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THE EFFECTS OF FLIGHT ON GROWTH AND INVESTMENT IN EMERGING MARKETS*

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Abstract

We investigated the impact of massive foreign-asset purchases by domestic agents (flight) on domestic countries' real GDP growth and investment by employing diverse generalized method of moments estimators. Flight is a matter for concern because it may indicate that domestic investors are fleeing domestic markets. However, our results show that flight is only harmful if there are not enough capital inflows from foreign investors. These results suggest that domestic investors do not significantly substitute foreign assets for domestic assets and, even if they do, domestic firms may not be severely damaged if they can borrow from non-residents.

Keywords: gross capital flows, flight, stop, GMM estimation, emerging market economies
JEL Classification Codes: E22, F21, F32, F40.

I. *Introduction*

Thanks to the development of liberalized financial markets, domestic investors in emerging markets have more opportunities than ever before to diversify their portfolios. Both capital inflows by foreign investors and capital outflows by domestic investors play a significant role in domestic financial accounts. Figure 1 describes domestic investors' contribution to financial accounts in selected emerging markets. Before 2000, the magnitude of gross capital outflows (percentage of GDP) was small and did not fluctuate much. This behavior of gross capital outflows contrasted with that of gross capital inflows, which was much larger and more volatile. For that reason, net capital flows were almost the perfect proxy for gross capital inflows.[1] Since 2000, however, the magnitude and volatility of gross capital outflows have been getting closer to that of gross capital inflows.[2] This raises the possibility that large and volatile capital outflows may have a substantial impact on domestic economies.

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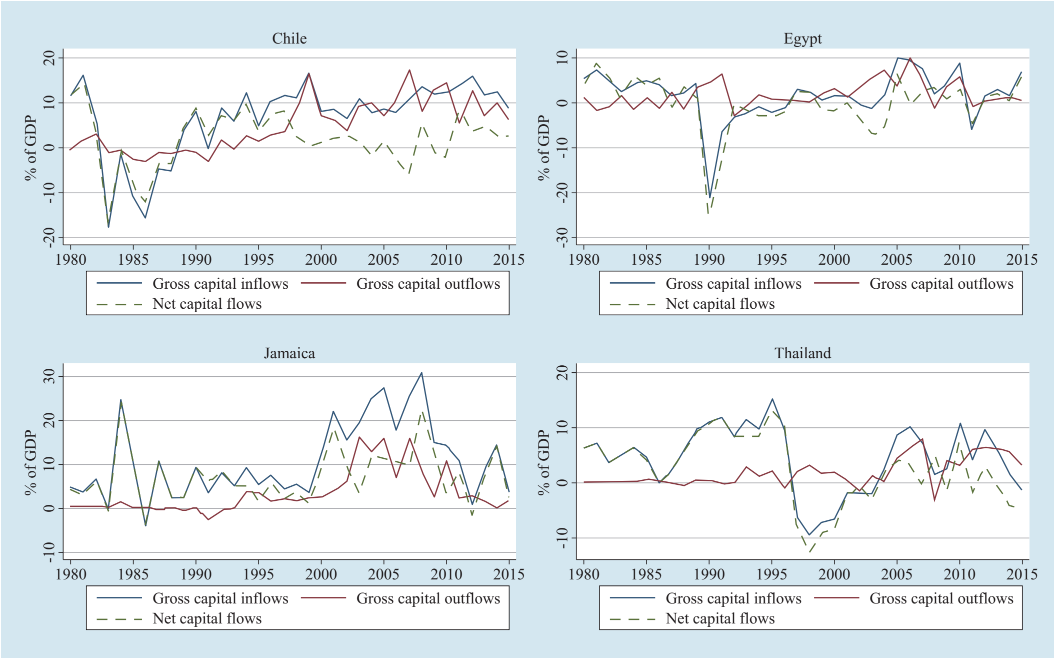
[1] Net capital flows = gross capital inflows − gross capital outflows.
[2] For the stylized facts on gross capital inflows and outflows, see Broner et al. (2013).

FIGURE 1. CAPITAL FLOWS IN FOUR SELECTED EMERGING MARKETS BETWEEN 1980 AND 2015 (Source: IMF BOPS and WEO)



These stylized facts prompted us to answer the following three questions:

- What is the impact of massive capital outflows on emerging markets' economic growth?
- Is the impact of flight different from that of stop in capital inflows?
- Is the impact of flight conditional on the amount of capital inflows in the country?

Here "flight" designates a sharp increase in gross capital outflows.[3] We also use the term "stop" to designate a sharp decrease in gross capital inflows. Therefore, net capital flows in countries are significantly decreased when these two events occur.

To some extent, foreign assets are a substitute for domestic assets. Flight might, therefore, imply domestic companies' loss of working capital loans by allowing domestic agents to invest abroad. Although this traditional view has represented one of the main concerns about flight events,[4] the impact of flight could be conditional on foreign investment. For example, if there are enough external loans in the country and if domestic investors have access to financial markets, they may not need to sell their domestic assets to finance overseas investments. In this

[3] Note that a diverse terminology exists for the phenomenon of flight. Some examples are outflow-driven sudden stop (Cowan, De Gregorio, and Nelson, 2008), sudden flight (Rothenberg and Warnock, 2011), flight (Forbes and Warnock, 2012), and sudden start (Cavallo et al., 2015). Although their technical definitions are somewhat different, they designate the same phenomenon which is a large increase in licit capital outflows.

[4] For example, see Cuddington (1986).

case, flight would not necessarily depress domestic investment. Rather, it may promote economic growth by allowing investors to take fruitful investment opportunities.

We also investigated flight and stop to determine if they are similar events because both reduce net capital flows. There is a large amount of literature that warns of the potential costs of stop,[5] so the government may need to be cautious of flight, as well, and implement similar policies. However, the drivers of the two events are completely different. Stop is driven by foreigners, and flight is driven by domestic agents. Because the two groups are distinguished by specific characteristics,[6] the impacts of the two events might be different. This information is important to policymakers, and we aim to answer the second question: Is the impact of flight different from that of stop in capital inflows?

It is important to define the underlying causality of flight and stop when addressing the abovementioned issues. For example, if flight is fleeing behavior to avoid domestic turmoil, the estimation of flight on the domestic economy will overstate the damage from them because simple association cannot tell which came first. Therefore, we need to address endogeneity bias and, for that purpose, we employ three kinds of generalized method of moments (GMM) estimators: difference, system, and orthogonal deviation GMM.

This paper makes three contributions to the existing literature. First, unlike previous research, which focused on the association between macro variables and gross capital flows, this research measures unbiased estimates of flight on domestic economies. Second, this paper tests the hypothesis that the impact of flight is conditional on the amount of gross capital inflows. Third, it investigates whether flight reduces domestic investment and sheds light on the reasons why the impacts of flight and stop are different.

Previewing the results, we cannot find evidence that flight alone depresses GDP growth, but we do find that the estimates of flight are remarkably different from those of stop. However, flight depresses growth when there are not enough gross capital inflows (coincident with stop). This is new empirical evidence that has not been discussed in the existing literature, which has emphasized the negative effects and similarity with stop only. It was necessary to review previous research to examine the reason as to why the effects of flight are different from that of stop. Most studies agree that stop in capital inflows severely reduces domestic investment although there are different reasons for the reduction. On the contrary, this paper shows that the impact of capital outflows on domestic investment is insignificant. This proves that flight and stop are different phenomena, although both decrease net capital flows. The government therefore needs to see these two events from different perspectives to implement proper policies to prevent them if that becomes necessary.

This paper is organized as follows. Section 2 reviews existing literature on capital flight. Section 3 explains the data, defines capital-flow episodes, and presents stylized facts about them. Section 4 demonstrates estimation strategies and reports the results. Section 5 discusses the results and some theoretical frameworks that could explain the mechanism behind them. Section 6 summarizes the paper and concludes it.

[5] Section 2 introduces some of them.

[6] Information asymmetricity and home-bias are some examples (Caballero and Simsek, 2020).

II. *Related Literature*

The negative interpretation of flight stems from the Latin American experience in the 1970s and 1980s. When several countries in Latin America were in domestic turmoil, domestic investors moved their funds to safer global markets and this behavior certainly worsened the countries' economic situations. This phenomenon was called capital flight and, following that experience, many researchers studied the factors that make capital flight costly. For example, Cuddington (1986) suggested seven reasons why capital flight is harmful, Alesina and Tabellini (1989) argued private capital outflows are associated with low domestic investment because of political uncertainty, and Bennett (1988) asserted that capital flight brings high external debt through case studies in four Caribbean countries.

Recently, Cheung, Steinkamp, and Westermann (2016) also studied China's illicit capital outflows before and after the global financial crisis (pre- and post-2007). They determined that there was a different pattern of capital flight in China between these two periods. This is mainly because of quantitative easing in the United States and China's more liberalized financial markets after 2007. Consequently, the role of covered interest parity in capital outflows has weakened in China, which necessitates a new way of looking at post-crisis flight. This may also apply to other countries. Ndikumana (2016) reviewed eight case studies on the causes and effects of capital flight from Africa. He derived three common lessons from these studies. First, capital flight from Africa is mainly associated with external debts. Second, trade mis-invoicing is an important channel for flight. Third, high-quality institutions alleviate the risks of capital flight. These single-country studies provide a closer look at the phenomenon of capital flight and a better understanding of and an improved solution to the specific cases.

However, it is important to note that our study considers only licit capital such as foreign direct investment (FDI), portfolio investment, and other investments. The purpose of this is to examine what happens to the domestic economy if net capital flows significantly decrease not by foreign investors but by domestic investors. Therefore, the definition of flight in this paper is identical to so-called sudden stop, except the fact that it occurs by domestic agents.

Of course, several attempts have been made to estimate sudden increases in gross capital outflows. For example, Cowan, De Gregorio, and Nelson (2008) called large drops in net capital inflows by gross capital outflows an outflow-driven sudden stop. They argued that this drop is destructive for emerging markets although the adverse effect is smaller than that of a sudden stop. Similarly, Rothenberg and Warnock (2011) called it as a sudden flight and argued that the differences in pain experienced during sudden flights and stops are not severe. Cavallo et al. (2015) investigated if the effect of reversal in gross capital outflows changes by corresponding reversals in gross capital inflows and net flows. There have been several studies on this effect, but many of them estimate the cyclical behavior of macro variables around flight events using time-trend models; that is, they focus on the association between macro variables and gross capital outflows. On the contrary, this paper estimates the causal effects of gross capital outflows using GMM estimators and shows that flight does not depress GDP growth directly and, therefore, is harmless to domestic economies.

This study focuses on the impact of flight on domestic investment to prove that flight and stop are different phenomena. Stop depresses growth by hurting domestic investment. For instance, Calvo (1998) and Calvo and Reinhart (2000) emphasized the incidence of nonperforming loans and the bankruptcies that followed caused by capital inflows slowdown. Mendoza (2010) also emphasized the role of collateral constraint binding, which might be caused by a cessation of capital inflows. In this case, companies were required to pay extra financing premia or liquidate their assets. As a result, they were forced to reduce working capital and production and factory demands dropped. For this reason, if flight fails to depress domestic investment, it indicates that the channels through which stop depresses domestic economies do not work for flight. Our paper shows that flight does not reduce domestic investment and proves that stop and flight are different.

III. *Data, Definitions, and Stylized Facts*

1. Data

The data is from 56 emerging market economies from 1990 to 2014, but it excludes major oil-exporting countries, bank havens, and countries that are categorized as low-income groups according to the 2008 GNI per capita by the World Bank because these countries might function as strong outliers in the group. See Table 1 for the list of countries included. All countries have at least 15 years of gross capital outflow data and the data for 10 of these years are consecutive (source: IMF, BOPS).

Gross capital outflows (inflows) are net foreign-asset purchases made by domestic agents (net domestic-asset purchases by foreign agents) that include FDI, portfolio investment (equities and debts), and other investments (e.g., trade credits, loans, and deposits). Total domestic investment is a gross capital formation. The data sources and the definition of the variables are detailed in Table 2.

2. Definitions of Capital-Flow Episodes: Flight and Stop

The formal definitions of flight and stop are as follows:

- Flight: a large purchasing of foreign assets by domestic agents
- Stop: a large selling (or large reduction in purchases) of domestic assets by foreigners

These flows should be considered large deviations in country-specific and global experiences. Accordingly, each episode is defined by dummies as follows:

- Flight:

$$\begin{cases} 1 \ \ if \ KO_{jt} \in \left\{ top \ 30\% \ of \ (KO_{js})_{s=1}^{T} \right\} \cap \left\{ top \ 30\% \ of \ (KO_{js})_{j=1,s=1}^{N,T} \right\} \\ 0 \ \ otherwise \end{cases}$$

- Stop:

$$\begin{cases} 1 \ \ if \ KI_{jt} \in \left\{ bottom \ 30\% \ of \ (KI_{js})_{s=1}^{T} \right\} \cap \left\{ bottom \ 30\% \ of \ (KI_{js})_{j=1,s=1}^{N,T} \right\} \\ 0 \ \ otherwise \end{cases}$$

where KO_{jt} is gross capital outflow (percentage of GDP) in country j at time t. Likewise, KI_{jt} is

Table 1. List of Countries

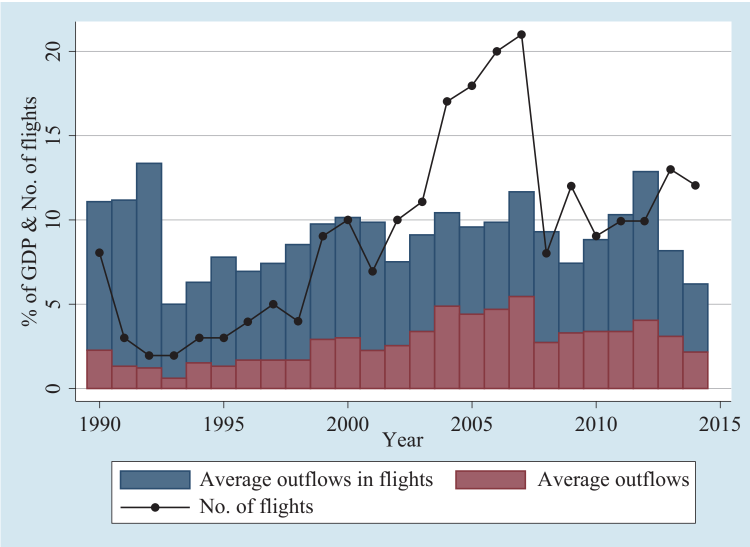
Country	Year	Country	Year
Angola	1990-2014	Lesotho	1990-2014
Armenia	1995-2014	Lithiania	1995-2014
Belarus	1997-2014	Malaysia	1990-2009
Belize	1990-2014	Maldives	1990-2014
Bolivia	1990-2014	Mexico	1990-2014
Bosnia and Herzegovina	1998-2014	Moldova	1995-2014
Botswana	1990-2014	Mongolia	1990-2014
Brazil	1990-2014	Morocco	1990-2014
Bulgaria	1990-2014	Namibia	1990-2014
Chile	1990-2014	Nigeria	1990-2014
Colombia	1990-2014	Pakistan	1990-2014
The Rep. of the Congo	1990-2007	Paraguay	1990-2014
Costa Rica	1990-2014	Peru	1990-2014
Cote d'Ivore	1990-2013	Philippines	1990-2014
Dominica	1990-2013	Poland	1990-2014
Dominican Republic	1990-2014	Romania	1990-2014
Egypt	1990-2014	Russia	1995-2014
El Salvador	1990-2014	Saint Lucia	1990-2013
Georgia	1997-2014	Seychelles	1990-2014
Grenada	1990-2013	South Africa	1990-2014
Guatemala	1990-2014	Sri Lanka	1990-2014
Honduras	1990-2014	Syria	1990-2010
India	1990-2014	Thailand	1990-2014
Indonesia	1990-2014	Tunisia	1990-2014
Jamaica	1990-2014	Turkey	1990-2014
Jordan	1990-2014	Ukraine	1995-2014
Kazakhstan	1994-2014	Uruguay	1990-2014
Latvia	1995-2014	Venezuela	1990-2013

Note: There are total 56 countries and year indicates available gross capital outflow data in each country.

Table 2. Variable Data Sources

Variable	Definition	Source
Gross capital inflows (% of GDP)	Net domestic-asset purchase by foreigners. Domestic assets consist of foreign direct investment, portfolio investment, and other investment.	IMF BOPS
Gross capital outflows (% of GDP)	Net foreign-asset purchase by domestic agents. Foreign assets consist of foreign direct investment, portfolio investment, and other investment.	IMF BOPS
GDP (nominal and real)		IMF WEO
Real GDP growth (%)		IMF WEO
Total investment (% of GDP)	Gross capital formation	IMF WEO
Capital market openness	The index ranged from 0 to 1. 1 means the most liberalized market.	Chinn and Ito (2006)
Exchange rate regime	The index ranged from 1 to 16. 16 means the most flexible regime.	Ilzetzki et al. (2016)
Trade openness	The sum of exports and imports of goods and services measured as a share of gross domestic product.	World Bank
Change in foreign exchange reserves	The growth rate of foreign exchange reserves	IMF IFS

Figure 2. Annual Flights and Average Gross Capital Outflows



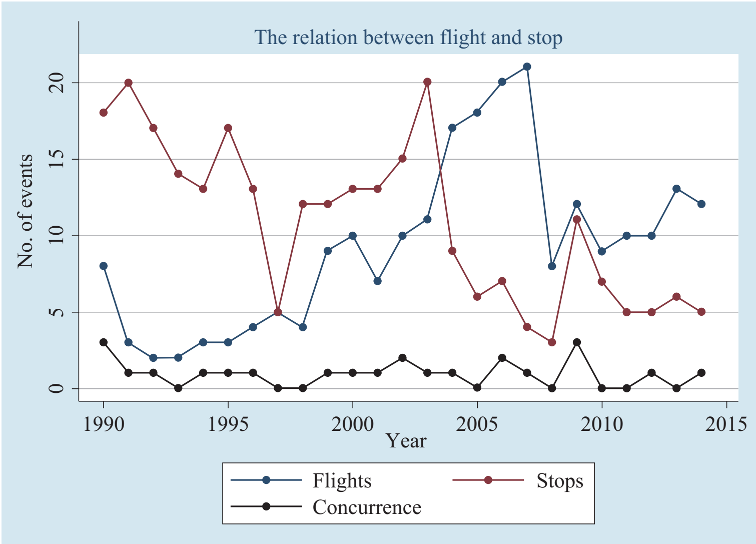
Note: The *y*-axis represents average overall outflows (red bar) and average outflows in flights (blue bar) in % of GDP and the number of flights (black line). The number of flights has been increasing consistently (except 2008) and there was a remarkable change in gross capital outflows when a country experienced flight.

gross capital inflow (percentage of GDP) in country j at time t. Therefore, the top 30% of $(KO_{js})_{s=1}^{T}$ implies gross capital outflows that are remarkably large by country j's experience. The top 30% of $(KO_{js})_{j=1,s=1}^{N,T}$ implies remarkably large outflows by cross-country experiences. Using these dummy variables, we estimate the impact of flight and stop in emerging markets.

The thresholds follow Gosh et al.'s (2014). Another common approach to define extreme capital flow movements is using rolling means and standard deviations of capital flows. For example, Forbes and Warnock (2012) define flight as a period when gross capital outflows fall one standard deviation below its mean given the fact that they fall two standard deviations below the mean at least once. The episode ends when gross outflows come back one standard deviation below the mean. This approach would be suitable for defining "sudden" stop and flight in emerging market economies because a sudden change in gross flows may fulfil the criteria while it hardly affects rolling means and standard deviations.

However, gross capital flows in emerging markets are much smaller but more volatile than those in advanced economies (Davis and Van Wincoop, 2018). We are therefore concerned that very small change in gross flows during tranquil periods might be defined as flight or stop. For the purpose of our study, the change should be remarkable during any episode (Figure 2) and this is the main reason why we follow Gosh et al.'s (2014) approach. Another reason is that their approach is more suitable for annual data which do not have enough observations to compute rolling means and standard deviations.

FIGURE 3. RELATIONSHIP BETWEEN FLIGHTS AND STOPS



Note: The *y*-axis represents the number of flights (blue line), the number of stops (red line), and the number of their concurrences (black line).

TABLE 3. CONCURRENCE OF FLIGHTS AND STOPS, 1990-2014

	Flight	No flight	Total
Stop	23 (2%)	240 (18%)	263 (20%)
No stop	208 (16%)	827 (64%)	1,035 (80%)
Total	231 (18%)	1,067 (82%)	1,298 (100%)

Note: Each cell reports the number of capital-flow episodes that are distinguished by the occurrence of flight and stop. The number of episodes as a percentage of total observations is in parenthesis. The data cover the years 1990-2014.

3. Stylized Facts

This subsection provides some stylized facts about flight. Figure 2 shows the number of flights and the annual average of gross capital outflows for the sample countries. Two interesting points emerge. First, except in 2008 (during the global financial crisis), the number of flights has been increasing consistently. The gross capital outflows were normalized by the current GDP, which indicates that the growth rate of capital outflows surpassed GDP growth in emerging market economies. Second, there is a remarkable change in gross capital outflows when a country experiences flight. We can see that gross capital outflows are at least three times larger during flight periods compared to those during tranquil times. This confirms that flight is a distinctive event in which domestic agents strongly prefer foreign assets.

Figure 3 and Table 3 report the relationship between flights and stops. Note that Figure 3 and Table 3 exhibit negative correlations between two episodes because only 10% of the flights

Table 4. Summary of Selected Variables

Flight

	Obs.	Mean	Std. Dev.	Min	Max
Gross capital outflows (% of GDP)	231	9.468***	5.638	3.405	50.815
Gross capital inflows (% of GDP)	231	11.015***	11.778	-24.566	71.014
Total investment (% of GDP)	230	24.053	8.385	2.212	58.151
Real GDP growth (%)	229	4.708***	5.228	-15.136	22.593
Exchange rate regime	231	6.653**	4.175	1	14
Capital market openness	228	0.486	0.353	0	1
Trade openness	216	90.488***	36.137	30.924	220.406
Change in foreign exchange reserves	224	25.459	65.7	-77.315	564.883

No flight

	Obs.	Mean	Std. Dev.	Min	Max
Gross capital outflows (% of GDP)	1,067	1.409	3.128	-15.048	15.029
Gross capital inflows (% of GDP)	1,067	5.406	7.049	-38.985	47.089
Total investment (% of GDP)	1,043	23.356	7.148	3.824	59.464
Real GDP growth (%)	1,066	3.751	4.142	-23.983	25.788
Exchange rate regime	1,067	7.371	4.045	1	15
Capital market openness	1,047	0.45	0.326	0	1
Trade openness	1,009	77.32	35.163	15.161	225.023
Change in foreign exchange reserves	1,037	36.642	366.869	-98.654	10210.23

Note: Selected variables are summarized according to the existence of flight. ***, **, and * indicate significant differences between two periods at the 1%, 5%, and 10% level, respectively. Welch's approximation was used.

coincided with stops.[7] This might indicate that foreigners were actively investing in the domestic economy when these countries were experiencing flights. In this case, the loss of working capital by domestic agents would be minimized through borrowing from abroad. For this reason, not only the amount of capital outflows but also the amount of capital inflows in a country needs to be considered to precisely estimate the impact of flight.[8]

Variables in our models are summarized in two separate periods—when flights occurred and when they did not—to see how they changed between the two episodes. Table 4 shows the summary. Gross capital outflows were almost seven times larger but gross capital inflows also doubled during flights. A more interesting result is that emerging markets were enjoying higher growth during flights, while domestic investment was hardly affected. This brief summary suggests that flight is not detrimental to economic growth and is, therefore, different from stop.

IV. *Estimation Strategy and Results*

1. GMM Estimators

This subsection briefly introduces GMM estimators.[9] We begin with the following panel

[7] The correlation between flight and stop in this paper is −0.1193.

[8] This does not mean that we need to study net capital flows rather than gross capital flows because the former do not differentiate the roles of domestic agents and foreigners in the economy.

data model:

$$y_{it}=X_{it}'\beta+u_{it} \text{ and } u_{it}=\eta_i+\epsilon_{it} \quad (1)$$

where y_{it} is the dependent variable for country i at time t. X_{it} is a vector of k independent variables, and u_{it} is the error term that may contain country-fixed effects (η_i) and time-varying components (ϵ_{it}). In the first step, difference GMM (DGMM) generates the equations in first differences to get rid of individual fixed effects: $\triangle y_{it}=\triangle X_{it}'\beta+\triangle\epsilon_{it}$ where $\triangle y_{it}=y_{it}-y_{it-1}$. We then constructed the instruments set that contain twice and further lagged independent variables (i.e., $X_{it-2}, X_{it-3}, ..., \text{and } X_{i0}$). Two conditions should be satisfied for them to be valid instruments. First, they have to be orthogonal to error terms:

$$E[(X_{it-s}\triangle\epsilon_{it})]=0 \text{ for } t\geq 3 \text{ and } s\geq 2. \quad (2)$$

Second, transformed error terms should not be serially correlated:

$$E[(\epsilon_{it}-\epsilon_{it-1})(\epsilon_{it-2}-\epsilon_{it-3})]=0 \text{ for } t\geq 3. \quad (3)$$

Hansen tests prove Equation 2, and Arellano and Bond AR(2) tests prove Equation 3.

However, the difference equation may cause the instruments to be weak if independent variables are persistent. To resolve this issue, Blundell and Bond (2000) suggest system GMM (SGMM) which extends the system by adding level equations:

$$\begin{pmatrix}\triangle y_{it}\\ y_{it}\end{pmatrix}=\begin{pmatrix}\triangle X_{it}\\ X_{it}\end{pmatrix}'\beta+\begin{pmatrix}\triangle u_{it}\\ u_{it}\end{pmatrix}. \quad (4)$$

Lagged differences are used as the instruments for level equations under the assumption that differenced lags are orthogonal to fixed effects (e.g., $E[\triangle X_{it-1}(\eta_i)]=0$). Blundell and Bond (2000) show that this condition is satisfied if x_{it} and y_{it} both have stationary processes.

Another disadvantage of DGMM is that it might not work well with unbalanced panel data because if some observations are missing, available equations may significantly decrease. Furthermore, Bun and Windmeijer (2010) argue that SGMM for the dynamic panel data models might have a weak instrument problem similar to DGMM. In this case, orthogonal deviation GMM (OGMM) could be a solution. The OGMM requires each equation to be subtracted from the average of future available samples. That is,

$$\triangle^* y_{it}=\triangle^* X_{it}'\beta+\triangle^*\epsilon_{it} \text{ and } \triangle^* x_{it}=c_{it}\left(x_{it}-\frac{1}{T_{it}}\sum_{s>t}x_{is}\right) \quad (5)$$

where $c_{it}=\sqrt{T_{it}/(T_{it}+1)}$. T_{it} is the number of observations from time t for individual i. As a result, only one equation is unavailable for a missing observation with unbalanced panel data, which improves the efficiency of GMM.

An important caveat of GMM estimators is that they generate too many instruments from a dataset with a long-time span. Roodman (2009) warned of two potential problems that may occur with too many instruments in GMM. First, GMM estimators may fail to expunge endogenous components in estimates and, second, the Hansen test may become invalid. For

[9] See Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (2000) for the detailed descriptions of GMM estimators.

these reasons, he suggested reducing the number of instruments to less than the number of individuals, and we followed his suggestion. The number of instruments is reported in the main results.

2. Similarities and Differences in the Impacts of Stop and Flight

We used four different estimators of the impacts of flight and stop on real GDP growth (*zgdp*) and total investment (*toinv*). The OLS estimator with fixed effects (*FEOLS*) is our baseline model. We also used difference, system, and orthogonal deviation GMM estimators (DGMM, SGMM, and OGMM, respectively) for more robust estimates.

The regression models are

$$zgdp_{it}=\beta_1 flight_{it}+X'_{it}\gamma+u_{it} \tag{6a}$$

$$zgdp_{it}=\beta_2 stop_{it}+X'_{it}\gamma+u_{it} \tag{6b}$$

$$zgdp_{it}=\beta_1 flight_{it}+\beta_2 stop_{it}+X'_{it}\gamma+u_{it} \tag{6c}$$

where stop and flight are dummies and the main interests. The two episodes were estimated separately first and then estimated together to perform a Wald test to see whether they were significantly different ($H_0: \widehat{\beta}_1=\widehat{\beta}_2$). X_{it} is the matrix of independent variables and u_{it} is the disturbance term that may contain individual-fixed components.

X_{it} includes a lagged dependent variable (*lzgdp*), an exchange rate regime (*exregime*), capital market openness (*kaopen*), and trade openness (*tropen*). Previous research on sudden stop has been argued that closed and rigid markets make the domestic economy vulnerable to the crisis by hindering external adjustment. For example, Edwards (2004a, b) argue that more open economies with flexible exchange rate regimes are less prone to stops and following output losses. See also Cavallo and Frankel (2008), Guidotti et al. (2004) and Mishikin (1999). The government might actively spend foreign exchange reserves to inject liquidity in the economies and to mitigate the damage caused by capital-flow episodes. Therefore, we also control for the growth rate of foreign exchange reserves (*fxrsv*).[10] Finally, we control for time-fixed effects that capture common shocks to every country in the same year.

Likewise, the impacts of the two episodes on total investment (*toinv*) are estimated to provide empirical evidence that the channel through which stop hurts the domestic economy is not the same as for flight. The regression models are

$$toinv_{it}=\beta_1 flight_{it}+X'_{it}\gamma+u_{it} \tag{7a}$$

$$toinv_{it}=\beta_2 stop_{it}+X'_{it}\gamma+u_{it} \tag{7b}$$

$$toinv_{it}=\beta_1 flight_{it}+\beta_2 stop_{it}+X'_{it}\gamma+u_{it} \tag{7c}$$

where X_{it} is the same matrix as the one in equation 6 excluding a lagged dependent variable. A Wald test was again performed to see whether $\widehat{\beta}_1$ and $\widehat{\beta}_2$ are significantly different. In equations 6 and 7, not only are capital-flow episodes but also all other independent variables

[10] We thank an anonymous referee for suggesting this.

treated as endogenous except the lagged dependent variable (which is predetermined) and the time dummies.

Table 5 shows the results on real GDP growth. As is already well-known through existing literature, stops depress emerging markets' growth. On the other hand, flights fail on average to depress emerging markets' growth and positively, but not significantly, contribute to domestic economies. More importantly, the results from the Wald test from FEOLS and DGMM indicate the impacts of the two episodes are significantly different. This supports the hypothesis that flight and stop are different phenomena.

The coefficients on the lagged dependent variable are moderate, significant, and range from 0.24 to 0.35. This justifies the employment of the dynamic model. For example, with the coefficient of 0.3 for the lagged dependent variable, the damage from stops increases about 43% in the long run. The estimates of the exchange regime are all negative and many of them are significant, which indicates that a flexible regime hurts the domestic economy. This is probably because of the negative impact on net exports. Trade openness positively contributes to the domestic economy as expected, but the impact of capital market openness on real GDP growth is inconclusive. Not all coefficients of capital market openness are statistically significant, and the sign of the coefficient also changes according to the control variables. This is consistent with Stiglitz' (2000) argument that capital market liberalization is not always beneficial for growth because in many cases it increases economic instability. The impact of foreign exchange reserves on the domestic economy is insignificant.

Table 6 shows the impacts of capital-flow episodes on domestic investment. Flight does not depress domestic investment either while stop significantly does so. If the opportunity cost of foreign-asset purchases equals purchases of the same amount of domestic assets, flight must reduce domestic investment, but the results contradict this speculation. As previously suggested, flight might indicate that domestic agents mostly use foreign borrowing rather than their savings to substantially increase foreign-asset purchases. If so, savings do not necessarily flow overseas during flights, and as a consequence, domestic investment might not be hurt. Moreover, the results from all estimators show that the impacts of the two episodes are significantly different. For this reason, we can also conclude from Table 6 that flight is different from stop because the former does not reduce domestic investment.

As expected, liberalized capital markets and trade promote domestic investment. On the other hand, flexible exchange regime depresses domestic investment as well as GDP growth, and the impact of foreign exchange reserves on domestic investment is insignificant. Finally, the estimates of control variables rarely change, regardless of estimators.

3. The Impact of Flight Conditional on the Existence of Stop

This subsection investigates the impact of flight conditional on the existence of stop using time-trend models. Flight episodes were separated into two different groups: the flights that concurred with stops and the ones that occurred alone. We also considered stop episodes that occurred without flight events. This tests the hypothesis that the country is damaged most when flight and stop occur simultaneously. We expected that the damage from two simultaneous events would outweigh the damage from a single-stop event. Each episode is separated as: {Flight only}, {Flight with Stop}, or {Stop only}.

The estimation model is

TABLE 5. IMPACTS OF STOPS AND FLIGHTS ON REAL GDP GROWTH

	Dependent Variable: Real GDP growth											
	FEOLS	DGMM	SGMM	OGMM	FEOLS	DGMM	SGMM	OGMM	FEOLS	DGMM	SGMM	OGMM
FLIGHT	0.4531	1.3617	0.845	-0.4374					0.3177	0.5176	0.7218	-0.5076
	(0.3439)	(1.5939)	(1.5053)	(1.6039)					(0.3544)	(1.7902)	(2.573)	(1.5427)
STOP					-1.2153***	-2.5419**	-2.7106***	-1.2425	-1.168***	-2.3052**	-1.9274*	-1.3909
					(0.3158)	(0.9858)	(0.8834)	(1.1147)	(0.3282)	(1.1113)	(1.0538)	(1.1149)
LZGDP	0.2636***	0.357***	0.3179***	0.337***	0.2526***	0.321***	0.2859***	0.321***	0.2467***	0.3232***	0.3236***	0.3214***
	(0.0478)	(0.0756)	(0.0912)	(0.0512)	(0.0454)	(0.0574)	(0.064)	(0.0493)	(0.0471)	(0.0678)	(0.0943)	(0.0559)
EXREGIME	-0.1971***	-0.1663	-0.2674*	-0.2516*	-0.1684***	-0.1655	-0.2027	-0.2629*	-0.1822***	-0.0909	-0.3012*	-0.214
	(0.046)	(0.2031)	(0.1387)	(0.1502)	(0.0403)	(0.1984)	(0.1356)	(0.1474)	(0.0428)	(0.1997)	(0.1562)	(0.1421)
KAOPEN	0.0242	3.4458	1.2572	2.3913	-0.3106	-0.3862	-0.3775	-0.3183	-0.2807	-0.8018	1.0172	0.8292
	(0.4428)	(3.2595)	(2.164)	(2.5201)	(0.398)	(2.702)	(1.734)	(2.1964)	(0.4203)	(3.52)	(2.6701)	(2.4208)
TROPEN	0.0002	0.1274***	0.0717**	0.0876***	-0.0002	0.1045***	0.0643***	0.0524*	-0.0001	0.0979***	0.0313	0.0616*
	(0.0062)	(0.0337)	(0.0327)	(0.0332)	(0.006)	(0.0324)	(0.0229)	(0.0298)	(0.0063)	(0.034)	(0.0321)	(0.033)
FXRSV	-0.0002	-0.0001	-0.0005	-0.0024	-0.0003	-0.0003	-0.0006	-0.0018	-0.0002	-0.0004	-0.0005	-0.0025
	(0.0002)	(0.001)	(0.0009)	(0.0045)	(0.0003)	(0.001)	(0.001)	(0.0029)	(0.0002)	(0.001)	(0.0036)	(0.0029)
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Countries	54	54	54	54	54	54	54	54	54	54	54	54
Observations	1,141	1,080	1,141	1,087	1,162	1,107	1,162	1,108	1,141	1,080	1,141	1,087
Hansen test		0.468	0.434	0.379		0.478	0.549	0.202		0.604	0.307	0.363
A-B AR(2) test		0.381	0.603	0.764		0.28	0.401	0.611		0.383	0.452	0.705
Diff-in-Hansen test			0.386				0.477				0.513	
$H_o:\hat{\beta}_1=\hat{\beta}_2$									0.0005	0.0626	0.2793	0.5634

Notes: The coefficients of the regression model (6)s are reported. FEOLS is a fixed-effects estimator, DGMM is a two-step difference GMM estimator, SGMM is a two-step system GMM estimator, and OGMM is a two-step orthogonal deviation GMM estimator. Robust standard errors are in the parentheses (clustered by country in FEOLS and Windmeijer-corrected in GMMs). *, **, and *** for statistical significance at the 10, 5, and 1 percent levels, respectively. P-values are reported in each test.

TABLE 6. IMPACTS OF STOPS AND FLIGHTS ON TOTAL INVESTMENT

	Dependent Variable: Total investment											
	FEOLS	DGMM	SGMM	OGMM	FEOLS	DGMM	SGMM	OGMM	FEOLS	DGMM	SGMM	OGMM
FLIGHT	0.2253	1.193	2.8862	3.0036					-0.0158	2.2087	3.7505	3.7266
	(0.5342)	(3.0495)	(2.7343)	(2.4867)					(0.5493)	(2.3433)	(2.7285)	(2.4714)
STOP					-2.0859***	-3.5731**	-3.8987**	-4.3847**	-2.0701***	-3.8724*	-5.1192**	-2.8779
					(0.4412)	(1.6698)	(1.6376)	(1.7226)	(0.4238)	(2.16)	(2.2145)	(1.8109)
EXREGIME	-0.2904*	-0.4205	-0.3345	-0.7072*	-0.2432*	-0.3219	-0.1239	-0.4488	-0.2501*	-0.3628	-0.3227	-0.5489
	(0.1446)	(0.403)	(0.2483)	(0.3952)	(0.1374)	(0.2772)	(0.1945)	(0.3668)	(0.1381)	(0.341)	(0.2009)	(0.4011)
KAOPEN	4.2236**	16.7341***	6.2174*	13.3648***	3.5713**	12.0223**	3.101	8.3466**	3.5848**	10.5531*	3.6475	10.9728**
	(1.6032)	(5.5404)	(3.6461)	(4.5238)	(1.5969)	(4.976)	(2.4918)	(3.6313)	(1.5508)	(5.7122)	(2.5726)	(5.2134)
TROPEN	0.022	0.156	0.1042	0.1494*	0.0237	0.0601	0.0723*	0.1459**	0.0216	0.0432	0.0233	0.1538**
	(0.0184)	(0.1009)	(0.0662)	(0.0769)	(0.018)	(0.0658)	(0.0426)	(0.0726)	(0.0184)	(0.0857)	(0.0433)	(0.0738)
FXRSV	0.0005	-0.0102	-0.0059	0.0028	0.0004	0.0012	0.0007	0.0054	0.0004	0.0062	0.0129	0.006
	(0.0009)	(0.0093)	(0.0085)	(0.0068)	(0.0008)	(0.0018)	(0.0017)	(0.006)	(0.0008)	(0.0069)	(0.0084)	(0.0062)
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Countries	53	53	53	53	53	53	53	53	53	53	53	53
Observations	1,175	1,115	1,175	1,122	1,196	1,143	1,196	1,143	1,175	1,115	1,175	1,122
Hansen test		0.776	0.251	0.789		0.663	0.467	0.674		0.523	0.509	0.869
A-B AR(2) test		0.696	0.966	0.117		0.602	0.646	0.372		0.238	0.189	0.223
Diff-in-Hansen test			0.160				0.102				0.288	
$H_o: \widehat{\beta}_1 = \widehat{\beta}_2$									0.0036	0.0667	0.0175	0.0214

Notes: The coefficients of the regression model (7)s are reported. FEOLS is a fixed-effects estimator, DGMM is a two-step difference GMM estimator, SGMM is a two-step system GMM estimator, and OGMM is a two-step orthogonal deviation GMM estimator. Robust standard errors are in the parentheses (clustered by country in FEOLS and Windmeijer-corrected in GMMs). *, **, and *** for statistical significance at the 10, 5, and 1 percent levels, respectively. P-values are reported in each test.

Table 7. Trend of Real GDP Growth and Total Investment

	Real GDP growth			Total investment		
	Fligths w/ Stops	Flights only	Stops only	Fligths w/ Stops	Flights only	Stops only
T-2	-0.4397	-0.3549	-0.8463**	-0.6036	-0.9715*	-0.0132
	(1.1359)	(0.4318)	(0.3654)	(1.363)	(0.4955)	(0.4541)
T-1	-4.1767***	-0.1695	-1.0249***	-2.462*	-1.1374**	-1.3211***
	(1.1689)	(0.4519)	(0.3642)	(1.4028)	(0.5189)	(0.4526)
T	-2.2541**	0.1787	-1.241***	-4.0543***	-1.997***	-2.2016***
	(1.1367)	(0.4595)	(0.3623)	(1.3645)	(0.5249)	(0.4502)
T+1	-0.4853	0.6487	0.1074	-2.641*	-0.075	-1.3423***
	(1.135)	(0.4619)	(0.3555)	(1.3623)	(0.5275)	(0.4417)
T+2	0.6218	0.5171	0.367	-1.8576	-0.9023*	0.0795
	(1.059)	(0.4573)	(0.3422)	(1.271)	(0.5223)	(0.4252)
Wald test						
$y_{t-1}-y_{t-2}$	-3.737**	0.1854	-0.1786	-1.8584	-0.1629	-1.4079*
y_t-y_{t-1}	1.9226	0.3482	-0.216	-1.5923	-0.8596	-0.9705
$y_{t+1}-y_t$	1.7688	0.47	1.3485**	1.4133	1.922**	0.9492
$y_{t+2}-y_{t+1}$	1.1071	-0.1316	0.2595	0.7834	-0.8273	1.4219**
y_t-y_{t-2}	-1.8144	0.5336	-0.3946	-3.4507*	-1.0255	-2.2784***
$y_{t+2}-y_t$	2.8759*	0.3384	1.608***	2.1967	1.0947	2.3711***
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Time trend	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.1348	0.1242	0.1509	0.4947	0.5552	0.5559
Countries	56	56	56	55	55	55
Observations	1,155	1,044	1,102	1,139	1,023	1,081

Note: The table reports the trends of real GDP growth and total investment around capital-flow episodes. T is when the episodes occurred. The results of the Wald test show whether the behavior of y in the model (8), which is real GDP growth or total investment, is statistically significant.

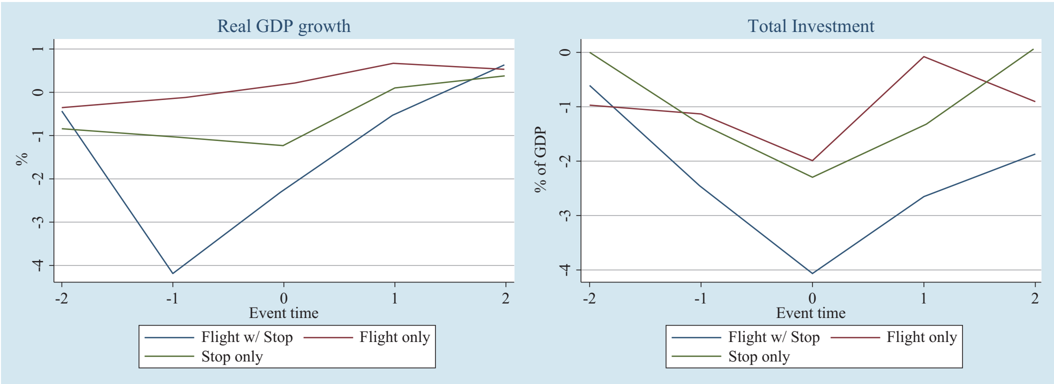
$$y_{it}=\alpha+\sum_{0\leq s\leq 4}\beta_s episode^j_{i,t-2+s}+\gamma year+\eta_i+\epsilon_{it} \tag{8}$$

where j is an index for the three sets {Flight only}, {Flight with Stop}, and {Stop only}. The time trend to get rid of the linear trend in GDP growth and investment is *year*. Therefore, the model estimates the behavior of real GDP growth and total investment around two events from $t-2$ to $t+2$ where t is the year when the event occurred.

Table 7 reports the results of the estimation model, and Figure 4 summarizes it. The behaviors of real GDP growth and domestic investment around the two events are starkly different according to the presence of stop and flight. For example, during simultaneous flight and stop, GDP growth is lowest at $t-1$ (−4.1767%) and recovers slowly after that. Likewise, total investment is lowest at t (−4.0543% of GDP) when the two events occur simultaneously. In other words, GDP growth decreased about 1.8% compared to GDP growth two years before the event, and it took two years to fully recover. The damage to domestic investment was worse. Domestic investment decreased about 3.4% of GDP compared to domestic investment two years before the event. Moreover, even two years after the event, it had not fully recovered, which indicates that it takes longer to recover from the shocks.

On the other hand, although GDP growth and domestic investment also significantly

Figure 4. Trend of Real GDP Growth and Total Investment around Episodes



Note: Each line represents the trends of real GDP growth and total investment when flight occurred (red line), when stop occurred (green line), and when flight and stop simultaneously occurred (blue line).

decreased during "stop only" events, the decrease was much smaller than that during simultaneous flight and stop. Gross domestic product growth and domestic investment were lowest at t (-1.241% and -2.2016% of GDP, respectively), which is still higher than t during simultaneous flight and stop. Furthermore, there is little change in GDP growth when flights occur alone. Domestic investment decreases slightly during single-flight periods, but it was already at a low level at $t-2$, so it is doubtful that they played a major role in domestic investment at t. Recovery is also quicker than when "stop only" occurs, which again indicates that flight and stop are different. The results from the time-trend models, therefore, confirm the hypothesis that the impact of flight is conditional on the amount of gross capital inflows in the economy.

If countries do not have access to domestic financial markets, they will try to borrow from global financial markets to prevent the loss of working capital. They may be damaged most when they cannot borrow from both markets simultaneously. Furthermore, this circumstance arguably occurs more frequently in emerging market economies than in advanced economies. Our results therefore suggest that governments should monitor not only capital outflows but also capital inflows when they observe flight from the country. That is, net capital inflows also do matter to implement proper policies against extreme capital flow movements.[11]

V. *Discussion*

The results suggest that heterogeneity exists between the effects of flight and stop on the domestic economy. According to Mendoza (2010), this indicates that collateral constraint binds

[11] We also used GMM estimators to estimate the impact of interactions between two capital flow events in an earlier draft of this paper (i.e., $y_{it}=\beta_1 flight_{it}+\beta_2 stop_{it}+\beta_3 flight_{it}*stop_{it}+X'_{it}\gamma+u_{it}$). Although the results were similar, we failed to draw conclusions because of strong multicollinearity between interaction terms and constitutive terms. For this reason, the results from interaction models are not reported here, but they are available upon request.

when stop occurs but does not do so when flight occurs, which is supported by our empirical evidence in the previous section. It is likely that a decrease in domestic investment by massive gross capital outflows during flight periods will be quickly recovered by a large amount of gross capital inflows in the same period (see Table 4). Namely, unlike stop, simultaneous gross capital inflows and outflows during flight periods make flight harmless to domestic investment.

Why do gross capital inflows and outflows increase simultaneously during flight periods? Many studies have evinced a high correlation between capital inflows and outflows because both are affected by global common factors, such as US monetary policy (Miranda-Agrippino and Rey, 2015). Furthermore, most studies argue that this high correlation is getting stronger because of recent capital market liberalization policies and global economic growth. For instance, Davis and Van Wincoop (2018) built a two-country model with four different types of shocks and showed that a high correlation existed between the two flows because the impact of financial globalization is stronger than the impact of trade globalization. See Broner et al. (2013), Rey (2013), and Caballero and Simsek (2020) for further empirical evidence concerning this correlation.

However, our results on heterogeneity cannot be fully explained by a single stylized fact regarding the high correlation between the two flows because if a reduction in domestic investment by flight can be quickly recovered by capital inflows by foreign agents, a reduction by stop can also be quickly recovered by capital retrenchment by domestic agents. Nonetheless, unlike flight, stop is detrimental to the domestic economy, which implies that if foreigners withdraw their investments, the loss cannot be fully recovered by domestic agents. To explain this heterogeneity, a theoretical model that can also demonstrate the asymmetry in the magnitude of gross capital inflows and outflows is required.

Several studies have addressed these issues by emphasizing global banks' value-at-risk (VaR) constraints. VaR, which is regularly reported to the government, is a measure of a loss for investments. Specifically, VaR is defined by a threshold V such that the probability that the realized loss is larger than V is below 1-c:

$$P(A < A_0 - V) \leq 1 - c,$$

where A_0 is the base level of the banks and c is the confidence level, which is 95% or 99% in most cases. Adrian and Shin (2014) documented that VaR per dollar of assets (unit VaR) fluctuates over the global financial cycle and increased significantly during the global financial crisis. Consequently, there was a considerable reduction in leverage because of the reaction of firms to a measured risk and a contraction in bank credit supply. Their theoretical explanation indicates that a substantial decrease in capital inflows led by global banks during a stop period might be hardly recovered by domestic firms through capital retrenchment.

Similarly, Miranda-Agrippino and Rey (2020) demonstrated that the procyclicality of leverage, which is led by global banks, is affected by global factors, particularly US monetary policies. The aforementioned authors built a model with two heterogeneous investors: global banks that maximize the expected return of their portfolios subject to a VaR constraint and domestic asset managers who are standard mean-variance investors with a constant level of risk aversion. In this model, a key difference between the two groups is that global banks are risk-neutral, whereas asset managers are risk-averse (the asymmetry in risk aversion).

Under this circumstance, the expected excess returns on tradable risky assets constitute the sum of global and regional components in which both components are scaled by the wealth-weighted average of the risk aversions of the asset managers and global banks. Therefore, asset prices and consequent asset trades (capital flows) follow the global financial cycle. For example, during a boom, risk-neutral global banks with a loose VaR constraint dominate the aggregate degree of the effective risk aversion of the market, which results in aggressive capital inflows into emerging market economies. Conversely, during a recession, global banks retrench from the market and risk-averse asset managers dominate the aggregate risk aversion of the market. Thus, capital inflows and outflows decrease significantly; however, unlike global banks, the role of asset managers in the capital market is limited because their risk-averse nature prohibits leverage. Thus, the heterogeneous effects of stop and flight are due to heterogeneous risk aversion between two investors. See also Zigrand et al. (2010).

In summary, our results can be accounted for by theoretical frameworks that emphasize the role of global banks with VaR constraints. These frameworks suggest that capital inflows into emerging market economies are mainly driven by highly leveraged banks. Moreover, domestic investors are more risk-averse; therefore, their roles in the capital market are limited. This explains why stop cannot be easily recovered by domestic investors, whereas flight can be recovered even if capital inflows and outflows are highly correlated with each other.

VI. *Summary and Conclusion*

This paper estimated the effect of flight on emerging market economies by employing diverse GMM estimators. Moreover, it adopted time-trend models to test the hypothesis that the effect might be conditional on the amount of gross capital inflows available for working capital. This aspect differs from previous research that focused on the association between flight and economic variables and assumed that the impact of flight is absolute. As a result, this paper provides a quite different conclusion. Namely, flight alone does not depress emerging markets' growth and investment. This effect differs from the effect of stop in capital inflows by foreigners, which has consistently depressed domestic economies. It could be explained by a theoretical framework which emphasizes the role of global banks with a VaR constraint in the global financial cycle.

Our research necessitated seeing flight from a new perspective and suggests the possible implementation of appropriate capital outflow policies, such as capital outflow restrictions. Liberalized capital markets allow domestic agents to diversify their portfolios while reducing the risks and to take advantage of overseas investments. However, if the benefits are derived through the loss of the country's investments and growth, social welfare would eventually decrease as a consequence. This paper denied this possibility and argued that more liberalized gross capital outflows are beneficial for emerging market economies unless sudden reductions in capital inflows are expected.

Another policy implication of our analysis is that not only gross capital flows but also net capital flows should be closely monitored to implement proper policies against abrupt changes in capital flows. Recent papers on extreme capital movements study gross capital flows arguing that the cause of extreme capital movements could be different according to the drivers (see, e.g., Calderón and Kubota, 2013). However, although the cause of extreme capital movements might be different, our empirical evidence suggests that consequential damages might be still determined by the magnitude of net capital inflows during the event. We conclude that we need to consider both gross capital flows and net capital flows with a balanced view for a stable financial environment.

This paper provided empirical evidence that flight is harmless to the overall emerging economy. Nonetheless, flight might still affect specific economic sectors under certain circumstances. For example, flight might indicate currency attacks on their own currency by domestic investors in an effort to depreciate it. In this case, a country might experience currency crises and subsequent inflation crises, and economic growth might decrease as a result. Another important caveat is that flight might be associated with a surge in capital inflows. As emphasized in this paper, domestic investment is severely depressed if companies cannot simultaneously borrow from domestic and foreign agents. Therefore, the companies would be tempted to increase foreign borrowing if they observe domestic agents fleeing domestic markets. The country might then experience "capital inflow bonanzas" and subsequent financial crises.[12]

These situations have been left for a future research agenda. Although there has been significant research on capital inflow reversals, there has been relatively little research on capital outflow flights caused by domestic agents. Considering the increasing role of capital outflows in emerging market economies, more complete knowledge of this phenomenon would help the design and implementation of sound policies.

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[12] See Reinhart and Reinhart (2008) and Ghosh, Ostry, and Qureshi (2016).

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