U.S. Dollar Dominance and Exorbitant Privilege

John Caramichael * Gita Gopinath † Gordon Y. Liao ‡

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We isolate a U.S. dollar currency premium by comparing corporate bonds issued in the dollar and the euro by firms outside of the U.S. and Eurozone. We make several empirical observations that dissect the perceived advantage of borrowing in the dollar. First, while the dollar dominates global debt issuance, borrowing costs in the dollar are more expensive without a currency hedge and about the same with a currency hedge when compared to the euro. This observed parity in currency-hedged corporate borrowing stands in contrast to the persistent deviation from covered interest parity in risk-free rates. Second, we observe a dollar safety premium in the relative hedged borrowing costs, found in the subset of bonds with high credit ratings and short maturities, which are attributes similar to safe sovereigns. Third, investment returns on dollar- and euro-denominated bonds are similar both in excess of respective risk free rates and on a currency hedged basis. Finally, we find that firms optimize the currency mix of their debt issuance depending on the relative borrowing cost between dollar and euro debt. Our evidence suggests that the "exorbitant privilege" the U.S. enjoys likely manifests in a disproportionate demand for U.S. dollar debt that is reflected in higher issuance volumes rather than cheaper direct borrowing costs. In short, the dollar dominates global finance in quantity but not in price.

Keywords: U.S. Dollar Dominance, Exorbitant Privilege, Exchange Rate, Global Corporate Debt, Covered Interest Rate Parity Deviation
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*Caramichael: Board of Governors of the Federal Reserve System. Email: john.caramichael@frb.gov.
†Gopinath: International Monetary Fund and Harvard University
‡Liao: Board of Governors of the Federal Reserve System. Email: gordon.y.liao@frb.gov.

> "The fact that many states accept dollars as equivalent to gold... in order to make up for the deficits of [the] American balance of payments has enabled the United States to be indebted to foreign countries free of charge. Indeed, what they owe those countries, they pay ... in dollars that they themselves can issue as they wish." (Charles de Gaulle, 1965)

It is long-held in international finance that the global financial architecture based on dollar hegemony bestows a special privilege to the United States and borrowers with access to the U.S. dollar capital market. Assessments of this "exorbitant privilege" have typically focused on the returns and yields on U.S. assets and liabilities at the country level (Gourinchas et al., 2010; Lane and Milesi-Ferretti, 2007; Eichengreen, 2011). The privilege that the U.S. enjoys is then explained as either a unique attribute of the currency (the currency effect), or a result of the special qualities of its issuer, the U.S. (the country effect). In the latter paradigm, the U.S. acts as the "banker of the world" by providing liquidity transformation (Kindleberger, 1965) or as the "venture capitalist of the world" through risky investments backed by safe assets (Gourinchas and Rey, 2007).

In this paper, we isolate the currency effect and assess the specialness of the dollar versus the euro for a unique set of securities — corporate debt issued by global firms outside of the two currency regions. Examining the borrowing cost in this context provides a clean decomposition of the country versus the currency effects in their contribution to the dollar dominance and currency specialness. This is because borrowers in "third-party" countries with access to international debt markets have a choice to denominate their debt in one of the two primary international currencies, the dollar or the euro. The relative price of these firms' dollar and euro debt, and their choice to issue in either currency, provides insight into the attractiveness of the dollar that is independent of sovereign risk. Additionally, we compare borrowing costs with and without currency hedge. As currency hedging removes exchange rate volatility, the debt denomination choice more clearly reflects currency preference devoid of exchange rate risk considerations.

This paper documents several main empirical facts on the global corporate bond market and the specialness of the dollar. First, we find that while the dollar dominates in the quantity of debt issuance, it is generally not cheaper to issue debt in the dollar. On a currency unhedged basis, the yield on dollar bonds is on average 103 basis points higher than the yield on euro bonds, after controlling for firm and bond characteristics. Most of this difference can be attributed to differences across risk-free rates in our sample period between 2003 and 2020. However, even after we use currency hedging instruments to strip away the differences in risk-free rates, we find that credit spreads on euro bonds are about the same or slightly lower than credit spreads on dollar bonds. This newly documented fact challenges the notion that dollar borrowers directly enjoy cheaper cost of funding by the virtue of their access to the dollar capital market alone. Furthermore, the observed parity in currency-hedged corporate borrowing costs in the euro and the dollar indicates that the covered interest rate parity (CIP) condition mostly holds in the global corporate bond market, despite observed CIP deviations for risk-free benchmarks (Du et al., 2018a). This may indicate the importance of banking regulations in driving the CIP deviations in money markets that are notably absent for large global firms and global investors in credit markets.

Second, we document a dollar safety premium for a subset of corporate bonds with characteristics of safe sovereign bonds — high ratings and short maturity. For these "safe" corporate bonds, the currency-hedged dollar yield is typically lower than that of similar euro bonds. This observed premium for dollar bonds possibly indicates a demand for safety or convenience of dollar assets that have been observed in sovereign bonds.[1] The dollar safety premium was particularly large during the Global Financial Crisis and the European debt crisis. More recently during the COVID-19 market turmoil of March and April 2020, however, this measure of dollar safety premium did not increase.[2]

[1]See, for instance, Du et al. (2018b), Jiang et al. (2018).

[2]The absence of a safety premium in the corporate bond market during the COVID-19 market selloff likely reflected a "dash for cash" that led to investors selling safe and risky bonds alike for dollar cash.

Third, from the investor perspective, the excess and currency hedged returns on dollar- and euro-denominated bonds are broadly similar for the two currencies, though euro-denominated bonds exhibit more correlation with equity markets when investors are not currency hedged. From this perspective, an unhedged global investor might prefer to purchase dollar bonds to achieve a more favorable return profile, but a currency-hedged global investor would be better off with investments in euro-denominated bonds.

Finally, we find that global firms actively switch their issuance to the cheaper currency for borrowing on both a currency hedged and unhedged basis. This type of issuance currency optimization and associated arbitrage of CIP deviations is studied in-depth in Liao (2020) that use a sample of firms based in the same currency area as their debt issuance. This paper focuses on firms in "third party" countries in assessing the privilege of issuing in the U.S. dollar. Understanding the behavior of these global firms, particularly those in emerging markets, helps us to assess the extent of the entrenchment of dollar hegemony, as firms seek a lower borrowing cost between international currencies.

Our results suggest that the dollar's dominance in financing and investments is not due to a clear cost advantage to borrowers nor a sizable return differential for investors. Though the euro has taken off as a major currency for trade and finance, the euro debt capital market has failed to chip away at the dollar's stronghold post-GFC. Our results also suggest that the exorbitant privilege bestowed to the U.S. likely reflects country factors and that the return differential due to the currency alone is absent.

In terms of methodology, we leverage a dataset with a large panel of global corporate bond secondary market prices and bond attributes. To quantify the currency effect, we remove fundamental differences in credit risk by selecting on bonds issued by large, global firms that issue in multiple currencies and control for differences in firm risk and bond rating and maturity. We regress the unhedged and hedged borrowing costs on a set of covariates in the cross-section at each observation date. This methodology isolates the currency fixed effects in borrowing cost as a time series. We also construct a measure of

investment return differentials from the currency effect by similarly regressing bond returns on a set of covariates. This paper contributes to several streams of literature. A number of papers have studied the exorbitant privilege of the U.S. dollar (Gourinchas et al., 2010; Curcuru et al., 2008; Gourinchas and Rey, 2007; Eichengreen, 2011). Earlier papers have documented a special privilege that the U.S. enjoyed in borrowing cheaply and investing in foreign assets with higher returns(Gourinchas et al., 2010; Lane and Milesi-Ferretti, 2007; Eichengreen, 2011). Gourinchas and Rey (2007) highlights the unique balance sheet structure of the U.S. serving as "venture capitalist" of the world. Curcuru et al. (2008) noted that the differences in returns earned by U.S. investors in foreign assets versus those earned by foreign investors in U.S. assets might not be as large as previously documented. Relative to these work, we take a granular approach in carefully constructing measures of relative borrowing cost and investment returns that captures the specialness of the U.S. dollar while controlling for country and other fundamentals.

Our paper is also related to a strand of literature on the dominance of the U.S. dollar in trade and finance. Gopinath and Stein (2018) studies the synergistic relationship between the usage of the U.S. dollar in financing and invoicing. Gopinath et al. (2020) studies the key features of dominant currency paradigm. This paper places focus on understanding the pricing differences for dollar-denominated debt in global capital market and concludes that the U.S. dollar dominates in volume but not so much in price.

Finally, our paper relates to a set of recent work that have examined U.S. sovereign safety premium and convenience yield relative to those from other countries. Du et al. (2018b); Jiang et al. (2018) noted the specialness of the dollar in global sovereign yields. Compared to earlier work, we dissect the specialness in borrowing cost by focusing on global firms in "third-party" countries that regularly borrows in both the dollar and the euro, thus isolating the currency effect separately from the sovereign and country effect.

1 Methodology

Unhedged relative borrowing cost

We calculate the relative borrowing cost for global firms issuing dollar- and euro-denominated bonds using two large panels of secondary market bond yield and price data. To calculate the unhedged yield differential, we estimate the following regression at each date t[3]

$$y_{it} = \alpha_t \mathbb{1}_{EUR,i} + \beta_{ft} + \gamma_{mt} + \delta_{rt} + \epsilon_{it}. \tag{1}$$

y_{it} is the local currency yield for bond i traded in the secondary market at time t. $\alpha_{EUR,t}$ is the coefficient on the indicator variable $\mathbb{1}_{EUR,i}$, which equals one if bond i is denominated in the euro. β_{ft}, γ_{mt} and δ_{rt} are fixed effects for firm f, maturity bucket m and rating bucket r at date t. The regressions are estimated in the cross-section at each date t.

Hedged relative borrowing cost

To calculate the currency hedged borrowing cost differential, we calculate a FX-hedged yield differential. The objective is to measure the corporate basis ψ, defined as the FX-hedged bond yield differential between euro- and dollar-denominated bonds:

$$\psi_t \equiv \underbrace{\left(y_t^{€} - y_t^{\$}\right)}_{\text{risky yield diff.}} + \underbrace{\left(f_t - s_t\right)}_{\text{forward premium}} . \tag{2}$$

$y_t^{€}$ and $y_t^{\$}$ are risky euro- and dollar-denominated bond yields, and f_t and s_t are forward and spot exchange rates at time t.

As currency forwards are less liquid at greater than one year of maturity, we construct the corporate basis with currency swaps that have more liquidity with maturity. By subtracting

[3]In this regression, and in the regression in Equation 4, the data is winsorized on the dependent variable with a 95% window at each month to control for outliers.

the risk free rates $r_t^{€}$ and $r_t^{\$}$ from Equation 2, we can rewrite ψ_t as

$$\psi_t = \underbrace{\left(y_t^{€} - r_t^{€}\right)}_{€ \text{ credit spread}} + \underbrace{\left[r_t^{€} - r_t^{\$} + (f_t - s_t)\right]}_{\text{currency basis}} - \underbrace{\left(y_t^{\$} - r_t^{\$}\right)}_{\$ \text{ credit spread}} . \tag{3}$$

This decomposition allows us to measure the corporate basis by using the observable market prices of the currency basis (given by the cross-currency basis swap, a common FX hedging instrument) and the euro and dollar risk-free rates (given by LIBOR swaps). The advantage of this is that both cross-currency basis swaps and LIBOR swaps are more liquid than currency forwards at longer-dated tenors. The currency basis is also known as the covered interest rate parity deviation based on risk-free rates.

In Equation 3, the hedged relative borrowing cost is then the difference between the euro credit spread adjusted for CIP deviation (the first two terms) and the dollar credit spread (the last term). We therefore define and calculate this CIP-adjusted credit spread for each bond i as

$$S_{it}^{FXhedged} \equiv y_{it} - r_t^c + \mathbb{1}_{EUR,i}\left[r_t^{€} - r_t^{\$} + (f_t - s_t)\right]. \tag{4}$$

r_t^c is either the euro or dollar LIBOR-based swap rate with currency and maturity matching that bond i[4].

We then regress each bond's CIP-adjusted credit spread $S_{it}^{FXHedged}$ on the same set of covariates as in Equation 1:

$$S_{it}^{FXHedged} = \alpha_t \mathbb{1}_{EUR,i} + \beta_{ft} + \gamma_{mt} + \delta_{lt} + \epsilon_{it} \tag{5}$$

This regression approach enables us to measure the currency-hedged relative borrowing cost ψ_t, which is reflected in α_t. In this context, the terms hedged relative borrowing cost and corporate basis are then equivalent. Liao (2020) provides additional details on this method of estimating the corporate basis.

[4]We linearly interpolate the LIBOR swap rate curve and the cross-currency basis curve to match to the maturity of each bond at each observation date t.

Return differential

We calculate the return differential between dollar- and euro-denominated bonds by approximating the log return of each bond. To approximate a bond's log return $R_{i,t}$ from $t-1$ to t, we use the bond's yield income, duration and change in yield:

$$R_{i,t} = \log\left(\text{yield income}_{i,t} - \text{duration}_{i,t-1} \cdot \Delta y_{i,t}\right). \tag{6}$$

The yield income for bond i at time t is given by $y_{i,t-1}\Delta t$. The duration is approximated as $(1 + y_{i,t-1}/2)^{2M}/y_{i,t-1}$, where M is the time to maturity.

We then regress each bond's log return R_{it} on the same set of covariates as in Equation 1:

$$R_{it} = \alpha_t \mathbb{1}_{EUR,i} + \beta_{ft} + \gamma_{mt} + \delta_{lt} + \epsilon_{it} \tag{7}$$

This gives us the euro minus dollar log return differential α_t. Additionally, we use the log return differential α_t to estimate the unhedged, hedged and excess log return differentials. The unhedged differential is taken by adding the euro carry return to the log return differential. The hedged differential adjusts the log return differential by the cost of currency hedging with one-month forward contracts. The excess differential takes the log return differential in excess of euro and dollar OIS rates.

2 Data

Monthly bond dataset (2003-2020)

Secondary market bond yields at the monthly level are sourced from Bloomberg. The sample consists of euro- and U.S. dollar-denominated fixed- and zero-coupon non-callable corporate bonds with at least $50 million in notional value and at least one year to maturity. We only consider bonds issued by firms based outside the U.S. and Eurozone.

To construct the sample, we first exclude bonds whose issuer's country of risk is in the United States or Eurozone. We then narrow down the sample to include only bonds where the issuer has a qualifying bond trading in both currencies at some point in the sample period. We also exclude supranationals, such as regional development banks, and we filter out very illiquid bonds. The final result is a dataset of 3,452 bonds issued by 172 firms. The sample period is August 2003 to September 2020.

INSERT Table 1

Daily bond dataset (2014-2020)

Additionally, we source daily secondary market bond prices from Bloomberg's BVAL database. Using the prices, we estimate the yield of each bond with its duration and coupon rate. The bond prices are a mixture of quoted prices and evaluated prices calculated by Bloomberg's proprietary evaluated pricing service BVAL. This evaluated data is high-quality and is routinely used for regulatory purposes, and its depth allows for a deeper sample over a shorter time period. The bonds are selected and filtered in the same manner as the monthly bonds. The final dataset consists of 4,485 bonds issued by 190 firms. The sample period is January 2014 to September 2020.

INSERT Table 2

Bond issuance: Dealogic (2000-present)

We source bond issuance data from Dealogic. We include only bonds with a maturity at issuance greater than one year, where the issuer's nationality is outside the U.S. and Eurozone. The coverage consists of 82,185 euro- and dollar-denominated bonds issued from 2000 to 2020. The sum notional value of this dataset is $12.4 trillion, with $8.8 trillion issued in the dollar and $3.6 trillion issued in the euro.

3 Relative borrowing cost

3.1 Relative borrowing cost

Our first empirical finding is that the U.S. dollar does not offer generally lower yields for borrowers despite large volumes of issuance. Figure 1 shows that the share of U.S. dollar denominated bonds has been much higher than euro denominated bonds for firms located in "third-party" countries. Early in the 2000s, with the introduction of the euro, there was a gradual increase in the euro share of bond issuance, reaching a peak in 2007 when the euro bond issuance briefly surpassed dollar bond issuance. This trend reversed with the GFC, and since then the dollar share of issuance has been stable at around 75%.

INSERT FIG 1

Figure 2 shows the unhedged and hedged corporate basis constructed following Equation 1 and Equation 5, plotted monthly from August 2003 to September 2020. Between the launch of the euro and the global financial crisis, the unhedged basis widened to about -180 basis points (positive indicating cheaper USD borrowing cost), while the hedged basis stayed just under zero. Following the crisis, the unhedged basis steadily fell as far as -320 basis points, before rising in 2019 and quickly tightening to about -100 basis points during the onset of COVID-19. The hedged corporate basis, despite dipping in March 2020, has otherwise held consistently in the -5 to -40 basis points range.

INSERT FIG 2

We can quantify the aggregated borrowing cost difference over time through Fama-Macbeth regressions. Table 3 shows the regression result with the euro-currency indicator variable and other covariates. The table summarizes the results from the time series plotted in Figure 2. On average, the hedged borrowing costs between the two currencies are similar (the coefficient on the euro indicator is -5.5 basis points), but the unhedged borrowing cost

difference substantially favors the euro. Investment returns (unadjusted for hedging) are also similar between the two currencies.

INSERT TABLE 3

3.2 The impact of global dollar shortages during Covid-19 market turmoil

In addition to the general observation that the borrowing cost in the U.S. dollar on average is similar to that in the euro, we find that during times of severe dollar shortages, global firms experience a higher borrowing cost in the dollar. Figure 3 shows the relative borrowing cost and credit spreads during the onset of the Covid-19 episode in early 2020. During the financial stress of March 2020, the relative borrowing cost between dollar and euro bonds plummeted, with the dollar becoming 100 basis points more expensive than the euro on a hedged basis. In Panel A we see the hedged relative borrowing cost plummet by about 80 basis points, before rebounding to slightly above its previous level and stabilizing by June 2020. In Panel B, we find this price action primarily reflects the asymmetric moves in credit spreads on dollar and euro bonds. During this period, the dollar credit spread over LIBOR spiked sharply upwards relative to the euro credit spread and remained elevated through mid-April.

INSERT FIG 3

The uneven movement in credit spreads was most likely driven by the sudden stop in dollar funding, which exacerbated the sell-off in dollar-denominated securities in a "dash for cash". A similar plummet in the relative borrowing cost can be seen during the global financial crisis (Figure 2), which also saw dollar funding markets seize up and trigger a wave of dollar asset sales.

This phenomenon seems to indicate that global firms can benefit by issuing euro debt instead of dollar debt in international debt markets. The conventional thought is that dollar funding markets are more liquid or offer a cheaper financing cost. Instead, we find that

in times of key financial stress, global firms experience disproportionate strain when their liabilities are denominated in the international reserve currency. Additionally, as the U.S. dollar corporate market froze during the two weeks of the most acute funding stress (March 15 to 21 and March 22 to 29), dollar debt issuance from global firms outside the U.S. and Eurozone collapsed dramatically relative to euro issuance. In the first week, dollar issuance accounted for just 27% of combined euro and dollar issuance, and in the second week, it accounted for 50%. This was down from its relatively stable level of about 75%. On a currency-unhedged basis, the aggressive monetary response by the Federal Reserve overall narrowed the spread in euro minus dollar borrowing cost as the benchmark target rate in the U.S. was cut by 100 basis during this period.

3.3 Comparison to benchmark CIP deviations

In Figure 2, we see that CIP mostly holds or slightly favors the euro in currency-hedged corporate debt. This stands in contrast with the persistent positive CIP deviations in risk-free rates, favoring the dollar. We measure the CIP deviation in risk-free rates with the cross-currency basis b, which is defined as the difference between the actual risk-free rate and the risk-free rate implied by foreign exchange contracts:

$$b = (F - S) - S\left(\frac{1 + r^{\$}}{1 + r^{€}} - 1\right). \tag{8}$$

F is the forward exchange rate, S is the spot rate and $r^{\$}$ and $r^{€}$ are the LIBOR rates in the dollar and euro for a given tenor. In Figure 4, we compare the hedged corporate basis with the 5-year benchmark CIP deviation. The deviation from CIP is measured with the cross-currency basis swap, a market instrument for measuring the cross-currency basis that is more liquid than FX swaps at longer tenors.

INSERT FIG 4

After the onset of the GFC, benchmark CIP deviations have been persistently positive for the dollar against the euro, indicating that it has been expensive to swap euro into dollar. This positive CIP basis in money markets indicates possible financial constraints and a shortage of dollar funding in the money market. In contrast, the hedged corporate basis has fluctuated between negative and positive.

The decoupling of the hedged corporate basis and the cross-currency basis may indicate that the CIP deviation in money markets is a product of bank balance sheet regulation and international imbalances, not a fundamental currency effect that reflects a cheaper dollar borrowing cost. Related to this distinction, (Liao and Zhang, 2020) finds that international investment imbalances can explain the cross-section of CIP deviations — investors in net saver currency regions, like Japan or the euro zone, make currency hedged investments abroad. This investment imbalance requires swapping of investors' home currency into dollars in order to invest in dollar assets, resulting in a consistent pressure on the cross-currency basis. However, banking regulations limit the ability of arbitrageurs to enter into these swaps as counterparties, which limits the availability of funding and results in a relatively persistent deviation in the cross-currency basis towards dollar shortage (Du et al., 2018a). This effect is especially pronounced during quarter-end and year-end periods in short tenors, when large banks pare back their FX derivative exposures in order to avoid regulatory penalties like the GSIB surcharge in the United States.

In contrast to these distortions in money markets, the hedged corporate basis tracks the relative borrowing cost of global firms in bond markets, and we observe a rough parity between the dollar and the euro borrowing costs despite the large interest rate differentials. Our finding suggests that global firms are able to arbitrage borrowing rate differentials in international debt markets more effectively than banks arbitraging in the global money market. This observation is bolstered by our finding in Section 6: Issuer currency choice, where we find that firms actively switch their issuance to the cheaper currency.

In this context, it is understandable why the benchmark CIP deviation and the hedged corporate basis moved in opposite directions during the GFC. During the GFC, the benchmark CIP deviation was positive, indicating a shortage for dollar funding and hedging in money markets. The hedged corporate basis was negative, indicating that the global dollar bond market was much more distressed than the global euro bond market, after adjusting for the cost of FX hedging. Both of these measures indicate a stressed dollar funding condition, with the former focusing on money markets, and the latter focusing on credit markets.

However, the two bases do not necessarily have to be negatively correlated. Taking a stylized version of Equation 2, we essentially have

$$\text{Hedged corporate basis} = \underbrace{\left(y_t^{€} - r_t^{€}\right)}_{€ \text{ credit spread}} - \underbrace{\left(y_t^{\$} - r_t^{\$}\right)}_{\$ \text{ credit spread}} + \text{Benchmark CIP deviation.} \tag{9}$$

So in times of severe dollar funding distress, while the benchmark CIP deviation may rise, the hedged corporate basis can be dominated by the disproportionate rise in dollar credit spreads during the dash for cash.

4 Dollar safety premium

Our second set of empirical findings is that corporate bonds with characteristics of safe sovereigns – a high rating and short maturity – have a cheaper borrowing cost in the dollar. In Figure 5, we aggregate the bonds by rating and plot the hedged relative borrowing cost.[5][6] We see that bonds with a high rating have a cheaper relative borrowing cost in the dollar than in the euro.

INSERT FIG 5

[5]Ratings are sourced from Moody's and S&P.

[6]For this figure, we exclude junk bonds (a small fraction of the sample).

We also separate the bonds by maturity in Figure 6. We find that dollar borrowing is relatively cheaper than borrowing in the euro in shorter maturities, and relatively more expensive for longer maturities.

INSERT FIG 6

Additionally, we compare the hedged relative borrowing cost for all bonds with the hedged relative borrowing cost for AAA bonds and the 5-year hedged sovereign basis. The sovereign basis is the currency hedged yield differential between 5-year German bunds and U.S. Treasuries. The sovereign basis is typically positive, indicating a dollar safety premium for U.S. Treasuries relative to German bunds, and the AAA corporate basis is typically higher and more often positive than the broad corporate basis. The sovereign basis and AAA corporate basis also exhibit similar patterns of cheaper dollar borrowing costs during periods of global financial stress – the GFC and onset of COVID-19.

INSERT FIG 7

5 Investment returns

Our final set of empirical finding is that the investment returns on dollar- and euro-denominated bonds issued by global firms are similar, though there are some cyclical differences in the returns with regard to their correlation with broad equity markets. Studying investment returns grants us a view that differs from borrowing cost, as the focus shifts onto the providers of capital that might not hold an investment to term. Additionally, this allow us to relate to earlier studies that focus on differences in investor returns. In Figure 8, we compare the unhedged, hedged and excess return differentials between dollar and euro bonds. The unhedged return is shaped primarily by exchange rate movements. The hedged return assumes currency hedging with one-month forward contracts, and the excess return is taken in excess of one-month OIS rates. In Figure 8, we see the hedged and excess return differentials do not consistently favor dollar or euro bonds for investors.

INSERT FIG 8

Additionally, in Table 5, we calculate the correlation between the return differentials and the S&P 500 and Euro Stoxx 50 equity indexes. On an unhedged basis, the dollar bond return correlates more negatively with equity market returns. This suggests that an unconstrained investor might benefit from the more desirable return profile for unhedged dollar bonds. However, because this return profile is driven primarily by exchange rate movements, this observation is essentially the same as noting that an investor who is long on the dollar will benefit in economic downturns due to dollar appreciation. In contrast, the hedged and excess return differential does not correlate with equity returns, suggesting there is no counter-cyclical advantage to investing in dollar bonds on a hedged basis. In short, dollar bonds issued by global firms offer a benefit to investors compared to euro bonds so long as investors are unhedged, but the benefit evaporates after the hedging of exchange rate risk.

INSERT TABLE 5

6 Issuance currency choice

We find that global firms optimize the currency mix of their debt liabilities based on the hedged and unhedged relative borrowing costs. In Table 4, we see that for global firms, a cheaper relative borrowing cost in the U.S. dollar corresponds to a higher dollar share of issuance. The regressions control for the firms' dollar share of issuance in the previous period, and they include either time or firm fixed effects.

INSERT TABLE 4

Comparing the coefficients on hedged versus unhedged basis, we observe that the hedged borrowing cost has a somewhat stronger connection with currency choice than the unhedged borrowing cost. This may reflect that currency hedging is an integral part of corporate foreign

currency borrowing for large global firms with strong access to debt markets. However, it is likely that not all global firms rely on financial instruments to hedge against their currency risk, as some have natural hedges in the form of future cash flows denominated in those currencies. For example, under the petrodollar system, oil is priced almost exclusively in the U.S. dollar. Global oil firms then receive most revenue in dollars, so they do not need to hedge currency risk when issuing dollar debt. Overall, the results suggest that firms are actively responding to variations in borrowing cost differences between the dollar and the euro debt capital market.

7 Conclusion

In this paper, we document several new facts related to the dominance of the U.S. dollar in the global capital market using a detailed comparison of global corporate bond prices.

We find that the cost of comparable corporate debt in the dollar and the euro are similar after the cost of exchange rate hedges, but it has been more costly to borrow in the dollar on a currency unhedged basis. However, a dollar premium is observed in a subset of bonds with the highest credit quality and shortest maturities, resembling safe sovereign bonds. Investor returns on dollar and euro-denominated bonds are broadly similar though investors benefit from a counter-cyclical dollar appreciation when investing unhedged in dollar bonds. Finally, global corporate borrowers optimize borrowing cost by switching between issuing in the euro and the dollar depending on the cost of issuance.

Our results suggest that the dominance of the U.S. dollar may confer an exorbitant privilege on the United States in the form of lower borrowing costs for relatively "safe" dollar-denominated assets, like U.S. Treasuries or, in our paper, AAA-rated corporates. However, setting aside sovereign and "quasi-sovereign" debt, the exorbitant privilege does not manifest in lower FX-hedged yields for corporate debt. Instead, it seems to be expressed through the U.S. dollar's dominance in the quantity of risky debt issuance, not the price. If the upward sloping aggregate demand curve for risky dollar debt lies to the right of the

demand curve for risky euro debt, we would expect to see the dollar dominate in quantity while both euro and dollar receive the same price. This appears to be the case in the global corporate debt market, where large issuers actively arbitrage fluctuations from this rough parity in price.

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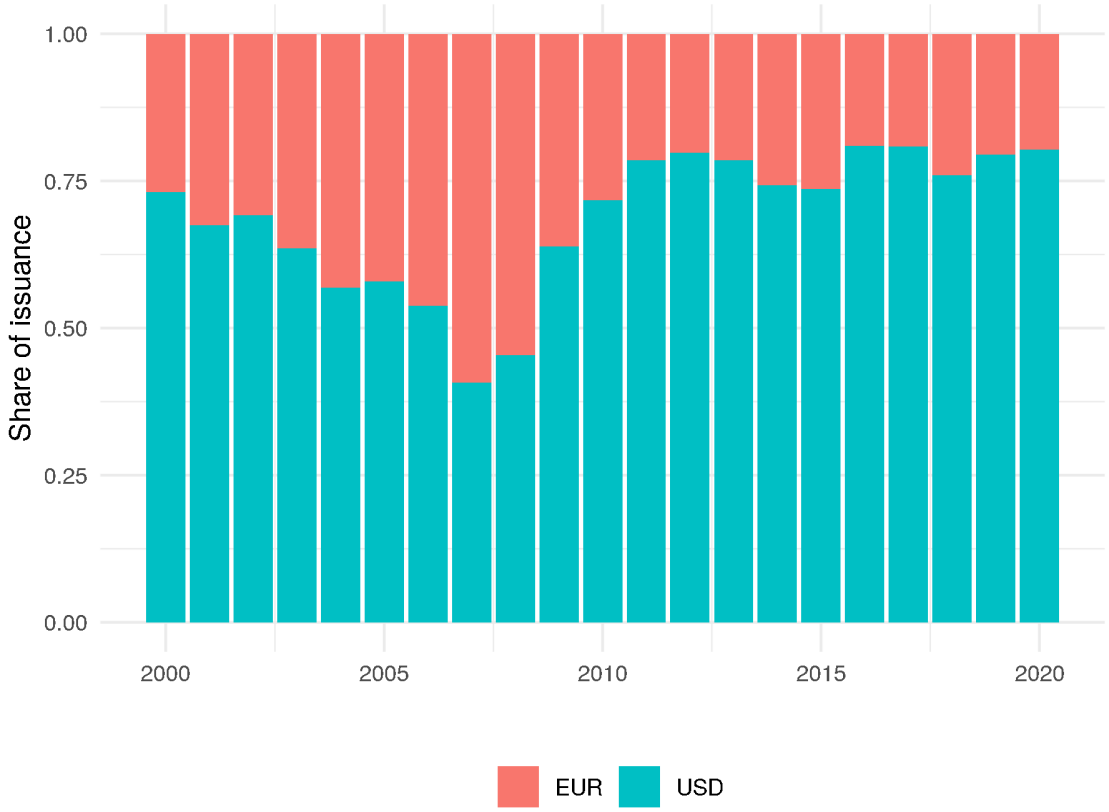
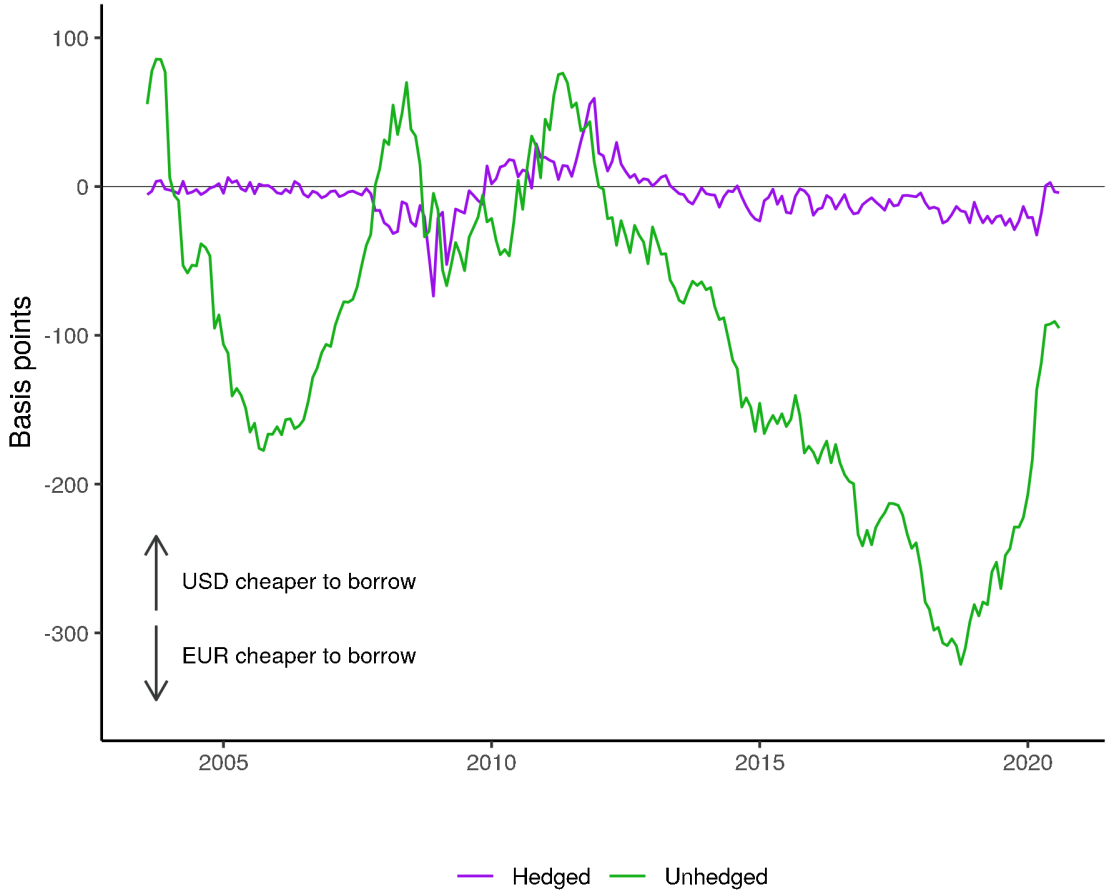
Figure 1: Share of notional issuance in EUR and USD (non-U.S./Eurozone issuers)



The share of new bond issuance in the euro and U.S. dollar by firms whose ultimate parent nationality is outside of the U.S. and Eurozone. The sample is from 2000 to 2020 at an annual frequency, using the Dealogic bond issuance dataset.

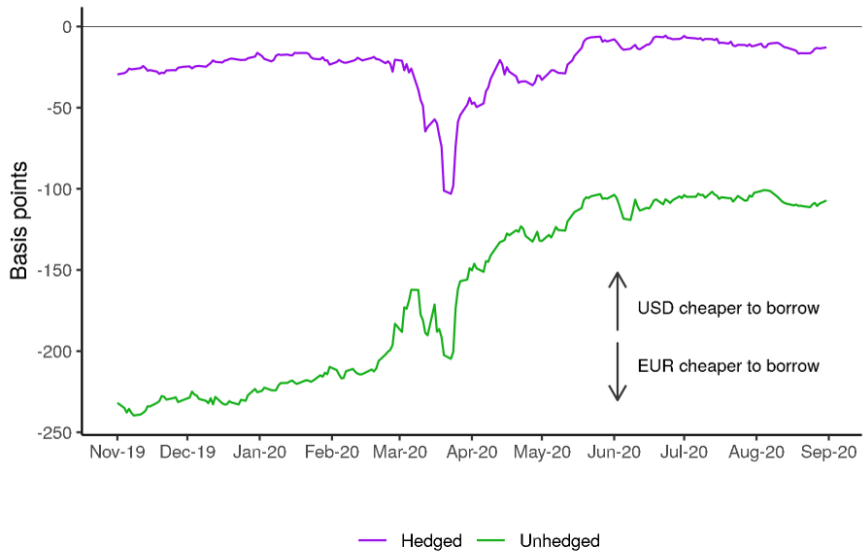
Figure 2: EUR-USD relative borrowing cost



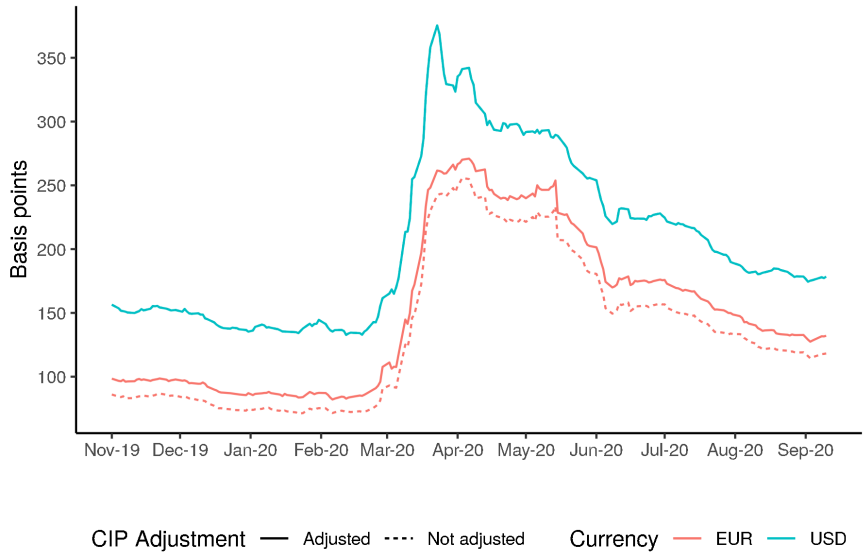
The hedged and unhedged relative borrowing cost between euro- and dollar-denominated bonds. A positive value indicates that euro-denominated bonds have a higher borrowing cost. The sample is from 2003 to 2020 at a monthly frequency, using the monthly bond dataset.

Figure 3: Credit markets during COVID-19

Panel A: EUR-USD relative borrowing cost

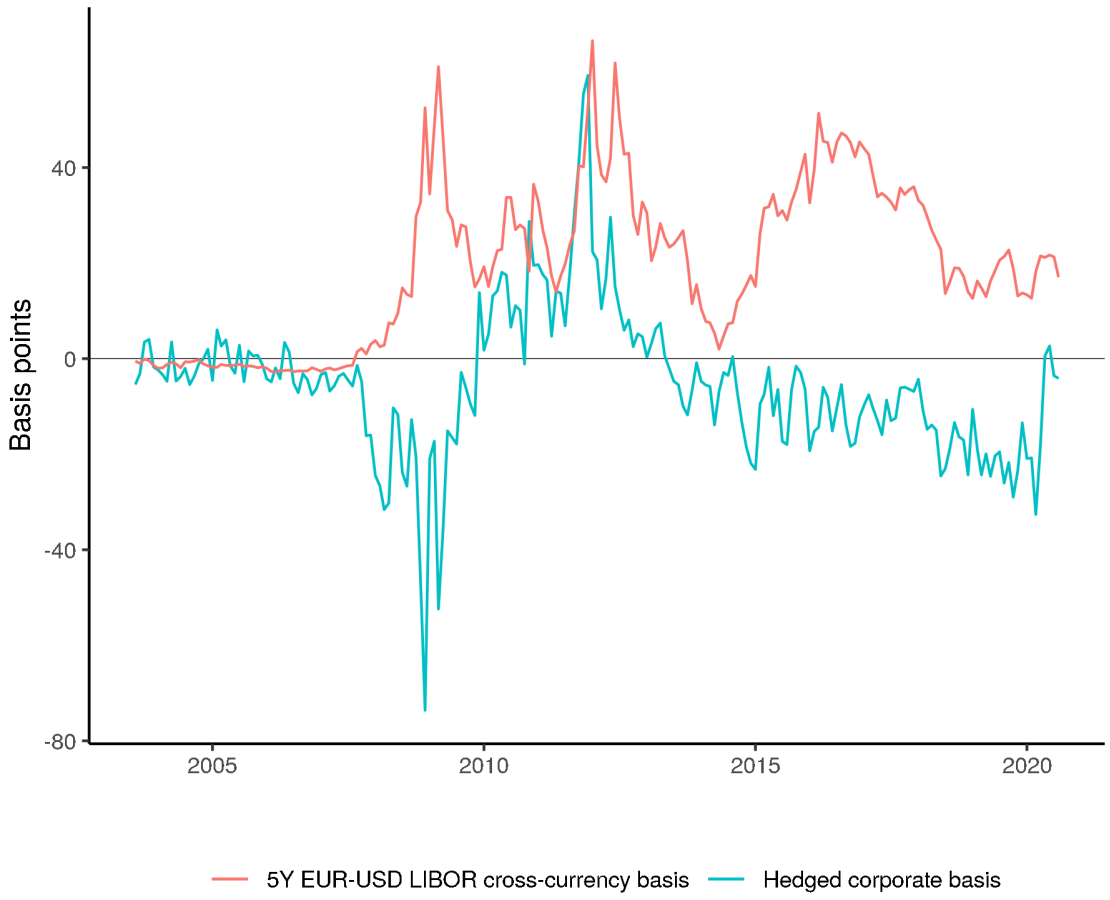


Panel B: Credit spread by currency



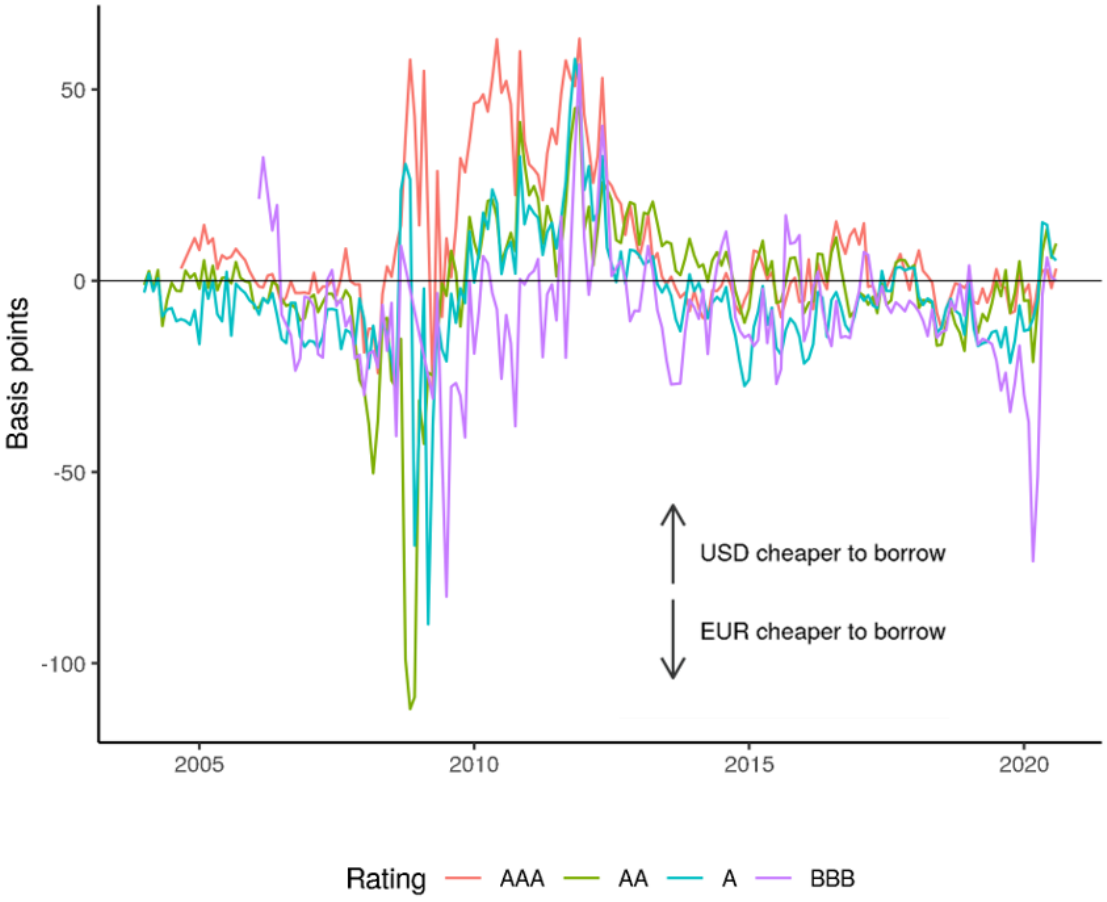
Panel A is the hedged and unhedged relative borrowing cost during COVID-19. Panel B is the median of the firm-level median credit spread for euro- and dollar-denominated bonds. The euro credit spread is both adjusted and not adjusted for the euro's CIP deviation relative to the U.S. dollar. The sample is from November 2019 to September 2020 at a daily frequency, using the daily bond dataset.

Figure 4: Comparison to the cross-currency basis



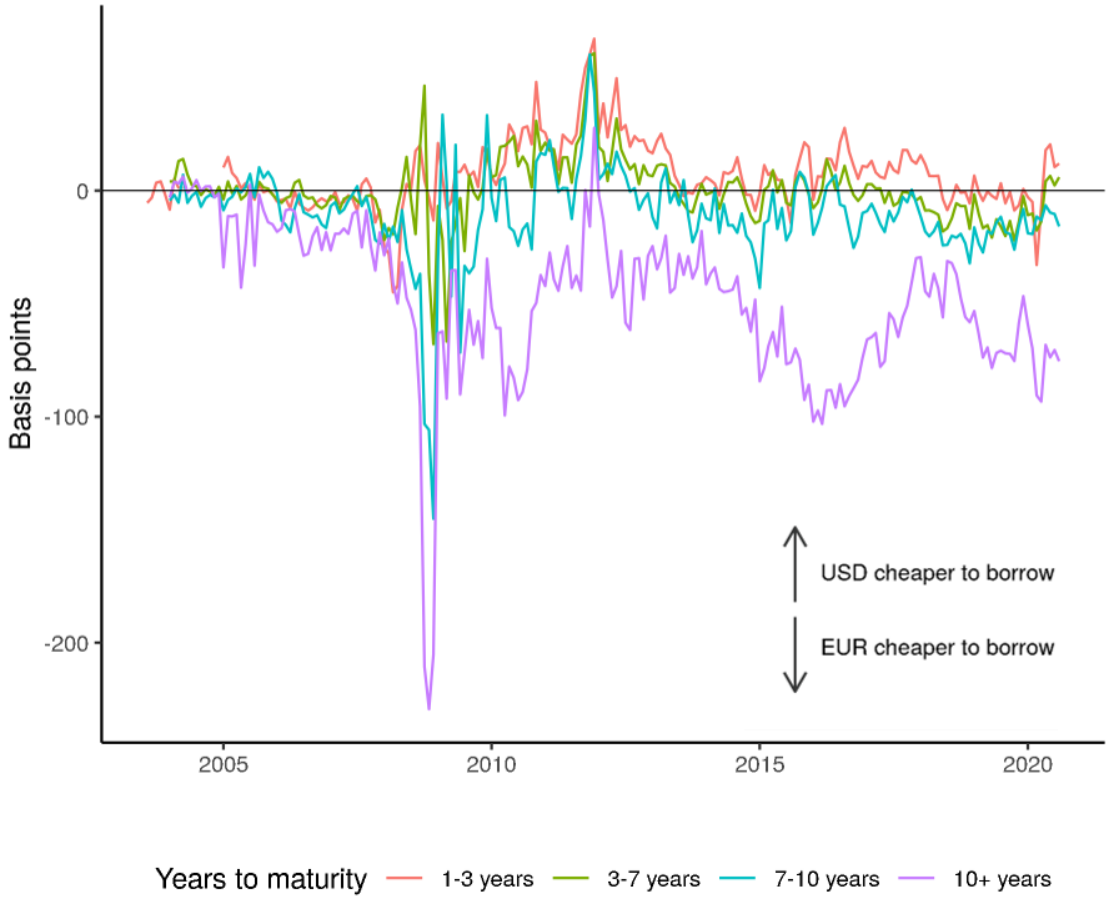
The hedged relative borrowing cost for corporate bonds, compared to the 5-year EUR-USD LIBOR cross-currency basis. The cross-currency basis is given by the mid price of the cross-currency basis swap, sourced from Bloomberg.

Figure 5: EUR-USD hedged relative borrowing cost by rating



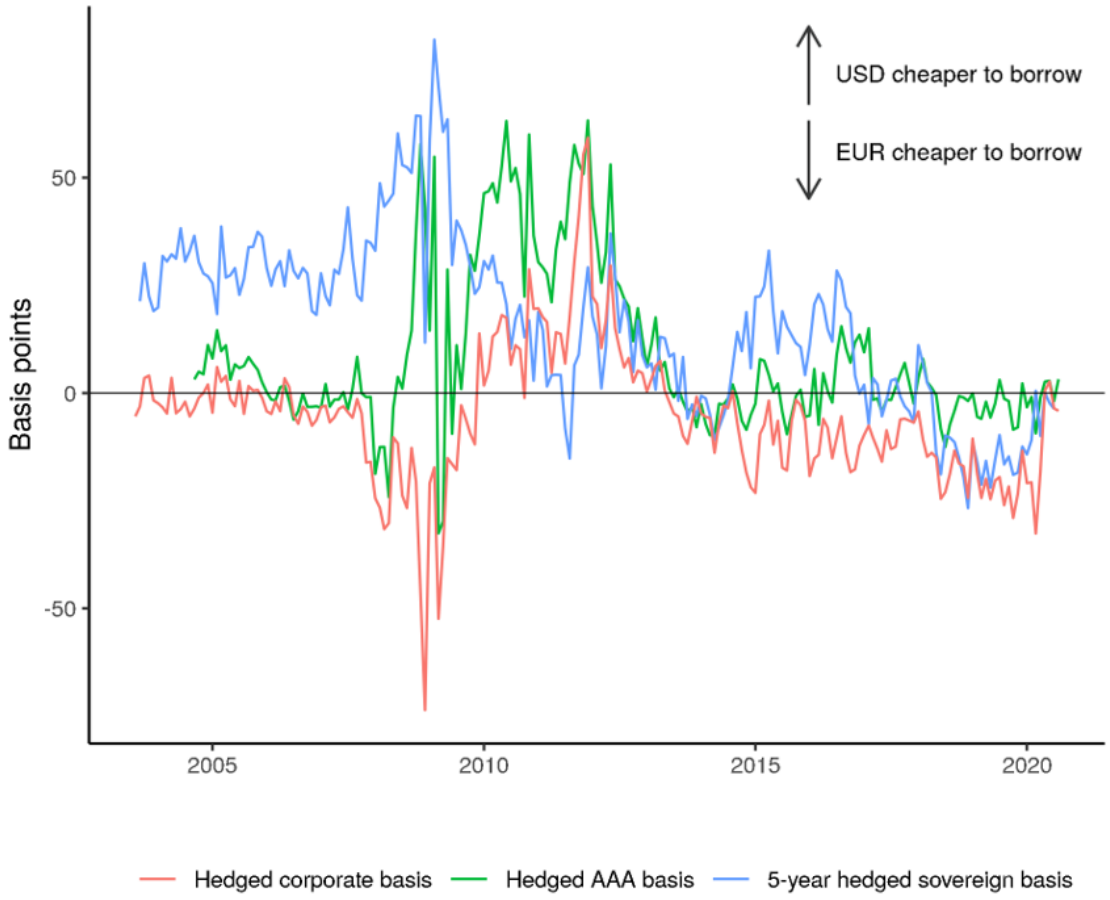
The hedged relative borrowing cost for bonds bucketed by bond rating. The sample is from 2003 to 2020 at a monthly frequency, using the monthly bond dataset.

Figure 6: EUR-USD hedged relative borrowing cost by maturity



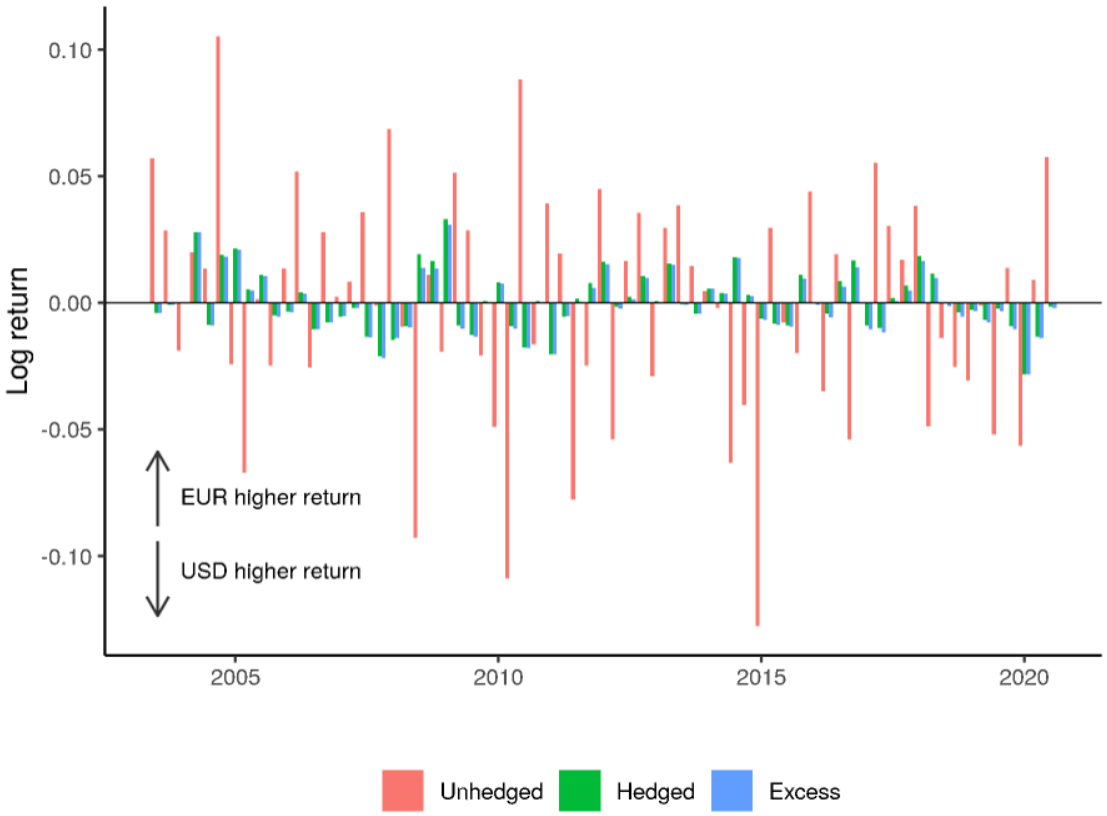
The hedged relative borrowing cost for bonds bucketed by years to maturity. The sample is from 2003 to 2020 at a monthly frequency, using the monthly bond dataset.

Figure 7: EUR-USD hedged corporate and sovereign relative borrowing cost



The hedged relative borrowing cost, the hedged relative borrowing cost for AAA bonds and the 5-year hedged sovereign basis. The sovereign basis is the currency hedged yield differential between 5-year German bunds and U.S. Treasuries. The sample is from 2003 to 2020 at a monthly frequency. The corporate bases are calculated using the monthly bond dataset. The sovereign basis is calculated using sovereign yields sourced from Bloomberg.

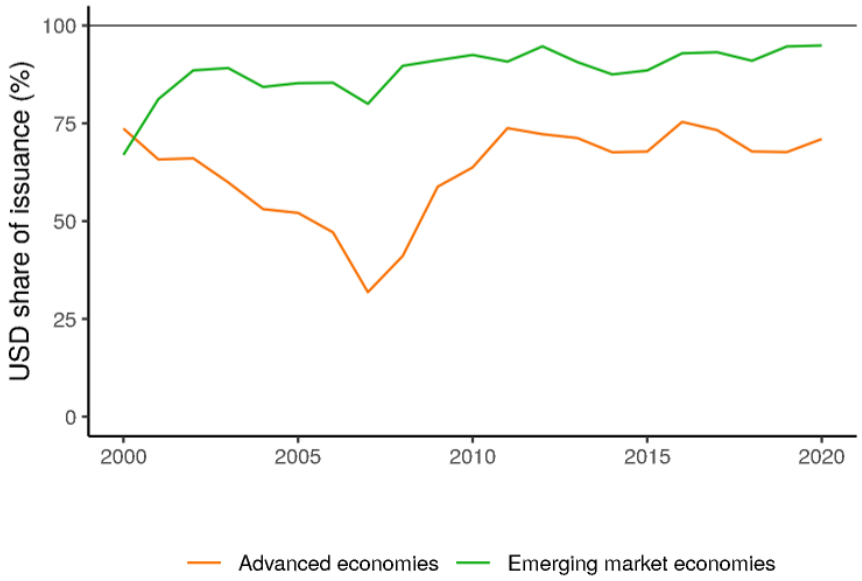
Figure 8: EUR-USD investment return differentials



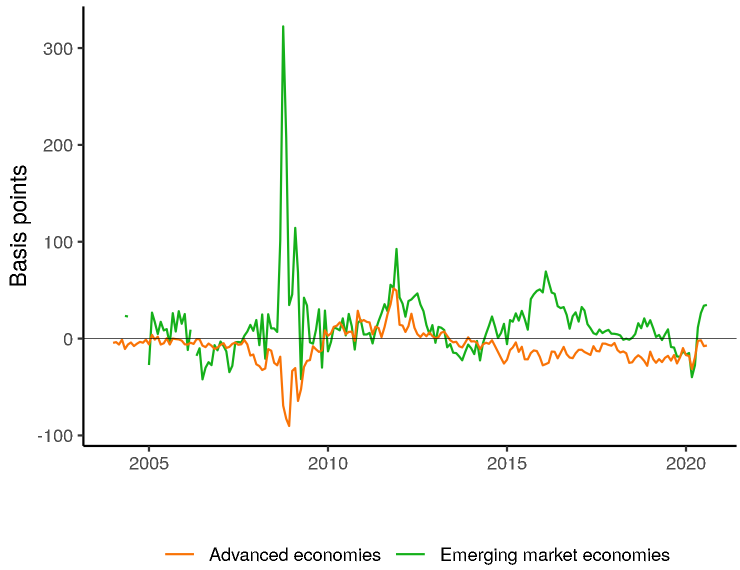
The relative log return on euro- and dollar- denominated bonds on a hedged, unhedged and excess basis. The unhedged return is composed of the euro minus dollar bond log return differential plus the euro minus dollar currency log return. The hedged return assumes currency hedging using one month forward contracts. Excess return is the log return differential in excess of respective short-term risk free rates, which are one-month OIS rates. The sample is from 2003 to 2020 at a quarterly frequency, using the monthly bond dataset.

Figure 9: Issuance and relative borrowing cost by country group

Panel A: Issuance



Panel B: Hedged relative borrowing cost



Panel A is the dollar share of new bond issuance in the euro and dollar by firms whose ultimate parent nationality is outside of the U.S. and Eurozone, aggregated by country group. We exclude bonds with less than one year to maturity at issuance. The sample is from 2000 to 2020 at an annual frequency, using data sourced from Dealogic. Panel B is the hedged relative borrowing cost for bonds bucketed by the country group of the issuer's ultimate parent's country of risk. The sample is from 2003 to 2020 at a monthly frequency, using the monthly bond dataset.

Tables

Table 1: Monthly bond data summary statistics

	All bonds			USD			EUR		
	Median	Mean	SD	Median	Mean	SD	Median	Mean	SD
Not. amt.	750.0	878.4	582.2	887.0	975.1	650.1	664.8	716.9	397.0
Maturity	5.0	7.6	5.8	5.0	7.8	6.8	7.0	7.3	3.7
N per firm	9.0	20.1	25.6	6.0	12.8	17.5	3.0	7.4	10.6
N		3,452			2,184			1,268	

Summary statistics for the monthly bond dataset. The variables are the notional amount ($ billion), number of bonds per ultimate parent and the maturity at issuance (years). The statistics reported are the median, mean and standard deviation. The sample period is from August 2003 to September 2020 at a monthly frequency. Data is sourced from Bloomberg.

Table 2: Daily bond data summary statistics

	All bonds			USD			EUR		
	Median	Mean	SD	Median	Mean	SD	Median	Mean	SD
Not. amt.	750.0	879.6	680.1	750.0	895.1	683.5	724.9	834.5	668.4
Maturity	5.0	6.9	6.1	5.0	7.0	6.6	5.1	6.4	4.5
N per firm	12.0	23.6	27.9	8.5	17.8	22.4	2.0	6.1	8.7
N		4,485			3,341			1,144	

Summary statistics for the daily bond dataset. The variables are the notional amount ($ USD), number of bonds per ultimate parent and maturity at issuance (years). The statistics reported are the median, mean and standard deviation. The sample is from January 2014 to September 2020 at a daily frequency. Data is sourced from the Bloomberg BVAL database.

Table 3: Fama-Macbeth Regression of Borrowing Costs and Returns

	(1) Hedged cost	(2) Unhedged cost	(3) Log return
Euro	-5.551*	-102.7***	-0.0536
	(3.185)	(24.55)	(0.0668)
Years to maturity			
4-7 years	28.23***	62.81***	0.122***
	(3.003)	(10.11)	(0.0444)
7-10 years	54.29***	140.3***	0.209**
	(5.002)	(15.91)	(0.0858)
10+ years	87.38***	218.3***	0.229*
	(7.779)	(22.67)	(0.137)
Rating			
AA	42.83***	42.99***	0.00974
	(8.027)	(8.691)	(0.0346)
A	65.91***	65.97***	-0.0206
	(15.09)	(16.20)	(0.0887)
BBB	94.01***	96.23***	0.0291
	(17.84)	(18.64)	(0.0873)
High yield	132.9***	135.5***	0.189
	(28.52)	(30.00)	(0.119)
Not rated	74.13***	78.50***	0.00873
	(14.98)	(15.97)	(0.0954)
Firm FE	✓	✓	✓
N	135,210	134,986	131,609
R^2	0.864	0.922	0.595

Firm clustered standard errors in parentheses.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Fama-Macbeth regression of the unhedged yield, hedged corporate basis and log return of each bond on their currency, maturity and rating. The data is winsorized on the dependent variable with a 95% window at each month to control for outliers. The sample is from 2003 to 2020 at a monthly frequency using the monthly bond dataset.

Table 4: Firm-level issuance flows

	USD share of issuance (%)					
	(1)	(2)	(3)	(4)	(5)	(6)
Hedged basis	0.091***		0.053*	0.050**		0.086***
	(0.018)		(0.027)	(0.024)		(0.024)
Unhedged basis		0.060***	0.033*		−0.007	−0.022*
		(0.011)	(0.018)		(0.011)	(0.013)
USD share $_{t-1}$	0.237***	0.234***	0.233***	0.094**	0.094**	0.090**
	(0.024)	(0.023)	(0.024)	(0.038)	(0.036)	(0.035)
Time FE	✓	✓	✓			
Firm FE				✓	✓	✓
N	2,682	2,679	2,666	2,682	2,679	2,666
Adjusted R^2	0.103	0.103	0.105	0.206	0.202	0.209

Clustered standard errors in parentheses. Standard errors are clustered on the fixed effect variable.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Regression of monthly firm-level dollar share of issuance on the firm-level hedged and unhedged corporate basis, controlling for the dollar share of issuance at $t-1$. The dollar share of issuance is the dollar share of euro and dollar issuance from a given firm over the monthly period. We exclude bonds with less than one year to maturity at issuance. The firm-level hedged and unhedged basis is the difference between a firm's median euro and median dollar bond yield or hedged credit spread. The sample is from 2003 to 2020 at a monthly frequency. The hedged and unhedged corporate bases are calculated using the monthly bond dataset. The dollar share of issuance is calculated using data sourced from Dealogic.

Table 5: Correlation of bond and equity log returns

	Unhedged	Hedged	Excess	S&P 500
Hedged	-0.216***			
Excess	-0.204***	0.998***		
S&P 500	0.422***	-0.115	-0.104	
Euro Stoxx 50	0.247***	-0.033	-0.023	0.811***

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Correlation of euro minus dollar bond log returns with equity index log returns. Unhedged return is composed of the euro minus dollar bond log return differential plus the euro minus dollar currency log return. Hedged return assumes currency hedging using one month forward contracts. Excess return is the log return differential in excess of respective short-term risk free rates, which are one-month OIS rates. The sample is from 2003 to 2020 at a quarterly frequency using the monthly bond dataset.