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Consolidation first - About twin deficits and the causal relation between fiscal budget and current account imbalances

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Abstract

During recent years, large trade- and budget deficits have accumulated especially in advanced economies. This study examines if this coincidence actually reflects a causal relation. Economic theory and previously documented findings on causality between trade and government balances are inconclusive. Summarizing evidence over a cross section of 19 advanced economies, we document that the budget balance influences the current account in a more pronounced way than vice versa. Moreover, the documented causal influence is characterized by a stronger tendency towards a twin deficit (or -surplus) rather than a twin divergence.

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1 Introduction and data

Comparing government- and external balances of the recent decade with those observed in the 1980s, it has been noted that growing *twin deficits* involving the fiscal- and the external balance might be increasingly important for policymakers in open economies (Frankel 2006). The emergence of a (positive) causal impact from the fiscal- to the current account balance (FB and CA, henceforth) is e.g. described in the Mundell-Fleming open economy model. Fiscal expansions favoring domestic goods may lead the real FX rate to appreciate, thus deteriorating the trade balance. In contrast, CA may also influence FB if governments successfully target CA by means of fiscal policy over prolonged periods (cf. Bluedorn and Leigh 2011). Moreover, the *Ricardian equivalence* argument predicts the absence of any such effect. This argument suggests limited scope of fiscal policy since households anticipate required future consolidation by adjusting their consumption and labor supply (Barro 1974, Obstfeld and Rogoff 1996). Distinct empirical investigations report evidence for both causal directions, the absence of any impact and also for a negative relation, termed *twin divergence*. Such a divergence might result from adverse reactions in the savings rate after expansionary fiscal policy shocks (Kim and Roubini 2008). In principle, policy interventions aiming to reduce a contemporaneous FB and CA deficit would be facilitated by the existence of a positive unidirectional causal influence. Considering a cross section of 19 industrialized economies, we test for the prevalence, direction and the sign of causality between FB and CA. Henceforth, we abbreviate the influence of FB on CA as FC and the reverse causal effect by CF. Inconclusive findings in the related literature could, e.g., stem from an economies' idiosyncratic characteristics or time-variation of causal linkages. Such effects may be addressed by explicitly testing for country-specific nonstationarity in the presence of structural breaks (Baharumsha and Lau 2009). However, Bagnai (2010) notes that unit root tests for single economies regarding FB and CA might suffer from low power to reject the nonstationarity hypothesis. Thus, in this study country-specific and time-local in-sample (IS) and out-of-sample (OS) causality testing schemes are based on rolling and non-overlapping estimation windows. By summarizing evidence across time instances and economies in these ways, we address structural change such that potential (non-) stationarity and regime switches are implicitly taken into account. We thereby avoid the need to test for unit root behavior Furthermore, aggregating cross section specific evidence is less dependent on parameter homogeneity assumptions than alternative panel estimation methods (Pesaran and Smith 1995). The data set comprises quarterly observations on CA_{it} and FB_{it} as fractions of GDP for 19 economies[1] and $T = 128$ time instances between 1980Q2 and 2012Q1. These series are provided by *Oxford Economics Ltd.* and seasonally adjusted by means of the X12 method.

[1] Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, Norway, Portugal, Spain, Sweden, UK, US.

2 Causality testing

In this section, the methodology to test for IS and OS causality is described. A discussion of the results follows.

2.1 In-sample schemes

We estimate bivariate SUR regressions

$$\begin{pmatrix} CA_{it} \\ FB_{it} \end{pmatrix} = \begin{pmatrix} \mu_{i1} \\ \mu_{i2} \end{pmatrix} + \sum_{p=1}^{P} \underbrace{\begin{bmatrix} a_{11,ip} & a_{12,ip} \\ a_{21,ip} & a_{22,ip} \end{bmatrix}}_{A_{ip}} \begin{pmatrix} CA_{i,t-p} \\ FB_{i,t-p} \end{pmatrix} + \begin{pmatrix} v_{i1t} \\ v_{i2t} \end{pmatrix}, \qquad (1)$$

for CA_{it} and FB_{it}, $i = 1, ..., 19$, $t = \tau - E_R + 1, ..., \tau$, where $(v_{i1t}, v_{i2t})' \sim (0, \Omega_i)$ and τ denotes the end of the rolling estimation window which is of size E_R. By estimating (1) in a stepwise manner for $\tau = T - T_0, ..., T - 1$, we summarize time-specific evidence on causal relations. As an alternative means to account for structural change, we divide the sample period $[P_{\max} + 1, ..., T]$ into non-overlapping partitions W_k, $k = 1, ..., K$, where $P_{\max} = 8$. Given a sufficient number of presample values, each of these subperiods comprises E_K observations which are available for estimation. Consequently, we obtain a total number of $K = \lfloor (T - P_{\max})/E_K \rfloor$ subperiods. The lag order P for predetermined influences $CA_{i,t-p}$ and $FB_{i,t-p}$ is selected by means of the BIC.[2] The parameters in A_{ip} express the impact of fiscal policy and the trade balance, respectively.

We distinguish five related null hypotheses of noncausality. In the most restrictive case neither causal effect holds, i.e. $H_0: \; a_{12,p} = a_{21,p} = 0 \; \forall p$. A rejection of $H_{01}: \; a_{12,p} = 0$ or $H_{02}: \; a_{21,p} = 0$ is regarded as evidence for the FC or the CF causal effect, respectively. Of particular interest for policy interventions are cases where only a single causal effect can be found. The rejection of a conditional hypothesis $H_{03}: \; a_{12,p} = 0 \mid a_{21,p} = 0$ or $H_{04}: \; a_{21,p} = 0 \mid a_{12,p} = 0$ corresponds to a case where only one of the unconditional hypotheses H_{01} and H_{02} can be rejected. In such instances, evidence for causality between FB_{it} and CA_{it} is most clearly interpretable. For example, if H_{03} is more frequently rejected than H_{04}, fiscal balance adjustments are typically followed by reactions of the external account. The alternative hypothesis being throughout that both causal effects hold jointly, i.e. $H_1: \; a_{12,p} \neq 0 \wedge a_{21,p} \neq 0$ for at least one p in (1). Hypotheses testing is carried out by means of F-tests

[2] Causality test outcomes are qualitatively equivalent if serial correlation tests regarding disturbances from (1) are employed as a means to motivate the choice of P. These results are available from the authors upon request.

at the 5% significance level[3]. Furthermore, evidence in favor of the *twin deficit* or the *twin divergence* hypothesis is expressed by means of fractions of cases where accumulated effects $\bar{a}_{lm} = \sum_{p=1}^{P} a_{lm,p} > 0,\ l \neq m \in \{1,2\}$ are either positive or negative, respectively.

2.2 Out-of-sample causality testing

An alternative way to examine causality is to test for predictive ability. One-step ahead forecasts obtain as

$$\begin{pmatrix} \widehat{CA}^{(\circ,\bullet)}_{i,\tau+1|\tau} \\ \widehat{FB}^{(\circ,\bullet)}_{i,\tau+1|\tau} \end{pmatrix} = \begin{pmatrix} \hat{\mu}_{i1} \\ \hat{\mu}_{i2} \end{pmatrix} + \sum_{p=1}^{P} \hat{A}^{(\circ,\bullet)}_{ip} \begin{pmatrix} CA_{i,\tau-p+1} \\ FB_{i,\tau-p+1} \end{pmatrix}, \tag{2}$$

where $\tau = T - T_0, ..., T-1$, if estimates $\hat{\mu}_{i1}, \hat{\mu}_{i2}, \hat{A}^{(\circ,\bullet)}_{ip},\ p = 1, ..., P$, are determined within a rolling window. Additionally, we obtain forecasts for non-overlapping subperiods $W_k,\ k = 2, ..., K,$ based on estimates from the preceding sample partitions W_{k-1}. Dependence of parameter estimates on distinct hypotheses is indicated by "$\circ$", $\circ \in \{H_{01}, H_{02}, H_1\}$[4] while "$\bullet$" refers to the two alternative sampling schemes. Predictive performance is assessed by means of absolute forecast errors $AE^{(\circ,\bullet)}_{i,\tau+1|\tau}(y_i)$ with $y_{i,\tau+1} \in \{CA_{i,\tau+1}, FB_{i,\tau+1}\}$. Cases where $AE^{(\circ,\bullet)}_{i,\tau+1|\tau}(y_i)$ are lower for predictions from (2) under H_1 than under H_{01} or H_{02}, are regarded as evidence for the FC or the CF effect, respectively. Evidence against H_0 obtains if predictions under H_{01} and H_{02} are both outperformed by those under H_1.

2.3 Results

The total number of IS tests conducted is $(T - T_0 + 1) \times 19$, respectively $K \times 19$, for the two alternative estimation methods. The OS evaluation period lengths are $\mathcal{T}_R = T - T_0 + 1$ for the rolling window and $\mathcal{T}_K = (K-1) \times E_K$ for the partitioned sample scheme. Consequently, $\mathcal{T}_R \times 19$ and $\mathcal{T}_K \times 19$ OS predictions are obtained in the respective cases.

The IS results show that evidence in favor of the FC effect is stronger than for the reverse causal impact. Rejection frequencies for H_{01} are in all cases higher than for H_{02}. The findings based on rejections of H_{03} and H_{04} are in line with these results. Thus, if evidence for unidirectional causality is found, the FC influence is stronger than the opposite CF impact. However, there are also cases where bidirectional causality is indicated. Furthermore, both causal effects are mostly positive, however, the CF effect is more often negative than the

[3]The consideration of distinct significance levels of 1% or 10% leaves the respective findings qualitatively unaffected. These results are available from the authors upon request.

[4]An alternative testing scheme is to initially impose a constraint on A_{ip} according to H_0 and to regard $H_{01}, ..., H_{04}$ and H_1 as alternative hypotheses accordingly. Conclusions based on this arrangement, however, might be affected by omitted variables bias. Thus, we consider H_1 as the reference hypothesis for OS modeling.

FC effect. The findings documented in the middle of Table 1 indicate more pronounced OS evidence against H_{01} than against H_{02}. This is in line with the results from the IS diagnosis. Thus, employing the fiscal balance as a predictor variable for the current account is more likely to increase forecast accuracy than in the reverse case. The results are robust with respect to the consideration of rolling and non-overlapping estimation windows as alternative estimation schemes. To summarize, both IS and OS test results indicate that fiscal policy affects more strongly the current account balance than vice versa. It is worthwhile to mention that these findings hold robustly if periods of relatively large fiscal deficits are considered[5]. Moreover, while the CF impact acts towards a *twin divergence* in a certain fraction of instances, the stronger FC effect is positive in the majority of cases, which is expressed by the *twin deficit* (or -surplus) hypothesis. This suggests that economic policy is most likely to deliver favorable results if the trade balance is targeted by means of fiscal policy. However, since these estimation methods emphasize the time-local aspects of potential causal relations, one may regard them primarily as a guideline for short- to medium term oriented policy interventions. In particular, our findings do not necessarily reject principles like the *Ricardian equivalence*, which most likely become effective in the longer term.

3 Conclusions

It is documented that adjustments in the government primary balance affect the current account balance more strongly than in the reverse way. We also find more pronounced evidence for positive causality between the budget- and the trade balance, i.e. the causal relation acts more strongly towards a convergence of the two quantities. Results are documented by means of in-sample and out-of-sample causality test procedures for a large sample of advanced economies. As an implication, governments might reduce current account deficits by means of fiscal consolidation.

[5]Moreover, distinguishing economies with respect to their demographic structure does also not change the outcomes qualitatively. However, this might be a result of largely similar demographic conditions in the sample of considered economies. Corresponding results are available from the authors upon request.

Table 1: Causality test results and sign of causal impact

	IS tests					OS tests			OS tests		
Rolling estimation window, $T-T_0+1=80$						$\mathcal{T}_R=80$ (1993Q1-2012Q1)			Large fiscal deficit cases		
	H_0	H_{01}	H_{02}	H_{03}	H_{04}	H_0	H_{01}	H_{02}	H_0	H_{01}	H_{02}
	43.92	34.35	32.22	19.00	16.87	20.03	46.78*	43.06	20.87	44.82*	48.73
$\bar{a}_{lm}>0\|\bar{H}_{0\star}$		92.97	71.79	88.35	53.79						
Rolling estimation window, $T-T_0+1=40$						$\mathcal{T}_R=40$ (2003Q1-2012Q1)					
	47.86	38.18	34.19	20.51	16.52	18.42	48.52*	40.63	21.43	50.89*	44.05
$\bar{a}_{lm}>0\|\bar{H}_{0\star}$		98.07	79.35	90.63	52.34						
Non-overlapping estimation windows, $K=6$						$\mathcal{T}_K=100$ (1987Q2-2012Q1)					
	38.95	33.68	25.26	16.84	8.42	12.72	51.97*	26.75	13.82	58.16*	18.13
$\bar{a}_{lm}>0\|\bar{H}_{0\star}$		74.26	51.12	64.86	56.76						

Cell entries regarding IS tests (left part of the Table) contain rejection frequencies of distinct null hypotheses of noncausality at the 5% significance level. The number of tests based on a rolling estimation window and non-overlapping sample partitions amounts to $(T-T_0+1)\times 19$ and $K\times 19$, respectively. Evidence for FC obtains as rejections of H_{01} and H_{03}, whereas evidence for CF is expressed by rejection frequencies of H_{02} and H_{04}. Rejecting H_0 indicates bidirectional causality. The row labeled as $\bar{a}_{lm}>0|\bar{H}_{0*}$ reports the percentage of cases where causal effects corresponding to rejected null hypotheses $\bar{H}_{01},...,\bar{H}_{04}$ are positive. Moreover, the cells in columns H_{01} and H_{02} of the OS (center and rightmost) part of the Table report frequencies of $\mathcal{T}_R\times 19$ or $\mathcal{T}_K\times 19$ cases where predictions from (2) given either of these hypotheses are less accurate than under H_1. If forecasts turn out as less precise under both H_{01} and H_{02}, this is regarded as evidence against H_0. Asterisks indicate if the former frequencies differ with 5% significance (i.e. forecast errors under H_{01} are more often smaller in absolute value than those under H_{02}). The rightmost part of Table 1 reports frequencies of OS causality for those time instances from the evaluation sample when economies' fiscal balances are below their respective country-specific median value.

References

Barro, R.J. (1974) "Are government bonds net wealth?" Journal of Political Economy 82, 1095-1117.

Bagnai, A. (2010) "Twin deficits in CEEC economies: Evidence from panel unit root tests" Economics Bulletin 30, 1071-1081.

Baharumshah, A.Z. and E. Lau (2009) "Structural breaks and the twin deficits hypothesis: Evidence from East Asian countries" Economics Bulletin 29, 2517-2524.

Bluedorn, J. and D. Leigh (2011) "Revisiting the twin deficits hypothesis: The effect of fiscal consolidation on the current account" International Monetary Fund Economic Review 59, 582-602.

Frankel, J. (2006) "Twin deficits and twin decades" in The Macroeconomics of Fiscal Policy by R. Kopcke, G. Tootell and R. Triest, Eds., MIT Press: Cambridge (MA).

Kim, S. and N. Roubini (2008) "Twin deficit or twin divergence? Fiscal policy, current account, and real exchange rate in the U.S." Journal of International Economics 74, 362-383.

Pesaran, M.H. and R. Smith (1995) "Estimating long-run relationships from dynamic heterogeneous panels" Journal of Econometrics 68, 79-113.

Obstfeld, M. and K. Rogoff (1996) Foundations of International Economics, MIT Press: Cambridge (MA).