

Discussion of:
A. Buraschi, E. Sener, and M. Menguturk
“The Dynamics of the Limits to Arbitrage”

Jakub W. Jurek

Princeton University – Bendheim Center for Finance

April 2013

Paper Summary

The paper studies the relative pricing of EUR- and USD-denominated sovereign debt (Brazil, Mexico, Turkey) over the period 2005-2010.

1. Related literature:

- ▶ *Limits to arbitrage*: DeLong, Shleifer, Summers, and Waldmann (1990), Shleifer and Vishny (1997), Brunnermeier and Pedersen (2009), Mitchell, Pulvino, and Pedersen (2007)
- ▶ *Intermediary asset pricing*: Adrian, Etula, and Muir (2011), Garleanu and Pedersen (2011), He and Krishnamurthy (2012)
- ▶ Empirical evidence on “arbitrages” during credit crisis:
 - ▶ Treasuries-TIPS (Fleckenstein, Longstaff, and Lustig (2012))
 - ▶ Covered interest parity (Griffoli and Rinaldo (2011))
 - ▶ CDS-bond basis (Garleanu and Pedersen (2011), Bai and Collin-Dufresne (2012))

Paper Summary

The paper studies the relative pricing of EUR- and USD-denominated sovereign debt (Brazil, Mexico, Turkey) over the period 2005-2010.

1. Related literature:

- ▶ *Limits to arbitrage*: DeLong, Shleifer, Summers, and Waldmann (1990), Shleifer and Vishny (1997), Brunnermeier and Pedersen (2009), Mitchell, Pulvino, and Pedersen (2007)
- ▶ *Intermediary asset pricing*: Adrian, Etula, and Muir (2011), Garleanu and Pedersen (2011), He and Krishnamurthy (2012)
- ▶ Empirical evidence on “arbitrages” during credit crisis:
 - ▶ Treasuries-TIPS (Fleckenstein, Longstaff, and Lustig (2012))
 - ▶ Covered interest parity (Griffoli and Rinaldo (2011))
 - ▶ CDS-bond basis (Garleanu and Pedersen (2011), Bai and Collin-Dufresne (2012))

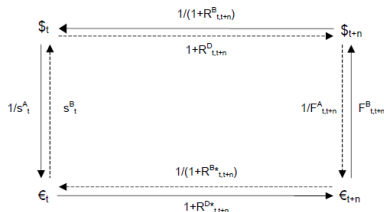
2. This paper: Spreads on USD- and EUR-denominated sovereign debt of the same obligor diverge during the credit crisis.

- ▶ Papers examine the relation between the “no arbitrage” pricing deviation and proxies for: (1) market liquidity risk; (2) funding risks; (3) global cash flow and discount rate risks; (4) short sale frictions; and (5) institutional frictions.
- ▶ Evidence points to important role of institutional frictions and funding constraints.

Arbitrage Pricing

CIRP intuition

The no arbitrage restriction linking the prices of USD bonds and hedged EUR bonds, shares the spirit of the covered interest parity restriction.



- ▶ The price of the currency forward, $F(t, T)$, must satisfy:

$$\frac{\exp(-y_d^* \cdot (T - t))}{S_t \cdot \exp(-y_e^* \cdot (T - t))} \cdot F(t, T) - 1 = 0$$

- ▶ In practice, the arbitrage trade involving the sovereign bonds is risky (\rightarrow default is similar to deal failure risk in merger arbitrage).

Arbitrage Pricing

Default and FX risk

The FX-hedged long/short sovereign bond portfolio remains exposed to **default risk**:

- ▶ Suppose the bonds can only default at T and the recovery is zero.
- ▶ The currency forward represents an obligation to sell euro and has associated with it a pre-specified *quantity*.
- ▶ Results in net FX exposure on paths with default; correlated with economic conditions.

Arbitrage Pricing

Default and FX risk

The FX-hedged long/short sovereign bond portfolio remains exposed to **default risk**:

- ▶ Suppose the bonds can only default at T and the recovery is zero.
- ▶ The currency forward represents an obligation to sell euro and has associated with it a pre-specified *quantity*.
- ▶ Results in net FX exposure on paths with default; correlated with economic conditions.
- ▶ The trade requires variable-quantity (cancellable) currency forwards.
- ▶ The timing of default further affects the net FX exposure from the currency forward hedge.

Arbitrage Pricing

Default and FX risk

The FX-hedged long/short sovereign bond portfolio remains exposed to **default risk**:

- ▶ Suppose the bonds can only default at T and the recovery is zero.
- ▶ The currency forward represents an obligation to sell euro and has associated with it a pre-specified *quantity*.
- ▶ Results in net FX exposure on paths with default; correlated with economic conditions.
- ▶ The trade requires variable-quantity (cancellable) currency forwards.
- ▶ The timing of default further affects the net FX exposure from the currency forward hedge.

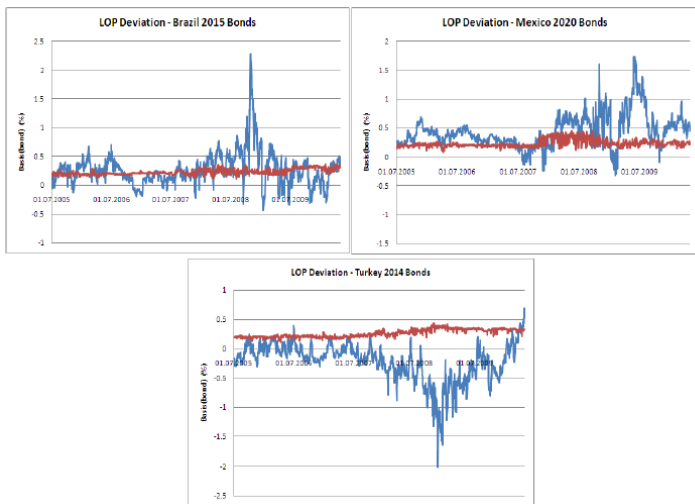
The arbitrage pricing relation (replicating portfolio) is approximate. Need to consider what is likely to happen in states where the relation fails:

- ▶ Deal failure risk in merger arbitrage is similar to short put on S&P 500 index (Mitchell and Pulvino (2001)).

Bond Basis

Sovereign debt

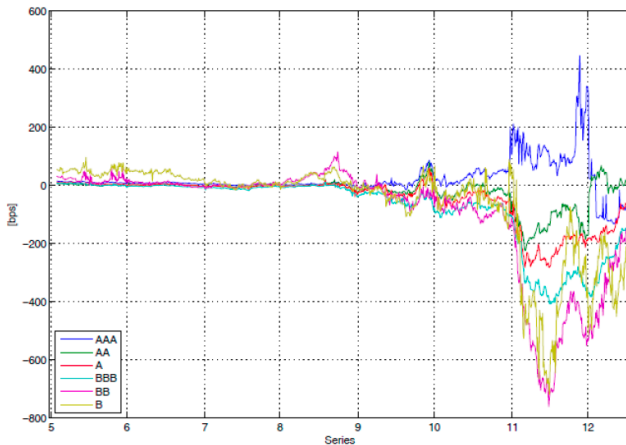
Bond Basis = YTM FX-hedged EUR-bond - YTM USD-bond



Bond Basis

Corporate debt

Magnitude of the EUR/USD bond basis is generally smaller than CDX-bond basis for rating-matched corporate bonds (Brazil (BB), Mexico (BBB+), Turkey (BB-)).



Trading Strategy

Paper focuses on regression analysis of $\Delta |\text{Basis}|$ onto proxies for liquidity, short-selling frictions and global cash flow and discount rate shocks.

- ▶ Panel regressions based on 5 bonds (full-sample: 24 EUR-bonds, 58 USD-bonds).
- ▶ Explanatory power ranges from 11% (08/07-08/08) to 45% (09/08-03/09).

Trading Strategy

Paper focuses on regression analysis of $\Delta |\text{Basis}|$ onto proxies for liquidity, short-selling frictions and global cash flow and discount rate shocks.

- ▶ Panel regressions based on 5 bonds (full-sample: 24 EUR-bonds, 58 USD-bonds).
- ▶ Explanatory power ranges from 11% (08/07-08/08) to 45% (09/08-03/09).

Use the returns to a feasible **trading strategy** to provide an economic measure of the dislocation:

1. Buy “cheap” bond via a repurchase agreement, and short the “expensive” bond via a reverse repurchase agreement. Hedge currency risk using FX forward.
2. What is the return on the arbitrageur’s capital?
 - ▶ Bid/ask spreads on the individual bonds + FX hedge → market liquidity.
 - ▶ Repo financing costs and variation in margin requirements → funding liquidity.

What drives the geography of the bond basis?

- ▶ Bank holdings of sovereign debt from Brazil and Mexico (Turkey) are concentrated in U.S. (European) institutions.
- ▶ Banks have funding advantage in local currency (→ deposit guarantee) *and* face constraints in FX forward market.
- ▶ During crisis:
 1. USD-denominated debt of Turkey becomes cheap → negative basis
 2. EUR-denominated debt of Brazil/Mexico becomes cheap → positive basis

What drives the geography of the bond basis?

- ▶ Bank holdings of sovereign debt from Brazil and Mexico (Turkey) are concentrated in U.S. (European) institutions.
- ▶ Banks have funding advantage in local currency (→ deposit guarantee) *and* face constraints in FX forward market.
- ▶ During crisis:
 1. USD-denominated debt of Turkey becomes cheap → negative basis
 2. EUR-denominated debt of Brazil/Mexico becomes cheap → positive basis

But ...

- ▶ Are banks likely to be the marginal pricers of sovereign debt?
- ▶ What is the nature of friction in the FX market?