Dollar Funding Shortage - A New Database and New Evidence*

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Abstract

I construct a novel measure of dollar funding stress for a sample of 119 economies during the period 1980 - 2021. I name this measure the "Dollar Funding Shortage" (DFS) index. The DFS index is a country-level assessment of countries' dollar funding conditions, and is constructed through text classifications using a natural language processing (NLP) model. I document that systemic dollar funding crises are more prevalent than other financial crises, and typically happen simultaneously with or precede currency and banking crises. Empirically, I find that such idiosyncratic dollar funding stress can adversely affect countries' GDP, bank dollar lending, imports, and exports. Industries that depend more on external dollar financing export significantly less than others in face of a dollar funding crunch.

KEYWORDS: Dominant Currency, Bank Lending Channel, Exports, Natural Language Processing, Local Projection, Difference-in-Difference.

JEL CLASSIFICATION: C82, F62, F30

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I Introduction

The U.S. dollar is the dominant funding currency in the global financial and trade system. According to Bank for International Settlements (BIS) locational banking statistics, cross-border debt to non-US firms stood at 13 trillion USD as of 2021. About 88% of the foreign exchange (FX) transactions and 83% of credit-related cross-border payments are in dollars. For the non-US bank funding, 62% of the foreign currency local liabilities of banks are denominated in dollars. Similarly, 60% of the non-US firms' foreign borrowings are in U.S. dollars even if these companies do not generate dollar revenue (BIS, 2020; Hofmann et al., 2022). Moreover, trade markets are also characterized by a predominance of U.S. dollar (USD) invoicing (Boz et al., 2020; Goldberg & Tille, 2008; Gopinath, 2015; Stein & Gopinath, 2020).

The liquidity provision of the U.S. dollar by the banking sectors has a substantial impact on a country's economic activities (Gopinath et al., 2020; Obstfeld & Zhou, 2022), yet the efforts to measure the dollar liquidity at the country level are limited due to several challenges. First, dollar shortage has a broad definition, ranging from countries' balance of payment deficit to banks' currency and maturity mismatch in their dollar balance sheet. Second, current measures of dollar funding stress either only capture global factors, or cover a small subset of countries in a relatively short period.

The index described in this paper overcomes both challenges and captures the dollar shortage in a unified framework. I construct a novel Dollar Funding Shortage (DFS) dataset for a panel of 119 economies between 1980 and 2021 by using a news-based measure. To the best of my knowledge, this is the first effort to construct a panel index of dollar shortage containing a large set of both developed and developing countries. This is also the first attempt to measure the dollar funding crisis using the narrative approach with global and local news as the source.

Most of the studies so far focus on measuring the dollar funding condition at the global level by using the USD broad index. To measure the country-level dollar funding costs, researchers mostly rely on using the cross-currency basis (CCB) (Avdjiev, Du, et al., 2019; Bahaj & Reis, 2020; Bottazzi et al., 2012; Du & Schreger, 2021; McGuire & von Peter, 2009). In addition, indicators such as the cross-currency funding ratio (CCFR) measure the level of banks' USD funding gap, and the USD stable funding ratio (SFR) can measure the short-term dollar liquidity in the banking system (Barajas et al., 2020; Eguren-martin et al., 2019; McGuire & von Peter, 2009). However, all these *disaggregated* indicators are only available for a small set of economies (mostly advanced) and for a short period of time.

My paper makes at least three contributions to the existing literature on dollar fund-

ing conditions. First, I develop a novel measure of dollar funding conditions for a sample of 119 economies since 1980. Such quarterly country-level measure of dollar shortage focus on documenting the "dominant currency" exposure from its *financial angle*, and hence can be viewed as the "mirror" data of the Boz et al. (2020) on dollar invoicing in *trade*. Second, I demonstrate that dollar crises typically precede or happen simultaneously with banking and currency crises. Third, I present new systematic evidence on the role of the adverse impact of dollar shortage episodes on real and external sectors, and its transmission channel through banks' foreign currency lending, using quarterly Local Projections (LPs), cross-country data, and industry-level data.

The first two sections of the paper explain the process of constructing the dollar funding shortage index. Section II first describes my definition of dollar funding shortages. Then, I introduce the data source, which is based on global and local newspapers. For the criteria to classify the crisis severity, I draw on Romer and Romer (2017) methods to construct a continuous measure of crisis severity. In Section III, I explain how I adopt the Natural Language Processing (NLP) model to auto-identify the dollar funding pressure information.

In Section IV, I first present the stylized facts of dollar crisis episodes over the past 40 years. The number of dollar crisis episodes in developing countries is eight times more than that in developed economies. Globally, the five largest spikes are recorded during the Asian Financial Crisis, the Global Finance Crisis, the Euro Debt Crisis, the 2016 oil price collapse, and the Covid-19 pandemic. Afterward, I compare the dollar crisis with other types of macro-financial crises. I show that a *systemic dollar crisis* [1] is likely to proceed [2] currency crisis and banking crisis. About one-third of the systemic dollar shortage crises overlap with currency crises, and one-fifth of those overlap with the banking crises. Using concrete examples, I explain the nexus and differences between dollar crises and other types of macro crises.

Section V addresses the potential concern regarding the reliability of the data. I validate the DFS with other dollar funding stress measurements such as cross-currency basis and the broad dollar index. I show that the resulting dollar funding shortage index accurately identifies global dollar funding episodes. Importantly, the DFS index also captures important country-level dollar shortage episodes that are not reflected in these indicators.

In the Section VI of this paper, I look at the macroeconomic effects of dollar crises. I conduct several forecasting analyses using Jordà (2005)'s Local Projection (LP) method.

[1] Systemic dollar crises correspond to the episodes falling at the end of the spectrum of the DFS severity classifications. See Section III for the severity categories and criteria.

[2] Occurs together with or precedes.

The results show that a moderate level of dollar shortage crisis is associated with a significant decline in output, banks' dollar lending, import, and export. However, the magnitude of the impact decreases by over half after the global financial crisis (GFC).

Section VII provides further evidence of the implications of the dollar shortage crisis using industry-level data. Relying on a difference-difference method similar to Dell'Ariccia et al. (2008) and Iacovone et al. (2019), I show that during a dollar crisis, the exports of sectors more dependent on external finance grow significantly less than other sectors. However, such a differential crisis effect applies to industrial value-added growth only when the economy has a high level of financial dollarization.

Additional Related Literature:

This paper brings together two strands of literature. Since the 2000s, the international role of the USD as a global funding currency becomes increasingly prominent. The influential work of Gopinath et al. (2020) explains the interplay of dollar trade invoices and low dollar funding costs that bestows the exorbitant privilege on the dominant currency. Avdjiev, Du, et al. (2019) show the relationship between covered interest parity (CIP) deviation and contractions of cross-border bank lending in dollars. An earlier study of Ivashina et al. (2015) demonstrate the particular vulnerability of foreign banks' balance sheets to US dollar funding shock, and how banks' lending behavior would change as a result. According to the "Bruno and Shin (2015) risk-taking" channel, dollar appreciation is associated with increased risk exposure of a globally diversified bank, which reacts by cutting back credit supply, and then decreasing the export sectors' activity (Berthou & Horny, 2017; Bruno & Shin, 2020). As the efforts to measure country-level dollar exposure from the financial angle, Bénétrix et al. (2021) provide a dataset on the currency composition of the international investment position of 50 countries, Goldberg and Krogstrup (2019) construct the Exchange Market Pressure (EMP) index to capture the international capital flow pressures across countries and over time. In addition, this paper relates to the previous literature that explains the relationship between the dollar cycle and countries' economic conditions. Hofmann and Park (2022) use broad dollar appreciation to signal global dollar funding stress episodes, and shows that global dollar shortage can adversely affect countries' GDP, imports, and exports. Similarly, Obstfeld and Zhou (2022) construct the dollar's weighted nominal exchange rate against other advanced economies, and show that dollar appreciation shocks predict declines in output in emerging markets. This paper builds a novel index that measures the *idiosyncratic* dollar funding shortage over the past forty years for 119 economies, and demonstrates the adverse influence of such *country-specific* dollar funding shocks on a variety of macro

indicators.

My methods of constructing the DFS index are similar to the emerging literature that build text-based measurement of financial indicators. Fratzscher et al. (2022) use a text classification approach that extracts information about interventions from multi-source news articles. David et al. (2022) identify the announcement date of fiscal consolidation actions relying on the global news database. Other examples of using multi-media sources for constructing indicators include Baker et al. (2016), Caldara and Iacoviello (2022), David and Leigh (2018), and Hoberg and Phillips (2010). In addition, Ahir et al. (2022) rely on single-source media to construct the World Uncertainty Index (WUI) for a panel of 143 countries. In this paper, I incorporate the most recent innovation of the NLP model to identify and classify dollar funding shortage information.

II Definition, Data, and Measurement

As the first part of the data construction process, I describe the definition of dollar shortage adopted in this paper. Then, I introduce the data source. Lastly, I discuss how to measure the US dollar shortage at each severity level.

II.A Definition of Dollar Funding Shortage

In economics, when demand exceeds supply, there is a shortage. Traditionally, a dollar shortage means that a country's exports cannot accumulate enough dollars to support the nation's imports (Reinhart, 2016). The first description of "dollar shortage" emerges after World War II, when European countries were rebuilding their industries out of the wrack of wars, and the United States was the only country with the capability to produce the needed capital equipment. However, without enough dollar access, Europe had trouble paying for the imported inputs to generate export revenue.

The current reference of the term dollar shortage is more complex, ranging from countries' balance of payment deficit, lack of central banks' reserves, to the increased dollar funding costs for financial institutions. In Baba and Packer (2009), the authors characterize dollar shortage as funding illiquidity suffered by financial institutions. This is the perspective I embrace for this paper.

I define *dollar shortage crisis* as the country-wide dollar liquidity stress in its banking sector. Banking sector plays a central role in facilitating a country's economic activities, therefore its dollar funding inadequacy will result in difficulty to meet the dollar needs of trade and other business.

Two considerations about this definition are in place. First, I do not consider a currency crisis or exchange rate depreciation as representing a dollar funding crisis. The question of exchange rate adjustment and the central bank's policy is different from the dollar liquidity condition of the banking sector, and I avoid confounding the two. I will explain more in detail on this point in Section IV.B[3]. Second, I focus on interpreting the banking sectors' dollar liquidity, which means that a thriving dollar black market suggests a dollar liquidity problem in the bank, even in some cases the informal dollar trading can meet the need of domestic business.

II.B Data Source

I extract dollar shortage information from over 32,000 major global and local newspapers, newswires, industry publications, magazines, and reports. To achieve that, I rely on a dictionary-based method, specifying a dictionary of words whose occurrence in newspaper articles is associated with dollar funding shortages. The full dictionary is described in Table 1. In total, the query returns 47,899 articles that contain information on dollar funding. For all these related articles, I acquire the full context, along with their titles, date of publication, and publishers' names.

I use two groups of publications as real-time narrative sources. The primary group contains the most reputable global newswires/newspapers and magazines. The list of primary source media includes *the Wall Street Journal, the Economist Intelligent Units Country Report (EIU), the Reuters, BBC, Dow Jones, Financial Times, and Agence-France-Presse (AFP).* The publication frequency of the above media is mostly daily, but there are some monthly publications such as the EIU. To complement the coverage of the primary group, I also include 700+ regional and major national newspapers of the 156 countries as secondary sources.[4]

To include multiple information sources has several advantages, as previous literature indicates (Baker et al., 2016; Caldara & Iacoviello, 2022; David & Leigh, 2018; David et al., 2022; Hoberg & Phillips, 2010). First, this allows me to construct a comprehensive dollar funding distress database with optimal coverage of countries and periods. Second, a single real-time source could raise systemic biases issues both in selection and description. For example, the Reuters analysts may only choose to cover the dollar funding condition for certain major economies, leaving other small open economies with less news coverage. Also, an analyst might overlook evidence of distress in an episode for

[3] Goldberg (2022) also explains how the foreign exchange intervention (FXI) makes the exchange rate no longer a sufficient statistic for international capital flow pressures, across countries and over time.

[4] I limit the language of the newspaper to English.

several reasons. For example, he or she may judge the episode as not important enough to mention, or get numbed by the deteriorating economic situation. Furthermore, country leaders may pressure journalists to downplay the distress severity. Lastly, including multiple media sources increases the chance of acquiring the information with the shortest lags between "dollar funding condition" and "news attention." Furthermore, the abundance of the sample data obtained can dramatically reduce the sampling noise issue. The downside, however, is that the multiple sources would inevitably generate the inconsistency of "tones" and "judgment" across countries.

II.C Criteria for Different Severity Categories

My method to classify the severity levels for dollar funding stress is similar to that of Romer and Romer (2017). Romer and Romer (2017) used continuous measures of financial distress for a sample of OECD countries by extracting information from OECD reports. I tailor Romer and Romer's approach in terms of classification criteria so that the classification fits better with the crisis features of dollar funding shortages. For this study, the categories of dollar shortages are 1) dollar funding disruption, 2) dollar funding distress, 3) moderate dollar funding crisis, and 4) major dollar funding crisis. Table 2 summarizes each category and its corresponding criteria.

A typical episode of the country's dollar funding disruption follows the case that the news agency perceived the shortage of dollars was important enough to be reported, yet it did not believe it would cause significant macroeconomic consequences, nor the situation would be likely to persist. For example, the dealers viewed the dollar funding shortage as caused simply by the quarter-end or year-end buying of USD to meet the account requirement of institutions, or the scarcity was due to the national holidays when banks wished to hoard enough dollars during the long break. Other scenarios are that the analysts described the event as a signal of the potential dollar funding difficulty, or the current short-term dollar inadequacy was a recovery process from previous dollar funding crisis episodes. In this category, the dollar funding will likely be resumed automatically without further government intervention. Dollar credit disruption, for example, is often seen in Japan with the following description as reported by Reuters in 1991: *"The market has recently over-reacted to talk of Japanese year-end commercial buying of dollars, and some used the rumor as a method to manipulate the market, " said Naito at Sanwa."But looking at the amount of dollar shortage at the local fixing these days, I don't think the buyers would be that serious".* [5] [6] Similarly reported by Reuters in 1990, *"A shortage*

[5]Due to copyright restrictions, full new articles mentioned in this paper cannot be accessed nor found through links/searches. Please contact the author if you are interested in any copies for these articles.

[6]"Japanese Unlikely to Rush to Bid Dollars ", March 5th, 1991, Reuter

of dollars at month-end and ahead of Japan's Golden Week holidays, which start this weekend, initially propped up the dollar against the yen". [7]. Another publication on dollar disruption in Russia was distributed by Reuters in 1995: *"There is a shortage of dollars on the market and dollar loans are expensive, but this is a temporary situation and the rouble is likely to stabilise again, said a major bank treasurer"*. [8]

A case of dollar funding distress, in my classification, has the following four features: 1) a perception by the news reporters that the hard currency shortage was certainly not trivial, and will likely persist over the medium-term (above three months) at the commercial banks; 2) central bank intervened the inter-bank market, yet not in an aggressive manner[9]; 3) a belief that problems were not so severe that central banks had enough capacity to tackle the problem; and 4) no other restrictions such as currency exchange limitation or dollar withdrawal from deposit accounts were imposed by the governments. An example of a dollar funding distress is the Philippines in 1995. Reported by Reuters: *"The Philippine Monetary Board has approved a proposal for the central bank to open dollar swap contracts with commercial banks, a senior central bank official added. The move is a response to a scarcity of dollars in the market, and the central bank is hoping it will encourage banks to sell dollars in the spot market"*. [10]. Another example was Mauritius in 2001 by Reuters. *"We appreciate the central bank's move to ease pressure on the rupee. But some commercial banks are still holding dollar shortage positions, though they are not alarming, one dealer said"*. [11]

A moderate crisis involves dollar funding problems that are serious and widespread, critical for the financial performance as a whole, yet not so severe that the event paralyzes the whole financial system. In other words, similar to (Romer & Romer, 2017), moderate crises are the threshold of systemic crises. In this category, I look for the statements on the central bank's massive interventions in terms of its variety of tools and injected dollar amounts. Also, I look for descriptions that markets had limited responses to these interventions due to pessimistic expectations. For countries that have established dollar swap line agreements with the Federal Reserve, the activation of the swap line facility also suggests an on-going moderate level of dollar funding trouble. Finally, repetitive coverage of the situation is another factor in making the episode fall into this category. An example of a moderate dollar funding crisis is Mauritius in 2000. Reported by Reuters: *"Dealers said all commercial banks were short of dollars despite central bank intervention and sugar export inflows in the week... Commercial banks are suffering from an*

[7] "Dollar Ends Easier vs Yen in Thin Tokyo Trade", April 27, 1990, Reuter

[8] "Russian central bank seen keeping rouble stable", May 18, 1995, Reuter

[9] One exception is the year-end or seasonal-end dollar shortage episodes, which are classified as 1-dollar credit disruption.

[10] "The Philippines approves dollar swaps with banks", Jan 28th, 1998, Reuter

[11] "Mauritius rupee weakens despite intervention", May 11th, 2001, Reuter

acute shortage of dollars". [12] Another well-known example of a moderate dollar shortage crisis is the Eurozone from 2011 to 2012. Reported by Financial Times in 2011: *"... but there was some evidence US banks are cutting back on lending to European banks and companies in a feedback loop that could make economic conditions in Europe worse... a shortage of dollar liquidity in Europe forced the fed to extend dollar swap lines with the European central bank in September"*. [13]

At the end of the spectrum of my classification is the major crisis. These are usually the severe chronic dollar shortage situation that has led to long-term economic catastrophes. In terms of government interventions, I look for descriptions of "extreme" actions such as the ban on currency exchange and dollar withdrawal from deposit accounts. I also search for words that describe the dollar shortage situation with obvious negative sentiments. Such terms include, for example, "extreme", "grave", "paralysis", "desperate", and "acute". Importantly, I also take the evidence of governments' actions: a major dollar crisis happened when the country qualifies for the IMF program for dollar liquidity. An example of an extreme dollar funding crisis would be Venezuela in 2013. Reported by Financial Times: *"failing to slow annual inflation rates of almost 50 percent and reduce the shortage of dollars that is causing scarcity of everything from communion wine to toilet paper"*. And the ongoing crisis in Argentina. Reported by CE Noticias Financieras: *"Argentina is a country that desperately requires reservations to have dollars...it is forbidden to withdraw dollars from banks"*.[14]

III Classification using Natural Language Processing Method

The nature of this study requires classifications of a giant amount of narrative data. To achieve that, I take advantage of the Natural Language Processing (NLP) methods for classifications. In particular, the default NLP model I use for this paper is RoBERTa. RoBERTa is a self-supervised NLP system in the family of BERT's language masking strategy. Such a system learns to predict intentionally hidden sections of text within otherwise unannotated language examples. It is a proven model that can produce extraordinary performances on NLP tasks compared with every model published before (Liu et al., 2019).

The NLP classification works as follows: humans apply their own set of labels to data. Depending on the difficulty of the classifications, after a certain quantity of labels,

[12] "Mauritius rupee steady, elections not a factor", August 11th, 2000, Reuter

[13] "Eurozone crisis has impact on US bank lending", August 11th, 2011, Financial Times

[14] "Argentina lacks dollars and is all the time on the edge of the ledge", Jan 19th, 2021, CE Noticias Financieras

the model starts understanding the labeling process, and will perform the rest of the labeling automatically. Figure VIII summarizes the NLP process of this paper. In the following subsections, I first demonstrate the classification process. Then, I summarize the consolidation process and how I audit the dataset.

III.A Selecting Relevant News: A 0 - 1 Classification

The first classification task targets screening only the dollar shortage news that describes the country's macro-financial condition.

Although the query obtains all the articles potentially related to dollar funding stress (DFS), many of them are irrelevant articles for this study. For example, many news articles talked about a particular U.S. city or state short of funding for public services. Other news covered the Australian dollar or Canadian dollar shortage.[15]. Some articles addressed the lack of dollars for specific firms rather than the country's economic condition overall. In order to keep only the "dollar funding" articles that are related to countries' macro-financial conditions, I use the NLP to conduct the screening.

I conduct several coding strategies for manual labeling. First, I matched the articles with a list of countries. If the returning results are: NaN (No Country), Australia, U.S., Canada [16], these articles are classified as irrelevant. Conversely, if the article is associated with a single country that is not Australia, the United States, and Canada, the article will be labeled as relevant. After two rounds of proofreading, I finalized the hand-label data set with 7,236 articles labeled as zero and 6,786 articles labeled as one. The remaining articles contain multiple countries. They are left with the empty label at this point, and will later be labeled by NLP. The goal is to let the machine learn these hand-labeled articles, and predict the label of the rest of 21,034 articles.

The performance of the classification by RoBERTa is extraordinary for this experiment[17]. As the F1 scores [18] in Table 5 show, the overall accuracy of classifying into its correct category is 94.2 percent. As a review process of the model performance, I conduct random proofreading of 200 news articles. The results confirmed that the machine-based classification indeed performs well. Considering the large quantity of labeling needed

[15]Because of the pre-domain knowledge that these two countries did not experience idiosyncratic dollar funding shocks, the observations that are related to the two countries are irrelevant to our study. Also, a significant number of articles discussed Australia Dollar(AUD) and Canadian Dollar(AUD) about their fiscal budget funding shortage in their domestic currency.

[16]NaN suggests no countries are discovered. Discussions on the US, Australia, and Canada are about their domestic fiscal issues and have nothing to do with the US dollar funding conditions of banks.

[17]As a standard machine learning process, I split them into a training set and a testing set with a ratio 4:1.

[18]See Section B.A for the explanation of F1 scores.

for this study, such accuracy perhaps is even better than a well-trained research assistant.

III.B Assigning the Dollar Shortage Articles with Severity Levels

The second classification step is to separate all the relevant news into different severity categories, which also first requires manual labeling by matching the articles with the categories group described in the previous section.

Even though the classification criteria are pre-defined, labeling is challenging due to several factors. First, I encountered news describing an ambiguous situation, for example, using the words "acute" and "seasonal" simultaneously. Second, there are many cases where the event falls on the border of two categories. For example, an episode that happened in the United Arab Emirates in 2016 described something between dollar funding distress and dollar funding disruption: *"Banks are also facing deteriorating liquidity conditions and dollar shortages, as government deposits in the banking system have dropped following the fall in oil prices"*.[19]. The general rule for classifying borderline cases is to evaluate the entire article's sentiment. Another typical situation is that the news presented divided opinions held by different shareholders - where central bank governors claimed "no shortage of US dollars," but the market analysts emphasized the "worsening dollar funding". A typical example is Pakistan in 2006: *"Panic was witnessed due to severe shortage of dollars at the currency exchange centers in Rawalpindi and Islamabad following IMF advice to devalue the rupee...One of the leading currency dealers said there was no shortage of dollars in the market...The currency dealers have created an artificial shortage of dollars and are waiting for any positive statement from the State Bank of Pakistan"*.[20] In this case, I examine the entire article by looking for more supporting evidence of the entire situation, such as whether the domestic citizens started hoarding dollars, banks stop issuing letters of credit, enforced capital control, etc. However, as the labeling process is entirely subject to my evaluation, the labeling process will inevitably generate a certain degree of bias.

The final hand-labeled data include 3,943 news articles out of 14,449 relevant dollar shortages, with the distribution from zero to five are 1,313, 664, 656, 560, and 750 respectively.[21] With these labels, I create two classification definitions. The first one is to keep the original five categories - classifying the crisis in a spectrum from "funding disruption" to "severe dollar crisis".[22] The second one is to separate the crisis episodes

[19] "The UAE is most diversified economy in the region", July 16th, 2016, CPI Financial

[20] " Misreading of IMF statement hits currency trading", December 10th, 2006, Business Recorder

[21] Label zero corresponds to the articles that describe the "dollar funding shortage" situation as non-existence. It also includes the situation that 1) a country has fully recovered from DFS, and 2)a country might face a DFS in the future, but no DFS at the moment.

[22] Plus "No shortage".

into "non-systemic" and "systemic". The systemic crises category combines the labels of categories 3 & 4, and the non-systemic crises combine combines the labels of categories 1 & 2.

The results of the two severity classification tasks are shown in Table 4 and Table 5. The indicator we are interested in is the Macro Average F1 score. For the five categories, the overall accuracy level is 64%, with the prediction accuracy much better on the two sides when labels equal 0 and 4. This is easy to grasp, as it is harder for both humans and AI to decide the mid-range categories compared to the "extreme categories". The overall accuracy level improves significantly for the 3-categories classification to 80%. This improvement comes from both a reduced level of categories, and an increased training sample size after merging.

To show this machine learning model is stable and optimal, I conduct several robust experiments with different training sample sizes, and machine learning rate λ. Appendix B explains the details of these exercises. The results of the experiments indicate the machine learning model I apply is stable and optimal.

III.C Additional Check and Consolidation

Additional Review

For those episodes that have low article coverage and those with large standard deviation across articles, I conduct a round of manual reviews to avoid the classification errors' impact on the index[23]. The threshold number of defining "low coverage" is 5 for the three categories and 10 for the five categories.[24] Such number is derived from Table 4 and Table 5.[25] Eventually, I reviewed additional 540 articles that relate to 72 "low coverage" episodes that have less than ten media coverage. The overall error rate is 21%, and has impacted 22 episodes' classifications. [26]

[23]If there are sufficient media coverages for episodes within a given period, the occasional incorrect NLP classifications would not affect the final DFS index.

[24]This number applies to quarterly frequency consolidation.

[25]Take the "3-steps" classification output as an example. An F1 score around 0.80 suggests that, on average, one out of five articles could be mistakenly classified into other categories. Take a borderline case as an example; four articles cover this episode of DFS. Three out of four give a correct identification as 2, and another gives the incorrect identification as 0 (which should be two if not missed). By taking the average, the severity score for this crisis episode is 1.50, which then rounds up to 2. However, if the same misclassification occurs for an episode with less or equal to 3 coverages, the final categories assigned to this episode will be wrong, and therefore requires additional review.

[26]The review is conducted by using the benchmark of five categories' thresh-hold.

Consolidation

Following the additional review, I finalize the dataset that includes the severity of the dollar crisis in each quarter in a sample of 119 economies over the period of 1980 - 2021. I proposed two methods to construct the DFS index: the average[27], and the max. Both methods apply to the "3-steps" and "5-steps" severity graduations in the classification. That said, eventually, I end up with four different indexes that can be measuring the DFS. Below is an example of the final spreadsheet that documents four different DFS indexes.

Country	Date	3_Step_Max	5_Step_Max	3_Step_Average	5_Step_Average
Argentina	4/1/2012	2	4	1.84	3.10
Argentina	7/1/2012	2	4	1.80	3.17
Nigeria	1/1/2016	2	4	1.73	2.80
Nigeria	4/1/2016	2	4	1.72	2.83

IV Dollar Funding Shortage Episodes during 1980 -2021

IV.A Stylized Facts

I identify 1588 quarterly episodes of dollar funding stress episodes for 119 economies using the above construction process. Table 6 presents the count of episodes for each severity level under both "max" and 'mean" measures. The results include both "3-steps" and "5-steps" categories. Surprisingly, the number of systemic dollar shortage crisis episodes is about 30 percent higher than the non-systemic ones.

Figure 2 shows the count of dollar shortage distress identified for each year at the country-quarter level. The black line indicates that count spikes near the Asian Financial Crisis, the Global Finance Crisis, the Euro Debt Crisis, the oil price collapse, and the Covid-19 pandemic. The blue bars suggest an upward trend of systemic dollar crisis occurrences in the past decade - indicating the increasing international role of the USD as the global funding currency. Figure 5 presents selective major countries' dollar funding shortage stress level evolvement.

For the convenience of further illustration, I then consolidate the episodes in yearly frequency. At the year level, I derive the severity level of the crisis from the maximum level of dollar stress the economy has experienced within a year. Following the previous literature such as Laeven and Valencia (2020), the crisis episode is only counted once

[27]The average score will round up into its closest integer during the empirical applications.

using its start year even if it persists for a longer time. Figure 3 shows that most countries have experienced at least one systemic dollar crisis in the past forty years. Some emerging markets such as Brazil (9), Argentina (6), Pakistan (12), Thailand (7) experienced more than 6 episodes of systemic dollar crises.[28] Appendix A lists the systemic and non-systemic dollar shortage crises at the year level.

Following the International Monetary Fund (IMF) World Economic Outlook classification, I group episodes according to the economic development status of the affected country. Table 7 shows that the number of dollar crises that occurred within the emerging and developing economies (EMDEs) is 8 times that of the advanced economies (AEs). AE experienced dollar funding crises mostly only during the Global Finance Crisis, the Euro Debt Crisis, and briefly during the Covid-19 pandemic. Whereas, EMDEs have been suffering from the dark dollar cycle throughout the past 40 years (Figure 5).

IV.B Nexus with other Crises

To assess the sequencing of dollar funding crises, I compare the systemic dollar funding shortage episodes with currency and banking crisis episodes introduced by Laeven and Valencia (2020). Figure 6 shows the incidence of the dollar, banking, and currency crises over the sample period covered in both databases. In total, I identify 17 triple crises (i.e., simultaneous dollar, currency, and banking crises in a given country) over the period 1980–2017. Among twin crises, the dollar/currency crises pair are more common than the dollar/banking pair: about one-third of dollar crises happen simultaneously with currency crises, and one-fifth of dollar crises are accompanied by banking crises.

To better describe a crisis sequencing pattern, I show in Figure 7 the incidence of currency and banking crises along a time scale in countries that experienced a dollar funding crisis in year T. The figure reveals that currency and banking crises tend to coincide or follow the dollar funding crises in the next year.

Several factors can explain the nexus between the banking crisis and the dollar crisis. First, the reduced creditworthiness of banks causes pessimistic expectations about future developments in the domestic economy, and encourages investors to withdraw their dollars or convert their domestic currencies to dollars. Second, for the EMDEs that have high financial dollarization ratios, the dollar liquidity turmoil - coming from either the terms of trade shocks or the global dollar cycle, is equal to a direct impact on the banking balance sheets. Lastly, although foreign currency lending is less common in

[28] However, given crisis episodes are only counted once using the starting year, Figure 3 doesn't reveal the persistence level of the crisis. For example, Argentina has chronic dollar shortage problem since the 2000s, while Brazil experienced mostly "short-lived" dollar shortage hits.

developed countries, global banks of the developed world tend to lend aggressively in the international market. When investors began to pull their short-term dollar loans, global banks sometimes need to address the dollar shortage by tapping their domestic assets and converting them into dollars at the Foreign Exchange (FX) market, which hurts their balance sheets.

The dollar funding crisis has a close relationship with the currency crisis. Laeven and Valencia (2020) defines currency crisis as a "sharp" year-on-year depreciation of the currency vis-a-vis the U.S. dollar of at least 30 percent. Under the law of supply and demand, the scarcity of the dollar could be the main reason that drives the price of domestic currency to fall. However, it is important to highlight that the context of the two crises is different for many reasons. First, for some countries, local currencies are pegged with the USD, therefore the depreciation threshold does not reflect the dollar liquidity in the domestic market. Second, the official foreign exchange rate does not reflect the "actual" currency supply and demand for many crises that undergoing currency crises. For example, in Nigeria - a country that faces chronic dollar shortages and currency crises, its central bank continues to list the pegged exchange rate to the dollar on its website. However, on the side of the thriving currency black market, the naira continues to depreciate sharply. Third, countries can experience currency crises, but have sufficient dollar liquidity in their banking systems. The Turkish lira, for example, depreciated by 44% in 2021, but the country had sufficient dollar liquidity in its banking system through strong exports and trusted relationships with European Banks. Lastly, the dollar crisis in the definition of this paper focuses on the banking sector, which is more "subtle" and can occur without affecting the exchange rate. For a country that has built up sufficient reserves, central banks can alleviate the banking sectors' dollar liquidity stress by selling the foreign reserve. In this scenario, there will be no exchange rate turmoil, but banks will tighten their dollar credit provision.

V Comparison with Other Dollar Shortage Indicators

After constructing the DFS database, an obvious next step is to cross-validate the new narrative measure of dollar funding stress with other "dollar funding shortage" indicators and ensure the new measure is accurate and reliable.

I start by examining the association of the overall news report on DFS with the US dollar broad index. The US dollar index shows how much the dollar is in demand globally and is used as a general indicator of the global dollar funding stress. Then, I show with examples that the new measure is highly correlated with the negative spikes

of foreign countries' cross-currency basis - an indicator of a country's dollar funding condition. However, the DFS index (both aggregated and at country-level) also captures important dollar shortage episodes that are not reflected in these indicators.

V.A With US Dollar Broad Index

Figure 8 plots the aggregated news-based dollar funding shortage (DFS) index (right axis) and a weighted average of the foreign exchange value of the U.S. dollar against the currencies of a broad group of major U.S. trading partners, based only on trade in goods (left axis). Following the methodology of Caldara and Iacoviello (2022) and Baker et al. (2016) on constructing the global news index, such global DFS index measures the frequency of total newspaper articles discussing adverse dollar funding conditions since 1989.

As Figure 8 shows, since the 2000s, the trends of the two indexes go hand-in-hand. This preliminary exercise suggests that pooled global DFS index indeed captures the tightening global dollar funding condition measures by the USD broad index.

However, the differences between these two indexes before the 2000s highlight the important limitations of using the USD broad index to measure the historical global funding conditions. As the period of 1998-2002 suggests, the USD broad index reached its peak level in the past 40 years, however, the report of other countries' dollar funding stress episodes are at the historical bottom level. There are two main reasons why the USD broad index is an insufficient indicator of the global dollar funding condition prior to the mid-2000s. First, the USD started becoming a global funding currency only after the 2000s when global banks expanded their operations in developing countries (McGuire & von Peter, 2009). Second, because of the less prominent dominant currency position prior to the mid-2000s, it is the strong fundamentals of the US economy together with the overvaluations of the USD that mainly explained the USD index movements. From this perspective, the aggregated DFS is advantageous to the USD index in providing a better historical description of the global dollar funding conditions.

Finally, the plots show that the spike in the media coverage of dollar shortages precedes the US dollar index spike, which highlights an interesting fact that text-based measures of dollar shortage might have excess coverage at the beginning of the dollar funding crisis, with the attention slowly diverts prior to the peak of the crisis.

V.B With Cross-currency Basis

Cross-currency basis (CCB) is one of the commonly used indicators that reflects a country's dollar funding shortage. The CCB measures deviations from covered interest rate parity (CIP) - a fundamental relationship linking money and foreign exchange markets, yet such a relationship has been broken since the GFC.

Though the long-time fail of CIP after GFC is argued to be associated with multiple drivers across time (Cerutti et al., 2020; Du & Schreger, 2021), a spike of CCB in the short-term is often linked to an interpretation of an increased country's dollar funding pressure (Avdjiev, Du, et al., 2019; Bahaj & Reis, 2020; Bottazzi et al., 2012; Du & Schreger, 2021; McGuire & von Peter, 2009). Therefore, it is natural to ask how our new measure of dollar distress compares with CCB for the same countries over the same period.

Before comparing CCB with DFS, let me briefly explain why a cross-currency basis is the de facto measure of dollar funding stress. The deviation of covered interest rate parity is defined as:

$$CCB_{t,t+n} = y^{\$}_{t,t+n} - (y_{t,t+n} - \rho_{t,t+n})$$

Where $y^{\$}_{t,t+n}$ is the is the **direct** cost of funding in USD at time t for a term n maturity, and $y^{\$}_{t,t+n} - (y_{t,t+n} - \rho_{t,t+n})$ is the cost of **synthetic** dollar funding. A negative dollar basis where $CCB_{t,t+n} < 0$, suggests that direct dollar funding, if accessible, is cheaper than borrowing foreign currency and swapping it into dollars. In reality, the dollar deposit market and FX market are quite segregated - each has different market participants. Small banks and non-bank financial institutions lack access to direct US dollar funding, so they have to rely on the FX swap market to borrow dollars supplied by other financial intermediaries (i.e., large global banks). In a tranquil time, such CIP deviation is close to zero because global banks who have access to both markets can arbitrage away the above basis profit. Whereas at the time of dollar distress, banks face additional costs on balance constraints, so they need to 1) shrink the dollar supply 2) increase the demand for currency hedging at the FX swap market. As a result, the cost of dollar funding rises in the FX swap market, with the dollar shortage reflected in the widening CCB.

I compare the text-based DFS and CCB index by plotting the average evolution of these two indicators for the five selected countries in which the CCB is available. For the DFS index, I chose to plot the "5-step average" instead of the other three measures, given that it gives more variations and neutrality. Since our new series is constructed quarterly, I also converted the CCB into quarterly. The selected advanced economies are Japan, Eurozone, and South Korea. The selected emerging markets are Mexico and Russia.

Figure 9 shows a remarkable correlation between the country-specific DFS index and CCB indicator. The five panels show that the DFS not only has identified the global dollar crunches period - such as the GFC, Eurozone debt crisis, and covid-19 pandemic, it also has successfully documented country - idiosyncratic dollar distress episodes- examples such as Russia in 2014, Japan in 2016, and South Korea in early 2007. Second, within the country's dollar funding stress period, the evolution of DFS severity also overlaps with the evolution of the width of CCB. Third, during global and regional dollar funding distress seasons, the DFS can reflect the different spillover effects for countries. For example, at the peak of the Eurozone debt crisis in 2011, the dollar stress level in Eurozone is three on average - which is considered moderate, yet such spillover on Japan is only minor with a severity level of one.

The DFS has several advantages compared with the CCB indicators. First, with a sample of 118 countries, the new text-based approach allows a more comprehensive coverage of countries. The CCB as an indicator of dollar funding shortages, on the other hand, is only feasible for a small set of countries or currency unions, as most of the countries either 1) do not participate in the FX forward market or 2) impose strong capital controls that could cause distortions on the CCB indicators[29]. Second, as Figure 9 shows, the DFS is built with a long time horizon - starting from 1980 until 2021, yet the CCB indicator has become viable only in recent two decades. More importantly, because there is a persistent failure of CIP post-GFC due to multiple drivers such as the amid risk aversion and regulation changes, a negative basis cannot best reflect a contemporaneous dollar funding pressure (Du & Schreger, 2021). For example, under the measure of DFS, South Korea did not experience dollar funding shortage episodes in the period of 2013q1 - 2020q1, but the CCB was persistently negative during these quarters.

With the above evidence, I conclude that the new text-based DFS is reasonably accurate, reliable, and has its own advantages over other quantitative indicators of dollar shortage. The downside of the DFS is its relatively low-frequency nature compared to CCB.

[29]These capital controls create market segmentation for participants, with a gap in the onshore local currency bond yields and the offshore non-deliverable cross-currency swap rates. Together with a higher forward premium with the reduced risk appetite of global investors, the overall CCB would be positive under strong capital controls - which is what we see in 2008 for some of the countries such as China, Russia, and India.

VI Empirical Analysis - the Macro Impact of Dollar Shortage

After creating a new scaled measure of dollar funding stress for a set of 119 countries, a natural empirical exercise is to examine the average impact of it on the economy. In this section, I use the Jordà (2005) local projection method to estimate an average cumulative effect of moderate size dollar crisis. I focus on predicting real economic activity, bank dollar lending, import, and export. To keep the analysis manageable and aligned with previous literature, I use the country's real GDP to measure the real sector performance. I include banks' dollar finance and trade in the exercise because these activities are characterized by a predominance usage of the U.S. dollar.

There has been emerging literature that demonstrates the adverse impacts of the tightening *global* dollar funding condition and on the global economy (Avdjiev, Du, et al., 2019; Bruno & Shin, 2020; Hofmann & Park, 2022; Obstfeld & Zhou, 2022), with the main mechanism relies on the "Bruno and Shin (2015) risk-taking channel". Motivated by the same mechanism, the following exercise focus on examining the impact of the *idiosyncratic* dollar shortage funding shocks on the real economy using the novel DFS index, which will be the first attempt in the current literature.

VI.A Data and Baseline Model

Data.— I use the "5-step average" index as it provides more variation in the severity of the episode. The quarterly GDP data is collected from the IMF international financial statistics (IFS) database and individual central banks. For the bank's dollar lending, I used the banks' dollar liability data acquired from the BIS locational database A5-table. [30]. The export and import data is acquired from the IMF Direction of Trade Statistics (DOTS). All the quarterly data are seasonally adjusted using ARIMA X-12.

Model Specification.— In the baseline specification, I use the Jordà (2005) local projection to estimate the impulse response function to dollar shortage shocks for four variables. I also assume that distress is not affected by the outcome variables contemporaneously, but economic activity may be affected by distress within the period. The specification of the model is:

[30]The objective of using dollar liability data is to capture the lending behaviors of international banks that channel dollar funding globally. Ideally, the dollar lending data need to be constructed by summing the components of dollar loans and dollar bonds, as well as with a counter-party of only non-banks. However, such a detailed breakdown is confidential to external access at the time of this paper.

$$y_{j,t+h} - y_{j,t-1} = \alpha_j^h + \gamma_t^h + \beta^h DFS_{j,t} + \sum_{k=1}^{3} \varphi_k^h DFS_{j,t-k} + \sum_{k=1}^{4} \theta_k^h \Delta y_{j,t-k} + e_{j,t}^h \qquad (1)$$

The dependent variable is the cumulative change in the country i's economic or financial variable y from quarter t - 1 to t + h, h = 0, . . . , H. In this model, I include four lags of both the DFS and the outcome variable as controls. I also include country fixed effects α_j^h to capture the country's own economic characteristics. In addition, I include time fixed effects γ_t to control for the global economic factors that affect all countries in a given year.

The equation (1) is estimated using the OLS model with a time horizon of 20 quarters - a good length for a medium-term analysis. My coefficients of interest are those β^h for successive horizons at time t, which demonstrate the response of real and external activities to an innovation of 1. In order to make the interpretation more meaningful, such coefficient is multiplied by 3 - which corresponds to a moderate level dollar crisis.

VI.B Baseline Result and Interpretations

Impulse response functions.—— Figure 10 shows the impulse response functions for the four outcome series estimated over the full sample of countries with the two-standard-error bands.

The upper-left panel shows the results for real GDP. The real GDP appears to fall contemporaneously with the impulse in the dollar crisis variable. The immediate aftermath of a moderate dollar shortage crisis is a fall in GDP of 1.69 percent. The decline grows over the 6 quarters following the impulse, with a local maximum decline at 2.58 percent. Such a negative effect remains large after six quarters with the sign of improvement only seen after 18 quarters.

The impulse response function for BIS country's dollar capital flow is demonstrated in the upper-right panel. This panel shows that the bank's dollar capital flow falls with the innovation in dollar funding stress after 12 quarters. The commercial banks' dollar liability decreased by 15.04 percent from quarters 12 - 17 after experiencing a moderate crisis innovation. The estimated negative effect on capital flow begins to wane after 17 periods, yet remains significant.

A moderate dollar funding crisis also has a negative impact on export, triggering a cumulative contraction of up to 3.84 percent after five quarters, as indicated in Figure 11 left-lower panel. In parallel, import growth is negatively affected by a dollar crisis. The cumulative effect of the dollar crisis reaches 7.20 percent after three quarters. The dollar crisis's effects on import growth are also more persistent, fading only after 20

quarters. The impact of DFS on the exports sector sheds light on interactions among the "dominant currency channel, "financial channel", and "traditional Mundell-Fleming channel", which I will provide further interpretations in the following sections

Interpretations.—— The baseline results largely confirm the negative and persistent impact of the dollar crisis on the real economy, bank's dollar lending, export, and import. Economic activity and banks' lending declined significantly following a substantial rise in dollar funding pressure. Interestingly, the magnitude and speed of responsiveness are somehow different across the four outcome variables.

The fall of GDP growth is immediately after the dollar funding crises and throughout the predicted horizon (20 quarters), with a decline of 2.58 percent in the first 5 quarters. The negative effect is consistent Obstfeld and Zhou (2022), who report that following 10 percent dollar appreciation real GDP falls 1.5 percent relative after about eight quarters. However, it is difficult to directly compare the magnitude of the two analyses given Obstfeld and Zhou (2022) measures the global dollar cycle, where I measure country-level dollar funding stress. When compared to banking crises, such cumulative effect is smaller and shorter-lived to Babecký et al. (2014) and Bordo et al. (2001), who report an average decrease in output of 6-7% after experiencing a banking crisis in 25 quarters. It is also smaller to Romer and Romer (2017), who reported a 6% cumulative decline of output aftermath of the financial crisis after 3.5 years. When comparing to the currency crisis, such magnitude of impact on GDP is more analogous to Babecký et al. (2014), who finds a maximum cumulative loss of 3.5% of GDP in quarter 10 aftermath of a currency crisis.

A moderate dollar crisis reduces commercial banks' dollar liability markedly after around 12 quarters. Such decline grows significantly - peaking at 15.04% in quarter 17. The result is consistent with Avdjiev, Bruno, et al. (2019) and Bruno and Shin (2015): both studies find a negative correlation between the US dollar funding shock and BIS capital flows. In addition, the "delayed" response of BIS capital flows to DFS is in line with Bruno and Shin (2015), which shows that such impact does not occur contemporaneously but after 8 quarters after the initial shock. However, the difference between Bruno and Shin (2015), Avdjiev, Bruno, et al. (2019) and my paper is that: Bruno and Shin (2015) and Avdjiev, Bruno, et al. (2019) use Fed fund rate and US dollar broad index, respectively, as the indicators for global dollar funding shock, where I use the text-based DFS that captures country-idiosyncratic dollar shortages.

Intuitively, two drivers can shape the speed of balance adjustment of the non-US intermediaries following a dollar funding shock. There is a demand for banks' dollar borrowings from the wholesale funding market, and a supply of dollar credit to local

borrowers. In terms of the dollar demand, foreign banks first need to increase their short-term dollar borrowings - to cover any liquidity mismatch that appears in their dollar balance sheet[31]. At the same time, the increased dollar funding costs deteriorated the health of banks' balance sheets, so in the medium-term, banks adjust their leverage by decreasing the dollar credit supply to local borrowers. With the supply force eventually overweight the demand force, the changing dynamic of these two drivers might lead to the sluggish response of dollar capital flow to dollar crises, as suggested in the empirical result.

Another intriguing discovery of this analysis is the response of countries' export and import. A dollar shortage crisis has a negative impact on the country's export growth, with a magnitude of as much as 3.84 percent after five quarters. This finding is in line with the studies of Gopinath et al. (2020) and Bruno and Shin (2020), which explain the dominance of the financial channel and dollar invoicing channel over the competitiveness channel that has the expansionary effects on exports that would emanate from the currency depreciation. In parallel, the persistent and negative impact of the dollar crisis on imports is more in line with traditional trade competitiveness channel effects. Moreover, since the impact of the dollar crisis on imports is more significant than that on exports, the overall effect dollar crisis on net export is positive - suggesting the decline of GDP is probably coming from the channel of investment.

VI.C Resilience after the Global Financial Crisis

Recent studies of the BIS show that the financial system has been less vulnerable to the US dollar funding changes since the GFC (Aldasoro et al., 2021; BIS, 2020). Several factors have contributed to the better resilience of banking sectors to dollar funding shocks, such as strengthened regulatory changes, shifted business models, and enhanced international monetary corporations. First, as a response to strengthened supervision under Basel III regulation, banks started holding more dollar capital and improving their risk management practice. In particular, banks have adjusted the US dollar exposure of their balance sheets by reducing their usage of short-term US dollar liabilities and increasing holdings of more liquid US dollar assets. Second, global banks, especially European banks, have scaled back their dollar activities operations. It has been shown that cross-border bank loans in US dollars as a share of global GDP fell back to their levels in the early 2000s. Lastly, during and since the GFC, a network of bilateral central bank swap lines has been established, covering various currencies. The most prominent

[31] As recent BIS paper shows, non-US banks' on-balance sheet dollar liabilities rose during the height of the Covid-19 crisis (Aldasoro et al., 2021).

one is the Fed swap line facility between the Federal Reserve and major foreign central banks. According to the recent literature, the dollar swap line network significantly alleviated the dollar liquidity stress during the crisis period (Bahaj & Reis, 2020; Barajas et al., 2020).

Given those post-GFC structural changes in dollar funding at banks, I split the sample into two periods: the start of the sample through 2007Q4, and 2008Q1 through the end of the sample. Importantly, I expect that after experiencing a dollar funding shock, the recovery of the natural and finance sector will be faster since GFC.

Figure 11 shows the results for the baseline full sample and the two subsamples. For the real sector, the average decline in GDP after a crisis in the post-2007 period is distinctly smaller than that for the full sample, and much smaller than that for the pre-2007 sample. The maximum decline in GDP following a dollar shortage shock in the post-2007 period is 1.56 percent as opposed to 2.58 percent in the full sample and 4.53 percent in the pre-2007 sample. More importantly, the GDP is more resilient to the shock since the GFC period, with a sign of improvement appearing after 3 quarters as opposed to the 12 quarters in the pre-2007 sample.

Such structural change is even more prominent when looking into the banking sector. The percentage decline in banks' dollar liability after a dollar crisis in the pre-2007 period is more than twice larger than that of the post-2007 one. The maximum decline in banks' capital flow following a dollar shortage shock in the post-2007 period is 17.73 percent, as opposed to 36.5 percent in the pre-2007 sample. Similar to the real sector, such results suggest that dollar lending is also more resilient to the shock since the GFC period.

In summary, this sample-split analysis further supports the robustness of the baseline analysis, yet highlights the distinct recovery path since GFC for both the real and banking sector. Though this analysis does not go beyond scrutinizing the causality between the structural changes and declining vulnerabilities to dollar shock, such sensitivity analysis shows an increased resilience of the economies since the GFC.

VII Sectoral Analysis

The local projection exercise in the above section shows the adverse influence of the dollar funding shortage on countries' economic conditions, but it does not allow me to make any causal statements. In the last section, I provide further evidence of the effects of the dollar crisis on real output and export through the transmission channel of finance. The goal of this exercise is to resolve the joint endogeneity concern in the Section VI, and make a causal inference. To achieve that, I adopt the "difference-in-difference" approach

used by Rajan and Zingales (1998), and answer the following question: do industries that are relying more on external finance tend to export and produce less during the dollar funding crisis?

VII.A Empirical Strategy

To study whether the dollar funding crisis has impacts on exports and outputs, I exploit the identification assumption that industries that are more dependent on external finance will be more severely affected by the crisis. Following Dell'Ariccia et al. (2008) and Iacovone et al. (2019), the benchmark regression model is:

$$ln(Y_{ijt}) = \alpha_{ij} + \beta_{it} + \gamma_{jt} + \delta Dollar\_Crisis_{it} * ExtFinDep_j + \phi X_{ijt} + \varepsilon_{ijt} \quad (2)$$

where $Dollar\_Crisis_{it}$ is the start year of the crisis.

$ln(Y_{ijt})$ corresponds to two types of dependent variables: 1) the export growth and 2) the value-added growth in country i, industry j and time t.

There are three fixed effects this model controls: α_{ij} controls for unobserved time-invariant characteristics of each country-industry pair. β_{it} controls for unobserved country-specific characteristics. γ_{jt} controls for the industry-specific effects. These three fixed effects avoid the usual difficulties of choosing an appropriate set of control variables, and allow for the reduction of endogeneity concerns that are central to many studies on financial sectors' impact on macroeconomics. Under this setting, the only additional variations identified are those that simultaneously vary across all three dimensions: country, industry, and year.

$\phi_j X_{it}$ include additional controls that are crucial for the study. First, because I am interested in the pure effect of the dollar funding crisis, I control for other types of financial crises such as banking and currency crises. Second, when the dependent variable is export, I follow the Iacovone et al. (2019) and Rajan and Zingales (1998) and control the level of a country's financial sector development. And when the dependent variable is value-added growth, I follow the Dell'Ariccia et al. (2008) and Rajan and Zingales (1998) and control the lagged share of industry j in country i to account for "convergence" effects. All the controls, except for the lagged shared, also interacted with the external finance dependence index.

The main variable of interest is the interaction of the dollar shortage dummy with the external financial dependence. According to the hypothesis of this study, a negative δ would suggest that sectors relying more on bank loans are hurt more during tight dollar funding conditions than those that typically finance their investments mainly with

internal funds. Regressions are estimated in STATA using *reghdfe*.[32]

Data on manufacturing value added come from the UNIDO, and is deflated using consumer price indexes from the IMF International Financial Statistics. Data on sectoral export value is obtained from WITS Comtrade. Both variables were converted to ISIC Revision 2 from 3 and 4-digit sectors, so that they match the 36 sectors available from Rajan and Zingales (1998). For the currency and banking crises, I continue using the information provided by Laeven and Valencia (2020).

VII.B Results

VII.B.1 Impacts on Sectors' Export Growth

Table 8 summarizes the results of benchmark regression Equation 2 when dependent variable is export growth. Column 1 shows that the coefficient of the dollar crisis/external finance dependence interaction term is negative and significant at the 5 percent level. As columns 2 - 4 indicate, additional controls on financial development, banking crisis, and currency crisis do not vary the sign and the coefficient magnitudes.

The magnitude of this disproportional effect is substantial. Based on results shown in column 1 of Table 8, exports in a sector highly dependent on external finance (at 90 percent quantile) will experience a 15.0 percent decline than a low-dependent sector (at 10 percent quantile).[33] Such magnitude of impact is very close to the banking crises' effects on export - as Iacovone et al. (2019) reports that sectors highly dependent on external finance will experience a 14 percent drop in exports, while a low-dependent sector will be almost unaffected. The impact of the currency crisis on export is not significant at the 10% level - as column 4 shows. This result is consistent with the ambiguous effect of the currency crisis on export. On one hand, large exchange rate depreciation increases export competitiveness; but, on the other hand, it erases the value of the exporter's domestic assets and prevents other exporters from entering the market (Chaney, 2016).

In order to test whether the dollar funding crisis has a persistent impact on export growth, I estimate the Equation 2 with a four-year window. As shown in Table 9, the

[32]See more on Correia (2017). Reghdfe is a STATA package that produces regressions when there exist many levels of fixed effects. The method will take into account also the collinearity within the fixed effects and eliminate singleton groups. For these reasons, it is preferred to the STATA commands areg or xtreg when high-dimensional fixed effects are in place.

[33]In addition, I use the Jordà (2005)'s local projection method with specification as Equation 3. Figure 12 reports the differential export growth effects to systemic dollar funding crisis of an industry with high external financial dependence (at 90th percentitles) compared to one with low external financial dependence (at 10th percentiles) in a five-year horizon.

peak of the adversity of the dollar funding crisis on export happens in its second year, such a negative effect on export growth prolongs until the fourth year after the crisis. Such a result is also similar to Iacovone et al. (2019), who find the negative effects of a banking crisis persist until the fourth year

VII.B.2 Impacts on Sectors' Value Added Growth

Table 10 summarizes the results of benchmark regression Equation 2 when the dependent variable is the growth of the sector's output measured by the value added. In the first two columns of the table, the results reject the hypothesis, indicating that sectors relying more on external finance will not be disproportionally impacted by the dollar funding crisis. Indeed, unlike global exporters that borrow mainly in dollars (Gopinath, 2015), most domestic firms borrow more in domestic currency, especially in developed countries. Foreign currency lending is only prevalent in countries whose financial sectors are highly dollarization. That said, unless the sectors' production is mostly for export, or a country's economy is high-dollarized, the external finance dependence index of Rajan and Zingales (1998) is not equivalent to the dollar finance dependence faced by industries.

To address such issues, I adjust the dollar crisis magnitude to match its importance in a country's financial system. In particular, I use the interaction term of a country's deposit dollarization rate with dollar crisis to re-measure the dollar crises importance to the economy. That said, the interaction term $RZ * Dollar\_Crisis_{it}$ in the Equation 2 is substituted by:

$$RZ * \underbrace{(Dollar\_Crisis_{it} * Financial\_Dollarization_{it})}_{\text{Importance of the DFS shock to Financial Sector.}}$$

The term in the parentheses measures the overall importance of the dollar funding crisis in a country's financial system.

I use the country's deposit dollarization rate instead of its credit dollarization rate to proxy the level of financial dollarization. The dollar funding crisis is negatively correlated with the dollar credit growth, but has no correlation with the change of dollar deposit[34]. However, the fact that deposit and credit dollarization have a correlation of 0.83 indicates that deposit dollarization is a good instrument for countries' dollar credit dependence. Financial dollarization data is compiled and shared by Christiano et al. (2021). In this case, column (4) shows that industries that are more dependent on external finance from banks indeed experience a larger drop in exports during the dollar

[34]Correlation between dollar crisis and credit and deposit dollarization increase is -0.0673 and -0.0001 respectively.

funding crisis. For one-standard deviation increase in the dollar funding crisis index, the output of a sector highly dependent on external finance (at 90 percent quantile) will experience a 0.5 percentage decline than a low- dependent sector (at 10 percent quantile).

VIII Policy Implications and Conclusion

As the key contribution, this paper introduces a novel database that measures the country-level dollar funding pressure for a sample of 119 economies. This new database, which is constructed using the state-of-art NLP classification model, allows automatic classifications for a piece of large-scale narrative information, and provides a handful of information on the severity and evolution of dollar funding distress across episodes. A cross-validation of the new database with other dollar shortage measurements suggests that the new measure is reasonably accurate, reliable, and advantageous from many perspectives.

As a second major contribution, I examine the impact of *idiosyncratic* dollar shortage crises on the real sector and the external sector using both macro and micro data. I find that real GDP, dollar lending, import, and export, all fall rapidly and significantly following a dollar funding shortage episode. The sector-level analysis then reveals that industries that are more dependent on external dollar finance would export significantly less than other sectors when in face of a dollar funding crunch.

From a methodological perspective, this new database faces two major challenges. First, even with narrative daily news, it is very difficult to isolate some truly exogenous episodes of idiosyncratic dollar shortage crises. Instead, some dollar crises are likely to be related to economic activity deterioration, as a result, the macro-analysis is likely to overestimate the adverse impact of dollar crises. Second, for maximizing the coverage of countries, the database is constructed by relying on multiple sources, which inevitably reduces the consistency of narrative tones.

Looking ahead, as financial institutions in emerging markets start expanding their cross-border investments in recent years, the world's demand for US dollar funding and FX hedging will only expect to increase (BIS, 2020). Policies should focus on closer monitoring of financial institutions' international balance sheets and accumulate enough reserve buffers. In addition, central banks and international organizations should enhance the corporations and supply stable dollar funding liquidity in the event of market distress. Here, policy options for different economies and entities could include:

- *Enhance macro-prudential monitoring:* For advanced economies and emerging markets with developed financial systems, regulators should closely monitor banks' in-

ternational balance sheets for possible maturity mismatches. Currency mismatches make financial institutions vulnerable to changes in market sentiment and could trigger a fire sale - as we experienced during the GFC and the Covid-19 pandemic.

- *Increase reserve buffers:* For emerging markets and low-income countries, central banks should accumulate ample reserve buffers during the normal time. A comfortable level of reserve holdings would allow domestic central banks to be the "hedging party of last resort" and activate a currency-swap facility during periods of distress. However, such dollar liquidity backstop should be well structured to mitigate the risk-taking and moral hazard behavior of the banks.

- *Strengthen international cooperation:* Many studies indicate the benefits of accessing this dollar liquidity directly from the Fed at a time of global dollar funding crisis. However, the current Fed swap line partnership agreements are highly selective and exclude most emerging markets. It is worth examining whether the current capacity of international monetary cooperation could be expanded upon. International organizations, such as the IMF for example, have the opportunity to explore the potential role to be the " lender of last resort" with the purpose of better stabilizing the global financial markets, reducing economic uncertainty, and advancing the economy for EMDEs.

Lastly, I hope this new country-level database can open a new avenue for future research related to the international roles of the U.S. dollar. As Gopinath et al. (2020) famously pointed out, the U.S. dollar plays a predominant role in the international trade and financial system. With the new dataset, we can answer a set of important policy questions. For example, what is the state-dependency response of the real and external sectors to dollar funding shortage with the sources such as the level of financial/trade openness, swap-line status, the share of dollar invoices, and global value chain integration? Also, do the *global* and *idiosyncratic* dollar funding shortage factors have different implications on domestic financial conditions, depending on their international investment position? I will leave these questions for future studies.

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Table 1: Dollar Funding Shortage Search Syntax / Vocabulary Examples

Panel A: Dollar Funding Shortage Dictionary of Words		
Dollar Bag of Words	**Shortage Bag of Words**	**Notes**
Dollar(s), USD, Greenback(s), Hard Currency, Foreign Currency	Shortage(s), Scarcity(ies), Pressure(s), Crisis, Crises, Struggle(s), Struggling Difficulty(ies), Distress, Stress, Shortfall(s), Squeeze(s), Crunch(es), Run, Lack, Dearth, Tight(ness)	In total: 8 *26 = 208 combinations
Panel B: Dollar Funding Shortage Query Syntax		
Exact Query Syntax	**Explanation**	**Phrases Examples**
[dollar* near4 shortage*]; [dollar* near4 scarc*]; [dollar* near4 struggle*]; [dollar* near4 pressure*]; [dollar* near4 squeeze*]; [dollar* near4 crunch*]; [dollar*near4 stress]; [dollar* near4 difficult*]; [dollar* near4 cris*]; [dollar* near4 distress]; [dollar* near4 shortfall*]; [dollar* near1 run] "Dollar" in the above syntax includes: **"Dollar(s)", "USD", "Greenback(s)", "Hard currency", "Foreign Currency"**	Articles that contain words "dollar" and "shortage". And two words are within the distance of 4 words.	Shortage of USD; Pressure of finding enough dollar; Hard currency shortfall; Severe crunches on USD; Dollars are scarce; Greenback shortages; Lack of dollar liquidity.

Notes: In panel A, the dictionary comprising two bags of words, the first bag containing thesaurus of "dollar", the second bag containing thesaurus of "shortage". In panel B, for the query syntax, the combination of two words (out of the two bags of words) must fall within certain distance. Section II.B explains more on the data source.

Table 2: Severity Measurement Criteria Summary Table

Measure of Dollar Funding Severity		
Severity Level	**Criteria**	**Examples**
0 - No Shortage	1) No dollar shortage. 2) Fully recovered from previous episodes. 3) Banks face potential dollar funding difficulty.	*1) " No dollar shortage appears in the bank" .* *2) "Previous dollar funding crisis has taught us …"*
1 - Dollar Funding Disruption	1) No significant macroeconomic consequences. 2) Will not be persistent. 3) Largely relieved from previous episodes. 4) Market will likely recover automatically without further actions.	*1) "There is a shortage of dollars on the market and dollar loans are expensive, but this is a temporary situation and the rouble is likely to stabilise again."* *2) "A shortage of dollars at month-end and ahead of Japan's Golden Week holidays, which start this weekend, initially propped up the dollar against the yen."*
2 - Minor Dollar Funding Crisis	1) Situation is not trivial, and will likely persist over the medium term. 2) Central bank temporarily intervenes in the inter-bank market to add dollar liquidity. 4) No other types of financial controls were imposed. 5) No major spillovers that deteriorate other macro indicators. 6) Relieved from a major crisis.	*1) "The Philippine Monetary Board has approved a proposal for the central bank to open dollar swap contracts with commercial banks. The move is a response to a scarcity of dollars in the market, and the central bank is hoping it will encourage banks to sell dollars in the spot market."* *2) "We appreciate the central bank's move to ease pressure on the rupee. But some commercial banks are still holding dollar shortage positions, though they are not alarming."*
3 - Moderate Dollar Funding Crisis (Systemic Crisis)	1) Serious and widespread. 2) Central bank conducts frequent interventions and injects massive dollar liquidity. 3) The activation of the currency swap line. 4) Despite the situation, the financial system and the economy have not lost control.	*1) "Dealers said all commercial banks were short of dollars despite central bank intervention and sugar export inflows in the week…Commercial banks are suffering from an acute shortage of dollars."* *2) "... a shortage of dollar liquidity in Europe forced the fed to extend dollar swap lines with the European central bank in September."*
4 - Major Dollar Funding Crisis (Systemic Crisis)	1) Severe and chronic dollar shortage in the banking system. 2) Has led to economic catastrophe. 3) Central bank uses extreme tools such as the ban on currency exchange and withdrawal of dollars from deposit accounts. 4) Central bank has depleted dollar reserves, or faces other limitations to rescue banks. 5) Resorts to the IMF or other nations for dollar lending.	*1) "Failing to slow annual inflation rates of almost 50 per cent and reduce the shortage of dollars that is causing scarcity of everything from communion wine to toilet paper".* *2) "Argentina is a country that desperately requires reservations to have dollars…it is forbidden to withdraw dollars from banks"*

Notes: This table describes each dollar shortage severity category and summarize its corresponding criteria. Severity categories are defined by the author, and follow the similar approach of Romer and Romer (2017). See details in Section II.C.

Table 3: Relevance vs Non-Relevance Classifications Performance

	Precision	Recall	F1	N
1 - Relevant News	0.95717	0.92739	**0.94294**	1446
0 - Irrelevant News	0.92637	0.95655	**0.94122**	1441
Accuracy			0.94164	2887
Macro Average	0.94177	0.94197	**0.94163**	2887
Weight Average	0.94212	0.94163	0.94163	2887

Notes: This table presents the binary classification results on topic relevance using pre-trained NLP model - RoBERTa. The overall classification accuracy F1 equals 0.94. News that is classified as "relevant (lable 1)" will be forwarded to the next step: severity classification. Only 1-relevant news will proceed to the next step: severity classifications. Non-relevant news will be discarded. See Appendix Section B.A for the F1 score and other NLP terminology explanations. See Section III.A for more details.

Table 4: Severity Classifications Performance - Five Categories

	Precision	Recall	F1	N
0 - No Dollar Shortage	0.78261	0.71739	**0.74858**	276
1 - Dollar Funding Disruption	0.58065	0.66176	**0.61856**	136
2 - Dollar Funding Distress	0.51538	0.51538	**0.51538**	130
3 - Moderate Crisis	0.55340	0.50000	**0.52535**	114
4 - Major Crisis	0.74359	0.82270	**0.78114**	141
Accuracy			0.66248	797
Macro Average	0.63513	0.64345	**0.63780**	797
Weight Average	0.66487	0.66248	0.66219	797

Notes: This table presents the 5-step severity classification results using the pre-trained NLP model - RoBERTa. 0 corresponds to no dollar shortage distress; 1 and 2 correspond to dollar credit disruption and minor dollar shortage crises; 3 and 4 correspond to moderate and major dollar shortage crises. The overall classification accuracy F1 (macro averageis 0.64. See Appendix Section B.A for the F1 score and other NLP terminology explanations. See Section III.B for more details.

Table 5: Severity Classifications Performance - Three Categories

	Precision	Recall	F1	N
0 - No Shortage	0.81048	0.76718	**0.78824**	262
1 - Non-systemic	0.73602	0.73832	**0.73717**	321
2 - Systemic	0.85822	0.87984	**0.86890**	516
Accuracy			0.81165	1099
Macro Average	0.80158	0.79511	**0.79810**	1099
Weight Average	0.81115	0.81165	0.81165	1099

Notes: This table presents the 3-steps severity classifications results using the pre-trained NLP model - RoBERTa. 0 corresponds to no dollar shortage distress; 1 corresponds to non-systemic dollar shortage crisis. 2 corresponds to systemic dollar shortage crisis. The non-systemic category includes to the "credit disruption(1)" and "minor crisis(2)" categories defined in Section II.C. The the systemic category includes the "moderate crisis(3)" and "major crisis(4)" categories. The overall classification accuracy F1 (macro averageis 0.80. See Appendix Section B.A for the F1 score and other NLP terminology explanations. See Section III.B for more details.

Table 6: Summary of the DFS Index

Five Categories			Three Categories		
	Max	**Average**		**Max**	**Average**
0 - No Dollar Shortage	7,954	7,954	0 - No Dollar Shortage	7954	7954
1 - Dollar Funding Disruption	372	419	1 - Non-systemic	681	809
2 - Minor Crisis	309	462	2 - Systemic	907	779
3 - Moderate Crisis	508	535			
4 - Major Crisis	399	172			
Total (Exclude 0)	1588	1588		1588	1588

Notes: This table summarizes the total numbers of dollar funding shortage episodes identified at the quarterly level. The DFS index is available at "5-steps" and "3-steps" categories for 119 economies. The "Max" index is the highest level of dollar funding stress a country experienced within a quarter. The "Average" index is the mean of the dollar funding stress a country experienced within a quarter, rounded into its closest integer. Data is constructed by the author using the NLP-RoBERTa text classifcation method.See Section IV.A for details.

Table 7: (Yearly) Dollar Crises Episodes by Income Group

	Non-systemic	**Systemic**
Advanced Economies	45	32
Emerging Markets and Developing Economies	222	247
Total	267	279

Notes: This table presents the total number of systematic and non-systematic crises occurred in difference income groups. Episodes are consolidate in yearly frequency by taking the highest level of dollar funding stress a country experienced within a year. Crisis episode is only counted once using its start year even if it persists for many years. The income group classification follows the IMF World Economic Outlook. See Section IV.A for details.

Table 8: Baseline: Differential Effect of Dollar Crises on Export Growth

	(1)	(2)	(3)	(4)
RZ*Dollar Funding Crisis	-0.150***	-0.162***	-0.157***	-0.157***
	[0.047]	[0.048]	[0.048]	[0.048]
RZ*FINdev		0.004***	0.005***	0.005***
		[0.001]	[0.001]	[0.001]
RZ*Banking Crisis			-0.139**	-0.139**
			[0.058]	[0.058]
RZ* Currency Crisis				0.002
				[0.058]
Constant	9.558***	9.518***	9.518***	9.518***
	[0.003]	[0.017]	[0.017]	[0.017]
N	92959	84519	84519	84519

Notes: t-statistics in parenthesis. This table presents the baseline results of estimating Equation 2. The dependent variable is the log of 1 plus the gross export disaggregated into 27 3-digit and 9 4-digit ISIC level sectors as defined in Rajan and Zingales (1998). Dollar Funding Crisis is a dummy variable for the year of crisis inception and two following years. RZ is a parameter measuring an industry's dependence on external finance (Rajan & Zingales, 1998). Financial development is computed as private credit in GDP and taken from World Bank. Banking crisis and currency crisis are taken from Laeven and Valencia (2020). Regressions are estimated with OLS, standard errors are clustered by industry-country, and also include time-country, time-industry, and industry-country fixed effects.
*Significance at the 10% level.
** Idem, 5%.
*** Idem, 1%

Table 9: 4-year window: Differential Effect of Dollar Crises on Export Growth

	(1)	(2)
RZ*Dollar Funding Crisis_t	-0.082*	-0.090**
	[0.047]	[0.046]
RZ*Dollar Funding Crisis_t+1	-0.137**	-0.158***
	[0.053]	[0.058]
RZ*Dollar Funding Crisis_t+2	-0.201***	-0.169***
	[0.059]	[0.061]
RZ*Dollar Funding Crisis_t+3	-0.049	-0.035
	[0.051]	[0.053]
RZ*Dollar Funding Crisis_t+4	-0.082*	-0.062
	[0.049]	[0.052]
RZ*Banking Crisis		-0.130**
		[0.063]
RZ* Currency Crisis		0.019
		[0.078]
RZ*FINdev		0.005***
		[0.001]
Constant	9.898***	9.867***
	[0.005]	[0.02]
N	76519	69509

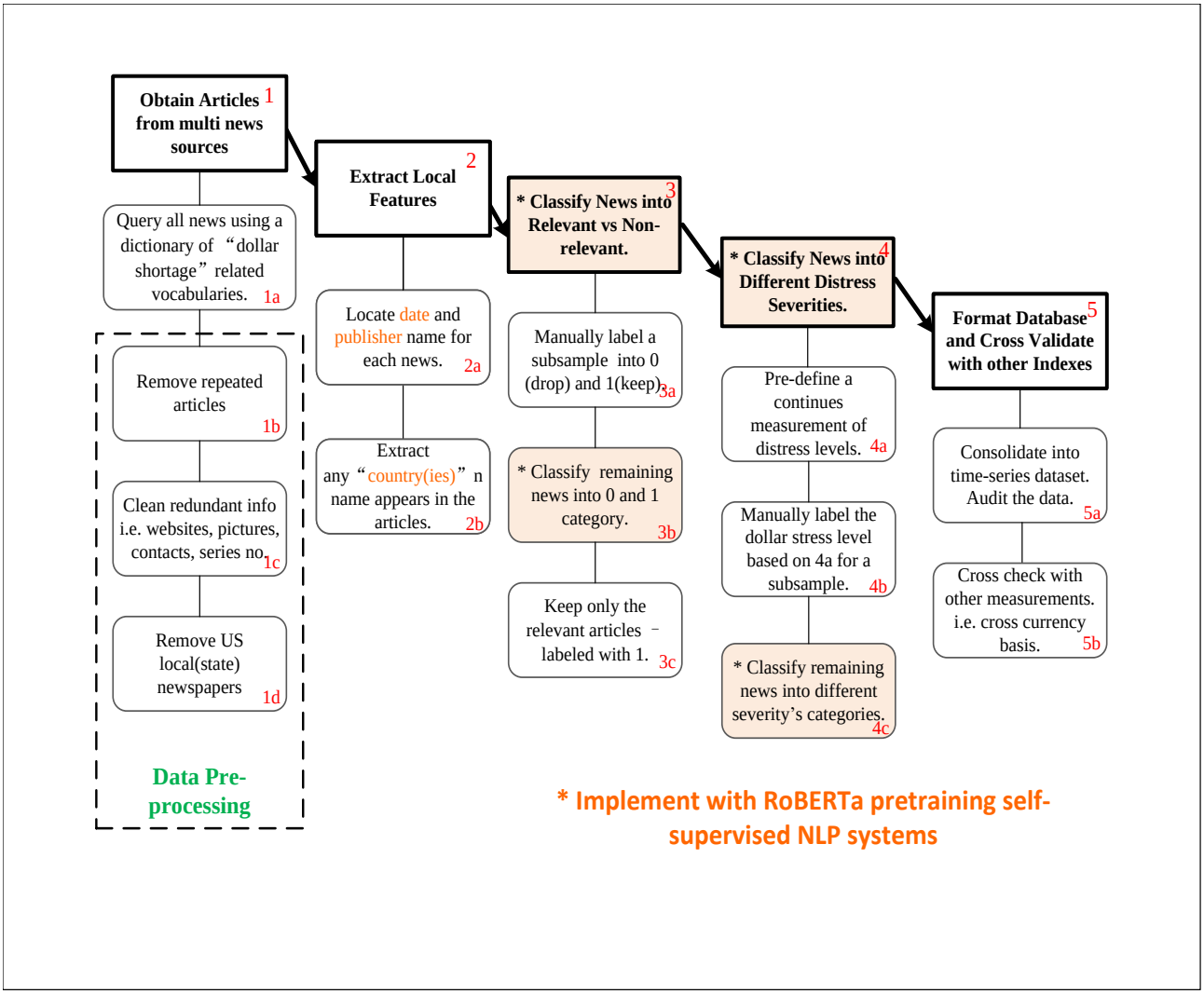
Notes: t-statistics in parenthesis. This table presents the baseline results of estimating Equation 2 using a 4-year window. The dependent variable is the log of 1 plus the gross export disaggregated into 27 3-digit and 9 4-digit ISIC level sectors as defined in Rajan and Zingales (1998). Dollar Funding Crisis is a dummy variable for the year of crisis inception. RZ is a parameter measuring an industry's dependence on external finance (Rajan & Zingales, 1998). Financial development is computed as private credit in GDP and taken from World Bank. Banking crisis and currency crisis are taken from Laeven and Valencia (2020). Crisis_t+n equals to one n years after the start of a crisis. Regressions are estimated with OLS, standard errors are clustered by industry-country, and also include time-country, time-industry, and industry-country fixed effects.
*Significance at the 10% level.
** Idem, 5%.
*** Idem, 1%

Table 10: Baseline: Differential Effect of Dollar Crisis on Value Added Growth

	(1)	(2)	(3)	(4)
RZ*Dollar Funding Crisis	0.013	0.022	0.032	
	[0.029]	[0.031]	[0.042]	
RZ*Dollar Funding Crisis *Financial Dollarization			-0.005**	-0.005**
			[0.003]	[0.003]
RZ*Banking Crisis		-0.082**	-0.103**	-0.099**
		[0.036]	[0.049]	[0.047]
RZ* Currency Crisis		-0.001	-0.019	-0.01
		[0.044]	[0.074]	[0.074]
Share (t-1)	7.644***	7.639***	7.790***	7.790***
	[0.438]	[0.438]	[0.594]	[0.594]
Constant	18.926***	18.929***	18.890***	18.892***
	[0.021]	[0.021]	[0.035]	[0.036]
N	39487	39487	23952	23952

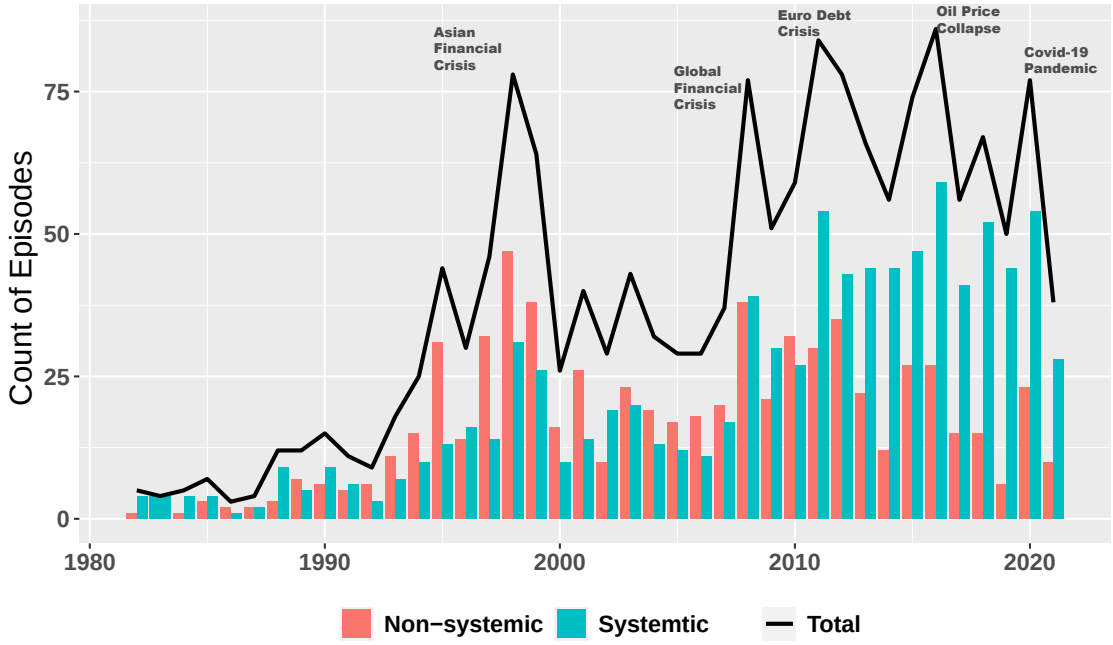
Notes: t-statistics in parenthesis. The dependent variable is the log of the value added disaggregated into 27 3-digit and 9 4-digit ISIC level sectors ISIC level sectors as defined in Rajan and Zingales (1998). Dollar Funding Crisis is a dummy variable for the year of crisis inception and two following years. RZ is a parameter measuring an industry's dependence on external finance (Rajan & Zingales, 1998). Financial dollarization is compiled by Christiano et al. (2021). Banking crisis and currency crisis are taken from Laeven and Valencia (2020). Regressions are estimated with OLS, standard errors are clustered by industry-country, and also include time-country, time-industry, and industry-country fixed effects.
*Significance at the 10% level.
** Idem, 5%.
*** Idem, 1%

Figure 1: Summary of the News Classification Process.



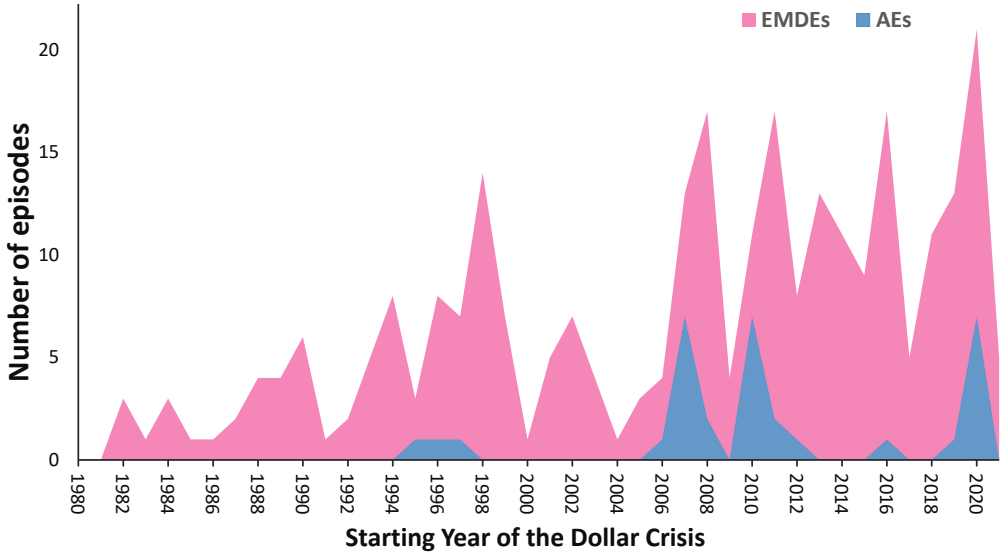
Notes: This diagram presents the data construction process of the DFS index. Yellow boxes are the steps that involve the auto text classifications performed by the NLP - RoBERTa model.

Figure 2: Number of Dollar Shortage Distress by Year



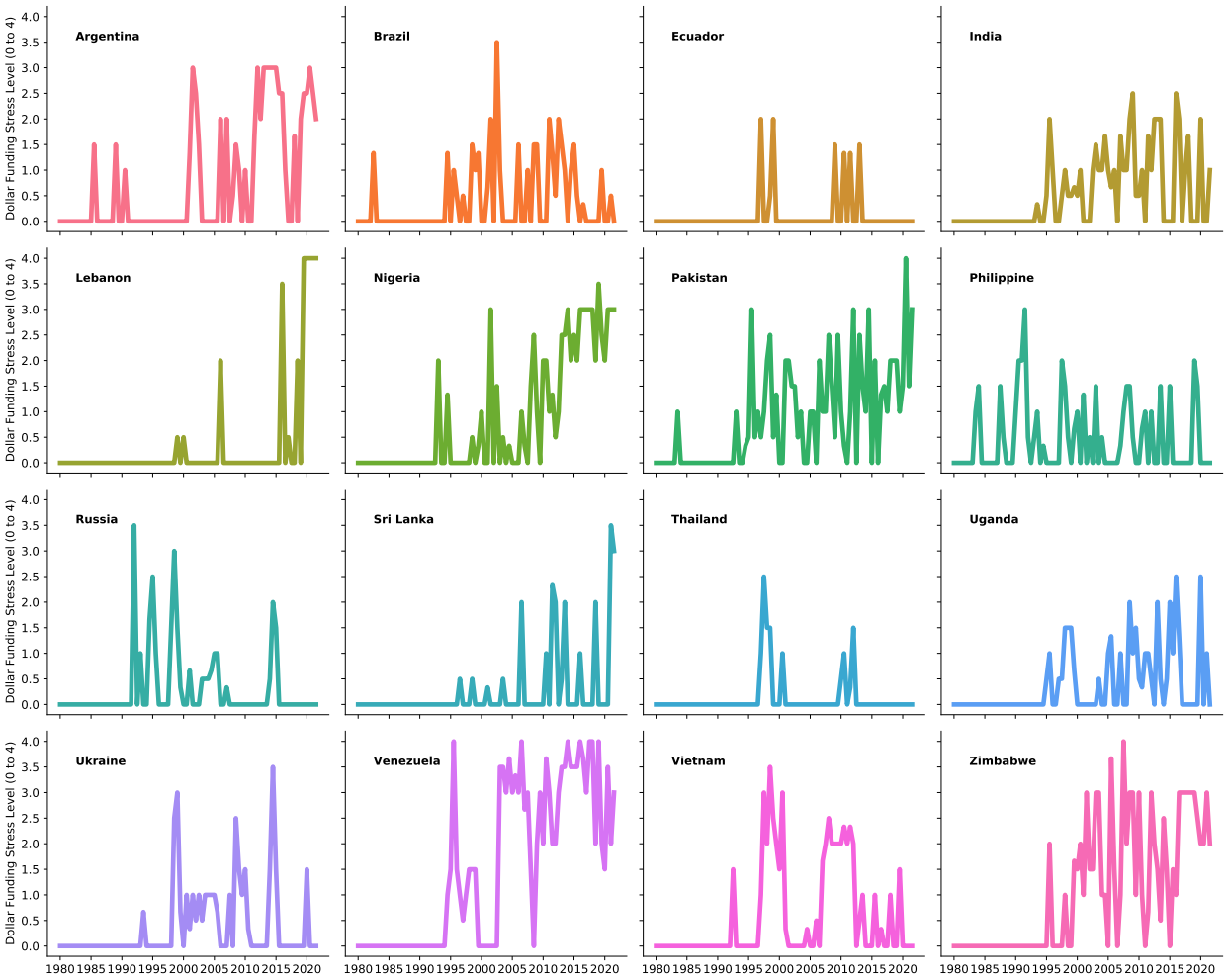
Notes: This figure shows the count of dollar shortage distress for each year after aggregating the data at the country-quarter level. The non-systemic category corresponds to what is previously classified as "credit disruption(1)" and "dollar funding distress(2)", and the systemic category corresponds to "moderate crisis(3)" and "major crisis(4)". Source: Author's calculations.

Figure 3: Systemic Dollar Crises Episodes by Income Level 1980 -2021



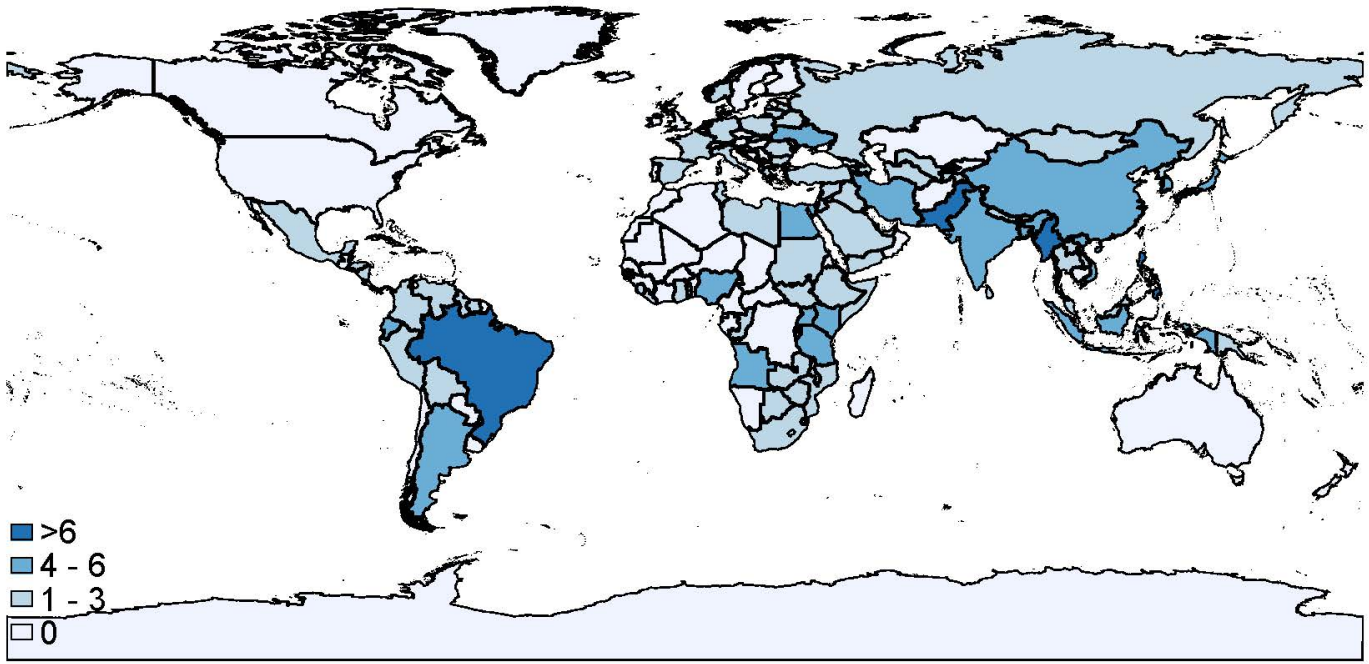
Notes: This figure shows the count of episodes of systemic dollar funding crisis by the economic development group. Systemic crisis corresponds to "moderate crisis(3)" and "major crisis(4)". A crisis is counted only by its starting year even if it persists afterward.
Source: Author's calculations.

Figure 4: Selective Countries' Dollar Funding Stress Level



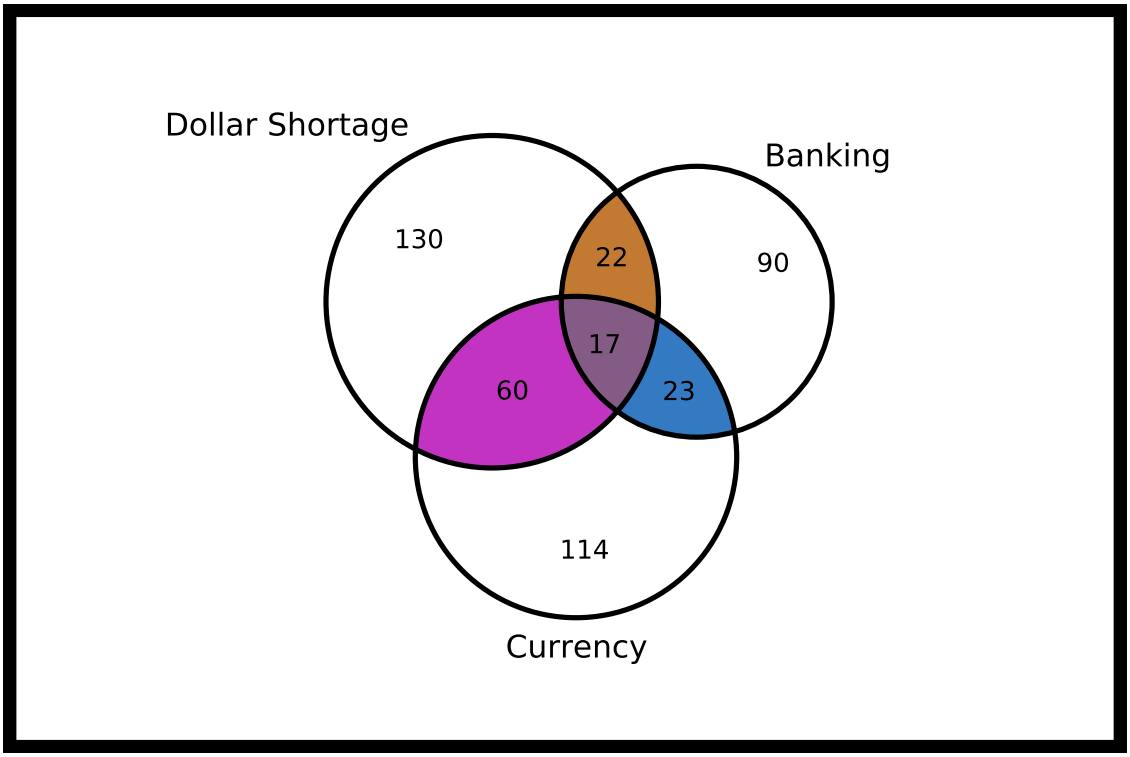
Notes: This figure shows selective countries' dollar funding shortage stress level evolution. Dollar funding stress starts from level 0 to 4 as defined in Section II.C. The DFS index is re-sampled into semi-annual frequency.
Source: Author's calculations.

Figure 5: Frequency of Systemic Dollar Crises Around the World, 1980 - 2021



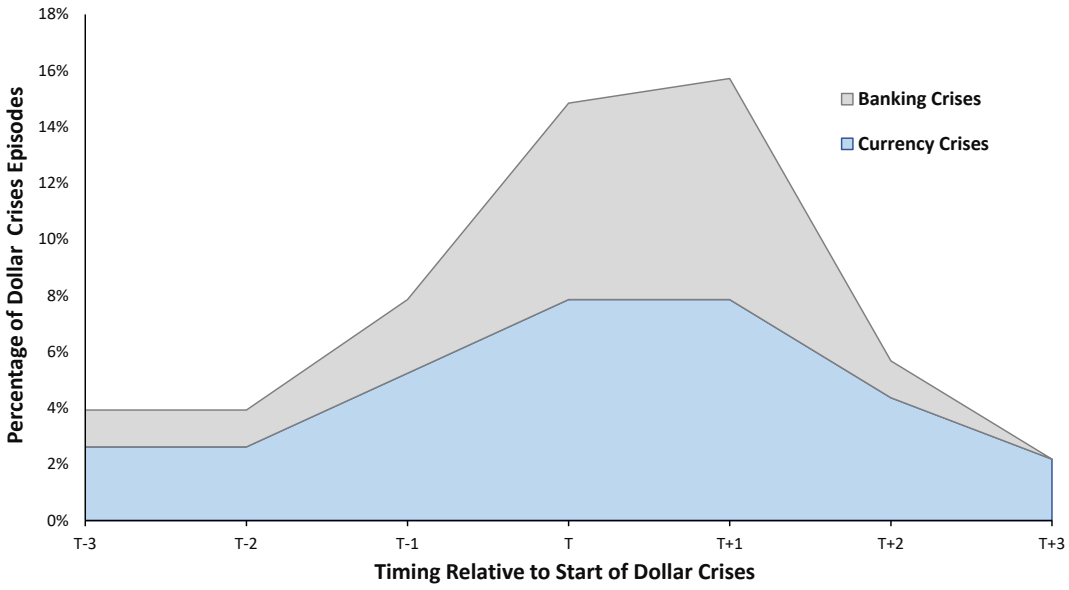
Notes: Total count of historical episodes of systemic dollar funding crisis. Systemic crisis corresponds to "moderate crisis(3)" and "major crisis(4)" as defined in Section II.C. Crisis is counted only by its starting year even if it persists afterwards.
Source: Author's calculations.

Figure 6: Twin and Triple Crises, 1980 - 2017



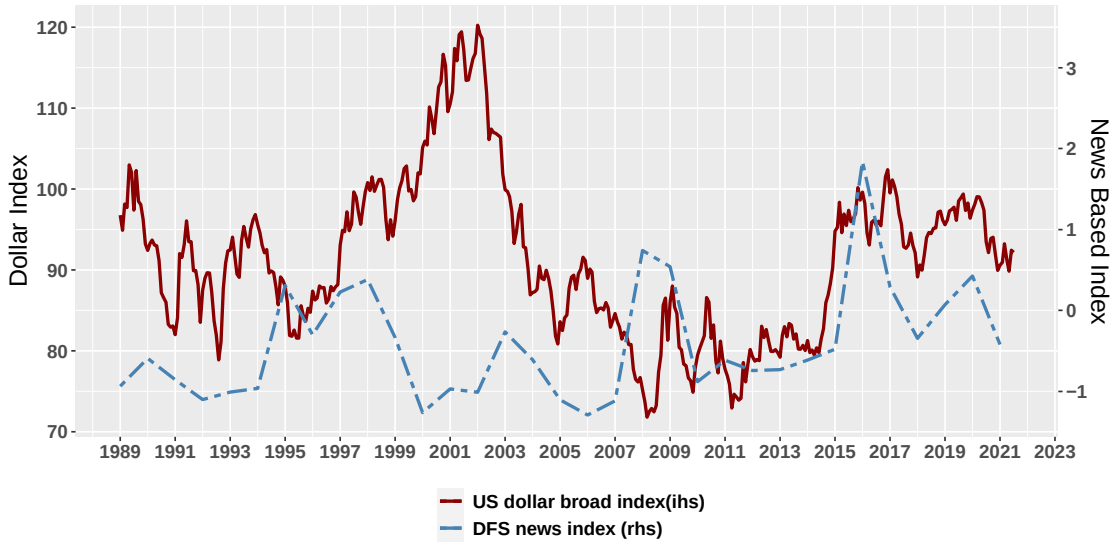
Notes: Dollar crisis overlap with banking and currency crisis.
Source: Author's calculations.

Figure 7: Sequencing of Crises, 1980 - 2017



Notes: The figure is constructed by selecting systemic dollar crises episodes and plotting the percentage of them that were followed, coincided, or were preceded by a banking or currency crisis, with T denoting the start of the dollar funding crisis.
Source: Author's calculations.

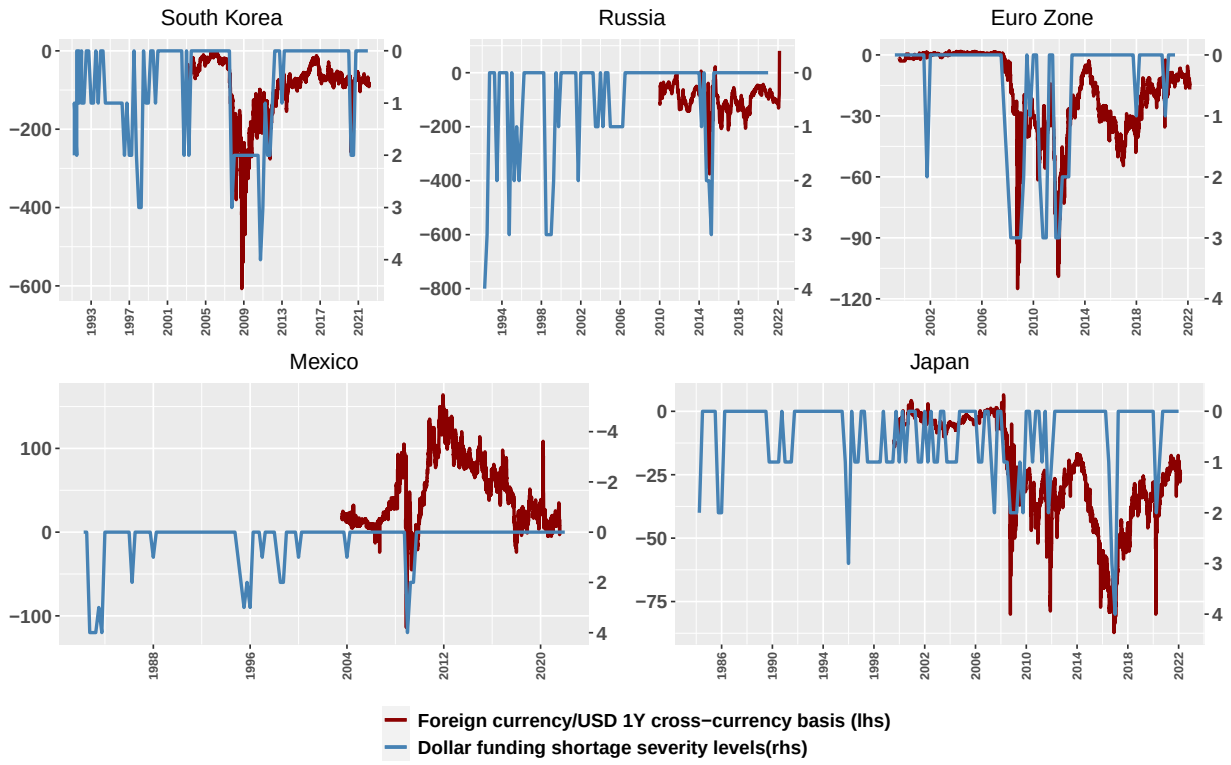
Figure 8: DFS Global Index and USD Index



Notes: This figure shows the aggregated news based dollar funding shortage (DFS) index (right axis) and a weighted average of the foreign exchange value of the U.S. dollar against the currencies of a broad group of major U.S. trading partners, based only on trade in goods (left axis). The DFS index is measured by the frequency of newspaper articles discussing adverse dollar funding conditions. The trends of the two indexes go hand-in-hand since 2000s when the USD started becoming global funding currency. See Section V.A for more details.

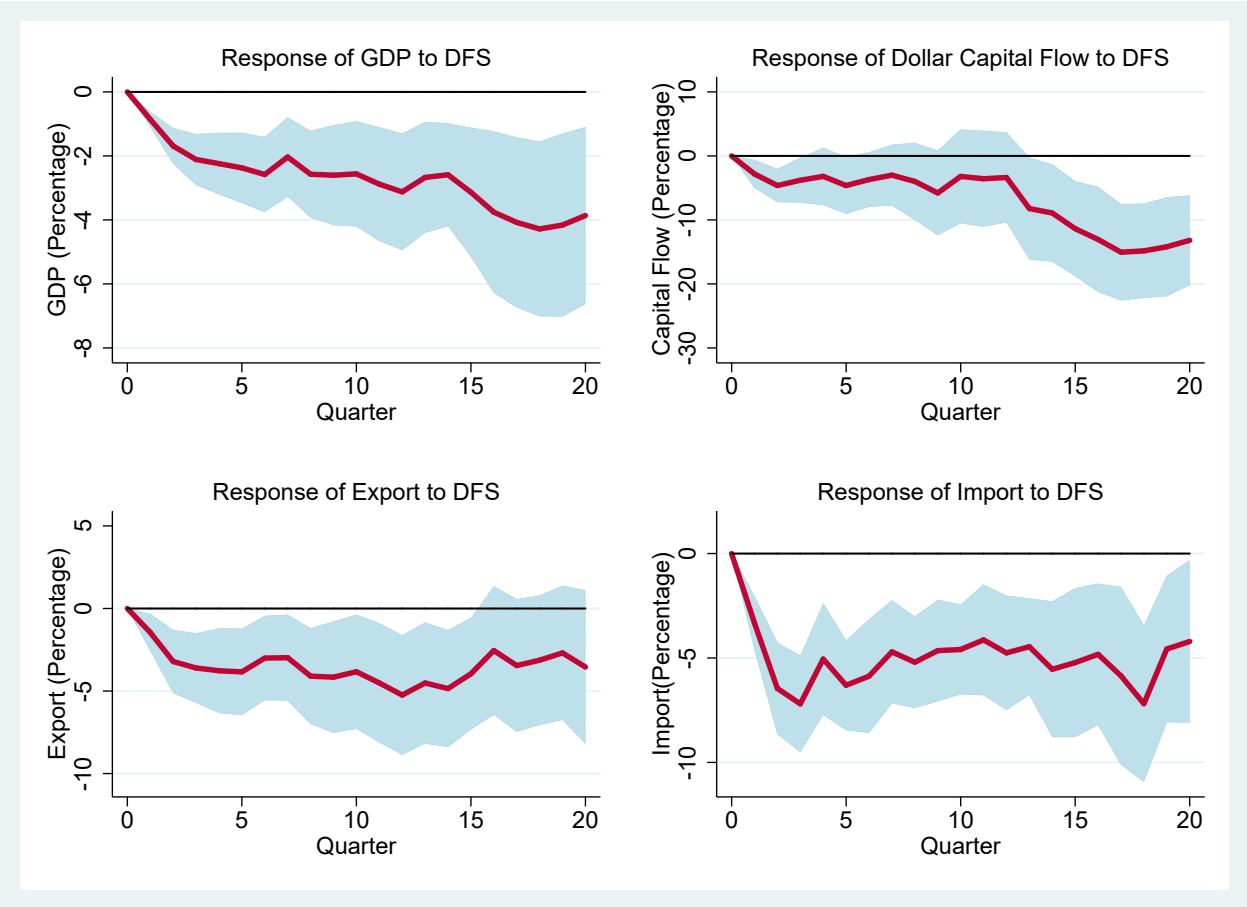
$$\text{Aggregated DFS news index} \propto \frac{\text{Articles on Dollar Funding Stress}}{\text{Total Number of Articles}}$$

Figure 9: Comparison of the New Measure and Cross-Currency Basis



Notes: This figure shows the comparison of the text-based DFS index (right axis) with the cross-currency basis (CCB) (left axis) for selective countries that have the CCBs available. The DFS index is a quarterly index that measures the country's dollar funding conditions and is constructed through text classifications. The CCB is a deviation from the covered interest rate parity, with its negative spikes suggesting the period of dollar funding stress. The DFS index is constructed by the author using 5-steps "average" method described in Section IV. The CCBs are obtained from Refinitiv Eikon. See Section V.B for more details.

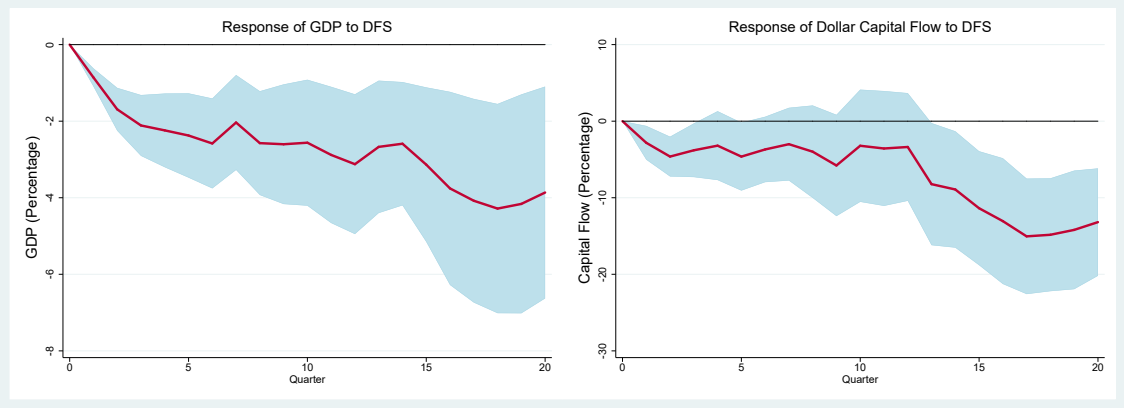
Figure 10: Response of Outcome Variables to Dollar Funding Stress: Full Sample



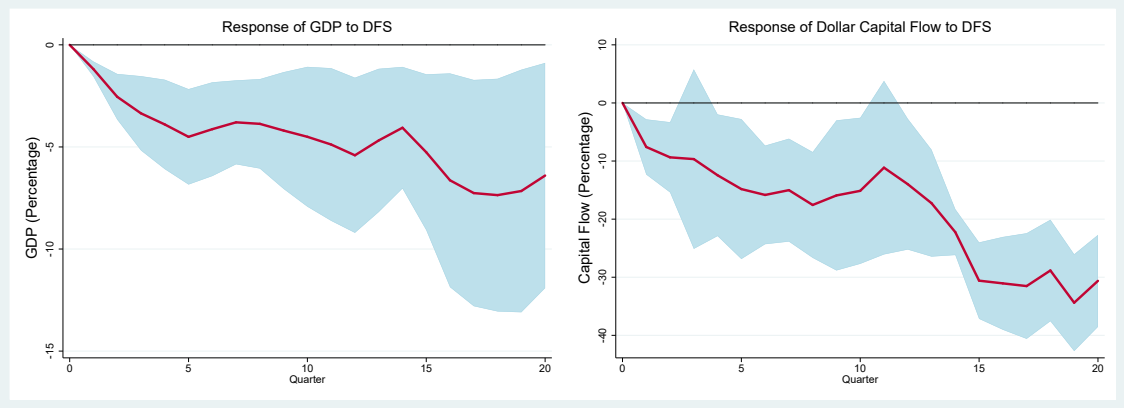
Notes: The panels show the impulse response functions for various outcome variables to an impulse of 3 (a moderate level of DFS crisis) in my measure of DFS derived from estimating Equation 1 over the entire sample period using OLS. The blue areas show the two-standard-error confidence bands.

Figure 11: Response of GDP and Capital Flow to DFS: Sample Split

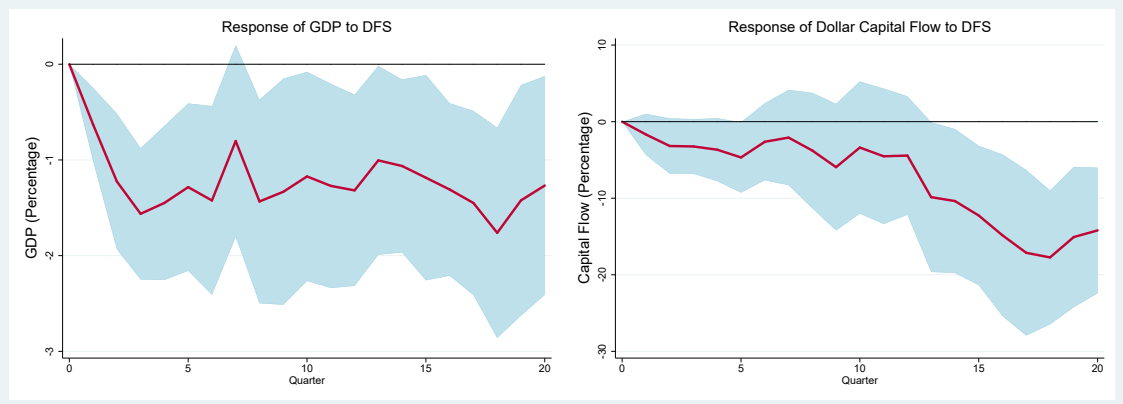
Panel A. Full Sample



Panel B. Pre-GFC Sample

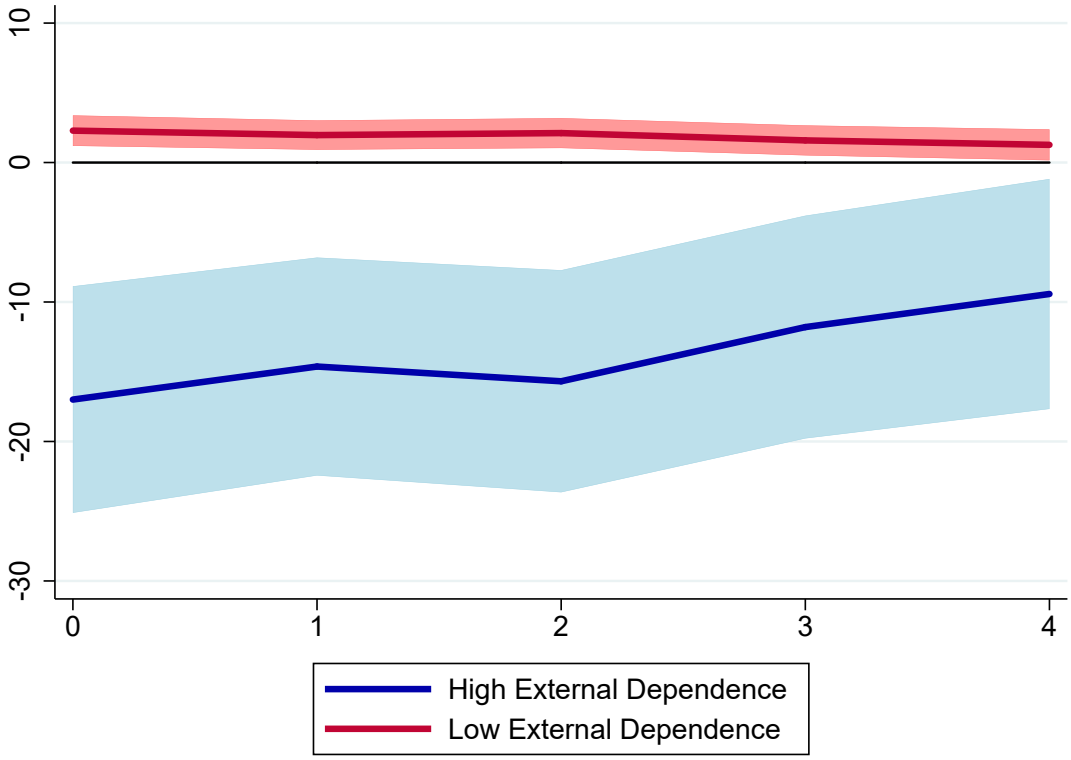


Panel C. Post-GFC Sample



Notes: The panels show the impulse response functions for GDP and BIS dollar capital flow to an impulse of 3 (moderate crisis) in my measure of DFS derived from estimating Equation 1 over the full sample period using OLS. Panel A shows the baseline results from the entire sample period; Panel B shows the results from the sample ending in 2007Q4; Panel C shows the results using the sample starting in 2008Q1. The blue areas show the two-standard-error confidence bands.

Figure 12: Industries Exports Impulse Response to Dollar Funding Crises



Notes: This figure shows the impulse response to systemic dollar funding crisis of sectoral exports with High vs Low external dependence. Response estimated using the following specification:

$$ln(Y_{ijt}) = \alpha_{ij} + \beta_{it} + \gamma_{jt} + \sum_{k=0}^{4} \delta_k Dollar\_Crisis_{i,t-k} * ExtFinDep_j + \phi_j X_{it} + \varepsilon_{ijt} \quad (3)$$

Where $ln(Y_{ijt})$ is the log(export value +1). $Dollar\_Crisis_{i,t-k}$ is a dummy variable for the year of dollar crisis inception and two following years. α_{ij} controls country-industry fixed effect. β_{it} controls for country-specific fixed effect. γ_{jt} controls for the industry-specific fixed effect. X_{it} controls for currency and banking crisis interactions with external dependence. Blue line denotes the export values for the 90th percentiles of measure of external dependence based on Rajan and Zingales (1998). Red line denotes the export values for the 10th percentiles of measure of external dependence. The blue and red areas show the two standard-error confidence bands.

Appendices

A Dollar Funding Crisis Date

Country	Systemic Dollar Funding Crises	Non-Systematic Dollar Funding Crises
Angola	1994 1999 2009 2014-2020	
Argentina	2001-2002 2009 2011-2021	1990 2007-2008
Azerbaijan	2015-2016	2005
Bangladesh	2005 2011 2017-2018 2020	1995 1997-2000 2003 2006
Belarus	1996 2011	2020
Bolivia	1982 2018	2021
Brazil	1982 1999 2002 2013	1994-1998 2001 2003 2006-2012 2014-2016 2019 2021
Burundi	2015-2017 2019	
China	2007-2009 2016	1988-1989 1991 1993 1998-1999 2010-2012
Colombia	1996 2002	1993 1995 1997-1999 2003 2010-2012 2015
Congo	1999 2016-2017	
Cuba	1988 1994-1995 2002-2003 2013 2020-2021	
Denmark	2011	2020
ECB (Euro Area)	2010-2012 2008-2009	2007 2013 2017 2020
Ecuador	1996-1997 1999 2009 2011 2013	1998
Egypt	1984-1985 1990-1992 1998-1999 2001-2004 2006-2007 2011-2021	1997 2000 2008
Ethiopia	2018 2021	2009 2019
France	2011	2012
Ghana	2009 2013-2014 2019-2020	2010-2012 2015 2018 2021
Greece	2011-2012	
Guyana	1998 2017	1999
Haiti	1994 2002	2001
Honduras	1989	1988
India	2002-2005 2008 2018	1994-2000 2006-2007 2010 2012-2013 2016 2020-2021
Indonesia	1997-1998	1994-1996 1999-2002 2005 2008-2015 2018 2020
Iran	1989-1990 2008 2012 2014-2015 2018	2010 2013
Iraq	2017 2019-2020	1991 1998 2001 2003
Italy	2011	
Japan	1995	1985 1989-1991 1994 1996-1997 2007-2011 2016
Jordan	1990	1999
Kenya	1998-1999	1993-1995 2000 2004 2008-2011 2014
Kyrgyzstan	1993	2016 2018 2020
Laos	1998	
Lebanon	2006 2016 2018-2021	1999-2000
Liberia	2014 2016 2018-2020	2013 2017
Libya	2013-2016 2018 2021	
Malawi	2010-2013 2020	
Malaysia	1997-2000 2008	1992 1994 2007 2010-2011 2016

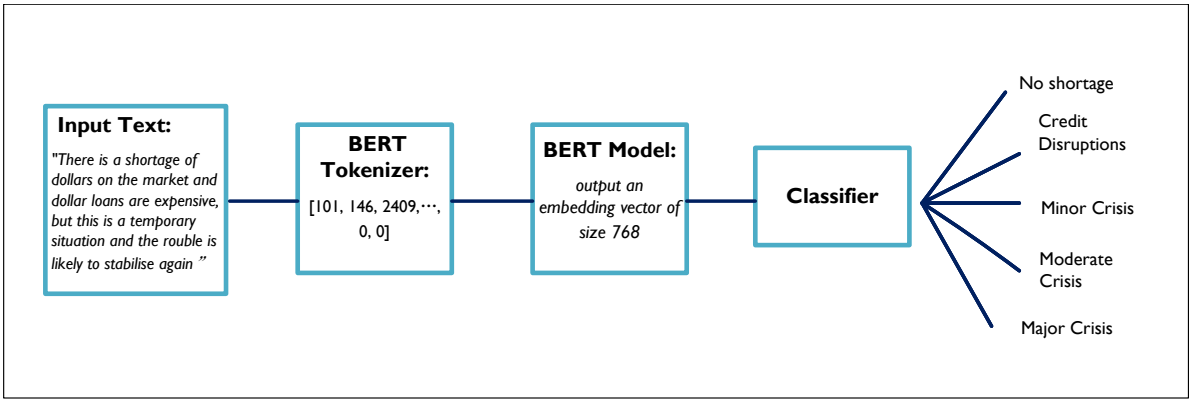
Maldives	2008-2009 2011 2013 2015	2010 2012 2016 2020-2021
Mauritius	1996 1998-1999	1995 1997 2000-2001
Mexico	1982-1983 1995 2008	1986-1987 1994 1996 1998-1999 2003 2009
Mongolia	2016	
Mozambique	2016 2018	
Myanmar	1997 2001 2003-2004 2013 2015 2021	2014 2016 2018
Nepal	2012 2016 2020	1997 2010 2017
Nicaragua	1986 1989 2019	
Nigeria	1993-1994 2002 2009 2014-2021	1995 1998 2001 2004 2006-2008 2010-2013
Norway	2008	
Pakistan	1993 1995 1998-1999 2001-2002 2007-2009 2012-2014 2016-2021	1996-1997 2003 2005-2006 2015
Panama	1988	
Papua New Guinea	2016 2018	2019
Peru	1985 1987-1989	1990 1995 1999 2010 2012 2021
Philippine	1983-1984 1987 1990-1991 1993 1997-1998 2008 2010 2013 2015	1988 1992 1995 1999-2001 2004 2007 2009 2012
Poland	1988 2011	
Qatar	2008 2015 2017	
Romania	1995-1996	1994 1997
Russia	1992-1995 1998 2014-2015	1999 2001 2003-2007
Rwanda	2012-2013 2015-2016	2017
Seychelles	2020	
Sierra Leone	1998-1999	
Singapore	1997	2009
Somalia	2008 2013	1998
South Africa	1994	1985-1986 1989 1992-1993 1995-1996 1998 2001
South Korea	1990 1997 2000 2007-2010	1991-1996 1998-1999 2001 2003 2011-2012 2020
South Sudan	2012 2014-2016	
Soviet Union	1990	
Spain	2010-2011	2012
Sri Lanka	2021	1996 1998 2001 2003 2006 2010-2013 2016 2018
Sudan	2008 2010-2021	2007
Suriname	1994 2019	
Syria	2011-2013 2019-2021	
Taiwan	1996	2010
Tajikistan	2015 2017-2019	2009 2011,2020
Tanzania	1998-1999 2008 2015	1997 2003 2005 2011-2012 2014 2018-2019
Thailand	1997-1998 2012	2000 2010-2011
Trinidad and Tobago	2014-2015 2018 2021	
Tunisia	2017	
Turkey	2000-2001	2018-2020
Turkmenistan	1994 1998 2018	
Uganda	1998 2009	1995 1997 1999 2005 2008 2010-2017 2020 2021
Ukraine	1998-1999 2008 2014-2015	1993 2000-2007 2009-2010 2020
United Arab Emirates	2011	2008 2016
Venezuela	1994-1996 2003-2021	1997-1999
Vietnam	1997-2000 2008-2012	2001 2004 2006-2007 2013 2015
Yemen	2011 2016	1990
Yugoslavia	1993	

Zambia	1998 2003 2007 2014-2015	1995 1999 2008-2009 2016 2021
Zimbabwe	2000-2010 2012-2021	1995 1998-1999
Uzbekistan	1997, 2019-2020	
Afghanistan		2014
Armenia		2002 2012 2016
Bahrain		2008
Botswana		2019
Bulgaria		1993-1994 1996-1997
Cambodia		2000
Chile		1982 1997-1998 2004 2006 2008 2012 2017
Costa Rica		2008
Dominica		1994 2003-2004 2013 2016
Georgia		2016
Germany		1984 1989-1990 2011
Hungary		1989
Israel		1995 2001 2020
Jamaica		1995
Kazakhstan		1999 2015
Latvia		1999
Lithuania		1998
Moldova		1998
Namibia		2018
Paraguay		2020
Saudi Arabia		2008
Uruguay		2012

Notes: The Dollar Funding Shortage (DFS) crises year date. **Systemic Dollar Funding Crises** refer to **3 - moderate crisis** and **4 - major crisis** defined in Section II.C. **Non-Systemic Dollar Funding Crisis** refer to **1 - credit disruptions** and **2 - minor crisis**.

B Natural Language Processing

Figure B.1: BERT Classification Process



Notes: A simple demonstration of BERT - NLP classifications mechanism in this paper.

B.A Precision, Recall, F1 score, and Confusion Matrix.

Precision tells us that out of the results classified as positive by our model, how many were actually positive. The equation that represents precision is:

$$precision = \frac{\text{True Positives}}{\text{True Positives+False Positives}}$$

Recall tells us how many of the positive cases the classifier correctly predicted, over all the positive cases in the data. The equation that represents recall is:

$$Recall = \frac{\text{True Positives}}{\text{True Positives+False Negatives}}$$

F1 Score is the weighted average of Precision and Recall.The equation that represents F1 score is:

$$F1 = 2 \times \frac{\text{Precision} \times \text{Recall}}{\text{Precision+Recall}}$$

Table B.1: confusion matrix of classification

	Predicted Positives	Predicted Native
Positives	True Positives	False Negative
Negatives	False Postivies	True Negative

Table B.2: Confusion Matrix for Five Categories Classifications

Confusion Matrix		Predicted Class				
		0 - No	1 - Disruption	2 - Distress	3 - Moderate	4 - Major
Actual Class	0 - No	198	19	28	18	13
	1 - Disruption	24	73	33	3	3
	2 -Minor	15	13	73	22	7
	3 - Moderate	8	4	20	54	28
	4 - Major	4	1	6	11	119

Notes: This table presents the confusion matrix for classifying the severity of dollar credit disruption into five levels of severity. The row shows the actual class, and the column shows the predicted class. The results show that the NLP model can correctly identify most of the labels, with the misclassification ones mainly lying on the neighbor sides of the correct labels.

Table B.3: Confusion Matrix for Three Categories Classifications

Confusion Matrix		Predicted Class		
		0 - No Shortage	1 - Non-systemic	2 - systemic
Actual Class	0 - No Shortage	201	37	24
	1 - Non-systemic	33	237	51
	2 - Systemic	14	48	454

Notes: This table presents the confusion matrix for classifying the severity of dollar credit disruption into systemic and non-systemic. The row shows the actual class, and the column shows the predicted class. Take the third row - 2 -systemic crisis for example; in the test set, out of the 506 manually labeled news, after machine learning, 454 were correctly identified as label 2 by NLP, 14 were incorrectly identified as 0, and 48 were incorrectly identified as 1.

B.B Parameter Tuning and other Robustness Experiments

To show this machine learning model is stable and optimal, I run several robust experiments on 1) different training sample sizes, 2) different machine learning rate λ, 3) the training convergence process under the best learning rate and the maximum training sample size is defined in 1) & 2). To make the interpretation more manageable, I demonstrate in detail using the three-step classification model as the example.

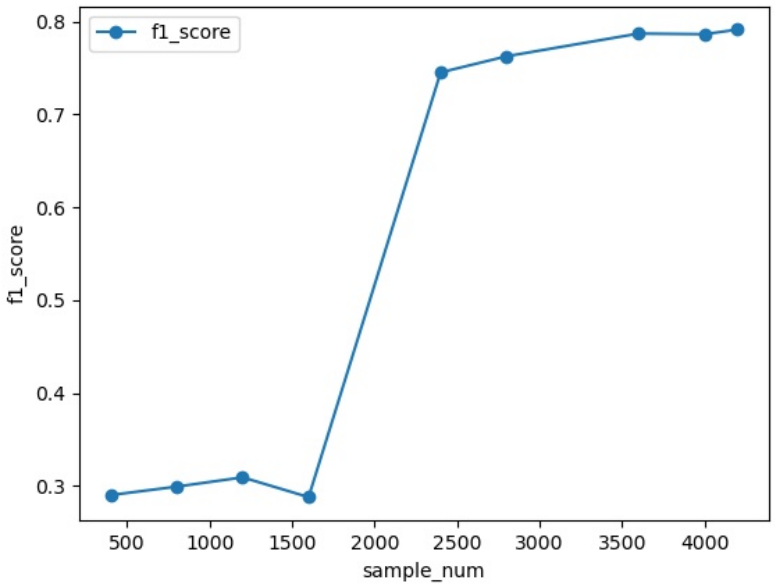
Figure B.2 depicts the learning curve of different training sample sizes. Hypothetically, the performance of NLP models will increase with the number of training samples, yet it will plateau when samples reach a certain number. Figure B.2 shows that there is steep learning of the model the sample size increase from 1600 to 2400, then the model performance starts slowly converging to 0.8. After substantially increasing the sample size from 3500 to 4300, the F1 score stays almost the same - suggesting that my training sample is large enough to produce the optimal learning process.

Figure B.3 depicts the hyper-parameter tuning process of the RoBERTa model. The first learning rate parameter I started with is λ = 4.75e-5, because this ratio is what NLP-RoBERTA literature commonly recommends, then ran ten experiments around this number, with a new learning rate deviating of 0.1e-5 from the first λ at each trail. The best learning rate in this range is 5.3e-5, with F1 score equal to 0.81. The model's performance decreases dramatically - to below 0.3 when the learning rate is above 5.45 and

below 4.25.

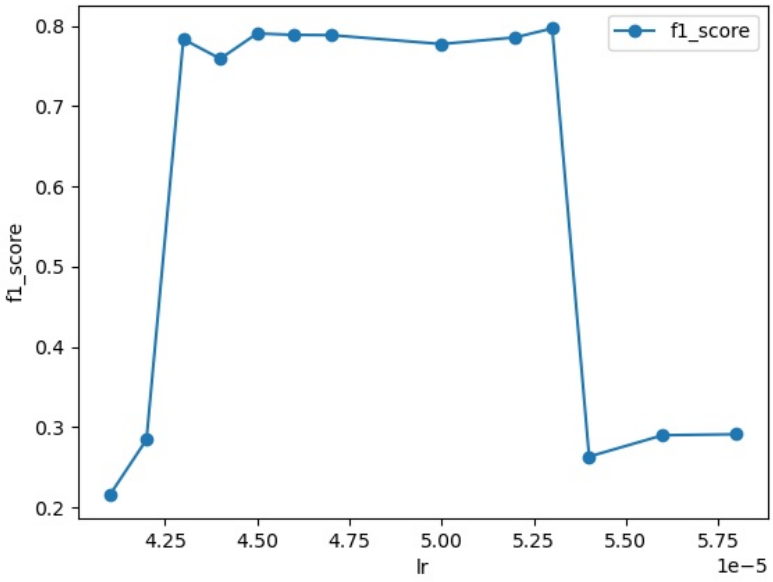
Finally, Figure B.4 shows the learning process of the model when λ = 5.3e-5 with a full training sample. The left panel yellow line shows that the prediction results no longer improved after 10 epochs. The right panel shows the change of loss function with each additional epoch. The loss function decreases, and the test accuracy is stable, suggesting that this model is not over-fitting.

Figure B.2: Learning Curve for Sample Size



Notes: This figure shows changes in learning performance with the increasing size of training samples. The model converges at a sample size larger or equal to 3500, with the F1 score reaching its optimal around 0.8. This demonstration is based on the model that produces three-category classifications.

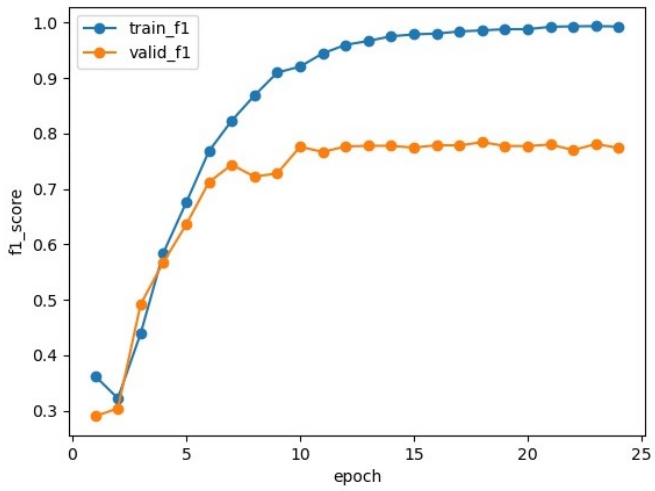
Figure B.3: Hyper-parameter Tuning



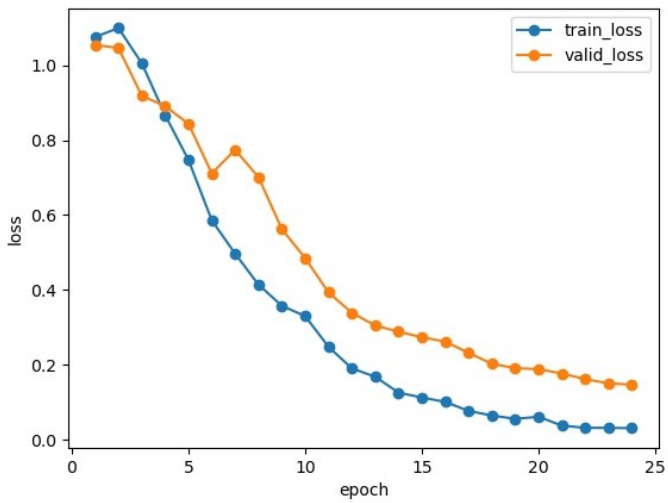
Notes: This figure shows the changes in learning performance at different learning rate parameters. I started with the learning rate parameter, which λ = 4.75e-5. The optimal learning rate range is 4.3e-5 -5.3e-5. The best learning rate in this range is 5.3e-5. This demonstration is based on the model that produces three-category classifications.

Figure B.4: Validation Accuracy Overtime for the Best Optimizer

Pane A. Accuracy



Pane B. Loss function



Notes: The left panel shows that the prediction result no longer improves after 10 epochs. The right panel shows the change of loss function with each additional epoch. The fact that the loss function decreases the test accuracy yet is stable suggests that this model is not over-fitting.

C Robustness Analysis- Macro Impact of the DFS Episodes

C.A Excluding Contemporaneous Relations

In the baseline specification, I follow the spirit of previous literature that includes the contemporaneous correlation between the outcome variables and the DFS. I explore two alternative timing assumptions in this section by excluding such contemporaneous correlation between the series. In particular, to make the analysis more management, I focus o on the impulse response function(IRF) for real GDP.

My first alternative assumption is that the dollar shortage is caused by the declining output contemporaneously, but the output is not affected by the DFS within the period. The corresponding equation of such assumption is:

$$y_{j,t+h} - y_{j,t-1} = \alpha_j^h + \gamma_t^h + \beta^h DFS_{j,t} + \sum_{k=1}^{3} \varphi_k^h DFS_{j,t-k} + \sum_{k=0}^{3} \theta_k^h \Delta y_{j,t-k} + e_{j,t}^h \tag{4}$$

For this equation, the estimated horizon is from 1 to 20. Such construction means that the contemporaneous response of output to DFS by default would be zero. In addition, with $y_{j,t}$, I can exclude the contemporaneous relationship of DFS and output, which otherwise would be absorbed by the coefficient β^h for horizons 1 to 10.

The second variation of the timing assumption relates to the delayed news report on DFS. It is possible that due to lack of attention or wrong judgment, the media's report on the dollar shortage is slower than the actual event. The corresponding estimation to address such a possibility is:

$$y_{j,t+h} - y_{j,t-1} == \alpha_j^h + \gamma_t^h + \beta^h DFS_{j,t+1} + \sum_{k=0}^{3} \varphi_k^h DFS_{j,t-k} + \sum_{k=0}^{4} \theta_k^h \Delta y_{j,t-k} + e_{j,t}^h \tag{5}$$

For this specification, the estimated horizon is from 1 to 20, yet the output in period t starts responding to the DFS identified in the t + 1.

Figure C.1 shows the impulse response of real GDP under the alternative timing assumptions. Panel A is the result of the baseline estimation. Panel B shows the impulse response function under the alternative specification, excluding the contemporaneous correlation between real GDP and DFS. The alternative treatment of the contemporaneous correlation reduces the estimated maximum fall in GDP following the dollar crisis to 1.65 percent from the baseline estimate of 2.58. Panel C shows the results of

including DFS from one period forward. Interestingly, the result rejects the assumption that the media coverage of DFS is somewhat delayed for more than a quarter - as the GDP response from period 0-1 is almost zero. Such a result also proves the benefits of using multiple information sources rather than relying on only one, as we are more likely to get a timely record of DFS events. The impulse response function of the second assumption is very similar to the baseline: the maximum decline of GDP is 1.98 percent in quarter 7.

C.B Alternative Specifications

I check the robustness of the results to two different identifications

In the first exercise, I explore the sensitivity of the results to both a smaller and a larger dynamic structure, using 8 and 2 lags, respectively, for the outcome variables and the DFS. Figure C.2 shows that the impulse response functions do not deviate much from that in the baseline.

In the second exercise, I consider the role of non-linearity in the estimations. The problem of non-linearity could prevail for two reasons. First, it is possible that under our narrative classifications, each jump in severity level of DFS does not have equal significance. Another concern is that each incremental step may not impact the real GDP and dollar capital flow equally. Following the spirit of previous literature, I replace the F in equation 1 with a quadratic term $f(F) = F + bF^2$ for both DFS and DFS lags. Figure C.3 suggests a small level of departure from linearity for the IRF. For the GDP, the point estimate of b is -0.03 - suggesting there might be a decreasing impact on GDP for each step of DFS. However, a p-value of the estimate is 0.73 - suggesting the null hypothesis that there exists no such non-linearity (b=0) cannot be rejected. For the dollar capital flow, the point estimate of b is -0.19, with a p-value of 0.00. Differing from the GDP analysis, this result supports the evidence of a non-linearity relationship between DFS and dollar lending, with a decreasing marginal impact of DFS on BIS banks' dollar flow.

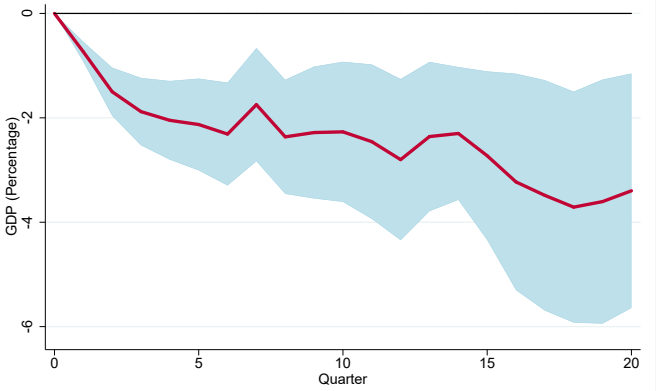
C.C Alternative DFS Indexes

In the last exercise, I consider using the DFS constructed with other methodologies. During the DFS construction, I allowed four ways to measure the DFS: the average and the maximum - for the 3-categories and 5-categories classifications. Figure C.4 shows the impulse response functions for GDP and banks' capital flow to an impulse of a moderate or systemic level of the crisis using all four DFS indexes. The

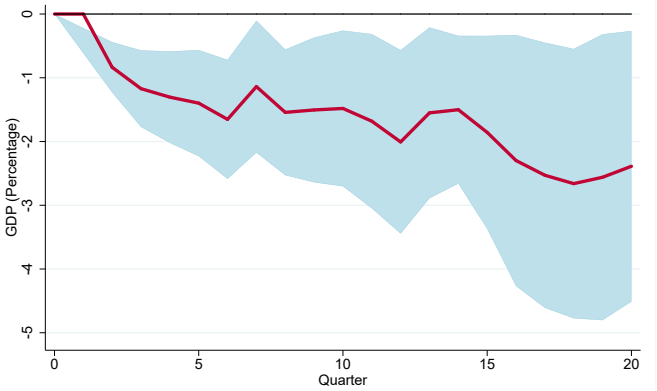
results of four different DFS measurements are very similar to each other. There is a more significant decline in GDP for the three-categories measurements because, by construction, the "systemic crisis" described in the 3 -steps classification is, on average, more severe than the "moderate crisis" in the" 5 steps classification".

Figure C.1: Response of GDP to DFS: Alternative Timing Assumption

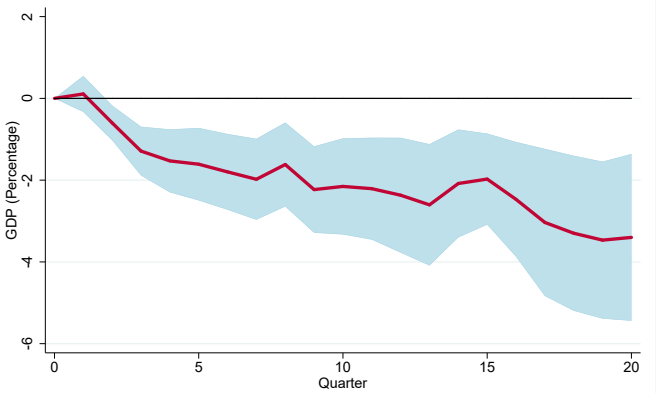
Panel A. DFS in t can affect output in t (baseline)



Panel B. DFS in t cannot affect output in t

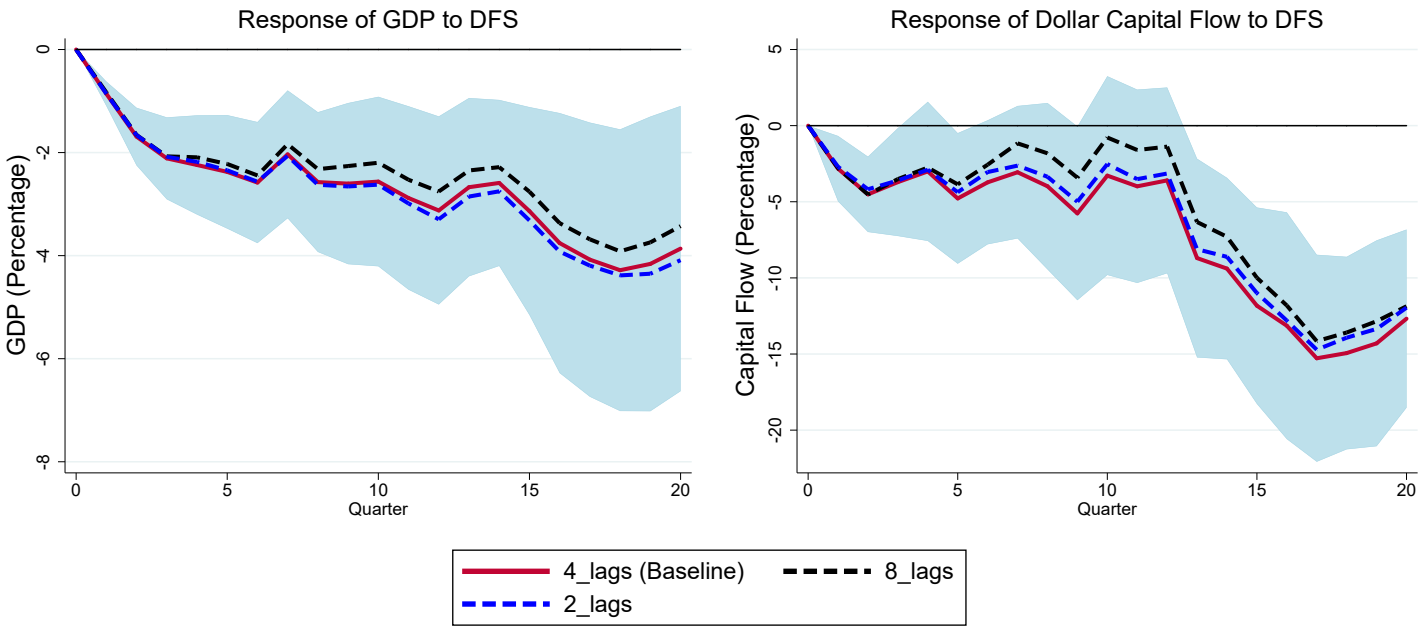


Panel C. DFS in t+1 can affect output in t



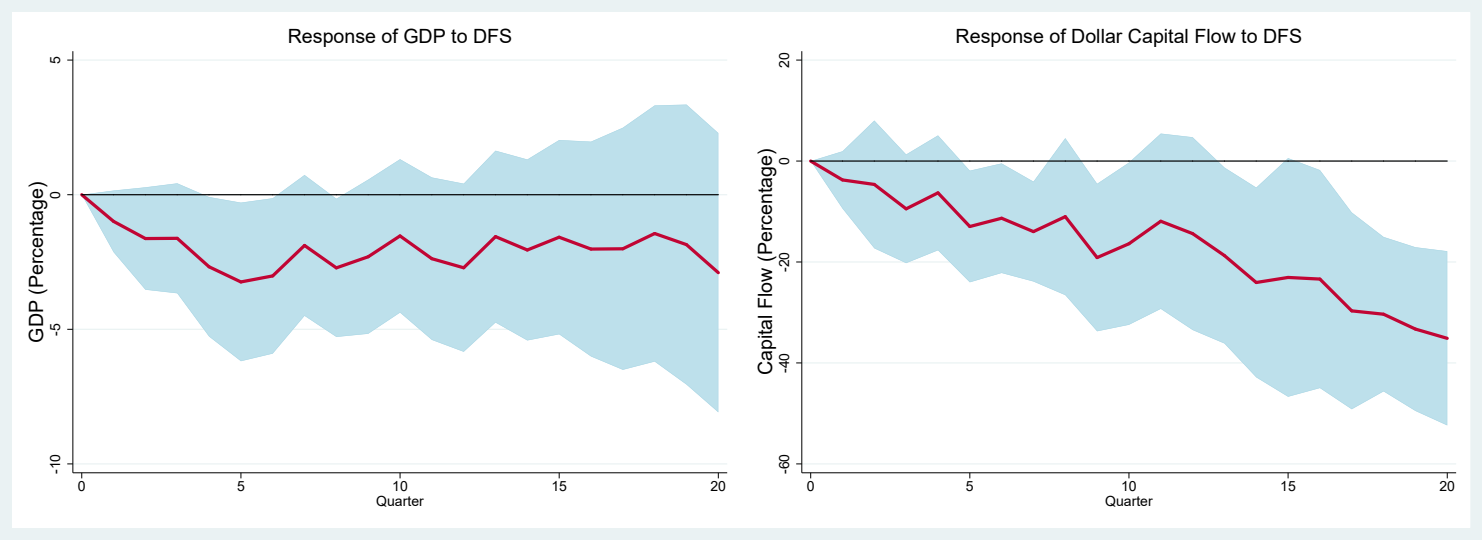
Notes: The panels show the impulse response functions for GDP to an impulse of 3 (moderate crisis) in my measure of DFS. Panel A shows the baseline results of estimating Equation 1; Panel B excludes the contemporaneous correlation between output and DFS; Panel C shows the results of including DFS from one period forward.

Figure C.2: Response of GDP and Capital Flow to DFS: Alternative Lags



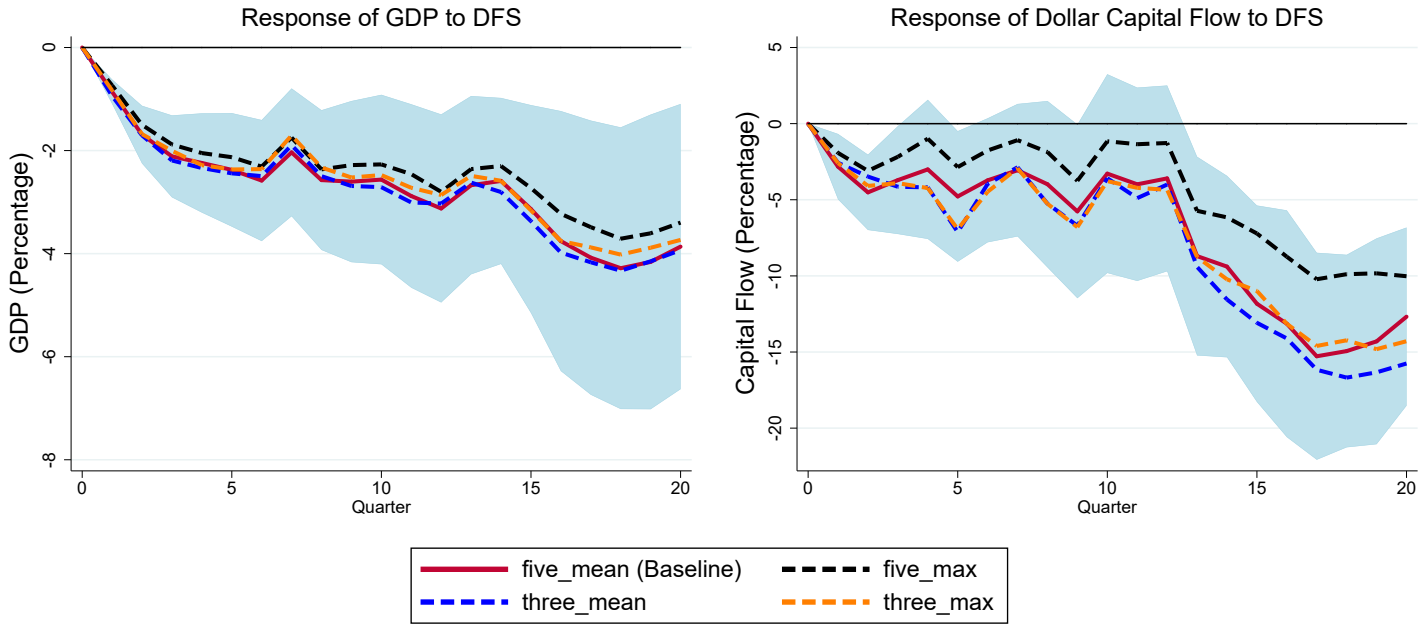
Notes: The panels show the impulse response functions for GDP and banks' capital flow variables to an impulse of 3 (moderate crisis) over the full sample period using OLS. The red solid line refers to the baseline result of equation (1). The black dash line refers to specifications with eight lags of variables in equation (1). The blue dash line refers to specifications with two lags of variables in equation (1). The blue areas show the two-standard-error confidence bands for the baseline model.

Figure C.3: Response of GDP and Capital Flow to DFS: Non-linearity



Notes: The panels show the impulse response functions for GDP and banks' capital flow variables to an impulse of a moderate crisis level over the full sample period from estimating equation (1) with an additional quadratic term. The quadratic specification includes both the level and the square of the DFS variable. The blue areas show the two standard-error confidence bands.

Figure C.4: Response of GDP and Capital Flow to DFS: Alternative Indexes



Notes: The panels show the impulse response functions for GDP and banks' capital flow variables to an impulse of a moderate crisis level using alternative DFS measurement indexes. The solid red line refers to the baseline result of equation (1). The black dash line refers to the result of equation (1) using the DFS classified into 5 categories and consolidated with its max value within the quarter. The blue dash line refers to the result of equation (1) using the DFS classified into 3 categories and consolidated with its mean value within the quarter. The orange dash line refers to the result of equation (1) using the DFS classified in 3 categories and consolidated with its max value within the quarter.The blue areas show the two-standard-error confidence bands for the baseline model.

D Newspaper Examples

THE WALL STREET JOURNAL.
U.S. EDITION

Banks in France Cut Dollar Loans

By Carrick Mollenkamp
498 words
23 September 2011
The Wall Street Journal
J
C2
English

European banks, facing a dollar shortage and bracing for new rules aimed at preventing another financial crisis, are changing their borrowing and lending in ways that will trim the supply of credit to the struggling U.S. economy.

The latest sign: Two of France's biggest banks -- BNP Paribas SA and Societe Generale SA -- are jettisoning dollar-denominated assets.

BNP expects to have reduced its dollar-denominated loan book by as much as $42 billion by the end of the year. The Paris bank plans to cut $40 billion more next year, bank officials said in an interview.

Societe Generale Chief Executive Frederic Oudea told investors attending a New York conference this month that new regulations and scarcer funding will force the bank to scale back shipping, aircraft, real-estate and leveraged finance in the U.S. Societe Generale declined to provide a specific dollar amount.

DOWJONES | Newswires

MARKET TALK: ECB Taps Fed's Swap Line Amid Funding Stress

146 words
25 August 2011
16:24
Dow Jones News Service
DJ
English

4:24 (Dow Jones) The ECB just followed SNB to use the Fed's dollar swap line -- a sign that funding stresses in the euro-zone banks are increasing. The ECB taps $500M from the facility -- used as a mechanism to ease short-term dollar shortage in money markets. It is a seven-day loan with an interest rate of 1.1%. SNB tapped the line last week with $200M and it has returned the loan. Many banks in the euro zone have confronted higher borrowing cost as US money funds, a key funding source in commercial papers, have cut back. Many euro zone banks have relied heavily on ECB for funding. (min.zeng@dowjones.com)

REUTERS

CORRECTED - OFFICIAL-UPDATE 1-UAE cbank offers dlr facility to Islamic banks

407 words
9 June 2008
03:24
Reuters News
LBA
English

(Corrects June 8 item to make clear that Islamic banks can borrow funds from the central bank through a swap facility. This follows a clarification from the central bank.)

DUBAI, June 8 (Reuters) - The United Arab Emirates central bank said on Sunday it would allow Islamic banks to borrow up to $200 million per day through a swap facility to help them cope with a dollar shortage.

In March, the central bank started allowing commercial banks in the world's fifth-largest oil exporter to borrow dollars for as long as three months against their certificates of deposit in a response to the global credit crisis.

Islamic banks, whose borrowing needs are different from the commercial banking sector because they cannot pay or receive interest, would also be able to borrow dollars from the central bank under separate terms, it said in a statement on its website on Sunday.

FT FINANCIAL TIMES

S Korean banks again face dollar shortage

By Song Jung-a in Seoul
401 words
19 February 2009
Financial Times (FT.Com)
FTCOM
English

North Korea threatens them with war and Hillary Clinton is making her first visit to Seoul as US secretary of state, but what is really gripping South Koreans is the possibility of a dollar shortage at local banks due to the global credit crunch.

The Bank of Korea on Thursday tried to play down fears that the country will face a funding crisis as local banks struggle to pay back external debts maturing next month. The BoK said South Korean lenders have $24.5bn of foreign currency debt maturing this year with $10.4bn of it coming due in February and March.

The central bank stressed that $24.5bn is "not a big amount" when taking into account the country's $201bn foreign exchange reserves, the world's sixth-largest holdings. It said that local lenders' foreign-currency funding conditions have shown signs of improvement since January.

Briefing sheet

ECONOMIST INTELLIGENCE | EIU

Editor: **Edward Dehnert**
Forecast Closing Date: **October 10, 2019**

Political and economic outlook

- Political instability will persist throughout the 2020-24 forecast period. Confession-based in-fighting will impede policy formation, and intermittent public protests are to be expected in response to government inaction.
- Lebanon's attempts to improve relations with the US and the Arab Gulf states will be endangered by the division between the nationalist camp of the prime minister, Saad Hariri, and pro-Syrian groups including Hizbullah and the Free Patriotic Movement.
- Political disunity will dampen economic sentiment. In 2020 headline GDP growth will reach 2.1%, strengthening thereafter, helped by a recovery in trade with Syria, to average 2.9% over 2020-24.
- The fiscal deficit will remain wide in 2020 at 9.6% of GDP, before narrowing slightly over 2021-24 at an annual average of 8.4% of GDP. Heavy debt-servicing costs will weigh on the fiscal account, which could precipitate a funding crisis.
- The Lebanese pound will remain pegged to the US dollar throughout the forecast period. It will, however, come under intense strain as Lebanon experiences a dollar crunch in the first half of the same period.
- Poor domestic production capabilities will cause import spending to exceed substantially export revenue. The current-account deficit will remain extremely wide, and, despite a marginal narrowing over the forecast period, will average 16.5% of GDP over 2020-24.

BBC

Kazakh banks 'face dollar shortage over Ukraine war'

248 words
11 March 2022
11:02
BBC Monitoring Central Asia
BBCCA
English

By BBC Monitoring

Banks in Kazakhstan are facing a shortage of dollars due to Russia's invasion of Ukraine, privately-owned news website KazTAG reported on 11 March.

"There is a shortage of dollars in Kazakhstan. Many banks do not have dollars in cash. This is due to an increase in the delivery time of the cash currency from other countries to Kazakhstan. Specifically, we all see that regular flights are also taking longer since they are not carried out over Ukraine and Russia. It is the same thing with the delivery of the foreign currency," the report quoted a source in one of the banks as saying.

She noted that this was "a temporary phenomenon due to the conflict in Ukraine". "Now everyone will re-arrange the delivery of dollars in order to speed up the delivery time of cash," the source said.

The website said that another source in a different bank had also "confirmed the information". "This is only about cash foreign currency. Any of our clients can make non-cash transfers in dollars and euros. And if necessary, he can simply withdraw the same amount [of money] in cash, but in tenge. We do not see any difficulties and those who need money, they withdraw it in tenge," he noted.