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Abstract

We show that U.S. dollar movements affect borrowing costs of syndicated loans for U.S. borrowers, even for those without trade exposure. We identify the effect of dollar movements using spread adjustments during the syndication process. Using this high-frequency, *within* loan variation, we find that dollar appreciation raises U.S. syndicated loan spreads. Instrumenting dollar changes with ECB monetary policy surprises, we find that a one standard deviation increase in the dollar increases spreads by up to 10 basis points. This effect is not driven by changes in risk sentiment, as effects from ECB monetary policy shocks and ECB information shocks are similar. Our results imply that the dollar transmits global shocks to U.S. borrowing costs.

Keywords: loan pricing, syndicated loans, dollar, institutional investors, risk taking.

JEL Classification: F15, G15, G21, G23

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1 Introduction

The supply of credit to the $1.2 trillion U.S. leveraged loans market crucially depends on funding from institutional investors (Ivashina and Sun, 2011; Irani et al., 2021). As these institutional investors invest globally (e.g. insurance companies), raise capital globally (e.g. CLOs) or both (e.g. mutual funds, hedge funds), they are sensitive to global developments. Since the global financial crisis, the dollar has been shown to be a key variable affecting the "global financial cycle."[1] While the literature has documented the effect of dollar movements on non-U.S. countries, the effect of dollar movements on U.S. borrowers has remained unclear.[2]

In this paper, we show that, as a consequence of this global investor base, foreign shocks affect the borrowing costs of U.S. corporations through the dollar. Figure 1 shows that dollar appreciations are associated with lower nonbank shares in newly formed syndicates, providing the first piece of suggestive evidence that global investors' demand for leveraged loans to U.S. corporations responds to dollar movements.[3]

Identifying the effect of macro-economic or global developments on corporate borrowing costs is challenging and entails endogeneity issues in many settings. To address these issues, we exploit the institutional setting of the leveraged loan syndication process and an instrumental variable strategy. First, we use the fact that leveraged loan terms are adjusted during the syndication to address borrower selection and lower frequency confounding macroeconomic factors.[4] Specifically, we relate movements in the dollar during the syndication process to differences between initial and final loan terms, similar in spirit

[1] When the dollar appreciates, the capacity to bear risk in global capital markets tends to fall, reflected in lower cross-border lending, larger CIP deviations, and a larger demand for U.S. safe assets.

[2] An exception is Niepmann and Schmidt-Eisenlohr (2019), who show that U.S. banks' lending volumes and secondary market prices for corporate loans also move with the dollar.

[3] The sharp drop in the nonbank share in late 2011 can be attributed to the European debt crisis.

[4] For more details on the syndication process, see Bruche, Malherbe, and Meisenzahl (2020).

to the identification in Bernstein (2015).[5] Second, we use ECB monetary policy surprises as plausibly exogenous variation in dollar movements. We follow Jarocinski (2020) and distinguish ECB monetary policy shocks and ECB information shock and find that the dollar effects on spreads are present when using each type of shock as instrument. This finding suggests that our results are indeed driven by exogenous shocks to the dollar and do not arise because ECB monetary policy surprises reveal new information about the state of the global economy and thereby shift global risk sentiment.

Figure 2 illustrates the institutional setting of our study. Price adjustments during the syndication process (flexes) offer a close-to-ideal setting to study our question. Initial loan terms are agreed upon by the borrower and the lead arranger *before* the lead arranger assembles the syndicate—that is, the borrower and key loan characteristics are fixed before demand for a loan realizes, leaving no room for borrower selection. In addition, initial loan arranging agreements are designed to provide the lead arranger with strong incentives to obtain the best possible loan terms for the borrower. Therefore, adjustments of loan spreads during the syndication process directly reflect changes in the demand from outside investors for a given loan and are independent of lead arranger characteristics.[6] Finally, the syndication process takes about two weeks, allowing us to use daily data to tightly identify the effect of dollar movements on spreads, in contrast to other studies focusing on quantities at the monthly or quarterly frequencies, which may be affected by other macroeconomic factors.

We postulate that dollar appreciations lower the demand for risky assets and derive three key testable hypotheses from book building theory applied to the loan syndication process

[5]Bernstein (2015) uses stock market movements during the IPO book building process as instruments for the completion of IPOs.

[6]Berg, Saunders, and Steffen (2016) document that discounts, sometimes labeled fees, play a significant role in loan pricing.

based on Bruche, Malherbe, and Meisenzahl (2020). First, changes in the effective spread during the syndication process should be positively related to dollar movements. Second, the effect of the dollar should be independent of the trade status of the borrower. Third, the effect of dollar movements should be stronger for new, underwritten loans where lenders incur information collection cost such as screening than for refinancing where lenders are familiar with the borrower and can reinvest repaid principal.

Our main data source to test these hypotheses is the Leveraged Loan Commentary and Data (LCD) that provides us with data on syndicated leveraged loans from 2009-2019. In our main analysis, we keep only U.S. borrowers. The data include the loan launch date, original (talk) loan terms (amount, spread, original issue discount (OID), purpose and other loan characteristics) and crucially adjustments to pricing terms (spread flex, OID flex) as well as the respective flex dates.

The main explanatory variable is the change in the broad dollar index during the syndication process for loans to U.S. corporations.[7] We construct this change as the difference in the broad dollar index between the start of the book building process (launch date) and the date of pricing flexes (spread and/or OID).[8] The key outcome variable to test our first hypothesis is the change in the effective spread (spread + OID/4) during the book building process.[9] We regress the change in the effective spread on the change in the dollar index and, controlling for a rich set of loan characteristics such as the initial (talk) loan spread, find that a one standard deviation change (about one point) in the dollar index increases the final effective spread by 2-3 basis points (bps). This increase is statistically significant

[7]The broad dollar index is a trade-weighted average of the foreign exchange value of the U.S. dollar against the currencies of major U.S. trading partners.

[8]When no flex date is available, we calculate the change in the dollar index in the first 12 days after the start of the book building process.

[9]We follow the market convention and ignore discounting. The typical maturity of a term loan is 5 years. However, these loans are often refinanced earlier, so that the effective maturity is closer to 4 years.

and economically meaningful, especially when considering that, on average, flexes to the effective spread occur within 12 days from the loan launch date.

Our primary market pricing result is robust to including loan and borrower characteristics as well as lead arranger fixed effects. To ensure that our results are not driven by U.S. developments, we also control for changes in the log VIX, the 2-year Treasury yield, the US term spread, the 3-month U.S. Libor, and the Aruoba-Diebold-Scotti Business Conditions Index.[10] We find that the coefficient on the changes in the dollar index remains unchanged.

Despite our high-frequency approach and the financial, macro and risk controls, one may still be worried about omitted factors that might drive both the dollar and U.S. corporate spreads. To address this concern, we instrument changes in the broad dollar index with high-frequency changes to the dollar-euro exchange rate around ECB announcements from Ferrari, Kearns, and Schrimpf (2017). Intra-day ECB surprises explain broad dollar moves over the syndication window well. Results from the second stage are highly significant, confirming that foreign shocks affect U.S. borrowing conditions through the dollar.

The main coefficient in the IV regression is almost five times larger than the OLS estimate. It implies that a one standard deviation increase in the broad dollar index increases the interest rate spread by 9 bps in the sample of underwritten loans (or 10 bps for a one point increase in the dollar index). For context, we compare the estimated 18 bps increase in loan spreads during syndication to the response of secondary market prices of high-yield bonds. Figure 3 shows that high-yield spreads on corporate bonds increased from 350 bps in mid-2014 to 800 bps in December 2015, while the dollar index increased by 21 points, a 21 bps increase in spreads for a one point increase in the dollar index, suggesting that changes in the dollar account for about half of primary market response.[11]

[10]The Aruoba-Diebold-Scotti Business Conditions Index is designed to track real business conditions at high observation frequency (see Aruoba, Diebold, and Scotti (2009)).

[11]The appendix shows the time series for the changes in both series. The correlation between the changes

While we focus on U.S. borrowers only, one concern is that exposure to dollar movements through imports or exports could be driving our results. Such exposure would make borrowers' credit risk sensitive to dollar movement and, therefore, affect loan pricing. Our results are robust to restricting the sample to loans to non-tradable industries. The estimate coefficients are in magnitude similar to the full sample. Hence, international trade exposures do not account for our results.

One potential channel through which dollar movements could affect borrowing costs is lead arranger's balance sheet exposure to dollar movements.[12] Consistent with dollar movements indicating investors' demand for loans, we find that interactions of U.S. lead arranger characteristics with dollar movements cannot explain the observed flexes. Non-U.S. lead arrangers do not drive our results either. We conclude that the effect of the dollar on U.S. borrowing costs is unrelated to lead arranger characteristics.

Next, we show that our findings are robust to controlling for other variables that have been linked to dollar movements in the international finance literature. Including covered interest rate parity (CIP) deviations—a proxy for financial intermediary arbitrage capital (Avdjiev et al., 2019)—and the Treasury basis—a proxy for global demand for safe assets (Jiang, Krishnamurthy, and Lustig, 2018) in the regressions does not affect our findings on the dollar and corporate interest rate spreads. Our results therefore uncover a dollar-channel that is separate from the effects of intermediary constraints captured by CIP deviations or the demand for safe assets.

We then examine whether there is cross-sectional heterogeneity. Specifically, we assess whether there is difference between underwritten loans—new loans typically financing LBOs and M&A activity that will be originated even when investor demand is low—and

in the two series is 0.5.

[12] See Bruno and Shin (2015).

refinancing loans, which are typically not underwritten. Institutional investors have less information about new deals and therefore incur search and screening costs when investing in new, underwritten loans. In contrast, for refinancing loans, institutional investors can reinvest the repaid principal with the same borrowers, with no search or screening cost. Due to this information friction, a decline in the demand for loans by institutional investors should therefore fall more heavily on new, underwritten loans than on refinancing loans. Consistent with this prediction, we find that the dollar effects on spreads are concentrated in the underwritten loans.

We then study whether dollar appreciation and depreciation have the same effect. We find that the effect of dollar changes on spreads are concentrated in appreciations. The effect of depreciations is driven by (refinancing) loans originated during the European debt crisis in 2011/12 when demand of institutional investors for leveraged loans was particularly low (see figure 1). When excluding these loans or time period, we find no effect of depreciations on spreads but still a large and significant effect of appreciations. This asymmetry could also be linked to asymmetric hedging of exchange rate exposure over appreciation–depreciation cycles as suggested by Koutmos and Martin (2003).

We contribute to several strands of the literature. First, we add to the understanding of the dollar's role for asset markets. Avdjiev et al. (2019) document that a stronger dollar is associated with larger deviations from covered interest parity and less cross-border bank lending. Jiang, Krishnamurthy, and Lustig (2018) find that the dollar appreciates with the global demand for U.S safe assets. Niepmann and Schmidt-Eisenlohr (2019) show that dollar appreciations reduce secondary market loan prices and credit supply from banks that follow an originate-to-distribute model. Lilley et al. (2019) find that after the 2007-08 financial

crisis the dollar co-moves with global risk measures.[13] Our high frequency results show that foreign shocks affect U.S. domestic borrowing costs through the dollar even when controlling for CIP deviations and the global demand for safe assets and when instrumenting dollar changes with ECB surprises.

Second, we add to the literature on the syndication process and loan prices. Ivashina and Sun (2011) show that loans that were syndicated during times of lower inflows to funds take longer to syndicate and have higher spreads. Bruche, Malherbe, and Meisenzahl (2020) use the LCD data to show that lead banks hold larger loan shares when investors demand is low, using flex incidences as proxy for low demand. We add to their findings by linking flex spreads to movements in the dollar index.[14]

Third, we add to the growing literature that emphasizes the role of nonbanks and institutional investors in lending markets. Bord and Santos (2012). Irani et al. (2021), and Lee et al. (2019) document that nonbank participants now account for 80 percent of leveraged loan holdings and that nonbanks hold the most risky loans in this segment.[15] Our findings show that the US dollar affects the demand of such investors for risky assets.

The remainder of the paper is organized as follows. Section 2 describes our data. In section 3, we develop our testable hypothesis. The empirical results are presented in section 4. Section 5 considers other variables that move with the dollar. Section 6 concludes.

[13] Jiang, Krishnamurthy, and Lustig (2018) argue that changes in the convenience yield assigned by foreign investors to U.S. Treasuries drive dollar movements.

[14] Since we only use within-loan variation, we implicitly control for other factors affecting loan pricing. For instance, Ivashina (2009) documents the impact of asymmetric information between the syndicated lead and participants on spreads. Santos (2011) links the lead bank's financial health to syndicated loan spreads.

[15] However, there is little evidence that nonbank participation increases adverse selection (Benmelech, Dlugosz, and Ivashina, 2012).

2 Data

Our main data source is S&P Capital IQ's Leveraged Commentary and Data (LCD). LCD contains detailed data on leveraged loans, their characteristics, and their syndication process. The data set includes syndicated loans with either a non-investment-grade rating, or with a first or second lien and a spread of at least 125 basis points over LIBOR.[16]

In our analysis, we focus on loans originated between 2009 and 2019 for two reasons. First, a crucial measure of loan riskiness, the talk yield—the loan yield used by the lead bank to start the book-running—is only consistently available from 2009 on. Second, by excluding prior years, we ensure that our results are not driven by the 2007-08 financial crisis. In addition, we only keep U.S. borrowers to exclude the possibility that borrowers' credit risk is directly affected by dollar movements.[17]

Figure 4 shows the monthly number of loans and monthly total loan amounts in the institutional leveraged term loan market during the sample period. While leveraged loan originations were subdued at the beginning of the sample, we observe on average 58 loans per month.[18] Over the sample period, the loan amounts add up to $2.5 trillion.

Our main variables of interest are the adjustments (flexes) to the spread. The data contain the corresponding launch and flex dates of these variables. Figure 5 shows the incidences of positive (negative) flexes to the effective spread. The figure shows that adjustments to spreads are common. Moreover, positive and negative flex incidences exhibit a clear, negative correlation for effective spread flex.

[16] Figure A1 shows the distribution of loan ratings for the sample.

[17] To identify U.S. borrowers in the LCD data, we merge LCD data with Dealscan data and information from the Loan Syndications and Trading Association (LSTA).

[18] In late 2015/early 2016 the primary market for syndicated loans effectively shut down in the wake of a failed syndication. The arrangers were not able to assemble a syndicate to finance the take-over of Veritas. The low demand for this loan, which market participants attributed in hindsight to CLO industry concentration limits (preventing CLOs from investing in this deal), as well as uncertainty about CLO oil exposures spooked investors.

Using the launch date, the flex date, and the date of the first secondary market price, we construct changes in the broad dollar index for the time from launch date to flex date and from flex date to first secondary market price date. If a loan does not have a flex date, we calculate the change in the dollar in the first 12 days after launch. The broad dollar index is a trade-weighted dollar exchange rate index calculated and published as part of the weekly H.10-Foreign Exchange Rate release by the Board of Governors of the Federal Reserve System.[19]

For our instrumental variable estimation, we obtain data on exchange rate surprises from Ferrari, Kearns, and Schrimpf (2017). The data capture responses of the dollar-euro exchange rate around monetary policy announcements from the ECB and the Federal Reserve, covering both scheduled and unscheduled policy meetings and any press conference that follows a policy meeting. For policy meetings without a press conference, dollar-euro exchange rate changes are calculated over a 30-minute window, from 15 minutes before to 15 minutes after the announcement. For meetings with a press conference, exchange rate changes are calculated over a 105-minute window, from 15 minutes before to 90 minutes after the announcement. In addition, we obtain data from Jarocinski (2020) to distinguish between information and monetary policy shocks. A monetary shock is defined as an ECB surprise when ECB tightening (easing) coincides with a drop (rise) in European stock prices, whereas an information shock is defined in the opposite way.

Table 1 presents the summary statistics for the LCD sample, the broad dollar index, and additional control variables, including U.S. financial market variables and bank balance sheet variables. Throughout the analysis, we are dropping financial corporations and

[19]The trade partners included in the broad dollar index calculations are the Euro Area, Canada, Japan, Mexico, China, United Kingdom, Taiwan, Korea, Singapore, Hong Kong, Malaysia, Brazil, Switzerland, Thailand, Philippines, Australia, Indonesia, India, Israel, Saudi Arabia, Russia, Sweden, Argentina, Venezuela, Chile, and Colombia.

utilities.[20]

3 Hypothesis Development

In the development of our testable hypothesis, we focus on the implications of book building theory because Bruche, Malherbe, and Meisenzahl (2020) document that syndication is a book building process.[21] We first briefly summarize the syndication process and then derive testable hypotheses.

The Syndication Process

The syndication process, illustrated in Figure 2, starts with borrowers soliciting bids including pricing and risk-sharing provisions from arrangers. The borrower awards the mandate to the preferred arranger. The arranger then proposes a facility agreement that includes all loan terms such as the interest rate, the original issue discount, covenants, and repayment options and uses this agreement to market the loan to investors.

The marketing or book running takes place in at least one round. In each round, the arranger proposes a facility agreement including all loan terms such as the pricing to investors. If, given proposed loan terms, there is sufficient demand, the loan is originated at those terms. If the demand from the loan is higher or lower, then there is another round. Based on demand that realized with the last set of loan terms, the arranger "flexes," that is, adjusts the terms accordingly. For instance, if demand was low, then the arranger may increase the interest rate or decrease the loan amount in the next round. The ability to flex, the range of flexes, and the consequences of flexes for the arranger's fee are part of the

[20] All variables are described in Appendix A, table A1.

[21] For detailed description of the syndication process, see Bruche, Malherbe, and Meisenzahl (2020). For more details and test of book building theory especially in the context of IPOs, see Benveniste and Spindt (1989), Hanley (1993), and Cornelli and Goldreich (2003).

risk-sharing in the contract between borrower and arranger. The process continues until the loan is originated. After the borrower received the funds, the loan starts trading in the secondary loan market.

A crucial feature of the arranger-borrower agreement is the way arrangers are incentivized to obtain the best loan terms possible for the borrower. The total (final) arranging fees depend on how flex provisions are used. Specifically, to ensure that an arranger exerts effort in the book building process, if the spread is flexed down during the syndication process, the arranger receives part of the borrower's interest rate cost saving as additional fee. However, if the spread needs to be flexed up during the syndication process to place the loan, the borrowers gets partially compensated for this extra interest rate cost by a reduction in the arranging fee. The average per-loan fee income, about 2-3 percent of the loan amount, generated over the relatively short syndication process dwarfs any potential additional interest income on the retained loan share, on average 5 percent for term loans (Lee et al., 2019). In other words, the final fee (payoff) of the arranger is, to first order, a function of loan term adjustments and final loan terms that the borrower receives.[22] As such, the changes in loan terms during the book building process should be independent from the lead arranger's balance sheet.

Testable Hypothesis

Our analysis of the effect of dollar movements on loan spreads is motivated by an emerging literature that documents a link between the dollar and the global risk-taking capacity of investors and their demand for risky assets. Bruno and Shin (2015) and Avdjiev et al. (2019) find that dollar appreciations reduce cross-country dollar lending. Niepmann and Schmidt-Eisenlohr (2019) show that such movements also reduce the credit supply of U.S.

[22] A detailed example can be found in Bruche, Malherbe, and Meisenzahl (2020).

banks to U.S. corporations because of lower demand for loans by institutional investors. It then follows that if the dollar appreciates during the syndication process of a loan, demand for the loan will be lower. As explained above, in this case the effective spread (spread + OID/4) will be increased to entice investors to participate in the syndicate.

Hypothesis 1. *On average, the flex in the effective spread is positively related to dollar appreciations.*

Another implication of the demand channel is that spreads of loans to firms in all sectors should be affected similarly by changes in the dollar. In contrast, if borrower characteristics were central to the dollar effect, loan spreads of firms in tradable sectors would responds differently to dollar changes than loan spreads of firms in non-tradable sectors.

Hypothesis 2. *The effects of dollar changes on spreads is independent of a firm's trade exposure.*

We argue that the dollar affects syndicated loan pricing through loan demand. In particular, loan spreads should increase if there is weak demand from investors and finding syndicate participants is more difficult than expected during the syndication period. This channel is central for underwritten loans that raise new funds because these require new syndicate participants. Investing in new loans is costly as the participants in new loans have to search for new investment opportunities and then screen these opportunities. This information cost channel is less likely to be salient for refinancing loans because these can be rolled over with the current lenders who have already screened the borrower in the past and have received information about the borrower's financial health regularly.[23] Since refinance loans have lower information cost, investors may prefer to roll over loans and

[23]Gustafson, Ivanov, and Meisenzahl (2021) show that most leveraged loans are typically monitored on a monthly basis. This information is shared with all syndicate participants.

therefore refinance loans should be less affected by short-term changes in the demand from institutional investors. We thus expect the demand channel to be potent only when the lead underwrites a loan—that is, when the lead provides a guarantee for the new funds to be raised.

The demand channel therefore implies:

Hypothesis 3. *The effects of dollar changes affect only spreads of underwritten loans, but not spreads of refinancing loans.*

We test three hypotheses below.

4 Corporate Borrowing Costs and the Dollar

In this section, we conduct our empirical analysis. We first study the effect of changes in the dollar during the book-running process on effective loan spreads and whether these effects vary by loan characteristics. We provide robustness analysis, controlling for borrowers' trade exposures, macro and financial shocks, and lead agent characteristics. We then instrument dollar changes with ECB surprises. Finally, we look at asymmetric effects of the dollar.

4.1 The Dollar and Syndicated Loan Terms

We start our empirical analysis by assessing the effect of changes in the dollar on the change in the effective spread (Hypothesis 1). The effective spread is easy to calculate since syndicated loans have a floating rate, typically comprised of LIBOR as base rate and the effective spread (spread + OID/4).[24] To isolate this effect, we focus on dollar movements during the syndication process—that is, we focus on the changes in the effective spread

[24]Later, we directly control for an extensive set of macroeconomic, financial, and monetary controls, including the 2-year Treasury yield and the term spread in case that changes in the base rate affect the effective spread.

during the syndication process, while holding borrower and loan characteristics constant. By focusing on this within-loan variation, we avoid potential borrower selection and can separate the effect of dollar movements as they are orthogonal to other potential loan-specific factors that can explain loan spreads.[25] We estimate the following regression:

$$\Delta \textit{Effective Spread}_{i,\Delta t} = \beta \Delta Dollar_{\Delta t} + \gamma X_i + \epsilon_{i,\Delta t} \tag{1}$$

The key variable of interest is the change in the broad dollar index for the time from the launch date of loan i to the flex date of loan i $\Delta Dollar_{i,\Delta t}$ (or over the first 12 days after the launch date if a loan does not have a flex date). We add loan-control variables X_i (the talk (initial) loan amount, the talk (initial) spread, maturity, and dummy variables for whether the loan is sponsored, the loan is rated, the loan is a cov-lite loan, and the loan is a middle market loan, as well as fixed effects for the lead agent, the borrower industry, and the loan purpose).

Table 2 shows the results from estimating equation 1. Column 1 shows the baseline for all loans. The estimated dollar coefficient is highly statistically significant and suggests that a one standard deviation (0.91 points) increase in the dollar index increases the effective loan spread by 2.2 basis points. In column 2, we add loan-level controls, including the talk (initial) spread to account for the ex-ante riskiness of the loan, and find that the coefficient size and statistical significance remain unchanged. This result is robust to the inclusion of borrower industry, loan purpose and lead bank fixed effects (column 3).

These results provide the first evidence that changes in the dollar affect the spreads of leveraged loans. While these results are suggestive of a credit supply channel, other factors

[25]For instance, Ivashina (2009) studies the effect of asymmetric information on loan spreads. Our identification strategy is similar to Bernstein (2015), who uses stock market movements after the initial IPO filings as an instrument for IPO completion.

such as trade and macroeconometric developments could drive our results. We assess these factors below.

Controlling for International Exposures

One concern with the baseline regression is that changes in the broad dollar may directly affect a borrower's revenues and costs if the borrower imports, exports, or has cross-border financial activities. This may in turn affect the ability of a borrower to repay a loan and hence the credit spread charged by banks. We address this concern by testing our second hypothesis which states that our results hold in the sample of firms in non-tradable sectors.

Table 3 shows the sample splits between borrowers exposed to trade and borrowers not exposed.[26] For ease of comparison, Column 1 shows the baseline result with the sample of loans for which industries could be matched to trade data. To ensure that our results are not driven by the trade exposures of borrowers, we split the sample into non-traded and traded industries. Columns 2 and 3 show results for the baseline specification for industries that do not export or import (as before, we are also excluding the financial sector) in the full sample. The baseline results remain, which implies that even firms with no exports or imports face higher financing costs when the dollar appreciates.

Controlling for macroeconomic developments

A second potential concern is that changes in the dollar index could reflect other macroeconomic developments such as changes to the economic outlook, monetary policy, or increases in economic uncertainty. To ensure that our results are not driven by such developments, we augment equation 1 by adding the changes in a large set of U.S. variables.

[26]Note that industry fixed effects in table 3 are based on borrowers' SIC codes. SIC codes are not available for all borrowers in the dataset. Therefore industry fixed effects in other tables are implemented using a less granular industry classification that is available in the LCD data.

Specifically, we use changes in the log VIX, the 2-year Treasury yield, the U.S. term spread, the 3-month U.S. Libor, and the Aruoba-Diebold-Scotti Business Conditions Index as proxies for U.S. financial and macroeconomic conditions.[27] Because syndicated term loans are floating rate loans, changes in the level of short-term interest rates should not directly affect the spread.

Table 4 shows the results. In columns 1 and 2, we subsequently add controls for changes in U.S. macroeconomic conditions. All columns include the baseline loan controls. Column 3 adds industry, purpose and lead agent fixed effects. Comparing column 3 with the baseline (Table 2, column 3), we find that the coefficients on dollar change shown in column 3 are somewhat larger. Finally, column 4 adds syndication quarter fixed effects to the specification. As this partly absorbs the changes in the dollar index, it is not surprising that the size of the coefficient declines. Nonetheless, the effect remains sizable and statistically significant. Taken together, the results indicate that changes in the dollar index do not simply reflect other observable changes in the U.S. financial and macroeconomic environment.[28]

4.2 Instrumental variable approach

In this section, we use an instrumental variable approach to address concerns about omitted U.S. factors that could drive our results. For this, we instrument the changes in the broad dollar index with intra-day changes to the dollar-euro exchange rate around European Central Bank (ECB) monetary policy announcements.

[27] We include the VIX as measure of uncertainty in the economy. We include the 3-month U.S. Libor and the 2-year Treasury yield as measures of short-term and medium-term interest rates, and the U.S. term spread as measure of future economic conditions. The Aruoba-Diebold-Scotti Business Conditions Index captures U.S. business conditions at high frequency.

[28] In section 5, we demonstrate the robustness of our results to controlling for changes in CIP deviations and the Treasury basis. In addition, table B2 in the appendix includes changes in risk aversion and economic uncertainty from Bekaert, Engstrom, and Xu (2019) as control variables, with no effects on the magnitude nor the significance of the dollar coefficient. In unreported results, we find that the inclusion of changes in Japanese macroeconomic conditions also does not affect our main result.

In general, monetary policy decisions by the ECB should not affect expectations about the U.S. economy because the ECB should not have private information about U.S. economic conditions. While ECB policy surprises might have an effect on base rates like the LIBOR, it is less obvious why they should affect syndicated loan spreads other than through their effects on the dollar index. Any direct spillover from an ECB easing surprise should lower U.S. spreads. As we show below, this is indeed the case: ECB surprises to the 2-year rate are positively correlated with U.S. leveraged loan spreads. In contrast, the same ECB easing surprise should appreciate the dollar against the euro and thereby raise spreads through the channel that we identify.

We obtain data on exchange rate surprises from Ferrari, Kearns, and Schrimpf (2017), who collect responses of the dollar-euro exchange rate around monetary announcements by the ECB and the FED. For each loan, we check if any monetary policy announcement takes place during the book-running period. If there is a monetary policy announcement within that time window, we set the ECB and Fed surprises to the observed exchange rate change around that event. Otherwise, we set each surprise to zero. We control for FED monetary policy announcements and only use the ECB policy announcements as instruments for changes in the dollar. About half of the book-running periods overlap with ECB announcements.

The main IV results are presented in table 6. Column 1 shows the OLS baseline results. We start with all ECB monetary policy shocks. The first stage is shown in column 2. ECB surprises to the dollar-euro exchange rate are strong predictors of the broad dollar, with first-stage F statistics of above 100. Column 3 reports the second stage result for the full sample. When instrumented by ECB surprises, changes in the dollar continue to explain effective spread flexes in the syndicated loan market. Moreover, the coefficient is almost

three times larger than the OLS baseline estimate in column 1. One potential explanation of why the IV coefficient estimate is considerably larger than the OLS estimate is that part of changes in the exchange rate may reflect news about the U.S. economy that is not well captured in the macroeconomic controls in table 4.[29]

To isolate the effect of ECB surprises that operate directly through the dollar, in column (4), we add responses in interest rates across the yield curve around the same ECB announcements as controls, which further increases the estimated effect. Consistent with standard channels of monetary policy transmission, a rise in the Euro area 2-year rate caused by an ECB tightening surprise raises spreads for U.S. corporate loans, reflecting a spillover of tighter financial conditions to the United States. When controlling for this channel, our coefficient estimate on the dollar becomes significantly larger, indicating that omitting the interest rate channel (which has the opposite direction), biases our estimates downward in column (3).

ECB surprises are plausibly exogenous to U.S. factors and thus rule out the possibility that our findings are driven by unobserved U.S. factors that both move spreads on the syndicated loan market and the dollar. However, as shown by Jarociński and Karadi (2020), monetary policy announcements not only affect markets through changes in the monetary policy stance but can also reveal information about the state of the economy. To ensure that our results are not driven by changes in risk sentiment that are caused by new information from ECB monetary policy announcements, we use the classification in Jarocinski (2020) that distinguishes monetary policy shocks—where interest rates and stock markets move in opposite direction—from information shocks—where interest rates and stock markets move

[29]The results are robust to including secondary market prices (appendix table B3 and corporate bond spreads (appendix table B4). However, the effects appear to be concentrated in above median dollar changes in absolute terms (see appendix table B5).

in the same direction.[30] Columns 5 and 6 show results when using only ECB monetary policy shocks as instruments. The results are comparable to those using all shocks. We then only use ECB information shocks as instruments. The point estimate shown in column 7 is comparable to the estimates when using all ECB monetary policy decisions (column 3) or using only ECB monetary policy shocks (column 5).

To summarize, IV results hold both when using only information shocks and when using only monetary policy shocks. This implies that our findings are not driven by changes in risk sentiment that are merely reflected in the dollar.[31] Instead, they suggest that exogenous shocks to the dollar directly transmit to U.S. corporate borrowing costs.

The Role of Lead Agent Characteristics

While studying price adjustments *during* the syndication process alleviates concerns about borrower selection, it is possible that time-varying lead arranger characteristics affect price adjustments during the syndication process—that is, flexes could be driven by dollar exposures of lead arrangers' balance sheets rather than by the demand for the loans from investors. For instance, if lead banks fund loans through wholesale dollar markets, sudden dollar movements will affect the lead arranger's funding cost. However, if the dollar reflects investor demand, then lead arranger characteristics will not affect the flexes.

The arranger agreement is designed to provide the lead arranger with strong incentives to obtain the best possible loan terms for the borrower. As described in section 3, the arranger agreement makes the lead arranger's payoff a function of flexes during the syndication process. Moreover, lead arrangers only retain a small loan share, reducing the benefits of higher interest rates for the arranger. Taken together, this incentive structure implies

[30] Jarocinski (2020) shows that central bank information effects account for most of the co-movement of German and US government bond yields around ECB policy announcements, which explains some of the puzzling responses of US macroeconomic variables.

[31] In that case, one would expect the IV findings to be driven by ECB information shocks.

time-varying lead arranger characteristics should not matter for effective spread flexes.

To test whether lead arrangers' characteristics affect flexes, we draw on balance sheet information contained in the Y-9C reports of 21 U.S. lead arrangers.[32] These 21 lead agents arrange around 84 percent of the loans in the sample. We compute lagged four-quarter rolling averages of the following U.S. lead-agent characteristics: Tier 1 capital ratio, retail deposit share, liquid asset ratio, share of loans held for sale (LHS share), non-interest income ratio, share of trading revenues in non-interest plus interest income, and ratio of net charge-offs to total loans.[33]

We conduct our analysis in parallel to column 4 in table 2, restricting our sample to underwritten loans to U.S borrowers and including loan controls as well as industry, purpose and lead fixed effects. Columns 1 to 7 of table 5 each add an interaction term between changes in the dollar index and a lead-bank characteristic to the regression. Consistent with our hypothesis that U.S. lead arranger characteristics do not affect flexes, none of the interactions terms are statistically significant. We conclude that U.S. lead arrangers' exposure to dollar movements do not play a role for price adjustments during the syndication process.[34]

To ensure that our results are not driven by non-U.S. lead arrangers that arguably are exposed to dollar movements by having to raise dollar funding for syndicated loans, we test for differences in the effect of the dollar on the effective spread flex between U.S. lead arrangers and lead arrangers with foreign parents. Accordingly, we define a dummy variable *Foreign Lead* that takes the value of 1 if the lead arranger is owned by a foreign parent

[32] Foreign banks that do not operate BHCs or IHCs in the U.S. and nonbanks such as Nomura or Jefferies Securities do not have to file regulatory reports.

[33] Details on the construction of the lead-arranger variables can be found in table A1.

[34] We ran different variants of the effective spread flex regressions, including various fixed effects as controls and using a sample that includes all loans. The interaction terms between the dollar and lead arranger characteristics were not statistically significant in these alternative specifications.

and interact this dummy with the change in the dollar index.

Table 5, columns 8 and 9 show the results. The point estimate on the interaction of *Foreign Lead* with dollar changes is economically small and statistically insignificant, suggesting that our results are not driven by effects of dollar changes on non-U.S. lead banks.

In sum, neither differences across lead arrangers' balance sheet exposures to dollar movements nor differences between domestic and foreign lead arrangers account for the observed changes in the flexes in response to dollar movement.

5 Accounting for Other International Factors

Recent research in international finance documents that the dollar co-moves with important financial variables.[35] First, Avdjiev et al. (2019) show that the dollar exchange rate is correlated with CIP deviations, which arguably proxy the capacity of financial intermediaries to engage in arbitrage activities. When the arbitrage capital of financial intermediaries globally becomes scarcer, reflected in bigger CIP deviations, the dollar tends to appreciate.[36] Second, Jiang, Krishnamurthy, and Lustig (2018) document that convenience yields on U.S. Treasuries correlate positively with the dollar exchange rate, which implies that the dollar appreciates with the global demand for safe assets. Third, the dollar, along with the Japanese Yen is deemed a so-called "safe-haven currency" that appreciates when global investors become more risk-averse.

In this section, we show that our results on the dollar and corporate borrowing costs are robust to controlling for these additional channels. Specifically, we provide robustness

[35] See Du (Forthcoming) for a review of the literature.

[36] In theoretical work, Gabaix and Maggiori (2015) show how financial intermediaries price currency risk and, thereby, affect the level of exchange rates. Akinci and Queralto (2018), model a two-way relationship between balance sheet strength of borrowers and the dollar.

analysis that includes changes in CIP deviations, the Treasury basis, and the Japanese Yen as additional controls.[37]

Results are presented in Table 7. For ease of comparison, column 1 presents again the baseline results from table 2, column 4, showing the effect of changes in the dollar index on flexes for underwritten loans. Column 2 adds a measure of CIP deviations, the average five-year dollar Libor cross-currency basis against G10 currencies from Avdjiev et al. (2019). This Libor basis is almost always negative over the sample period. Increases in the Libor basis reflect, on average, smaller CIP deviations and, hence, greater financial intermediary capacity. As expected, an increase in the Libor basis (a less negative Libor basis) is associated with smaller flexes, as indicated by the negative, significant coefficient. However, the inclusion of CIP deviations reduces the coefficient on dollar changes only somewhat and the dollar effect continues to be highly statistically significant. This implies that the dollar effect on corporate borrowing costs goes beyond any effect that works through the financial intermediary arbitrage capital channel.

Column 3 of table 7 employs changes in the 1-year Treasury basis from Du, Im, and Schreger (2018).[38] A larger Treasury basis implies that investors are willing to pay a higher premium to hold U.S. Treasuries compared to other safe securities. Accordingly, a higher Treasury basis should be associated with less risk-taking and, hence, larger flexes. However, in contrast to this conjecture, conditional on dollar movements a higher Treasury basis is associated with lower flexes, as column 3 shows. This finding shows that the dollar effect on corporate borrowing costs is not driven by a differential demand for U.S. safe assets.

Column 4 adds changes in the Board Yen to control for global safe-haven currency

[37] In the appendix, we provide further robustness, showing that results continue to hold when including measures of risk aversion and economic uncertainty from Bekaert, Engstrom, and Xu (2019).

[38] We obtain similar results when using 3-month, 2-year, 3-year, 5-year, 7-year, or 10-year treasury basis instead of the 1-year Treasury basis.

demand in column 4. The estimated effect on dollar changes is the same as without controlling for the changes in the Yen (column 1). The point estimate on changes in the Yen is small and statistically insignificant, showing that our findings are not driving by save-haven currency demand.

Column 5 controls for CIP deviations, the Treasury basis, and the Board Yen at the same time. Column 6 incorporates other macro variables and year-quarter fixed effects. The estimated dollar coefficients are hardly changed compared with the equivalent regressions without CIP deviations, Treasury basis or the Yen.

The results shown in this section show that the effect of the dollar is independent from other international factors and therefore suggest that the dollar is a risk factor in itself.

6 Heterogeneous Responses to Dollar Movements

In this section, we first study the cross-sectional heterogeneity of spread changes to dollar movements by loan purpose. We then assess whether the effect of dollar appreciations and depreciations is symmetric.

6.1 Heterogeneity by Loan Purpose

We now split the sample into loans that are underwritten and refinanced loans and test our third hypothesis to provide insights into the drivers of our result.[39] The key difference between the two types of loans is that underwritten loans are *new* loans for which lead arranger commit to a set of terms. These new loans typically finance LBOs and M&A activity and are originated even when investor demand is low. If there is insufficient demand

[39]We drop dividend recapitalization loans as the implications for loans issued to pay dividends are not clear. One the one hand, dividend recapitalization loans require new funds, on the other hand, these loans are typically not underwritten. Hence, the loans cannot be easily placed in the refinance/underwritten dichotomy.

for an underwritten loan for investors, the lead arranger has to provide the remaining funds (Bruche, Malherbe, and Meisenzahl, 2020). In contrast, when a firm refinances, the old loan is paid of and the proceeds are distributed to the loan holders, making the holders of the old loan who just received funds likely investors (see, e.g. Beyhaghi, Nguyen, and Wald (2019)). A second important difference is that in refinancing lenders are already familiar with the borrower and the financial conditions of the borrower, lowering their screening cost relative to a new loan. As such, investors are more likely to reinvest the repaid principal into the refinancing than search for a new deal. Refinanced loans are typically not underwritten, meaning that the lead arranger does not guarantee a set of terms. We therefore expect that through the loan demand channel movements in the dollar affect underwritten loans more than refinance loans.

Note that our high frequency within loan identification is key to fully capture the heterogeneity in spread flex responses between underwritten and refinancing loans. While initial terms for both types of loans might respond to average conditions at the start of the syndication process, flexing during the syndication period should be more tightly linked to the demand from new syndicate members and hence the demand from institutional investors.

Table 8, shows the estimated effect for the sample split. For ease of comparison, column 1 shows the baseline from table 2. Column 2 shows the results of the subsample of underwritten loans. Compared to column 1, the coefficient is about 50 percent larger. It remains statistically significant at the 1 percent level. A one standard deviation increase in the dollar index increases the effective loan spread by 3.6 basis points. However, for refinanced loans the estimated effect is economically small and statistically insignificant (column 3).[40]

[40]In unreported results, we find some evidence for heterogeneous effects of dollar movements by credit ratings. Spreads on not rated loans that CLOs typically do not buy are unaffected by dollar changes, while spreads on rated loans respond to dollar changes.

To summarize, the cross-sectional analysis reveals that underwritten and refinanced loans differ notably in their responsiveness to exogenous shocks to investors' loan demand, which is consistent with changes in the U.S. dollar affecting credit supply.

6.2 Asymmetric Effect of Dollar Movements

Next, we test whether the effects of increases and decreases of the dollar index are symmetric. We estimate the following regression:

$$\begin{aligned} \Delta Outcome_{i,\Delta t} = \beta_1 \mathbb{1}_{\Delta Dollar_{\Delta t}>0} \Delta Dollar_{\Delta t} \\ + \beta_2 \mathbb{1}_{\Delta Dollar_{\Delta t}<0} \Delta Dollar_{\Delta t} + \gamma X_i + \epsilon_{i,\Delta t} \end{aligned} \tag{2}$$

Table 9 shows the results of estimating equation 2 with changes in the dollar index split into appreciations and depreciations in the dollar. Results for the effective spread flex are driven by dollar appreciations rather than depreciations. The effect of increases in the dollar index (β_1) is economically large and statistically significant. The effect of decreases in the dollar index (β_2) is negative, but economically small. This pattern holds when we include industry, purpose, lead fixed effect (column 2) and when we replace the industry fixed effect with industry-year fixed effects to absorb industry-time specific variation (column 3).

Estimated effects of dollar appreciations are substantially larger than the average effects estimated before. Specifically, a standard deviation increase in the dollar index increases the spread by 10 bps compared to 3.4 bps shown in table 2, column 4. These results suggest that institutional investors' loan demand responds differently to dollar appreciation than to dollar depreciation. One potential explanation for this could be asymmetric hedging of

exchange rate exposure over appreciation–depreciation cycles as suggested by Koutmos and Martin (2003). However, since we do not have data on hedging or derivative contracts held by nonbank financial institutions, we cannot test this hypothesis.

The negative effect of depreciation is surprising as dollar changes are expected be positive. We therefore investigate the drivers or this negative coefficient. The negative effect is driven by the 2011/12 subsample that includes the European debt crisis and is no longer present when we drop these two years (column 4). Indeed, figure 1 suggests unusually low demand from institutional investors in late 2011/early 2012. Column 5 shows the results for underwritten loans only. Consistent with the results in table 8, the effect of appreciations is sizable and statistically significant. However, the effect of depreciations is small and not statistically significant.

We conclude that the negative effect of depreciations seems to be confined to a specific volatile period and one type of loan (refinancing). Future research will hopefully shed more light on this intriguing finding.

7 Conclusion

We show that movements in the dollar index materially affect borrowing costs of U.S. corporate borrowers. Using high frequency data, within-loan identification and instrumenting the dollar with ECB surprises. The effects are present for ECB monetary policy shocks and ECB information shocks indicating that our findings are not driven by changes in risk sentiment. We document that effects are concentrated in underwritten loans that have higher transaction cost for investors. The relationship between the dollar and borrowing costs persists when controlling for CIP deviations, the convenience yield and for different measures of risk and uncertainty.

Why then is the dollar linked to global investors' demand for risky assets? Based on our within loan high-frequency identification and our IV results, we conclude that U.S. factors do not drive our findings. Instead, our results point to a close connection between the dollar exchange rate and investor demand for risky assets. One plausible explanation for this relationship is that changes in the dollar exchange rate may alter the risk profile of global investors' portfolios, making them riskier in the spirit of Bruno and Shin (2015). Through this channel, exogenous shocks to the dollar exchange rate may directly affect investors' risky asset demand and U.S. corporate borrowing costs.

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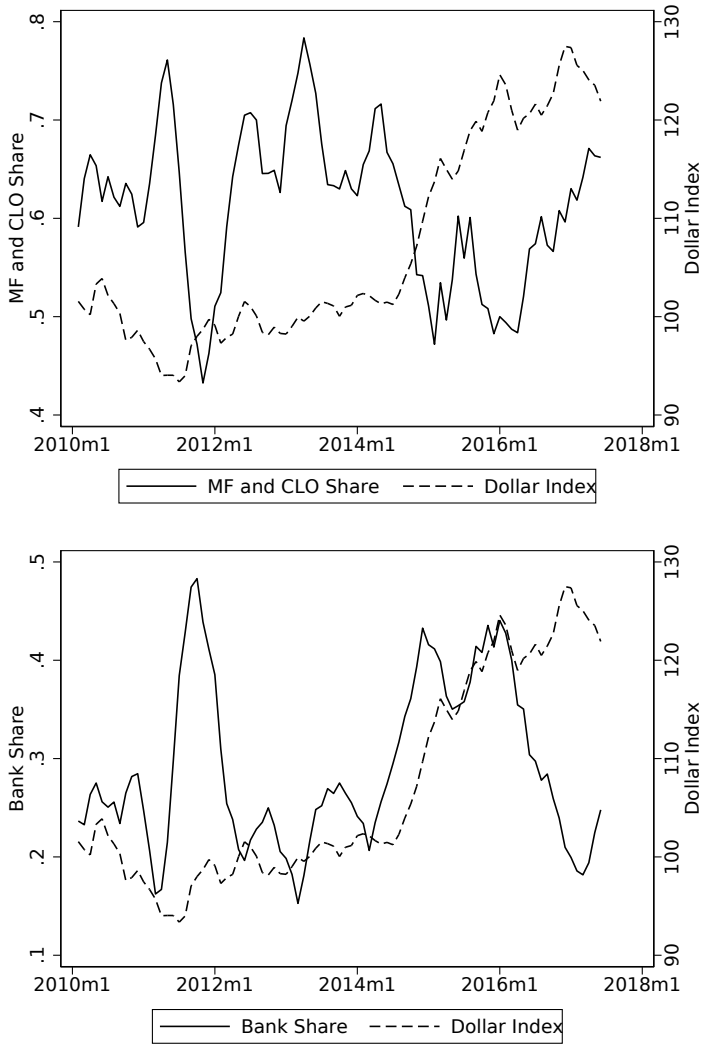
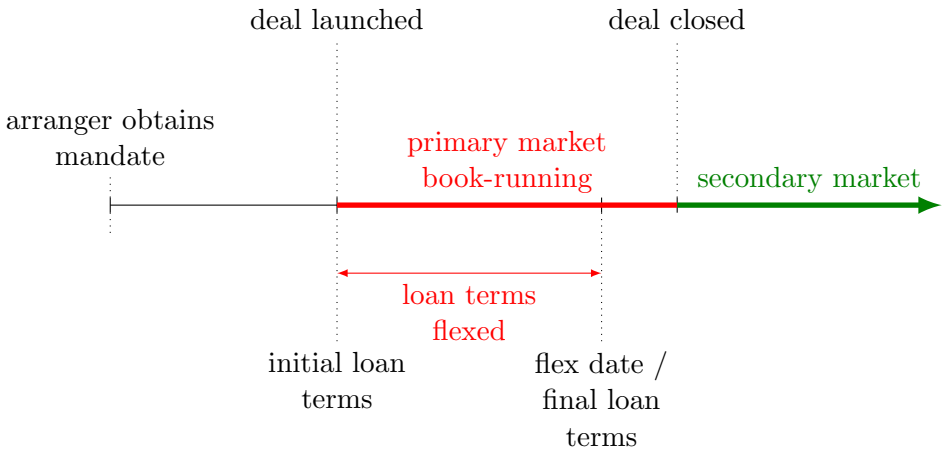
Figure 1: New Syndicate Composition and Dollar Index



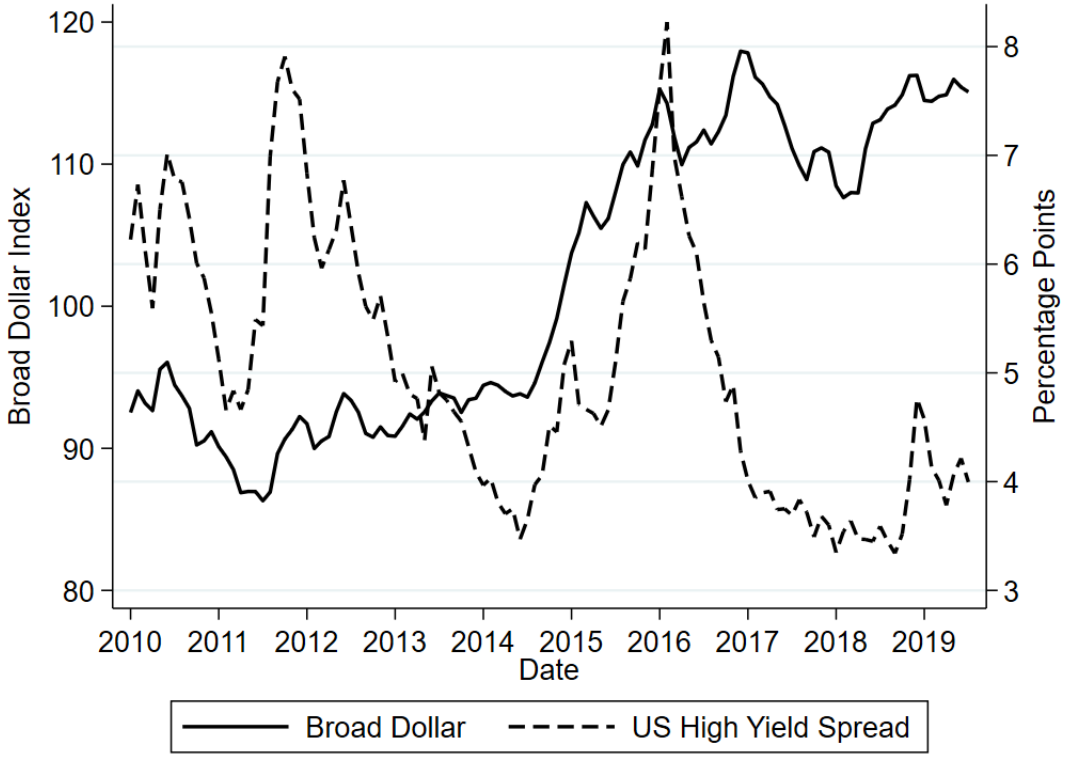
Note: The upper panel figure shows the broad dollar index and the aggregate CLO and mutual fund share in new loan syndicates in the Shared National Credit Program (SNC). The lower panel figure shows the broad dollar index and the aggregate bank share in new loan syndicates. The shares reflect the syndicate composition of new loans originated within the reporting quarter. We drop loans originated within 14 days of the reporting date as they are typically not distributed at the reporting day. Shares series are smoothed over 4 quarters. The correlation of the series with the dollar index is -0.63 (nonbank share) and 0.38 (bank share).

Figure 2: Syndication timeline



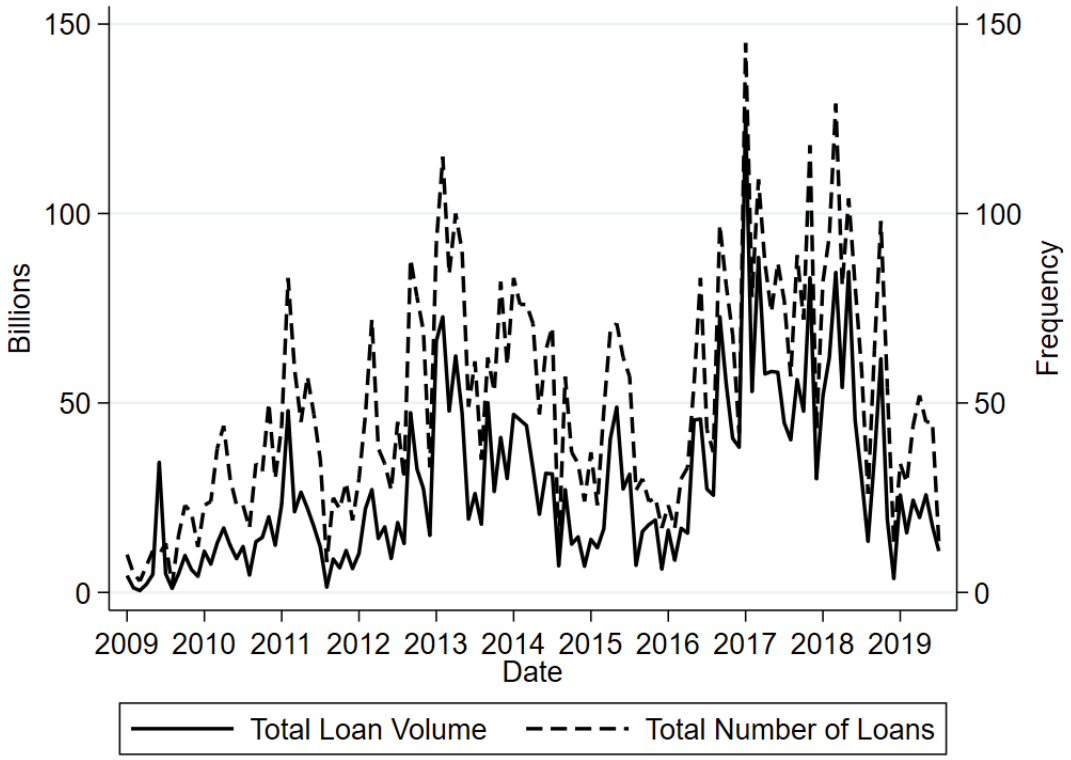
Timeline for the leveraged term loan syndication process based on Bruche, Malherbe, and Meisenzahl (2020).

Figure 3: High Yield Spread and the Dollar Index



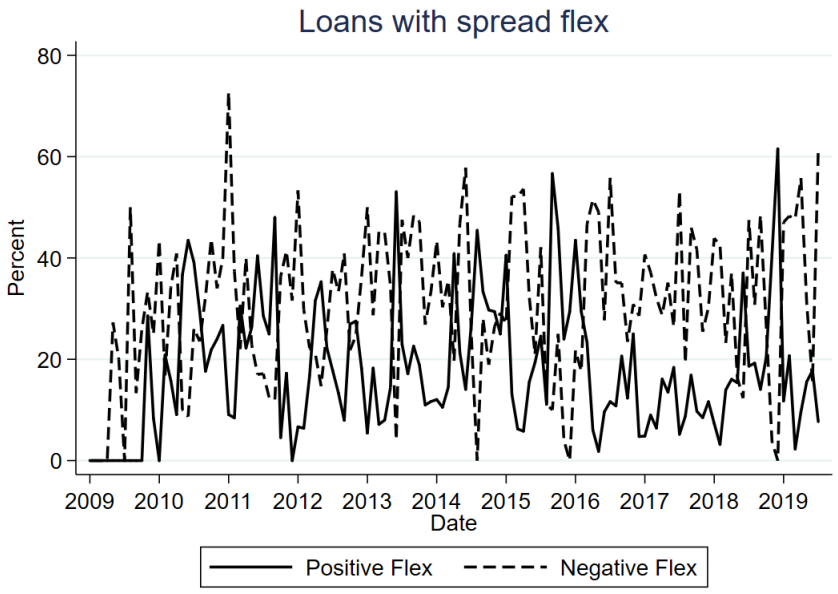
Note: The figure shows the broad dollar index and the US high yield spread from 2009 to 2019. The high yield spread is the Master II Option-Adjusted Spread from FRED.

Figure 4: Total Number of Loans and Loan Amounts



Note: The figure shows the total loan volume and the total number of loans on a monthly basis, from 2009 to 2019. The total loan volume is represented in USD billions, and the total number of loans is a simple frequency count. The figure uses US-borrowers only. Sources: S&P Capital IQ Leveraged Loan Commentary Data (LCD) and Dealscan.

Figure 5: Share of Loans with Interest Rate Spread Flexes



Note: This figure shows the share of total loans that have a positive or negative interest rate spread flex, on a monthly basis from 2009 to 2019. The figure uses US-borrowers only. Sources: LCD and Dealscan.

Table 1: Summary Statistics

	Mean	S.D.	Min.	25th	Median	75th	Max.
Effective Spread Flex (bsp)	2.248	37.582	-183.333	-4.167	0.000	0.000	341.667
Δ Broad Dollar	0.088	0.905	-3.842	-0.476	0.048	0.606	4.972
Underpricing	-20.764	41.113	-102.500	0.250	0.500	0.875	4.500
Talk Amount (log)	5.790	1.061	0.191	5.166	5.828	6.492	10.404
Talk Spread (log)	5.991	0.304	5.165	5.784	5.991	6.163	7.313
Maturity (log)	1.738	0.312	-2.303	1.649	1.792	1.946	2.303
Amount Flex Weighted (usd mil)	0.024	0.187	-3.000	0.000	0.000	0.000	3.533
Δ VIX (log)	0.007	0.177	-0.708	-0.095	-0.008	0.090	1.180
Δ US Libor	0.009	0.036	-0.191	-0.003	0.001	0.014	0.490
Δ 2-Year Treasury	0.004	0.073	-0.391	-0.033	0.004	0.045	0.384
Δ US Term Spread	0.005	0.093	-0.458	-0.042	0.012	0.059	0.640
Δ 1-Year Treasury Basis	0.097	5.186	-35.126	-2.720	-0.018	2.615	37.638
Δ Economic Conditions Index	0.017	0.127	-1.136	-0.062	0.005	0.085	0.884
Import Intensity	0.103	0.176	0.000	0.000	0.013	0.154	0.928
Export Intensity	0.070	0.119	0.000	0.000	0.005	0.117	0.486
T1 Cap Ratio	14.864	5.602	0.000	12.167	13.737	15.825	46.895
Retail Dep. Ratio	0.360	0.211	0.000	0.144	0.421	0.525	0.753
Liqu. Ass. Ratio	0.204	0.079	0.026	0.152	0.211	0.260	0.487
LHS Share	0.026	0.040	0.000	0.004	0.011	0.031	0.337
Noninterest Inc. Ratio	2.488	2.258	0.250	0.957	1.110	4.384	6.903
Trading Rev. Share	0.114	0.101	0.000	0.035	0.088	0.125	0.501
Net Charge-off to Loans	0.007	0.008	0.000	0.001	0.005	0.011	0.063
Foreign Lead Agent Parent	0.418	0.493	0.000	0.000	0.000	1.000	1.000
ECB FX Suprise	-4.679	38.915	-181.587	0.000	0.000	0.000	252.701
Fed FX Surprise	-0.303	28.667	-176.847	0.000	0.000	0.000	150.855
Observations	5802						

Note: This table shows the summary statistic for the baseline regression sample that only includes loans to US borrowers with flex dates.

Table 2: Dollar and Effective Spread Flex

	(1)	(2)	(3)
Δ Broad Dollar	2.427***	2.576***	2.415***
	(0.612)	(0.619)	(0.621)
Talk Amount(log)		1.345***	0.941*
		(0.477)	(0.558)
Talk Spread (log)		14.86***	12.75***
		(2.294)	(2.585)
Years to Maturity (log)		-1.292	-8.068***
		(1.752)	(2.630)
Sponsored		0.392	0.839
		(1.189)	(1.301)
Rated		4.408**	2.576
		(2.064)	(2.545)
Cov-Lite		-4.868***	-4.375***
		(1.103)	(1.206)
Middle Market		8.131***	9.150***
		(1.897)	(2.149)
Industry	No	No	Yes
Purpose	No	No	Yes
Lead Agent	No	No	Yes
Observations	5802	5679	5622
R^2	0.003	0.032	0.064

Note: This table shows the effect of the change in the broad dollar index on the effective spread flex of loans to U.S. borrowers. The dollar change is calculated as change over the first 12 days after the launch date. The dependent variable is the effective spread flex in basis points, calculated as the spread flex plus OID flex divided by four. All loan controls are taken from LCD and described in Appendix A. The sample period jis from 2009 to 2019. Robust standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level.

Table 3: The Role of Borrowers' Trade Exposures

	(1) Baseline	(2) No Trade	(3) Posit. Trade
Δ Broad Dollar	2.319***	1.720*	2.620***
	(0.641)	(0.944)	(0.881)
Loan Controls	Yes	Yes	Yes
Industry	Yes	Yes	Yes
Purpose	Yes	Yes	Yes
Lead Agent	Yes	Yes	Yes
Observations	5360	2296	3053
R^2	0.065	0.074	0.089

Note: This table shows the effect of the change in the broad dollar index on the effective spread flex by trade exposure of U.S. borrowers. The dependent variable is the effective spread flex in basis points, calculated as the spread flex plus OID Flex divided by four. The dollar change is calculated as change over the first 12 days after the launch date. Loan controls are taken from LCD. All variables are described in Appendix A. The sample period is from 2009 to 2019. Robust standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level.

Table 4: Macroeconomic Controls

	(1)	(2)	(3)	(4)
Δ Broad Dollar	3.754***	3.861***	3.715***	2.038***
	(0.728)	(0.730)	(0.739)	(0.771)
Δ VIX (log)	-9.135***	-9.057***	-11.45***	-9.814***
	(2.991)	(2.981)	(3.135)	(3.067)
Δ US Term Spread	16.09**	15.06*	15.98**	10.09
	(7.814)	(7.934)	(8.052)	(8.086)
Δ Economic Conditions Index		-7.998	-7.482	3.734
		(5.855)	(5.839)	(6.611)
Δ US Libor	50.33***	49.93***	32.38	27.80
	(17.44)	(17.47)	(20.65)	(28.05)
Δ 2-Year Treasury	-15.59	-16.90*	-24.97**	-12.05
	(9.847)	(9.874)	(10.33)	(10.03)
Loan Controls	Yes	Yes	Yes	Yes
Industry	No	No	No	Yes
Purpose	No	No	Yes	Yes
Lead Agent	No	No	Yes	Yes
Industry-Year	No	No	Yes	No
Year-Quarter	No	No	No	Yes
Observations	5679	5679	5598	5622
R^2	0.041	0.042	0.133	0.107

Note: This table shows the effect of the change in the broad dollar index on the effective spread flex of loans to U.S. borrowers, using macroeconomic variables as controls. The dependent variable is the effective spread flex in basis points, calculated as the spread flex plus OID flex divided by four. Loan controls are taken from LCD. All variables are described in Appendix A. The sample period is from 2009 to 2019. Robust standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level.

Table 5: The Role of Lead Agent Characteristics

	(1) Ret. Deposit	(2) Liquid Asset	(3) Nonint. Income	(4) LHS Share	(5) Trading Rev.	(6) Net Charge-off	(7) Tier 1 Ratio	(8) Foreign Lead	(9) Foreign Lead
Δ Dollar X Bank Characteristic	-1.262	-4.863	0.0124	-13.03	2.988	58.92	0.0682	0.582	0.351
	(3.577)	(9.204)	(0.349)	(19.27)	(7.146)	(122.0)	(0.163)	(1.680)	(1.637)
Δ Broad Dollar	3.849**	4.439**	3.360**	3.733***	3.093**	2.931***	2.417	3.429***	3.334***
	(1.548)	(1.947)	(1.362)	(1.110)	(1.268)	(1.068)	(2.728)	(0.896)	(0.883)
Retail Dep. Ratio	13.55								
	(10.33)								
Liqu. Ass. Ratio		40.78**							
		(20.33)							
Noninterest Inc. Ratio			2.015**						
			(0.844)						
LHS Share				-28.77					
				(27.52)					
Trading Rev. Share					24.26				
					(23.80)				
Net Charge-off to Loans						-475.5***			
						(141.6)			
T1 Cap Ratio							0.205		
							(0.178)		
Foreign Lead Agent Parent								-1.220	
								(1.124)	
Loan Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Purpose	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Lead Agent	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Observations	3567	3595	3595	3595	3595	3595	3595	5044	5043
R^2	0.075	0.076	0.076	0.074	0.074	0.078	0.075	0.034	0.064

Note: This table shows that the effect of dollar movements on loan prices does not depend on lead agent characteristics. The regressions shown are parallel to that in column 4 of table 2. The dependent variable is the effective spread flex in basis points, calculated as the spread flex plus OID Flex divided by four. The dollar change is calculated as the change in the broad dollar index between launch date and flex date. Loan controls are described in Appendix A. The sample period is from 2009 to 2019. Standard errors are clustered by lead agent X year-quarter and are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level.

Table 6: Instrumental Variable Estimation

			All ECB Shocks		ECB MP Shocks		ECB Inf. Shocks	
	(1) OLS	(2) First	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV
Δ Broad Dollar	3.542***		9.558***	30.20***	8.565*	42.97**	10.12**	13.84*
	(0.732)		(3.387)	(9.699)	(4.934)	(20.87)	(4.334)	(8.365)
ECB FX Surprise		-0.431***						
		(0.0295)						
ECB 3m Surprise				-1.450*		-3.521*		-0.954
				(0.762)		(1.905)		(0.873)
ECB 2y Surprise				2.375***		4.415**		0.562
				(0.818)		(1.793)		(0.948)
ECB 10y Surprise				0.0796		-0.572		0.134
				(0.378)		(0.808)		(0.376)
Fed FX Surprise		0.00675***	0.0290	-0.122*	0.0362	-0.223	0.0248	-0.00178
		(0.000466)	(0.0317)	(0.0733)	(0.0400)	(0.157)	(0.0392)	(0.0622)
Talk Amount(log)	1.017*	0.00231	0.986*	1.021	0.992*	0.804	0.982*	1.009*
	(0.559)	(0.0130)	(0.562)	(0.655)	(0.559)	(0.764)	(0.567)	(0.576)
Talk Spread (log)	13.74***	-0.000427	13.71***	13.90***	13.73***	13.88***	13.70***	13.61***
	(2.607)	(0.0487)	(2.616)	(2.900)	(2.608)	(3.234)	(2.626)	(2.651)
Years to Maturity (log)	-8.094***	0.0904	-8.751***	-10.82***	-8.675***	-10.92***	-8.794***	-9.153***
	(2.645)	(0.0572)	(2.768)	(3.391)	(2.792)	(4.075)	(2.748)	(2.989)
Sponsored	0.995	0.00338	0.905	0.691	0.911	0.238	0.902	0.958
	(1.299)	(0.0282)	(1.315)	(1.523)	(1.311)	(1.769)	(1.317)	(1.340)
Rated	2.508	0.0519	2.180	0.836	2.221	0.534	2.156	1.937
	(2.559)	(0.0483)	(2.605)	(2.924)	(2.599)	(3.334)	(2.615)	(2.669)
Cov-Lite	-4.534***	0.0000855	-4.561***	-4.186***	-4.558***	-4.032**	-4.563***	-4.566***
	(1.201)	(0.0255)	(1.207)	(1.374)	(1.204)	(1.570)	(1.209)	(1.228)
Middle Market	8.989***	0.0471	8.693***	7.581***	8.724***	7.148**	8.675***	8.506***
	(2.137)	(0.0396)	(2.152)	(2.483)	(2.150)	(2.840)	(2.157)	(2.226)
Δ VIX (log)	-9.450***	1.254***	-17.59***	-42.70***	-16.43**	-56.60**	-18.25***	-23.05**
	(2.988)	(0.0698)	(4.949)	(12.18)	(6.515)	(24.89)	(5.820)	(10.45)
Δ 2-Year Treasury	-17.26*	1.812***	-36.41***	-71.53***	-34.69***	-89.31**	-37.39***	-44.97**
	(9.979)	(0.227)	(11.57)	(19.85)	(13.07)	(36.49)	(12.56)	(18.47)
Δ US Term Spread	16.54**	0.894***	12.84	1.025	13.80	-12.26	12.29	9.551
	(7.648)	(0.155)	(7.878)	(10.14)	(8.525)	(18.82)	(8.440)	(10.10)
Δ US Libor	52.58***	1.636***	45.92**	12.97	47.36**	6.666	45.09**	38.36*
	(17.36)	(0.393)	(18.49)	(26.88)	(19.16)	(36.83)	(18.94)	(23.04)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Purpose	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lead Agent	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5622	5622	5622	5622	5622	5622	5622	5622
R^2	0.073	0.189	0.018	-0.305	0.024	-0.712	0.014	-0.018

Note: This table shows the effect of dollar movements on loan prices in an instrument variable setting. The OLS regressions shown are parallel to that in column 4 of table 2. The dependent variable is the effective spread flex in basis points, calculated as the spread flex plus OID Flex divided by four. The dollar change is calculated as the change in the broad dollar index between launch date and flex date. The instrument is changes in the dollar around ECB monetary policy announcement. Columns (3) and (4) use all ECB shocks, columns (5) and (6) use only ECB monetary policy shocks, and columns (7) and (8) use only ECB information shocks, based on Jarociński and Karadi (2020). Loan controls are described in Appendix A. The sample period is from 2009 to 2019. Robust standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level.

Table 7: CIP deviations, Treasury Basis, and Safe-Haven Currency

	(1)	(2)	(3)	(4)	(5)	(6)
Δ Broad Dollar	2.686***	1.825**	2.971***	2.694***	2.162***	2.574***
	(0.817)	(0.749)	(0.806)	(0.817)	(0.754)	(0.789)
Δ Broad CIP		-1.442**			-1.938***	-2.012***
		(0.574)			(0.603)	(0.610)
Δ 1-Year Treasury Basis			-0.164		-0.365***	-0.423***
			(0.130)		(0.130)	(0.129)
Δ Broad Yen				0.187	0.0311	-0.254
				(0.480)	(0.486)	(0.586)
Talk Amount(log)	1.142*	1.133*	1.128*	1.149*	1.102*	1.208*
	(0.625)	(0.624)	(0.625)	(0.624)	(0.622)	(0.625)
Talk Spread (log)	13.09***	12.98***	13.03***	13.08***	12.81***	13.90***
	(2.903)	(2.901)	(2.903)	(2.904)	(2.901)	(2.968)
Years to Maturity (log)	-8.668***	-8.673***	-8.677***	-8.698***	-8.697***	-8.867***
	(2.901)	(2.921)	(2.900)	(2.895)	(2.917)	(2.925)
Sponsored	1.176	1.215	1.191	1.195	1.266	1.516
	(1.404)	(1.402)	(1.403)	(1.409)	(1.406)	(1.409)
Rated	2.148	2.281	2.133	2.179	2.300	2.188
	(2.788)	(2.787)	(2.786)	(2.799)	(2.794)	(2.802)
Cov-Lite	-4.798***	-4.700***	-4.839***	-4.804***	-4.758***	-5.162***
	(1.274)	(1.273)	(1.275)	(1.275)	(1.274)	(1.284)
Middle Market	10.87***	10.80***	10.88***	10.87***	10.78***	10.88***
	(2.238)	(2.241)	(2.236)	(2.239)	(2.237)	(2.225)
Δ VIX (log)						-9.438***
						(3.249)
Δ US Term Spread						10.83
						(8.452)
Δ Economic Conditions Index						-11.03*
						(6.125)
Δ US Libor						61.58***
						(21.26)
Δ 2-Year Treasury						-14.84
						(13.11)
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Purpose	Yes	Yes	Yes	Yes	Yes	Yes
Lead Agent	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4886	4886	4886	4886	4886	4886
R^2	0.074	0.077	0.075	0.074	0.078	0.084

Note: This table shows the effect of the change in the broad dollar index on the effective spread flex when the regression controls for changes in CIP deviations and changes in safe asset demand. Changes in CIP deviations are computed as changes in the five-year dollar Libor cross-currency basis against G10 currencies from Avdjiev et al. (2019). Changes in safe asset demand are proxied by changes in the 1-year treasury basis from Du, Im, and Schreger (2018). Changes in the Board Yen are the changes in the BIS Board Yen index. The effective spread flex is in basis points, calculated as the spread flex plus OID Flex divided by four. The change in the broad dollar index is calculated as the change from launch date to flex date. All loan controls are taken from LCD and are described in Appendix A. The sample period is from 2009 to 2019. Robust standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level.

Table 8: Heterogeneity of Loan Purpose

	All Loans	Underwritten	Not Underwritten
	(1)	(2)	(3)
Δ Broad Dollar	2.415***	3.587***	0.478
	(0.621)	(1.020)	(0.756)
Talk Amount(log)	0.941*	1.232	0.685
	(0.558)	(1.037)	(0.561)
Talk Spread (log)	12.75***	21.68***	6.478*
	(2.585)	(4.487)	(3.397)
Years to Maturity (log)	-8.068***	-13.05**	-2.867
	(2.630)	(5.625)	(2.274)
Sponsored	0.839	1.796	0.839
	(1.301)	(2.750)	(1.457)
Rated	2.576	7.521*	-4.219
	(2.545)	(3.981)	(3.820)
Cov-Lite	-4.375***	-6.894***	-1.815
	(1.206)	(2.337)	(1.334)
Middle Market	9.150***	10.11***	4.746
	(2.149)	(3.238)	(3.242)
Industry	Yes	Yes	Yes
Purpose	Yes	Yes	Yes
Lead Agent	Yes	Yes	Yes
Observations	5622	2573	2405
R^2	0.064	0.098	0.058

Note: This table shows the effect of the change in the broad dollar index on the effective spread flex of loans to U.S. borrowers. The dollar change is calculated as change over the first 12 days after the launch date. Column 2 includes only loans that are underwritten. Column 3 includes only refinancing loans. The dependent variable is the effective spread flex in basis points, calculated as the spread flex plus OID flex divided by four. All loan controls are taken from LCD and described in Appendix A. The sample period jis from 2009 to 2019. Robust standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level.

Table 9: Appreciations vs. Depreciations

	All Loans			Excl. 2011/12	Underwritten
	(1)	(2)	(3)	(4)	(5)
Δ Broad Dollar > 0 (Launch to Flex)	9.304***	9.837***	10.30***	8.621***	10.78***
	(1.491)	(1.511)	(1.582)	(1.572)	(2.716)
Δ Broad Dollar < 0 (Launch to Flex)	-3.024*	-3.608**	-3.715**	-2.428	-2.181
	(1.647)	(1.647)	(1.723)	(1.755)	(2.873)
Industry	No	Yes	No	No	No
Purpose	No	Yes	Yes	Yes	Yes
Lead Agent	No	Yes	Yes	Yes	Yes
Industry-Year	No	No	Yes	Yes	Yes
Observations	5212	5161	5131	4251	2273
R^2	0.038	0.070	0.133	0.130	0.203

Note: This table shows the effect of dollar appreciation and dollar depreciation separately on various flex variables. The effective spread flex is in basis points, calculated as the spread flex plus OID Flex divided by four. The change in the broad dollar index is calculated as the change from launch date to flex date. All loan controls are taken from LCD and are described in Appendix A. The sample period is from 2009 to 2019. Robust standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level.

Internet Appendix

A Data

The appendix provides the definitions of all variables used in the empirical analysis and presents additional data summary statistics.

Table A1 gives detailed variables definitions and sources for each variable used in our analysis.

Figure A1 shows the ratings distribution of the loans in our sample.

Figure A2 shows the time series of the changes in the dollar and changes in US high-yield spreads.

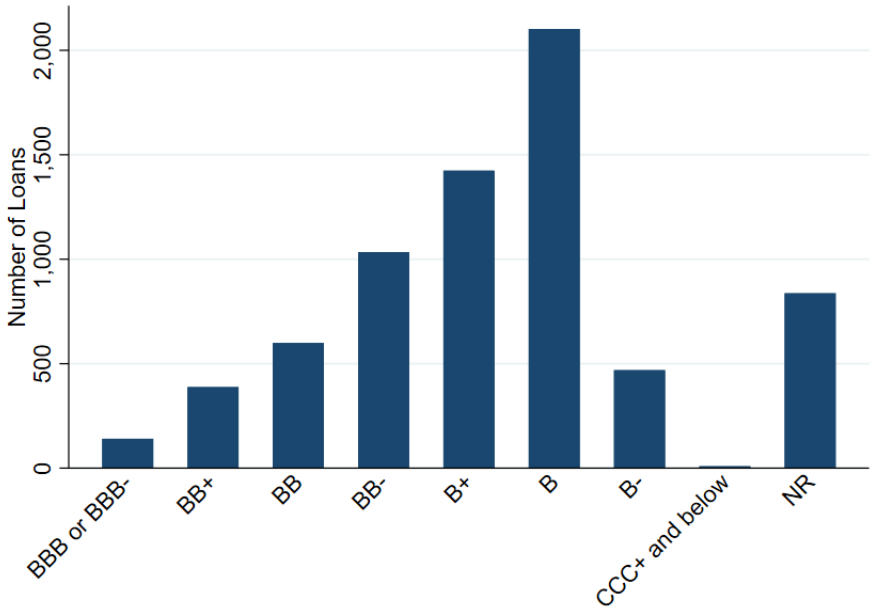


Figure A1: Loan Rating Distribution

Note: This figure shows the total number of loans for each ratings bucket in the sample 2009 to 2019. Sources: S&P Capital IQ Leveraged Loan Commentary Data (LCD) and Dealscan.

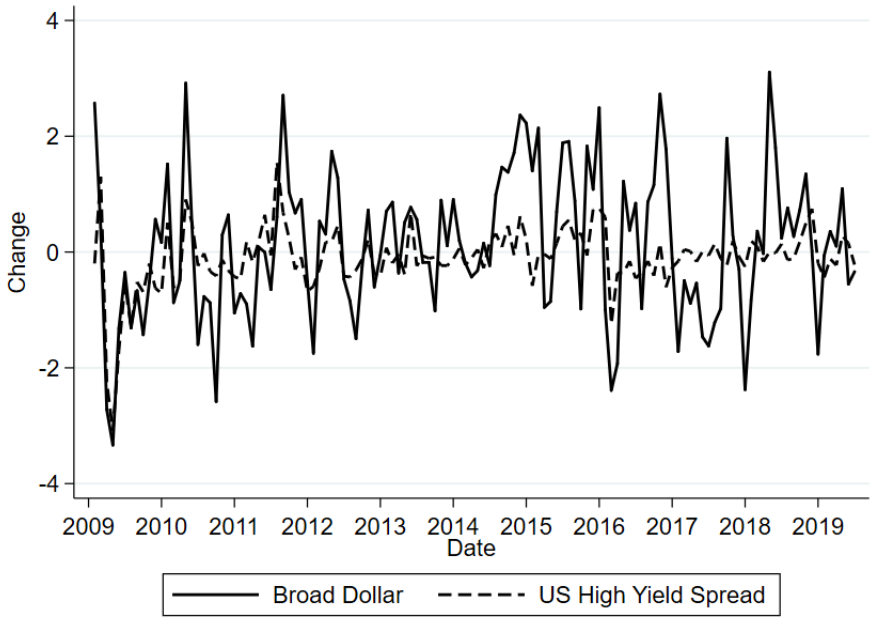


Figure A2: Changes in High Yield and Dollar Indexes

Note: This figure shows the change in broad dollar index and US high yield spread from 2009 to 2019. The correlation coefficient is 0.5. The high yield spread is the Master II Option-Adjusted Spread from FRED.

Table A1: Variable Description

Variable Name	**Description**	**Source**
Effective Spread Flex	Equal to Spread Flex plus OID Flex divided by four	S&P LCD
Flex Date	Date flex occurred	
Industry	A categorical variable indicating the industry of the borrower	
Issuer Name	Name of borrower	
Launch Date	Date the deal came to market	
Lead Agent	The administrative agent on the deal	
Maturity	Length of loan in years	
Middle Market	A binary variable indicating whether the issuer is a middle market borrower	
OID Flex	The amount in basis points that the OID has changed since talk	
Purpose	A categorical variable indicating the purpose of the loan	
Rating	Company rating determined by Standard and Poor	
Sponsored	A binary variable indicating whether the deal is sponsored	
Spread Flex	The amount in basis points that the spread has changed since talk	
Talk Amount	Initial deal size discussed, in millions USD	
Talk Spread	Initial spread discussed	
Company	Name of borrower	LSTA
Country	Country of borrower	
Broad Dollar Index	Trade-weighted dollar index	Federal Reserve Board
US High Yield Spread	Master II Option-Adjusted	
US Term Spread	10-Year Treasury Yield minus 2-Year Treasury Yield	
US 2-Year Treasury Yield	Yield on US Treasury 2-Year Bonds	
VIX	Volatility Index	
U.S. Libor	3-month U.S. Libor	
Treasury Basis	1-Year Treasury Basis	Du, Im, and Schreger (2018)
CIP Deviation	Average five-year Libor cross-currency basis against G10 currencies	Avdjiev et al. (2019)
Economic Conditions Index	Aruoba-Diebold-Scotti Business Conditions Index	Aruoba, Diebold, and Scotti (2009)
Broad Yen	Trade-weighted Yen index	Bank for International Settlements
Import Intensity	Constructed as imports/(production+imports- exports)	BEA, U.S. Census Bureau
Export Intensity	Constructed as exports/(production+imports- exports)	
T1 Capital Ratio	Tier1 capital ratio	FR Y-9c Data
Retail Deposit Ratio	Total deposits minus wholesale deposits defined as (brokered deposits+large time deposits+fed funds purchased+repos+other borrowed money) divided by total assets	
Liquid Asset Ratio	Sum of non-interest bearing balances, interest bearing balances, available-for-sale securities, and securities held to maturity divided by total assets	
Noninterest Inc. Ratio	Non-interest income divided by net interest income	
LHS Share	Share of loans held for sale in total loans and lease financing receivables	
Trading Rev. Share	Absolute trading revenues divided by the sum of non-interest income and interest income	
Net Charge-off to Loans	Charge-offs plus recoveries divided by total loans	
Foreign Bank	Dummy variable equal to 1 if lead agent has a foreign parent	
ECB FX surpise	Changes in dollar-euro exchange rate around EBC monetary policy announcements	Ferrari, Kearns, and Schrimpf (2017)
Fed FX surprise	Changes in dollar-euro exchange rate around Fed monetary policy announcements	

B Robustness Tests

U.S. vs Non-U.S. Borrowers

Below, we study whether the effect of movements in the dollar index differ for U.S. and non-U.S. corporate borrowers. Non-U.S. corporate borrowers' ability to repay U.S. dollar denominated loans may decrease if most of the revenues are in local currency, directly linking credit risk and dollar movements.[41] That said, if the effects of dollar movements on borrowing cost for U.S. and non-U.S. corporations are similar, this would suggest that movements in the dollar index reflect changes in global risk appetite and the global demand for risky assets that are transmitted to borrowers through higher spreads.

Table B1 shows the results of estimating equation 1 separately for U.S. and non-U.S. borrowers. Comparing the results for U.S. corporations without and with macroeconomic controls (columns 1 and 2) to the corresponding results for non-U.S. corporations (columns 3 and 4) shows that the effects are sizable and statistically significant. The effects of dollar movements on spreads for non-U.S. corporations are somewhat larger than for U.S. corporations, potentially reflecting the fact that the loans are denominated in U.S. dollars exposing non-U.S. borrowers to exchange rate risk. However, the differences in the dollar coefficient between U.S. and non-U.S. borrowers are not statistically significant (columns 5 and 6).

[41] It is common, however, that loan agreements mandate corporation hedge exchange rate risk, partially alleviating this concern.

Table B1: U.S. vs Non-U.S. Borrowers

	U.S. Borrowers		Non-U.S. Borrowers		Both	
	(1)	(2)	(3)	(4)	(5)	(6)
	FE	Macro Var	FE	Macro Var	FE	Macro Var
Δ Broad Dollar	4.208***	4.752***	9.070**	9.973***	4.237***	4.961***
	(1.103)	(1.137)	(3.607)	(3.500)	(1.104)	(1.132)
Talk Amount(log)	1.200	1.303	-2.880	-3.399	0.611	0.692
	(1.041)	(1.039)	(3.066)	(3.134)	(0.974)	(0.974)
Talk Spread (log)	22.20***	21.54***	34.78**	28.27*	22.81***	21.99***
	(4.475)	(4.485)	(15.55)	(15.52)	(4.316)	(4.325)
Years to Maturity (log)	-13.34**	-13.63**	11.62	19.98	-10.71**	-10.96**
	(5.642)	(5.621)	(16.50)	(16.77)	(5.224)	(5.201)
Sponsored	1.711	2.170	-11.17	-11.60	1.101	1.510
	(2.739)	(2.736)	(8.973)	(8.961)	(2.583)	(2.574)
Rated	7.213*	7.150*	3.124	3.492	8.885**	8.676**
	(3.987)	(4.017)	(12.50)	(12.50)	(3.863)	(3.888)
Cov-Lite	-6.887***	-7.018***	-3.097	-2.479	-7.123***	-7.153***
	(2.331)	(2.321)	(7.717)	(7.688)	(2.212)	(2.197)
Middle Market	9.906***	9.716***	9.091	11.99	9.222***	9.145***
	(3.237)	(3.239)	(14.30)	(14.32)	(3.148)	(3.142)
Δ VIX (log)		-14.32***		-11.17		-15.36***
		(5.080)		(15.34)		(4.765)
Δ US Term Spread		16.55		9.474		14.04
		(12.80)		(39.72)		(12.08)
Δ Economic Conditions Index		-16.92*		-50.57*		-19.79**
		(9.245)		(26.86)		(8.758)
Δ US Libor		55.76**		-62.73		51.06**
		(26.54)		(71.13)		(25.02)
Δ 2-Year Treasury		-28.27*		-59.95		-31.84**
		(16.20)		(54.46)		(15.45)
Δ Dollar X Foreign Borrower					2.314	2.188
					(3.403)	(3.319)
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Purpose	Yes	Yes	Yes	Yes	Yes	Yes
Lead Agent	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2573	2573	280	280	2859	2859
R^2	0.101	0.109	0.353	0.379	0.096	0.105

Note: This table tests whether the effect of dollar movements on the effective spread flex differs by borrower region. Column 1 and 2 are based on a sample with U.S. borrowers. Columns 3 and 4 only include non-U.S. borrowers. Regressions in columns 5 and 6 are based on a sample with both types of borrowers but include a dummy variable that takes the value of 1 for non-U.S. borrowers. The dependent variable is the effective spread flex in basis points, calculated as the spread flex plus OID flex divided by four. This table only includes underwritten loans. Control variables are described in Appendix A. The sample period is from 2009 to 2019. Robust standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level.

Table B2: Controlling for risk aversion and economic uncertainty from Bekaert, Engstrom, and Xu (2019)

	(1)	(2)	(3)	(4)
Δ Broad Dollar	2.947**	3.130**	3.569***	4.180***
	(1.185)	(1.272)	(1.227)	(1.308)
Δ Broad CIP	-1.566*	-1.646*	-1.790**	-1.722**
	(0.846)	(0.848)	(0.836)	(0.844)
Δ 1-Year Treasury Basis	-0.561**	-0.618***	-0.466**	-0.537**
	(0.229)	(0.226)	(0.228)	(0.224)
Δ Uncertainty Index	9.536	6.727		
	(11.08)	(13.50)		
Δ Risk Aversion Index			-8.094**	-10.71**
			(4.072)	(4.308)
Talk Amount(log)	1.761	1.907	1.625	1.801
	(1.184)	(1.185)	(1.177)	(1.178)
Talk Spread (log)	22.44***	22.03***	21.76***	21.44***
	(5.030)	(5.059)	(5.043)	(5.061)
Years to Maturity (log)	-14.43**	-15.26**	-14.36**	-15.44**
	(6.330)	(6.230)	(6.364)	(6.300)
Sponsored	3.206	3.262	3.243	3.476
	(3.089)	(3.100)	(3.095)	(3.109)
Rated	6.243	6.075	6.079	6.139
	(4.487)	(4.504)	(4.473)	(4.502)
Cov-Lite	-7.927***	-8.172***	-7.868***	-8.067***
	(2.523)	(2.519)	(2.523)	(2.510)
Middle Market	12.11***	12.69***	12.46***	12.85***
	(3.400)	(3.421)	(3.419)	(3.434)
Δ Economic Conditions Index		-22.30**		-22.18**
		(9.632)		(9.621)
Δ US Libor		54.59		67.61**
		(34.44)		(33.23)
Δ 2-Year Treasury		-4.940		-26.21
		(22.92)		(20.80)
Industry	Yes	Yes	Yes	Yes
Purpose	Yes	Yes	Yes	Yes
Lead Agent	Yes	Yes	Yes	Yes
Observations	2136	2136	2136	2136
R^2	0.119	0.125	0.121	0.127

Note: This table controls for risk aversion (columns 1 to 3) and uncertainty (columns 4 to 6) indices from Bekaert, Engstrom, and Xu (2019). The dependent variable is the Effective Spread Flex in basis points, calculated as the Spread Flex plus OID Flex divided by four. This table only includes underwritten loans. Robust standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level.

Table B3: Instrumental Variable Estimation, controlling for Secondary Market Price Index

			All ECB Shocks		ECB MP Shocks		ECB Inf. Shocks	
	(1) OLS	(2) First	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV
Δ Broad Dollar	2.997***		9.791***	27.41***	8.826*	49.13*	10.40**	12.61**
	(0.727)		(3.207)	(7.935)	(4.548)	(25.51)	(4.267)	(6.036)
Δ Second. Mark. Prices	-0.220**	-0.0237***	-0.0441	0.359*	-0.0659	0.881	-0.0303	0.0355
	(0.0862)	(0.00158)	(0.109)	(0.207)	(0.131)	(0.611)	(0.127)	(0.161)
ECB FX Surprise		-0.460***						
		(0.0272)						
ECB 3m Surprise				-1.487**		-3.529*		-1.239
				(0.736)		(1.958)		(1.005)
ECB 2y Surprise				2.080***		4.612**		0.368
				(0.664)		(1.967)		(0.717)
ECB 10y Surprise				0.184		0.0660		0.142
				(0.399)		(1.087)		(0.403)
Fed FX Surprise		0.00570***	0.0288	-0.0830	0.0349	-0.228	0.0249	0.0112
		(0.000445)	(0.0294)	(0.0543)	(0.0348)	(0.166)	(0.0359)	(0.0435)
Talk Amount(log)	0.999*	0.00310	0.960*	0.964	0.967*	0.688	0.955*	0.977*
	(0.565)	(0.0127)	(0.570)	(0.642)	(0.566)	(0.828)	(0.575)	(0.581)
Talk Spread (log)	14.55***	0.0624	14.04***	13.17***	14.11***	11.86***	13.99***	13.72***
	(2.636)	(0.0474)	(2.635)	(2.854)	(2.631)	(3.658)	(2.669)	(2.700)
Years to Maturity (log)	-8.690***	0.0643	-9.229***	-10.39***	-9.179***	-10.86**	-9.262***	-9.389***
	(2.784)	(0.0573)	(2.904)	(3.335)	(2.909)	(4.345)	(2.894)	(2.965)
Sponsored	0.760	-0.00850	0.742	0.776	0.737	0.434	0.746	0.830
	(1.309)	(0.0272)	(1.323)	(1.480)	(1.319)	(1.844)	(1.327)	(1.342)
Rated	2.385	0.0601	1.964	0.654	2.010	-0.214	1.935	1.751
	(2.614)	(0.0461)	(2.656)	(2.868)	(2.652)	(3.576)	(2.667)	(2.684)
Cov-Lite	-4.522***	-0.00689	-4.504***	-4.044***	-4.507***	-3.623**	-4.502***	-4.479***
	(1.201)	(0.0247)	(1.211)	(1.348)	(1.208)	(1.717)	(1.212)	(1.225)
Middle Market	8.646***	0.0192	8.546***	8.002***	8.549***	7.883***	8.544***	8.492***
	(2.151)	(0.0379)	(2.166)	(2.371)	(2.162)	(2.802)	(2.169)	(2.194)
Δ VIX (log)	-11.65***	0.967***	-18.50***	-35.09***	-17.65***	-53.39**	-19.05***	-21.37***
	(3.038)	(0.0694)	(4.201)	(8.054)	(5.108)	(23.24)	(4.847)	(6.413)
Δ 2-Year Treasury	-9.212	2.739***	-36.37***	-82.09***	-33.85**	-134.5**	-37.98**	-45.57**
	(10.41)	(0.230)	(13.17)	(23.18)	(15.58)	(66.04)	(15.17)	(19.44)
Δ US Term Spread	12.89*	0.423***	11.73	9.983	12.23	0.460	11.41	11.03
	(7.784)	(0.149)	(7.742)	(8.372)	(7.878)	(12.90)	(7.948)	(8.080)
Δ US Libor	42.21**	0.269	44.94**	40.47*	45.04**	49.96*	44.87**	43.89**
	(17.52)	(0.393)	(18.16)	(21.32)	(18.09)	(27.03)	(18.21)	(18.65)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Purpose	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lead Agent	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5597	5597	5597	5597	5597	5597	5597	5597
R^2	0.076	0.240	0.018	-0.227	0.024	-0.909	0.013	-0.004

Note: This table shows the effect of dollar movements on loan prices in an instrument variable setting. The dependent variable is the effective spread flex in basis points, calculated as the spread flex plus OID Flex divided by four. The dollar change is calculated as the change in the broad dollar index between launch date and flex date. The instrument is changes in the dollar around ECB monetary policy announcement. Columns (3) and (4) use all ECB shocks, columns (5) and (6) use only ECB monetary policy shocks, and columns (7) and (8) use only ECB information shocks, based on Jarociński and Karadi (2020). Loan controls are described in Appendix A. The sample period is from 2009 to 2019. Robust standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level.

Table B4: Instrumental Variable Estimation, controlling for Secondary Market Price Index and Corporate Spread

			All ECB Shocks		ECB MP Shocks		ECB Inf. Shocks	
	(1) OLS	(2) First	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV
Δ Broad Dollar	2.392***		9.810***	26.89***	8.803*	42.63**	10.47**	12.63**
	(0.732)		(3.203)	(7.511)	(4.562)	(18.97)	(4.238)	(5.998)
Δ Second. Mark. Prices	-0.0508	-0.0125***	0.0407	0.245	0.0292	0.448*	0.0483	0.0951
	(0.104)	(0.00173)	(0.108)	(0.150)	(0.114)	(0.272)	(0.114)	(0.127)
Δ US Corp AAA-BBB Spread	59.49***	3.687***	27.77	-33.23	31.47	-91.49	25.34	18.93
	(18.02)	(0.358)	(21.44)	(31.75)	(24.77)	(70.38)	(23.37)	(27.45)
ECB FX Surprise		-0.461***						
		(0.0260)						
ECB 3m Surprise				-1.452**		-3.249**		-1.304
				(0.717)		(1.650)		(0.977)
ECB 2y Surprise				2.060***		4.258***		0.354
				(0.654)		(1.610)		(0.724)
ECB 10y Surprise				0.142		-0.278		0.158
				(0.378)		(0.846)		(0.397)
Fed FX Surprise		0.00511***	0.0242	-0.0744	0.0300	-0.172	0.0204	0.00790
		(0.000432)	(0.0282)	(0.0485)	(0.0327)	(0.114)	(0.0340)	(0.0405)
Talk Amount(log)	0.997*	0.00262	0.956*	0.970	0.963*	0.748	0.951*	0.974*
	(0.565)	(0.0124)	(0.570)	(0.638)	(0.567)	(0.760)	(0.576)	(0.581)
Talk Spread (log)	14.83***	0.0768*	14.14***	13.06***	14.24***	11.87***	14.08***	13.79***
	(2.627)	(0.0465)	(2.630)	(2.847)	(2.628)	(3.434)	(2.671)	(2.711)
Years to Maturity (log)	-8.763***	0.0587	-9.272***	-10.31***	-9.225***	-10.40***	-9.304***	-9.413***
	(2.798)	(0.0557)	(2.910)	(3.289)	(2.913)	(3.923)	(2.902)	(2.966)
Sponsored	0.638	-0.0156	0.689	0.839	0.677	0.634	0.697	0.796
	(1.303)	(0.0267)	(1.319)	(1.470)	(1.314)	(1.715)	(1.325)	(1.342)
Rated	2.632	0.0742	2.069	0.558	2.131	-0.222	2.028	1.822
	(2.610)	(0.0457)	(2.660)	(2.864)	(2.658)	(3.371)	(2.674)	(2.694)
Cov-Lite	-4.497***	-0.00524	-4.492***	-4.067***	-4.493***	-3.774**	-4.491***	-4.470***
	(1.199)	(0.0243)	(1.209)	(1.339)	(1.206)	(1.573)	(1.212)	(1.224)
Middle Market	8.479***	0.00924	8.470***	8.114***	8.463***	8.217***	8.475***	8.439***
	(2.145)	(0.0372)	(2.163)	(2.344)	(2.159)	(2.613)	(2.167)	(2.186)
Δ VIX (log)	-11.93***	0.920***	-18.88***	-34.17***	-18.03***	-46.33***	-19.43***	-21.64***
	(3.019)	(0.0688)	(4.091)	(7.388)	(4.941)	(16.54)	(4.675)	(6.131)
Δ 2-Year Treasury	-6.282	2.869***	-35.44***	-81.76***	-32.68**	-121.1**	-37.26**	-45.09**
	(10.34)	(0.221)	(13.40)	(22.87)	(16.03)	(51.85)	(15.49)	(19.85)
Δ US Term Spread	10.77	0.260*	10.49	11.54	10.85	6.699	10.25	10.19
	(7.733)	(0.146)	(7.702)	(8.348)	(7.742)	(10.03)	(7.830)	(7.898)
Δ US Libor	27.34	-0.673*	37.83**	49.13**	37.00*	73.86**	38.38**	39.07**
	(17.88)	(0.379)	(18.78)	(21.80)	(18.90)	(30.90)	(18.96)	(19.19)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Purpose	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lead Agent	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5597	5597	5597	5597	5597	5597	5597	5597
R^2	0.080	0.268	0.018	-0.215	0.025	-0.652	0.014	-0.004

Note: This table shows the effect of dollar movements on loan prices in an instrument variable setting. The dependent variable is the effective spread flex in basis points, calculated as the spread flex plus OID Flex divided by four. The dollar change is calculated as the change in the broad dollar index between launch date and flex date. The instrument is changes in the dollar around ECB monetary policy announcement. Columns (3) and (4) use all ECB shocks, columns (5) and (6) use only ECB monetary policy shocks, and columns (7) and (8) use only ECB information shocks, based on Jarociński and Karadi (2020). Loan controls are described in Appendix A. The sample period is from 2009 to 2019. Robust standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level.

Table B5: Testing for Non-linearity of Effects

	(1) OLS	(2) OLS	(3) IV
Δ Broad Dollar	3.542***		
	(0.732)		
Δ Broad Dollar X Large Change		4.406***	13.57***
		(0.818)	(4.470)
Δ Broad Dollar X Small Change		1.147	3.138
		(1.520)	(5.341)
Fed FX Surprise			0.0127
			(0.0339)
Talk Amount(log)	1.017*	1.022*	0.992*
	(0.559)	(0.559)	(0.567)
Talk Spread (log)	13.74***	13.81***	13.90***
	(2.607)	(2.603)	(2.629)
Years to Maturity (log)	-8.094***	-8.181***	-9.103***
	(2.645)	(2.647)	(2.821)
Sponsored	0.995	1.041	1.052
	(1.299)	(1.298)	(1.329)
Rated	2.508	2.508	2.136
	(2.559)	(2.563)	(2.635)
Cov-Lite	-4.534***	-4.459***	-4.325***
	(1.201)	(1.200)	(1.231)
Middle Market	8.989***	9.055***	8.877***
	(2.137)	(2.140)	(2.167)
Δ VIX (log)	-9.450***	-9.122***	-17.88***
	(2.988)	(2.991)	(4.965)
Δ 2-Year Treasury	-17.26*	-18.06*	-40.27***
	(9.979)	(10.01)	(11.99)
Δ US Term Spread	16.54**	16.47**	11.20
	(7.648)	(7.649)	(8.046)
Δ US Libor	52.58***	53.55***	46.99**
	(17.36)	(17.36)	(18.58)
Industry	Yes	Yes	Yes
Purpose	Yes	Yes	Yes
Lead Agent	Yes	Yes	Yes
Observations	5622	5622	5622
R^2	0.073	0.074	0.005

Note: This table tests for nonlinear effects of dollar movements on loan prices. The dependent variable is the effective spread flex in basis points, calculated as the spread flex plus OID Flex divided by four. The dollar change is calculated as the change in the broad dollar index between launch date and flex date. Large change (small change) is an indicator variable that takes a value of 1 if the absolute change in the dollar is above (below) the sample median. Column (1) replicates our baseline result. Column (2) shows results from an OLS regression with interaction terms. Column (3) presents an IV estimation of column (2), where the instrument is changes in the dollar around ECB monetary policy announcement. Loan controls are described in Appendix A. The sample period is from 2009 to 2019. Robust standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level.