Does Financial Liberalization Decrease Capital Flight? A Panel Causality Analysis

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Working Paper No: 11-02
TOBB University of Economics and Technology
Department of Economics

June 2011

TOBB University of Economics and Technology Department of Economics Working Papers are published without a formal refereeing process, with the sole purpose of generating discussion and feedback.

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Abstract

We employ a panel causality approach in order to examine whether financial liberalization affects the magnitude of capital flight, which measures unrecorded accumulation of foreign assets by the private sector. Our data from 21 emerging market economies for the period between 1980 and 2004 show no significant evidence of a causal relationship. Lagged values of capital flight, however, seem to increase its current level, indicating its self-reinforcing characteristic. Our results suggest that financial liberalization policies per se may not be helpful in reducing capital flight. As a result, emerging market economies should seek to prevent capital from fleeing abroad and encourage repatriation of capital by improving domestic policy environment instead. Keywords: Capital flight, financial liberalization, emerging markets, panel causality. *JEL* Codes: F32, F39, C23

1 Introduction

Since the 1990s, many developing countries have followed policies toward liberalization of their capital accounts in order to attract foreign capital inflows that can help finance not only

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investments but also the rising debt stocks. On the other hand, various studies have also shown that capital flows can actually take place in the opposite direction as the residents move the already scarce capital to richer countries (Lucas 1990; Alfaro et al. 2008). The process of unrecorded accumulation of foreign assets by the private sector is referred to as "capital flight" (CF) which, especially after the debt crisis of the 1980's, has come to be viewed as one of the major economic problems in many developing countries. Not surprisingly, a voluminous literature has emerged on CF as well as its adverse effects on investment, growth, domestic tax base, and poverty. One of the two main strands of this research has focused on the different measures and the determinants of CF (World Bank 1985; Morgan Guaranty Trust Company 1986; Lessard and Williamson 1987; Lensink et al. 2002; Schneider 2003), while the other strand has concentrated on its effects on macroeconomic outcomes such as financial markets (Loungani and Mauro 2000), high external debt (Boyce and Ndikumana 2001; Demir 2004), aid flows (Collier et al. 2004), and investment (Yalta forthcoming). So far, little has been written regarding the causal relationship between CF and financial liberalization. Considering the fact that the problem is still prevalent, and in view of the financial liberalization policies undertaken by most developing countries, whether CF decreases with financial liberalization is an interesting and important question that needs to be addressed empirically.

Understanding the nature of a possible causal nexus between financial liberalization and CF has important policy implications. If there exists a negative causality running from financial liberalization to CF, then these policies can be useful to prevent it. However, if financial liberalization does not have any effect or have a positive effect, then such policies may not be the panacea for reducing CF, pointing out the need for more effective policy measures. Theoretically, financial liberalization can affect CF in two ways. On the one hand, conventional analysis suggests that CF should be greater in a closed economy due to residents turning to illegal channels for moving capital abroad. Thus, by freeing up capital flows, financial liberalization policies are expected to cause a decline in the magnitude of CF (Mody and Murshid 2005). On the other hand, CF can still exist in a liberalized regime because financial openness

may also bring about certain risks such as uncertainties and vulnerabilities to financial crises (Demirguc-Kunt and Detragiache 1998). Park (1996) supports this view, and discusses how CF can be greater under a free capital account. Groombridge (2001) argues that liberalization can lead to CF if the country does not undertake the necessary reforms before opening up its capital account. The little empirical evidence on this issue provides mixed results. Using a portfolio model, Lensink et al. (1998) investigate the relation between financial liberalization and CF for nine African countries for the 1970-1991 period and conclude that CF has decreased with financial liberalization policies. Two descriptive studies by Schneider (2003) and Epstein (2005) calculate CF using different methodologies and find that, in many countries, CF has remained high and even has increased after 1990.

In this study, our objective is to provide the first empirical evidence on the financial liberalization and CF causal relationship by investigating the case of emerging markets. Emerging markets are ideal candidates for studying this nexus for two reasons. First, due to the historically high flows of CF, these countries are more susceptible to its negative effects.[1] Second, since the 1990s, these countries have undertaken financial liberalization policies and it is interesting to see whether these policies have been useful in reducing the magnitude of CF. In order to examine the causal relation between financial liberalization and CF, we apply 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). Our analysis is based on data for 21 emerging market economies for the period between 1980 and 2004.

The rest of the paper is organized as follows. The next section reviews the definition and the calculation of CF. Section 3 describes the data sources. Section 4 reviews the methodology used in the paper and presents the empirical results. Section 5 concludes.

[1]The existence of high levels of CF in emerging markets is documented in such studies as Schneider (2003), Epstein (2005), and Yalta (forthcoming).

2 The Data

To measure CF, we adopt the "residual method" developed by the World Bank (1985).[2] This approach is based on calculating the discrepancy between the sources of capital flows (i.e., net increases in external debt and the net inflows of foreign investment) and the uses of capital flows (i.e., the current account deficit and additions to foreign reserves). Thus, we compute CF at time t as

$$K_t = D_t + FI_t + CAS_t - \Delta R_t \tag{1}$$

where, D_t refers to the total net debt flows after taking into account the effect of changing currency composition, FI_t is the net foreign investment flows (foreign direct investment and portfolio equity flows), CAS_t is the current account surplus, and ΔR_t is the change in foreign reserves. The data on foreign investment flows, current account, and foreign reserves come from World Development Indicators (2007). The data on total net debt flows are obtained from Global Development Finance (2007).

As the measure of financial liberalization, we employ the Chinn and Ito (2008) index, which is one of the most commonly used indices in the literature.[3] The index is based on four convertibility restrictions reported in the IMF's Exchange Arrangement and Agreements (AREAER). These involve restrictions on payments for capital account transactions, restrictions on payments for current account transactions, surrender or repatriation requirements for export proceeds, and the existence of multiple exchange rates. The index is calculated based on the first standardized principal component of the four variables above, and it ranges between -2.66 (full capital controls) to 2.66 (complete liberalization).

Our study covers the period between 1980-2004. Since capital account liberalization efforts begin in the late 1980s and early 1990s, we start the data at 1980, also taking into consideration

[2]While there are other measures such as the Dooley method (Dooley 1986) and the hot money method (Cuddington 1986), the residual method is the most commonly used approach in the literature.

[3]The Chinn-Ito index has been employed in recent studies including Kose et al. (2008), Eichengreen et al. (2009), Arestis and Caner (2009). It is available online at http://www.ssc.wisc.edu/~mchinn/research.html (accessed November 14, 2010).

the need to use lagged values. The analysis is based on 21 emerging market economies. The countries included are Argentina, Brazil, Chile, China, Colombia, Ecuador, Egypt, India, Indonesia, Malaysia, Mexico, Morocco, Peru, Philippines, South Africa, South Korea, Thailand, Tunisia, Turkey, Uruguay, and Venezuela. Transition economies are not included due to data limitations.

Because the relationship between CF and financial liberalization can be affected by other factors, it is desirable to adopt a multivariate approach to avoid an omitted variable bias. The two additional variables that we consider are the GDP growth rate and the inflation rate.[4] Because uncertainties in the domestic economy encourage residents to transfer capital out of the country, CF is expected to be higher when the growth rate of GDP is low. As a result, we use GDP growth rate as the first control variable. Another important factor affecting CF is the rate of inflation. Several empirical studies have found that high inflation encourages CF by making assets denominated in domestic currency less attractive in comparison to those denominated in foreign currency (Dooley 1988; Lensink et al. 1998). Consequently, we include the inflation rate as a second control variable. Both of these variables are obtained from World Development Indicators (2007) as well.

3 The Methodology and Empirical Results

To examine the existence of a possible causal linkage between financial liberalization and CF, we consider a time-stationary VAR model adjusted to a panel data context as in Holtz-Eakin et al. (1988, 1989). This approach provides consistent and efficient parameter estimates, while also allowing to avoid misleading causality results due to an incorrect choice of the lag length (Podrecca and Carmeci 2001). The two specifications that we consider are

$$CF_{it} = \alpha_0 + \sum_{l=1}^{m} \alpha_1 CF_{it-l} + \sum_{l=1}^{m} \delta_1 FO_{it-l} + \sum_{l=1}^{m} \phi Z_{it-l} + \mu_i + u_{it} \tag{2}$$

[4]Other alternatives such as interest rate, external debt, tax rates, and political factors can also be considered. We include these two variables due to data limitations and a concern for the degree of freedom.

$$FO_{it} = \beta_0 + \sum_{l=1}^{m} \beta_1 FO_{it-l} + \sum_{l=1}^{m} \gamma_1 CF_{it-l} + \sum_{l=1}^{m} \psi Z_{it-l} + \eta_i + \upsilon_{it} \quad (3)$$

Here, $i(i = 1, \ldots, N)$ refers to individual countries, $t(t = 1, \ldots, T)$ refers to the time period, and l shows the lag number. FO_{it} and CF_{it} respectively denote financial liberalization, and capital flight as a percentage of GDP. Z_{it} represents the two control variables namely the growth rate and the inflation rate. μ_i and η_i are the individual fixed effects for the panel member i, while u_{it} and υ_{it} are white noise errors.

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 FO_{it} is said not to Granger cause CF_{it} if all the coefficients of lagged FO_{it} in Equation (2) are jointly not statistically different from zero. Although the main focus of the paper is to test specifically whether causality runs from financial liberalization to CF, we consider the reverse case specified in Equation (3) as well. This is done as an additional robustness check, and also because it is common in the literature to test causation in both directions.

It should be noted that certain econometric problems may arise while using the OLS method for estimating Equation (2) and (3). First, omitting individual effects can yield biased and inconsistent estimates. Although individual effects can be removed by taking the first difference of all variables, there still remains correlation between the lagged dependent variables and the error term. The Generalized Method of Moments (GMM) estimator, proposed by Arellano and Bond (1991), offers a solution to this problem by first differencing equations (2) and (3) and then using the appropriate lags of the dependent and the independent variables as instruments. A potential problem with this technique, on the other hand, is that the lagged levels of regressors may be weak instruments for the differenced variables. This in turn can be avoided by using the "system GMM" estimator developed by Arellano and Bover (1995) and Blundell and Bond

(1998)[5]. To compute the system estimator, variables in differences are instrumented with the lags of their own levels, while variables in levels are instrumented with the lags of their own differences (Bond et al. 2009). Consequently, 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, for $t = 2$ and earlier. This approach allows the introduction of more instruments and thereby improves efficiency (Roodman 2009).[6]

Reported in Table 1 are the GMM estimation results for the CF equation. The first column of the table shows the bivariate analysis while the second and the third columns introduce the inflation rate and the GDP growth rate consecutively. Based on Schwarz Bayesian Information Criterion, the lag length is determined as 2. As can be seen in the lower panel of the table, $l = 2$ is also supported by Wald tests with the H_0 that coefficients on the second lag of the variables are jointly zero. Because the consistency of the GMM estimator depends on the soundness of the instruments, two sets of diagnostic tests are also reported for the three models. First, tests of first order auto correlation (AR1) and second order auto correlation (AR2) show that the disturbances at levels are uncorrelated. Second, the Sargan test statistic indicates that the instruments are uncorrelated with the error term, and their validity is therefore not rejected at the $\alpha = 0.05$ level. The p-values for these tests are reported in the table as well.

Table 1 reveals that the coefficients of the lagged financial liberalization, our main variable of interest, are not significant in all three models. The Wald tests also do not reject the null of no-causality at the 10 percent significance level. This main finding provides empirical support for Schneider (2003) and Epstein (2005), who argue that CF continued to remain high after the 1990s despite financial liberalization policies. The estimated coefficients on the other variables are interesting as well. In all regressions, lagged CF is found statistically significant. This is consistent with Ndikumana and Boyce (2003), who find that countries with high levels of CF

[5]For the system GMM estimations, we use the xtabond2 command (Roodman 2009) run in Stata.

[6]Standard ADF and KPSS tests as well as panel unit root tests by Levin et al. (2002) and Im et al. (2003) reveal no nonstationarity in the differenced series. These results are not reported for brevity.

Table 1: GMM Estimates and Causality Tests for CF

Dependent Variable: *Capital Flight*			
	(1)	(2)	(3)
CF_{it-1}	0.3009^{***}	0.3007^{***}	0.2889^{***}
	(0.0519)	(0.0552)	(0.0527)
CF_{it-2}	0.1485^{***}	0.1416^{***}	0.1464^{***}
	(0.0506)	(0.0546)	(0.0509)
FO_{it-1}	0.4546	0.4352	-0.2132
	(0.4202)	(0.4222)	(0.5059)
FO_{it-2}	-0.2975	-0.2762	0.4369
	(0.4205)	(0.4225)	(0.5055)
Inf_{it-1}		-0.0000	0.0007
		(0.0016)	(0.0018)
Inf_{it-2}		0.0013	0.0020
		(0.0016)	(0.0018)
Gr_{it-1}			-0.0100
			(0.0633)
Gr_{it-2}			0.0354
			(0.0616)
Constant	0.7092^{***}	0.3765	-0.0636
	(0.2398)	(0.5581)	(0.6754)
n	456	456	456
Wald ($l \neq 2$ test)	0.01	0.01	0.01
AR1 test	0.00	0.00	0.00
AR2 test	0.84	0.83	0.87
Sargan test	0.43	0.37	0.42
Wald (noncausality test)	0.41	0.41	0.20

Note: Standard errors in parantheses. (***), (**) indicate significance at the 1 and 5 percent levels respectively.

in the past are likely to continue experiencing this problem in the future due to the fact that CF can be "habit forming," making investors unlikely to respond rapidly to improvements in the investment climate. The statistically insignificant impact of inflation on CF is observed by Cerra et al. (2008), and can be due to the reverse mechanism that, as CF erodes tax base, governments can resort to money creation to finance fiscal deficit (Ndikumana and Boyce 2003). Finally, in the third column, the coefficients for the GDP growth rate are found insignificant as well. This result also supports Ndikumana and Boyce (2003), who argue that the insignificant GDP coefficients can be because economic growth is affected by some of the causes of CF, making

it difficult to isolate its independent effects.

As discussed earlier, financial liberalization can have both positive and negative effects on CF, whereas CF is not expected to have a direct influence on financial liberalization.[7] Therefore, we assume that the causal relation between financial liberalization and CF runs in one direction. On the other hand, because it is the usual practice in Granger-causality analyses to test for both cases, we provide estimation results for the financial openness equation as well. As can be seen in Table 2, the apriori expectation of non causality is confirmed by the high Wald statistic p-values for our bivariate and multivariate specifications. Also as expected, short term changes in the inflation rate and the growth rate do not have a significant effect on financial liberalization, while financial liberalization itself shows persistence due to its evolutionary nature. These findings can be considered as additional evidence supporting our results.

4 Conclusion

Capital flight, which measures the unrecorded accumulation of foreign assets by the private sector, is one of the most important problems of capital-scarce developing economies. It has adverse effects on growth, investment as well as the domestic tax base while also sending a bad signal to foreign investors regarding the confidence in the economy. Because of the financial liberalization efforts ongoing since the 1990s in many developing countries, examining whether CF decreases with financial liberalization is a meaningful research question that can have important policy implications for emerging markets.

To investigate whether financial liberalization can lead to lower CF, we employ Granger causality tests for panel data using the dynamic panel estimation model of Arellano and Bover (1995) and Blundell and Bond (1998) for 21 emerging market economies for the 1980-2004 period. Our results, which is robust to different specifications employed, do not show a causal

[7] A High level of CF could have acted in the past as an incentive to adopt finacial liberalization policies, at least for some developing countries. The significance of this impetus is not yet discussed in the literature and warrants further research.

Table 2: GMM Estimates and Causality Tests for FO

Dependent Variable: *Financial Openness*			
	(1)	(2)	(3)
CF_{it-1}	0.0000	−0.0005	−0.0006
	(0.0058)	(0.0058)	(0.0058)
CF_{it-2}	−0.0067	−0.0063	−0.0061
	(0.0056)	(0.0056)	(0.0056)
FO_{it-1}	0.9423***	0.9437***	0.9472***
	(0.0471)	(0.0473)	(0.0478)
FO_{it-2}	−0.0184	−0.0196	−0.0232
	(0.0472)	(0.0473)	(0.0478)
Inf_{it-1}		0.0001	0.0001
		(0.0001)	(0.0001)
Inf_{it-2}		0.0000	0.0000
		(0.0001)	(0.0001)
Gr_{it-1}			−0.0001
			(0.0060)
Gr_{it-2}			−0.0004
			(0.0059)
Constant	0.0107	−0.0388	0.0259
	(0.0267)	(0.0625)	(0.0663)
n	462	462	462
Wald ($l \neq 2$ test)	0.44	0.47	0.47
AR1 test	0.00	0.00	0.00
AR2 test	0.20	0.19	0.18
Sargan test	0.43	0.33	0.43
Wald (noncausality test)	0.42	0.47	0.47

Note: Standard errors in parantheses. (***), (**) indicate significance at the 1 and 5 percent levels respectively.

relationship between financial openness and CF. This supports earlier research by Schneider (2003) and Epstein (2005), who calculate CF using different methodologies and find that CF has remained high after 1990 in many countries. Another important finding of our study is that past CF has a significant effect on its current level. This self-reinforcing behavior that has been put forward by previus studies such as Ndikumana and Boyce (2003).

Our results show that financial liberalization policies per se may not be a solution to the CF problem. Evidently, required instead are the use of mechanisms and strategies that can be more effective in preventing CF and encouraging capital repatriation. In this context, domestic

authorities should give priority to the implementation of sound macroeconomic policies such as decreasing the stock of debt, inflation, and budget deficits as well as improving the domestic investment environment. In addition, governments should give priority to the improvement of general investment climate in order to attract private assets that are acquired legally and held abroad for the purposes of return maximization (Fofack and Ndikumana 2010). Various mechanisms for capital repatriation such as tax amnesties can also be considered. In Italy, for example, a one year amnesty on privately held foreign assets in 2001 has resulted in the repatriation of $30 billion from Swiss banks (Watts 2002). Last but not least, CF also includes proceeds of illegal activities and preventing these activities may help alleviate the problem. In this context, international community should be called for increased collaboration toward introducing rules and regulations for the enforcement of transparency in the banking system that would prevent the illicit transfer of capital across countries. Future research on this subject should focus on the prospects of these strategies as well as extending the empirical analysis to other developing countries. Country-specific investigations should be encouraged as well.

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