Issuing GDP-linked bonds: demand and supply can match

Jean-Marc Fournier and Jakob Lehr
OECD Economics Department
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BETTER POLICIES FOR BETTER LIVES

Demand and supply – Government and investors

Government

- What is the government's willingness to pay to insure its budget?
- What drives the stabilisation properties of GLBs, e.g. persistence.
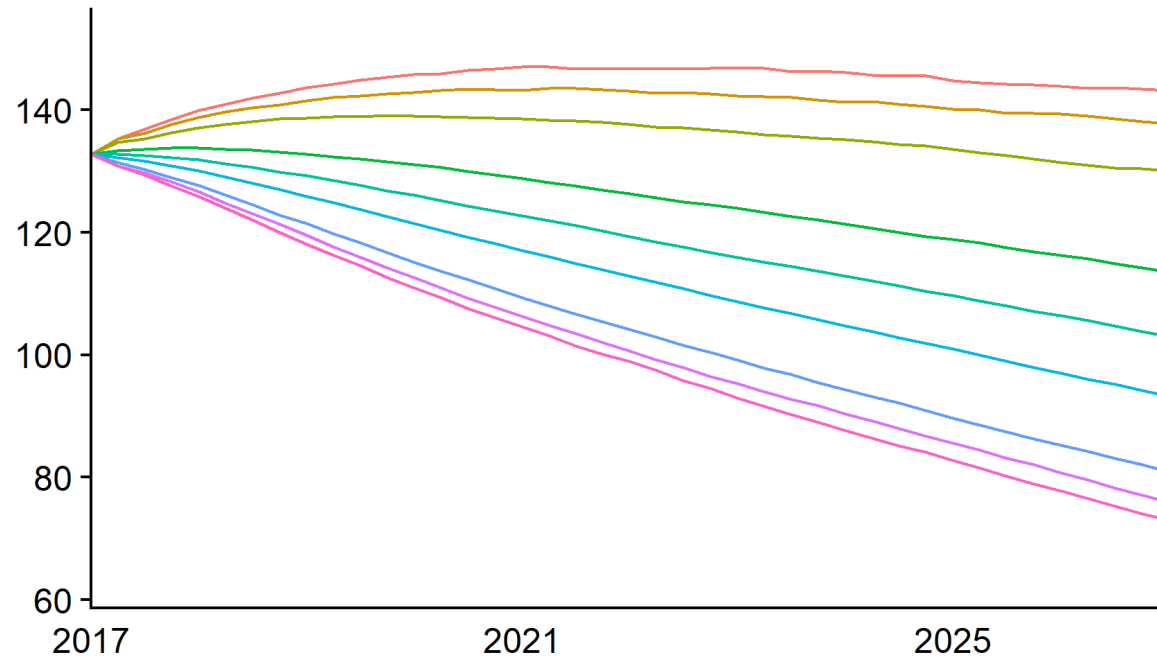
Investors

- What is the growth risk premium that investors will demand?
- Estimates from a CAPM taking persistence of shocks into account.

Reduction of debt uncertainties

% of GDP

Italy: conventional debt

- **Conventional bonds:**

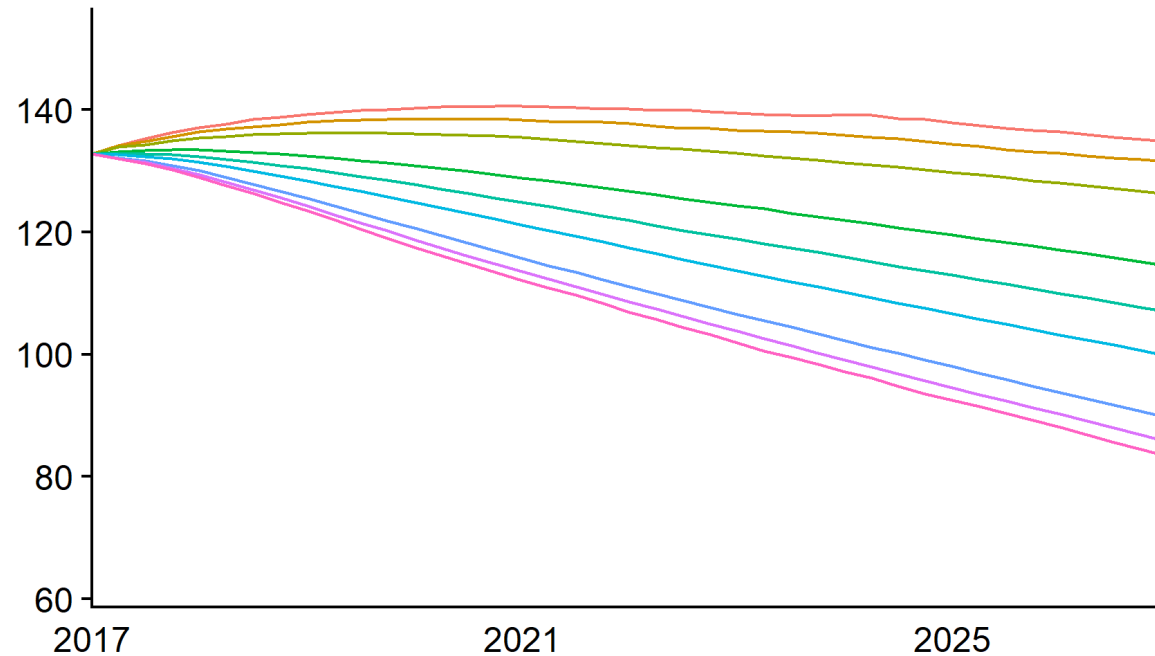$$Var(\Delta d_t) = Var(pb_t) \; +$$

$$d_{t-1}^2 Var(r_t - g_t) \; -$$

$$d_{t-t} Cov((r_t - g_t), pb_t)$$

Reduction of debt uncertainties
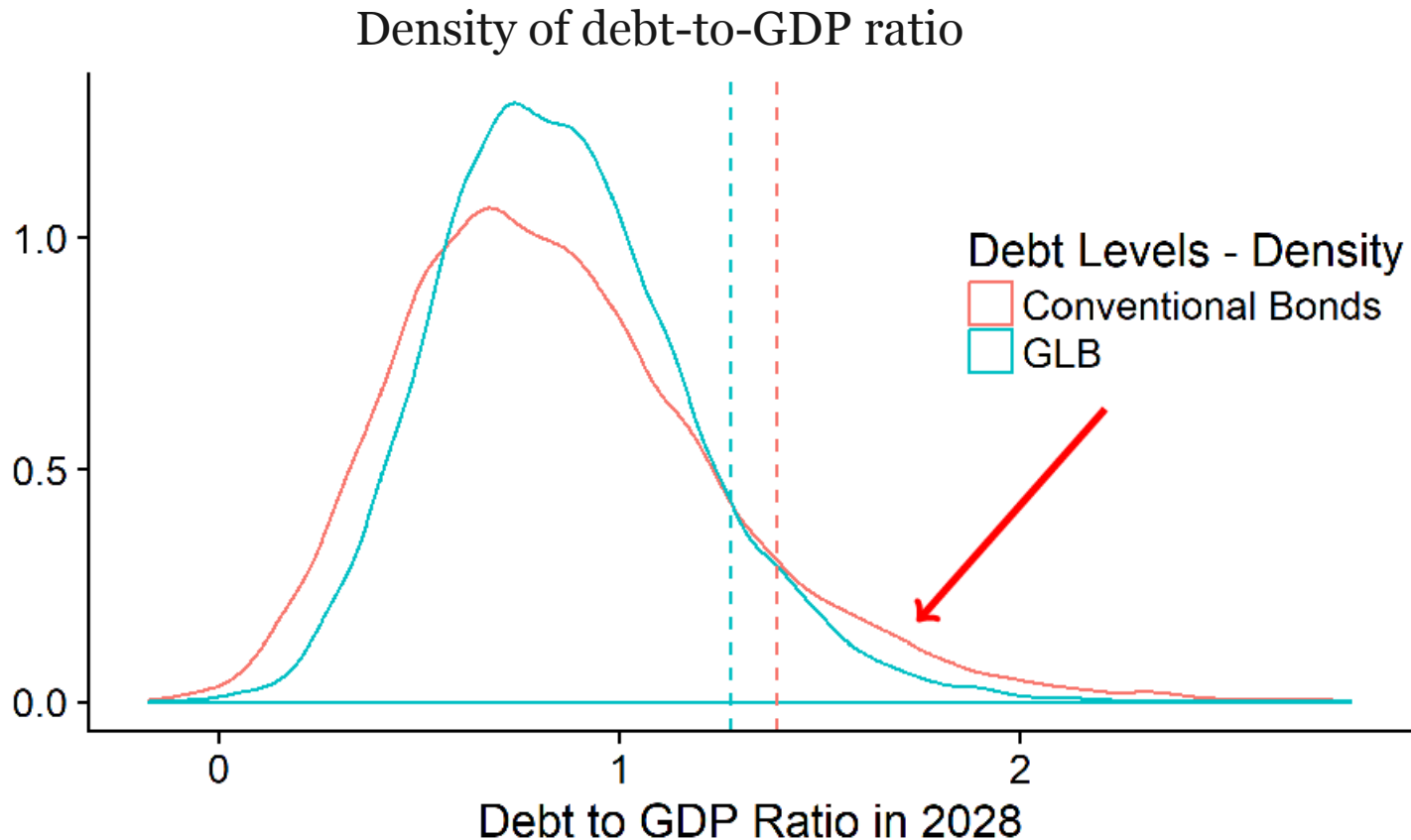
% of GDP

Italy: GDP-linked debt

- **GDP linked debt :**

$$Var(\Delta d_t) = Var(pb_t)$$

Insurance against tail events – an acceptable premium
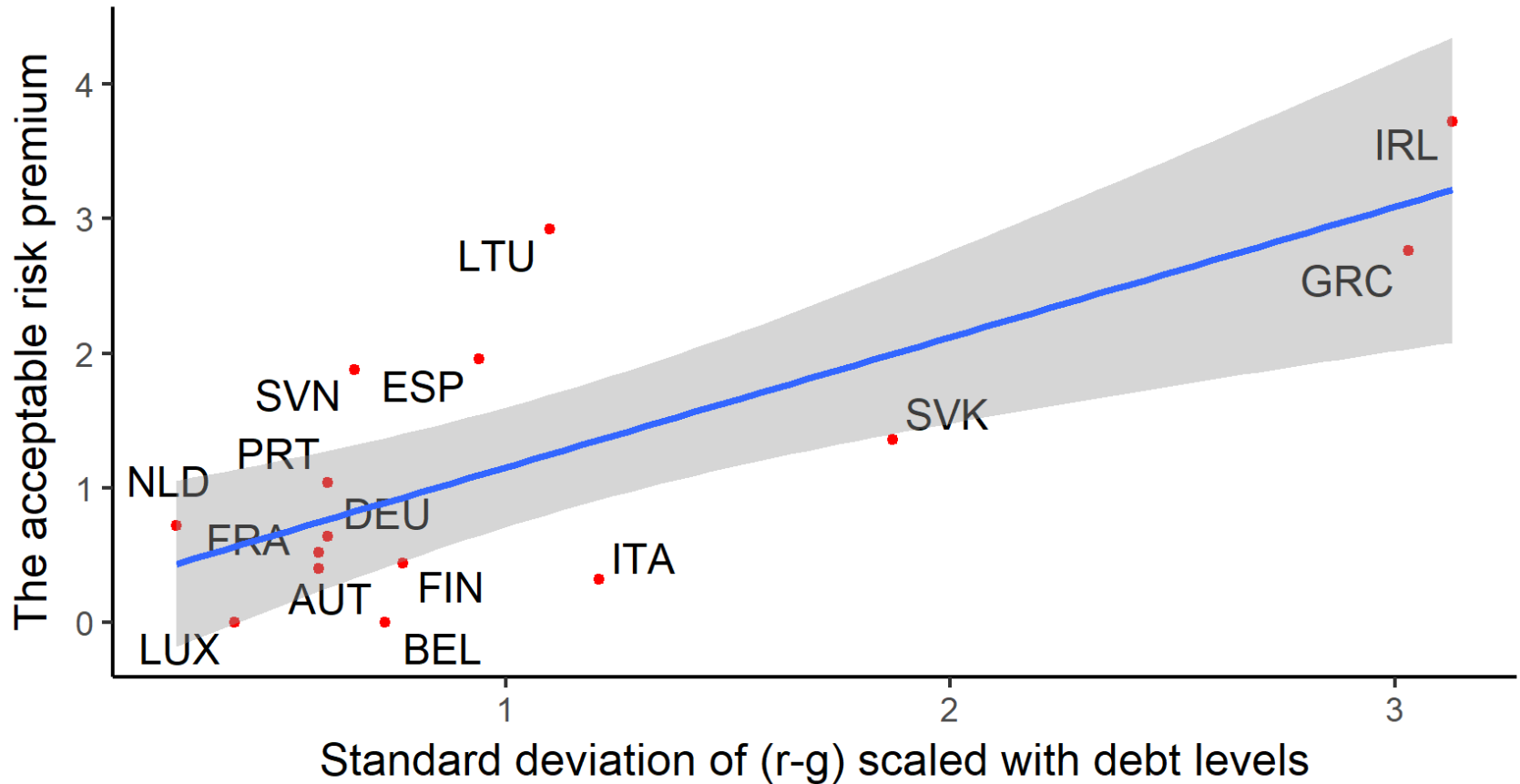
Density of debt-to-GDP ratio

- Dashed lines at the 90th percentiles.
- What risk premium makes the two lines coincide?

Stabilization effect: magnitudes and drivers

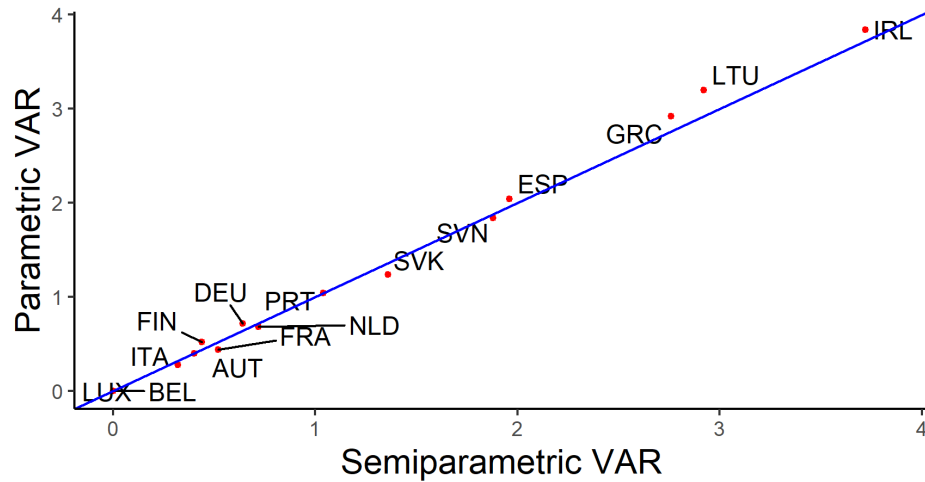The acceptable premium and the standard deviation of (r-g) * debt

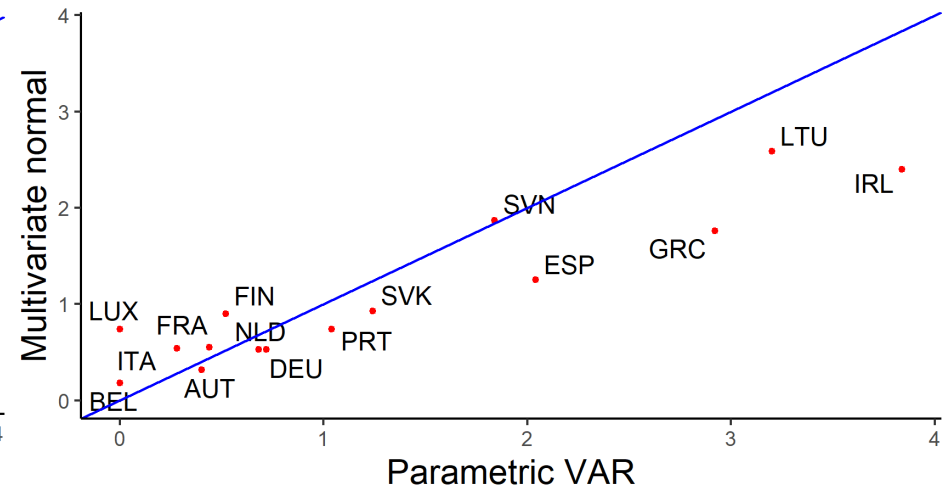- The average of the acceptable premium is 1.25%.

Magnitudes and drivers of the premium

Acceptable risk premiums, baseline vs. parametric VAR

Acceptable Risk Premiums, VAR vs MVRN

- Persistence matters more than fat tails.

Demand side: what risk premium compensates for GDP volatility

Estimation steps

1 • Estimating the growth process (ARMA or VAR)

2 • Extracting the persistence factor and the innovation

3 • Calculating the risk premium (CAPM)

Demand side: the return on a GLB

- The price of a GLB depends on the expected pay-off.
- The change of the price in each period reflects changes in the GDP forecast for all future periods k: $E(g_k|I_t) - E(g_k|I_{t-1})$.
- Thus the higher the persistence the higher the risk that is insured.
- For the CAPM this implies:

$$RP = (r_m - r_f) \frac{Cov\left(r_m, \dfrac{\sum_{k=t-1}^{+\infty} \dfrac{1}{(1+r)^{k-t}}\left(E(g_k|I_t) - E(g_k|I_{t-1})\right)V}{P_{t-1}}\right)}{Var(r_m)}$$

Demand and Supply, Bonds and Equity
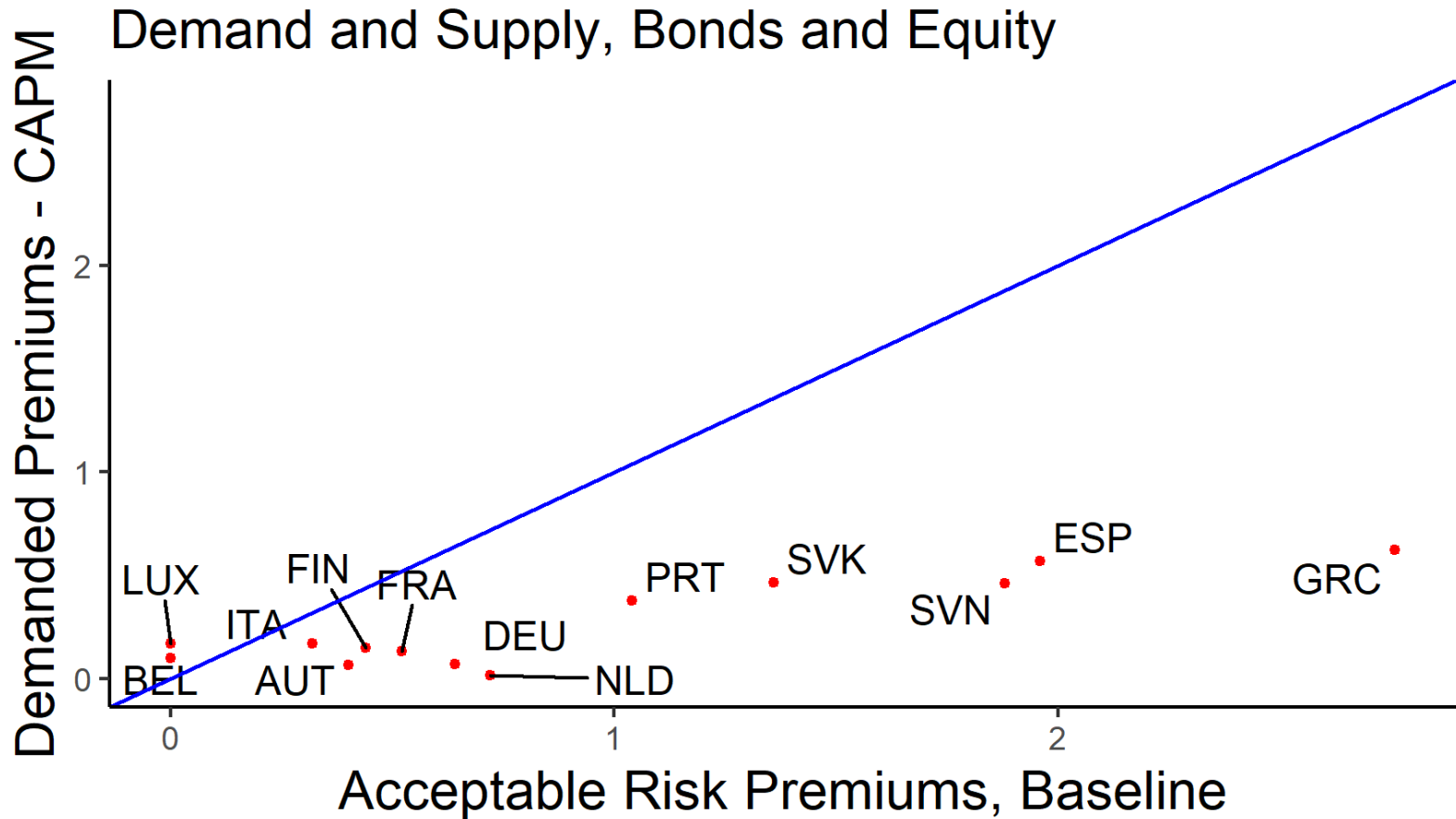
Conclusion

- The persistence of shocks captured by a VAR structure matters.

- Persistence has also to be taken into account on the investor side: it increases the risk premium.
  → "There is more to insure".

- The risk-premium that compensates for GDP volatility looks acceptable: this risk premium shifts the median debt level upwards but extremely high debt levels remain less likely.

- Government thus might want to "tap the market".