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Sudden Stops and Asset Purchase Programmes in the Euro Area

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Abstract

This paper analyses the incidence and severity of sudden stops in euro area countries before and after the introduction of the ECB's asset purchase programmes. We define sudden stops as abrupt declines in private net financial inflows, i. e. total flows adjusted for EU and IMF loans and changes in TARGET2 balances. We document that sudden stop were more frequent and more severe in euro area countries compared to other OECD economies over the period 1999 – 2020. We find that the susceptibility of euro area countries to severe sudden stops mainly reflects domestic fundamentals whereas there is no clear evidence of an adverse direct effect of being part of the euro area. Moreover, our econometric analysis suggests that the ECB asset purchase programmes have overall almost halved the risk of severe sudden stops in euro area countries. We find tentative evidence that this effect operates through confidence channels.

Keywords: Financial flows, sudden stops, monetary policy, ECB asset purchase programmes

JEL Classification: F21, F31, F32, F41, F45

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I. Introduction

Sudden stops, i. e. abrupt declines in net financial inflows, matter from a macroeconomic perspective. They are often associated with a painful compression of domestic demand and a real depreciation, either through an adjustment of the nominal exchange rate or significant declines in domestic prices and wages (*Calvo/Reinhart* 2000; *Krugman* 2014; *Martin/Schuknecht/Vansteenkiste* 2007).

The experience of the first two decades of Europe's Economic and Monetary Union has illustrated that euro area countries are not immune to episodes of booms and busts connected to sudden shifts in international financial flows (*Lane* 2013; *Lane/McQuade* 2014; *Alcidi* et al. 2020). Following strong net financial inflows in the first decade of the single currency, several euro area countries witnessed abrupt reversals during the global financial crisis and the euro area sovereign debt crisis. However, in the subsequent years – and even after the outbreak of the COVID-19 pandemic in 2020 – the net financial inflows of euro area countries remained surprisingly resilient despite persistent macroeconomic vulnerabilities in some countries.

An important policy question is if the recent resilience of the net financial inflows of euro area countries could be partly related to the unconventional monetary policy measures implemented by the European Central Bank (ECB), most notably its large-scale asset purchase programmes. In response to persistently low inflation in the euro area, in 2015 the ECB started purchasing public sector securities in addition to some private assets.[1] In addition, in March 2020 the ECB initiated the Pandemic Emergency Purchase Programme (PEPP) in response to the COVID-19 outbreak.[2]

The effect of the ECB's asset purchases on financial flows is a priori ambiguous. On the one hand, central bank asset purchases may trigger international portfolio rebalancing towards foreign assets and thus trigger net financial outflows in the balance of payments. In fact, *Cœuré* (2017) observes sizeable net outflows of portfolio investment for the euro area as a whole following the introduction of the ECB's purchases of public sector securities under the APP.

[1] The targets for the overall APP purchase volumes have varied over time, reaching up to 80€ billion per month. In early 2021, the stock of APP holdings stood close to 3,000€ billion, of which around 80 percent consisted of public sector securities. The allocation of the asset purchases across euro area countries is guided by the ECB capital key of the national central banks.

[2] The PEPP also consists of purchases of private and public sector securities, with a total envelope of 1,850 € billion. Again, the ECB capital key serves as the benchmark for the allocation of purchases of public sector securities. However, there is flexibility regarding the composition and timing of the purchases, with a view to preventing an unwarranted tightening of financing conditions. We cannot explore whether this flexibility matters in our context, since our dataset only covers a few months of the PEPP purchases.

Bergant/Fidora/Schmitz (2020) also provide evidence that euro area investors rebalanced from euro area into foreign debt securities. On the other hand, there remains the question whether the purchase programmes have – even if this is not their objective – helped preventing tail events, i. e. extreme declines in net financial inflows in individual euro area countries. Such positive effects on net financial inflows could come from confidence effects related to the purchases. The literature has documented that the ECB asset purchases may reduce economic and financial uncertainty and improve the economic outlook (see e. g. *Altavilla/Carboni/Motto* 2015; *Andrade* et al. 2016; *Afonso* et al. 2018; *Moessner* 2018; *Neri/Siviero* 2018; *De Santis* 2020). Moreover, international investors may perceive that the APP and the PEPP effectively establish a "purchaser of last resort" for government bonds of euro area countries for the duration of the programmes. Taken together, such confidence effects could help to stabilise financial inflows, particularly in times of financial market distress.

Against this backdrop, this paper analyses the determinants of sudden stops in euro area countries and other OECD countries, with a special focus on the role of the ECB's asset purchase programmes. We add to the literature by differentiating between mild and severe sudden stops based on the cumulative change of private net financial inflows during the episode. The literature on sudden stops has documented that the link between net financial flows and their determinants depends on the magnitude of the flows (see e. g., *Ghosh* et al. 2014, for surges). The factors explaining relatively contained changes in net financial flows will generally differ from those determining tail events. This could also apply to the ECB's asset purchases, as discussed above. By distinguishing between mild and severe sudden stops, we are able to analyse in a parsimonious way how the influence of the explanatory factors changes with the intensity of the episode.

For our econometric analysis, we look at quarterly data covering 42 OECD and EU countries, including all euro area countries. The broad sample allows a comparison of euro area countries with other advanced economies and helps increasing the number of sudden stops and thus the precision of the econometric estimates. After carving out a few stylised facts on the characteristics of sudden stops, we set up a multinomial logit model to explain the incidence of mild and severe stops based on a relatively standard set of global and domestic factors.

Our analysis is based on net financial inflows since the macroeconomic implications of swings in gross flows are more ambiguous. Gross financial flows may have important implications in particular from a financial stability perspective. At the same time, abrupt changes in gross flows on the asset and the liability side often in part offset each other, such that the reversal in net flows is smaller than that in gross flows, and therefore have only second-order effects on macroeconomic conditions (*Broner* et al. 2013). In fact, the literature finds that gross

outflows on the asset (or liability) side which are offset by an increase in gross inflows on the liability (or asset) side and thus do not result in net outflows are less painful in terms of the GDP loss (*Cavallo* et al. 2015).[3] Moreover, the literature typically finds that gross flows are highly correlated across countries and largely respond to global factors (*Forbes/Warnock*, 2012, 2021; *Davis/Valente/Van Wincoop* 2021) whereas declines in net inflows are more closely related to macroeconomic vulnerabilities at the country level.

An important contribution of this paper lies in the adjustment of financial flows for cross-border financing provided by and channelled through the official sector. EU-IMF progamme financing has contributed to a substantial smoothing of the current account adjustment in the euro area countries concerned, particularly in the aftermath of the global financial crisis. Arguably, these countries would have experienced much sharper current account reversals in the absence of such funding (*Merler/Pisani-Ferry* 2012). This is directly reflected in the financial account of those countries, which in the absence of any progamme financing would have undergone much sharper adjustments. In the same vein, private financial inflows were also substituted for by official sector inflows within the Eurosystem as reflected in widening TARGET2 balances. Hence, failing to correct financial flows for progamme financing and inter-country official sector liquidity flows would distort the identification of episodes of serious funding pressures due to sudden stops of private financial inflows.

Overall, our findings suggest that the Eurosystem's asset purchases under the APP and the PEPP have significantly reduced the probability of severe sudden stops in euro area countries, possibly by mitigating concerns about tail risks in individual countries. We also find a strong role for global factors, in particular investors' overall risk attitude, in determining whether a country experiences a sudden stop. By contrast, the severity of sudden stops is strongly influenced by domestic macroeconomic and structural characteristics. These findings suggest that it is important to strengthen domestic economic fundamentals before the Eurosystem's net asset purchases will come to an end.

The remainder of the paper proceeds as follows: Sections 2 and 3 describe our definitions of private net financial inflows and sudden stops, respectively. Section 4 provides descriptive statistics on our dataset. Section 5 presents our econometric methodology and baseline results, whereas Section 6 adds a number of robustness tests in terms of alternative measures of our dependent variable, additional explanatory variables and sample composition. Section 7 provides concluding remarks.

[3] This also implies that sudden stops are neither necessarily always accompanied by a current account rebalancing nor are they necessarily triggered by a current account deficit, as gross flows can undergo sharp swings also in the presence of a balanced current account.

II. Private Net Financial Inflows

Our analysis is based on private net financial inflows. As there is no readily available cross-country data on private financial flows based on an internationally agreed statistical definition, private flows need to be proxied. Previous studies have suggested different approaches. *Merler/Pisani-Ferry* (2012) take the current account balance, with inverted sign, as an approximation of total net financial inflows and obtain a proxy for private net financial inflows by subtracting two types of official sector flows: (i) official sector flows stemming from EU and IMF progamme financing and (ii) official sector flows within the Eurosystem as measured by changes of TARGET2 balances of the central banks of individual euro area countries with the ECB.[4] One problem with this approach is that the resulting proxy includes not only those financial flows that are accounted for in the financial account of the balance of payments but also flows accounted for in the capital account of the balance of payments. These flows are however typically official sector financing, relating for instance to debt forgiveness or EU cohesion funds.[5] A remedy to this problem is provided by *Ghosh* et al. (2014) who directly take total financial inflows from the financial account of the balance of payments and obtain a proxy for private financial inflows by subtracting "other investment" liabilities of the general government and changes in reserve assets. An important caveat is that this proxy does not exclude official sector flows within the Eurosystem in the form of changes in TARGET2 balances as these are not other investment liabilities of the general government but other investment liabilities of the central bank.

Bearing in mind that the identification of private net financial inflows is not straightforward we follow *Ghosh* et al. (2014) in taking as a starting point total net financial inflows from the financial account of the balance of payments but perform the adjustments made in *Merler/Pisani-Ferry* (2012). In a first step, quarterly total net financial inflows, *TNF*, are constructed as the sum of net inflows in direct investment, portfolio investment and other investment, thus leaving aside financial derivatives and reserves. Net inflows are in turn obtained

[4] TARGET2 is a real-time gross settlement system for euro-denominated payments that is owned and operated by the Eurosystem, i. e. the ECB and the national central banks of those countries that have adopted the euro. TARGET2 balances are intra-Eurosystem positions on the balance sheets of the national central banks resulting from net cross border payments in the form of central bank reserves via TARGET2. TARGET2 balances essentially emerge when the amount of reserves created by one national central bank does not equate with the amount of reserves deposited at that central bank. For a more detailed description of TARGET2 and its role in the balance of payments, see *Bindseil/König* (2012); *Eisenschmidt* et al. (2017).

[5] While the size of the capital account balance is negligible for most advanced economies, it can be quantitatively important for developing economies and the former transition economies in the EU.

as the difference between liability flows, i. e. net acquisitions of domestic assets by foreigners, and asset flows, i. e. net acquisitions of foreign assets by residents. In a second step, private net financial inflows, PNF, are isolated by stripping out (net) programme financing, ($PF^{received} - PF^{paid}$), received from the EU or the IMF and – in the case of euro area countries – changes in TARGET2 balances, $\Delta T2$, which reflect the automatic external financing via the Eurosystem.[6] Thus, private net financial inflows are obtained as follows:

$$PNF = TNF - \left(PF^{received} - PF^{paid}\right) + \Delta T2 \tag{1}$$

By removing changes in TARGET2 balances from total financial flows, our analysis should also be immune to potential distortions related to the technicalities of the ECB's asset purchase programmes. TARGET2 balances have increased substantially – in absolute terms – since the intro duction of the APP in 2015 and the PEPP in 2020. *Eisenschmidt* et al. (2017) argue that this does not necessarily signal balance of payments stress but instead reflects the interaction of decentralised monetary policy implementation and the integrated financial structure of the euro area. Each national central bank creates reserves on its own balance sheet in order to fund asset purchases under the APP and the PEPP. These reserves often flow into other euro area countries since only a few locations act as financial gateways between the euro area and the rest of the world. As a result, the TARGET2 claims (liabilities) of countries that host such gateways increase (decrease).

Another important caveat relates to the treatment of errors and omissions in the balance of payments. As *Lane/Milesi-Ferretti* (1999, 2007) point out, errors and omissions could correspond to transactions that are unrecorded either in the current account or in the financial account.[7] To the extent that errors and omissions reflect unrecorded private net financial inflows, disregarding these flows could distort our analysis. Therefore, we run robustness checks based on an alternative definition of private net financial flows accounting for errors and omission in Section 6.

Finally, it should be noted that private net financial inflows, as defined here, still contain transactions by foreign public entities, particularly central banks, developments banks and sovereign wealth funds. It is difficult to isolate such

[6] Programme financing covers IMF loans and financial assistance provided by the European Stability Mechanism (ESM), the European Financial Stability Mechanism (EFSM), the European Financial Stability Facility (EFSF), the EU Greek loan facility and the EU balance of payments assistance facility. The first source of financing is open to all IMF members, while the remaining sources are only available to a smaller subset of our sample.

[7] In principle, errors and omissions could furthermore also be due to mismeasurement of the capital account.

flows, since they are not recorded separately in the balance of payments statistics. Excluding these flows, however, from our definition of official flows is justifiable as they are generally not governed by the same overarching objective of mitigating balance of payments stress in the recipient country.[8]

Figure 1 illustrates our adjustment by decomposing total net financial inflows to those euro area countries that received programme financing over the last decade (i. e. Cyprus, Greece, Ireland, Portugal and Spain) into private and official sector components (as a share of combined GDP).[9] It turns out that until the outbreak of the global financial crisis foreign funding was obtained almost exclusively from private sector sources. With the outbreak of the crisis, however, a large part of total net financial inflows were provided for via the incurrence of TARGET2 liabilities with the ECB. Starting in 2010 programme financing was disbursed such that taken together official net financial inflows actually offset private net financial outflows. As a result, official sector funding masked a pronounced stop in private net financial inflows at the height of the euro area sovereign debt crisis that only came to a halt in 2013.

III. Identification of Mild and Severe Sudden Stops

Our identification of sudden stop episodes essentially follows a hybrid approach between the methodologies proposed in the seminal papers studying extreme movements in financial flows, i. e. sudden stops as well as surges, by *Forbes/Warnock* (2012, 2021) and *Ghosh* et al. (2014). *Forbes/Warnock* (2012, 2021) use quarterly data on – primarily gross – financial flows and identify large swings (including both surges and stops) in financial flows as periods of consecutive quarters that start with a year-on-year change of the four-quarter moving sum of (gross) flows that is more than one standard deviation above its five-year rolling average and include at least one quarter during which the year-on-year change of the four-quarter moving sum of gross flows is at least two standard deviations above its five-year rolling average. *Ghosh* et al. (2014) in turn identify surges – based on annual data – as years during which net (private) financial inflows belong to the 30th percentile of a country's own distribution of flows as well as the 30th percentile of the full-sample distribution of flows over all countries.

[8] Empirical studies, generally show that the portfolios of sovereign wealth funds as well as – at least – the investment tranche of reserve assets is responsive to standard risk-return considerations (*Beck/Fidor*a 2008; *Lu/Wang* 2019), although other – partly strategic – factors can also play a role (*Chhaochharia/Laeven* 2008).

[9] The figure excludes Latvia as it received EU balance of payments assistance prior to euro adoption.

In the following we choose to combine elements of the two identification strategies. First, we follow *Forbes/Warnock* (2012, 2021) by exploring the additional information contained in quarterly balance of payments data as opposed to annual data. In this way we also avoid missing episodes that, for instance, are composed of the last quarter of a given year and the first quarter of the next year and are followed by a quick recovery in the subsequent quarters such that any stop would be invisible in the annual data. Second, we opt for identifying extreme movements as such changes that are large both in terms of the country distribution as well as the global distribution as in *Ghosh* et al. (2014). In this way we mitigate the potential problem of countries with structurally relatively high volatility of financial flows – notably financial hubs, which we will also scrutinise in our robustness checks – registering a generally larger number of episodes than countries with less volatile flows.

Specifically, for an observation to qualify as a sudden stop, we require the year-on-year change in the four-quarter moving sum of private net financial inflows (expressed as a percentage of GDP), $\Delta_4 c_t$, to fall within

1. the 20th percentile of the country-specific distribution and
2. the 20th percentile of the "global", i. e. full-sample, distribution

where

$$c_t = \sum_{i=0}^{3} npf_{t-i} \qquad \text{with } t = 1, 2 \ldots T \tag{2}$$

$$\Delta_4 c_t = c_t - c_{t-4} \qquad \text{with } t = 5, 6 \ldots T \tag{3}$$

If several consecutive quarters fulfil the above criteria, these are treated as a single episode. Moreover, if two or more quarters qualifying as an episode are separated by one or two quarters in which this is not the case, all these quarters are treated as one episode. Finally, all episodes lasting only one quarter are discarded, since they can be considered as uninformative noise in the data.

We add to the literature by distinguishing between "mild" and "severe" sudden stops. This distinction is motivated by the well-documented fact that the link between net financial flows and their determinants depends on the magnitude of the flows (see e. g., *Ghosh* et al., 2014, for surges). The factors explaining relatively contained declines in net financial inflows, as observed frequently in the data, are likely to differ from those determining tail events, i. e. large declines in financial inflows. Against this backdrop, the existing literature typically defines a quantitative threshold for sudden stops and then restricts the analysis to these extreme events. However, in this paper, we will show that even within such a subset of sudden stops defined on the basis of conventional numerical thresholds there is systematic heterogeneity across episodes. We therefore take a more

granular approach, differentiating between mild and severe sudden stops. We argue that this is a parsimonious way of studying the incidence of sudden stops and their severity simultaneously.

In operational terms, we first calculate the cumulative change in private net financial inflows (as a share of GDP) over all quarters that form an episode. We then define all episodes for which this metric lies in the lower 20th percentile of the full-sample distribution as episodes of "severe" sudden stops whereas the remaining episodes are classified as "mild". The metric chosen has the advantage of capturing both the magnitude and the persistence of the changes in financial flows. In Section 6 we conduct robustness checks using different thresholds for identifying the episodes.[10]

An illustration of our identification strategy is provided in Figure 2 taking Greece as an example. Overall, we identify five episodes of which all but the first one taking place over the period 2008Q4 – 2009Q1 are classified as severe. The start of the first severe episode in 2010Q2 coincides with the downgrading of Greece's sovereign debt rating by the three major rating agencies in April 2010, the dramatic increase of its sovereign spread over German bunds to above 1,000 basis points by the end of April and the formal request for international financial assistance by the government in late April which resulted in the agreement on a first assistance package with the EU and the IMF in May 2010. A second episode is identified to start in 2012Q1 as yields on Greek government bonds peaked at 44 percent and a second international financial assistance packaged was agreed. The third episode which is identified to last from 2015Q1 to 2015Q4 in turn marks the culmination of Greece's sovereign debt crisis which coincided with the parliamentary elections in 2015Q1, the subsequently difficult negotiations with creditors, the failed bailout referendum, partial closure of the banking sector and the imposition of capital controls. Finally, we identify a short-lived episode also at the beginning of 2020 when at the start of the intensification of global financial market strains due to the COVID-19 pandemic capital flows retrenched globally. Importantly, the visual inspection of Figure 2 suggests that it would have been difficult to detect these episodes on the basis of total as opposed to private net financial inflows. In fact, only two out of the five episodes are characterised by a – if anything moderate – decline in total net financial inflows and in particular the episode around the culmination of Greece's sovereign debt crisis does not show any reduction of total net financial inflows.

[10] Our results are also robust to the identification criteria used in *Forbes* and *Warnock* (2012, 2021).

IV. Descriptive Analysis

Our empirical analysis is based on quarterly observations over the period 1999Q1 – 2020Q2 for a broad (unbalanced) sample of 42 EU and OECD countries, including all euro area countries. Since the focus of our analysis is on the euro area, our sample starts with the introduction of the euro in 1999. We deliberately include other OECD countries so as to allow for comparing the euro area to other economies. The broader sample also provides for a larger number of sudden stops and should thus increase the precision of the econometric estimates.

Quarterly data on financial flows in portfolio investment, direct investment and the category of other investment are sourced from the IMF Balance of Payments Statistics and the ECB. Data on international financial assistance progammes are taken from the IMF, the European Commission and the European Stability Mechanism. Data on TARGET2 balances are published by the ECB.

Applying the methodology described in Section 3 to our full sample, we identify 142 episodes of sudden stops in private net financial inflows, which are listed in Table 1.[11] The average episode lasts for 3.9 quarters. This finding is in line with *David/Gonçalves* (2019) and *Bandaogo/Chen* (2020) who – based on the identification strategy of *Forbes/Warnock* (2012, 2021) – report episodes to last between 3.7 and 3.9 quarters and 2.7 and 6.5 quarters, respectively. The average intensity in terms of the cumulative fall in private net financial inflows is 12.2 percent of GDP (Table 2). Out of all sudden stops, 29 are classified as severe (which by definition corresponds to 20 percent of the total) while the remaining episodes are mild stops.

The stylised facts support the idea that it is important to distinguish between mild and severe stops. During severe stops private net financial inflows decline by 38.1 percent on average, whereas the corresponding retrenchment is only 5.5 percent for mild stops. Moreover, severe stops typically last 5.1 quarters, compared to 3.6 quarters for mild stops. Sudden stops tend to go hand in hand with pronounced economic slowdowns and thus seem to matter from a macroeconomic point of view. The output gap during a sudden stop episode is 0.8 percentage points lower than in the four quarters preceding the stop. The deterioration in the output gap for severe stops, averaging 2.6 percentage points, is significantly more pronounced than for mild stops which is further evidence that it is important to distinguish between these two types of sudden stops.

[11] In numerical terms, our global threshold for the identification of sudden stops is –3.6 percent of GDP, while the average country threshold is –5.8 percent. To qualify as a severe stop, the cumulative fall in private net financial inflows has to exceed 21.4 percent of GDP.

In the next step, we compare sudden stops in euro area countries with those in the other EU and OECD economies. Since we are mainly interested in possible differences between the two country groups that are related to the European Monetary Union, we only include countries in the euro area sample after they have joined the euro area. Overall, we find that sudden stops in euro area countries tend to be more frequent and more severe than in other economies. In euro area countries 19.7 percent of all available quarterly observations qualify as a sudden stop, compared to 13.3 percent for the other economies (Table 2). Moreover, 35.0 percent of all sudden stops in euro area countries are classified as severe, compared to 9.8 percent in other EU and OECD countries.

While sudden stops in euro area countries tend to be more severe, this does not mean that severe stops are more intense in euro area countries than in the other EU and OECD economies. During a severe stop, private net financial inflows typically decline by 36.7 percent of GDP in euro area countries (in cumulative terms), while the average decline is 41.6 percent for other advanced economies (Table 2).[12] What is more, the slowdown in economic activity associated with severe sudden stops appears to be much smaller in the euro area than in other economies. The change in the output gap over a severe episode is on average –1.3 percentage points for euro area countries, whereas it reaches –6.2 percentage points on average in the other EU and OECD economies.

Overall, our findings are broadly consistent with the theoretical predictions of *Fagan/McNelis* (2020) who argue that the availability of TARGET2 financing for euro area countries increases the frequency of sudden stops, as it exacerbates the tendency towards over-borrowing, while also mitigating their real economic impact in terms of output, consumption and investment. In our econometric analysis, we will shed some light on this key finding of our paper.

We next dissect our sample along the time dimension. There is clear evidence that sudden stops tend to be synchronised across countries and concentrated in times of global economic and financial turmoil (Figure 3). For analytical purposes, it is useful to split the sample into three distinct time periods of similar length (Table 3): 1999Q1 – 2006Q4, 2007Q1 – 2014Q4 and 2015Q1 – 2020Q2. The first period from 1999Q1 to 2006Q4 covers the "Great Moderation" in the years leading up to the global financial crisis. This was a relatively calm period, with a sudden stop frequency of 8.2 percent for our full sample and not a single severe sudden stop. By contrast, sudden stops were particularly frequent and intense in the second period (2007Q1 – 2014Q4) which includes the global financial crisis and the euro area sovereign debt crisis. In this period, the share of observations associated with a sudden stop increased to 22.5 percent, of which

[12] Since the relative frequency of severe episodes is higher for euro area countries, the typical intensity of all sudden stops (i. e. mild plus severe episodes) is nevertheless higher for euro area countries than for the peer group.

almost a third are classified as severe stops. The frequency of sudden stops peaked at around 50 percent in 2009Q1 and then declined only gradually, remaining elevated for several years. A renewed sharp increase in the number of sudden stops was observed in 2011 and 2012 only to be reigned in by swift policy action, including the ECB's announcement of the Outright Monetary Transactions (OMT) programme ("whatever it takes"). At the start of the third period (2015Q1 – 2020Q2), the frequency of sudden stops briefly spiked again amid heightened volatility in global financial markets, although it remained below the previous peak and was mainly concentrated on mild stops. Thereafter, the frequency of sudden stops fell back towards more moderate levels. Even after the start of the COVID-19 pandemic and the associated global economic downturn in 2020, the number of sudden stops remained relatively low. As a result, around 15.5 percent of all observations in the last period covered by our sample (2015Q1 – 2020Q2) correspond to a sudden stop. Compared to the period 2007Q1 – 2014Q4, the decline in the frequency of sudden stops was more pronounced for severe stops than for mild stops.

The developments in the euro area countries broadly mirrored those in the full sample (Table 3). However, the increase in the relative frequency of severe stops in the period 2007Q1 – 2014Q4 and the subsequent shift towards mild stops in the period 2015Q1 – 2020Q2 was even more pronounced for the euro area than for the other EU and OECD economies. Interestingly, the start of the second period broadly coincided with the launch of the ECB's APP. We will return to this observation in the context of our econometric analysis.

We now explore the question whether our main stylised facts change if we look at total as opposed to private net financial inflows. To this end, we identify an alternative set of sudden stops based on total flows, using the same criteria as described above and thus different numerical thresholds. Based on this alternative metric, euro area countries do not stand out in terms of the frequency or severity of sudden stops. In fact, the share of quarters with a sudden stop is now similar for euro area countries and the rest of our sample, for both mild and severe stops (Table 2). Overall, in euro area countries official financial flows appear to be particularly effective in counteracting sudden stops in private financial flows. This is broadly consistent with the results of *Lane/Milesi-Ferretti* (2012) and *Gros/Alcidi* (2015) who find that ECB liquidity, particularly in the form of TARGET2 financing, cushioned the exit of private financial flows during the global financial crisis. However, despite this stabilising role of official flows in the euro area, balance of payments stress as signalled by sudden stops in private financial flows is typically still associated with an economic slowdown, as shown above. Our econometric analysis will therefore focus on sudden stops identified on the basis of private financial flows as a proxy for balance of payments stress.

Overall, the stylised facts gathered in this section suggest a role for both global and domestic factors in determining a country's risk of experiencing a sudden stop in net financial inflows. On the one hand, the synchronisation of sudden stops across countries indicates that common factors are at play. On the other hand, not all countries appear to be equally susceptible to sudden stops, suggesting that conditions in the recipient countries could also be relevant. In particular, we find that sudden stops in euro area countries are more frequent and severe than in non-euro area OECD economies. Notwithstanding this, the frequency and severity of sudden stops in euro area countries has declined over recent years and remained low even in times of economic and financial turmoil. Our econometric analysis in the next section will help to explain these stylised facts.

V. Econometric Analysis

In the following we base our analysis on a multinomial logit model of mild and severe sudden stops in advanced economies. For each economy i and quarter t, we distinguish between three different states as defined in Section 3: tranquil periods ($j = 0$), mild sudden stops ($j = 1$) and severe sudden stops ($j = 2$). Tranquil periods, characterised by the absence of a sudden stop, are set as the base outcome. We then estimate the probability of mild and severe sudden stops as follows:

$$\Pr(Y_{it} = j|\boldsymbol{X}_{t-1}) = \frac{exp(\beta_j \boldsymbol{X}_{t-1})}{1 + \sum_{k=1}^{2} exp(\beta_k \boldsymbol{X}_{t-1})} \tag{4}$$

Here, Y_{it} is a variable indicating the state, i. e. whether a quarter is classified as a tranquil period, a mild sudden stop or a severe sudden stop in country i in quarter t and $\boldsymbol{X}_{t-1}$ is a vector of explanatory variables. All explanatory variables are lagged by one quarter (as e. g. in *Forbes/Warnock* 2012, 2021) to mitigate any potential endogeneity issues and standard errors are clustered at the country level to address possible correlation in the error term.[13]

The vast literature on financial flows provides for a legion of candidate explanatory variables for modelling financial flows, typically divided into push factors and pull factors, i. e. global and domestic determinants. In the following we benefit from the previous work that focuses specifically on the incidence of sudden stops (and in part also surges) as extreme movements of financial flows.

[13] The results are robust to region-specific effects.

Most studies concur that, among the push factors, higher global risk aversion, higher global interest rates, lower global growth and regional contagion are typically associated with a larger probability of sudden stops, while among the pull factors lower domestic growth, looser monetary policy, higher debt and less flexible exchange rate regimes increase the likelihood of sudden stops (see *Edwards* 2004, 2007; *Calvo/Izquierdo/Mejia* 2008; *Cavallo/Frankel*, 2008; *Bordo/Cavallo/Meissner* 2010; *Jevcak/Setzer/Suardi* 2010; *Forbes/Warnock* 2012, 2021; *Calderon/Kubota* 2013; *David/Gonçalves* 2019; *Belke/Volz* 2018). With regards to openness, while there is a consensus that higher financial openness generally increases the vulnerability of a country's external position, there is no consensus in the literature as to whether higher openness to trade by raising a country's vulnerability to foreign shocks also increases the likelihood for countries to experience sudden stops or whether instead it makes adjustment less painful and thus mitigates large swings in flows of capital (see e. g. *Milesi-Ferretti/Razin* 1998; *Edwards* 2004; *Calvo/Izquierdo/Mejia* 2008; *Cavallo/Frankel*, 2008).

Particular attention has naturally been devoted to capital controls, as it is a variable that is directly controlled by the policymaker. Over the past decades, however, the literature has largely questioned the usefulness of capital controls for preventing sudden stops of net financial inflows, see e. g. *Calvo/Reinhart* (2000) among many others. Empirical studies have mostly found that capital controls exert little if no influence (see e. g. *Edwards,* 2004, 2007; *David/Gonçalves* 2019) and *Forbes/Warnock* (2012) even find that capital controls are associated with a higher likelihood of sudden stops in net financial inflows. The concept of capital controls is however very broad as these can take various forms, imposing restrictions on outflows or inflows relating to different types of transactions in terms of instruments, size, transacting parties or purpose. This greatly complicates the empirical assessment of their effectiveness, even more so if controls are only imposed to mitigate already materialising balance of payments stress. In this case, their econometric identification may also suffer from endogeneity issues, as the imposition of capital controls in response to balance of payments stress correlates positively with the event of a sudden stop, which may also at least partly explain the finding of *Forbes/Warnock* (2012). More recently, following the global financial crisis a gradual paradigm shift can be observed, as evidenced for instance in the International Monetary Fund's somewhat less critical view of capital flow management (see International Monetary Fund, 2012) which has led *Eichengreen/Gupta* (2018) to note that it "is fair to say that there is no consensus on or general answer to the question how capital-control measures are best utilised in the event of a sudden stop".

The effect of the ECB's asset purchases on financial flows is a priori ambiguous. On the one hand, central bank asset purchases may trigger international portfolio rebalancing towards foreign assets. The channels through which central bank asset purchases affect international portfolio rebalancing emerge from

the transmission channels of unconventional monetary policy in the domestic economy. Beyond pure scarcity effects, asset purchases can work through the signalling effect, the extraction of duration risk, as well as the risk-taking, confidence and inflation channels (*Krishnamurthy/Vissing-Jorgensen* 2011). If quantitative easing is successful in lowering domestic long-term yields, investors will hunt for yields abroad. The duration risk channel may add to this effect as the shortage of assets induces investors to accept smaller term premia which further depresses domestic yields and increases the attractiveness of investing in higher yielding assets abroad (*Chari/Stedman/Lundblad* 2017). Moreover, although the APP does not target short-term rates, investors may believe that the central bank is committed to keeping also short rates low for a considerable time. This creates expectations of persistent interest rate differentials which incentivises cross-border carry trades (*Neely* 2015). As a result, under the inflation channel, inflation expectations may increase which – if purchasing power parity holds – should lead to a depreciation of the currency and thus further increase the appetite for foreign assets. Finally, the confidence channel may lead investors to infer from the central bank's asset purchase programme that it has private information on the economic outlook which weighs on investor sentiment and increases risk aversion.

The review of the portfolio rebalancing channels makes a rather clear case for the ECB's asset purchase programmes to prima facie trigger net financial outflows in the balance of payments. In fact, *Cœuré* (2017) observes large net outflows of portfolio investment following the introduction of the ECB's purchases of public sector securities under the APP which at their peak in mid-2016 reached an all-time high of nearly 5 percent of euro area GDP. *Bergant/Fidora/Schmitz* (2020) indeed provide detailed evidence, based on the ECB's Securities Holding Statistics (a granular dataset of euro area security holdings at the level of each individual security), that euro area investors rebalanced from euro area into foreign debt securities.

On the other hand, despite the theoretical predictions and empirical evidence pointing to the ECB's asset purchase programmes having supported net financial outflows from the euro area as a whole, there remains the question whether the purchase programmes have – even if this is not their objective – helped prevent extreme episodes of net financial outflows in euro area countries as they mitigate tail risks in euro area countries. Such positive effects on net financial inflows could come from confidence effects related to the purchases. In particular in times of financial market distress, the ECB asset purchases may reduce economic and financial uncertainty and improve the economic outlook, which could lead to stabilising financial inflows (see e. g. *Altavilla/Carboni/Motto* 2015; *Andrade* et al. 2016; *Afonso* et al. 2018; *Moessner* 2018; *Neri/Siviero* 2018; *De Santis* 2020). We will explore this question in the following.

Table 5 presents our baseline regression results, based on a subset of the previously identified candidate variables that turn out to be significant in at least one specification (see Table 4 for variable definitions and data sources). The first column shows the results of our baseline regression for the full sample of EU and OECD countries. The results for mild stops are displayed in the upper panel of the table, those for severe stops in the lower panel. Overall, we find that global factors determine whether a country experiences a sudden stop, whereas domestic macroeconomic and structural characteristics strongly influence the severity of the sudden stop. These findings are in line with the results by *Ghosh* et al. (2014, 2018) in the sense that global factors act as "gatekeepers" that determine when an episode of extreme swings in financial flows will occur but domestic factors matter for the severity of the episode.

In greater detail, all of our global variables are statistically significant for mild stops and, with the exception of the global interest rate, also for severe stops.[14] To start with, higher levels of global risk increase the probability of a mild sudden stop, although this effect is reversed for safe haven countries (Germany, Japan, Switzerland and the United States). Against an unconditional probability of a mild sudden stop of eleven percent in the estimated sample, a one standard deviation shock to the median of the global volatility index (i. e. tighter-than-average financial conditions) increases the predicted mild stop probability by about three percentage points. However, if the country is a safe haven the probability declines by five percentage points (keeping all the other variables at their mean values). There is also some evidence that a more negative global output gap and lower global interest rates increase the risk of mild stops. Moving from the sample median of either global interest rates or the global output gap to the 25th percentile raises the predicted probability of a mild stop by around two and three percentage points respectively. The domestic variables included in our baseline specification are all statistically insignificant for mild stops.

The estimation results suggest a more prominent role for domestic factors in determining severe stops than in explaining mild stops. Countries are more likely to experience a severe stop if they record large net external debt, a high structural unemployment rate and a high degree of trade openness. There is also some evidence that the presence of capital controls can help reduce the likelihood of having a severe stop. At the same time, controlling for de iure capital account openness, we do not find evidence that de facto financial openness mat-

[14] The positive link between global interest rates and the likelihood of sudden stops stands in contrast to most of the literature who find a negative relationship. However, our result is in line with *Forbes* and *Warnock* (2021) who find that while global interest rates are insignificant in an earlier sample ranging from 1985 to 2009, global interest rates are significantly and negatively associated with both sudden stops of inflows of foreign capital as well as retrenchment foreign investment in later sample covering the period from 2010 to 2018.

ters for the incidence of mild or severe sudden stops (except for one specification in which the counter-intuitive negative sign contrasts the theoretical priors and previous empirical research). In quantitative terms and against the backdrop of an unconditional probability of a severe sudden stop of 1.3 percent, the predicted likelihood of a severe stop increases by 16 percent if the country's structural unemployment rate increases by one percentage point or net external debt rises by 20 percentage points. Moving from the sample median of trade openness to the 75th percentile doubles the predicted probability of a severe stop. The global and domestic factors are jointly highly statistically significant (Wald test p-value = 0.00) with a Pseudo-R2 of 11 percent. Our model does a good job in predicting episodes of abrupt declines in financial flows, in particular for larger episodes with an AUROC value of 0.65 for mild stops and 0.89 for severe stops.[15]

We now explore if being part of the euro area matters for a country's exposure to sudden stops. To this end, we include in our regression a dummy for euro area members which takes the value of one once a country has joined the monetary union and the value of zero otherwise (Table 5, column 2). However, this dummy is statistically insignificant for both mild and severe stops. Hence, we do not find evidence that being part of the euro area per se increases the susceptibility to severe stops. However, we cannot exclude that there are indirect effects operating via economic fundamentals. The absence of an autonomous monetary policy at the country-level and the fact that the nominal exchange rate does not serve as an adjustment channel can complicate the smooth correction of macroeconomic imbalances (*Lane/Pels* 2012; *Lane* 2013; *Gros/Alcidi* 2015; *Schnabl* 2021). Notwithstanding this, our econometric results strongly suggest that domestic fundamentals play an important role in explaining the relatively high incidence of severe sudden stops in euro area countries compared to other EU and OECD economies.

This view is further supported when we restrict the regression to a sample consisting only of euro area countries. Our main variables also keep their signs and statistical significance with a few notable differences (Table 5, column 3). The global output gap loses significance for mild stops whereas the safe haven dummy – now essentially a Germany dummy – becomes negative and highly significant for both mild and severe stops. For the euro area sample, there is also weak evidence that a higher degree of financial openness reduces the likelihood of a mild stop. Net external debt is no longer significant for severe stops, possibly because it is correlated with the structural unemployment rate which retains its significance.

[15] The AUROC corresponds to the area under the Receiver Operating Characteristics Curve. It varies between 0 and 1, with higher values pointing to better model performance.

In the next step, we explore if the introduction of the ECB's asset purchase programmes has fundamentally altered the susceptibility of euro area countries to sudden stops. To this end, we first add a dummy variable to our regression which captures the period when the ECB asset purchase programmes were implemented. It is denoted one for the years 2015 and beyond, and zero otherwise. The dummy turns out to be insignificant for the global sample while being significant for the euro area sample in the case of severe stops (Table 6, columns 1 and 2), thereby providing some tentative evidence for a regime shift around the time when the ECB net asset purchases started. In order to test whether the significance of our dummy variable is inherently related to ECB monetary policy, and does not simply capture a general regime shift in an environment of lower economic and financial uncertainty, we then restrict our sample to euro area countries and add to our baseline regression a variable capturing the combined net purchases under the ECB's Asset Purchase Programme (APP) and the Pandemic Emergency Purchase Programme (PEPP) at the country level (as percent of domestic GDP). While this variable covers only public sector securities, due to data availability issues, it captures the overwhelming majority of asset purchases by the Eurosystem. The estimation results show that the APP variable is insignificant for mild stops but highly significant with a negative sign for severe stops (Table 6, column 3). Interestingly, the post-2015 dummy loses significance when adding our asset purchase variable indicating that there has been indeed a genuine monetary policy impact from the asset purchase programme on financial flows. As regards the transmission mechanism, the positive – albeit insignificant –sign in the case of mild stops may suggest that indeed the portfolio rebalancing channel may a priori contribute to net financial outflows, but that this effect is very limited in terms of causing large movements and that in fact for the most extreme movements it is dominated by the opposite effect of the asset purchases actually containing severe events. In quantitative terms, we find that the asset purchases reduce the likelihood of a severe sudden stop in euro area countries by 44 percent. This effect is derived by comparing the probability of a severe sudden stop under the assumption of net asset purchases equivalent to their mean value (across euro area countries and over time) with the probability of a severe sudden stop assuming zero net asset purchases (Table 6, column 4).

Overall, our econometric findings suggest that the ECB's asset purchase programmes have significantly reduced the likelihood of euro area countries experiencing episodes of severe declines in private net financial inflows. As we will show below, this key finding of our paper survives a battery of robustness checks and in particular continues to hold if we control for the level of short-term interest rates. Our estimations also provide tentative evidence on the mechanisms that could be at play. In fact, our findings are consistent with the existence of a confidence channel whereby the ECB asset purchases help to mitigate concerns among international investors about tail risks in individual euro area countries

and thereby help prevent extreme declines in net financial inflows. Such tail risks could have different origins, stemming for instance from adverse sovereign-financial feedback loops, concerns about debt sustainability or redenomination risk, i. e. the risk that the euro area might break up and countries redenominate domestic debt into new domestic currencies.

VI. Robustness Checks

This section looks at the robustness of our main findings. Our first set of robustness tests introduces additional explanatory variables to address potential omitted variable bias. More specifically, we account for the effects of contagion (with a dummy variable that takes the value of one if there is a sudden stops in the same geographic region), the exchange rate regime (using the classification of *Ilzetzki/Reinhart/Rogoff* 2019), the domestic output gap and the short-term interest rate. Table 4 provides a more detailed description of these variables. The additional regressors do not generally improve the fit of the model substantially nor do the variables generally enter with significant coefficients. At the same time, all coefficients from our baseline regression remain largely unaffected (Table 7). Most importantly, the short-term interest rate is insignificant and does not materially affect the coefficient of the asset purchase variable in the euro area sample. This is important as one may argue that the effects of the asset purchases programme may be confounded with that of a low interest rate environment, reflecting the loose monetary policy stance. In order to control for the latter we choose to add short term interest rates rather than the level of long-term rates for a number of reasons. In particular, including long term interest rates in our specification would raise serious endogeneity concerns, as severe sudden stops of the nature experienced during the sovereign debt crisis inevitably translate into sharp increases of yields. Thus, one would expect a positive coefficient for long-term yields which however given the endogeneity bias should not be interpreted as an indication that a low yield environment contributes to reducing the likelihood of sudden stops. Short-term rates, on the other hand, are in the case at hand much less likely to raise any substantial endogeneity issues. Although one may argue that in the event of a sudden stop the central bank may raise its policy rate in order to prevent the outflow of capital this is not a relevant concern of the euro area, where monetary policy at the union-level actually resulted in lower policy rates. Thus, overall, our finding lend reasonable support to the view that the ECB's unconventional monetary policy measures affect the probability of sudden stops not by merely contributing to low interest rates but by reducing fragmentation risks.

In further specifications, we apply alternative measures of our dependent variable. First, we look at a metric of private net financial inflows that takes into account measurement issues. In principle, the financial account balance should

be equal to the sum of the current account and the capital account balance. However, as mentioned in Section 2, in practice discrepancies between these two elements of the balance of payments identity can arise due to imperfections in source data and compilation. These discrepancies, known as net errors and omissions, are a residual item. Therefore, it is generally impossible to infer with certainty whether they reflect mis-recording on the financial account side or on the other side of the balance of payments identity. *Lane/Milesi-Ferretti* (1999), however, argue that errors and omissions are likely mis-recorded financial flows, pointing to the prevalence of capital flight in the sample they study. It seems indeed plausible that the current and capital accounts are recorded with greater accuracy than the financial account. First, the largest part of the current account is composed of trade, in particular in goods, which, also for the purpose of the collection of tariffs and duties, is rather carefully recorded at international borders. Second, transactions included in the capital account largely reflect official sector flows, which due to the small number of transacting parties (i. e. mostly governments) and the absence of incentives for deliberate mis-reporting are arguably recorded properly. Third, incentives to mis-report seem most pronounced when it comes to flows in the financial account, as capital flight in the presence of financial account restrictions as argued by *Lane/Milesi-Ferretti* (1999) but also tax evasion, financing of illicit activities and money laundering are non-negligible phenomena in global financial markets. At the same time, it is plausible to assume that official financial flows in the financial account, as defined in this paper, will usually be recorded correctly, since data on programme financing and TARGET2 flows are readily available and their classification is straightforward. Hence, to the extent that net errors and omissions reflect missing financial flows, these flows are likely to be private flows, according to our definition. For our robustness check, we therefore construct an alternative indicator of private net financial inflows that includes the net errors and omissions recorded in the balance of payments statistics (Table 8). Again, our results are qualitatively unchanged. In particular, we confirm our finding that the ECB's asset purchases are associated with a lower probability of severe sudden stops.

As a second sensitivity test to our dependent variable, we remove the adjustment of official financing flows (EU-IMF loans and changes in TARGET2 balances) and redefine our dependent variable in terms of total rather than private financial inflows. Not surprisingly, this affects some of our results (Table 9). In contrast to our baseline regression the euro area dummy turns negative and significant, which is in line with the expectation that TARGET2 reduce a country's probability of experiencing severe sudden stops. In addition, a country's safe haven status and the structural unemployment lose some of their significance. Furthermore, global risk becomes less relevant for the full sample specification. These findings suggest that official financing contributes to stabilising financial

flows in times of high risk aversion and, to a certain extent, may also help to cushion the impact of structural weaknesses in the domestic economy.

Finally, we test the robustness of our results against an extension of the sample and alternative identification thresholds. Specifically, we extend our estimation to an unbalanced panel over the 1980Q1 – 2020Q2 period and thus also include the period before the start of the Economic and Monetary Union. The trade-off – and the reason why we choose not to employ this long sample in the baseline – is that, given our interest in the euro area, it is difficult to combine the 1980s and 1990s with the last two decades which were in many ways structurally different and characterised by much larger financial flows. Moreover, applying our methodology to the pre-1999 period results in only very few additional severe sudden stop episodes. Nevertheless, estimating the model for the full period serves as a useful robustness check for our results. Again, our main findings are confirmed (Table 10, column 1). A notable exception is financial openness that is now positively associated with sudden stops.

We also test the robustness of our regression results with respect to the exclusion of financial hubs (Cyprus, Ireland, Luxembourg, Malta and the Netherlands). The financial flows of these countries need to be interpreted with caution, since they are heavily affected by the activities of multinational enterprises and a large financial sector (including special purpose vehicles, investment funds, etc.) which often show only limited links with domestic economic activity (Table 10, column 2). Also here our baseline regression results remain intact.

In addition, we check the sensitivity of our results with respect to the threshold used for the definition of severe sudden stops. Rather than taking the lower 20^{th} percentile of the distribution of the cumulative change in private net financial inflows (as a share of GDP) during the episode, we alternatively apply the 5^{th}, 15^{th} and 25^{th} percentiles (Table 10, columns 3 – 5). Overall, also these alternative specifications lend support to the robustness of the results although capital controls lose some of their significance.

Next, we address the concern that the econometric results could be explained by the behaviour of the independent variables during the sudden stop period (*Bussiere/Fratzscher* 2002). As such, they could not be interpreted as determinants of sudden stops but would rather be a consequence of the net financial outflows (Table 10, column 6). Our quantitative results are broadly unchanged even when we ac- count for this bias by including only the first quarter of each sudden stop episode in our regression. One exception is a country's safe haven status, which loses statistical significance.

Last, we focus on the euro area to test for the robustness of our regression result on asset purchases. The finding that the ECB's asset purchases reduce the probability of a severe sudden stop holds for the sub-sample excluding financial

hubs and for stricter severity thresholds of the bottom 5th and 15th percentile of the distribution of episodes (Table 11, columns 1 – 3). The fact that the asset purchase variable is no longer significant if we relax our severity threshold to the lower 25th percentile is consistent with the idea that the asset purchases helped mitigate the risk of episodes with the sharpest decline in financial inflows (Table 11, column 4). The significance of the asset purchase programmes also remains if we only consider the first quarter of each episode (Table 11, column 5).

VII. Conclusion

In this paper, we have analysed the incidence of mild and severe sudden stops of private net financial inflows in euro area countries and other EU and OECD countries. We find, first, that there are marked differences between mild and severe sudden stops. Severe stops are less frequent, last longer and have more pronounced real economy effects. Moreover, mild stops are strongly driven by the external economic and financial environment, particularly the global risk sentiment. By contrast, severe stops are also influenced by domestic economic and financial conditions such as external indebtedness, structural unemployment and trade openness. In other words, economies with unsound economic fundamentals will be more susceptible to severe declines in net financial inflows.

Second, sudden stops in private net financial inflows tend to be more frequent and more pronounced in terms of magnitude in euro area countries than in other OECD economies. However, the real economy impact of sudden stops is smaller in euro area countries than in other economies. These findings may be explained by the institutional framework of Europe's Economic and Monetary Union, in particular the availability of external financing from the common central bank via the TARGET2 system. The elastic provision of central bank liquidity may, under certain circumstances, have the side effect of slowing down efforts for an orderly correction of macroeconomic imbalances which increases the susceptibility to a retrenchment in private sector liquidity. At the same time, liquidity provision to sound institutions against adequate collateral helps to avoid a potentially disruptive process of private liquidity shortages in the banking system and smoothens the adjustment pace imposed on the domestic economy in times of a sharp reversal of private financing flows (*Fagan/McNelis* 2020).

Third, the ECB's large-scale asset purchases introduced since 2015 have significantly reduced the likelihood of severe sudden stops for euro area countries. We find that the APP and the PEPP have together reduced the probability of a severe sudden stop in euro area countries by 44 percent while they have not significantly affected the probability of mild stops. Our results are consistent with

the existence of a confidence channel whereby the ECB asset purchases help to mitigate concerns among international investors about tail risks in individual euro area countries and thereby help prevent extreme declines in net financial inflows. This effect on extreme movements in financial flows is fully compatible with the finding of the existing literature that the ECB's asset purchases are conducive to a portfolio rebalancing from euro area towards foreign assets. It is also important to note that the ECB's asset purchases do not entirely remove the risk of severe sudden stops in euro area countries and are in any case temporary in nature. Therefore, stability-oriented macro-financial policies in individual euro area remain essential for a sustainable reduction in the risk of experiencing severe sudden stops with the associated adverse consequences and painful adjustment needs.

Tables and Figures

Table 1: **Sudden Stops by Country**

Country	*Start*	*End*	*Sudden stop*	*Country*	*Start*	*End*	*Sudden stop*
Austria	2008Q2	2009Q1	mild	Finland	2004Q2	2005Q1	mild
Austria	2013Q1	2013Q2	mild	Finland	2012Q4	2013Q4	severe
Austria	2015Q4	2016Q3	mild	Finland	2017Q2	2018Q4	mild
Belgium	2008Q2	2009Q1	mild	France	2008Q2	2008Q3	mild
Belgium	2010Q3	2012Q2	mild				
Belgium	2014Q1	2014Q2	mild	Germany	2013Q1	2014Q1	mild
Belgium	2016Q1	2016Q2	mild	Germany	2018Q4	2019Q1	mild
Bulgaria	1999Q1	1999Q1	mild	Greece	2008Q4	2009Q1	mild
Bulgaria	2008Q4	2011Q2	severe	Greece	2010Q2	2011Q1	severe
Bulgaria	2013Q3	2013Q4	mild	Greece	2012Q1	2012Q4	severe
Bulgaria	2016Q1	2016Q3	mild	Greece	2015Q1	2015Q4	severe
				Greece	2020Q1	2020Q2	severe
Chile	1999Q1	1999Q2	mild				
Chile	2004Q1	2004Q4	mild	Hungary	2002Q1	2002Q3	mild
Chile	2006Q4	2007Q3	mild	Hungary	2006Q4	2007Q3	mild
Chile	2009Q3	2010Q3	mild	Hungary	2012Q3	2013Q2	mild
Chile	2014Q3	2015Q1	mild	Hungary	2015Q3	2016Q2	mild
Croatia	2004Q3	2004Q4	mild	Iceland	2001Q2	2001Q4	mild
Croatia	2009Q1	2009Q4	mild	Iceland	2007Q2	2007Q4	mild
Croatia	2012Q1	2012Q2	mild	Iceland	2009Q1	2010Q3	severe
Croatia	2016Q1	2016Q2	mild	Iceland	2012Q3	2013Q2	severe
Cyprus	2002Q2	2003Q4	mild	Ireland	2008Q4	2009Q3	severe
Cyprus	2008Q3	2009Q2	severe	Ireland	2010Q4	2011Q2	mild
Cyprus	2011Q2	2012Q3	severe	Ireland	2013Q4	2014Q1	mild
Cyprus	2013Q4	2014Q1	mild	Ireland	2015Q3	2015Q4	mild
Cyprus	2016Q1	2016Q2	mild	Ireland	2018Q2	2018Q3	mild
Czech Republic	2003Q2	2004Q1	mild	Israel	2005Q3	2006Q2	mild
Czech Republic	2006Q2	2006Q3	mild	Israel	2010Q2	2010Q3	mild
Czech Republic	2018Q1	2018Q4	severe	Israel	2011Q4	2012Q3	mild
Denmark	2000Q2	2000Q4	mild	Italy	2010Q1	2010Q3	mild
Denmark	2003Q3	2004Q4	mild	Italy	2011Q4	2012Q3	mild
Denmark	2010Q3	2011Q2	mild	Italy	2015Q2	2017Q1	mild
Denmark	2013Q1	2013Q2	mild				
Denmark	2016Q1	2016Q3	mild	Japan	2005Q1	2005Q3	mild
Estonia	1999Q1	1999Q3	mild	Korea	1999Q2	1999Q3	mild
Estonia	2008Q3	2010Q2	severe	Korea	2001Q2	2001Q4	mild
Estonia	2014Q2	2017Q3	mild	Korea	2010Q4	2011Q1	mild

Notes: Sudden stops by country and intensity. A quarterly observation qualifies as a sudden stop if the year-on-year change in the four quarter moving sum of net private financial inflows (as a percentage of GDP) falls within the 20th percentile of both the country-specific and full-sample distribution. An episode is classified as severe if the cumulative change in net private financial inflows (as a percentage of GDP) is in the upper 20th percentile of the full-sample distribution of all sudden stops. The remaining episodes are classified as mild stops.

Country	*Start*	*End*	*Sudden stop*	*Country*	*Start*	*End*	*Sudden stop*
Latvia	2007Q4	2010Q1	severe	Portugal	2016Q1	2016Q2	mild
Latvia	2014Q2	2014Q3	mild	Portugal	2017Q2	2018Q1	mild
Latvia	2016Q1	2016Q4	severe				
				Romania	2008Q3	2010Q2	mild
Lithuania	2000Q4	2001Q2	mild				
Lithuania	2008Q3	2010Q2	severe	Slovak Republic	2003Q3	2004Q2	mild
Lithuania	2012Q4	2013Q3	mild	Slovak Republic	2009Q1	2009Q4	severe
Lithuania	2017Q1	2017Q3	mild	Slovak Republic	2013Q4	2015Q1	severe
				Slovak Republic	2018Q4	2019Q3	severe
Luxembourg	2009Q4	2011Q2	severe				
Luxembourg	2012Q4	2013Q3	severe	Slovenia	2003Q4	2004Q2	mild
Luxembourg	2017Q1	2017Q4	severe	Slovenia	2006Q4	2007Q2	mild
Luxembourg	2019Q3	2019Q4	severe	Slovenia	2011Q4	2012Q4	mild
				Slovenia	2015Q1	2016Q1	mild
Malta	2008Q3	2009Q1	mild				
Malta	2010Q1	2010Q4	severe	Spain	1999Q2	1999Q3	mild
Malta	2014Q1	2014Q4	severe	Spain	2008Q4	2010Q2	mild
Malta	2018Q1	2019Q1	severe	Spain	2011Q4	2012Q4	severe
				Spain	2014Q4	2016Q3	mild
Netherlands	2009Q1	2009Q3	mild				
Netherlands	2012Q4	2013Q4	severe	Sweden	2002Q2	2002Q3	mild
Netherlands	2016Q4	2018Q2	mild	Sweden	2004Q1	2004Q3	mild
				Sweden	2009Q3	2011Q2	mild
New Zealand	2008Q3	2009Q3	mild	Sweden	2015Q2	2015Q3	mild
New Zealand	2010Q4	2011Q2	mild	Sweden	2017Q3	2018Q1	mild
New Zealand	2013Q2	2014Q1	mild	Sweden	2020Q1	2020Q2	mild
Norway	2000Q4	2001Q4	mild	Switzerland	2000Q1	2000Q4	mild
Norway	2005Q3	2005Q4	mild	Switzerland	2004Q4	2005Q3	mild
Norway	2008Q3	2009Q1	mild	Switzerland	2011Q2	2011Q3	mild
Norway	2011Q4	2012Q2	mild	Switzerland	2013Q2	2014Q1	severe
Norway	2016Q4	2017Q1	mild	Switzerland	2016Q1	2017Q2	mild
Norway	2018Q4	2019Q1	mild	Switzerland	2018Q4	2019Q2	mild
Poland	2001Q4	2002Q1	mild	Turkey	1999Q1	1999Q2	mild
Poland	2005Q1	2005Q3	mild	Turkey	2001Q2	2001Q4	mild
Poland	2009Q1	2009Q3	mild	Turkey	2009Q2	2009Q4	mild
Poland	2011Q3	2012Q2	mild	Turkey	2014Q1	2014Q4	mild
Poland	2017Q3	2017Q4	mild	Turkey	2018Q4	2019Q2	mild
Portugal	2003Q2	2003Q4	mild	United Kingdom	2009Q2	2010Q3	mild
Portugal	2008Q4	2009Q1	mild	United Kingdom	2012Q1	2012Q3	mild
Portugal	2010Q2	2011Q1	mild	United Kingdom	2014Q2	2015Q4	mild
Portugal	2012Q1	2012Q3	mild	United Kingdom	2017Q1	2017Q3	mild

Notes: Sudden stops by country and intensity. A quarterly observation qualifies as a sudden stop if the year-on-year change in the four quarter moving sum of net private financial inflows (as a percentage of GDP) falls within the 20th percentile of both the country-specific and full-sample distribution. An episode is classified as severe if the cumulative change in net private financial inflows (as a percentage of GDP) is in the upper 20th percentile of the full-sample distribution of all sudden stops. The remaining episodes are classified as mild stops.

Table 2

Sudden Stops of Private and Total Net Financial Inflows

	Private flows			*Total flows*		
	Full sample	Euro area	Non-euro area	Full sample	Euro area	Non-euro area
All sudden stops						
Number of episodes	142	60	82	143	48	95
Frequency	15.6	19.7	13.3	15.8	15.2	16.1
Intensity	–12.2	–17.5	–8.3	–7.9	–8.3	–7.7
Length	3.9	4.1	3.7	3.9	3.9	3.9
Change in output gap	–0.8	–0.5	–1.0	–0.7	–0.3	–0.9
Mild sudden stops						
Number of episodes	113	39	74	114	39	75
Frequency	11.4	12.4	10.9	10.7	11.0	10.6
Intensity	–5.5	–7.1	–4.7	–3.8	–4.3	–3.5
Length	3.6	3.9	3.4	3.3	3.5	3.3
Change in output gap	–0.3	–0.1	–0.5	–0.4	–0.5	–0.4
Severe sudden stops						
Number of episodes	29	21	8	29	9	20
Frequency	4.2	7.3	2.5	5.0	4.3	5.5
Intensity	–38.1	–36.7	–41.6	–24.0	–25.4	–23.4
Length	5.1	4.3	7.0	6.1	5.7	6.4
Change in output gap	–2.6	–1.3	–6.2	–1.7	0.6	–2.7

Notes: Frequency is calculated as the share of available quarterly observations in the period with a sudden stop. *Intensity* is the average cumulative change in private net financial inflows during the episode expressed as share of GDP. *Length* is the average duration of the episodes expressed in quarters. *Change in output gap* is the average difference in the output gap between the four quarters preceding the episode and during the episode.

Table 3

Sudden Stops of Private Net Financial Inflows: Different Time Samples

	Full sample			*Euro area*		
	1999Q1 – 2006Q4	2007Q1 – 2014Q4	2015Q1 – 2020Q2	1999Q1 – 2006Q4	2007Q1 – 2014Q4	2015Q1 – 2020Q2
All sudden stops						
Number of episodes	35	72	35	3	37	20
Frequency	8.2	22.5	15.5	2.9	27.7	22.5
Intensity	–4.7	–16.5	–10.9	–4.7	–19.8	–15.1
Length	3.2	4.4	3.4	3.0	4.3	3.8
Change in output gap	–0.5	–1.4	0.1	–0.1	–0.3	–0.1
Mild sudden stops						
Number of episodes	35	51	27	3	23	13
Frequency	8.2	13.8	12.2	2.9	15.1	16.3
Intensity	–4.7	–6.3	–5.1	–4.7	–7.9	–6.3
Length	3.2	3.9	3.3	3.0	4.1	3.8
Change in output gap	–0.5	–0.6	0.5	–0.1	–0.1	–0.1
Severe sudden stops						
Number of episodes	0	21	8	0	14	7
Frequency	–	8.7	3.3	–	12.6	6.2
Intensity	–	–41.0	–30.4	–	–39.4	–31.5
Length	–	5.6	3.6	–	4.7	3.6
Change in output gap	–	–3.2	–1.1	–	–0.5	–0.3

Notes: Frequency is calculated as the share of available quarterly observations in the period with a sudden stop. *Intensity* is the average cumulative change in private net financial inflows during the episode expressed as share of GDP. *Length* is the average duration of the episodes expressed in quarters. *Change in output gap* is the average difference in the output gap between the four quarters preceding the episode and during the episode.

Table 4

Variables: Definitions and Sources

Variable	*Description*	*Source*
Global interest rate	Average 10-year government bond yield of Germany, Japan and the United States	ECB, OECD
Global output gap	Cyclical component of HP-filtered global real GDP	ECB, OECD
Global risk	Chicago Fed National Financial Condition Index (higher values indicate tighter financial conditions)	FRED
Safe haven	Dummy variable for Germany, Japan, Switzerland and the United States	
Trade openness	Ratio of the sum of imports and exports to GDP	ECB, IMF
Financial openness	Ratio of the sum of external assets and liabilities to GDP	ECB, IMF, Lane and Milesi-Ferretti (2007)
Net external debt	Ratio of net foreign debt liabilities to GDP	ECB, IMF, Lane and Milesi-Ferretti (2007)
Structural unemployment rate	Trend component of HP-filtered unemployment rate	ECB, IMF
Capital controls	Capital control classification as in Chinn and Ito (2006) (higher values indicate less open financial account)	July 2020 update of Chinn and Ito (2006) database
Net APP and PEPP purchases	Ratio of the sum of net purchases of public debt securities under the APP and PEPP to GDP	ECB
Contagion	Dummy variable for sudden stop in the region	
Exchange rate regime	Exchange rate regime classification as in Ilzetzki et al. (2019) (higher values indicate less flexible exchange rate regime)	Ilzetzki et al. (2019)
Output gap	Cyclical component of HP-filtered real GDP	OECD, IMF
Short-term interest rate	3-month money market interest rate (1-month if missing)	ECB, IMF

Notes: FRED stands for Federal Reserve Economic Data. For a straightforward interpretation of the results, we use the negative of the KAOPEN index (no data available for Luxembourg). APP and PEPP stand for Asset Purchase Programme and Pandemic Emergency Purchase Programme, respectively. Regions: Europe, America and Asia-Pacific.

Table 5

Baseline Estimation Results

	Full sample		Euro area
	(1)	(2)	(3)
Mild sudden stops			
Global interest rate	–0.154*	–0.154*	–0.494***
	(0.086)	(0.085)	(0.154)
Global output gap	–0.224***	–0.224***	–0.127
	(0.067)	(0.067)	(0.115)
Safe haven	–1.300	–1.301	–3.175***
	(1.004)	(1.002)	(0.384)
Global risk	0.478***	0.479***	0.855***
	(0.175)	(0.175)	(0.248)
Safe haven x global risk	–2.228**	–2.228**	–5.470***
	(0.948)	(0.948)	(0.345)
Trade openness	1.072	1.075	2.231
	(1.248)	(1.237)	(1.941)
Financial openness	0	0	–0.024*
	(0.011)	(0.013)	(0.014)
Net external debt	0.033	0.034	0.048
	(0.085)	(0.085)	(0.102)
Structural unemployment rate	0.028	0.028	0.045
	(0.029)	(0.029)	(0.039)
Capital controls	–0.187	–0.188	–0.803
	(0.148)	(0.157)	(0.667)
Euro area dummy		–0.012	
		(0.256)	
Severe sudden stops			
Global interest rate	–0.239	–0.212	–0.248
	(0.149)	(0.133)	(0.191)
Global output gap	–0.367***	–0.368***	–0.213*
	(0.111)	(0.108)	(0.128)
Safe haven	–3.031***	–2.976***	–14.678***
	(0.836)	(0.850)	(1.173)
Global risk	1.226***	1.222***	0.952**
	(0.196)	(0.200)	(0.385)
Safe haven x global risk	–7.174***	–7.097***	–1.223***
	(0.469)	(0.469)	(0.373)

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(Table 5 continued)

	Full sample		Euro area
	(1)	(2)	(3)
Trade openness	8.715***	8.774***	4.690*
	(1.914)	(1.827)	(2.788)
Financial openness	0.002	0	0.008
	(0.012)	(0.014)	(0.011)
Net external debt	0.761***	0.770***	0.206
	(0.203)	(0.192)	(0.285)
Structural unemployment rate	0.163***	0.158***	0.141***
	(0.036)	(0.042)	(0.047)
Capital controls	–0.459*	–0.443*	0.326
	(0.236)	(0.264)	(0.533)
Euro area dummy		0.207	
		(0.544)	
Pseudo-R2	0.108	0.108	0.108
N	3,348	3,348	1,155
AUROC mild sudden stops	0.65	0.65	0.62
AUROC severe sudden stops	0.89	0.89	0.82

Notes: The table refers to the results of a multinomial logit regression. The dependent variable is a categorical variable indicating whether there is no sudden stop (baseline), a mild stop or a severe stop. All explanatory variables are lagged by one quarter. AUROC stands for the area under the receiver operating characteristic curve (higher values correspond to better performance of the model at distinguishing between episode types). Robust standard errors clustered by country. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6

Baseline Estimation Results: APP and PEPP

	Full sample		Euro area	
	(1)	(2)	(3)	(4)
Mild sudden stops				
Global interest rate	–0.143	–0.507**	–0.511**	–0.383**
	(0.113)	(0.205)	(0.206)	(0.151)
Global output gap	–0.225***	–0.118	–0.075	–0.122
	(0.078)	(0.145)	(0.163)	(0.115)
Safe haven	–1.301	–3.165***	–3.300***	–3.300***
	(1.005)	(0.389)	(0.424)	(0.426)
Global risk	0.479***	0.864***	0.870***	0.875***
	(0.175)	(0.252)	(0.251)	(0.252)
Safe haven x global risk	–2.232**	–5.458***	–5.686***	–5.727***
	(0.940)	(0.405)	(0.470)	(0.478)
Trade openness	1.08	2.291	2.437	2.534
	(1.254)	(2.001)	(2.010)	(1.980)
Financial openness	0	–0.025*	–0.026	–0.025
	(0.011)	(0.014)	(0.016)	(0.016)
Net external debt	0.032	0.051	0.046	0.057
	(0.086)	(0.106)	(0.113)	(0.105)
Structural unemployment rate	0.028	0.046	0.042	0.047
	(0.029)	(0.041)	(0.038)	(0.036)
Capital controls	–0.188	–0.83	–0.796	–0.824
	(0.149)	(0.703)	(0.696)	(0.690)
Post-2015 dummy	0.036	–0.044	–0.473	
	(0.315)	(0.576)	(0.813)	
Net APP and PEPP purchases			0.117	0.083
			(0.092)	(0.057)
Severe sudden stops				
Global interest rate	–0.527**	–0.877**	–0.931***	–0.592**
	(0.243)	(0.363)	(0.358)	(0.237)
Global output gap	–0.293**	–0.06	–0.105	–0.219
	(0.122)	(0.142)	(0.175)	(0.147)
Safe haven	–2.839***	–14.639***	–13.413***	–14.433***
	(0.890)	(0.181)	(1.180)	(1.175)

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(Table 6 continued)

	Full sample	Euro area		
	(1)	(2)	(3)	(4)
Global risk	1.201***	0.997***	0.970***	0.925**
	(0.188)	(0.368)	(0.372)	(0.373)
Safe haven x global risk	–6.684***	–1.276***	–1.256***	–1.228***
	(0.476)	(0.388)	(0.378)	(0.362)
Trade openness	8.147***	3.871	3.817	4.193
	(1.965)	(2.569)	(2.681)	(2.762)
Financial openness	0.006	0.01	0.007	0.004
	(0.012)	(0.011)	(0.013)	(0.013)
Net external debt	0.729***	0.182	0.148	0.141
	(0.195)	(0.279)	(0.273)	(0.276)
Structural unemployment rate	0.156***	0.123***	0.111**	0.116**
	(0.038)	(0.047)	(0.045)	(0.046)
Capital controls	–0.438*	0.403	0.351	0.289
	(0.228)	(0.410)	(0.463)	(0.576)
Post-2015 dummy	–0.975	–1.584**	–1.069	
	(0.681)	(0.702)	(0.801)	
Net APP and PEPP purchases			–0.311**	–0.417***
			(0.153)	(0.146)
Pseudo-R2	0.11	0.118	0.128	0.123
N	3,348	1,155	1,155	1,155

Notes: The table refers to the results of a multinomial logit regression. The dependent variable is a categorical variable indicating whether there is no sudden stop (baseline), a mild stop or a severe stop. All explanatory variables are lagged by one quarter. Robust standard errors clustered by country. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7

Additional Control Variables

	Full sample				Euro area
	(1)	(2)	(3)	(4)	(5)
Mild sudden stops					
Global interest rate	–0.177**	–0.157*	–0.151*	–0.208**	–0.574
	(0.089)	(0.081)	(0.086)	(0.101)	(0.413)
Global output gap	–0.212***	–0.223***	–0.237**	–0.262***	–0.188
	(0.068)	(0.067)	(0.100)	(0.063)	(0.160)
Safe haven	–1.248	–1.293	–1.295	–1.220	–3.327***
	(0.930)	(1.004)	(1.002)	(1.014)	(0.433)
Global risk	0.478***	0.480***	0.471***	0.439**	0.733**
	(0.176)	(0.174)	(0.172)	(0.196)	(0.367)
Safe haven x global risk	–2.217**	–2.227**	–2.225**	–2.104**	–5.757***
	(0.924)	(0.950)	(0.943)	(0.995)	(0.484)
Trade openness	0.212	1.005	1.085	1.249	2.51
	(1.187)	(1.300)	(1.243)	(1.271)	(1.973)
Financial openness	0	0.001	–0.000	–0.000	–0.025
	(0.010)	(0.012)	(0.011)	(0.011)	(0.015)
Net external debt	–0.016	0.032	0.033	0.05	0.058
	(0.079)	(0.086)	(0.085)	(0.089)	(0.107)
Structural unemployment rate	0.015	0.028	0.028	0.04	0.045
	(0.028)	(0.029)	(0.030)	(0.029)	(0.037)
Capital controls	–0.138	–0.189	–0.177	–0.289	–0.816
	(0.129)	(0.148)	(0.146)	(0.184)	(0.685)
Contagion	0.751				
	(0.474)				
Exchange rate regime		–0.022			
		(0.104)			
Output gap			0.011		
			(0.053)		
Short term interest rate				0.023	0.153
				(0.015)	(0.313)
Net APP and PEPP purchases					0.079
					(0.059)
Severe sudden stops					
Global interest rate	–0.248*	–0.281**	–0.228	–0.284**	–0.313
	(0.147)	(0.137)	(0.152)	(0.141)	(0.679)

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(Table 7 continued)

	Full sample				Euro area
	(1)	(2)	(3)	(4)	(5)
Global output gap	–0.353***	–0.361***	–0.504***	–0.371***	–0.109
	(0.110)	(0.108)	(0.121)	(0.121)	(0.263)
Safe haven	–2.896***	–3.025***	–2.963***	–2.952***	–14.391***
	(0.786)	(0.820)	(0.843)	(0.955)	(1.188)
Global risk	1.223***	1.235***	1.138***	1.207***	1.150***
	(0.200)	(0.197)	(0.218)	(0.194)	(0.445)
Safe haven x global risk	–6.984***	–7.187***	–7.114***	–7.072***	–1.252***
	(0.623)	(0.421)	(0.431)	(0.373)	(0.334)
Trade openness	7.881***	8.323***	8.859***	8.384***	4.281
	(1.926)	(1.870)	(1.880)	(2.016)	(2.828)
Financial openness	0.004	0.008	0.003	0.004	0.004
	(0.012)	(0.017)	(0.012)	(0.012)	(0.013)
Net external debt	0.708***	0.739***	0.783***	0.726***	0.15
	(0.206)	(0.195)	(0.203)	(0.206)	(0.273)
Structural unemployment rate	0.151***	0.164***	0.169***	0.162***	0.119**
	(0.036)	(0.038)	(0.034)	(0.037)	(0.047)
Capital controls	–0.408*	–0.443**	–0.462*	–0.438	0.273
	(0.236)	(0.221)	(0.240)	(0.290)	(0.576)
Contagion	2.007*				
	(1.047)				
Exchange rate regime		–0.141			
		(0.224)			
Output gap			0.1		
			(0.090)		
Short term interest rate				0.018	–0.238
				(0.058)	(0.531)
Net APP and PEPP purchases					–0.415***
					(0.146)
Pseudo-R2	0.114	0.108	0.108	0.112	0.124
N	3,348	3,348	3,336	3,093	1,155

Notes: The table refers to the results of a multinomial logit regression. The dependent variable is a categorical variable indicating whether there is no sudden stop (baseline), a mild stop or a severe stop. All explanatory variables are lagged by one quarter. Robust standard errors clustered by country. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 8

Private Net Financial Inflows Including Errors and Omissions

	Full sample		Euro area		
	(1)	(2)	(3)	(4)	(5)
Mild sudden stops					
Global interest rate	–0.175	–0.164	–0.518***	–0.423***	–0.471
	(0.112)	(0.111)	(0.163)	(0.159)	(0.330)
Global output gap	–0.151**	–0.154**	–0.076	–0.070	–0.088
	(0.068)	(0.067)	(0.137)	(0.136)	(0.171)
Safe haven	–1.196	–1.196	–2.360***	–2.438***	–2.443***
	(0.977)	(1.001)	(0.308)	(0.336)	(0.332)
Global risk	0.617***	0.611***	0.882***	0.901***	0.862***
	(0.144)	(0.144)	(0.235)	(0.239)	(0.332)
Safe haven x global risk	–2.215*	–2.222*	–4.770***	–4.952***	–4.957***
	(1.240)	(1.245)	(0.274)	(0.384)	(0.384)
Trade openness	2.117**	2.049**	1.822	2.066	2.051
	(1.002)	(0.999)	(1.343)	(1.356)	(1.347)
Financial openness	–0.012	–0.016	–0.026***	–0.026***	–0.026***
	(0.010)	(0.011)	(0.007)	(0.008)	(0.008)
Net external debt	0.224***	0.220***	0.277***	0.292***	0.293***
	(0.069)	(0.070)	(0.086)	(0.087)	(0.088)
Structural unemployment rate	0.027	0.016	0.039	0.042	0.041
	(0.027)	(0.027)	(0.035)	(0.033)	(0.033)
Capital controls	–0.092	–0.052	–0.412	–0.415	–0.410
	(0.102)	(0.116)	(0.369)	(0.369)	(0.367)
Euro area dummy		0.272			
		(0.220)			
Net APP and PEPP purchases				0.07	0.069
				(0.059)	(0.059)
Short term interest rate					0.039
					(0.316)
Severe sudden stops					
Global interest rate	–0.213	–0.211	–0.212	–0.524*	0.081
	(0.143)	(0.139)	(0.226)	(0.285)	(0.798)
Global output gap	–0.268**	–0.269***	–0.154	–0.153	0.08
	(0.106)	(0.104)	(0.122)	(0.136)	(0.308)
Safe haven	–3.209***	–3.211***	–13.215***	–14.847***	–13.767***
	(0.876)	(0.853)	(1.152)	(1.152)	(1.170)
Global risk	1.202***	1.201***	0.888**	0.860**	1.344**
	(0.200)	(0.203)	(0.395)	(0.384)	(0.593)

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(Table 8 continued)

	Full sample		Euro area		
	(1)	(2)	(3)	(4)	(5)
Safe haven x global risk	–7.045***	–7.046***	–1.145***	–1.149***	–1.190***
	-0.38	-0.396	(0.384)	(0.374)	(0.355)
Trade openness	7.681***	7.664***	3.163	2.676	2.828
	(1.968)	(1.872)	(2.409)	(2.356)	(2.502)
Financial openness	0.007	0.006	0.018**	0.015*	0.015*
	(0.010)	(0.010)	(0.008)	(0.008)	(0.008)
Net external debt	0.602***	0.600***	0.114	0.056	0.073
	(0.199)	(0.184)	(0.237)	(0.232)	(0.235)
Structural unemployment rate	0.159***	0.157***	0.129**	0.106**	0.113**
	(0.035)	(0.042)	(0.052)	(0.052)	(0.054)
Capital controls	–0.525*	–0.517*	0.175	0.107	0.084
	(0.269)	(0.288)	(0.491)	(0.511)	(0.528)
Euro area dummy		0.046			
		(0.482)			
Net APP and PEPP purchases				–0.397***	–0.395***
				(0.146)	(0.148)
Short term interest rate					–0.508
					(0.580)
Pseudo-R2	0.098	0.099	0.103	0.116	0.119
N	3,217	3,217	1,143	1,143	1,143

Notes: The table refers to the results of a multinomial logit regression. The dependent variable is a categorical variable indicating whether there is no sudden stop (baseline), a mild stop or a severe stop. All explanatory variables are lagged by one quarter. Robust standard errors clustered by country. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 9

Total Net Financial Inflows

	Full sample		Euro area		
	(1)	(2)	(3)	(4)	(5)
Mild sudden stops					
Global interest rate	–0.041	–0.049	0.065	–0.061	–0.275
	(0.088)	(0.088)	(0.121)	(0.125)	(0.448)
Global output gap	–0.338***	–0.335***	–0.757***	–0.739***	–0.826***
	(0.078)	(0.080)	(0.139)	(0.133)	(0.263)
Safe haven	–0.980*	–0.998*	–0.923**	–0.894**	–0.900**
	(0.532)	(0.517)	(0.410)	(0.409)	(0.401)
Global risk	0.084	0.096	–0.230	–0.227	–0.359
	(0.159)	(0.162)	(0.276)	(0.271)	(0.398)
Safe haven x global risk	–2.184***	–2.193***	–3.288***	–3.185***	–3.184***
	(0.547)	(0.548)	(0.244)	(0.250)	(0.242)
Trade openness	–0.054	0.031	3.461	3.188	3.272
	(1.101)	(1.100)	(2.414)	(2.363)	(2.443)
Financial openness	0.023**	0.028**	0.012	0.012	0.012
	(0.009)	(0.011)	(0.012)	(0.013)	(0.013)
Net external debt	0.053	0.06	0.417**	0.393**	0.398**
	(0.096)	(0.099)	(0.186)	(0.181)	(0.188)
Structural unemployment rate	0.037**	0.050**	0.052	0.045	0.046
	(0.018)	(0.022)	(0.042)	(0.041)	(0.042)
Capital controls	–0.040	–0.090	–0.369	–0.386	–0.387
	(0.119)	(0.123)	(0.316)	(0.342)	(0.345)
Euro area dummy		–0.338			
		(0.304)			
Net APP and PEPP purchases				–0.117	–0.116
				(0.079)	(0.079)
Short term interest rate					0.186
					(0.372)
Severe sudden stops					
Global interest rate	0.232	0.151	0.104	–0.221	0.492
	(0.165)	(0.164)	(0.439)	(0.458)	(0.934)
Global output gap	–0.425***	–0.422***	–0.252	–0.239	0.046
	(0.113)	(0.120)	(0.209)	(0.180)	(0.294)
Safe haven	–0.727	–0.897	–13.914***	–12.427***	–13.848***
	(0.850)	(0.665)	(1.204)	(1.207)	(1.219)
Global risk	0.805***	0.862***	0.349**	0.328**	0.906
	(0.245)	(0.247)	(0.137)	(0.140)	(0.685)

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(Table 9 continued)

	Full sample		Euro area		
	(1)	(2)	(3)	(4)	(5)
Safe haven x global risk	–2.563***	–2.592***	–0.775***	–0.788**	–0.847**
	–0.22	–0.216	(0.291)	(0.314)	(0.419)
Trade openness	6.771***	6.473***	2.553	2.026	2.228
	(1.685)	(1.656)	(3.474)	(3.311)	(3.640)
Financial openness	0.005	0.036*	0.038	0.034	0.035
	(0.014)	(0.021)	(0.032)	(0.029)	(0.030)
Net external debt	0.575***	0.550***	–0.072	–0.135	–0.107
	(0.192)	(0.184)	(0.269)	(0.255)	(0.250)
Structural unemployment rate	–0.011	0.027	0.078	0.055	0.066
	(0.054)	(0.055)	(0.096)	(0.092)	(0.094)
Capital controls	–0.319	–0.454	0.138	0.074	0.041
	(0.292)	(0.285)	(1.108)	(1.073)	(1.142)
Euro area dummy		–1.674**			
		(0.701)			
Net APP and PEPP purchases				–0.467**	–0.467**
				(0.213)	(0.229)
Short term interest rate					–0.594
					(0.560)
Pseudo-R2	0.082	0.096	0.128	0.138	0.141
N	3,348	3,348	1,155	1,155	1,155

Notes: The table refers to the results of a multinomial logit regression. The dependent variable is a categorical variable indicating whether there is no sudden stop (baseline), a mild stop or a severe stop. All explanatory variables are lagged by one quarter. Robust standard errors clustered by country. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 10

Alternative Samples and Identification Thresholds (Full Sample)

	1980Q1 – 2020Q2	No fin hub	5th pctile	15th pctile	25th pctile	1st quarter
	(1)	(2)	(3)	(4)	(5)	(6)
Mild sudden stops						
Global interest rate	–0.132**	–0.074	–0.153*	–0.153*	–0.140	–0.089
	(0.054)	(0.091)	(0.084)	(0.084)	(0.091)	(0.071)
Global output gap	–0.238***	–0.238***	–0.245***	–0.245***	–0.228***	–0.094
	(0.062)	(0.069)	(0.062)	(0.062)	(0.071)	(0.078)
Safe haven	–0.643	–1.710***	–1.329	–1.329	–1.291	–1.549
	(0.501)	(0.655)	(0.981)	(0.981)	(0.992)	(0.994)
Global risk	0.184	0.430**	0.526***	0.526***	0.414**	0.530***
	(0.138)	(0.189)	(0.165)	(0.165)	(0.179)	(0.155)
Safe haven x global risk	–1.087***	–2.222**	–2.290**	–2.290**	–2.156**	–2.694***
	(0.257)	(0.955)	(0.940)	(0.940)	(0.952)	(0.956)
Trade openness	0.558	1.542	1.495	1.495	0.907	0.297
	(0.926)	(1.175)	(1.210)	(1.210)	(1.324)	(1.219)
Financial openness	0.016	0.145***	0.005	0.005	0.002	0.011
	(0.012)	(0.028)	(0.011)	(0.011)	(0.012)	(0.008)
Net external debt	0.153	–0.205	0.027	0.027	0.043	–0.026
	(0.146)	(0.172)	(0.098)	(0.098)	(0.086)	(0.078)
Structural unemployment rate	0.007	0.042	0.04	0.04	–0.008	0.03
	(0.020)	(0.031)	(0.032)	(0.032)	(0.029)	(0.027)
Capital controls	0.092	–0.102	–0.222	–0.222	–0.170	–0.148
	(0.073)	(0.161)	(0.151)	(0.151)	(0.163)	(0.153)
Severe sudden stops						
Global interest rate	–0.290***	–0.347**	–0.280	–0.280	–0.217*	–0.240
	(0.105)	(0.152)	(0.222)	(0.222)	(0.131)	(0.185)
Global output gap	–0.203*	–0.401***	–0.267*	–0.267*	–0.338***	0.247*
	(0.117)	(0.150)	(0.149)	(0.149)	(0.108)	(0.131)
Safe haven	–2.038***	–1.971*	–2.876***	–2.876***	–3.297***	–1.329
	(0.778)	(1.054)	(0.925)	(0.925)	(0.826)	(1.007)
Global risk	1.104***	1.288***	1.238***	1.238***	1.197***	1.415***
	(0.169)	(0.208)	(0.174)	(0.174)	(0.189)	(0.210)
Safe haven x global risk	–5.400***	–6.962***	–7.293***	–7.293***	–7.009***	–4.685***
	(1.296)	(0.587)	(0.549)	(0.549)	(0.415)	(0.210)
Trade openness	6.947***	10.624***	7.912***	7.912***	7.688***	7.663***
	(1.520)	(2.651)	(2.324)	(2.324)	(1.539)	(1.810)

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(Table 10 continued)

	1980Q1 – 2020Q2	No fin hub	5th pctile	15th pctile	25th pctile	1st quarter
	(1)	(2)	(3)	(4)	(5)	(6)
Financial openness	0.023**	–0.156	–0.009	–0.009	0.003	0.007
	(0.010)	(0.212)	(0.015)	(0.015)	(0.012)	(0.013)
Net external debt	0.794***	1.431***	0.850***	0.850***	0.647***	0.657***
	(0.126)	(0.411)	(0.179)	(0.179)	(0.175)	(0.212)
Structural unemployment rate	0.134***	0.188***	0.149***	0.149***	0.184***	0.165***
	(0.034)	(0.028)	(0.046)	(0.046)	(0.030)	(0.047)
Capital controls	–0.322**	–0.940***	–0.368	–0.368	–0.393**	–0.395*
	(0.134)	(0.329)	(0.254)	(0.254)	(0.187)	(0.230)
Pseudo-R2	0.108	0.136	0.1	0.1	0.113	0.066
N	5,011	3,029	3,348	3,348	3,348	2,955

Notes: The table refers to the results of a multinomial logit regression. The dependent variable is a categorical variable indicating whether there is no sudden stop (baseline), a mild stop or a severe stop. All explanatory variables are lagged by one quarter. Robust standard errors clustered by country. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 11

Alternative Samples and Identification Thresholds (Euro Area Sample)

	No fin hub	5th pctile	15th pctile	25th pctile	1st quarter
	(1)	(2)	(3)	(4)	(5)
Mild sudden stops					
Global interest rate	–0.823*	–0.653*	–0.653*	–0.747	–0.796*
	(0.466)	(0.377)	(0.377)	(0.490)	(0.413)
Global output gap	–0.352**	–0.272*	–0.272*	–0.243	–0.141
	(0.166)	(0.145)	(0.145)	(0.174)	(0.164)
Safe haven	–3.155***	–3.198***	–3.198***	–3.462***	–1.943***
	(0.598)	(0.400)	(0.400)	(0.490)	(0.302)
Global risk	0.399	0.678**	0.678**	0.63	0.468
	(0.430)	(0.333)	(0.333)	(0.400)	(0.301)
Safe haven x global risk	–5.689***	–5.567***	–5.567***	–5.861***	–3.604***
	(0.493)	(0.421)	(0.421)	(0.610)	(0.364)
Trade openness	5.162**	3.457**	3.457**	1.847	–0.028
	(2.248)	(1.556)	(1.556)	(1.945)	(2.138)
Financial openness	–0.012	–0.019**	–0.019**	–0.022	0.009
	(0.073)	(0.008)	(0.008)	(0.018)	(0.013)
Net external debt	0.64	0.084	0.084	0.077	–0.076
	(0.858)	(0.123)	(0.123)	(0.107)	(0.135)
Structural unemployment rate	0.013	0.066	0.066	–0.012	0.052
	(0.062)	(0.043)	(0.043)	(0.028)	(0.034)
Capital controls	–1.307	–1.077	–1.077	–1.011	–0.208
	(0.936)	(0.708)	(0.708)	(0.621)	(0.629)
Net APP and PEPP purchases	0.064	0.048	0.048	0.031	0.043
	(0.065)	(0.050)	(0.050)	(0.074)	(0.067)
Short term interest rate	0.409	0.206	0.206	0.204	0.451
	(0.357)	(0.282)	(0.282)	(0.363)	(0.295)
Severe sudden stops					
Global interest rate	–0.885	0.142	0.142	–0.090	0.373
	(0.917)	(0.654)	(0.654)	(0.570)	(0.705)
Global output gap	–0.447	0.21	0.21	–0.068	0.326
	(0.323)	(0.328)	(0.328)	(0.225)	(0.256)
Safe haven	–11.765***	–12.489***	–12.489***	–14.672***	–14.015***
	(1.308)	(1.287)	(1.287)	(1.134)	(1.165)
Global risk	0.859	1.534**	1.534**	1.148***	1.566***
	(0.759)	(0.596)	(0.596)	(0.390)	(0.482)
Safe haven x global risk	–1.309***	–1.249***	–1.249***	–1.275***	–1.312***
	(0.405)	(0.345)	(0.345)	(0.317)	(0.307)

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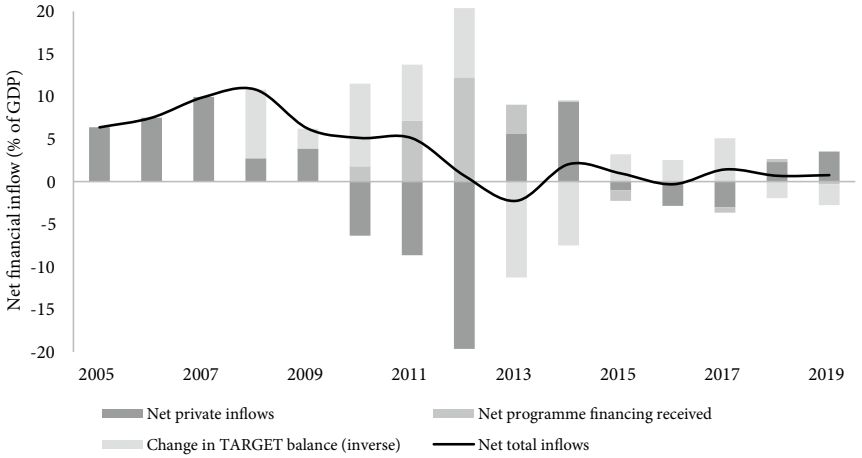
(Table 11 continued)

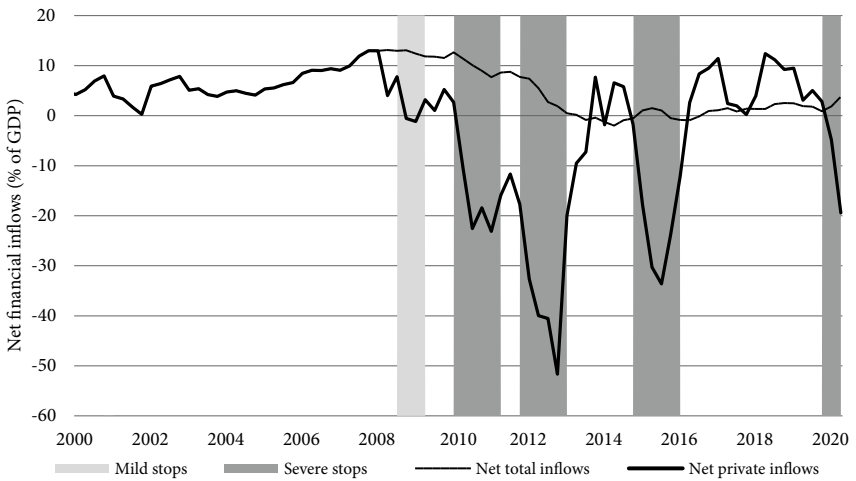
	No fin hub	5th pctile	15th pctile	25th pctile	1st quarter
	(1)	(2)	(3)	(4)	(5)
Trade openness	7.129*	2.272	2.272	4.789**	5.342**
	(3.972)	(3.711)	(3.711)	(2.318)	(2.399)
Financial openness	–0.170	0.006	0.006	0.001	0.002
	(0.266)	(0.018)	(0.018)	(0.008)	(0.013)
Net external debt	1.202	0.162	0.162	0.164	0.244
	(0.910)	(0.303)	(0.303)	(0.223)	(0.200)
Structural unemployment rate	0.127	0.088	0.088	0.167***	0.157***
	(0.087)	(0.063)	(0.063)	(0.050)	(0.039)
Capital controls	–0.284	1.033	1.033	0.175	–0.111
	(0.710)	(0.738)	(0.738)	(0.428)	(0.580)
Net APP and PEPP purchases	–0.392**	–0.487***	–0.487***	–0.056	–0.322**
	(0.191)	(0.161)	(0.161)	(0.109)	(0.132)
Short term interest rate	–0.104	–0.582	–0.582	–0.168	–0.472
	(0.639)	(0.546)	(0.546)	(0.452)	(0.505)
Pseudo-R2	0.152	0.126	0.126	0.126	0.079
N	908	1,155	1,155	1,155	982

Notes: The table refers to the results of a multinomial logit regression. The dependent variable is a categorical variable indicating whether there is no sudden stop (baseline), a mild stop or a severe stop. All explanatory variables are lagged by one quarter. Robust standard errors clustered by country. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.



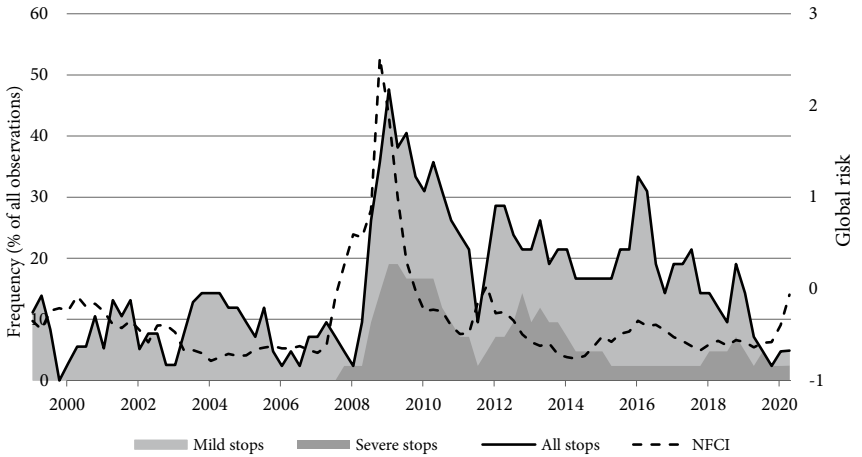
Notes: Annual net financial inflows in Ireland, Greece, Spain, Cyprus, and Portugal (as a percentage of GDP).

Figure 1: Total Net Financial Inflows: Official and Private Components



Notes: Four-quarter moving sum of total and private net financial inflows expressed as a share of GDP.

Figure 2: Private Net Financial Inflows and Sudden Stops in Greece



Notes: Share of observed quarters with a sudden stop episode by type (left axis). Chicago Fed National Financial Condition Index (NFCI), higher values indicate tighter financial conditions (right axis).

Figure 3: Frequency of Sudden Stops

References

Afonso, A./*Arghyrou*, M. G./*Gadea*, M. D./*Kontonikas*, A. (2018): "Whatever it takes" to resolve the European sovereign debt crisis? Bond pricing regime switches and monetary policy effects. Journal of International Money and Finance, Vol. 86(C), 1 – 30.

Alcidi, C./*Capolongo*, A./*Gros*, D./*Musmeci*, R./*Jahn*, M. (2020): Developments in EU Capital Flows in the Global Context. Technical report, European Commission.

Altavilla, C./*Carboni*, G./*Motto*, R. (2015): Asset purchase programmes and financial markets: lessons from the euro area. ECB Working Paper 1864, European Central Bank.

Andrade, P./*Breckenfelder*, J./*De Fiore*, F./*Karadi*, P./*Tristani*, O. (2016): The ECB's asset purchase programme: an early assessment. ECB Working Paper 1956, European Central Bank.

Bandaogo, M. S./*Chen*, Y. (2020): Duration of sudden stop spells: a hazard model approach. Review of International Economics, Vol. 28(1), 105 – 118.

Beck, R./*Fidora*, M. (2008): The impact of sovereign wealth funds on global financial markets. Review of European Economic Policy, Vol. 43(6), 349 – 358.

Belke, A./*Volz*, U. (2018): Capital flows to emerging market and developing economies: global liquidity and uncertainty versus country-specific pull factors. Working Paper 23/2018, Deutsches Institut für Entwicklungspolitik.

Bergant, K./*Fidora*, M./*Schmitz*, M. (2020): International capital flows at the security level: evidence from the ECB's asset purchase programme. IMF Working Paper 2020/046, International Monetary Fund.

Bindseil, U./*König*, P. J. (2012): TARGET2 and the European sovereign debt crisis. Credit and Capital Markets, Vol. 45(2), 135 – 174.

Bordo, M. D./*Cavallo*, A. F./*Meissner*, C. M. (2010): Sudden stops: determinants and output effects in the first era of globalization, 1880-1913. Journal of Development Economics, Vol. 91(2), 227 – 241.

Broner, F./*Didier*, T./*Erce*, A./*Schmukler*, S. L. (2013): Gross capital flows: dynamics and crises. Journal of Monetary Economics, Vol. 60, 113 – 133.

Bussiere, M./*Fratzscher*, M. (2002): Towards a new early warning system of financial crises. ECB Working Paper 145, European Central Bank.

Calderon, C./*Kubota*, M. (2013): Sudden stops: are global and local investors alike? Journal of International Economics, Vol. 89(1), 122 – 142.

Calvo, G. A./*Izquierdo*, A./*Mejia*, L.-F. (2008): Systemic sudden stops: the relevance of balance-sheet effects and financial integration. NBER Working Paper 14026, National Bureau of Economic Research.

Calvo, G./*Reinhart*, C. (2000): When capital inflows suddenly stop: consequences and policy options. In Reforming the international monetary and financial system. International Monetary Fund.

Cavallo, E. A./*Frankel*, J. A. (2008): Does openness to trade make countries more vulnerable to sudden stops, or less? Using gravity to establish causality. Journal of International Money and Finance, Vol. 27(8), 1430 – 1452.

Cavallo, E./*Powell*, A./*Pedemonte*, M./*Tavella*, P. (2015): A new taxonomy of sudden stops: which sudden stops should countries be most concerned about? Journal of International Money and Finance, Vol. 51, 47 – 70.

Chari, A./*Stedman*, K. D./*Lundblad*, C. (2017): Taper tantrums: QE, its aftermath and emerging market capital flows. NBER Working Paper 23474, National Bureau of Economic Research.

Chhaochharia, V./*Laeven*, L. (2008): Sovereign wealth funds: their investment strategies and performance. CEPR Discussion Paper 6959, Centre for Economic Policy Research.

Chinn, M. D./*Ito*, H. (2006): What matters for financial development? Capital controls, institutions, and interactions. Journal of Development Economics, Vol. 81(1), 163 – 192.

Cœuré, B. (2017): The international dimension of the ECB's asset purchase programme. Speech at the Foreign Exchange Contact Group meeting, 11 July 2017.

David, A./*Gonçalves*, C. E. (2019): In search of lost time: examining the duration of sudden stops in capital flows. IMF Working Paper 2019/230, International Monetary Fund.

Davis, J. S./*Valente*, G./*Van Wincoop*, E. (2021): Global drivers of gross and net capital flows. Journal of International Economics, 128.

De Santis, R. A. (2020): Impact of the asset purchase programme on euro area government bond yields using market news. Economic Modelling, Vol. 86(C), 192 – 209.

Edwards, S. (2004): Financial openness, sudden stops, and current-account reversals. American Economic Review, Vol. 94(2), 59 – 64.

Edwards, S. (2007): Capital controls, capital flow contractions, and macroeconomic vulnerability. Journal of International Money and Finance, Vol. 26(5), 814 – 840.

Eichengreen, B./*Gupta*, P. (2018): Managing sudden stops. In Mendoza, E. G./Pastén, E./Saravia, D. (eds.), Monetary policy and global spillovers: mechanisms, effects and policy measures, volume 25 of Central Banking, Analysis, and Economic Policies Book Series, chapter 2, 009-047. Central Bank of Chile.

Eisenschmidt, J./*Kedan*, D./*Schmitz*, M./*Adalid*, R./*Papsdorf*, P. (2017): The Eurosystem's asset purchase programme and TARGET balances. ECB Occasional Paper 196, European Central Bank.

Fagan, G./*McNelis*, P. D. (2020): Sudden stops in the euro area: does Monetary Union matter? Journal of International Money and Finance, Vol. 108, 102 – 163.

Forbes, K. J./*Warnock*, F. E. (2012): Capital flow waves: surges, stops, flight, and retrenchment. Journal of International Economics, Vol. 88(2), 235 – 251.

Forbes, K. J./*Warnock*, F. E. (2021): Capital flow waves – or ripples? Extreme capital flow movements since the crisis. Journal of International Money and Finance, Vol. 116, 102394.

Ghosh, A. R./*Ostry*, J. D./*Qureshi,* M. S. (2018): Taming the tide of capital flows: a policy guide. MIT Press Books. The MIT Press.

Ghosh, A. R./*Qureshi*, M. S./*Kim*, J. I./*Zalduendo*, J. (2014): Surges. Journal of International Economics, Vol. 92(2), 266 – 285.

Gros, D./*Alcidi*, C. (2015): Country adjustment to a 'sudden stop': does the euro make a difference? International Economics and Economic Policy, Vol. 12(1), 5 – 20.

Ilzetzki, E./*Reinhart*, C. M./*Rogoff*, K. S. (2019): Exchange arrangements entering the twenty-first century: which anchor will hold? Quarterly Journal of Economics, Vol. 134(2), 599 – 646.

International Monetary Fund (2012). The liberalization and management of capital flows: an institutional view. Policy Paper 196, International Monetary Fund.

Jevcak, A./*Setzer*, R./*Suardi*, M. (2010): Determinants of capital Flows to the new EU Member States before and during the financial crisis. Economic Papers 425, European Commission.

Krishnamurthy, A./*Vissing-Jorgensen*, A. (2011): The effects of quantitative easing on interest rates: channels and implications for policy. Brookings Papers on Economic Activity, Vol. 42(2 (Fall), 215 – 287.

Krugman, P. (2014): Currency regimes, capital flows, and crises. IMF Economic Review, Vol. 62(4), 470 – 493.

Lane, P. R. (2013): Capital flows in the euro area. CEPR Discussion Paper 9493, Centre for Economic Policy Research.

Lane, P. R./*McQuade*, P. (2014): Domestic credit growth and international capital flows. Scandinavian Journal of Economics, Vol. 116(1), 218 – 252.

Lane, P. R./*Milesi-Ferretti*, G. M. (1999): The external wealth of nations: measures of foreign assets and liabilities for industrial and developing countries. CEPR Discussion Paper 2231, Centre for Economic Policy Research.

Lane, P. R./*Milesi-Ferretti*, G. M. (2007): The external wealth of nations mark ii: revised and extended estimates of foreign assets and liabilities, 1970 – 2004. Journal of International Economics, 73.

Lane, P. R./*Milesi-Ferretti*, G. M. (2012): External adjustment and the global crisis. Journal of International Economics, Vol. 88(2), 252 – 265.

Lane, P. R./*Pels*, B. (2012): Current account imbalances in Europe. CEPR Discussion Paper 8958, Centre for Economic Policy Research.

Lu, Y./*Wang*, Y. (2019): Determinants of currency composition of reserves: a portfolio theory approach with an application to RMB. IMF Working Paper 2019/052, International Monetary Fund.

Martin, R./*Schuknecht*, L./*Vansteenkiste*, I. (2007): The role of the exchange rate for adjustment in boom and bust episodes. ECB Working Paper 813, European Central Bank.

Merler, S./*Pisani-Ferry*, J. (2012): Sudden stops in the euro area. Policy Contributions 718, Bruegel.

Milesi-Ferretti, G. M./*Razin*, A. (1998): Sharp reductions in current account deficits: an empirical analysis. European Economic Review, Vol. 42(3-5), 897 – 908.

Moessner, R. (2018): Effects of asset purchases and financial stability measures on term premia in the euro area. Applied Economics, Vol. 50(43), 4617 – 4631.

Neely, C. J. (2015): Unconventional monetary policy had large international effects. Journal of Banking & Finance, Vol. 52(C), 101 – 111.

Neri, S./*Siviero*, S. (2018): The non-standard monetary policy measures of the ECB: motivations, effectiveness and risks. Credit and Capital Markets, Vol. 51(4), 513 – 560.

Schnabl, G. (2021): Macroeconomic policy making and current account imbalances in the Euro Area. Credit and Capital Markets.