and the temporary nature of the effect are basically unaffected. These results are also robust to various estimation techniques.

The significance of the paper’s findings is straightforward. Fiscal policies that alter the government’s budget position have a sizable effect on the current account. Our estimates confirm that the effect will be in the same direction but they argue that it will be smaller than previously thought (about a-quarter-to-one) and temporary.

References


Annex on line at the journal Website: http://www.usc.es/economet/eaat.htm
Figure 2a
Notes: Government Budget Deficits (black lines) and Current Account Balances (blue lines) as percent of GDP

Figure 2b
Notes: Government Budget Deficits (black lines) and Current Account Balances (blue lines) as percent of GDP