The integration of the Czech, Hungarian and Polish (NMS-3) bond markets with the euro area bond market

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Motivation to look into NMS-3 bond market integration

- Local currency bond market as channel of financial intermediation
  - Important: Main source of financing fiscal deficits
  - Sizeable: Nominal stock-to-GDP ratio ranges from 38% (PL) to 62% (HU)
  - Liquid (T/O-to-m/cap): e.g. more liquid in Poland than in Sweden

- Role of euro area yield changes in determining NMS-3 yield changes
  - Investment opportunities for risk diversification?
  - Scope for independent monetary policy?
  - Preparedness for effective monetary transmission after euro adoption?

- Conflicting results in existing literature concerning the degree of bond market integration with the euro area

- Are NMS-3 bond markets already to a similar degree integrated as the “Club Med“ (Greece, Italy, Portugal, Spain) markets were during their „convergence play“ in the run-up to euro adoption?
Sovereign 10y spreads in “Club Med“
(Local currency bonds versus DEM-EUR benchmark bonds, % points)

Note: Club-Med: last 4 years before euro adoption
Sovereign 10y spreads in NMS-3 in 2000 to 2002/2003
(Local currency bonds versus EUR benchmark bonds, % points)
Sovereign 10y spreads in “Club Med“ and in NMS-3
(Local currency bonds versus DEM-EUR benchmark bonds, % points)

Note: “Club Med“: last 4 years before euro; NMS-3: at the end of the first bull period in 2002-2003
Measures of bond market integration

• Quantity-based measure
  - e.g. share of non-domestic bond holdings in total bond volume
  → HU (30%) and PL (20%) more integrated than CZ (10%)

• Yield-based (price-based) measure → yield levels, yield spreads
  - Criterion: Does the law of one price hold?
  → CZ more integrated than PL and HU (as shown in chart above)

• News-based measure → yield changes
  - Criterion: Are local yield changes driven by common (vs. local) news?

→ Our opinion: Higher degree of bond market integration corresponds to convergence in both yield levels and yield changes
Methodological approach

• How to measure the impact of „common news“?
  → Regression of local yield changes on benchmark yield changes:

  \[ \Delta R_{i,t} = \alpha + \beta \Delta R_{b,t} + \varepsilon_t \]

• Higher degree of bond market integration corresponds to larger impact of „common news“, whereby
  - Intercept term (impact of local news) converges towards zero
  - Slope coefficient (sensitivity) converges towards one
  - Benchmark-to-local yield volatility ratio converges towards one
  - \( R^2 \) increases towards one

\[ \rho_{x,y} = \beta \frac{\sigma_b}{\sigma_i} \]

→ We performed GARCH regressions for NMS-3 bond yields and for “Club Med“ yields as point of reference
  - Findings based on correlation, volatility ratios and regression results
Sensitivity to benchmark yld chg in “Club Med”
(Bivariate regressions of 10y yield changes on benchmark yield changes)

Note: “Club Med”: last 4 years before euro adoption
Benchmark-to-local yield volatility ratio in “Club Med“
(Bivariate regressions of 10y yield changes on benchmark yield changes)

Note: “Club Med“: last 4 years before euro adoption
Explanatory power of regressions in “Club Med“  
(Bivariate regressions of 10y yield changes on benchmark yield changes)

Note: “Club Med“: last 4 years before euro adoption
Summary: Yield convergence in “Club Med“

Before euro adoption:
• Yield levels:
  - spreads against DEM-EUR benchmark yields decreased considerably

• Yield changes:
  - Increase of correlation (of $R^2$) in the run-up to euro adoption
    • driven by decline in ClubMed yield volatility relative to DEM-EUR yld vola
  - $R^2$ below 1, namely between 0.40 (GR) and 0.70 (IT)
    in the last year before euro adoption

After euro adoption:
• Spreads decreased further
• Regression betas increased to 0.8 (GR) and 1.0 (ES, IT, PT) in t+4
  $\Rightarrow R^2$ increased to 0.75 – 0.96
Has bond market integration in NMS-3 increased?

• Yield levels:
  - After spread widening from Q2-2003 to Q3-2004
  - Spreads narrowed again to levels close to those before the widening

• Yield changes: Development from 2000 to 2005
  - Sensitivity (beta) increased considerably only in CZ
  - Volatility ratio increased further in CZ (from an already high level)
    • It increased considerably also in PL (from a low level)
  - Correlation ($R^2$) increased in CZ
    • It increased slightly in PL

To sum up: Evidence on convergence in yield levels & changes:
  - CZ: convergence process in place
    • despite temporary spread widening
  - PL: no clear cut convergence process
  - HU: nearly no convergence process on-going
Sensitivity to benchmark yld chg in “Club Med“ and in NMS-3
(Bivariate regressions of 10y yield changes on benchmark yield changes)

Note: “Club Med“: last 4 years before euro; NMS-3: in 2002/2003 to 2005-q1
Benchmark-to-local yld vola ratio in “ClubMed“ and in NMS-3 (Bivariate regressions of 10y yield changes on benchmark yield changes)

Note: “Club Med“: last 4 years before euro; NMS-3: in 2002/2003 to 2005-q1
Explanatory power of regressions in “Club Med“ and in NMS-3
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Possible reasons why the CZ bond market is different

• Possibility of idiosyncratic, e.g. institutional issues at work in CZ

• Possibility of negative relation between (higher) quantity-based integration of PL and HU bond markets and their (lower) news-based integration,
  – because: foreign investors may have been more sensitive to policy inconsistency

• Possibility that the yield level (as opposed to yield dynamics) plays a role for news-based yield convergence
  → Plotting quarterly average 10y yield spreads (vs. EUR) against R^2s of quarterly GARCH regressions …
Quarterly average 10y yield spreads against $R^2$s of quarterly GARCH regressions

Average spread vs. EUR 10Y in % points
Summary and Conclusions I

• Despite yield convergence on the basis of yield level-based measure, according to the yield changes-based measure of integration
  – HU and PL bond markets are less integrated with the euro area than “Club Med“ was 2y (GR) or more (ES, IT, PT) prior to euro adoption
  – Only the CZ bond market shows integration levels comparable to “Club Med“ 2y prior to euro adoption

• The difference between HU & PL and CZ may be (partly) due to the particularly low level of yield spreads already achieved in CZ

• Implications of currently comparatively low integration in PL & HU
  – It offers room for risk diversification
  – It limits spillover effects that may interfere with monetary policy
    ... so far so good ...
Summary and Conclusions II

- However:
  - effective transmission of monetary policy signals will require stronger bond market integration once these countries gradually reduce their monetary policy independence during their progress in monetary integration (ERM II, euro adoption)

- On the other hand:
  - “Club Med“ experience indicates that bond market integration may be to a large extent endogenous to the monetary integration process (participation in ERM, euro adoption)
Thank you for your attention!

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(Local currency bonds versus DEM-EUR benchmark bonds, %-points)

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NMS-3 bond yield spreads against the euro area

NMS-3 yield spreads against EUR 10Y yield

in percentage points

Quelle: Bloomberg.
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Benchmark-to-local volatility ratio in Club-Med and in NMS-3
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