INTERACTION BETWEEN CAPITAL FLOWS AND CURRENT ACCOUNT: A DYNAMIC PANEL CAUSALITY ANALYSIS OF 19 EMERGING MARKET ECONOMIES FOR THE PERIOD 1980 TO 2009

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Abstract

We empirically examine the causal relation between current account and different types of foreign capital flows applying a dynamic panel causality approach, which enables us to deal with the endogeneity between foreign capital flows and current account. Our analysis based on 19 emerging market economies indicates that foreign direct investment and portfolio flows Granger-cause current account. This finding raises questions regarding the sustainability of current account deficits in emerging market economies, which rely on foreign capital inflows for financing the deficit.

Keywords: current account, capital flows, panel causality, dynamic panel

JEL Classification F32, F 41

1. Introduction

Current account imbalances in emerging market economies have received considerable attention in recent years. Whether increased capital flows have been contributing to these imbalances has been an important focus of academic and policy debates as well. In theory, the causal relation between current account and capital flows can run in either direction.

According to the intertemporal current account balance model, capital flows finance the gap between national saving and investment. Hence, capital flows may be used to finance current account deficits (Obstfeld and Rogoff, 1996). However, it is likely that capital flows also create instabilites in balance of payments (Wong and Carranza, 1999). Massive amounts of capital flows may lead to current account deficit by causing real exchange rate appreciation and a reduction in exports (Kim et al, 2004; Prasad and Rajan, 2008).

Understanding which of the above propositions is valid for emerging markets is important for the formulation of effective macroeconomic policies concerning capital flows. If there is a unidirectional causality running from foreign capital flows to current account, the countries should take measures to manage massive capital inflows.

However, if there is unidirectional causality from current account to foreign capital flows, emerging markets should encourage capital inflows with continued support for various types of tax and financial incentives.

Nevertheless, the empirical literature on the relation between capital flows and current account is rather scarce and the existent studies show mixed results especially for developed and developing countries. Wong and Carranza (1999) consider four developing countries and argue that after capital account liberalization, capital account granger causes current account. Yan (2005) analyzes whether causal relation between

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financial account and current account differs between developed and developing countries and concludes that while for developed countries financial account is used to finance current account imbalances, it contributes to current account deficits for developing countries.

Yan and Yang (2008) find that capital flows granger-cause current account balance in emerging market countries. Ersoy (2011) finds unidirectional causality running from financial account to current account in Turkey. Similarly, Garg and Prabreesh (2015) find that there exists a causal relationship from non debt flows to current account in India. A common feauture of the aforementioned studies is the use of standard time series tools. Because traditional time series tools may suffer from low power problems, some authors have recently applied panel data methods to examine the relation between current account and capital flows.

Sarisoy-Guerin (2012) examines this relation for both developed and developing countries and finds that the linkage between current account and capital account differ across countries. Using an ordinary fixed effect panel estimation model, Yan and Yang (2012) conclude that foreign capital flows granger-cause current account in the emerging markets. In a recent study, Bayraktar-Saglam and Yalta (2015) apply a heteregenous panel causality analysis in a bivariate framework to explain the linkages between current account and foreign capital flows and find that causality relationship change across countries.

Going through the recent studies that apply panel data methods to investigate the link between current account and capital flows, it becomes apparent that they neglect the dynamic nature of the relation between current account and capital flows. Lahiri and Morshed (2010) suggest that there can be a two way relation between current account deficit and movements of foreign capital because while investment and saving depend on capital inflows, the capital inflow a country receives can also be affected by domestic economic activity. Therefore, the endogeneity between foreign capital flows and current account should be taken into account.

In this paper, we aim to fill this gap in the literature by empirically examining the linkages between current account and various types of foreign capital flows by adopting Granger causality tests for panel data using the dynamic panel estimation model of Holtz-Eakin et al. (1988), Arellano and Bover (1995) and Blundell and Bond (1998). We employ a multivariate approach to overcome a possible omitted variable bias problem. In this context, we enrich the existing literature by including growth rate of gross domestic product and terms of trade volatility as control variables into the analysis based on the findings of the existing literature. Our analysis based on data for 19 emerging market economies for the period from 1980 to 2009 indicate that current account does not have any effect on foreign capital flows. However, FDI and portfolio equity flows contribute to current account deficit negatively.

The rest of the paper is organized as follows. Section 2 describes the data sources, explains the methodology and presents the empirical results. The next section concludes.

2. The Methodology and Empirical Results

Our analysis is based on data for 19 emerging market economies for the period 1980 to 2009.[1] The data on current account (CA), foreign capital flows – FDI and portfolio equity flows (PE)- are obtained from the World Development Indicators (2010). All variables are expressed as ratios to GDP. The relation between current account and foreign capital flows can also be affected by other variables and the failure to take these factors into account can result in a specification bias.

To overcome this problem, we include two additional variables, growth rate of gross domestic product (GR) and terms of trade volatility (TT), which are also obtained from World Development Indicators. We rely on previous empirical research on choosing the control variables. Terms of trade can have different effects on current account. On the one hand, as Chinn and Ito (2007) argue that agents in economies that face more volatile terms of trade save more for precautionary purposes to smooth consumption and current account improves. On the other hand, Loayza et al. (1999) suggest that increases in terms of trade or appreciation of the real exchange rate worsen current account deficit. The second control variable we use is the growth rate of GDP following Loayza et. al (1999) and Gruber and Kamin (2007). A positive shock to GDP is expected to increase import demand and lead to an increase in current account deficit. GDP growth rate can affect current account balance negatively through its effect on investment and savings as well. An increase in the growth rate increases the return on investment and the potential for higher future income decreases saving (Gruber and Kamin, 2007).

In order to examine the existence of a possible causal linkage between current account and foreign capital flows, we use panel Granger-causality testing[2]. Given the relatively short time span of the individual series, we rely on recently developed panel causality tests. We consider a time-stationary VAR model adjusted to a panel data context as in Holtz-Eakin *et al*. (1988, 1989). Podrecca and Carmeci (2001) discuss that this approach provides consistent and efficient parameter estimates, while allowing to avoid misleading causality results due to an incorrect choice of the lag length. The following two models are estimated:

$$CA_{it} = \delta_0 + \sum_{l=1}^{m} \delta_1 CA_{it-1} + \sum_{l=1}^{m} \alpha_1 FL_{it-1} + \sum_{l=1}^{m} \varphi Z_{it-1} + \mu_i + u_{it} \quad (1)$$

$$CF_{it} = \beta_0 + \sum_{l=1}^{m} \beta_1 FL_{it-1} + \sum_{l=1}^{m} \theta_1 CA_{it-1} + \sum_{l=1}^{m} Z_{it-1} + \eta_i + v_{it} \quad (2)$$

Here, i refers to the country, t refers to the time period, and l refers to the lag number. u_{it} and v_{it} are white noise errors. μ_i and η_i are individual fixed effects

[1] The emerging markets included in the regressions are: Argentina, Brazil, Chile, China, Colombia, Ecuador, India, Indonesia, Malaysia, Mexico, Morocco, Peru, Philippines, South Africa, Korea, Thailand, Turkey, Uruguay, Venezuela.

[2] The reader is referred to Guisan (2015) for an analysis of Granger causality approach.

for the panel member i. CA_{it} denotes current account, while CF_{it} denotes various types of capital flows. Z_{it} represents the control variables, GDP growth rate and terms of trade volatility.

It is of course well known that a stationary time series *X* is said to Granger cause another stationary series *Y* if the forecast of *Y* improves when lagged variables of *X* is taken into account. If the lags of *X* are found to be jointly statistically significant, then the null hypothesis that *X* does not Granger cause *Y* can be rejected. In the context of the present paper, this means that the variable CA_{it} is said not to Granger cause CF_{it} if all the coefficients of lagged CA_{it} in the equation are not jointly statistically different from zero. The sign of the causal relationship is determined by the sum of the jointly significant coefficients. A positive sum implies that the causal relationship is also positive (Casu and Girardane, 2009).

It should be noted that certain econometric problems may arise while using the OLS method for estimating Equations 1 and 2. First, omitting individual effects can yield biased and inconsistent estimates. Individual effects can be removed by taking the first difference of all variables. However, there still remains correlation between the lagged dependent varıable and the error term. The Generalized Method of Moments (GMM) estimator, proposed by Arellano and Bond (1991), offers a solution to these problems by first differencing equations 1 and 2 and then using the appropriate lags of the dependent and the independent variables as instruments.

One potential problem with the above technique is that the lagged levels of regressors may be weak instruments for the differenced variables. As a result, we use the "system GMM" estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998)[3]. To compute the system estimator, variables in differences are instrumented with lags of their own levels, while variables in levels are instrumented with lags of their own differences (Arellano *et al*., 2001). By instrumenting the variables in levels with their lagged first differences, this estimator allows the introduction of more instruments and thereby improves efficiency (Roodman, 2009). In the empirical analysis, we employ the lagged values of all the explanatory variables as instruments in levels for the first difference equations while using the lagged first differences of the endogenous variables as instruments in the level equation. Since the consistency of GMM estimator depends on the soundness of the instruments, two sets of diagnostic tests are should be reported. First, Hansen test statistic indicates that the instruments are uncorrelated with the error term and their validity is not rejected. Tests of first order (AR 1) and second order (AR 2) autocorrelation show that the disturbances at levels are uncorrelated.

Since Granger-causality test results are sensitive to the choice of lag lenght, it is important to specify the lag lenght appropriately. We choose the lag lenght as two based on Schwarz's Bayesian Information Criterion.

First, we examine the effect of foreign direct investment and portfolio equity flows on current account balance.

[3] For the system GMM estimations, Roodman's "xtabond2" command was used in Stata v.10. (Roodman, 2006)

Table 2 reports the causality test results based on the GMM estimates for the selected models. The table presents the coefficient estimates as well as the Granger-causality test (Wald test) statistic p-values.

Table 1: Effect of Foreign Capital Flows on Current Account: Causality Test Results Based on GMM Estimates

Dependent Variable: *CA*	(1)		(2)	
CA_{it-1}	0.6375***	(0.0918)	0.6810***	(0.1122)
CA_{it-2}	-0.0971	(0.0591)	-0.0653	(0.0872)
FDI_{it-1}	-0.4554*	(0.2289)		
FDI_{it-2}	-0.0314	(0.1102)		
PE_{it-1}			-0.4934***	(0.1520)
PE_{it-2}			-0.1970	(0.2252)
Gr_{it-1}	-0.2638	(0.2923)	-0.2857	(0.2974)
Gr_{it-2}	-0.1015	(0.2159)	0.0573	(0.1753)
TOT	0.0627*	(0.0357)	0.0625*	(0.0353)
Number of observations	481		477	
Arellano-Bond test for AR(1)	0.001		0.002	
Arellano-Bond test for AR(2)	0.345		0.290	
Hansen test	0.31		0.52	
Wald test	0.050		0.01	

Notes: CA: Current Account, FDI: Foreign Direct Investment, PE: Portfolio Equity Flows, Gr: Growth and TOT: Terms of Trade Volatility. Model (1) estimates the effect of FDI, and model (2) estimates the effect of portfolio equity flows on current account. Both models are estimated using the Arellano and Bover (1995) dynamic panel system GMM estimators. The standard errors are in parantheses. (***), (**), (*) indicate significance at the 1, 5, 10 per cent level respectively.

The test results reveal that the null of non-causality for the both models is not rejected. This finding is in line with that of Yan and Yang (2007) and Yan and Yang (2012) who found that foreign capital inflows Granger-cause current account. It is evident from the table that both portfolio equity flows and foreign direct investment flows have a negative effect on current account. In these regressions, the statistically significant coefficients of lagged values of foreign capital flows indicate that capital flows are influenced from previous year's capital flows. In addition to the Granger-causality test (Wald test) statistic p-values, the table also presents Hansen test of over identification and serial autocorrelation test results. Tests of first order (AR-1) and second order auto correlation (AR-2) show that the disturbances at levels are uncorrelated. The Hansen test statistic indicates that the instruments are uncorrelated with the error term, and are therefore valid.

In Tables 2 and 3, we explore whether the reverse causality between foreign capital inflows and current account exists. The results show that current account does not have any influence on either FDI or portfolio equity flows. In both tables, it is seen that FDI

and PE flows are affected by their lagged levels significantly. Finally, in current account-FDI regressions, GDP growth rate affects current account balance negatively as expected.

Table 2: Effect of Current Account Balance on Foreign Direct Investment (FDI) : Causality Test Results Based on GMM Estimates

Dependent Variable:	**FDI**	
FDI_{it-1}	0.644***	(0.077)
FDI_{it-2}	0.089*	(0.044)
CA_{it-1}	0.011	(0.028)
CA_{it-2}	0.004	(0.035)
Gr_{it-1}	-0.345	(0.204)
Gr_{it-2}	-0.267*	(0.139)
TOT_{it-1}	0.004	(0.004)
TOT_{it-2}	0.005	(0.005)
Number of observations 478; Number of Groups 19 Number of Instruments 18, Arellano-Bond test for AR(1) 0.00; Arellano-Bond test for AR(2) 0.289; Hansen test 0.29; Wald test 0.71		

Notes: CA: Current Account, FDI: Foreign Direct Investment, Gr: Growth and TOT: Terms of Trade Volatility. The standard errors are in parantheses. (***), (**), (*) indicate significance at the 1, 5, 10 per cent level respectively.

Table 3: Effect of Current Account Balance on Portfolio Equity Flows (PE) : Causality Test Results Based on GMM Estimates

Dependent Variable:	**PE**	
PE_{it-1}	0.301***	(0.085)
PE_{it-2}	-0.150	(0.136)
CA_{it-1}	-0.003	(0.017)
CA_{it-2}	-0.008	(0.006)
Gr_{it-1}	0.003	(0.072)
Gr_{it-2}	0.055	(0.090)
TOT_{it-1}	-0.002	(0.0022)
TOT_{it-2}	0.002	(0.012)
Number of observations 473; Number of Groups 19; Number of Instruments 18; Arellano-Bond test for AR(1) 0.004; Arellano-Bond test for AR(2) 0.861; Hansen test 0.302; Wald test 0.438		

Notes: CA: Current Account, PE: Portfolio Equity Flows, Gr: Growth and TOT: Terms of Trade Volatility The standard errors are in parantheses. (***), (**), (*) indicate significance at the 1, 5, 10 per cent level respectively.

3. Conclusion

In this paper we examine the interrelationships between foreign capital flows (foreign direct investment and portfolio equity flows) and the current account by employing dynamic panel causality tests for the emerging markets for the period 1980-2009. We find that current account does not have any effect on foreign capital flows. However, foreign direct investment (FDI) and portfolio equity flows contributes to current account deficit.

Our findings have several policy implications since understanding the nature of the causal relation between current account and foreign capital flows is essential to the development of a sound macroeconomic framework for emerging market economies. Although foreign capital inflows may seem beneficial as a source of financing means for the current account deficit, it may eventually lead to balance of payments problems due to adverse effects on current account. This finding raises questions regarding the sustainability of current account deficits in emerging markets. Thus, emerging market economies should not totally rely on foreign capital inflows for financing the deficit. Moreover, rather than offering further incentives and privileges to foreign investors, emerging markets should give priority to improve the domestic investment environment.

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