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An Attempt to Analyze the Determinants and Effects of Sudden Stops of Capital Flows in Their Different Forms: The Case of Emerging Market Economies

Berk Palandökenlier[1+] and Harun Bal[2]

[1]*Gaziantep University Social Sciences M.Y.O., Gaziantep, Türkiye*
[2]*Çukurova University, Sarıçam, Adana, Türkiye*

Abstract The objective of this paper is to investigate the main determinants of sudden stops of different types of gross capital inflows and the impact of such events for 13 Emerging Market Economies (EMEs) over the period 2006Q1-2021Q2. In this framework, a complementary log-log model is used to identify the factors that trigger sudden stop events. Moreover, a structural VAR analysis technique is used to identify the macro-financial implications of sudden stops. The analysis reveals that both global factors and local conditions have a significant impact on sudden stops, although global events (especially global risk and uncertainty perceptions and contagion effects) are relatively more dominant. We also find that an overabundance of short-term capital inflows can increase the risk of sudden stops, although the quality of institutions seems to have a more significant impact on sudden stops related to short-term inflows. Finally, the findings of the structural VAR analysis suggest that the economic effects of sudden stop shocks, especially those stemming from debt-based capital inflows, are much larger and negative.

Keywords: Gross Capital Inflows, Sudden Stops, Political Risk Components, Effects of Sudden Stops

JEL Classifications: F32, F36, F40, G15

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I. Introduction

The gradual liberalization policies of EMEs towards capital flows in the 1980s and 1990s led to developments that can be considered successful in terms of attracting international capital to these countries. While generally and overwhelmingly supported, it has often been neglected that these policies can also be a facilitating factor for capital outflows from these countries

+Corresponding Author: Berk Palandökenlier
Lecturer, Office Services and Secretariat Department, Gaziantep University Social Sciences M.Y.O., Gaziantep, Türkiye. E-mail: berkplndkn@gmail.com
Co-Author: Harun Bal
Prof. Dr., Department of Economics, Faculty of Economics and Administrative Sciences, Çukurova University, Sarıçam, Adana, Türkiye. E-mail: balharun@gmail.com
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and therefore need to be treated with caution. Such developments, which many EMEs have been exposed to in the past, have led to deepening crises and contagion effects (Stiglitz, 2000).[1] Similar developments in the mid-1990s, which affected most of the EMEs, were later repeated in Far East Asian countries and in individual countries such as Turkey and Argentina in the early 2000s with their internal dynamics.

The 2008 financial crisis, which started in the US in the early second half of the 2000s, brought external dynamics to the fore. Although there was a wave of capital flows to EMEs, especially in the 2009-2012 period, as a result of the expansionary monetary policies implemented by advanced economies to revitalize economic and financial activity, a small number of emerging market economies attracted more than half of global capital flows. In these developments, the liquidity expansion policies of developed countries (primarily the Federal Reserve Bank of the United States (FED) and some central banks in the United Kingdom, Japan and the Eurozone) within the framework of unconventional policy measures and interest rate policies at levels close to the zero band have been influential in international investors' expectations of higher returns, leading them to turn to EMEs that offer higher interest rates. The unconventional monetary policy measures caused a significant increase in capital inflows to the EMEs. This led to the overvaluation of national currencies, asset price bubbles, and excessive credit expansion in these economies. As a result, widening fiscal imbalances were observed (Fratzscher et al., 2018).

In 2013, after the global financial crisis, the US central bank began to reduce its asset purchases. This caused negative effects on asset prices, foreign exchange reserves, and exchange rates in EMEs. As a result, financial market volatility increased and capital inflows were reversed (Sahay et al., 2014; Acharya et al., 2010). The global financial crisis, the Taper Tantrum phase and its aftereffects are important examples of sudden stops[2] for emerging markets and other EMEs. The COVID-19 pandemic, on the other hand, caused a new fluctuation in the processes of capital flows. It caused extremely negative economic and financial effects especially in emerging market economies (Cakmakli et al., 2020).

In 2020Q1 (as of March), the COVID-19 crisis caused a significant decline in portfolio investments, particularly from non-residents, and their components, portfolio equity and debt flows. In January-May 2020, equity and debt capital outflows from the EMEs amounted to approximately USD 103 billion (OECD, 2020). Our study aims to analyze the causes and effects

1) The so-called contagion effect refers to the spread of crises from one country to another (Lopez-Mejia, 1999). The contagion effect has attracted attention especially after the outbreak of the Asian crisis and the significant impact of the crisis on other countries. This situation has emerged when external shocks in another country or countries spread to other countries through trade and financial linkages (spillover effects) (Brana ve Lahet, 2010).

2) In the related literature, sudden slowdowns or sharp reversals in private capital inflows are referred to as "sudden stops". In particular, slowdown in capital inflows or large capital outflows (reversals) lead to serious current account deficits and cause significant negative effects (Reinhart and Calvo, 2000).

of sudden stops in gross private capital inflows in 13 EMEs, as classified by the MSCI Emerging Markets Index.[3] We will use relevant datasets covering the period from 2006Q1 to 2021Q2 to determine both global and local determinants of these sudden stops, as well as their impact on the domestic economy. The analysis takes into account the different risk profiles of capital types, their sensitivity to various domestic economic, financial and political dynamics and external factors, and how they vary depending on investor behavior and perceptions. Thus, by including all types and possible combinations of gross private capital inflows in the analysis, the risks and key determinants of sudden stops arising from these capital inflows are evaluated.

According to the estimation results, sudden stops are more likely to happen when there is a surge in capital inflows. This means that excessive capital inflows play a significant role in causing sudden stops. This has been documented in various empirical studies, including those by Sula (2010), Agosin and Huaita (2012), and Efremidze et al. (2017). This study examines the impact of excessive increases in both gross capital inflows and different types of inflows on sudden stops. On the other hand, analyzing the reasons behind sudden stops caused by different types of capital inflows in a more comprehensive and multidimensional manner is possible by including various components of the political risk index in the analysis. Therefore, taking different types of risk factors into account can help capture the cause-and-effect relationships between these risk factors. This helps us to identify which factor has a greater impact on the sudden stops associated with different types of capital inflows. Finally, in our study, we examine the impact of sudden stops caused by various types of gross capital inflows on macroeconomic and financial variables. We analyze all possible channels and transmission mechanisms using the SVAR analysis method.

The heterogeneity of international capital flows to emerging market economies implies that the factors that cause sudden stops in capital inflows also vary. This paper makes an important contribution to the research on sudden stops by analyzing capital inflows from non-residents in terms of gross rather than net inflows. The objective is to investigate the factors that cause sudden stops in gross capital inflows by analyzing all subcomponents of gross total capital inflows and other alternative definitions using up-to-date data sets.

The following sections of the paper are organized as follows for clarity: Section 2 provides an overview of the empirical literature on capital flows, including their determinants and macroeconomic effects. Section 3.1 provides a methodological discussion and a detailed description of the dataset for identifying periods of large capital inflows and sudden stops. Section 3.2 discusses the empirical evidence on the global and local determinants of sudden stops caused by different types of capital inflows. On the other hand, Section 4 presents the literature on the local macro-financial effects of sudden stops, Section 4.1 presents the

3) These countries are Brazil, Chile, Colombia, Czech Republic, Hungary, Indonesia, South Korea, Mexico, Poland, Russian Federation, South Africa, Thailand, Turkey.

methodology and dataset, and Section 4.2 presents the findings of the analysis. Finally, the study concludes with Chapter 5, which includes evaluations of the results of the analysis and policy recommendations.

II. Empirical Literature

According to the literature, sudden stops in capital flows had a significant impact on the crises of the mid-1990s and worsened them. Indeed, the question of whether the factors that trigger sudden stops are mainly driven by local dynamics or global influences has led to the emergence of a literature investigating the determinants of sudden stops. This is due to the possibility that the factors that trigger sudden stops may be influenced by different forces than those that drive capital flows in normal times. Early studies on sudden stops suggested that the reversals in capital inflows in EMEs were caused by changes in interest rates in advanced economies, which were external factors (Calvo et al., 1993).

Calvo et al. (2004) conducted a study to examine the features and likelihood of sudden stops in capital flows for a group of 32 developed and emerging market economies. Their findings suggest that sudden stops cause fluctuations in the real exchange rate because of substantial inflows of capital and result in the actual depreciation of the country's currency. In addition, an increase in liability dollarization raises the likelihood of sudden stops by amplifying real exchange rate depreciations through balance sheet effect.[4] Research by Bordo et al. (2010) supports the conclusion that sudden stops for EMEs are driven by increases in liability dollarization. In addition, countries with low degree of openness to foreign trade have a higher risk of sudden stops. Similar results were also obtained by Calvo et al. (2006). Again, Cavallo and Frankel (2004, 2008), analyzing the data of 141 countries for the period 1970-2002, conclude that greater external openness can reduce economic fragility, instability caused by sudden changes in capital flows and the possibility of sudden stops in general. Other studies, such as Calvo et al. (2003), Edwards (2004), and Bordo et al. (2010), have also provided similar empirical evidence.

On the other hand, Radelet and Sachs (1999) attribute the rapid reversal of capital flows in emerging Asian economies to the weaknesses in their financial systems. Similarly, Agosin and Huaita (2012) point out that capital flows are under the influence of global developments and that the sudden fluctuations in capital flows also depend on whether the EMEs have developed financial market conditions and the immediate reactions of investors trading in such markets.

4) This situation, also known as the balance sheet effect, is an example of a financial-based crisis (e.g. banking crisis) that may arise when companies or banks borrowing in Foreign Currency (FX) have difficulties in meeting their debt obligations due to mismatches between assets and liabilities on their balance sheets.

Jeanne and Ranciere (2006), using data from 1975-2003 for 34 EMEs, find that sudden stops are largely driven by increases in public debt, higher financial openness and high liability dollarization in the banking sector. Similarly, according to Baek and Song (2019), there is a close relationship between public debt and sudden stops. Accordingly, the probability of a sudden stop due to debt-based capital inflows decreases with increases (decreases) in public debt (Baek and Song, 2019). Gourinchas and Obstfeld (2012), using annual data covering the period 1973-2010 for 57 EMEs, find that increases in domestic credit growth rates and real appreciation of the national currency are closely related to the probability of sudden stops in EMEs.

Eichengreen et al. (2008), using panel data for the period 1980-2003 for 24 EMEs, find that increases in the yield spread of risk-free US government bonds, used as a measure of the global risk premium, lead to sudden stops. On the other hand, decreases in oil prices reduced the risk of sudden stops. This points to the importance of global developments for EME economies. Forbes and Warnock (2012), Eichengreen et al. (2016) and Li et al. (2018) also emphasize the importance of global factors in sudden stop events. They find that increases in the VIX index and contagion effects[5] are the most important external factors that increase the risk of sudden stops. Again, Calderon and Kubota (2013) conclude that global developments are the most important factors triggering sudden stops in gross capital inflows. Similarly, Tunio (2022), using monthly data for the period 1990-2022 for 19 EMEs, finds that sudden stops are largely driven by exogenous factors. Moreover, inflationary pressures caused by rising commodity prices due to the Russian-Ukrainian war, current account deficits caused by rising import costs, and weakening external financing opportunities due to increasing uncertainty and slowdown signals in the global economy are the main risk factors likely to trigger sudden stops in capital inflows in these countries.

Many studies in the literature on sudden stops have questioned the main determinants of sudden stops by taking into account the volatility of different types of capital flows. These studies have generally found that portfolio type investments (especially portfolio debt investments) and other short-term speculative investments other than long-term FDI are highly volatile and carry the risk of sudden reversal and are much more likely to cause a sudden stop (Rodrik and Velasco; 1999, Sula and Willet, 2009; Sula, 2010; Agosin and Huaita, 2012; Levchenko and Mauro, 2007).[6] Eguren-Martin et al. (2021) conducted a study to examine the factors affecting various private capital inflows in emerging market economies. They use quantile regression analysis and find that global push factors have no impact on gross FDI inflows. However, they found that sudden stops in gross portfolio inflows are more likely to be caused by changes

5) Another finding that contagion effects increase the probability of sudden stops is from Agosin and Huaita (2012). Their analysis shows that international contagion increases the probability of a sudden stop by approximately 3%.

6) Levchenko and Mauro (2007) find that although the volatility of portfolio equity flows is relatively high, they have limited effects during sudden stops and are mostly stable during sudden stops.

in global conditions. On the other hand, analysis suggests that local conditions drive sudden stop risk in gross other investment inflows.

III. Global and Country-specific Determinants of Sudden Stops

A. Data set and methodology

Following Forbes and Warnock (2012), we estimate a complementary logarithmic (cloglog) model to investigate the global and country-specific determinants of sudden stops in gross total capital inflows and their different components. In this framework, the relationship between the probability of a sudden stop and several global and domestic factors is analyzed using a cloglog model. The variables related to potential global factors that may lead to sudden stops in foreign capital recipient countries and potential pull factors indicating the domestic economic fundamentals of countries and explanations for these variables are presented in online Appendix A Table A1.

Since sudden stops in capital inflows are rare events that are not encountered very often, the analysis method is considered to be a highly appropriate and effective method for analyzing data that are asymmetric around zero and highly skewed. In this framework, the estimated model is as follows;

$$\Pr(SS) = F\left(A_K^{'} X_{i,t-1}^{Global},\ A_y^{'} X_{i,t-1}^{Domestic}, A_B^{'} X_{i,t-1}^{Contagion}\right) \tag{1}$$

SS is a binary variable that takes 1 if country i faces a sudden stop event at time t and 0 otherwise. Also, $X_{i,t-1}^{Global}$, $X_{i,t-1}^{Domestic}$, $X_{i,t-1}^{Contagion}$ are vectors of global, local and contagion variables respectively. Since sudden stop events occur irregularly, the distribution of F(.) is likely to be asymmetric. Therefore, Equation 1 is estimated with a complementary logarithmic model that assumes that the cumulative distribution function of the extreme value distribution is F(.). In Equation 1, the dependent variable is defined as a dummy variable that takes the value 1 in periods when sudden stops occur at time t and 0 otherwise. Following the methodology of Forbes and Warnock (2012), this variable denotes 7 different dummy variables that define the periods in which sudden stop events are detected for 7 different components of gross capital inflows and each of them is included in the analysis and estimated separately.

$$C_t = \sum_{i=0}^{3} GINFLOW_{t-i}, \qquad t = 1,2,\ldots,N \tag{2}$$

$$\Delta C_t = C_t - C_{t-4} \qquad t = 1,2,\ldots,N \tag{3}$$

Therefore, our study investigates the probability of sudden stops during periods of excessive increases in capital inflows by taking into account the periods of excessive increases in certain types of private capital inflows. In the equation above, C_t denotes the cumulative totals of gross capital inflows for the last 4 quarters and this calculation gives the cumulative annual gross capital inflows in period t. The next step is to calculate the year-on-year change in C_t (ΔC_t) relative to the same quarter of the previous period. At this stage, in order to identify sudden stops, the moving average (μ) and standard deviation (σ) of ΔC_t for the last 5 years should be calculated. As a result of the calculation, a sudden stop event starts when the change (ΔC_t) is 1 standard deviation below its mean, provided that it is 2 standard deviations below its mean, and ends when it is no longer at least 1 standard deviation below its mean.

Moreover, the literature shows that excessive increases in capital inflows can have significant effects in causing sudden stops (Sula, 2010; Agosin and Huaita, 2012; Efremidze et al., 2017). In this framework, our study investigates the probability of sudden stops of excessive increases in capital inflows by taking into account the periods of excessive increases in certain types of private capital inflows. Accordingly, the calculation of periods of excessive increases can be expressed as the reverse of the methodology followed for sudden stops, although the initial phase remains unchanged.

As a result of the calculations made within this framework, the determination of the sudden stop periods arising from gross total capital and their main components are presented in Table A2, Table A3 and Table A4 in online Appendix A.

The heterogeneity of international capital flows to EMEs leads to a differentiation in the determinants of sudden stops in capital inflows. In our study which investigates the determinants of the probability of sudden stops, the distinction between net and gross capital flows should also be considered. A large body of empirical evidence suggests that global developments have a greater impact on the occurrence of extreme periods caused by gross capital flows rather than net flows (Forbes and Warnock, 2021; Calderon and Kubota, 2013; Furceri et al., 2012).

B. Empirical results

Country-specific variables such as the level of trade openness, liability dollarization and political risk index, which are theoretically argued to have significant effects on the occurrence of sudden stops due to capital inflows and have been partially taken into account in the recent empirical literature, are included in the analysis respectively and checked whether there is a significant change in the analysis findings. These variables are included individually to overcome endogeneity or multicollinearity problems. Moreover, the possible effects of fluctuations in global commodity prices, which have been largely neglected in most of the recent empirical studies on sudden stops in EMEs, are investigated for different types of gross capital inflows.

Therefore, these variables in the analysis are of great importance in terms of investigating the relative roles of recent developments with global implications in the occurrence of sudden stops in the case of EMEs.

Initially, the main determinants of sudden stop events stemming from gross aggregate capital inflows were investigated by including different domestic variables in the analysis (online Appendix A. Table A6). The results obtained in this respect suggest that in addition to global factors and regional contagion effects, domestic factors also have significant effects on sudden stop events. Accordingly, it has been concluded that high global interest rates and a rise in the risk-averse behavior of foreign investors are significant factors that increase the likelihood of sudden stops in EMEs. Conversely, an increase in global liquidity has a substantial impact on reducing the risk of sudden stops in EMEs. The findings of the analysis suggest that the most important global variable that may affect the risk of sudden stops in aggregate gross capital inflows is the developments in the VIX index. In this framework, the findings that increases in the VIX index and contagion effects increase the risk of sudden stops in gross capital inflows are consistent with Forbes and Warnock (2012), Calderon and Kubota (2013), Eichengreen and Gupta (2016) and Emter (2020). Moreover, country-specific factors such as rapid increases in domestic inflation rates and domestic credit growth trigger sudden stops in EMEs by causing macroeconomic and financial instability.

Among the alternative definitions of capital inflows, it is of great importance to reveal the effects of global and domestic factors on the possibility of sudden stops in gross debt-based (FDI + portfolio equity-based) and gross equity-based (portfolio debt-based + other investment inflows) capital inflows to EMEs (online Appendix A. Table A6). Several studies in the literature have found empirical evidence that debt-based capital inflows are more likely to be exposed to sudden stop events under the influence of global factors than equity-based capital inflows. These studies include Forbes ve Warnock, (2012), Forbes ve Warnock, (2021), Emter, (2020) and Milesi-Feretti ve Tille, (2011). In this framework, the estimation results suggest that the rapid growth in domestic credit supply and the overvaluation of the real exchange rate are domestic factors that increase the probability of a sudden stop in gross equity-based inflows. Global factors, on the other hand, are found to be extremely limited in causing sudden stops in these capital inflows. Accordingly, only rises in the VIX index are strongly associated with sudden stops in equity-based inflows. The estimation results for alternative regression models show similar results, but increases in liability dollarization are also found to positively affect the risk of sudden stops.

On the other hand, the estimation results of the first model show that growth in domestic credit supply and increases in domestic inflation rates and increases in the VIX index among global factors have positive effects on the risk of sudden stop due to gross debt-based inflows. In alternative regression models, the estimation difference becomes evident in the third model

that includes the political risk index. As the real exchange rate depreciation expectation increases, the risk of sudden stops also increases. Moreover, among global factors, increases in the volume of global liquidity and commodity prices are found to reduce the risk of sudden stops in gross debt-based capital inflows. Contagion effects are found to be effective in large-scale contractions in both gross equity-based and gross debt-based capital inflows for all alternative cases (Table A6).

The analysis findings for different types of components of gross total capital inflows are presented in online Appendix A. Table A7. In this framework, firstly, when the findings on gross FDI inflows are evaluated, it is found that among various country-specific fundamental dynamics, only the overvaluation of the real exchange rate has an impact on the probability of sudden stops. Overvaluation may discourage FDI inflows by making domestic assets and factors of production relatively more costly (Bayoumi et al., 1996). Among global factors, only increases in the VIX index are associated with the risk of sudden stops. It is also concluded that regional contagion effects are also a factor that increases the risk of sudden stops in gross FDI inflows to EMEs. However, country-specific factors lose their significance with the inclusion of the policy risk index in the model. An analysis of the causes of sudden stops in gross total portfolio inflows shows that sudden stops are more likely to occur due to excessive domestic credit supply expansion and high inflation rates. These variables are also important determinants of sudden stops in cross-border investment inflows consisting of bank loans. Therefore, high inflation is an important factor that increases the risk of sudden stops in international capital inflows for EMEs and other developing countries, and this estimation result is consistent with the findings of Li et al. (2018). Moreover, an increase in global interest rates is more likely to cause a sudden stop in gross total portfolio inflows than the other two significant domestic variables (Table A7).

Global liquidity and commodity prices effectively reduce risk of sudden stops in EME banking inflows.[7] However, increases in global risk and uncertainty adversely affect cross-border banking inflows to EMEs. Similarly, contagion effects are found to be closely related to the sudden stop events caused by other investment inflows. The estimation results obtained by including domestic liability dollarization in the analysis reveal a positive correlation between sudden stops in gross other investment inflows and the degree of dollarization of the domestic economy. This positive relationship is consistent with the findings of Cavallo and Frankel (2008), Bordo et al. (2010), Calvo et al. (2004), Jeanne and Ranciere (2006) and Guidotti et al. (2004) In the third model, which includes the political risk index, in addition to the other variables, changes in global interest rates are also found to increase the incidence of sudden stops due to gross other investment inflows. Finally, large flows of bank flows to EMEs significantly increase the likelihood of sudden stops. The results of the analysis that excessive increases

7) The idea that rising global commodity prices may have positive repercussions for commodity importers in the long run is also supported by the empirical findings of some studies (see Iwaisako and Li, 2019).

in short-term capital inflows lead to sudden stops (see Table 7) are in line with the studies of Sula (2010), Agosin and Huaita (2012) and Efremidze et al. (2017).

In order to fully identify the factors that cause sudden and large contractions in gross aggregate portfolio inflows to EMEs, the estimation results for their components, gross portfolio equity and portfolio debt-based inflows, which are not homogeneous in many respects, should also be taken into account. Indeed, Table A8 shows that domestic factors such as improvements in the current account and greater openness to trade can reduce the likelihood of sudden stops due to portfolio equity inflows. This finding is consistent with results from previous studies, including Cavallo and Frankel (2004, 2008), Calvo et al. (2004), Edwards (2004), Bordo et al. (2010) and Li et al. (2018). However, increased global interest rates and commodity prices raise the risk of sudden stops in portfolio equity inflows to EMEs. Increases in the global growth rate significantly reduce the probability of a sudden stop in portfolio equity inflows to EMEs. These results are consistent with the estimation results of Forbes and Warnock (2012) and Cerutti et al. (2017). In addition, we find that excessive growth in portfolio equity inflows leads to sudden stops.

On the other hand, domestic factors such as overvaluation of the real exchange rate and increases in domestic credit growth rates may lead to sudden stops in gross portfolio debt inflows. The finding of a positive correlation between economic downturns and rapid expansion in domestic credit supply is supported by several studies (see Li and others (2018), Gourinchas and Obstfeld (2012), Calderon and Kubota (2013), Emter (2020), Eichengreen and Gupta (2016) and Eichengreen and others (2008). This positive relationship between the real effective exchange rate and the risk of sudden stops is consistent with the findings of Jeanne and Ranciere (2006) and Gourinchas and Obstfeld (2012). Accordingly, the estimation results for the first regression model suggest that developments in domestic factors are relatively more influential in the sudden stops in gross portfolio debt inflows to the EMEs. Contagion effects are found to be positive and highly significant for both types of capital inflows. In the second model, in which domestic liability dollarization is included for sudden stops in gross portfolio debt inflows, the estimation results suggest that country-specific factors remain relatively important. The positive relationship between increases in liability dollarization and the risk of sudden stops is in line with the findings of Agosin and Huaita (2012), Calvo, Izquierdo and Mejia, (2004), Calvo, Izquierdo and Mejia, (2008), Cavallo and Frankel (2008). Finally, in the third model where the institutional quality variable is included, it is found that the only local variable that increases the probability of portfolio debt-based sudden stops is the increase in domestic credit growth rates (Table A8).

As a matter of fact, Table 1 below is a summary table of Table A6, Table A7 and Table A8, which present the findings of the complementary logarithmic model analysis on the main determinants of sudden stops in different types of gross capital inflows.

Table 1. *Fundamental Analysis Findings on the Factors Determining Sudden Stops in Different Types of Gross Capital Inflows*

Variables	Gross Total Capital				Gross FDI				Gross Total Portfolio				Gross Portfolio Equity				Gross Portfolio Debt				Gross Other Investments				Gross Equity Based				Gross Debt Based			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Variables Related to Domestic Economy																																
Real GDP Growth Rate																																
International Reserves (as a share of GDP)																																
Loans to the Private Sector (as a share of GDP)	✓	✓	✓	✓					✓	✓	✓	✓					✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Public Debt (as a share of GDP)																																
Inflation Rate (CPI)	✓	✓	✓	✓					✓	✓	✓	✓				✓					✓	✓	✓	✓					✓	✓	✓	✓
Trade Openness													✓																			
Current Account Balance (as a share of GDP)	✓												✓	✓	✓	✓																
Real Effective Exchange Rate					✓	✓											✓	✓							✓	✓					✓	
Liability Dollarization																		✓				✓				✓						
Political Risk Index - Corporate Quality (ICRG)															✓																	
Global Variables																																
VIX (Log)	✓	✓	✓		✓	✓	✓	✓													✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Global Interest Rate (Long Term)	✓	✓	✓	✓					✓	✓	✓		✓	✓	✓							✓	✓									✓
Global Growth Rate (Percent Change)													✓	✓	✓	✓																
Commodity Prices (Percentage Change)													✓		✓	✓					✓	✓	✓	✓								✓
Global Liquidity (Percentage Change)	✓	✓	✓	✓																	✓		✓	✓					✓		✓	✓
Contagion Effects																																
Geographic Contagion	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Excessive Capital Inflows (Surge)																✓								✓								

Note. 1, 2, 3 and 4 respectively TA in the table: Trade openness, DLD: Liability dollarization, ICRG: Average of political risk indicators represent.

While this study examines the impact of global and domestic factors on the likelihood of sudden stops in various types of capital inflows, it is of great importance to reveal the extent to which a country's political and institutional quality is also influential in sudden stops. For this purpose, the main subcomponents of the political risk index indicator included in the model are also included in the analysis to determine which component has a more significant impact on the risk of sudden stops. However, among the 12 subcomponents of the political risk index, the subcomponents with higher weights than the others are included in the analysis to reveal their relative importance.[8)]

The analysis findings regarding the subcomponents of the political risk index are presented in online Appendix A. Table A9, Table A10 and Table A11. Accordingly, the risk of sudden stops arising from gross total capital inflows decreases in EMEs with stronger legal systems and higher judicial impartiality (Table A9). On the other hand, debt and equity-based inflows respond differently to political and institutional factors. Research findings suggest that a more democratic environment reduces the chances of sudden stops in gross equity-based capital inflows. However, better socioeconomic conditions increase the risk of sudden stops. The other indicators are not statistically significant. However, none of the subcomponents of political risk and institutional quality indicators are found to affect the risk of sudden stops due to gross debt-based capital inflows (Table A9).

There is no statistically significant effect of any political risk and institutional quality components on sudden stops in gross FDI inflows. The risk of a sudden stop in gross aggregate portfolio inflows is expected to be lower for EMEs with a strong legal system. However, better socioeconomic conditions increase the likelihood of sudden stops in total portfolio inflows. Reduced government instability can decrease the likelihood of sudden stops in gross other investment inflows. However, the other components of political risk and institutional quality do not have a statistically significant effect on sudden stops in gross investment inflows (Table A10).

The risk of sudden stops in gross portfolio equity inflows is found to be lower when better socioeconomic conditions prevail. The results of the estimation show that higher government stability could result in sudden stops of portfolio equity inflows (refer to Table A11). Herrera et al. (2020) argue that developing country governments may delay policies to implement corrective measures, such as attempts to prevent excessive budget deficits and optimal use of international reserves, during economic booms in order to increase their popularity, which may lead to crises. This may be the result of conscious choices made by governments for short-term political rent-seeking. In fact, in their empirical study covering the period from 1990 to 2004, the authors found that government stability increased the likelihood of a sudden stop.

8) Since some of the sub-components with higher weights are statistically insignificant and affect the significance of other variables, they were excluded from the model.

Table 2. *Fundamental Analysis Findings on the Factors Determining Sudden Stops in Different Types of Gross Capital Inflows (Political Risk Components)*

Variables	Gross Total Capital		Gross FDI		Gross Total Portfolio		Gross Portfolio Equity		Gross Portfolio Debt		Gross Other Investments		Gross Equity Based		Gross Debt Based	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Variables Related to Domestic Economy																
Real GDP Growth Rate																
International Reserves (as a share of GDP)												✓				
Loans to the Private Sector (as a share of GDP)	✓	✓			✓	✓			✓	✓	✓		✓	✓	✓	✓
Public Debt (as a share of GDP)												✓				
Inflation Rate (CPI)	✓	✓			✓	✓					✓				✓	✓
Trade Openness																
Current Account Balance (as a share of GDP)	✓	✓			✓	✓	✓	✓				✓	✓	✓		
Real Effective Exchange Rate			✓	✓						✓			✓	✓		
Liability Dollarization												✓		✓		
Political Risk Components																
Government Stability							✓	✓	✓	✓	✓		✓			
Socioeconomic Conditions	✓	✓			✓	✓			✓	✓						
Investment Profile												✓				
Democratic Accountability	✓	✓			✓	✓			✓	✓			✓	✓		
Law and Order	✓	✓			✓	✓			✓	✓						
Global Variables																
VIX (Log)			✓	✓							✓	✓	✓	✓	✓	
Global Interest Rate (Long Term)	✓	✓			✓	✓			✓	✓	✓	✓				
Global Growth Rate (Percent Change)							✓	✓								
Commodity Prices (Percentage Change)							✓	✓			✓	✓				
Global Liquidity (Percentage Change)							✓	✓	✓	✓	✓					
Contagion Effects																
Geographic Contagion	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note. 1 and 2 respectively TA in the table: Trade openness, DLD: Liability dollarization represent.

On the other hand, we find that the risk of sudden stops in gross portfolio debt inflows is lower in EMEs with greater government stability, a more democratic environment, as well as a fairer judicial system that guarantees legal rights and freedoms (Table A11). However, we find that better socioeconomic conditions can lead to sudden and large contractions in gross total capital inflows. This may be due to the possibility of a sudden stop in later periods when other political factors are relatively better and stronger, as the EMEs with these characteristics attract more portfolio investments. Each of these subcomponents in the model is included in the analysis with a one-quarter lag. Hence, higher capital inflows may lead to serious macroeconomic imbalances in later periods (Table A9, A10, and A11).

In this framework, Table 2 below is a summary table of Table A9, Table A10 and Table A11, which presents the findings of the complementary logarithmic model analysis on the main determinants of sudden stops in different types of gross capital inflows when political risk components are included.

IV. Macroeconomic and Financial Impacts of Sudden Stops

Many pioneering studies in the sudden stop literature have investigated not only the causes of sudden stops but also their effects on key macroeconomic variables. For example, Calvo (1998) and Calvo and Reinhart (2000) argue that sudden stops can lead to financial crises and cause large contractions in output. On the other hand, a sudden stop crisis leads to capital account reversals and an excessive rise in nominal exchange rates, which leads to a currency crisis. Indeed, these effects triggered by sudden stops are widely supported by the empirical literature (see Calvo et al., 2003; Calvo et al., 2004; Edward, 2005).

The extent to which changes in the level of exports and imports have an impact on the reversals in the current account due to sudden stop events is an important issue. Guidotti et al. (2004), in their study on Latin American and Asian economies, found that current account adjustments in economies with higher trade openness are realized with higher export increases compared to closed economies. Hutchison and Noy (2006), in their study covering the 1975-2002 period for 24 EMEs, find that investment and imports show a large collapse during the sudden stop period and that this contraction continues for the first year after the sudden stop. On the other hand, they found that exports increased significantly both during and after the sudden stop crisis. Similarly, Mendoza (2010) finds that during the sudden stop periods between 1970 and 2006, there were increases in net exports and reversals in the current account. Smit et al. (2014), one of the single-country (South Africa) studies in the sudden stop literature, reached similar results. Smit et al. (2014) conclude that the sudden stop in foreign capital inflows led to reversals in current account deficits due to significant contractions in imports rather than

expansions in exports during the adjustment period. Bianchi and Mendoza (2020), on the other hand, find that sudden stops lead to current account reversals of about 3.7% of GDP. However, there are also studies in the literature on the possible macroeconomic effects of sudden stops for the EMEs that empirically reveal the contraction in the level of output caused by sudden stops (see Calvo et al. 2006; Cowan and Raddatz, 2013; Eichengreen et al., 2016; Agosin et al., 2019; Bachmann and Leist, 2013; Mendoza, 2010).

Empirical studies reveal the main characteristics of sudden stops in emerging markets and other developing economies in terms of their impact on macroeconomic and financial variables (see Korinek and Mendoza, 2014; Curdia, 2007; Hutchison and Noy, 2006) and find empirical evidence that sudden stop events have both macroeconomic and financial impacts (see Joyce and Nabar, 2009; Ma et al, 2020; Eichengreen and Gupta, 2016; Smit et al, 2014; Mendoza, 2010; Bianchi and Mendoza, 2020; Cavallo et al, 2015; Guo et al, 2020). However, it is important to analyze the extent to which the size and direction of these effects will change given the sudden stops caused by different types of capital inflows. Indeed, empirical studies investigating sudden stops in international capital inflows to EMEs generally employ an event study approach, fixed effect panel data analysis or GMM analysis techniques.[9] However, this leads to the neglect of the details on how macroeconomic and financial variables will react to sudden stop events over a certain period of time and how long these reactions will continue. For this reason, the structural VAR analysis technique is used in this study in order to take these details into account. Our study focuses on understanding the impact of sudden stops in gross capital inflows on both the real and financial sectors. We aim to answer two main questions: How and to what extent do sudden stop shocks affect these sectors? Moreover, do the effects of these shocks differ depending on the type of capital inflow?

A. Methodology and data set

Our analysis is based on the Structural VAR method. In this framework, the analysis takes into account sudden stops in capital inflows from foreigners in the form of equity and debt as well as sudden stops in total capital inflows including both equity and debt. In addition, the selected macroeconomic and financial variables are foreign reserves excluding gold (% of GDP), domestic real policy interest rate (inflation-differenced -CPI-based), real effective exchange rate, domestic credit to the private sector (% of GDP), domestic fixed capital investment (% of GDP), household consumption expenditure (% of GDP), net exports (the ratio of the difference between exports and imports of goods to GDP), real GDP and current account balance (% of GDP).[10] These variables are widely considered in the related literature

9) For multi-country studies, see Bianchi and Mendoza (2020), Joyce and Nabar, (2009), Ma et al. (2020), Cavallo et al. (2015), Guo et al. (2020) Mendoza (2010), Emara et al. (2018), Korinek and Mendoza (2014).

to investigate the transmission mechanism and the effects of sudden stop shocks on real variables.

B. Empirical results

The ordering of variables within the framework of structural VAR analysis is generally based on economic theory, relevant literature and stylized facts. In particular, the existence of sudden stop shocks stemming from exogenous factors requires that sudden stop periods stemming from different types of capital inflows should take the first place in the matrix form. In this case, it is assumed that the sudden stop events related to various types of gross capital inflows affect other macroeconomic and financial variables in the model but are not affected by developments in the local economy.

Sudden stops in capital inflows can be met by a contraction in the current account deficit or the utilization of international reserves (Calvo and Reinhart, 1999). Considering the initial reactions of countries in the form of changing their international reserves due to sudden stops, it is appropriate to place this variable in second place. Accordingly, Figure 1 in online Appendix A.[11] indicates that international reserves are spent during sudden stops in aggregate capital inflows. However, the largest lagged response to reversals in foreign capital inflows is observed only in the 6th period with a decreasing negative sign. After this period, the responses of changes in international reserves to sudden stops are statistically weak or insignificant. These findings are generally consistent with those of Jeanne and Ranciere (2011), Jeanne (2007) Eichengreen et al. (2008), Shousha (2017), Efremidze et al. (2019). However, the findings of the analysis indicate that the policy rate responses to the sudden stop shock stemming from gross aggregate capital inflows are not statistically significant in any period.

Balance sheet effects resulting from real exchange rate depreciations accompanying sudden stops and real depreciations due to increases in liability dollarization are factors that can lead to serious financial problems for both the private and public sectors (Calvo et al., 2003). It is appropriate to place the REER variable fourth, considering the domestic macro-financial effects of changes in the value of the national currency due to the decline in large capital inflows. In this framework, taking into account the effects of sudden stops initially stemming from gross total capital inflows, it is found that the REER responds to sudden stop shocks in a downward direction, especially in the short run. These findings are in line with the results of Bianchi and Mendoza (2020), Mendoza et al. (2008) and Kehoe and Ruhl (2009). In longer

10) The dataset is available from the authors upon request.

11) The results of the LM test for determining the serial correlation of errors in the model indicate that there is no autocorrelation problem for lag 4 (probability value 0.42). In addition, the fact that the inverse roots of the AR polynomial are distributed in a circle indicates that there is no structural problem in terms of the model in general.

periods, these responses lose statistical significance.

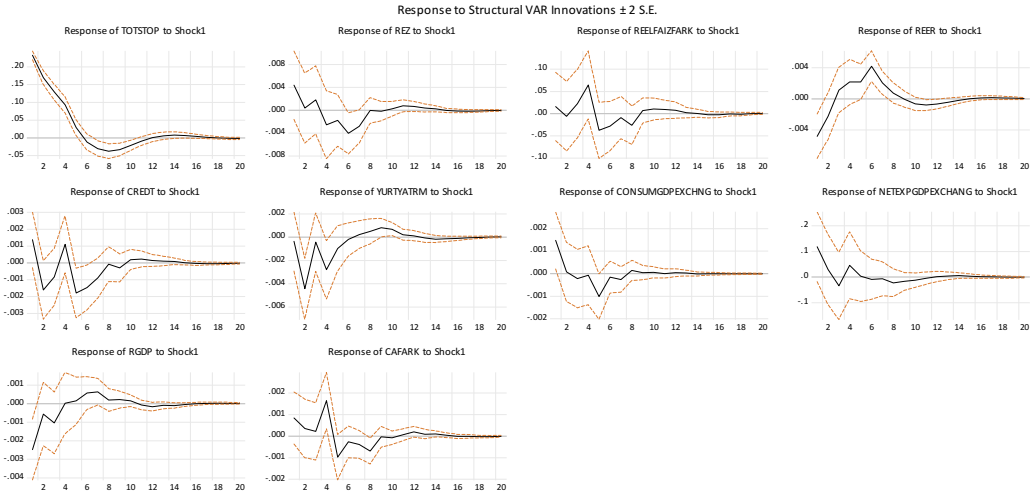
The realization of sudden stops and the emergence of constraints in the access of EMEs to global funds lead to a significant decline in the supply of credit to the private sector. Taking all these effects into account, the fifth variable should be domestic credit. As a matter of fact, Figure 1 in online Appendix A. shows that the volume of domestic credit to the private sector responds negatively to the sudden stop shock in the second period. However, this effect is of marginal statistical significance. Moreover, the largest negative response is found in the 5th period.[12)]

Considering the effects of contractions in domestic credit supply due to sudden stops on investment volume, consumption and output level (Curdia, 2007), domestic fixed capital investments, domestic consumption expenditures and real GDP variables should be ranked sixth, seventh and eighth, respectively. Indeed, as shown in Figure 1 of online Appendix A. sudden stop events have contractionary effects on domestic investments and consumption expenditures. Moreover, online Appendix A. Figure 1 shows that the real GDP growth rate responds negatively to sudden stop events. Therefore, contractions in domestic investment volume and consumption expenditures appear to be an important factor causing declines in GDP. These findings are consistent with Emara et al. (2018). Joyce and Nabar (2008), Mendoza (2010), Korinek and Mendoza (2014) and Bianchi and Mendoza (2020). It is observed that the current account responds positively to sudden stop shocks originating from total capital inflows in the fourth period. These findings support the studies of Bianchi and Mendoza (2020), Eichengreen et al. (2008), Calvo, Izquerdo and Talvi (2006), Mendoza (2010), Ozkan and Unsal (2010) and Curdia (2007). However, this surplus in the current account balance is not sustainable and although it has a statistically smaller significance, it is observed that negative diminishing returns emerge in the 8th period.

Several studies in the literature have examined the consequences of sudden stops caused by various types of capital inflows, such as portfolio and other investment inflows, excluding FDI. Notable references include Ma et al. (2020), Guo et al. (2020), Cavallo et al. (2015), and Eichengreen and Gupta (2016). These studies primarily focus on the impacts of sudden stops resulting from non-FDI (portfolio and other investment) investment inflows. However, among these studies, Ma et al. (2020), Guo et al. (2020) and Cavallo et al. (2015) investigated the effects of different types of capital inflows on one or more macroeconomic or financial variables. This study, on the other hand, attempts to examine more comprehensively all possible channels of impact on economic variables of sudden stop events arising from both gross equity and gross debt-based capital inflows.

12) Mendoza (2010) theoretically explains the causes of contractions in domestic consumption expenditures, investment and output following sudden stop events under the presence of borrowing constraints and debt deflation through the credit channel.

Figure 1. Macroeconomic and financial impacts of sudden stop events due to gross total capital inflows

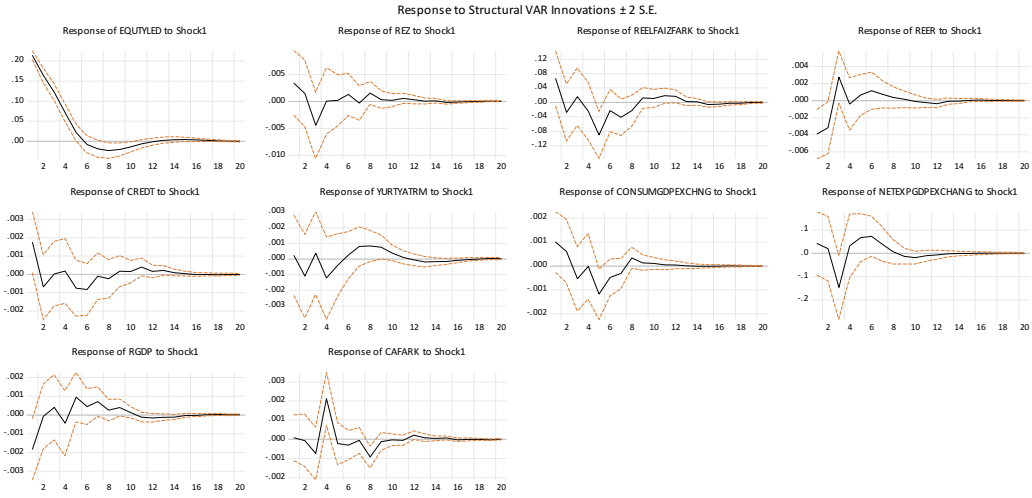


Note. TOTSTOP denotes sudden stops in gross total capital inflows, REZ: International reserves, REELFAIZFARK: domestic real policy interest rate, REER: Real effective exchange rate, CREDT: Domestic loans to the private sector, YURTYATRM: Domestic fixed capital investments, COMSUMGDPEXCHG: Household consumption expenditures, NETEXEXPGDPEXCHANG: Net exports, RGDP: Real GDP, CAFARK: Current account balance (first differenced variable).

According to the findings of the analysis, changes in international reserves in response to sudden stops in gross equity-based capital inflows are not statistically significant (online Appendix A. Figure 2). On the other hand, the real effective exchange rate responds negatively to the sudden stop shock in the first two periods and domestic credit volume responds positively in the first period. These responses lose statistical significance in subsequent periods.

While the response of domestic investments to the sudden stop shock in equity-based capital inflows is not significant in any period, the response of domestic consumption expenditures to the sudden stop shock is negative and decreasing. The largest response of changes in net exports to the sudden stop shock is negative and statistically significant in the third period. On the other hand, while the real GDP growth rate declined significantly, the current account balance responded positively to the sudden stop shock and the strongest response was observed in the 4th period. These improvements in the current account balance gradually weakened after the 4th period and positive and decreasing responses emerged until the 5th period. On the other hand, it is concluded that negative responses emerged between the 7th and 9th periods.

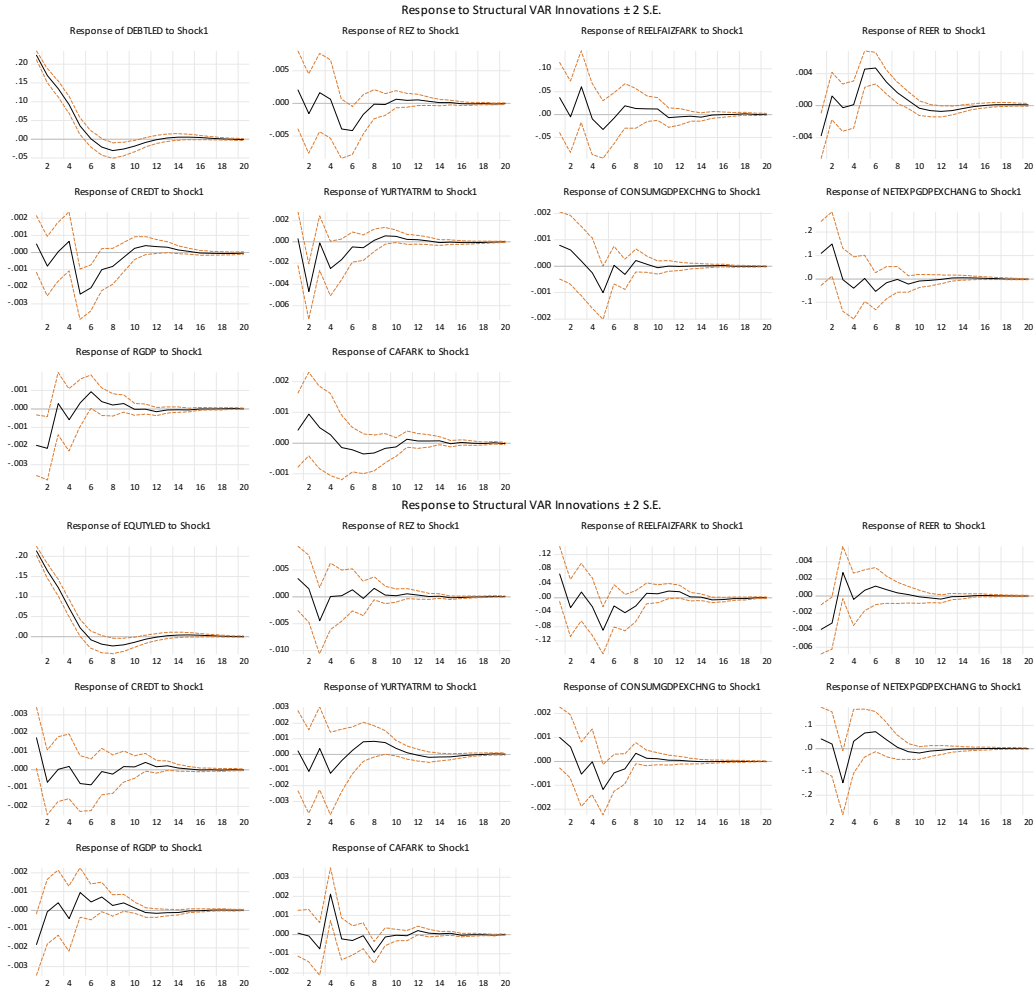
Figure 2. Macroeconomic and financial impacts of sudden stop events due to gross share-based capital inflows



Note. EQUİTYLED denotes sudden stops in equity-based capital inflows, REZ: International reserves, REELFAIZFARK: domestic real policy interest rate, REER: Real effective exchange rate, CREDT: Domestic loans to the private sector, YURTYATRM: Domestic fixed capital investments, COMSUMGDPEXCHG: Household consumption expenditures, NETEXEXPGDPEXCHANG: Net exports, RGDP: Real GDP, CAFARK: Current account balance (first differenced variable)..

On the other hand, the analysis shows that the effects of sudden stops in gross debt-based capital inflows on macro-financial variables are larger and more pronounced (see online Appendix A, Figure 3). Accordingly, international reserves react negatively to the positive sudden stop shock in lagged terms in the sixth period. Between the first and third periods, the REER experiences a negative reaction to a positive sudden stop shock. However, it responds positively with value increases between the fourth and eighth periods. Domestic credit supply reacts negatively and statistically significantly to the positive sudden stop shock between the 4th and 7th periods. The sharpest contraction in the growth rate of domestic investment in response to the sudden stop shock is found in the 2nd period. Moreover, only in the 5th period, domestic consumption expenditures show a negative and decreasing response to the sudden stop shock. However, the statistical significance of this response is quite low. Changes in net exports, on the other hand, are found to be positive and statistically significant only in the 2nd period. On the other hand, the impact of the shock on the real growth rate is negative in periods 1 and 2. However, it is concluded that in the 6th period, when the impact of the shock diminishes, the real growth rate recovers and positive increasing responses emerge. In the long run, the effects of the shock statistically disappear. Finally, the response of the current account balance to the sudden stop shock is not significant in any period.

Figure 3. Macroeconomic and financial impacts of sudden stop events due to gross debt-based capital inflows



Note. DEBTLED denotes sudden stops in debt-based capital inflows, REZ: International reserves, REELFAIZFARK: domestic real policy interest rate, REER: Real effective exchange rate, CREDT: Domestic loans to the private sector, YURTYATRM: Domestic fixed capital investments, COMSUMGDPEXCHG: Household consumption expenditures, NETEXEXPGDPEXCHANG: Net exports, RGDP: Real GDP, CAFARK: Current account balance (first differenced variable).

On the other hand, online Appendix A. Table A13, Table A14 and Table A15 show the results of variance decomposition analysis for sudden stop shocks arising from both total and gross equity and debt-based capital inflows. The variance decomposition analysis findings reveal the effects of sudden stop shocks on the changes in the forecast error variances of domestic variables. In this framework, in order to assess the relative importance of sudden stop shocks for each domestic variable, 20-period average values are calculated. The findings of the analysis reveal that, in general, sudden stop shocks stemming from gross debt-based capital inflows

have a larger negative impact on domestic macroeconomic and financial variables. This supports the hypothesis that the composition of capital flows is important in assessing the economic impact of sudden stop events. Therefore, it can be said that the destabilizing role of sudden stop events driven by changes in gross debt inflows on the overall economy is deeper. These findings are consistent with Cavallo et al. (2015), Guo et al. (2020) and Ma et al. (2020).[13] (Table A13, A14, and A15).

V. Conclusion and Recommendations

This study investigates the global and domestic economic determinants of sudden stops in gross capital inflows using all subcomponents of gross total private capital inflows and other alternative definitions. Thus, the complexity of different types of capital inflows and the interaction of global and domestic factors are more clearly identified. Moreover, the different causes and effects of sudden stops in capital inflows with different characteristics are critical for policymakers to develop and implement appropriate economic policies. In this framework, the analysis reveals that sudden stops in both total and different types of gross capital inflows are sensitive to global financial conditions as well as domestic economic, financial and political developments. Among global factors, we conclude that increases in the VIX index and global interest rates are important developments that increase the probability of a sudden stop. The findings suggest that increases in the VIX index (decreases in risk appetite) are more likely to increase the likelihood of sudden stops, especially for FDI and banking inflows, which are much more volatile types of short-term capital flows.

Among the country-specific variables, increases in domestic credit supply and inflation rate as well as overvaluation of the national currency are found to increase the probability of sudden stops due to their macroeconomic and financial instability deteriorating effects. Increases in liability dollarization, on the other hand, are found to trigger sudden stops especially in short-term capital types. Contagion effects are found to be an extremely important factor that increases the probability of sudden stops for all components of gross capital inflows. Finally, contagion effects and increases in the VIX index are found to be the strongest triggers for sudden stops in gross equity and debt-based capital inflows, while country-specific factors are excessive expansion in domestic credit and increases in inflationary pressures.

Another important contribution of the study to the related literature is to identify how different

13) According to the statistical findings, the impact of sudden stop shocks stemming from gross debt-based capital inflows on fluctuations in domestic credits, real effective exchange rate, real GDP, international reserves and domestic consumption expenditures is higher than other domestic variables. The results of the analysis reveal that the explanatory power of these shocks on the changes in these five variables is 3.25%, 3.15%, 1.88%, 1.37% and 1.33%, respectively.

subcomponents of the index of political risk (ICRG) may affect sudden stops in all types of capital inflows. The estimation results suggest that sudden stops caused by short-term foreign inflows are more sensitive to institutional quality indicators. On the other hand, in the study where the domestic economic effects of sudden stops caused by foreign capital inflows are investigated by SVAR method by taking into account all possible impact channels, the findings of the analysis indicate that sudden stop shocks caused by gross debt-based capital inflows have a larger impact on the domestic economic balance and strengthen the possibility of financial crisis.

As a result, policymakers need to implement appropriate policies for capital inflows with different characteristics to mitigate the adverse effects of sudden stops. To this end, policymakers should use capital controls to reduce the destabilizing effects of large capital inflows and the possibility of sudden stops, macroprudential policies to prevent fluctuations in financial markets and to increase financial regulation and supervision, and monetary and fiscal policies to allocate economic balances. Moreover, policy decisions should be consistent and stable, and investors should be provided with a transparent investment environment. However, it should not be ignored that the success of the implementations may vary depending on the economic and financial structure, institutional development and political conditions of the countries as well as the characteristics of capital flows.

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