Covered Interest Parity - RIP

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Three main points

- VERY interesting and well-written papers
- Law Of One Price and credit spreads in different currencies (Liao)
- Credit component in LIBOR rates and CIP deviations spreads (DTV)

Credit spreads and the Law of One Price (LOOP)

- Reasonable to say that CIP is based on LOOP principle
- In a frictionless model, we can prove the relationship
- However, it is not true, even without frictions, that credit risky companies should pay the same spread in different currencies
- No-arbitrage models can generate yields spreads and CDS premiums which depend on the currency
- The intuition is most easily grasped for sovereign CDS
- Quanto spreads are well known here

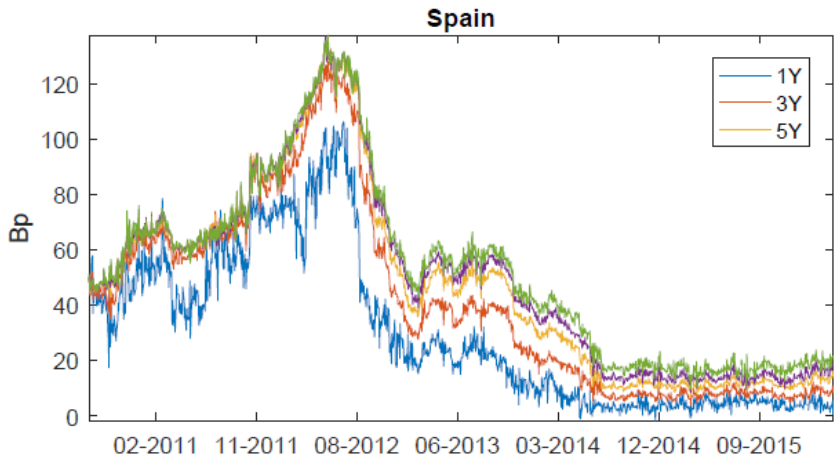
CDS quanto spreads

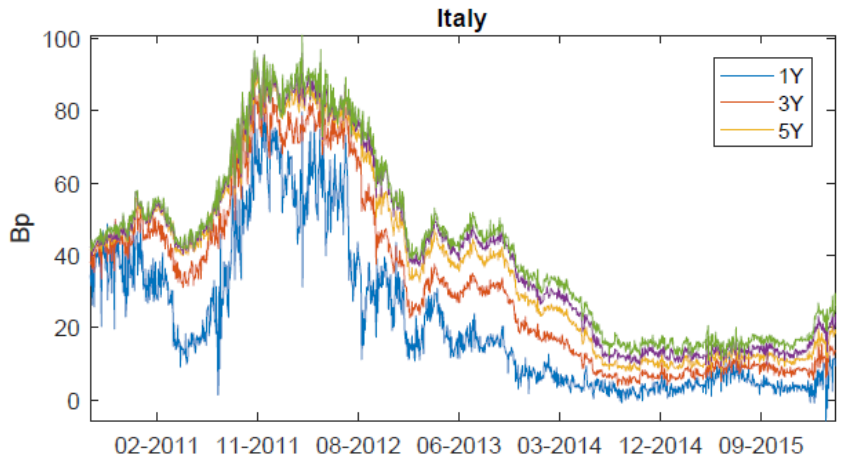
- Consider two CDS contracts on same reference sovereign entity
  1. One protecting against default on 100 USD notional - premium paid in USD
  2. One protecting against default on 100 EUR notional - premium paid in EUR
- Assuming same recovery as fraction of notional and same terms, premiums can be (and are) different even without frictions

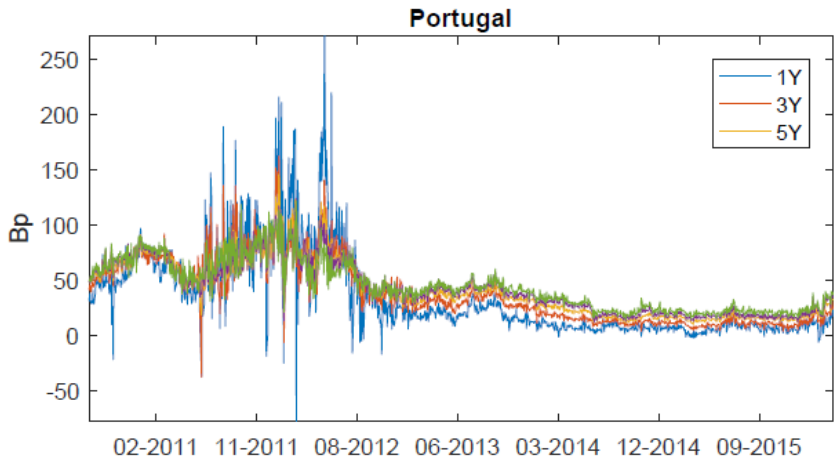
Quanto spreads for sovereigns

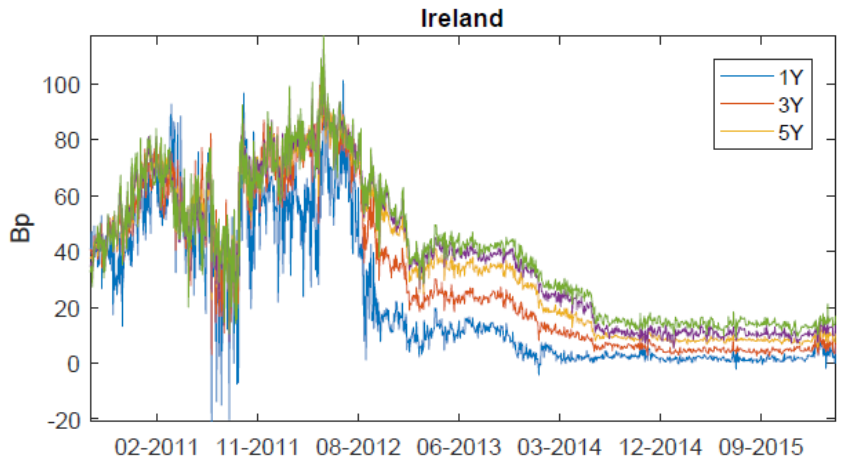
- Euro bonds can be delivered into USD contract (and vice versa) at FX rate prevailing at default
- Assume for simplicity that exchange rate is 1 USD per 1 EUR at initiation
- Assume Euro crashes at default, say, to 0.5 USD per 1 EUR
- Then it will be possible to deliver twice as many EUR bonds into USD contract, .i.e., in reality the USD contract delivers 'double protection'
- Therefore, USD CDS premium is higher than the EUR premium

Quanto spreads can be large









Source: Lando and Nielsen (2017)

Correlation instead of crash risk

- There does not have to be crash risk in the currency for a quanto effect to exist
- Correlation between the intensity of default on the sovereign entity and the exchange rate is enough
- This result carries over to corporate bonds
- Correlation between default event and exchange rate will generate currency-dependent yield spread

Crash risk and bonds

- Crash risk can also contribute to yield spread differentials for corporate bonds
- A sovereign 'disaster' may lead to an FX crash while also causing corporate defaults or large changes in default intensities
- Conversion of one bond into a synthetic bond in different currency fails because FX forwards do not cancel

Crash risk and bonds - breakdown in FX hedge

	$t=0$	No default at $t=1$	Default at $t=1$
Long USD Bond	$-P^{dom}$	1 USD	0 USD
Short Synthetic USD Bond	P^{synth}	-1 EUR $+$ 1 EUR - 1 USD	1 EUR -1 USD
Cash Flow L/S	0	0	-0.5 USD

Table: **One Period Crash Risk in Synthetic EUR Bond.** This table shows the payoffs for a short position in a synthetic EUR bond—which is a short a EUR zero coupon bond and long a forward contract—and a long position in a zero coupon bond denominated in USD. All contracts are initiated at time 0 and mature at time 1. The riskless interest rates are 0 and the exchange rate is 1 at time 0, such that $P^{synth} = P^{dom}$, and the forward exchange rate is 1. In the table the default state is a assumed to be associated with a 50 % depreciation in the EUR against the USD.

(from Lando and Nielsen (2017))

Default risk in bonds

- FX hedge also breaks down with default risk when FX risk and default intensities are correlated
- The effect is more pronounced for long-dated bonds
- In sum, emphasize LOOP less for yield spread differentials
- Or show, that in realistic arbitrage-free models the generated spreads cannot explain the observed spreads

Credit risk differentials

- Du, Tepper, Verdelhan (2017) look at - among many things - credit spreads differentials as source of CIP deviations
- Regress changes in Libor basis on changes in CDS premium differences
- It is remarkable that there is a regression coefficient of nearly zero in the regression

$$\Delta x_t^{i,Libor} = \alpha^i + \beta \Delta (cds_t^i - cds_t^{USD}) + \epsilon_t^i$$

- But does this perhaps conceal different regimes?
- Looking at LIBOR - OIS as measure of credit risk suggests that this could be the case

LIBOR - OIS differential and CIP deviation (3-month rates)