The Global Credit Cycle

Nina Boyarchenko and Leonardo Elias

Federal Reserve Bank of New York, CEPR and CESIfo

Ninth ECB Annual Research Conference

Frankfurt, September 20, 2024

Motivation: Is there a global component to local credit cycles?

- Two parallel but disconnected literatures:
  - Global Financial Cycle (GFCy):
    - Common variation in global asset prices
    - Global factor historically strongly correlated with VIX
  - Local credit cycles:
    - Local credit growth predicts adverse future real outcomes
    - Local expansions in quantity of credit coincident with compressions in the price of credit particularly pernicious

Motivation: Is there a global component to local credit cycles?

- Two parallel but disconnected literatures:
  - Global Financial Cycle (GFCy):
    - Common variation in global asset prices
    - Global factor historically strongly correlated with VIX
  - Local credit cycles:
    - Local credit growth predicts adverse future real outcomes
    - Local expansions in quantity of credit coincident with compressions in the price of credit particularly pernicious

- Why could there be a global component to local credit cycles?
  - GFCy proxies for global risk aversion in bank sector $\Rightarrow$ decreases in the quantity of bank-provided credit locally
  - GFCy proxies for global risk premia $\Rightarrow$ decreases in local prices of credit

- But GFCy potentially not the "right" measure of global credit cycles (GCC)
  - Less dependence on bank intermediated credit over time
  - Differential pricing of volatility in equity and corporate bond markets

▸ Return predictability

This paper

Construct a measure of the global credit cycle

- Targeted to predict one-month bond-level and country-level equity returns in a large panel of countries
- Non-linear factor estimated via reduced-rank regressions

This paper

Construct a measure of the global credit cycle

- Targeted to predict one-month bond-level and country-level equity returns in a large panel of countries
- Non-linear factor estimated via reduced-rank regressions

The global credit factor:

- Predicts asset returns
    - Across countries, subsamples, horizons, asset classes . . .
    - Monotonic factor loadings: across assets within a country, across countries
    - Flight-to-safety: low expected returns for safest, high expected returns for riskiest following credit factor tightening

This paper

Construct a measure of the global credit cycle

- Targeted to predict one-month bond-level and country-level equity returns in a large panel of countries
- Non-linear factor estimated via reduced-rank regressions

The global credit factor:

- Predicts asset returns
- Predicts local quantities of credit
  - Predict extreme debt capital flow events in particular
  - Predict declines in stock of private debt outstanding

This paper

Construct a measure of the global credit cycle

- Targeted to predict one-month bond-level and country-level equity returns in a large panel of countries
- Non-linear factor estimated via reduced-rank regressions

The global credit factor:

- Predicts asset returns
- Predicts local quantities of credit
- Predicts local real activity
  - Lower GDP growth
  - Higher probability of extreme GDP downturns

This paper

Construct a measure of the global credit cycle

- Targeted to predict one-month bond-level and country-level equity returns in a large panel of countries
- Non-linear factor estimated via reduced-rank regressions

The global credit factor:

- Predicts asset returns
- Predicts local quantities of credit
- Predicts local real activity
- Predictability in- and out-of-sample

This paper

Construct a measure of the global credit cycle

- Targeted to predict one-month bond-level and country-level equity returns in a large panel of countries
- Non-linear factor estimated via reduced-rank regressions

The global credit factor:

- Predicts asset returns
- Predicts local quantities of credit
- Predicts local real activity
- Predictability in- and out-of-sample

Tightening in global credit prices $\Rightarrow$ higher probability of debt portfolio flow stops $\Rightarrow$ Slowdown in growth $\Rightarrow$ Higher probability of growth crises

Outline of talk

1. Data and methodology

2. Return predictability

3. Real activity predictability

4. Out-of-sample

Data and methodology

Credit market data

1. Secondary market: quotes from

   - Lehman-Warga Fixed Income database: U. S. only, monthly, 1973 – 1998

   - ICE-BAML global corporate bond and global corporate bond high yield indices: international bonds issued in global currencies, 1997 – 2022

   - Use to construct bond-level excess returns from the perspective of U. S. investor
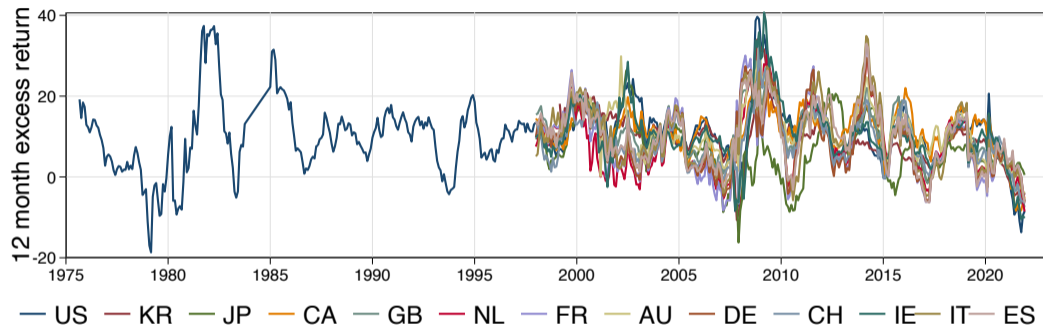
2. Firm-level expected default frequencies: Moody's KMV CreditEdge

   - Augmented Merton (1973) model

   - Use to construct bond-level default adjusted credit spreads (controls in return predictability)

Data details in Boyarchenko and Elias (2023): "The good, the bad, and the ugly of international debt market data"

Time-series average bond-market returns

- Large degree of comovement in global corporate bond returns

Factor construction: Basic idea

Corporate bond and equity expected returns related but distinct nonlinear functions of VIX and U. S. credit spreads

$$Rx_{i,t+h} = a_{i,h} + \varphi_{i,h} \left(\mathsf{VIX}_t, \mathsf{CS}_t \right) + \epsilon_{i,t+h}$$

- Approximate $\varphi_{i,h} \left(\mathsf{VIX}_t, \mathsf{CS}_t \right)$ as a cubic polynomial in VIX and credit spreads $\Rightarrow$

$$Rx_{i,t+h} = a_{i,h} + c_{i,h} X_t + \epsilon_{i,t+h}; \quad \underset{m \times 1}{X_t} = \left[CS_t, VIX_t, CS_t VIX_t, \dots, VIX_t^3 \right]$$

- Restrictions:
    - Common coefficients within a country-asset group: $c_{i,h} = c_{g,h} \ \forall i \in g$
    - Common factors across countries/assets: $c_h \equiv b_h \gamma_m', \ \gamma_m': \ r \times m, \ r < m$
- Factors: $\gamma_m' X_t$
- Estimated via ranked-reduced regression

Intuition

- Nonlinearity:

    - Theory: occasionally binding constraints for market participants (intermediaries)

    - Practical: nonlinearity in e.g. equity returns (Adrian et al. 2019)

- Two common factors:

    - Global intermediaries

   - But potentially different intermediaries for bonds and equities (e.g. NBFIs vs banks)

Implementation

- 22 countries: 13 AE, 9 EM

- 4 asset categories: above BBB-rated bonds, BBB-rated bonds, HY bonds, equities

- One-month ahead return predictability

- Bond-level returns; MSCI total index returns for equities

- Non-financial, senior corporate bonds only
  - Domicile based on ultimate parent
  - Non-financial based on ultimate parent

- Bond return predictability controls for:
  - Bond-level: duration-matched spread, duration, convexity, coupon, amount outstanding, callability, . . .
  - Firm-level: expected default frequency, industry

▸ Data details

Global risk and credit factors
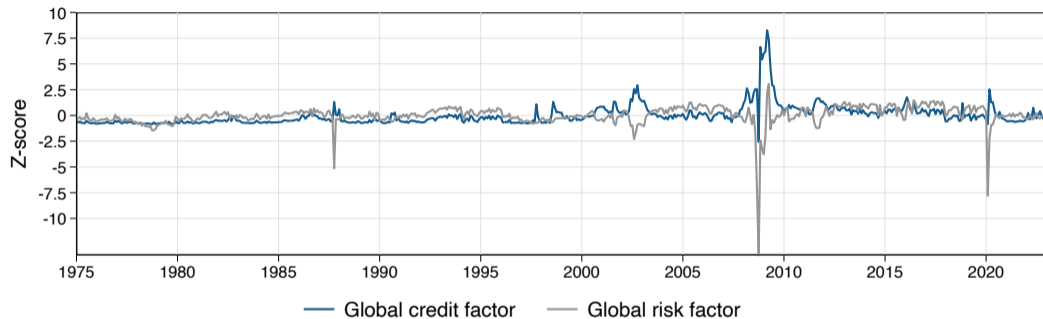
- Both large during the financial crisis and the pandemic
- Episodes with significant movement in global credit but not global risk (eg late 1990's)

‣ Correlations

Return Predictability
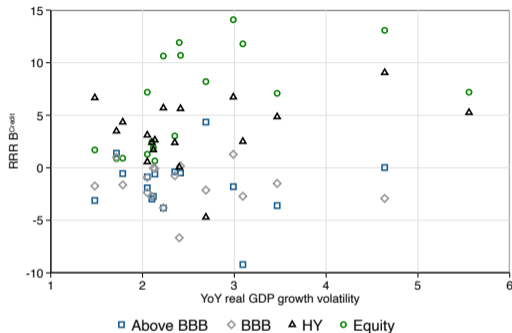
Return predictability

$$Rx_{i,t+1} = \beta_{c,r}^{credit}\text{global credit}_t + \beta_{c,r}^{risk}\text{global risk}_t + \gamma_i\text{Bond/firm controls}_t + \epsilon_{i,t+1}$$

	AE			EM		
	US	AU	DE	CN	MX	BR
Above BBB:						
Global credit	1.38***	-3.83***	-2.98***	-1.05	-3.60***	-1.80***
Global risk	0.06***	0.01	0.11***	0.16***	0.28***	0.31***
	[331,569]	[5,424]	[20,867]	[2,651]	[1,307]	[312]
	[0.01]	[0.01]	[0.01]	[0.02]	[0.02]	[0.12]
BBB:						
Global credit	1.00***	-3.81***	-2.72***	-5.29***	-1.49	1.28*
Global risk	0.25***	0.09***	0.16***	0.21***	0.69***	0.44***
	[334,183]	[6,346]	[18,217]	[1,353]	[4,808]	[4,097]
	[0.03]	[0.01]	[0.01]	[0.02]	[0.13]	[0.06]
High yield:						
Global credit	3.49***	5.69***	2.41**	7.34**	4.85	6.73***
Global risk	0.55***	0.89***	0.42***	0.64***	1.25***	0.94***
	[169,068]	[1,270]	[5,023]	[1,008]	[1,670]	[5,859]
	[0.07]	[0.12]	[0.03]	[0.04]	[0.05]	[0.13]
Equities:						
Global credit	0.87	10.64***	2.45	9.27***	7.08***	14.09***
Global risk	1.00***	1.57***	1.41***	1.21***	1.57***	1.84***
	[576]	[288]	[576]	[288]	[288]	[264]
	[0.10]	[0.24]	[0.10]	[0.09]	[0.15]	[0.13]

- $\beta_{US,BBB}^{credit} \equiv 1$; $\beta_{US,Eq}^{risk} \equiv 1$

- +ive $\beta \Rightarrow$ high global credit/risk factor $\to$ high expected excess return

- Flight to safety:
  - Within each country
    Above BBB $\leq$ BBB $<$ HY $<$ Equity
  - Across countries

- GCC distinct from GFC
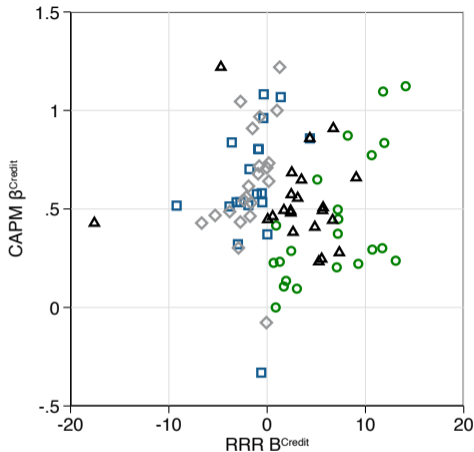 - e.g. AE equity mostly doesn't load on global credit factor

▸ Appendix

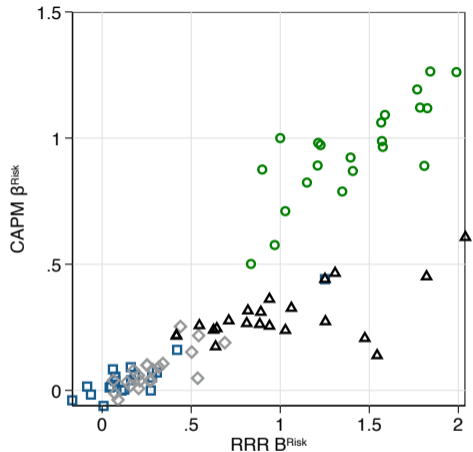# Higher factor loading for more volatile countries...
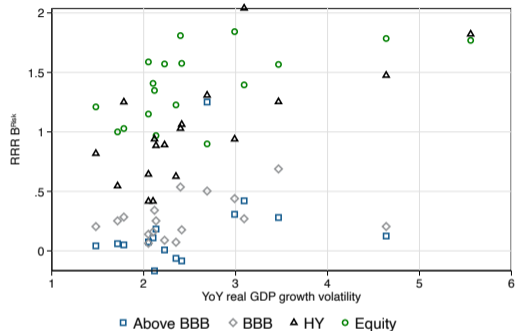
- Both β^{risk} and β^{credit} increasing in country volatility

. . . and riskier assets

□ Above BBB ◇ BBB ▲ HY ○ Equity

- Both β^{risk} and β^{credit} increasing in asset β

Is return predictability driven by GFC/pandemic?

E.g.: Germany BBB

	Full sample	Normal	GFC	2020	2021 − 2022
Global credit	-2.72***	-3.26***	-7.15***	3.48***	-4.77***
Global risk	0.16***	-0.28***	0.16**	0.38***	1.21***
Adj. R-sqr.	0.01	0.01	0.05	0.13	0.03
N. of obs	18,217	10,825	1,009	2,336	4,046

- Normal: pre July 2007, Jan 2010 − Dec 2019
- Amplified during GFC but switches signs during the pandemic
- +ive β^{risk} driven by GFC and pandemic

Predicting real outcomes

Recap: Global credit cycle in asset prices

What about economic activity?

- Does a global credit cycle in asset prices translate into a credit cycle in credit quantities?
- Does a global credit cycle translate into a local business cycle?

Show in two steps:

1. GCC and international capital flows

2. GCC and local business cycles

Capital flow events

- Quarterly data on gross international capital flows disaggregated by

    - Type: total, debt portfolio, equity portfolio, bank/other

    - Residency of the asset: foreign vs domestic

    - Eg: debt portfolio flows by foreign investors

- Identify quarters of extreme flows as in Forbes and Warnock (2012, 2021): stops, surges, flights, retrenchments

- Complimentary log-log regression for event probability

$$\mathsf{Prob}\left(e_{i,t} = 1\right) = 1 - \exp\left(-\exp\left(\beta_e^{credit}\Delta\mathsf{global\ credit}_{t-1} + \beta_e^{risk}\Delta\mathsf{global\ risk}_{t-1}\right.\right.$$
$$\left.\left. + \beta_{t-1}^{Global}X_{t-1}^{Global} + \beta_t^{Contagion}X_t^{Contagion} + \beta_{i,t-1}^{Local}X_{i,t-1}^{Local}\right)\right)$$

GCC tightening ⇒ Higher probability of capital flow stops

| | Full sample | | | | Normal | | | |
	Total	Debt portfolio	Equity portfolio	Bank/other	Total	Debt portfolio	Equity portfolio	Bank/other
L.ΔGlobal credit	0.31***	0.33***	0.29***	0.14***	0.21**	0.25***	0.06	-0.08
L.ΔGlobal risk	-0.18***	-0.11***	-0.12***	-0.12***	-0.07	0.00	-0.01	-0.08
L.Global liquidity	0.02*	0.02	0.01	0.03	-0.00	-0.00	-0.01	0.01
L.Global interest rates	0.06**	0.07**	0.11***	0.08***	0.10***	0.10***	0.14***	0.11***
L.Global GDP growth	-0.26***	-0.02	0.03	-0.32***	-0.18**	0.18***	0.13*	-0.31***
Regional contagion	0.53***	0.37***	0.25*	0.17	0.44***	0.33**	0.17	0.06
L.Local GDP growth	-0.08***	-0.01	-0.01	-0.09***	-0.09***	-0.02	-0.02	-0.10***
Log pseudolikelihood	-6211.94				-5297.39			
N. of obs	4,357				4,005			

- Full sample predictability across flow types

- Normal period predictability through predictability of debt portfolio stops only

⇒ GCC in asset prices translating into GCC in debt portfolio flows

- 1 st dev tightening in global credit factor → 2% increase in stop probability during normal times

Paper: results for other types of capital flow events consistent with global to local transmission primarily through debt portfolio flows

GCC and local business cycles

Global VAR intuition: local business cycles reflect local, foreign (trade partner), and global conditions

$$\Delta_h y_{i,t,t+h} = \alpha_h + \sum_{l=0}^{L} \beta_{credit,h}^{(l)} \text{Global credit}_{t-l} + \sum_{l=0}^{L} \beta_{risk,h}^{(l)} \text{Global risk}_{t-l}$$

$$+ \sum_{l=0}^{L} \beta_{y,h}^{(l)} \Delta y_{i,t-l+1,t-l} + \sum_{l=0}^{L} \beta_{y,h}^{*,(l)} \Delta y_{i,t-l+1,t-l}^{*}$$

$$+ \sum_{l=0}^{L} \beta_{r,h}^{(l)} \text{real rate}_{i,t-l+1} + \sum_{l=0}^{L} \beta_{r,h}^{*,(l)} \text{real rate}_{i,t-l+1}^{*} + \epsilon_{i,t}$$

- Local projections for h year log real GDP growth, growth in private credit/GDP
- Local conditions $\Delta y_{i,t-1,t}$: domestic local real GDP growth, domestic growth in private credit/GDP
- Foreign conditions $\Delta y_{i,t-1,t}^{*}$: foreign growth in private credit/GDP = trade-weighted average of other countries' growth in private credit/GDP
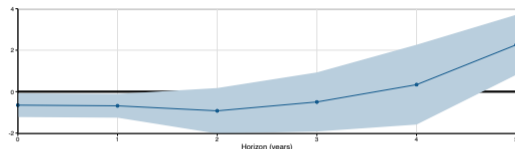
Capital flow stops ⇒ credit cycle in quantities
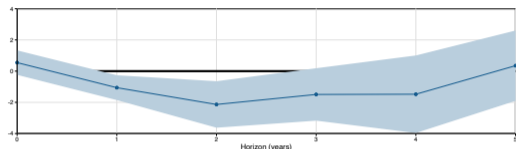
Global credit factor → Private credit growth   Global risk factor→ Private credit growth

- Tightening in global credit factor → long-lived decline in stock of private credit

- Long lags of global risk factor tightening → credit quantities respond to GCC in the short run, GFCy in the long run

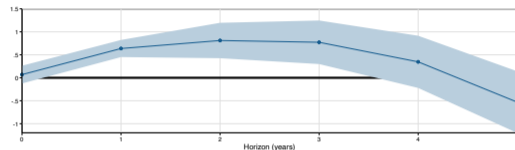- 1 st dev tightening in global credit factor → 2 p.p. lower cumulative growth in private credit/GDP 2-3 years ahead

Credit cycle in quantities ⇒ average real activity...
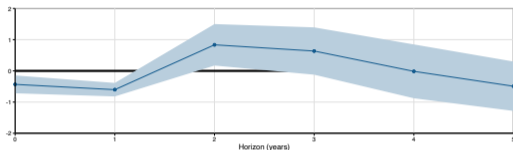
Global credit factor → real GDP growth   Global risk factor→ real GDP growth
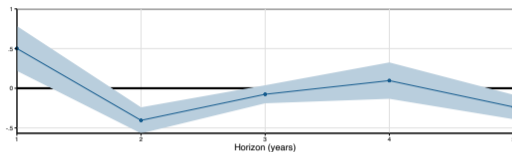

- Shorter-term effect of GCC on growth: 1 sd dev tightening → 2 p.p. lower two-years ahead cumulative growth

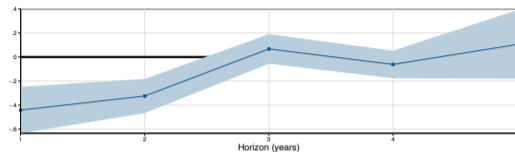- Longer-term effect of GFCy on growth: 1 sd dev tightening → 1 p.p. lower three-years ahead cumulative growth

. . . and predictable crises

Global credit factor → crisis probability | Global risk factor → crisis probability

$$\text{Prob}\left(crisis_{c,t+h}=1\right)=1-\exp\left(-\exp\left(\beta_h^{credit}\Delta\text{global credit}_t+\beta_h^{risk}\Delta\text{global risk}_t\right.\right.$$
$$\left.\left.+\ \beta_h^d\Delta_3 d_{c,t}^{priv}+\beta_h^d\Delta_3 d_{c,t}^{priv,*}\right)\right)$$

- Crisis: YoY real GDP growth <-2% (5% of pre-pandemic observations)
- Tighter global credit factor → higher short and medium-term crisis probability
- 1 sd dev increase in GCC → 2.2% higher probability of crisis within a year

Local crisis predictability by a global credit price variable

Out-of-sample

Out-of-sample approach

Purpose: Conduct pseudo-out-of-sample evaluation of the predictive relationships

"Suppose we were conducting the predictive exercise in December 2016"

1. Use data on one-month-ahead returns, VIX, and credit spreads through November 2016 to estimate factor loadings (γ)

2. Construct December 2016 factor vintage using these loadings and VIX and credit spreads data through December 2016

3. Estimate predictive regression as of December 2016 using the December 2016 factor vintage and macro data up to December 2016
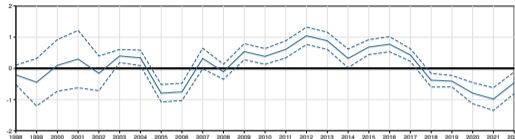
Global cycles and real activity: OoS

Global credit factor → real GDP growth
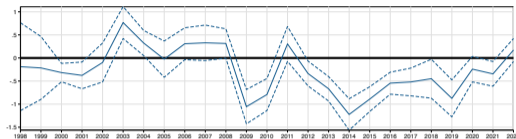
Global risk factor→ real GDP growth

- Each point corresponds to the coefficient from the one-year ahead predictive regression for a given factor vintage
  - E. g. 2016 coefficient uses December 2016 factor vintage
- Global credit factor has a stable relationship with future real GDP growth across factor vintages
- Relationship between global risk factor and future real GDP growth as expected only between 2011 − 2018
  - Declining role of the VIX as a proxy for the global financial cycle

Wrap-up

Conclusion

Investigate central role of global credit conditions in driving macroeconomic cycles around the world

- Global credit cycle in bond and equity returns

- Global credit cycle in *asset prices* translates into global credit cycle in *quantities*

- Tightenings in the global credit factor

  - $\rightarrow$ lower average real GDP growth

  - $\rightarrow$ lower average private credit growth

  - $\rightarrow$ higher probability of extreme growth contractions

Global pricing of credit $\Rightarrow$ capital flow stops $\Rightarrow$ *local* conditions

Broader research agenda

Interaction between credit markets, firms' decisions, and real activity

- Use rich heterogeneity in debt capital structures across firms, countries, ...

- Elias (2021): "Capital flows and the real effects of corporate rollover risk"
  - Real effects of rollover risk during stop episodes

- Boyarchenko and Elias (2024): "Financing Private Credit"
  - Composition of firms' liabs and of fin sector affects the transmission of mon policy

- Boyarchenko and Elias (2024b): "Corporate debt structure over the GCC"
  - GCC drives firms' capital structure decisions

- Boyarchenko and Elias (2024c): "Financing firm-level growth through the GCC"
  - Changing credit market access through GCC drives firm-level growth

Boyarchenko and Elias (2023): dataset construction and stylized facts about primary market issuance, secondary market pricing, amounts outstanding,...

Appendix

Fact: Debt market vs equity market returns

	U. S. equity		U. S. credit				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VIX	0.15	-3.38***	0.21**	0.14			0.69
VIX^2		1.35***		-0.09			-0.33
VIX^3		-0.15***		0.02			0.05*
G-Z spread					0.15**	-1.58***	-1.62***
G-Z spread^2						0.51***	0.54***
G-Z spread^3						-0.04***	-0.05***
Adj. R-sqr.	0.01	0.05	0.03	0.05	0.03	0.06	0.08
N. of obs	405	405	405	405	405	405	405

- Non-linear relationship b/w returns and proxies for risk

- Distinct relationships for bond and equity returns $\rightarrow$ potential role for a GCC?

◂ Back

Factor construction procedure

1. Estimate non-rank-restricted return predictability regression within each country-asset group g

$$Rx_{i,t+h} = a_{i,h} + \delta_{i,g} c_{g,h} X_t + F_{i,h} Z_{i,t} + \epsilon_{i,t+h},$$

where $\delta_{i,g}$ is an indicator of asset i belonging to country-asset group g
   - Output: $\hat{c}_{g,h}^{ols}$, $\widehat{Rx}_{i,t+h}^{e} = Rx_{i,t+h} - \hat{a}_{i,h}^{ols} - \hat{F}_{i,h}^{ols} Z_{i,t}$

2. Cross-sectional regression to estimate $\tilde{\gamma}_m$

$$\overline{Rx}_{g,t+h}^{e} = \sum_{l=1}^{r} \tilde{\gamma}_{m,l} \left(\hat{c}_{g,h,(l)}^{ols} X_t \right) + \epsilon_{g,t+h},$$

where $\overline{Rx}_{g,t+h}^{e} = \sum_{i \in g} w_i \widehat{Rx}_{i,t+h}^{e}$, $\hat{c}_{g,h,(l)}^{ols}$ l^{th} column of $\hat{c}_{g,h}^{ols}$, weight w_i: return volatility

3. Rotate to make factors $\hat{\gamma}_m' X_t$ orthogonal

$$\hat{\tilde{\gamma}}_m' = cov\left(\hat{\gamma}_m' X_t \right) \hat{\gamma}_m'$$

What's different in our factor construction relative to GFCy?

1. Different set of assets: information from secondary bond market returns, rather than equity and sovereign debt market prices

2. Reduced rank regression (RRR) rather than dynamic factor model/PCA

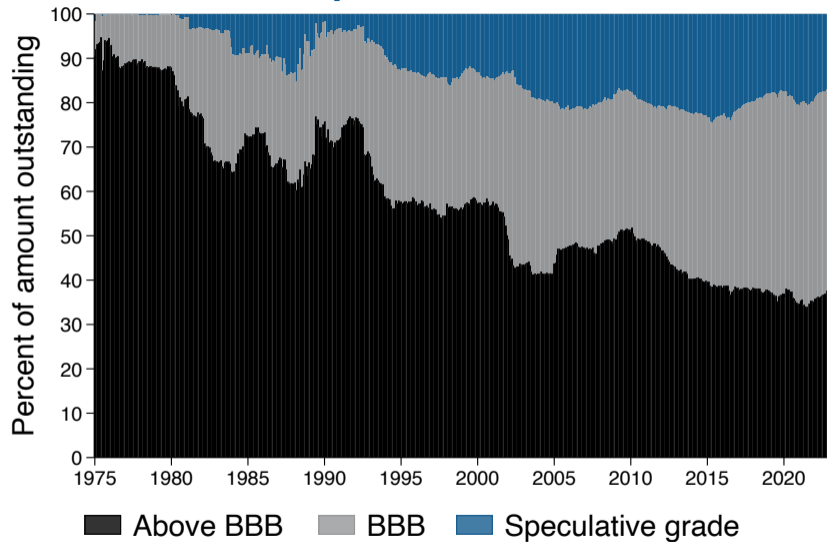   - Given set of variables X_t, both summarize information in a lower rank space

   $$Y_t = C \times BX_t + \epsilon_t$$

   - RRR: choose B to maximize $cov\left(Y_t, BX_t\right)$

   - PCA: choose B to maximize $cov\left(BX_t\right) / var\left(X_t\right)$

3. Non-linear factors of pre-specified aggregate conditions vs linear latent factors (with pre-specified persistence)

◄ Back

Bond return data composition

Measuring credit spreads: U. S.

1. Compute duration-matched credit spread for each bond-date observation:

$$z_{b,t} = y_{b,t} - rf_t^{(\tau_{b,t})}$$

- $\tau_{b,t}$: Duration of bond b at date t
- $rf_t^{(\tau_{b,t})}$: risk-free (Treasury) yield with duration $\tau_{b,t}$

2. Estimate predicted credit spread:

$$\log z_{b,t} = \alpha + \beta \log \mathrm{EDF}_{f,t} + \vec{\gamma}' X_{b,t} + \epsilon_{b,t}$$

- $\mathrm{EDF}_{f,t}$: 1 year EDF
- $X_{b,t}$: bond and firm characteristics

3. Compute default-adjusted credit spread:

$$d_{b,t} = z_{b,t} - \exp\left(\widehat{\log z_{b,t}} + \frac{\sigma_\epsilon^2}{2}\right)$$

Measuring credit spreads: International

1. Compute duration-matched credit spread for each bond-date observation:

$$z_{b,t} = y_{b,t} - rf_{c,t}^{(\tau_{b,t})}$$

 - $rf_{c,t}^{(\tau_{b,t})}$: sovereign yield for currency c with duration $\tau_{b,t}$

2. For each month, estimate cross-sectional regression of duration-matched credit spreads on currency, firm and rating fixed effects (as in Liao, 2020):

$$z_{b,t} = \alpha_{c,t} + \alpha_{f,t} + \alpha_{rating,t} + \epsilon_{b,t}$$
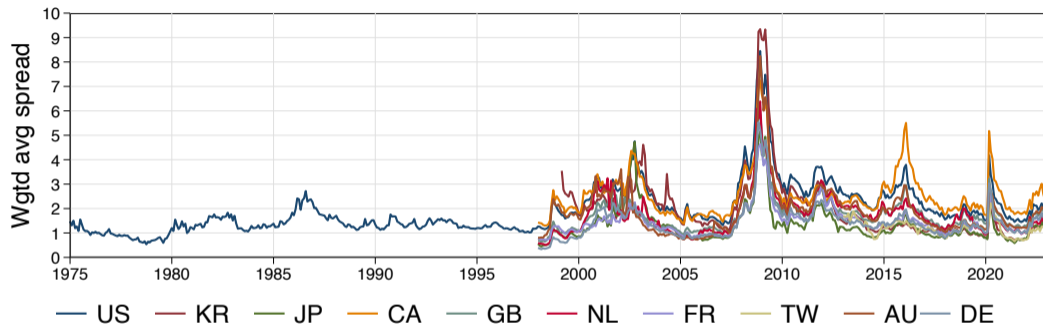
3. Compute currency-adjusted credit spreads:

$$z_{b,t}^{\$} = z_{b,t} - \left(\alpha_{c,t} - \alpha_{\$,t} \right)$$

4. Estimate predicted credit spread using currency-adjusted credit spreads
5. Compute default-adjusted credit spread

Time-series duration matched spread

- Large degree of comovement in global credit spreads

Correlation with standard GFC proxies

	Full sample		Pre-crisis		Post-crisis	
	Global credit factor	Global risk factor	Global credit factor	Global risk factor	Global credit factor	Global risk factor
VIX	0.48***	-0.63***	0.47***	-0.66***	0.46***	-0.73***
VIX^3	0.42***	-0.62***	0.40***	-0.58***	0.45***	-0.65***
G-Z spread	0.83***	-0.25***	0.82***	0.06	0.79***	-0.45***
EBP	0.58***	-0.37***	0.41***	-0.15***	0.44***	-0.30***
USD TWI	-0.03	-0.09**	-0.26***	-0.09*	0.08	0.14
GFC (original)	-0.44***	0.18***	-0.21***	0.15**	-0.61***	0.20
GFC (updated)	-0.04	0.14***	0.13**	0.23***	-0.03	0.02
U. S. GS FCI	0.45***	-0.25***	0.20***	-0.21***	0.57***	-0.38***
Global GS FCI	0.59***	-0.43***	-0.43	-0.37	0.38***	-0.29***

- They are not the same as other factors

Return predictability - controlling for other proxies of GFC

E.g.: Germany BBB

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Global credit	-2.72***		-6.52***		-7.38***		-1.45***		-6.19***		-2.55***		-2.81***	-7.11***	-8.30***
Global risk	0.16***		0.23***		0.27***		-0.10*		0.12**		0.16***		-0.13***	0.18***	0.33***
G-Z spread		-1.01*	9.41***											9.75***	
Predicted spread				-5.91***	1.92			-5.93***	0.83						-1.99
Default-adjusted spread				0.15	14.66***			3.51***	13.32***						13.14***
VIX						-4.66***	-6.59***	-5.28***	-3.76***					7.77***	9.48***
USD TWI										-0.28***	-0.20***			0.18***	-0.08
GFC (updated)												0.81*	0.12	1.21***	2.97***
Adj. R-sqr.	0.01	-0.00	0.02	-0.00	0.03	0.01	0.02	0.02	0.03	-0.00	0.01	-0.00	0.01	0.04	0.03
N. of obs	18,217	18,217	18,217	18,217	18,217	18,217	18,217	18,217	18,217	18,217	18,217	10,813	10,813	13,614	10,813

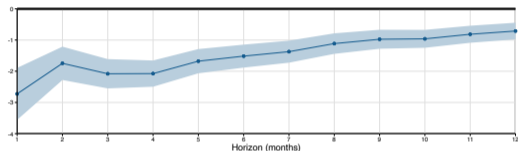- Global credit and global risk factors robust predictors of excess returns
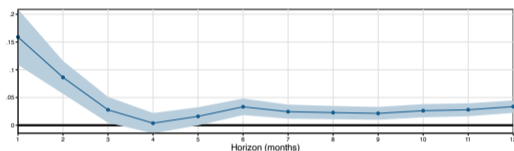
◄ Back

Return predictability - Horizons

E.g.: Germany BBB

Global credit factor

Global risk factor

- Return predictability up to 12 months out for both factors

- But magnitude of effect declining in horizon

  - 1 st dev increase in global credit factor $\rightarrow$ 1% decrease in 12 month exc return

Return predictability - 10y sovereign bonds

	US	KR	JP	CA	GB	FR	AU	DE	CH	IT	ES	MX	IN
Global credit	-0.23	-2.23**	-0.64	-2.83***	-2.29**	-1.47	-5.85***	-2.21**	-14.42	-22.01*	-10.02***	2.96***	0.17
Global risk	-0.20***	-0.75***	0.15*	-0.56***	-0.72***	0.07	-0.86***	-0.39**	-0.32	1.87	-1.20	-0.42***	-0.47***
Adj. R-sqr.	0.00	0.18	-0.00	0.08	0.08	-0.02	0.13	0.01	-0.01	-0.01	0.01	0.05	0.08
N. of obs	576	270	408	408	408	155	312	408	408	155	95	252	288

- Global credit and global risk factors predict returns even for assets not used in factor construction

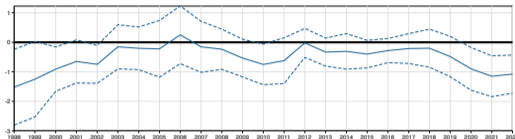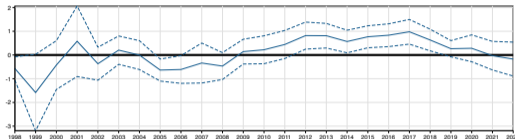- Loadings consistent with sovereign bonds safest in flight-to-safety ranking

◄ Back

Credit cycle in quantities: OoS

Global credit factor → Private credit growth   Global risk factor→ Private credit growth

- Each point corresponds to the coefficient from the one-year ahead predictive regression for a given factor vintage
    - E. g. 2016 coefficient uses December 2016 factor vintage

- Global credit factor has a stable relationship with future private credit growth across factor vintages

- Relationship between global risk factor and future private credit growth as expected only between 2011 – 2018
    - Declining role of the VIX as a proxy for the global financial cycle

References I

ADRIAN, T., R. K. CRUMP, AND E. VOGT (2019): "Nonlinearity and flight-to-safety in the risk-return trade-off for stocks and bonds," *The Journal of Finance*, 74, 1931–1973.

BOYARCHENKO, N. AND L. ELIAS (2023): "The Good, the Bad, and the Ugly of International Debt Market Data," Staff Report N. 1074, Federal Reserve Bank of New York.

FORBES, K. J. AND F. E. WARNOCK (2012): "Capital flow waves: Surges, stops, flight, and retrenchment," *Journal of International Economics*, 88, 235–251.

——— (2021): "Capital flow waves—or ripples? Extreme capital flow movements since the crisis," *Journal of International Money and Finance*, 116.

MIRANDA-AGRIPPINO, S. AND H. REY (2022): "The global financial cycle," in *Handbook of International Economics*, Elsevier, vol. 6, 1–43.

VERNER, E. (2022): "Private Debt Booms and the Real Economy: Do the Benefits Outweigh the Costs?" in *Leveraged: The New Economics of Debt and Financial Fragility*, ed. by M. Schularick, University of Chicago Press.