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Maria Siranova *(Slovak Academy of Sciences)*
Menbere Workie Tiruneh *(Slovak Academy of Sciences & Webster Vienna Private University)*
Brian Konig *(Slovak Academy of Sciences & University of Economics in Bratislava)*

Website:
https://infer-research.eu/

Contact:
publications@infer.info

From abnormal FDI to a normal driver of sudden stop episodes*

Maria Siranova[†a], Menbere Workie Tiruneh[a,b], and Brian Konig[a,c]

[a]Slovak Academy of Sciences
[b]Webster Vienna Private University
[c]University of Economics in Bratislava

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Abstract

In this paper we study role of 'abnormal FDI' as a potential driver of sudden stops during the 2009-2019 period. The unexplained part of country fixed effects in a bilateral gravity regression is used to calculate the abnormal FDI. We then construct three measures of 'FDI abnormalcy' that assess: i) the possible role of an economy as financial centre or tax haven, ii) the contribution of 'FDI abnormalcy' to total FDI position, and iii) the exposure toward territories considered as tax havens or financial centres. Determinants of sudden stops are analysed by the panel probit model. We find that economies labelled as tax havens or financial centres and economies with comparably higher shares of inward 'abnormal FDI' were associated with a lower incidence of sudden stops. In contrast, the presence of capital inflows linked to tax haven or financial centre territories may increase the likelihood of a sudden stop event.

Keywords: sudden stop, FDI, illicit financial flows, tax havens, international financial centres

JEL Codes: F23, F32, G20, H26

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[†]Corresponding author's address: Institute of Economic Research, Slovak Academy of Sciences, Sancova 56, Bratislava, Slovakia; email: maria.siranova@savba.sk

1 Introduction

Sudden stops are generally considered a policy concern because they often emerge unexpectedly and against the "will" of domestic policy-makers. Therefore, as Edwards (2004) describes them, a sudden stop in capital flows is "an abrupt and major reduction in capital inflows to a country that has been receiving large volumes of foreign capital". In this regard, sudden stops do not reflect a classical portfolio adjustment by economic agents,but rather are a type of financial "decoupling" with multifaceted adverse macroeconomic ramifications. Various studies point out that sudden stops can put downward pressure on the exchange rate (Calvo, 1998; Calvo and Reinhart, 2000; Forbes and Warnock, 2012; Eichengreen and Gupta, 2016), trigger currency and banking crises (de Mello et al., 2012; Calderón and Kubota, 2013), and lead to substantial output loss (Calvo et al., 2006; Edwards, 2007). Other studies show that sudden stops are highly correlated with real estate booms, debt defaults and inflation (Aizenman et al., 2010), with slower economic growth and higher interest rates (Edwards, 2007; Freund and Warnock, 2007).

Among the various determinants of sudden stop episodes, one strand of literature investigates their materialization considering variations in the composition of countries' foreign liabilities, such as FDI, portfolio investment and external debt. It is generally believed that foreign direct investment is predominantly a long-term investment and, as such, is less prone to short-term speculative financial swings (Eichengreen et al., 2008; Cardarelli et al., 2010; Sula and Willett, 2011; Hattari and Rajan, 2011), contrary to higher volatility of portfolio flows Forbes and Warnock (2021). According to Levchenko and Mauro (2006), FDI makes the least contribution to sudden stops episodes, while other flows, such as bank loans and trade credit, play a critical role in triggering sudden stops episodes. However, it is mainly advanced economies that benefit from net FDI flows during the balance of payments crisis, while emerging economies experience a larger contraction in their external accounts due to their initially negative net FDI positions (Villalvazo, 2024).

Nevertheless, the extreme financialization of the global economy has not left the (long-term believed) stable nature of FDI unscathed. Few recent studies warn of the grey area associated with FDI financial flows. Ndikumana and Sarr (2019) show that the non-negligible part of foreign direct investment is associated with capital flight. Similarly, Perez et al. (2012) examine the data of emerging economies and conclude that FDI serves as a vehicle to facilitate illicit financial flows. Their findings seem to suggest that a significant level (6–10%) of total FDI outflows, and over 20% of FDI to money-laundering countries from the sample, facilitated illicit money flows. Delatte et al. (2022) ventures even further by estimating that abnormal FDI in tax havens represent 36% of global predicted FDI. Damgaard et al. (2019) indirectly confirms this finding by estimating that phantom investment into corporate shells with no substance and no real links to the local economy may account for almost 40% of global FDI.

Reflecting on the rising role of 'phantom' (Damgaard et al., 2019) or 'abnormal' (Delatte et al., 2022) FDI in international monetary system, this study examines the determinants of sudden stops episodes during the period 2009-2019 focusing on the contributions of abnormal FDI to the likelihood of crisis incidence. Given the above-mentioned adverse consequences of capital flow reversals, our study provides an interesting piece of the puzzle by answering the question about whether the new, potentially 'speculative', nature of FDI can still deliver on the promise of its stabilization properties.

Methodologically, we depart from Delatte et al. (2022) and use gravity panel models in order to build three measures of 'FDI abnormalcy', that i) approximate the role of an economy as a financial centre or tax

haven, ii) indicate the contribution of 'FDI abnormalcy' to the total FDI position, and iii) adjust the value of FDI stock given their exposure toward territories considered as tax havens or financial centres.

Our findings suggest that territories characterized as tax havens or financial centres are associated with a lower probability of sudden stops; that comparably higher share of inward 'abnormal FDI' leads to a lower incidence of sudden stop episodes; and that capital flows linked to tax havens or financial centre territories may increase the likelihood of sudden stops. In the old economic paradigm, the standard policy prescription among developing countries for alleviating the pain of missing economic growth caused by lack of domestic capital formation was to attract the sufficient amount of FDI inflows. Yet, our empirical findings show that policy makers should be made aware of the increasing chance of a sudden dry out of external financing if it is transmitted via countries characterized as tax haven or financial centre territories. On the other hand, accumulation of capital in home economy due to the non-economic factors associated with the role of tax haven or financial centres (secrecy and anonymity) may provide additional unintended protection against sudden stop events.

The remainder of the paper is organized as follows. Section 2 outlines the relevant literature, and Section 3 describes the empirical methodology and introduces our data. The results are reported in Section 4, and Section 5 concludes the paper.

2 Literature Review

The literature investigating determinants of sudden stop episodes usually focuses on the size of financial systems and financial market integration (Forbes and Warnock, 2012), exchange rate regimes Agosin and Huaita (2012), fiscal space and fiscal discipline (Cardarelli et al., 2010; Hutchison et al., 2010) or trade openness (Cavallo and Frankel, 2008; Bordo et al., 2010). The diminishing role of global and regional factors in explaining the extreme movement of capital flows across countries and the rising role of domestic factors, such as economic growth or private debt accumulation has also been recently reported (Forbes and Warnock, 2021; Emter, 2020). With relatively equal probability of experiencing sudden stop episodes in developed and developing countries (Agosin et al., 2019), the real economic impact of such events is reported to be lower in developed countries (Fabiani et al., 2021) and can be magnified by higher capital mobility (Edwards, 2007).

Regarding the role of FDI-related capital inflows and outflows, several contributions has so far been published. Levchenko and Mauro (2006) broadly discuss the key mechanisms of how some foreign liabilities can exert additional pressure on countries' financial vulnerability while others, such as FDI, could help to alleviate potential shocks. In their most recent study, Forbes and Warnock (2021) examine the implications of cross-border portfolio and debt flows on episodes of sudden stops, and conclude that portfolio flows are more volatile compared to debt flows and that the contribution of portfolio flows to episodes of both surges and stops has mainly increased since the outbreak of the Global Financial Crisis. They conclude that foreign direct investment is more stable and is less likely to trigger sudden stops. It is generally believed that foreign direct investment is predominantly a long-term investment and is less prone to short-term speculative financial swings (Sula and Willett, 2011; Cardarelli et al., 2010; Hattari and Rajan, 2011). Estimating the likelihood of sudden stops, albeit based on net capital flows, other studies conclude that FDI makes the least contribution to sudden stops episodes, while other flows (bank loans and trade credit) play a critical role in triggering them (Levchenko and Mauro, 2006).

From a theoretical perspective, in a small open economy model recently developed by Villalvazo (2024) the FDI channel has a meaningful impact on the probability of a sudden stop-induced crisis due to the increased risk of government confiscation primarily in emerging economies. Emerging economies also tend to be characterised by persistently negative net FDI positions, which may not be used as a buffer in the event of sudden capital outflows as in the case of developed countries, which are characterised by almost fully balanced FDI positions.

However, as rightly argued in Sula and Willett (2011), while the physical infrastructure aspect of FDI is less likely to be reversed during a financial crisis, "the flow of funds" can change its course. This corroborates previous theoretical underpinnings regarding the "tricky" nature of FDI. Previous studies, such as Bank (2000), for instance, show the peculiarity and lack of clarity of financial flows that are associated with FDI. As argued, there are several channels through which FDI, if not triggered by directly, can certainly contribute to increasing the likelihood of financial vulnerability to the host economy. First, investors, while keeping their physical assets intact, can nonetheless worsen the financial vulnerability of a host economy by moving their profit remittances, which are not officially categorized as FDI, out of the host economy or reducing the liabilities of their affiliates towards mother companies (Bank, 2000; Sula and Willett, 2011). This seems to suggest that FDI can elevate financial vulnerability by disguising other types of flows. As emphasized by Bank (2000) and broadly discussed in Sula and Willett (2011), flows can be recorded in receiving countries as FDI but exit under different accounts. Furthermore, if FDI has been financed from a host country's banking system, for instance using its collateral to secure banks loans, it can eventually create outflows recorded as portfolio or bank lending, accelerating the financial vulnerability of the host economy (Bird and Rajan, 2002).

The diverse nature of FDI flows has been long studied. However, their link to tax optimization behaviour of private economic agents and associated illicit financial flows has been only recently recognized. Jones and Temouri (2016) incorporated for the first time the tax optimization strategy into the FSA-CSA framework describing the key determinants of FDI according to the internationalization theory. In their framework, MNEs engages in setting-up subsidiaries in tax haven countries because the host country specific advantage of zero tax rates together with high degrees of secrecy in tax havens proves highly attractive. According to Madrueño et al. (2022), the 'phantom' FDIs (Damgaard et al., 2019) are strongly associated with international trade, quality and effectiveness of governance approximated by rule of law, and tax environment. As such, they reflect flows that corporate shells established to avoid paying taxes in host countries. Various forms of illicit activities can therefore be associated either with the profit (income) shifting incentives by multinational companies for tax "optimization" purposes or due to an outright conduit to hide wealth in tax havens (offshore) in exchange for secrecy and anonymity. In conceptual framework developed by Hampton and Levi (1999), this element is referred to as "secrecy space".

Lastly, the sizeable part of the FDI may not be even foreign by its nature, if the round-tripping phenomenon is suspected to take place. In its simplest form, the round-tripping characterizes a situation where an outward FDI returns back to the country of its origin in order to gain more favorable tax treatment (Jones and Temouri, 2016). Anecdotal evidence from China (Xiao, 2004) or Russia (Karhunen et al., 2021) suggests that while capital is being routed outside of a domestic territory in order to bypass capital controls, to diversify domestic risks or to simply seek better investment opportunities, it often finds its way back disguised as a 'foreign' investment by utilizing various fiscal schemes that promote inflow of such a capital. Aykut et al.

(2017) estimate that round-tripping represents from 10 to 50% of FDI activities from emerging economies. Offshore financial centres or other special territories are usually at the heart of these structures. Haberly and Wojcik (2015) and Perez et al. (2012) estimate that at least 30% of global FDI stock is intermediated through tax havens.

3 Methodology

3.1 Gravity regression and 'abnormal FDI'

For analysing abnormal foreign direct flows (FDI), we adopt a two stages gravity procedure used by Delatte et al. (2022), initially developed by Head and Ries (2008), that is based on the gravity framework of bilateral FDI flows. We assess the country-specific unexplained part of investment stock as a measure of speculative bilateral investments (Delatte et al. (2022)). Originally, gravity models were developed to analyse the bilateral trade of goods among particular countries (Tinbergen, 1962; Anderson, 1979; Bergstrand, 1985; Anderson and van Wincoop, 2003). Later, gravity models were extended to capture various areas of research where interactions between two or more places were analysed (migration, tourism, financial flows, etc.). Explanations of bilateral financial transactions through the gravity framework are currently well documented in several studies (Martin and Rey, 2004; Head and Ries, 2008; Head and Mayer, 2014; Brei and von Peter, 2018; Delatte et al., 2022).

This approach allows us to differentiate between FDI determined by economic, historical, cultural and geographical factors and between FDI generated by more speculative activity driven by country-specific determinants, such as low taxation and low environment transparency. In the first step, investment stock is assessed on the time-varying fixed effects of origin and destination country and on a vector of bilateral factors:[1]

$$lnFDI_{ijt} = \lambda_{it} + \lambda_{jt} + \beta X_{ijt} + \delta Z_{ij} + \epsilon_{ijt} \tag{1}$$

where $lnFDI_{ijt}$ represents the log of bilateral FDI stock, λ_{it} and λ_{jt} are country-specific time-varying fixed effects of the origin and destination country, vectors X_{ijt} and δZ_{ij} represent a set of regressors covering mainly geographical, cultural and historical factors, as suggested by Delatte et al. (2022), that are either time-invariant or are of a slow-moving nature: log of bilateral distance, common language, common borders, common currency, the existence of a colonial relationship, tax treaty, regional trade agreement and EU membership, ϵ_{ijt} is a bilateral error term. Following the recommendation by Yotov et al. (2016), we use exporter-time and importer-time fixed effects to properly account for multilateral resistance terms in panel data gravity estimations.

In the second step, we focus on the estimates of country-specific investment stock associated with speculative motives as it is used in Delatte et al. (2022). We regress time-varying country-specific fixed effects of origin and destination country λ_{it}, λ_{jt} estimated in the first stage on the country-specific characteristics. This approach allows us to assess the country-specific residuals ϵ_{it} and ϵ_{jt} related to the speculative part of FDI. The second step equations are as follows:

[1]For OLS model we used reghdfe package by Correia (2014)

$$\lambda_{it} = \alpha_1 Z_{it} + \alpha_2 \overline{\mathrm{X}}_{it} + u_{it} \tag{2}$$

$$\lambda_{jt} = \alpha_1 Z_{jt} + \alpha_2 \overline{\mathrm{X}}_{jt} + u_{jt} \tag{3}$$

where Z_{it}, Z_{jt} are country-time varying covariates: log of current GDP, log of population, the rule of law, corporate tax rate, political stability and absence of violence, regulatory quality, control of corruption, voice and accountability, days required to start a business and number of procedures to start a business; and are error terms related to measuring speculative investments; $\overline{\mathrm{X}}_{it}$ and $\overline{\mathrm{X}}_{jt}$ represents the averages of bilateral characteristics of countries i and j included in $\mathrm{X_{ijt}}$. They are calculated as follows:

$$\overline{\mathrm{X}}_{it} = \sum_{j=1} \overline{\mathrm{X}}_{ijt} / N_j. \tag{4}$$

We do not use lagged values of most of the variables, as they are either time-invariant (e.g., gravity variables), or are slow-moving due to their nature (e.g., world governance indicators), similar to Mercado (2020).

3.2 Expanded gravity regression specification

The baseline specification used by Delatte et al. (2022) incorporates only the 'Rule of Law' as a proxy variable for quality of institutions and possibility to engage in 'institutional arbitrage' (Jones and Temouri, 2016). In particular, their approach specifically refrains from inclusion of the tax variable as its presence would deny the unfair tax competition and fiscal opacity. However, while a stronger rule of law is likely to attract inward real FDI, it is more likely that firms in countries with weaker institutions may engage in round trip investment via tax havens, whether for purposes of tax evasion or institutional arbitrage (Haberly and Wojcik, 2015). Additionally, tax havens are not only characterised by low (often zero) rates of corporate income taxation but also a high degree of secrecy (Jones and Temouri, 2016). One can therefore hypothesise that three key elements are simultaneously at play when discussing tax havens or offshore financial centres: institutional quality, tax rates, and level of secrecy.

Since our baseline specification strictly follows the one used by Delatte et al. (2022), in the expanded specification we add corporate tax rate as one additional control variable (CTR). The second expanded specification incorporates several factors often associated with quality of regulatory and business environment in a country (RBE). Thus, by controlling for specific elements of tax havens/offshore financial centres we not only test the robustness of our results, but also potentially indirectly identify those traits (lack of) that are more likely to be responsible for existing link between our measures and sudden stop episodes. Alternatively, after controlling for the 'usual suspects', the existence of the association between sudden stops and our measures can be attributed to the third element, financial secrecy, as the defining trait of these countries.[2]

It is necessary to note that positive regulatory and tax characteristics are neither necessary nor sufficient to attract nonresident business Pogliani and Wooldridge (2022). Financial centers and tax havens are

[2]According to our knowledge, the only database that provides empirical estimates of financial secrecy on a global scale is the Financial Secrecy Index compiled by the Tax Justice Network. However, the dataset is highly unbalanced with many of the territories being included only for the most recent rounds.

highly heterogeneous and often specialize on a specific type of financial or other (e.g., consultancy) services. While some of them actively adopt and implement internationally agreed economic and financial standards others are engaged in dubious activities. As an outcome of such a competition as well as specialization the above discussed three key elements can acquire more or less importance in our empirical specification.

3.3 Derived measures of 'FDI abnormalcy'

We calculate several measures linked to the extent of possible 'phantom' FDIs derived from equations [2] and [3]. Our methodology takes advantage of the model by Delatte et al. (2022) who link FDI residuals, among others, from the gravity type of regressions to international investments that follow an economically 'abnormal' pattern. These capital flows are endemic to the current financial landscape that is extensively populated by financial centres and tax haven economies.

Firstly, the residuals of reporter and partner fixed effects derived from the equations [2] and [3] are used to approximate the relative position of a country with respect to its possible role as a financial centre or a tax haven economy.

$$rankw_{i(j)t} = \frac{u_{i(j)t}}{\sum_{i(j)=1}^{I(J)} u_{i(j)t}} \tag{5}$$

The measure of relative position $rankw_{it}$ ranks a country i according to the value of its unexplained, or 'abnormal', FDI asset positions. Such a measure indirectly captures the average tendency of an economy to export abnormal capital to its partners. On the other side, the measure of relative position $rankw_{jt}$ ranks a country j according to value of its unexplained, or 'abnormal', FDI liabilities positions. Such a measure can be viewed in terms of the average tendency of an economy to become a target of abnormal capital deposited by its partners.

There is no a priory expectation whether a financial centre country should score higher in outward w_{it} or inward w_{jt} ranking. Empirically, many of the financial centres serve a double role, being both the target as well as the source of international capital flows.

Secondly, the residuals of reporter and partner fixed effects from the equations [2] and [3] allow us to calculate the relative importance of abnormal FDI on total reported stock of FDI by a particular economy.

$$ranks_{i(j)t} = \frac{N^{j(i)} u_{i(j)t}}{\sum_{j(i)=1}^{J(I)} FDI_{ijt}}, if FDI_{ijt} > 0 \tag{6}$$

A higher share of abnormal assets of total assets, $ranks_{it}$, may indicate a greater proclivity towards the export of capital to economies characterized as tax havens or financial centres. On the other side, a higher share of abnormal liabilities of total reported liabilities, $ranks_{jt}$, could be associated with the tax haven or financial centre role of an economy that now enters the global stage on the receiving side of capital.

Alternatively, the extent of misreporting of external financial positions may reflect often poor quality of external accounts statistics, especially in less developed economies. As Brandt (2022) notes, a higher proportion of both inward and outward FDIs being labelled as 'phantom FDIs' is stronger for low-income countries. If one fixes the $u_{i(j)t}$ in [6], then the misreporting in FDI_{ijt} will result in biased estimates of

$ranks_{i(j)t}$. As it is rational to expect that economic agents under-report rather the over-report their external positions (Pellegrini et al., 2016), comparatively higher $ranks_{i(j)t}$ may also signify a more prevalent issue of statistical inaccuracies in external accounts.

In a similar vein, we calculate the adjusted value of FDI stocks that considers international exposure of a domestic economy towards capital flows into or from financial centres and tax haven economies identified by our $rankw_{i(j)t}$ measure, derived in [5]. The weighted value of FDI stocks is then compared to the reported FDI stocks in the form of a ratio:

$$ratio_{i(j)t} = \frac{\sum_{j(i)=1}^{J(I)} FDI_{ijt} rankw_{j(i)t}}{\sum_{j(i)=1}^{J(I)} FDI_{ijt}} \tag{7}$$

A higher ratio of FDI assets weighted by ranking of a counterparty $rankw_{jt}$ of total assets, $ratio_{it}$, reflects a situation in which a country i exports capital to countries that are more likely to serve as world financial centres or tax havens. However, a higher ratio of FDI liabilities weighted by ranking of a counterparty $rankw_{it}$ of total liabilities, $ratio_{jt}$, could be associated with a situation in which country j receives a significant portion of international capital from financial centres or tax haven economies.

3.4 Probability model

In our approach we use a random effects probit model (Ostrihon, 2022) and provide estimates for both, the unbalanced panel sample (Detken et al., 2014) and the balanced panel.[3]. The random effect is chosen over the fixed effed model given the preference for also including countries that did not experience any crisis during the period under consideration. Disregarding such countries from a sample would reduce the information set as well as produce biased estimates (Caggiano et al., 2016). We do not include time fixed effects, similar to Davis et al. (2016), but we incorporate two global variables that capture a general trend in the world economy instead (oil prices, VIX index as global risk factor).

The baseline model explains the variation in the dependent variable through set of control variables and takes the following form:

$$Prob(event_{it} = 1 | M_{it-1}^{k}, X_{it-1}, \lambda_i) = f(M_{it-1}^{k}\alpha + X_{it-1}\beta + \lambda_i) \tag{8}$$

M_{it-1}^{k} represents $k-th$ measure of FDI 'abnormalcy', X_{it-1} represents the list of other control variables, and λ_i is the country-specific random effect, which is assumed to be normally distributed and independent of all included covariates. Given the probit model framework, the functional form f is derived from the cumulative normal distribution.

In order to maintain consistency, when analysing the impact of the measures of 'FDI abnormalcy' on sudden stops associated with a decrease in inward positions ($event_{it}$), we use indices calculated for a country's external liabilities positions.[4]

[3]We balance our panel out by reducing the number of countries, since the spatial linear panel model is available only for balanced panels

[4]All three measures of 'FDI abnormalcy' can be calculated separately for external assets and liabilities side (see ranking of

Financial crises tend to be imported especially across geographically related areas (Calvo et al., 2008). Sudden stop episodes have also been recently increasingly driven by global factors (Eichengreen and Gupta, 2016). From these reasons, we also produce regressions that account for possible spatial autocorrelation in the dependent variable, i.e. in sudden stop episodes. We employ the spatial auto-regressive linear model (SAR model) with random effects where the autoregressive coefficient estimates the extent of spatial autocorrelation in the dependent variable.[5]

The SAR model is specified as follows:

$$event_{it} = \beta_0 + \rho W_{ij} event_{it} + \alpha M^k_{it-1} + \beta X_{it-1} + \lambda_i + \epsilon_{it} \tag{9}$$

where W_{jk} represents the spatial weights matrix based on geographical distance, M^k_{it-1} represents $k-th$ measure of FDI 'abnormalcy', X_{it-1} represents list of other control variables, and λ_i is the country-specific random effect, which is assumed to be normally distributed and independent of all included covariates.

3.5 Dataset

In the gravity regression models we use the broadest (world) sample, available. The dependent variable, i.e., FDI bilateral asset positions (outward FDI), is gathered from the Coordinated Direct Investment Survey compiled by the International Monetary Fund. The CDIS coverage limits our sample to the 2009-2019 period. The missing data on the assets side are replaced by the information from the mirror position reported by the partner country (inward FDI), similar to Kox and Rojas-Romagosa (2019) and Delatte et al. (2022). The list of control variables in the benchmark regression corresponds to Delatte et al. (2022). The extended regressions incorporate corporate tax rate or the World Governance Indicators as well as measure of number of days and procedures to start a business. Details on the specific sources of the explanatory variables are available in Table A1.

For the sudden stop regression, the dependent variable is gathered from the most updated version of database by Forbes and Warnock (2021). The distribution of sudden stop episodes in the full and balanced sample is provided in Table 1. As apparent, the relative prevalence of crisis events is slightly higher in case of developing countries, but the difference is rather small. Altogether, we report approximately 15% (17%) sudden stop episodes from all country/year observations in full (balanced) sample.

The list of control variables in sudden stop equation broadly corresponds to Agosin et al. (2019), but additionally includes our three distinct measures of FDI 'abnormalcy' in bilateral exposures listed in Section 3.3. We also control for global factors, proxied by global risk aversion as captured by the VIX index and oil prices, similar to Forbes and Warnock (2012); Eichengreen and Gupta (2016); Li et al. (2019).

Details on the specific source of the explanatory variables are available in Table A1.The complete list of countries is available in Appendix.

countries in Table A2. However, in our analysis we focus solely on sudden stop events that, according to the definition that uses gross flows concept, affect liabilities side of external accounts. In our specification, the probability of an event will therefore be conditioned on $rankw_{jt}$ and $ranks_{jt}$. The third measure, $ratio_{jt}$, will use the counter-party $rankw_{it}$ in equation [7] to weight exposure on liabilities side to tax haven or financial centres ranking produced for assets position.

[5] We acknowledge that linear models with binary dependent variables suffer from several disadvantages. However, we are aware of only two applications of spatial panel probability models, Kakamu and Wago (2005) and Baltagi et al. (2018) in particular.

Table 1: Number of sudden stop episodes in the period 2010/2019

		Full sample (50 countries)					
		Developing		Advanced			
		Count	%	Count	%	Total	%
Sudden stops	Crisis	33	18.64	42	13.55	75	15.40
	No crisis	144	81.36	268	86.45	412	84.60
	Total	177		310		487	

		Balanced sample (41 countries)					
		Developing		Advanced			
		Count	%	Count	%	Total	%
Sudden stops	Crisis	32	18.82	37	15.42	69	16.83
	No crisis	138	81.18	203	84.58	341	83.17
	Total	170		240		410	

Notes: List of developed countries according to the IMF definition.

4 Results

4.1 Gravity equation and measures of 'FDI abnormalcy'

In Table [2] we report the estimates of the first-step gravity model parameters specified by [1]. The estimated coefficients are in line with our expectations: bilateral distance is the only factor out of those selected that negatively affects the FDI. All the other factors increase the bilateral investment stock, mainly EU membership, tax treaty, common language, common borders, the existence of a colonial relationship and the regional trade agreement. The estimated effect of a common currency on FDI is not statistically significant.

Table 2: First step gravity regression - bilateral determinants

Variable		Variable	
Ln(Distance)	-1.348***	Contiguity	0.604***
	(0.00)		(0.00)
EU membership	0.250**	Common currency	0.063
	(0.03)		(0.58)
Investment treaty	0.525***	Former colony	0.951***
	(0.00)		(0.00)
Common language	1.035***	RTA	0.565***
	(0.00)		(0.00)
Constant	13.91***		
	(0.00)		
N	83977		
R2	0.65		

Notes: P-values in parentheses. OLS estimator was used with reporter-time and partner-time fixed effects.

Table [3] provides estimates of the country-time fixed effects calculated from the first stage. The error terms of these regressions represent a measure of the speculative part of FDI. Our results suggest that larger values of GDP are related to higher levels of FDI. In contrast, higher population values are associated

with lower FDI. Observance of the rule of law in general has a positive effect on the FDI except in the case of the extended model (Benchmark + CTR) on the side of the reporter, where a negative effect is documented. Being a landlocked country negatively affects FDI stock. Except for these factors, we added some other controls (Benchmark + RBE) out of which a positive effect was reported with a higher level of voice, empowerment and accountability control, control of corruption, regulatory quality and political stability on the side of the reporter; and a negative effect on FDI was documented in connection with higher values of the days required to start a business and the number of procedures to start a business control, higher corporate tax and higher political stability on the side of the partner.

Table 3: Second step FDI gravity regression

	Reporter country fixed effect			Partner country fixed effect		
	(1)	(2)	(3)	(1)	(2)	(3)
	Benchmark	Benchmark + CTR	Benchmark + RBE	Benchmark	Benchmark + CTR	Benchmark + RBE
Ln(GDP)	0.870***	0.935***	0.752***	0.807***	1.044***	0.787***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Ln(POP)	-0.341***	-0.415***	-0.219***	-0.346***	-0.509***	-0.357***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Rule of law	0.112**	0.090***	-0.717***	0.873***	0.778***	0.871***
	(0.03)	(0.11)	(0.00)	(0.00)	(0.00)	(0.00)
Landlocked	-0.269***	-0.150	-0.289***	-0.549***	-0.262**	-0.535***
	(0.00)	(0.12)	(0.00)	(0.00)	(0.01)	(0.00)
Corporate tax rate		-0.015***			-0.023***	
		(0.00)			(0.00)	
Political stability			0.121**			-0.285***
			(0.04)			(0.00)
Regulatory quality			0.528***			-0.101
			(0.00)			(0.30)
Control of corruption			0.345***			0.224**
			(0.00)			(0.03)
Voice and account.			0.104*			0.164**
			(0.06)			(0.01)
Time and proced.			-0.003***			-0.003***
			(0.00)			(0.00)
Constant	-24.59***	-26.73***	-22.16***	-23.87***	-26.31***	-25.02***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
N	2069	1409	1949	2088	1409	1963
R2	0.62	0.63	0.67	0.69	0.75	0.72

Notes: P-values in parentheses. * indicates significance at the 10% level, ** at the 5% level and *** at the 1% level.

By using the residuals from the gravity regressions, we calculate our three measures of 'FDI abnormalcy'. Ranking of the top 10 countries in a world sample is available in Table A2, given the three regression specifications from Table 3.

According to the relative ranking of a country, *rankw* measure, which is hypothesized to be associated with a territorial role of financial centres or tax havens, top performers on the asset side (emitters of illicit financial flows) include the usual suspects, such as Cayman Islands, Bermuda, Luxembourg, Bahamas or the Netherlands (similar to Delatte et al. (2022)). Importantly, their high ranking remain almost unaffected even after controlling for the corporate tax differential (Benchmark+CTR) model. In the alternative model that also takes into account a wider variety of regulatory and business environment indicators, the top positions remain rather stable (Bahamas, Luxembourg, Netherlands) but ranking of other territories reshuffles slightly, with some of the tax haven or financial centre countries losing their prominent position. Apparently, the favourable tax environment might not be the only decisive factor that makes or breaks the status of tax

haven or financial centre. On the liabilities side (targets of illicit financial flows), few new contenders appear (Panama, Samoa) to score high in all, or in one particular ranking (Cyprus) among the list of other, usually poor African countries. As hypothesised, many tax haven and financial centre countries often serve as a conduit for international capital flows which makes them score high at both the outward (assets) and inward (liabilities) sides of external positions.

Top performers according to the relative share of abnormal FDI (Panel B, Table A2), *ranks* measure, belong to the group of countries that are usually not only associated with a strong presence of weak institutions affecting economic growth prospects but also suffer from the debilitating issue of capital flight and associated illicit financial flows. According to GFI (2021b), the most affected countries in terms of the relative extent of trade misinvoicing also score highest in our measure (Sierra Leone, Djibouti, Gambia), followed by countries (Benin, Sao Tome and Principe, Solomon Islands, Timor-Leste, Saint Kitts and Nevis, Dominica, Kyrgyzstan) that are placed in the upper third among all developed and developing countries sensitive towards the trade misinvoicing issue. The third group of countries is represented by territories, whose primary feature, in this context, is their extensive financial opacity and secrecy. This group includes Maldives, Gambia, Dominica and Samoa that are in the highest positions according to the Financial Secrecy Index published by the Tax Justice Network. The rest of top-performers can be characterized as less developed countries predominantly from Africa or as small island territories in Oceania and the Caribbean.

The last category, Adjusted FDI ratio, *ratio* measure, presents a heterogeneous mix in terms of ranking of territories either characterized by their proclivity towards trade misinvoicing (Gambia, Ghana, Malawi, Maldives, Sierra Leone, Zimbabwe), money laundering practices (e.g., Macao and Philippines pair, see GFI (2021a)), high financial secrecy (Gambia, Curacao), or just serving as financial centres (Singapore) or tax havens (Gibraltar, Bermuda). This group is further accompanied by the least developed countries from Africa (Sudan, Chad, Sierra Leone, Burundi), Asia (Thailand) and Latin America (Brazil). The most striking difference from previous rankings is the relative strong presence of matured advanced economies (Israel, the United States, Ireland) as well as some of the former transition economies from Europe (Hungary, Croatia, Russia). As apparent, involvement in international capital flows stemming from and directed to the most prominent tax haven and financial centre territories as identified by *rankw* measure is prevalent in a very heterogeneous group of economies.

In Table A3 we also report the ranking of countries in our unbalanced sample, but only for illustrative purposes. In the sudden stop models discussed in the next section we work with measures derived from the world sample estimates.

4.2 'FDI abnormalcy' measures as determinants of sudden stop episodes

Table 4 reports the estimated coefficients of our three measures of 'FDI abnormalcy' after controlling for standard set explanatory variables. For the sake of brevity, we only report the coefficients of interest; the tables with the full set of estimates are available in the Appendix.

The measure of sudden stop episodes is reported to be sensitive towards our measures of 'FDI abnormalcy' in several cases.

First, territories that can be characterized as tax havens or financial centres (*rankw*) on the receiving side of international capital are less likely to experience sudden stop episodes (Panel A); while this finding may potentially suffer from the sample selection it is not likely to be biased due to spatial auto-correlation,

Table 4: Determinants of sudden stop periods

PANEL A - Relative ranking of a country (rankw)									
Dep. = Foreign Liabilities Sudden Stops	RE unbal.	RE	SPRE	RE unbal.	RE	SPRE	RE unbal.	RE	SPRE
Benchmark model	-3.295	-5.315**	-4.766***						
	(0.266)	(0.045)	(0.002)						
Benchmark model + CTR				-2.630*	-3.660**	-2.404***			
				(0.077)	(0.012)	(0.000)			
Benchmark model + RBE							-3.102	-4.680**	-4.187***
							(0.223)	(0.044)	(0.003)
Rho			0.111*			0.109*			0.111*
			(0.062)			(0.066)			(0.062)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	487	410	410	487	410	410	487	410	410
N clusters	50	41	41	50	41	41	50	41	41
PANEL B - Relative share of abnormal FDIs (ranks)									
Dep. = Foreign Liabilities Sudden Stops	RE unbal.	RE	SPRE	RE unbal.	RE	SPRE	RE unbal.	RE	SPRE
Benchmark model	-0.009*	-0.008**	-0.003***						
	(0.096)	(0.039)	(0.000)						
Benchmark model + CTR				-0.008*	-0.007**	-0.003***			
				(0.053)	(0.032)	(0.000)			
Benchmark model + RBE							-0.010*	-0.008**	-0.004***
							(0.087)	(0.018)	(0.000)
Rho			0.106*			0.105*			0.106*
			(0.072)			(0.073)			(0.070)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	487	410	410	487	410	410	487	410	410
N clusters	50	41	41	50	41	41	50	41	41
PANEL C - Adjusted FDI ratio (ratio)									
Dep. = Foreign Liabilities Sudden Stops	RE unbal.	RE	SPRE	RE unbal.	RE	SPRE	RE unbal.	RE	SPRE
Benchmark model	1.024	0.632	0.796						
	(0.368)	(0.635)	(0.544)						
Benchmark model + CTR				1.523	0.504	0.688			
				(0.202)	(0.716)	(0.593)			
Benchmark model + RBE							6.755	6.316*	6.708
							(0.112)	(0.099)	(0.104)
Rho			0.103*			0.104*			0.105*
			(0.079)			(0.073)			(0.079)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	487	410	410	487	410	410	487	410	410
N clusters	50	41	41	50	41	41	50	41	41

Notes: P-values in parentheses. RE represents panel probit model with random effects. SPRE represents linear spatial autoregressive panel model with random effects. For panel probit model with random effects the average marginal effects calculated by delta method are reported. Benchmark model corresponds to 2nd stage model from Delatte et al. (2022) reported in Table 3 in column (1) for partner country fixed effect. 'Benchmark + CTR' refers to specification (2) in Table 3 for partner country fixed effect. 'Benchmark + RBE' refers to specification (3) in Table 3 for partner country fixed effect. Relative ranking of a country is calculated from equation [5].Relative share of abnormal FDIs is calculated from equation [6]. Adjusted FDI ratio is calculated from equation [7].

i.e., the clustering of crisis events. From the other perspective, the positive influence of tax haven (or financial centre) trait is reported to materialize across all three specifications. As debated, tax havens and financial centres exist not solely due to the favourable tax or institutional environment, but can also be characterized by pervading financial secrecy culture. Overall, the high score in *rankw* provides territories with a form of safety butter against sudden drying up of capital inflows.

The positive impact of 'abnormal FDI' is also confirmed for the second indicator, *ranks*, regardless of the model specifications. Countries with a higher share of abnormal FDI of total foreign liabilities face, on average, a lower probability of a sudden stop episode than their economic peers. More importantly, the possible hedging properties of abnormal FDIs are so substantial, that they are able to (positively) affect the behaviour of the overall external position.[6] Even after controlling for the possible contagion effect (SPRE model) as well as various elements of tax and institutional environment the significance of our results remains unaffected.

This finding suggests that the nature of illicit capital flows captured by the FDI residuals may still retain some of their more favourable properties in terms of stability-transparency trade-off. In other words, even if the sources and means of foreign capital are to be questioned, their inflows may still counteract pressure put on external financing. This finding may, therefore, support the general notion of the more long-term and less speculative nature of FDI (Eichengreen et al., 2008; Cardarelli et al., 2010; Sula and Willett, 2011; Hattari and Rajan, 2011), even in the presence of unexplained and potentially illicit elements.

In Panel C (Table 4), we report the results from the estimates with the Adjusted FDI ratio indicator, *ratio*. Compared to the previous indicator (*ranks*), this measure weights foreign exposure of an individual country by the characteristic trait of a counter-party, in our case the significance of a country in terms of its global role as a financial centre or tax haven (*rankw*). According to the reported results, a comparably higher share of inflows from territories likely serving as tax havens or financial centres could be potentially associated with *greater* risk of a sudden stop episode occurrence, but results are not statistically significant, with the exception of specifications controlling for regulatory and business environment factors. The tentative conclusion would, therefore, suggest that while economies targeted by capital inflows originating in tax haven or financial centre counter-parties may face higher risks of sudden stop episodes; however, this is only valid if one accounts for other supposedly non-economic factors explaining the existence of tax havens and financial centres.

Among the list of control variables (Table A4, Table A5, Table A6) the de jure financial openness, i.e., capital mobility, does not have a statistically significant impact, similar to Edwards (2007). Contrary to this, de facto financial openness in terms of levels as well as first difference is reported to have a negative impact in the former and a positive in the latter case. Agosin and Huaita (2012) report similar results for changes in de facto openness. A negative sign for financial integration is associated with sudden stop episodes in Forbes and Warnock (2012). In majority of instances, we report a positive sign for correlation of financial inflows and outflows, a determinant advocated by Agosin et al. (2019).

Studies also document that those countries with declining fiscal deficits or increases in fiscal surplus are less likely to face frequent episodes of sudden stops (Cardarelli et al., 2010; Hutchison et al., 2010). In contrast, we report increasing incidence of crisis events for countries with better fiscal balances. One

[6] We use database provided by Forbes and Warnock (2021) that reports sudden stop episodes identified for total capital flows (FDI, portfolio debt and equity, bank debt and other).

plausible explanation could be related to the fiscal policy behaviour during Great Recession. One of the responses to the spread of financial crisis relied on an inclination towards implementation of fiscal austerity measures. Thus, even economies with relatively sound fiscal positions were striving to maintain their external credibility and, potentially, decreasing their reliance on external financing.[7]

The global risk factor measured by VIX index is shown to be associated with an increasing likelihood of sudden stop episodes, a finding reflected in Forbes and Warnock (2012). The second global factor, a rise of oil prices, signifies the lowering probability of a sudden stop episode. As increasing oil prices usually mark upward trend in economic growth as well as increasing proceeds from international trade in oil exporting countries, the positive sign is in line with a priory expectations, similar to Forbes and Warnock (2021).

4.3 Alternative approach to identification of sudden stop events

Most studies in the pre-Global Financial Crisis period followed the net capital flows approach. In one of the first empirical studies, Calvo et al. (2004) and later Guidotti et al. (2004) estimated sudden stop episodes based on annual change in capital flows and sudden stop episodes occurred when these net flows fell one standard deviation below the mean. Numerous other studies followed the same approach in estimating sudden stops (Bordo et al., 2010; Rothenberg and Warnock, 2011; Cowan and Raddatz, 2013; Zhao et al., 2014); see also Efremidze et al. (2011) for detailed methodological discussion.

More recent studies, mainly since the GFC period, base their sudden stop episodes estimations on gross capital flows as opposed to net flows. Forbes and Warnock (2012) advocate benefits of using gross outflows and inflows as it allows to separate motivations of foreign from domestic investors. Ultimately, sudden stop episodes in their original formulation are supposed to capture sudden drying up of capital inflows triggered by behaviour of foreign investors rather than the reaction residents. Given the ongoing discussion, Cavallo et al. (2015) even propose a new taxonomy of sudden stop episodes which, by integrating the gross and net approach, lists seven possible combinations a country can potentially experience. The most disruptive among them is an event combining sudden stops in net flows that is associated with reductions in gross inflows.

The second delimiting criterion is the use of a pre-specified threshold (e.g., ratio over GDP) that separates minor ripples from major waves in the movement of international capital. While one stream of literature (Forbes and Warnock, 2021) considers only moments derived from country-specific historical distribution of capital flows, some authors impose additional criterion of a change in capital flows surpassing a certain (fixed) threshold (Edwards, 2004, 2007; Agosin et al., 2019).

In order to test the robustness of our results with respect to the above-discussed issues, we follow Agosin et al. (2019) as an alternative identification to Forbes and Warnock (2021).[8] *Gross* sudden stop episodes are identified as years in which the annual decline in the stock of foreign liabilities is at least one standard deviation larger than its average and, at the same time, this decline is larger than 5 percent of GDP. Alternatively, *net* sudden stop episodes are identified as years in which the annual decline in financial

[7] As a point of interest, Forbes and Warnock (2012) show that countries with a higher government debt-to-GDP ratio are less prone to experience sudden stop episodes, if net capital flows are used to identify crisis events.

[8] Recently, Siranova and Zelenak (2022) have argued that empirical crisis literature should conduct sensitivity analysis towards event identification strategy, or at least test for robustness of findings by introducing an additional one year lag. As we discuss later, sensitivity analysis provided in this section complies with this recommendation.

account balance is at least one standard deviation larger than its average and, at the same time, this decline is larger than 5 percent of GDP.[9]

Mathematically, the following condition must be satisfied:

$$event_{it}^{alt} = \begin{cases} 1 & \text{if } \triangle FL(FAB)_{it} < \overline{\triangle FL(FAB)}_i - \sigma_{\triangle FL(FAB)_i}, \ \frac{\triangle FL(FAB)_{it}}{GDP_{it}} < -5\%, \\ 0 & \text{otherwise.} \end{cases} \tag{10}$$

where $\triangle FL(FAB)_{it} = FL(FAB)_{it} - FL(FAB)_{it-1}$ is the annual absolute change in the net incurrence of foreign liabilities (financial account balance), and $\sigma_{\triangle FL(FAB)_i}$ is the standard deviation of annual absolute changes in the net incurrence of foreign liabilities (financial account balance).

The excessiveness of capital flows is measured by its ratio over nominal GDP, as in [10]. In line with Agosin et al. (2019), we use the quadratic trend of actual GDP for GDP_{it}. Sudden stop episodes are calculated with data collected from the International Financial Statistics compiled by the International Monetary Fund.

Table 5: Number of sudden stop episodes in 2010/2019 period, alternative identification scheme

	Forbes and Warnock (2021)						
	Full sample (50 countries)				Balanced sample (41 countries)		
		Crisis	No crisis	Total		Crisis	No crisis	Total
Gross concept	Crisis	22	69	91	Crisis	20	54	74
(Agostin et al., 2019)	No crisis	53	337	390	No crisis	49	287	336
	Total	75	406	481	Total	69	341	410
Net concept	Crisis	14	57	71	Crisis	13	47	60
(Agostin et al., 2019)	No crisis	61	349	410	No crisis	56	294	350
	Total	75	406	481	Total	69	341	410

By calculating the crisis event periods according to [10], we identify 91 episodes of liabilities-related dry-out of capital inflows (19% of all observations) for unbalanced sample, out of which only 22 (24%) were also identified by Forbes and Warnock (2021). In balanced sample, we identify 74 episodes of liabilities-related dry-out of capital inflows (18% of all observations), out of which only 20 (27%) were also identified by Forbes and Warnock (2021). Total number of crisis events in Forbes and Warnock (2021) also substantially surpasses those identified by Agosin et al. (2019), in particular in the unbalanced sample.

When one looks at a graphic presentation of the distribution of sudden stop episodes, one can find a substantial disagreement across time between two alternative approaches in both, full and balanced sample (Table 1). Not only the approach by Forbes and Warnock (2021) appears to lag one year behind the Agosin et al. (2019), it also fails to identify the highest peak in even occurrences in 2018. Instead, Forbes and Warnock (2021) report an elevated crisis prevalence spread across two consecutive years (2018, 2019).[10] The

[9] (Agosin et al., 2019) uses the term financial account sudden stops.

[10] Forbes and Warnock (2021) use (historical) 5-year rolling windows to identify periods of abnormal surges in capital flows; their approach can be therefore described as a 'backward-looking'. Compared to that, Agosin et al. (2019) calculate excessive capital flows using the entire sample; this approach therefore contains a very strong 'forward-looking' element.

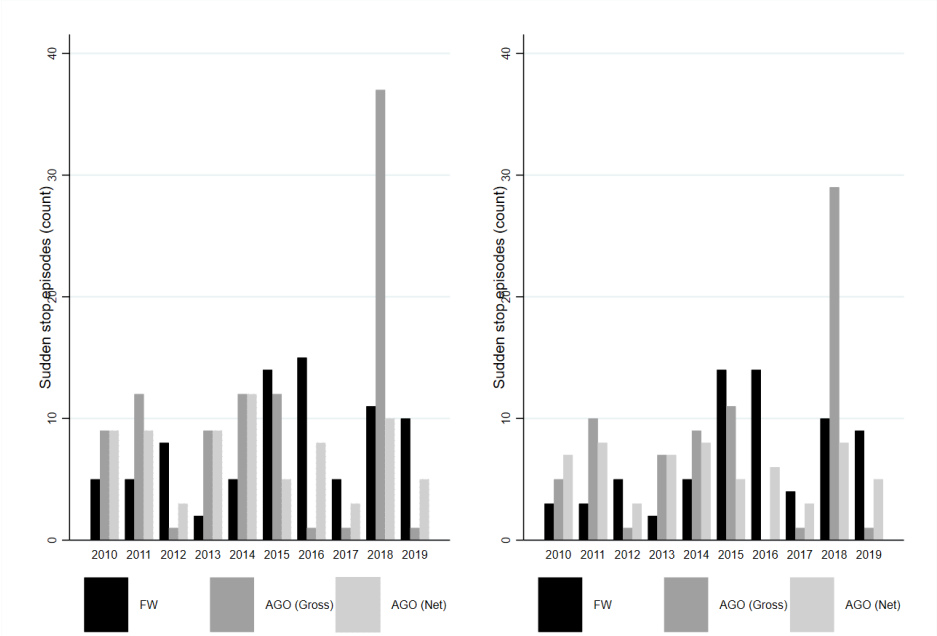

Figure 1: Distribution of sudden stop episodes - alternative identification scheme

Notes: Left figure - unbalanced panel. Right figure - balanced panel.

difference between the gross and net approach seems to become more pronounced towards the second half of the sample, starting 2015 onward.

In all cases we observe three peaks in the distribution of crisis events, first around year 2011, the second around year 2014/2015, and one major occurrence of sudden stops in year 2018. A similar pattern was reported in Forbes and Warnock (2012), Gelos et al. (2019), or Forbes and Warnock (2021) who describe post-GVC sudden stop patterns more as "ripples" than "waves". While the Great Recession crisis exhibited unusually large episodes of sudden stops and retrenchment mainly due to "investors' liquidation" of foreign investment positions and subsequently bringing the proceeds to their countries of origin, the peak in 2014 followed by retrenchment in 2015 can be attributed to the "taper tantrum" episode or unanticipated depreciation of the Renminbi (Gelos et al., 2019). High rate of event occurrences reported in 2018/2019 is interpreted as being associated with a response to the rise of the Federal Funds rates in the United States as well as rising trade tensions between the U.S. and China (Gelos et al., 2019).

Heterogeneity in the distribution of sudden stops poses an interesting sensitivity exercise testing the robustness of our findings.

We estimate the same set of regressions as in the case of baseline regression in [8]. Results are reported in Table A7, Table A8 and Table A9. To illustrate the possible heterogeneity in effect of our measures of 'FDI abnormalcy' on prevalence of sudden stop episodes we plot the estimated AMEs together with the 90% confidence intervals in Figure 2 (Relative ranking of a country, *rankw*), Figure 3 (Relative share of abnormal FDIs, *ranks*), and Figure 4 (Adjusted FDI ratio, *ratio*).

First piece of positive news is that for all three measures of 'FDI abnormalcy' the direction of average marginal effect remains unaffected, i.e., decreasing likelihood of event for *rankw* and *ranks* and increasing

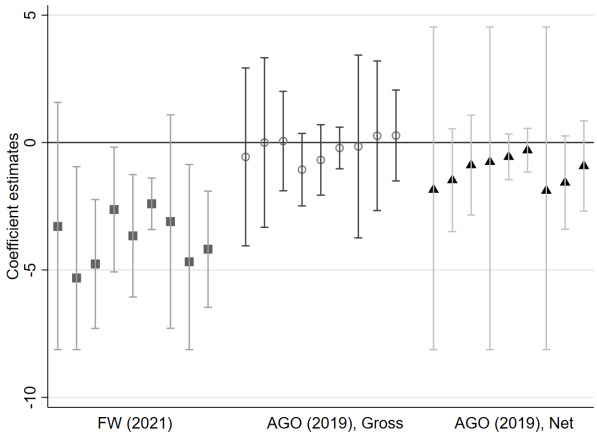

Figure 2: Effect of Rankw on sudden stop incidence - comparison of alternative identification schemes

Notes: FW (2021) stands for Forbes and Warnock (2021); AGO (2019) stands for Agosin et al. (2019). AMEs from Table A7 reported in the exact order. 90% confidence intervals depicted. Extremely wide confidence intervals are trimmed to fit the figure. 'Gross' refers to the identification of sudden stop events from the change in foreign liabilities, see eq. [10]. 'Net' refers to the identification of sudden stop events from the change in financial account balance, see eq. [10]. Extremely wide confidence intervals are trimmed.

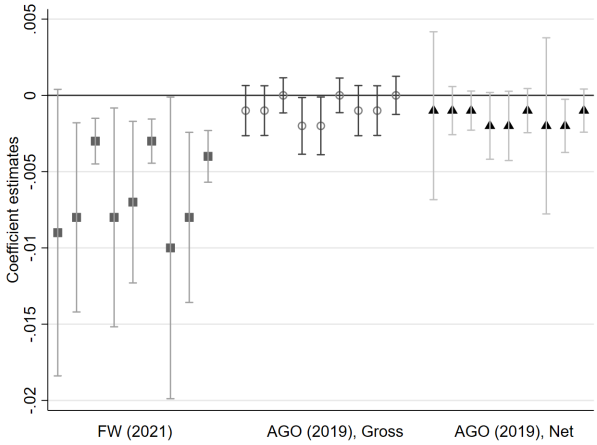

Figure 3: Effect of Ranks on sudden stop incidence - comparison of alternative identification schemes

Notes: FW (2021) stands for Forbes and Warnock (2021); AGO (2019) stands for Agosin et al. (2019). AMEs from Table A8 reported in the exact order. 90% confidence intervals depicted. Extremely wide confidence intervals are trimmed to fit the figure. 'Gross' refers to the identification of sudden stop events from the change in foreign liabilities, see eq. [10]. 'Net' refers to the identification of sudden stop events from the change in financial account balance, see eq. [10].

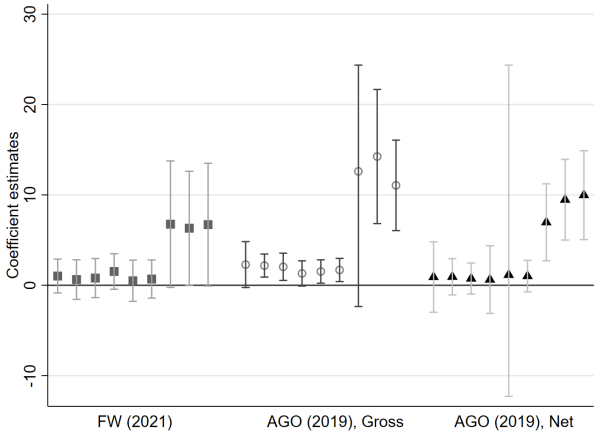

Figure 4: Effect of Ratio on sudden stop incidence -comparison of alternative identification schemes

Notes: FW (2021) stands for Forbes and Warnock (2021); AGO (2019) stands for Agosin et al. (2019). AMEs from Table A9 reported in the exact order. 90% confidence intervals depicted. Extremely wide confidence intervals are trimmed to fit the figure. 'Gross' refers to the identification of sudden stop events from the change in foreign liabilities, see eq. [10]. 'Net' refers to the identification of sudden stop events from the change in financial account balance, see eq. [10].

for *ratio*. However, in the first two cases the size of the AMEs declines substantially and often lies in statistically non-significant territories. Interestingly, the (hypothesised) difference between the 'gross' and 'net' concept of sudden stop identification strategy is almost negligible. In contrast, the effect of exposure towards capital linked to tax haven or financial centre territories (*ratio*) becomes more pronounced in the alternative identification scheme, notwithstanding the 'gross' vs 'net' dichotomy. Similar to the baseline results, the increasing risk of exposure towards sudden stop events gains on importance in case of the specification that controls for the regulatory and business environment. We attribute this finding to the underlying 'secrecy' element (Hampton and Levi, 1999) role of which is revealed only after other elements of tax haven and financial centres are accounted for.

Based on the findings from this sensitivity analysis, it appears that the effect of our measures is more likely to materialize within a certain time frame, and to affect the behaviour of gross capital inflows that are 'excessive' in light of a recent historical experience of a single country. As in the case of the baseline results, the tax haven and financial centre role together with higher share of 'unexplained' foreign capital appear to protect against sudden shortfalls in external financing. On the other hand, being more exposed towards tax haven and financial centre territories may come at the cost of increasing prevalence of sudden stop events.

4.4 Further considerations

Our *first* finding suggests that economies with comparably higher shares of inward 'abnormal FDI' as well as territories characterized as tax havens or offshore financial centres were reported to have a lower incidence of sudden stop episodes. While further research to shed more light on this (surprising) property is indispensable, as the extent of misreporting of external stocks is definitely to play a role, from our study perspective we attribute this to some non-economic factors, such as secrecy and anonymity (Hampton and Levi, 1999; Jones and Temouri, 2016). More importantly, significant effect of our first two measures remains broadly unaffected by inclusion of other conditioning variables usually associated with tax haven or financial centres characteristics (Section 3.2). Thus, it is likely that those unaccounted factors may provide positive incentives resulting in an unintended buffer against sudden stop events, which we take the liberty to term as the "safety premium". The recent leaked documents (such as, Pandora, Paradise, and Panama) with substantial magnitude of offshore investments held in tax havens strongly support the vital role of anonymity and secrecy tax havens provide to multinational companies and individuals.

Our *second* important finding shows that higher exposure towards FDI inflows associated with territories characterized as tax havens of financial centres may result in the increasing probability of experiencing a sudden stop event, once we account for heterogeneity in these territories related to the 'institutional competition'. Policy consequences of our findings therefore second the sentiment presented in other research papers, e.g. Madrueño et al. (2022). While the old economic paradigm prescribed countries to attempt to attract FDI flows in order to stimulate their economic growth, their often 'fictive' nature may simply undermine their macroeconomic stability due to the low degree of linkages with the real economy and the concentration of these flows within sectors that have high environmental impacts (Madrueño et al., 2022).

On the policy front, understanding the behaviour of sudden stops and the factors that trigger their occurrence can help in designing the appropriate and contingent policies in order to mitigate their frequency and alleviate the severity of these anomalies once they occur. Our results suggest that recent trends in the increase of 'phantom' or 'abnormal' FDI flows can potentially bring about very diverse consequences. As

apparent, the current nature of FDI flows is so strikingly heterogeneous that any policy response to increasing risks associated with new nature of such flows needs to be diverse and targeted by itself.

5 Conclusions

In this paper, we study role of abnormal FDI as a potential driver of stop episodes during the 2009-2019 period in a sample of developed and developing countries. The volume of abnormal FDI is derived from the unexplained part of country fixed effects in a bilateral gravity regression. We construct three measures of 'FDI abnormalcy' that i) approximate the role of an economy as a financial centre or tax haven, ii) calculate the contribution of 'FDI abnormalcy' to the total FDI position, and iii) adjust the value of FDI stock given their exposure towards territories considered as tax havens or financial centres. Using these measures, we estimate a panel probit model and obtain three important results.

We find that economies with comparably higher share of inward 'abnormal FDI' were associated with a lower incidence of sudden stop episodes; that exposure towards inflow of capital from tax haven or financial centre territories increases the likelihood of sudden stop events once the heterogeneity in regulatory and business environment is accounted for; and that tax haven and financial centre territories are likely to benefit from the 'safety premium' that may provide protection against sudden outflow of foreign capital. Our findings may also indirectly hint at the important role played by other non-economic factors, such as secrecy and anonymity.

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Appendix

List of countries (sudden stops panel)

Full sample: Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, Hong Kong, China: Mainland, Colombia, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, South Korea, Latvia, Lithuania, Malaysia, Mexico, the Netherlands, New Zealand, Norway, Panama, Poland, Portugal, Romania, the Russian Federation, Singapore, Slovakia, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, United Kingdom, United States, Venezuela.

Balanced panel: Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China: Mainland, Colombia, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, India, Indonesia, Ireland, Japan, Korea, Latvia, Lithuania, Malaysia, Mexico, the Netherlands, New Zealand, Panama, Poland, Portugal, the Russian Federation, Singapore, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, United States.

Table A1: Variables sources and descriptions

Determinant (variable)	*Format*	*Source*	*Description*
Panel A - Gravity model (1st stage)			
Distance	km	CEPII	Distance between capitals, in km
EU membership	dummy	CEPII	1 = Country is a EU member
Investment treaty	dummy	Delatte et al. (2022)	1 = Treaty
Common language	dummy	CEPII	1 = Common official or primary language
Contiguity	dummy	CEPII	1 = Contiguity
Common currency	dummy	Delatte et al. (2022)	1 = Common currency
Former colony	dummy	CEPII	1 = Pair ever in colonial or dependency relationship
RTA	dummy	CEPII	1 = RTA (source: WTO)
Panel B - Gravity model (2nd stage)			
ln(GDP)		CEPII	GDP (current thousands US$). If some observations were missing (not all) for particular country we extrapolated them as follows: for cases where at least four follow-up observations (out of 11 possible) were available (two or three observations if they weren't subsequent) we regressed GDP on time trend and used fitted values; if only two or three subsequent observations were available we calculated missing values as a previous value times GDP growth rate.
ln(POP)		CEPII	Population, total in thousands. For missing values we apply the same methodology as in the case of GDP. In addition, if only one observation was available we set all 11 observations to the same value.
Rule of law	index	World Governance Indicators	Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
Landlocked	dummy	CEPII	1 = landlocked
Corporate tax rate	%	KPMG, OECD	Corporate income tax rate
Political stability	index	World Governance Indicators	Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism.
Regulatory quality	index	World Governance Indicators	Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
Control of corruption	index	World Governance Indicators	Control of corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests
Voice and accountability	index	World Governance Indicators	Voice and accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.
Time and proc.	index	CEPII	Days + procedures to start a business
Panel C - Sudden stop regression			
De jure fin. openness	index	Chinn and Ito (2006)	Index measuring a country's degree of capital account openness, 2021 update
De facto fin. openness	% GDP	Lane and Milesi-Ferretti (2018)	Total foreign assets net of gold and liabilities to GDP, 2021 update
De facto fin. openness	YoY change	Lane and Milesi-Ferretti (2018)	Total foreign assets net of gold and liabilities to GDP, 2021 update
ln(GDP)		CEPII	GDP (current thousands US$)
GDP PPP p.c.		CEPII	GDP per cap, PPP (current thousands international $)
NER	YoY change	IMF	Exchange Rates, National Currency Per U.S. Dollar, Period Average, Rate
Fiscal balance	% GDP	IMF	Net government lending/borrowing to GDP
Inflows and outflows correl.	index	IMF	Net incurrence of foreign liabilities, Net increase in foreign assets.
Terms of trade	YoY change	World Development Indicators	Net barter terms of trade index (2000 = 100)
ln(VIX)	index	FRED	CBOE Volatility Index: VIX, Index, Daily, Not Seasonally Adjusted
ln(Oil price)	price	FRED	Crude Oil Prices: West Texas Intermediate (WTI) - Cushing, Oklahoma,

Table A2: List of top countries according to their score in measures of 'FDI abnormality' (world sample, 246 territories)

Panel A - Relative ranking of a country (rankw)

	Reporter (outward FDI)			Partner (inward FDI)		
Rank	Benchmark	Benchmark + CTR	Benchmark + RBE	Benchmark	Benchmark + CTR	Benchmark + RBE
1	Cayman Isl.	Cayman Isl.	Marshall Isl.	Marshall Isl.	Cayman Isl.	Liberia
2	Marshall Isl.	Netherlands	Liberia	Cayman Isl.	Panama	Marshall Isl.
3	Liberia	Bermuda	Bahamas	Liberia	Samoa	Belize
4	Bermuda	Mozambique	Luxembourg	Bermuda	Bermuda	Togo
5	Netherlands	Luxembourg	Mauritius	Belize	St. Vincent and Gren.	Panama
6	Luxembourg	Mauritius	Netherlands	Panama	Netherlands	Bahamas
7	Bahamas	Bahamas	Mozambique	Togo	Libya	Seychelles
8	Mauritius	Benin	Guinea-Bissau	Bahamas	Romania	Samoa
9	Mozambique	Angola	Angola	Netherlands	Cyprus	Netherlands
10	Guinea-Bissau	United Arab Emir.	Maldives	Samoa	Bahamas	Libya

Panel B - Relative share of abnormal FDI (ranks)

	Reporter (outward FDI)			Partner (inward FDI)		
Rank	Benchmark	Benchmark + CTR	Benchmark + RBE	Benchmark	Benchmark + CTR	Benchmark + RBE
1	Zambia	Sierra Leone	Bangladesh	Cent. Afr. Republic	Solomon Isl.	Eritrea
2	Gambia	Djibouti	Gambia	Eritrea	Sierra Leone	Cent. Afr. Republic
3	Nauru	Afghanistan	Guinea-Bissau	Timor-Leste	Burundi	Solomon Isl.
4	Tuvalu	Benin	Tonga	Nauru	Dominica	Timor-Leste
5	Guinea-Bissau	Gambia	Marshall Isl.	Solomon Isl.	Sudan	Somalia
6	Tonga	Senegal	Micronesia	Kiribati	St. Vincent and Gren.	Kiribati
7	Marshall Isl.	Solomon Isl.	Maldives	Somalia	Gambia	Burundi
8	Micronesia	Burundi	Haiti	Burundi	Congo	Chad
9	Sao Tome and Pr.	Samoa	Sao Tome and Pr.	Sao Tome and Pr.	Afghanistan	Congo
10	Cent. Afr. Republic	St. Kitts and Nevis	Cent. Afr. Republic	Chad	Djibouti	Sao Tome and Pr.

Panel C - Adjusted FDI ratio (ratio)

	Reporter (outward FDI)			Partner (inward FDI)		
Rank	Benchmark	Benchmark + CTR	Benchmark + RBE	Benchmark	Benchmark + CTR	Benchmark + RBE
1	China: Macao	China: Macao	Chad	Brazil	Brazil	Mayotte
2	Sudan	Israel	Sudan	Thailand	Norfolk Island	Gibraltar
3	Chad	Sudan	Sao Tome and Pr.	Philippines	Thailand	Norfolk Island
4	Israel	Aruba	Gambia	United States	Gibraltar	Micronesia
5	Aruba	El Salvador	Burundi	Kuwait	Curacao	Guinea
6	Mauritius	Iceland	Comoros	Norfolk Island	Philippines	Curacao
7	Nigeria	Mauritius	El Salvador	Gibraltar	Israel	Croatia
8	Sao Tome and Pr.	Nigeria	Sierra Leone	Ireland	United States	Madagascar
9	Burundi	Russia	Kazakhstan	Curacao	Ireland	Bermuda
10	Hungary	Burundi	Iceland	Israel	Kazakhstan	Ireland

Notes: Benchmark model corresponds to 2^{nd} stage model from Delatte et al. (2022) reported in Table 3 in column (1) for reporter (partner) country fixed effect. 'Benchmark + CTR' refers to specification (2) in Table 3 for reporter (partner) country fixed effect. 'Benchmark + RBE' refers to specification (3) in Table 3 for reporter (partner) country fixed effect. Relative ranking of a country is calculated from equation [5]. Relative share of abnormal FDIs is calculated from equation [6]. Adjusted FDI ratio is calculated from equation [7].

Table A3: List of top countries according to their score in measures of 'FDI abnormality' (full sample, 50 countries)

Panel A - Relative ranking of a country (rankw)

	Reporter (outward FDI)			Partner (inward FDI)		
Rank	Benchmark	Benchmark + CTR	Benchmark + RBE	Benchmark	Benchmark + CTR	Benchmark + RBE
1	Netherlands	Netherlands	Netherlands	Panama	Panama	Panama
2	Panama	Panama	Hungary	Netherlands	Netherlands	Netherlands
3	Hungary	Hungary	Brazil	Russia	Romania	Russia
4	Singapore	Brazil	Panama	Switzerland	Russia	China: Mainland
5	China: Hong Kong	China: Hong Kong	Singapore	Japan	Japan	Switzerland
6	Brazil	Singapore	Switzerland	China: Mainland	China: Mainland	Japan
7	Switzerland	Colombia	China: Hong Kong	Italy	Brazil	Hungary
8	Colombia	Malaysia	Colombia	Hungary	Switzerland	Italy
9	Malaysia	South Africa	Malaysia	Brazil	Mexico	Brazil
10	Australia	Thailand	Thailand	Mexico	Italy	Mexico

Panel B - Relative share of abnormal FDI (ranks)

	Reporter (outward FDI)			Partner (inward FDI)		
Rank	Benchmark	Benchmark + CTR	Benchmark + RBE	Benchmark	Benchmark + CTR	Benchmark + RBE
1	Panama	Panama	Panama	Panama	Romania	Romania
2	Estonia	Estonia	Latvia	Romania	Panama	Panama
3	Latvia	Latvia	Estonia	Latvia	Latvia	Latvia
4	Iceland	Thailand	Venezuela	Iceland	Iceland	Venezuela
5	Thailand	Lithuania	Iceland	Turkey	Croatia	Croatia
6	Lithuania	Venezuela	Thailand	Thailand	Thailand	Iceland
7	Colombia	Iceland	Lithuania	Russia	Turkey	Russia
8	Venezuela	Colombia	Colombia	Croatia	Estonia	Thailand
9	Croatia	Croatia	Croatia	Estonia	South Africa	Turkey
10	South Africa	South Africa	Romania	Venezuela	Venezuela	South Africa

Panel C - Adjusted FDI ratio (ratio)

	Reporter (outward FDI)			Partner (inward FDI)		
Rank	Benchmark	Benchmark + CTR	Benchmark + RBE	Benchmark	Benchmark + CTR	Benchmark + RBE
1	Israel	Israel	Iceland	Brazil	Brazil	Croatia
2	Hungary	Iceland	Belgium	Thailand	Thailand	Ireland
3	Iceland	Russia	Russia	United States	Israel	Israel
4	Singapore	Belgium	Switzerland	Ireland	United States	Belgium
5	Russia	Hungary	Greece	Israel	Ireland	United Kingdom
6	Ireland	Singapore	Germany	Canada	Canada	India
7	Japan	Ireland	Czechia	Malaysia	Belgium	Portugal
8	Belgium	Switzerland	Portugal	Greece	Malaysia	South Africa
9	China: Hong Kong	Japan	Spain	Chile	Portugal	United States
10	Chile	Brazil	Brazil	Turkey	Turkey	Turkey

Notes: Benchmark model corresponds to 2^{nd} stage model from Delatte et al. (2022) reported in Table 3 in column (1) for reporter (partner) country fixed effect. 'Benchmark + CTR' refers to specification (2) in Table 3 for reporter (partner) country fixed effect. 'Benchmark + RBE' refers to specification (3) in Table 3 for reporter (partner) country fixed effect. Relative ranking of a country is calculated from equation [5]. Relative share of abnormal FDIs is calculated from equation [6]. Adjusted FDI ratio is calculated from equation [7].

Table A4: Determinants of sudden stop periods

				Relative ranking of a country (rankw)					
Dep. = Sudden Stops	RE unbal.	RE	SPRE	RE unbal.	RE	SPRE	RE unbal.	RE	SPRE
Benchmark model	-3.295	-5.315**	-4.766***						
	(0.266)	(0.045)	(0.002)						
Benchmark model + CTR				-2.630*	-3.660**	-2.404***			
				(0.077)	(0.012)	(0.000)			
Benchmark model + RBE							-3.102	-4.680**	-4.187***
							(0.223)	(0.044)	(0.003)
De iure fin. openness	-0.045	0.002	0.017	-0.040	0.006	0.021	-0.044	0.002	0.017
	(0.559)	(0.983)	(0.823)	(0.597)	(0.945)	(0.779)	(0.570)	(0.982)	(0.816)
De facto fin. openness (% GDP)	0.000**	0.000***	0.000***	0.000**	0.000***	0.000***	0.000**	0.000***	0.000***
	(0.020)	(0.000)	(0.000)	(0.018)	(0.000)	(0.000)	(0.018)	(0.000)	(0.000)
De facto fin. openness (YoY change)	-0.000***	-0.000***	-0.001***	-0.000***	-0.000***	-0.001***	-0.000***	-0.000***	-0.001***
	(0.002)	(0.006)	(0.000)	(0.002)	(0.006)	(0.000)	(0.002)	(0.005)	(0.000)
Ln(GDP)	0.001	0.011	0.013	0.001	0.011	0.011	0.001	0.011	0.012
	(0.947)	(0.408)	(0.279)	(0.950)	(0.424)	(0.331)	(0.943)	(0.419)	(0.289)
GDP PPP p.c.	-0.003	-0.005**	-0.005**	-0.003	-0.005**	-0.005**	-0.003	-0.005**	-0.005**
	(0.235)	(0.027)	(0.012)	(0.201)	(0.021)	(0.011)	(0.231)	(0.026)	(0.012)
NER (YoY change)	0.002	0.001	0.002	0.002	0.001	0.002	0.002	0.001	0.002
	(0.270)	(0.565)	(0.313)	(0.265)	(0.568)	(0.304)	(0.278)	(0.586)	(0.329)
Fiscal balance (% GDP)	0.006	0.021***	0.018***	0.006	0.021***	0.018***	0.006	0.021***	0.018***
	(0.371)	(0.005)	(0.002)	(0.356)	(0.005)	(0.002)	(0.375)	(0.006)	(0.002)
Inflows and outflows correlation	0.225**	0.171	0.148*	0.225**	0.168	0.147*	0.225**	0.171	0.149*
	(0.016)	(0.114)	(0.066)	(0.015)	(0.120)	(0.068)	(0.016)	(0.114)	(0.065)
Terms of trade (YoY change)	-0.001	-0.001	-0.001	-0.001	-0.002	-0.001	-0.001	-0.002	-0.001
	(0.835)	(0.600)	(0.655)	(0.819)	(0.576)	(0.656)	(0.824)	(0.579)	(0.636)
ln(VIX)	0.150*	0.148*	0.134*	0.152*	0.150*	0.137*	0.148*	0.145*	0.131*
	(0.054)	(0.085)	(0.060)	(0.051)	(0.081)	(0.054)	(0.057)	(0.091)	(0.067)
ln(Oil price)	-0.195**	-0.267***	-0.235***	-0.193**	-0.265***	-0.233***	-0.197**	-0.270***	-0.239***
	(0.011)	(0.002)	(0.006)	(0.012)	(0.002)	(0.007)	(0.010)	(0.002)	(0.005)
Currency union (1=member)	-0.003	-0.011	-0.029	-0.004	-0.011	-0.030	-0.005	-0.014	-0.032
	(0.941)	(0.819)	(0.531)	(0.924)	(0.812)	(0.529)	(0.909)	(0.778)	(0.504)
Rho			0.111*			0.109*			0.111*
			(0.062)			(0.066)			(0.062)
Constant			0.534			0.544			0.567
			(0.205)			(0.193)			(0.176)
N	487	410	410	487	410	410	487	410	410
N clusters	50	41	41	50	41	41	50	41	41

Notes: P-values in parentheses. RE represents panel probit model with random effects. SPRE represents linear spatial autoregressive panel model with random effects. For panel probit model with random effects the average marginal effects calculated by delta method are reported. Benchmark model corresponds to 2^{nd} stage model from Delatte et al. (2022) reported in Table 3 in column (1) for partner country fixed effect. 'Benchmark + CTR' refers to specification (2) in Table 3 for partner country fixed effect. 'Benchmark + RBE' refers to specification (3) in Table 3 for partner country fixed effect. Relative ranking of a country is calculated from equation [5].

Table A5: Determinants of sudden stop periods

Dep. = Sudden Stops	Relative share of abnormal FDIs (ranks)								
	RE unbal.	RE	SPRE	RE unbal.	RE	SPRE	RE unbal.	RE	SPRE
Benchmark model	-0.009*	-0.008**	-0.003***						
	(0.096)	(0.039)	(0.000)						
Benchmark model + Tax rate				-0.008*	-0.007**	-0.003**			
				(0.053)	(0.032)	(0.000)			
Benchmark model + Inst. quality							-0.010*	-0.008**	-0.004***
							(0.087)	(0.018)	(0.000)
De iure fin. openness	-0.044	0.000	0.016	-0.041	0.002	0.016	-0.040	0.004	0.021
	(0.575)	(0.997)	(0.827)	(0.601)	(0.984)	(0.833)	(0.609)	(0.957)	(0.782)
De facto fin. openness (% GDP)	0.000**	0.000***	0.000***	0.000***	0.000***	0.000***	0.000**	0.000***	0.000***
	(0.027)	(0.000)	(0.000)	(0.024)	(0.000)	(0.000)	(0.026)	(0.000)	(0.000)
De facto fin. openness (YoY change)	-0.000***	-0.000***	-0.001***	-0.000***	-0.000***	-0.001***	-0.000***	-0.000***	-0.001***
	(0.002)	(0.006)	(0.000)	(0.002)	(0.006)	(0.000)	(0.002)	(0.005)	(0.000)
Ln(GDP)	-0.012	-0.002	0.005	-0.012	-0.002	0.005	-0.012	-0.002	0.004
	(0.385)	(0.890)	(0.699)	(0.391)	(0.891)	(0.704)	(0.391)	(0.899)	(0.735)
GDP PPP p.c.	-0.003	-0.005**	-0.005**	-0.003	-0.005**	-0.005**	-0.003	-0.005**	-0.005**
	(0.197)	(0.018)	(0.012)	(0.192)	(0.018)	(0.013)	(0.185)	(0.016)	(0.011)
NER (YoY change)	0.002	0.001	0.002	0.002	0.001	0.002	0.002	0.001	0.002
	(0.294)	(0.610)	(0.319)	(0.305)	(0.619)	(0.322)	(0.304)	(0.633)	(0.335)
Fiscal balance (% GDP)	0.006	0.020***	0.017***	0.006	0.020***	0.017***	0.006	0.020**	0.017***
	(0.417)	(0.009)	(0.002)	(0.427)	(0.010)	(0.003)	(0.427)	(0.010)	(0.003)
Inflows and outflows correlation	0.205**	0.147	0.141*	0.207**	0.150	0.142*	0.207**	0.149	0.141*
	(0.019)	(0.171)	(0.084)	(0.019)	(0.163)	(0.082)	(0.018)	(0.164)	(0.084)
Terms of trade (YoY change)	-0.001	-0.002	-0.001	-0.001	-0.001	-0.001	-0.001	-0.002	-0.001
	(0.798)	(0.584)	(0.633)	(0.824)	(0.608)	(0.635)	(0.799)	(0.575)	(0.622)
ln(VIX)	0.151*	0.149*	0.137*	0.151*	0.150*	0.138*	0.149*	0.148*	0.135*
	(0.051)	(0.083)	(0.055)	(0.051)	(0.082)	(0.054)	(0.053)	(0.084)	(0.057)
ln(Oil price)	-0.201***	-0.270***	-0.238***	-0.200***	-0.269***	-0.238***	-0.201***	-0.271***	-0.239***
	(0.009)	(0.002)	(0.005)	(0.009)	(0.002)	(0.005)	(0.009)	(0.002)	(0.005)
Currency union (1=member)	-0.009	-0.015	-0.030	-0.010	-0.014	-0.029	-0.011	-0.017	-0.032
	(0.832)	(0.755)	(0.528)	(0.824)	(0.767)	(0.539)	(0.808)	(0.731)	(0.503)
Rho			0.111*			0.109*			0.111*
			(0.062)			(0.066)			(0.062)
Constant			0.692			0.686			0.715*
			(0.108)			(0.115)			(0.099)
N	487	410	410	487	410	410	487	410	410
N clusters	50	41	41	50	41	41	50	41	41

Notes: P-values in parentheses. RE represents panel probit model with random effects. SPRE represents linear spatial autoregressive panel model with random effects. For panel probit model with random effects the average marginal effects calculated by delta method are reported. Benchmark model corresponds to 2^{nd} stage model from Delatte et al. (2022) reported in Table 3 in column (1) for partner country fixed effect. 'Benchmark + Tax rate' refers to specification (2) in Table 3 for partner country fixed effect. 'Benchmark + Inst. quality' refers to specification (3) in Table 3 for partner country fixed effect. Relative share of abnormal FDIs is calculated from equation [6].

Table A6: Determinants of sudden stop periods

Dep. = Foreign Liabilities Sudden Stops	Adjusted FDI ratio (ratio)								
	RE unbal.	RE	SPRE	RE unbal.	RE	SPRE	RE unbal.	RE	SPRE
Benchmark model	1.024	0.632	0.796						
	(0.368)	(0.635)	(0.544)						
Benchmark model + CTR				1.523	0.504	0.688			
				(0.202)	(0.716)	(0.593)			
Benchmark model + RBE							6.755	6.316*	6.708
							(0.112)	(0.099)	(0.104)
De iure fin. openness	-0.046	-0.014	-0.006	-0.044	-0.017	-0.008	-0.055	-0.021	-0.010
	(0.551)	(0.852)	(0.939)	(0.564)	(0.826)	(0.918)	(0.452)	(0.784)	(0.887)
De facto fin. openness (% GDP)	0.000*	0.000***	0.000***	0.000*	0.000***	0.000***	0.000*	0.000***	0.000***
	(0.061)	(0.000)	(0.000)	(0.078)	(0.000)	(0.000)	(0.090)	(0.003)	(0.000)
De facto fin. openness (YoY change)	0.000	-0.000***	-0.001***	-0.000***	-0.000***	-0.001***	0.000	-0.000**	-0.001***
	(0.141)	(0.007)	(0.000)	(0.006)	(0.006)	(0.000)	(0.159)	(0.015)	(0.000)
Ln(GDP)	-0.002	0.008	0.010	-0.003	0.008	0.010	0.000	0.009	0.012
	(0.874)	(0.585)	(0.474)	(0.833)	(0.585)	(0.474)	(0.985)	(0.491)	(0.336)
GDP PPP p.c.	-0.002	-0.004**	-0.004**	-0.002	-0.004*	-0.004**	-0.002	-0.004*	-0.004**
	(0.333)	(0.049)	(0.039)	(0.336)	(0.052)	(0.041)	(0.585)	(0.066)	(0.048)
NER (YoY change)	0.002	0.001	0.002	0.002	0.001	0.002	0.002	0.002	0.002
	(0.252)	(0.492)	(0.281)	(0.258)	(0.499)	(0.285)	(0.508)	(0.424)	(0.279)
Fiscal balance (% GDP)	0.006	0.020***	0.017***	0.007	0.020***	0.017***	0.008	0.022***	0.018***
	(0.375)	(0.008)	(0.002)	(0.341)	(0.008)	(0.002)	(0.421)	(0.008)	(0.001)
Inflows and outflows correlation	0.221**	0.177	0.152*	0.224**	0.178	0.152*	0.226	0.188*	0.156*
	(0.021)	(0.118)	(0.073)	(0.022)	(0.117)	(0.073)	(0.166)	(0.093)	(0.062)
Terms of trade (YoY change)	0.000	-0.001	-0.001	0.000	-0.001	-0.001	0.000	-0.001	-0.001
	(0.890)	(0.719)	(0.710)	(0.891)	(0.712)	(0.705)	(0.854)	(0.762)	(0.723)
ln(VIX)	0.155**	0.151*	0.138*	0.150*	0.148*	0.135*	0.167	0.162*	0.154**
	(0.047)	(0.082)	(0.052)	(0.054)	(0.088)	(0.058)	(0.148)	(0.062)	(0.036)
ln(Oil price)	-0.189**	-0.259***	-0.229***	-0.191**	-0.261***	-0.231***	-0.167	-0.229**	-0.205**
	(0.015)	(0.003)	(0.007)	(0.013)	(0.003)	(0.007)	(0.127)	(0.010)	(0.020)
Currency union (1=member)	0.004	0.000	-0.014	0.004	-0.001	-0.015	0.005	0.001	-0.012
	(0.933)	(0.992)	(0.777)	(0.924)	(0.977)	(0.758)	(0.901)	(0.980)	(0.791)
Rho			0.103*			0.104*			0.105*
			(0.079)			(0.073)			(0.079)
Constant			0.518			0.533			0.281
			(0.231)			(0.226)			(0.554)
N	487	410	410	487	410	410	487	410	410
N clusters	50	41	41	50	41	41	50	41	41

Notes: P-values in parentheses. RE represents panel probit model with random effects. SPRE represents linear spatial autoregressive panel model with random effects. For panel probit model with random effects the average marginal effects calculated by delta method are reported. Benchmark model corresponds to 2^{nd} stage model from Delatte et al. (2022) reported in Table 3 in column (1) for partner country fixed effect. 'Benchmark + CTR' refers to specification (2) in Table 3 for partner country fixed effect. 'Benchmark + RBE' refers to specification (3) in Table 3 for partner country fixed effect. Adjusted FDI ratio is calculated from equation [7].

Table A7: Determinants of sudden stop episodes - alternative identification scheme ($rankw$)

Measure - Relative ranking of a country (rankw)									
	RE unbal.	RE	SPRE	RE unbal.	RE	SPRE	RE unbal.	RE	SPRE
Dep. = Forbes and Warnock (2021)									
Benchmark model	-3.295	-5.315**	-4.766***						
	(0.266)	(0.045)	(0.002)						
Benchmark model + CTR				-2.630*	-3.660**	-2.404***			
				(0.077)	(0.012)	(0.000)			
Benchmark model + RBE							-3.102	-4.680**	-4.187***
							(0.223)	(0.044)	(0.003)
Rho			0.111*			0.109*			0.111*
			(0.062)			(0.066)			(0.062)
Dep. = Foreign Liabilities Sudden Stops									
Benchmark model	-0.564	0.000	0.058						
	(0.791)	(0.999)	(0.961)						
Benchmark model + CTR				-1.065	-0.682	-0.214			
				(0.218)	(0.417)	(0.667)			
Benchmark model + RBE							-0.155	0.265	0.277
							(0.943)	(0.882)	(0.799)
Rho			0.377**			0.377**			0.378**
			(0.000)			(0.000)			(0.000)
Dep. = Financial Account Balance Sudden Stops									
Benchmark model	-1.850	-1.478	-0.885						
	(0.880)	(0.228)	(0.457)						
Benchmark model + CTR				-0.758	-0.559	-0.304			
				(0.895)	(0.304)	(0.561)			
Benchmark model + RBE							-1.890	-1.571	-0.920
							(0.856)	(0.158)	(0.393)
Rho			0.064			0.064			0.064
			(0.240)			(0.238)			(0.241)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	481	410	410	481	410	410	481	410	410
N clusters	50	41	41	50	41	41	50	41	41

Notes: P-values in parentheses. RE represents panel probit model with random effects. SPRE represents linear spatial autoregressive panel model with random effects. For panel probit model with random effects the average marginal effects calculated by delta method are reported. Benchmark model corresponds to 2^{nd} stage model from Delatte et al. (2022) reported in Table 3 in column (1) for reporter country fixed effect. 'Benchmark + CTR' refers to specification (2) in Table 3 for reporter country fixed effect. 'Benchmark + RBE' refers to specification (3) in Table 3 for reporter country fixed effect. Relative ranking of a country is calculated from equation [5].

Table A8: Determinants of sudden stop episodes - alternative identification scheme (*ranks*)

Measure - Relative share of abnormal FDIs (ranks)									
	RE unbal.	RE	SPRE	RE unbal.	RE	SPRE	RE unbal.	RE	SPRE
Dep. = Forbes and Warnock (2021)									
Benchmark model	-0.009*	-0.008**	-0.003***						
	(0.096)	(0.039)	(0.000)						
Benchmark model + CTR				-0.008*	-0.007**	-0.003***			
				(0.053)	(0.032)	(0.000)			
Benchmark model + RBE							-0.010*	-0.008**	-0.004***
							(0.087)	(0.018)	(0.000)
Rho			0.106*			0.105*			0.106*
			(0.072)			(0.073)			(0.070)
Dep. = Foreign Liabilities Sudden Stops									
Benchmark model	-0.001	-0.001	0.000						
	(0.159)	(0.162)	(0.764)						
Benchmark model + CTR				-0.002*	-0.002	0.000			
				(0.089)	(0.104)	(0.484)			
Benchmark model + RBE							-0.001	-0.001	0.000
							(0.242)	(0.237)	(0.945)
Rho			0.377**			0.377**			0.377**
			(0.000)			(0.000)			(0.000)
Dep. = Financial Account Balance Sudden Stops									
Benchmark model	-0.001	-0.001	-0.001						
	(0.687)	(0.169)	(0.322)						
Benchmark model + CTR				-0.002	-0.002	-0.001			
				(0.119)	(0.146)	(0.197)			
Benchmark model + RBE							-0.002	-0.002	-0.001
							(0.625)	(0.119)	(0.252)
Rho			0.063			0.062			0.063
			(0.245)			(0.251)			(0.248)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	481	410	410	481	410	410	481	410	410
N clusters	50	41	41	50	41	41	50	41	41

Notes: P-values in parentheses. RE represents panel probit model with random effects. SPRE represents linear spatial autoregressive panel model with random effects. For panel probit model with random effects the average marginal effects calculated by delta method are reported. Benchmark model corresponds to 2^{nd} stage model from Delatte et al. (2022) reported in Table 3 in column (1) for reporter country fixed effect. 'Benchmark + CTR' refers to specification (2) in Table 3 for reporter country fixed effect. 'Benchmark + RBE' refers to specification (3) in Table 3 for reporter country fixed effect. Relative ranking of a country is calculated from equation [5].

Table A9: Determinants of sudden stop episodes - alternative identification scheme (*ratio*)

Measure - Adjusted FDI ratio (ratio)									
	RE unbal.	RE	SPRE	RE unbal.	RE	SPRE	RE unbal.	RE	SPRE
Dep. = Forbes and Warnock (2021)									
Benchmark model	1.024	0.632	0.796						
	(0.368)	(0.635)	(0.544)						
Benchmark model + CTR				1.523	0.504	0.688			
				(0.202)	(0.716)	(0.593)			
Benchmark model + RBE							6.755	6.316*	6.708
							(0.112)	(0.099)	(0.104)
Rho			0.103*			0.104*			0.105*
			(0.079)			(0.073)			(0.079)
Dep. = Foreign Liabilities Sudden Stops									
Benchmark model	2.289	2.181***	2.043**						
	(0.138)	(0.005)	(0.026)						
Benchmark model + CTR				1.311	1.523*	1.692**			
				(0.122)	(0.053)	(0.030)			
Benchmark model + RBE							12.60	14.25***	11.05**
							(0.166)	(0.002)	(0.000)
Rho			0.376***			0.379***			0.362***
			(0.000)			(0.000)			(0.000)
Dep. = Financial Account Balance Sudden Stops									
Benchmark model	0.910	0.939	0.744						
	(0.701)	(0.442)	(0.475)						
Benchmark model + CTR				0.632	1.153	1.011			
				(0.781)	(0.946)	(0.340)			
Benchmark model + RBE							6.973***	9.470***	9.973***
							(0.007)	(0.000)	(0.001)
Rho			0.064			0.066			0.060
			(0.237			(0.230)			(0.276)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	481	410	410	481	410	410	481	410	410
N clusters	50	41	41	50	41	41	50	41	41

Notes: P-values in parentheses. RE represents panel probit model with random effects. SPRE represents linear spatial autoregressive panel model with random effects. For panel probit model with random effects the average marginal effects calculated by delta method are reported. Benchmark model corresponds to 2^{nd} stage model from Delatte et al. (2022) reported in Table 3 in column (1) for reporter country fixed effect. 'Benchmark + CTR' refers to specification (2) in Table 3 for reporter country fixed effect. 'Benchmark + RBE' refers to specification (3) in Table 3 for reporter country fixed effect. Relative ranking of a country is calculated from equation [5].