Global Pricing of Risk and Stabilization Policies

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The views expressed are those of the authors, and do not necessarily represent the views of the IMF and its Executive Board

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Our Logic

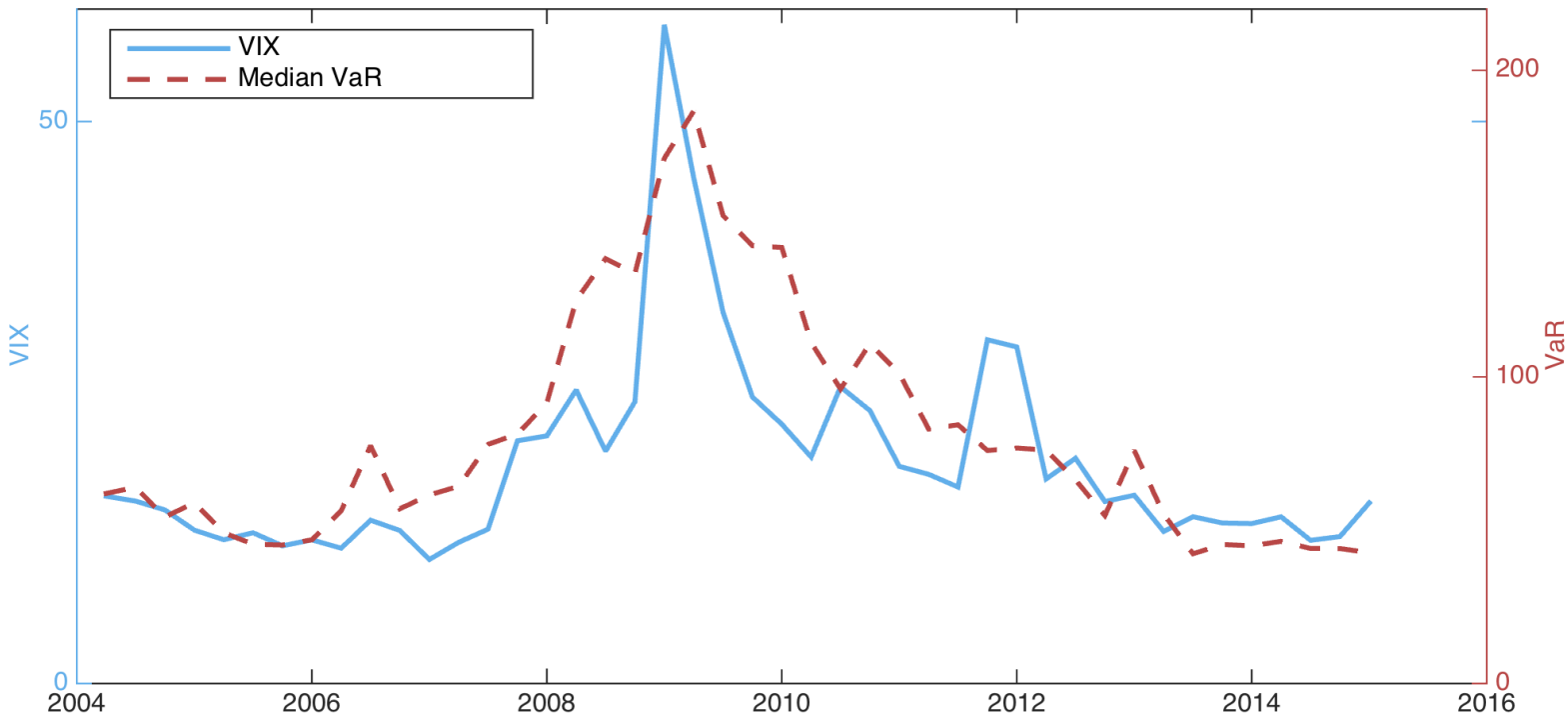
1. Global financial institutions impact the global pricing of risk
   - volatility is key state variable

2. Risk-return tradeoff: Larger global price of risk exposure accompanies
   - higher growth
   - higher volatility

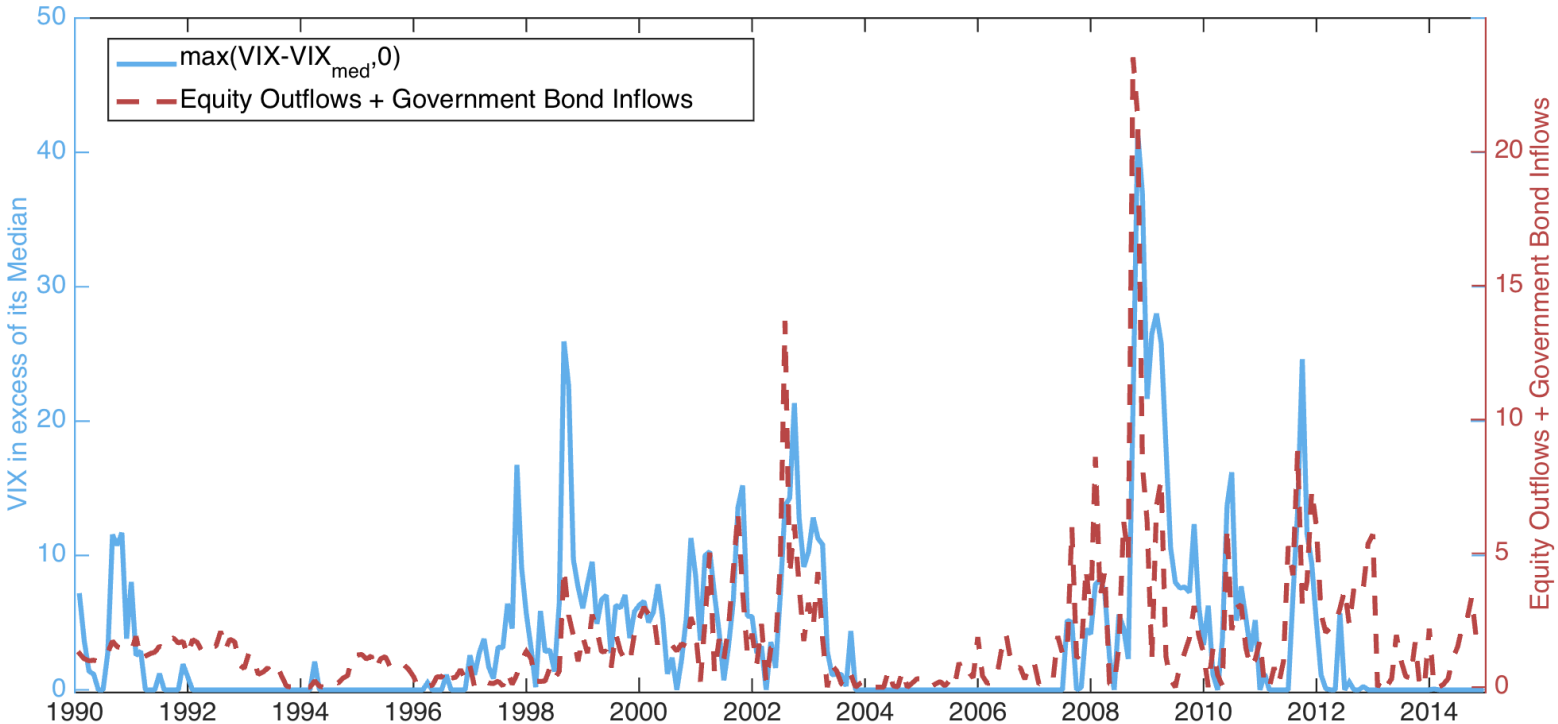
3. Countries can mitigate this shift of the risk-return tradeoff via
   - monetary policy
   - fiscal policy
   - macroprudential policies

Outline

VaR Constraints of Global Financial Institutions



Large VIX and Fund Flows



Institutional Asset Pricing: Theory

Each global financial institution i maximizes

$$\max_{n_t^i} E_t[n_t^i r_{t+1}] - Cov_t[n_t^i r_{t+1}, X_{t+1}]\psi_t^i$$

$$s.t. VaR_t^i \cdot \alpha \leq w_t^i$$

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$$s.t. VaR_t^i \cdot \alpha \leq w_t^i \quad \} \textbf{ regulatory constraint}$$

Then the demand for each risky asset is:

$$n_t^i = \frac{1}{\lambda_t^i \alpha}[E_t[r_{t+1}] - Cov_t[r_{t+1}, X_{t+1}]\psi_t^i][Var_t(r_{t+1})]^{-1}$$

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Market clearing gives equilibrium returns

$$E_t[r_{t+1}] = Cov_t(r_{t+1}, r_{t+1}^M)\frac{1}{\sum_i \frac{w_t^i}{\lambda_t^i \alpha}} + Cov_t[r_{t+1}, X_{t+1}]\frac{\sum_i \frac{w_t^i \psi_t^i}{\lambda_t^i \alpha}}{\sum_i \frac{w_t^i}{\lambda_t^i \alpha}}$$

Institutional Asset Pricing: Predictions

Global equilibrium expected returns are:

$$E_t[r_{t+1}] = \beta_t \Lambda_t$$

We assume affine prices of risk:

$$\begin{aligned} \Lambda_t &= \lambda_0 + \lambda_1 X_t \\ X_t &= \left[r_t^M, ci_t, r_t^f, \phi\left(vix_t\right) \right]' \end{aligned}$$

$\phi\left(vix_t\right)$ is a nonlinear function of the VIX that forecasts returns.

Nonlinearities in the VIX Matter

- Adrian, Crump, and Vogt (2015): Compensation for risk and flight-to-safety in US stock and bond returns is nonlinear in the VIX

- **Intuition**: Large moves in VIX are potentially systemic events
  $\Rightarrow$ priced differently than day-to-day fluctuations in uncertainty

- $\phi\left(vix_t\right)$ captures these nonlinearities, consistent with
  - asset manager asset pricing, e.g. Vayanos (2004)
  - intermediary asset pricing, e.g. Adrian and Boyarchenko (2012)

Estimation of the VIX Pricing Function

- The global price of risk function $\phi(\cdot)$ is unknown

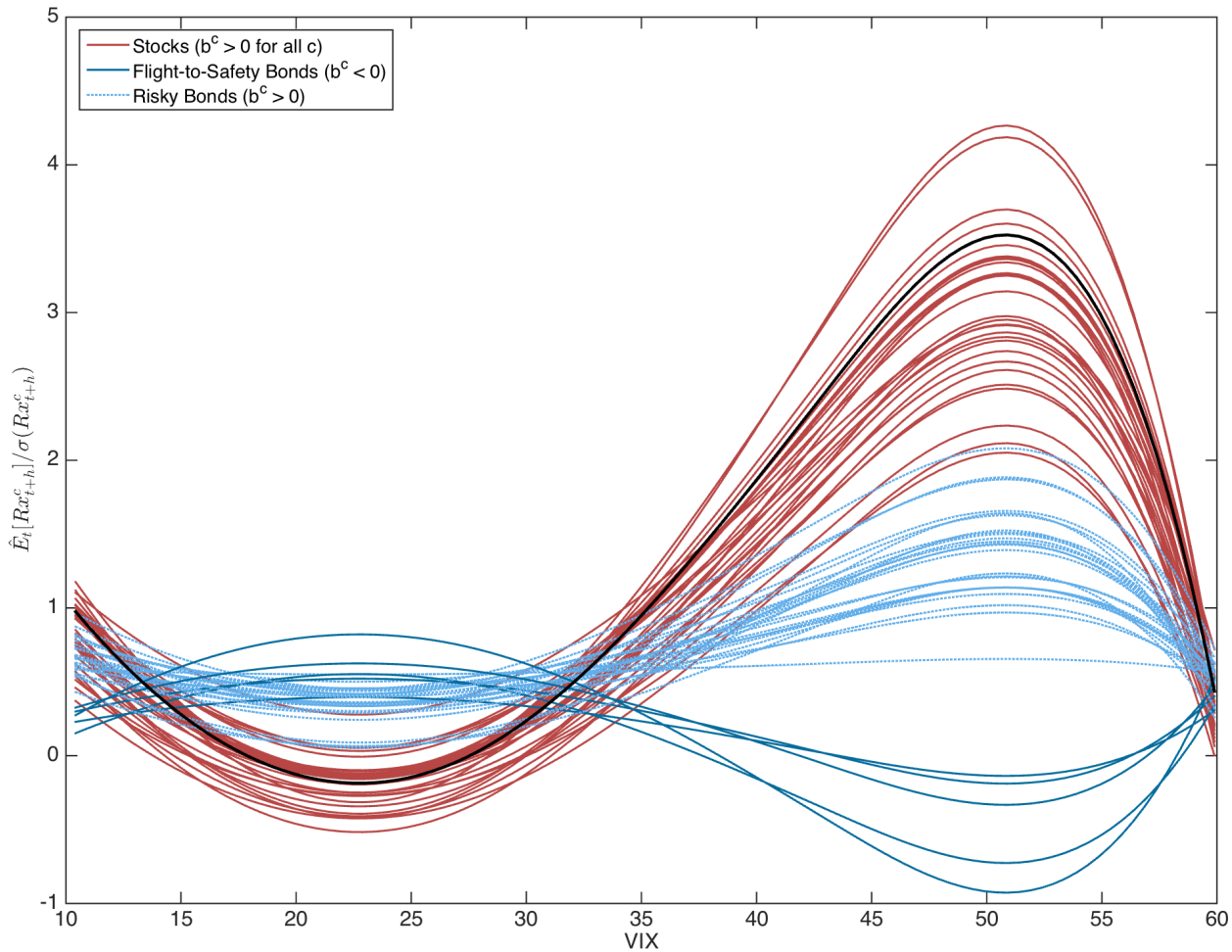
- **Sieve Reduced Rank Regressions** of Adrian, Crump, Vogt (2015)

$$r^c_{t+h} = a^c + b^c \phi(VIX_t) + \eta^c_{t+h}, \quad c = 1, \ldots, (n^{eqts} + n^{bnds} + mkt)$$

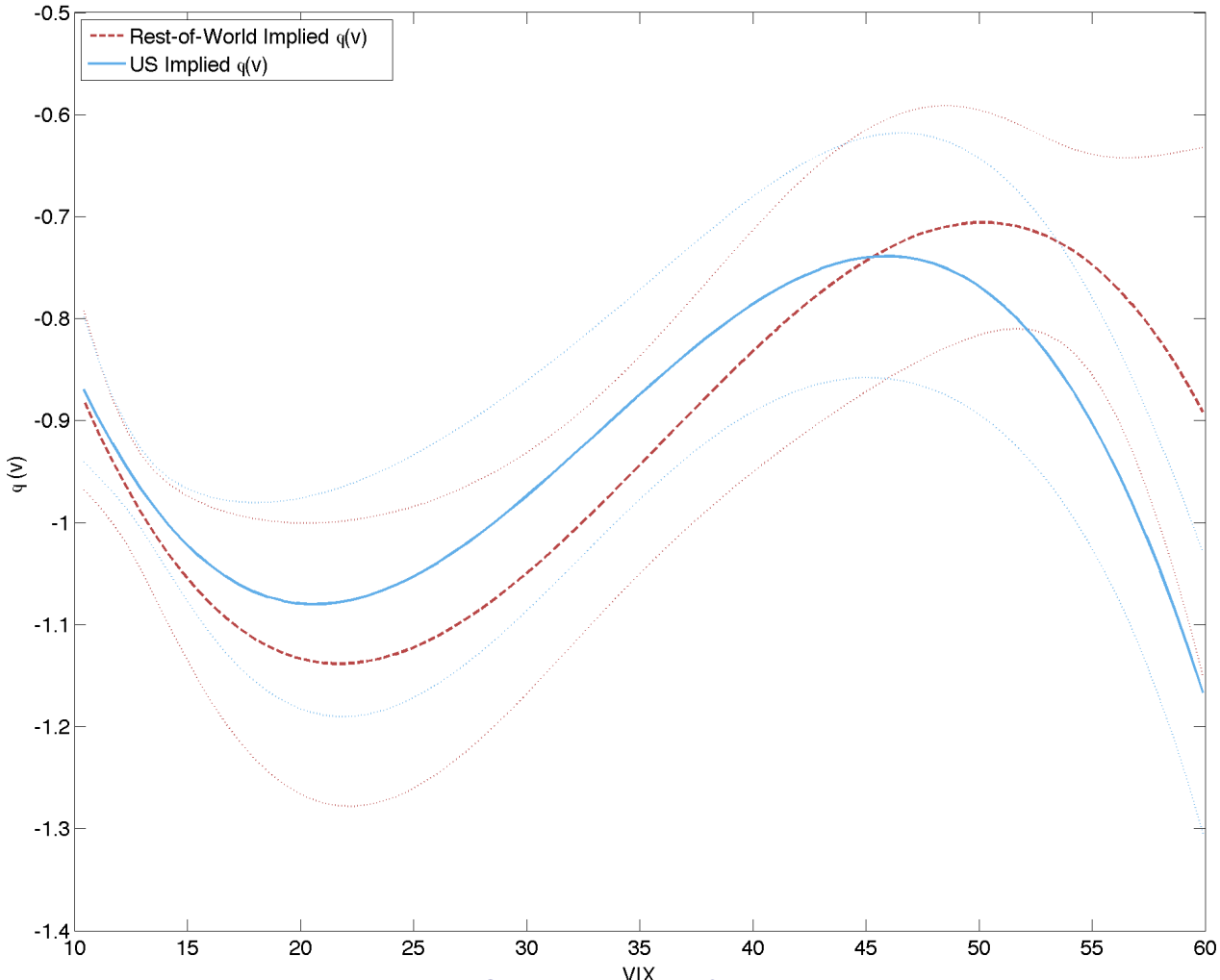
- All 27 equity and 27 bond returns are jointly informative about $\phi(\cdot)$

Conditional Sharpe Ratios of Global Stocks and Bonds

$$\hat{E}_t\left[r^c_{t+h}\right] = \hat{a}^c + \hat{b}^c\,\hat{\phi}\left(VIX_t\right)$$



Robustness of the Shape of the Nonlinearity: $\phi(v)$ Separately Estimated for US and Rest-of-the-World



Global Pricing of Risk

Prices of Risk	*MKT*	*GSCI*	*RF*	$\phi(v)$
λ_1	1.09***	0.96***	-0.03**	-0.33**

$$E_t[r_{t+h}] = \beta(\lambda_0 + \lambda_1 X_t)$$

State variables $X_t = [MKT_t, GSCI_t, RF_t, \phi(v_t)]'$ are

1. price of risk forecasting variables
2. cross sectional pricing factors

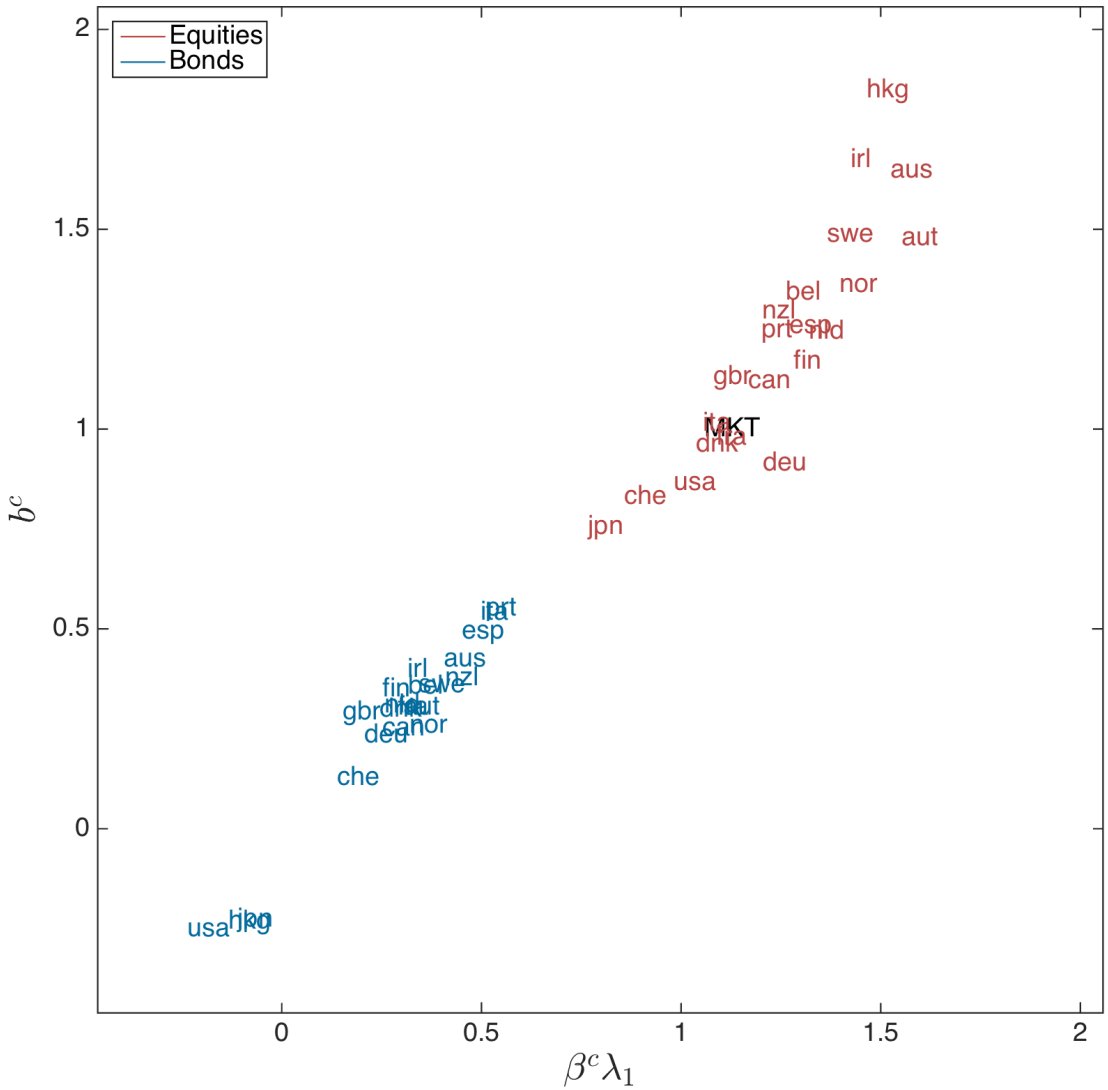
Global Equity Exposures

Exposures	β^c_{MKT}	β^c_{GSCI}	β^c_{RF}	$\beta^c_{\phi(v)}$	$\beta^c\lambda_1$	$(\alpha^i + \beta^c\lambda_0)$
MKT	0.99***	-0.00	0.56	0.00	1.06***	0.10***
aus Equity	0.98***	0.21***	-6.98***	-0.06	1.52***	0.15***
aut Equity	1.16***	0.36***	-3.71	0.57*	1.55***	0.11***
bel Equity	1.16***	0.01	-1.37	0.20	1.26***	0.13***
can Equity	0.93***	0.25***	3.31**	-0.07	1.17***	0.13***
che Equity	0.90***	-0.03	2.05	0.10	0.86***	0.11***
deu Equity	1.24***	-0.03	-0.62	0.43*	1.21***	0.10***
dnk Equity	0.97***	0.18***	4.28**	0.15	1.04***	0.14***
esp Equity	1.24***	-0.04	-3.01	0.44**	1.27***	0.13***
fra Equity	1.12***	0.03	1.95	0.33	1.09***	0.11***
gbr Equity	0.98***	0.03	1.89	-0.15	1.08***	0.10***
jpn Equity	0.82***	0.09*	0.56	0.61**	0.77***	0.02
nld Equity	1.16***	0.09**	-0.30	0.13	1.32***	0.11***
nzl Equity	0.62***	0.24***	-6.78**	-0.22	1.20***	0.13***
prt Equity	1.27***	-0.00	-0.95	0.68**	1.20***	0.08***
swe Equity	1.45***	0.01	4.19	0.27	1.37***	0.15***
usa Equity	0.92***	-0.07***	1.32	-0.25**	0.98***	0.11***

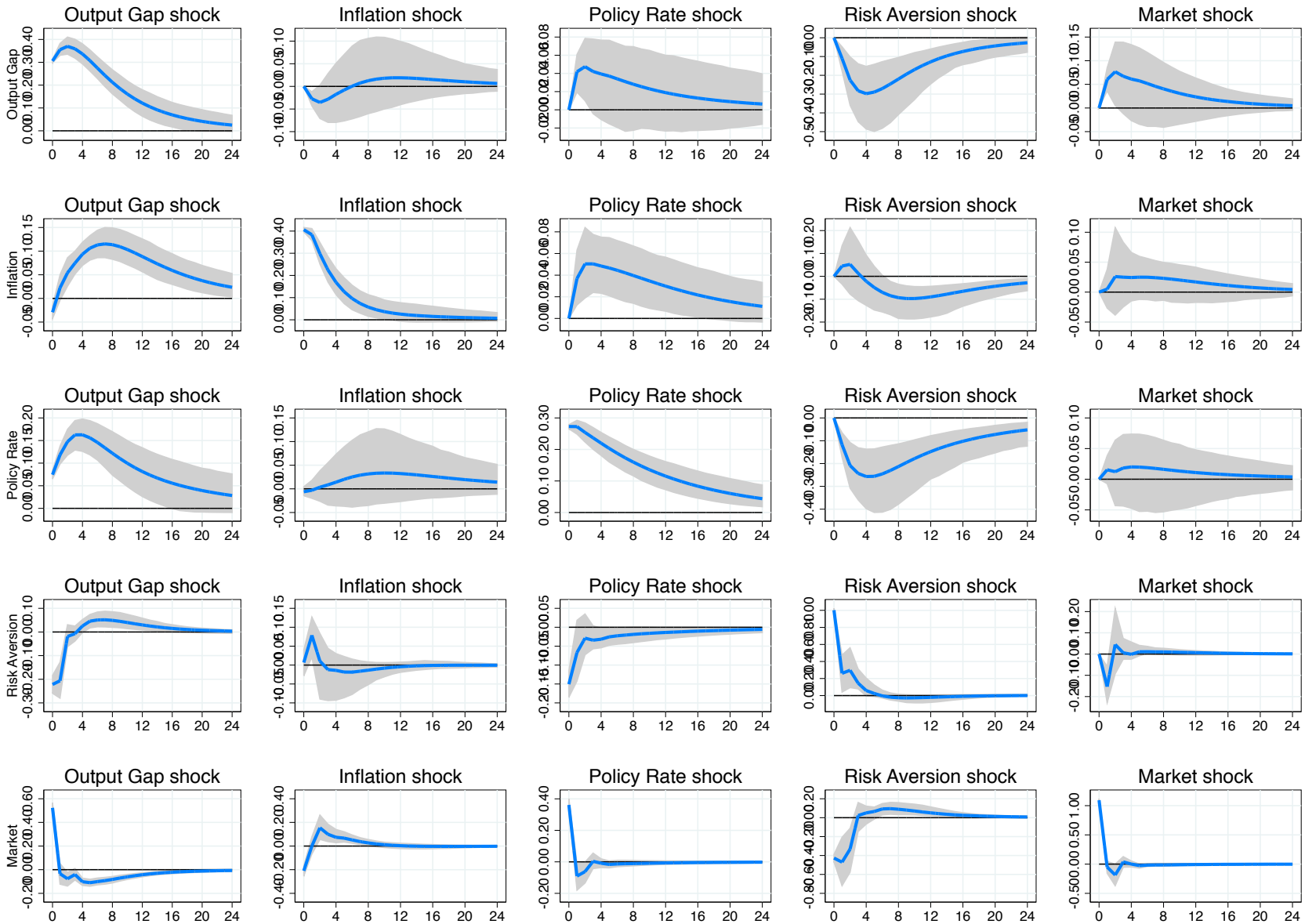
Global Bond Exposures

Exposures	β^c_{MKT}	β^c_{GSCI}	β^c_{RF}	$\beta^c_{\phi(v)}$	$\beta^c \lambda_1$	$(\alpha^i + \beta^c \lambda_0)$
aus Bonds	0.12**	0.12***	-3.73**	-0.12	0.41***	0.10***
aut Bonds	0.05	0.10**	-6.57***	0.17	0.30***	0.07***
bel Bonds	0.07	0.09**	-6.72***	0.23	0.32***	0.07***
can Bonds	0.10**	0.09***	-0.72	-0.09	0.25***	0.08***
che Bonds	-0.13**	0.08**	-6.40***	0.01	0.14	0.05***
deu Bonds	-0.01	0.08**	-6.10***	0.18	0.21**	0.06***
dnk Bonds	0.02	0.07*	-5.72***	0.10	0.24***	0.07***
esp Bonds	0.19***	0.12***	-8.88***	0.50***	0.45***	0.10***
fra Bonds	0.05	0.09**	-7.31***	0.27	0.29***	0.07***
gbr Bonds	0.04	0.02	-0.09	-0.25	0.15*	0.06***
jpn Bonds	-0.20***	0.03	-1.54	-0.09	-0.11	0.01
nld Bonds	0.00	0.09**	-6.42***	0.14	0.26**	0.06***
nzl Bonds	0.10	0.13***	-4.53**	-0.07	0.41***	0.09***
prt Bonds	0.33***	0.13**	-8.92***	0.81**	0.51***	0.10***
swe Bonds	0.10*	0.13***	-4.08**	0.11	0.34***	0.08***
usa Bonds	-0.23***	-0.02	0.10	-0.13	-0.24***	0.04***

Institutional Asset Pricing Setup Implies $b^c = \beta^c \lambda_1$



Global Panel VAR



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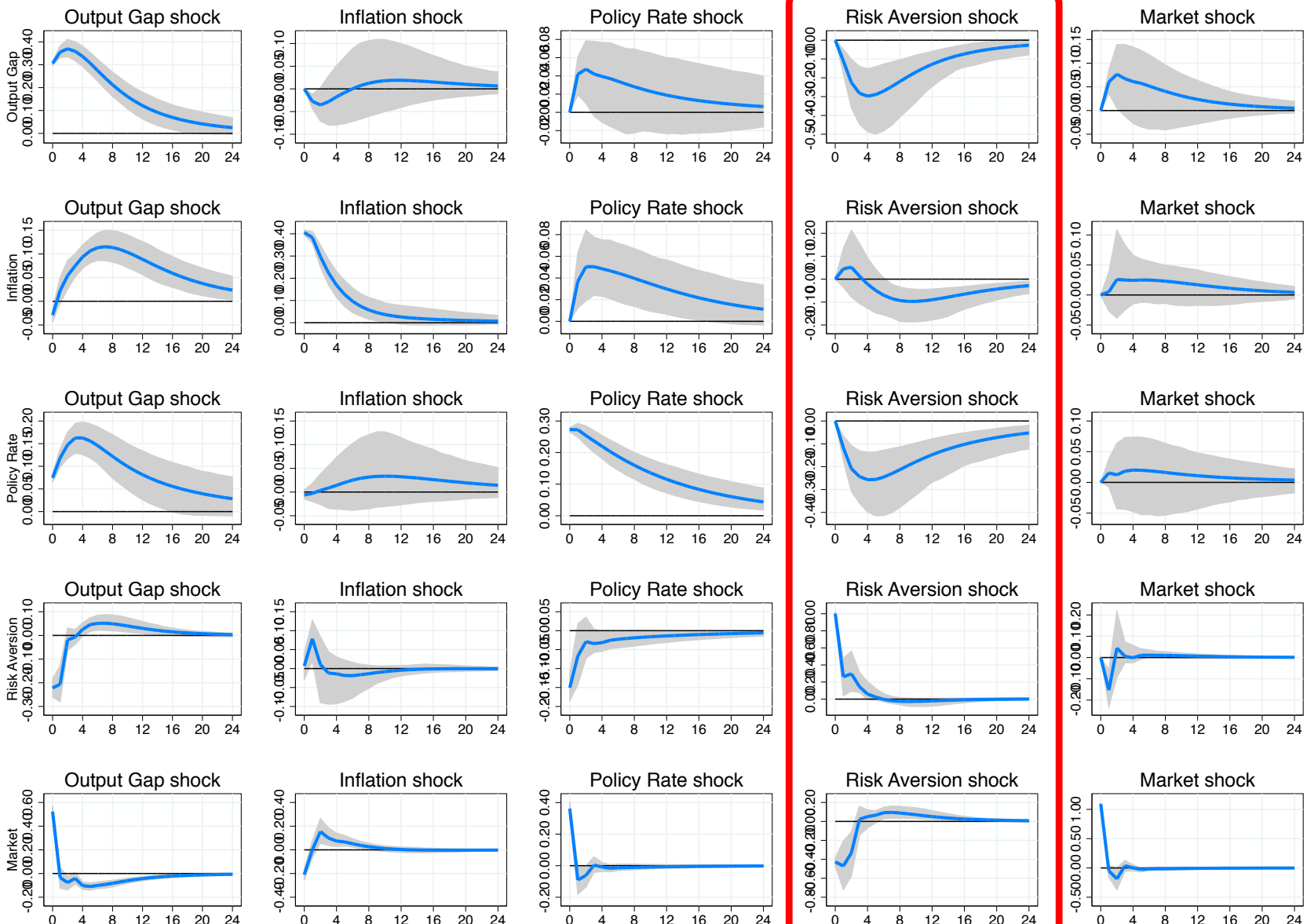


Takeaways from the Global Pricing of Risk

- **Theoretically**: VaR constraints of global financial institutions give role to volatility in the pricing of risk
- **Empirically**: VIX is a strong nonlinear forecasting variable as predicted by intermediary asset pricing theories
- **Consequence 1**: Cross country dispersion in the exposure to the global pricing of risk
- **Consequence 2**: Shocks to the global pricing of risk forecasts domestic macro performance

What are the macroeconomic consequences?

Outline

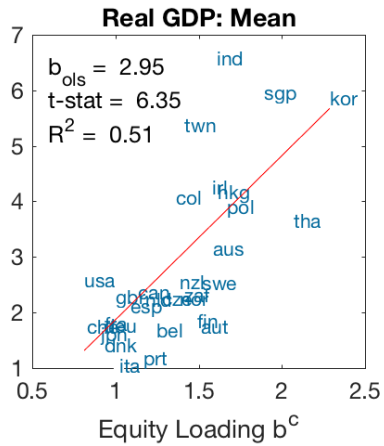
Global Bond Exposures and Macro Outcomes

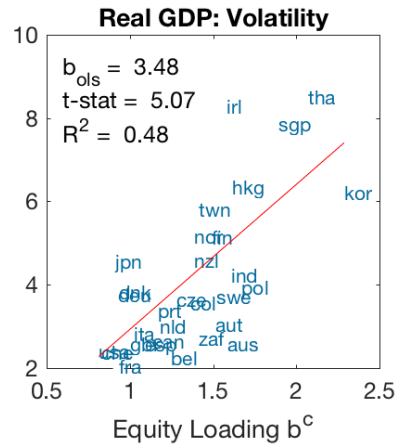
- Exposure $\mathbf{b}$ to global pricing of risk $\phi(\boldsymbol{v})$ varies across countries
- How does it relate to macro outcomes?

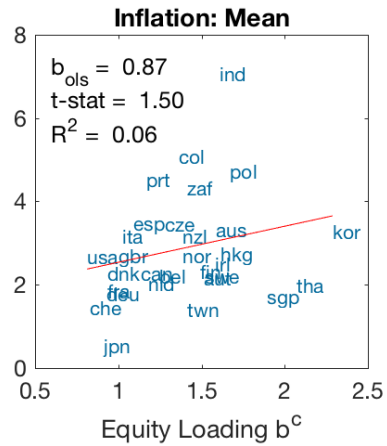
- Are countries with higher exposure more volatile?
- Do countries with higher exposure grow faster?
- Are crises more likely?

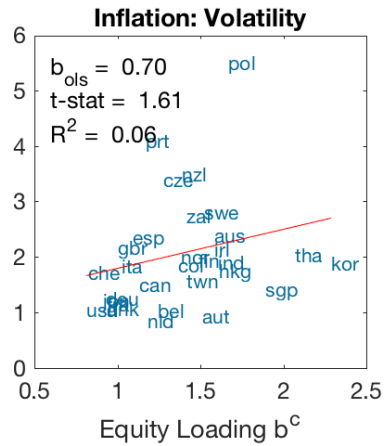
Real Outcomes and Global Risk Exposures

- Macroeconomic outcomes

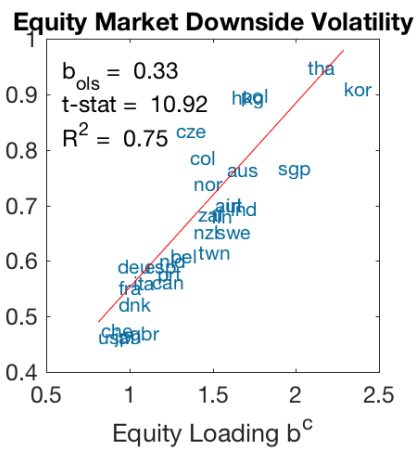


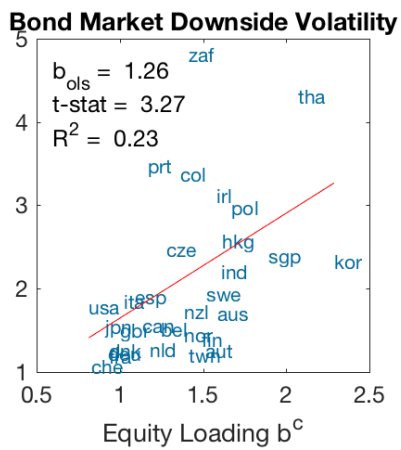


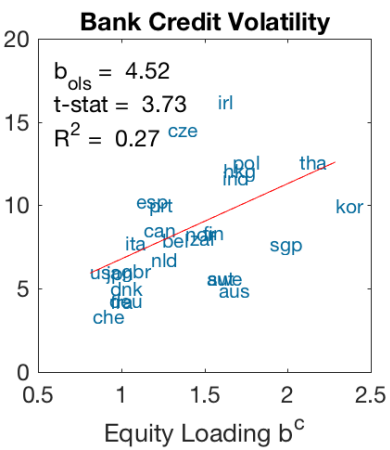


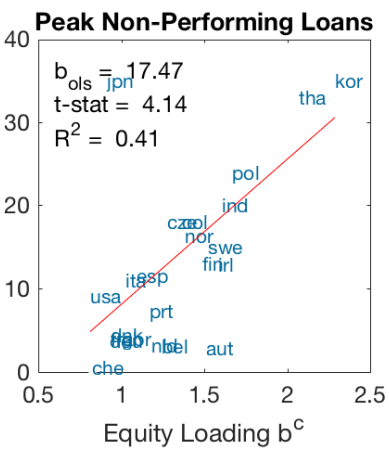


- Financial outcomes



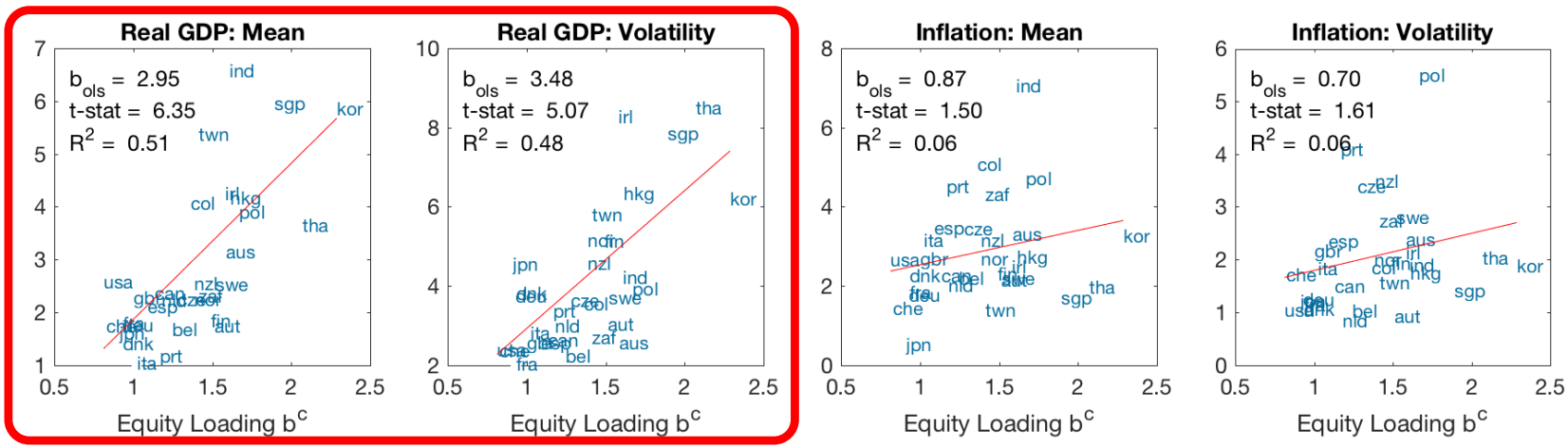






Real Outcomes and Global Risk Exposures

- Macroeconomic outcomes



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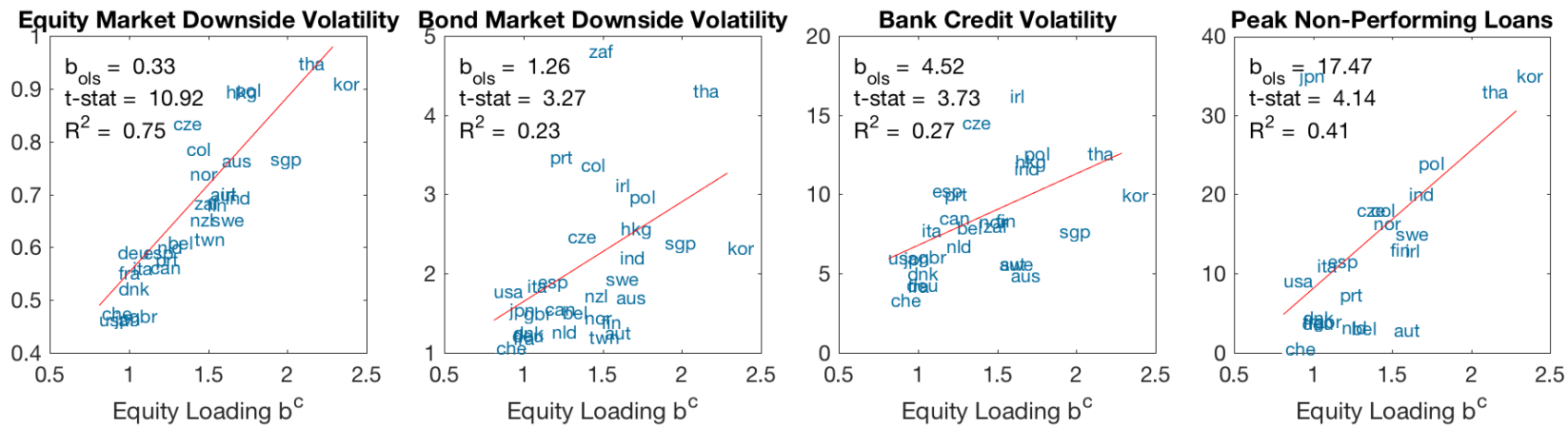

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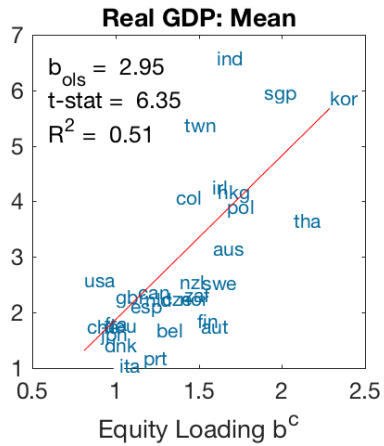

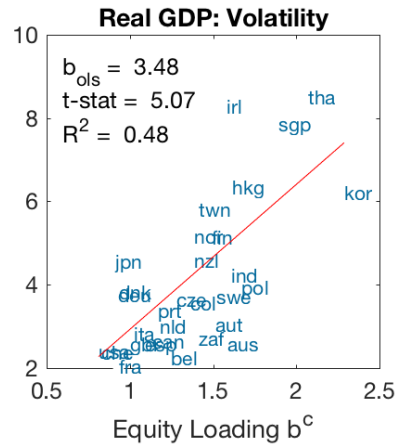

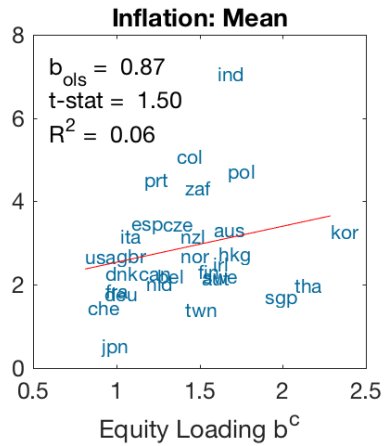

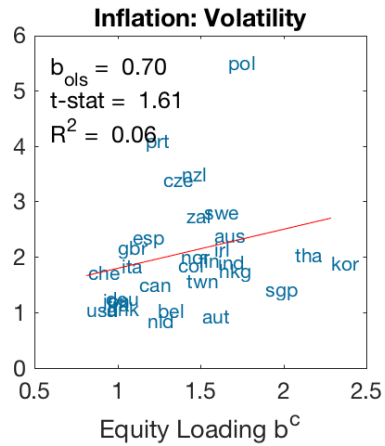

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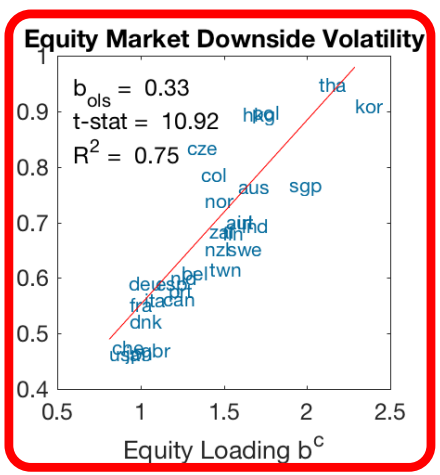

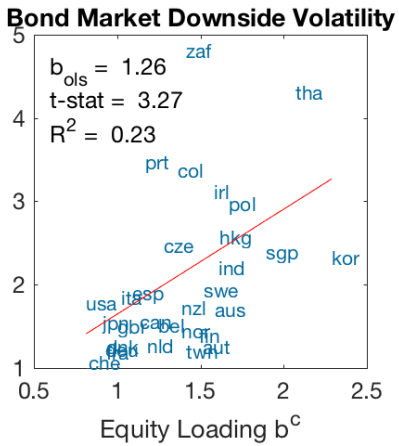

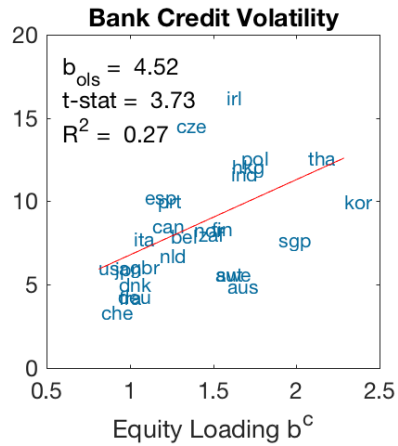

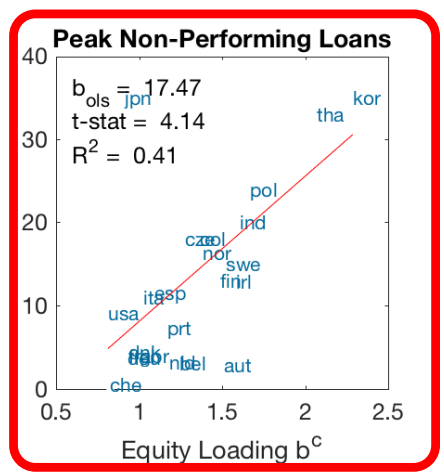

Cross-Section of Macro and Financial Outcomes

Panel A: Macro Outcomes	Real GDP		Inflation	
	Mean	Volatility	Mean	Volatility
Equities	3.20***	3.66***	0.76	0.58
Bonds	−2.38**	−1.82**	1.05	1.18***
p-val	0.00	0.00	0.18	0.01
R^2	0.64	0.53	0.09	0.13
Obs	30	30	30	30

Panel B: Banking Outcomes	Credit		Crisis Output	
	Boom	NPL	Pre-Crisis Gain	Crisis Loss
Equities	0.51***	19.02***	5.64***	4.70***
Bonds	0.73**	−12.33	2.46	−1.73
p-val	0.00	0.00	0.00	0.00
R^2	0.30	0.46	0.41	0.29
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Panel C: Financial Market Outcomes	Equity Market		Bond Market	
	Mean	Downside Volatility	Mean	Downside Volatility
Equities	−0.02	0.33***	−0.03	1.09***
Bonds	0.04	0.02	0.11*	1.70*
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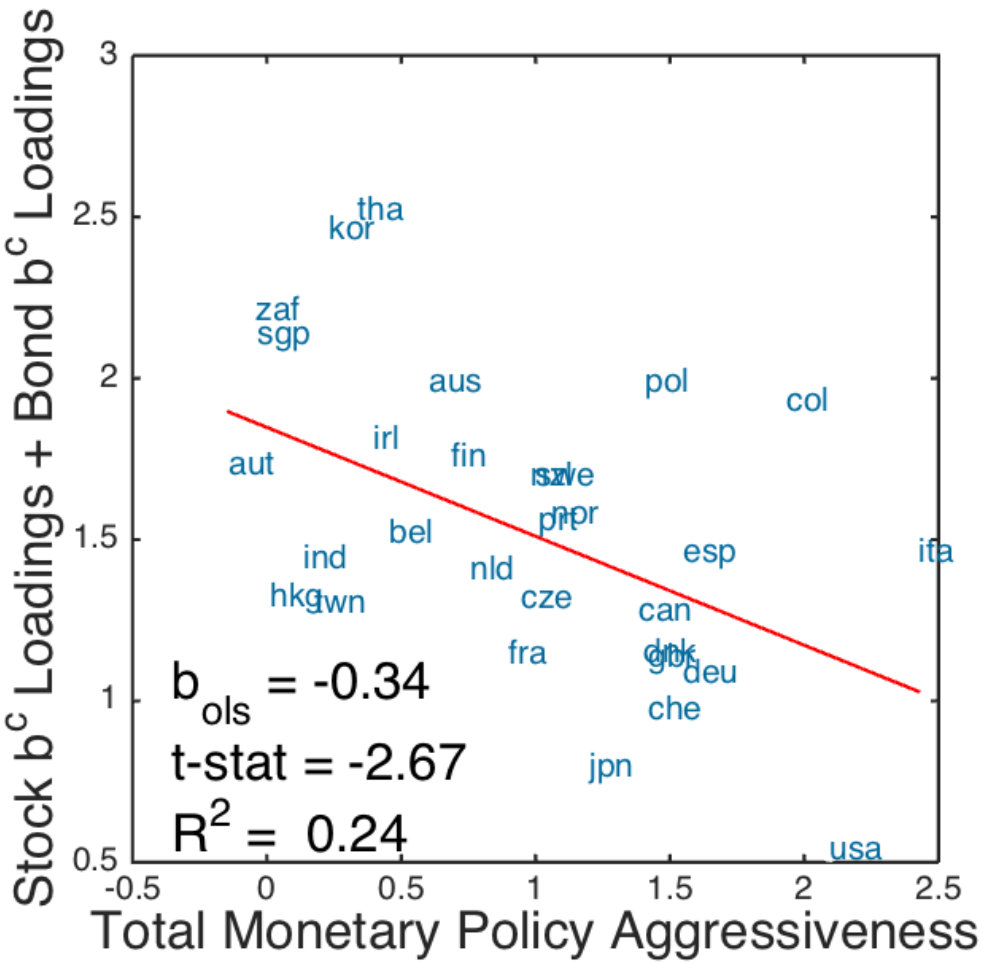
Global Bond Exposures and Economic Policies

- Is aggressiveness of stabilization policies systematically related to global price of risk exposure?
  - Aggressiveness of monetary policy
  - Degree of countercyclicality of fiscal policy
  - Macroprudential policies

Global Risk Exposures and Taylor Rule Coefficients



More aggressive Taylor rule coefficients associated with lower *b*

Takeaway from the Macro Risk-Return Tradeoff

1. Higher exposure to the global pricing of risk is associated with higher growth and higher volatility in the cross-section
   - **Macro risk-return tradeoff?**

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How does pricing of risk interact with economic policies?

Outline

Macro Risk-Return Tradeoff, Risk Exposure, and Stabilization Policies: Questions

- How do economic policies interact with the global pricing of risk?
- Is there a relationship between the macro risk-return tradeoff, global risk exposures, and stabilization policies?

Macro Risk-Return Tradeoff, Risk Exposure, and Stabilization Policies: Questions

- How do economic policies interact with the global pricing of risk?
- Is there a relationship between the macro risk-return tradeoff, global risk exposures, and stabilization policies?
- Estimate:

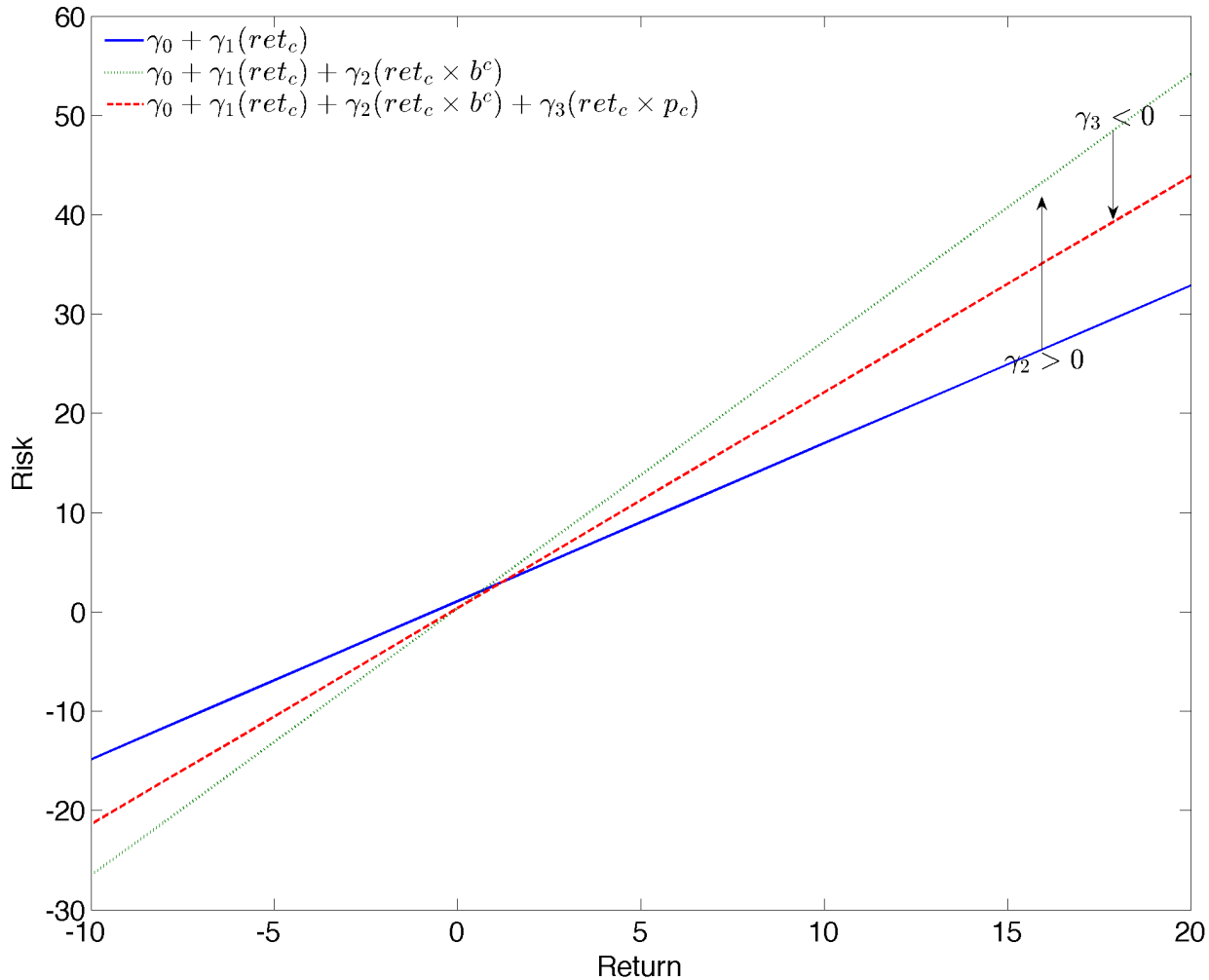
$$E[risk_c|\mathbf{x}] = \gamma_0 + \gamma_1 ret_c + \gamma_2(ret_c \cdot b^c) + \gamma_3(ret_c \cdot p_c) + \gamma_4(ret_c \cdot p_c \cdot b^c)$$

- **Risk-Return tradeoff** are given by partial effects:

$$\partial E[risk_c|\mathbf{x}]/\partial ret_c = \gamma_1 + \gamma_2 \cdot b^c + \gamma_3 \cdot p^c + \gamma_4(p^c \cdot b^c)$$

Macro Risk-Return Tradeoff

$$\partial E[risk_c|\mathbf{x}]/\partial ret_c = \gamma_1 + \gamma_2 \cdot b^c + \gamma_3 \cdot p^c + \gamma_4 (p^c \cdot b^c)$$



Macro Risk-Return Tradeoff and Monetary Policy

	GDP Volatility				Inflation Volatility			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
r	0.74^{***}	-0.64	-0.35	-1.92^{***}	0.40^{*}	0.34^{**}	0.49^{***}	0.82^{***}
$r \cdot b$		0.67^{*}	0.61^{**}	1.53^{***}		0.29	0.10	-0.34^{**}
$r \cdot p$			-0.49	3.42^{***}			-0.42^{**}	-1.22^{***}
$r \cdot b \cdot p$				-2.50^{***}				1.56^{***}
R^2	0.37	0.48	0.53	0.64	0.27	0.33	0.50	0.68
Obs	30	30	30	30	30	30	30	30

	Crisis Peak NPL				Bank Credit Volatility			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
r	4.80	-37.96^{***}	-37.95^{***}	-31.46^{***}	0.54^{***}	0.58^{**}	0.65^{**}	1.24^{**}
$r \cdot b$		23.69^{***}	23.72^{***}	20.08^{***}		-0.02	-0.05	-0.33
$r \cdot p$			-0.27	-28.25			-0.15	-2.53^{**}
$r \cdot b \cdot p$				14.95				1.22^{**}
R^2	0.05	0.43	0.43	0.43	0.35	0.35	0.36	0.47
Obs	23	23	23	23	27	27	27	27

	Equity Downside Volatility				Bond Downside Volatility			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
r	-0.38	-6.66^{***}	-7.24^{***}	-4.83^{***}	0.96	-1.71	-2.10	-2.08
$r \cdot b$		4.44^{***}	4.66^{***}	3.01^{**}		6.88^{**}	3.81	3.86
$r \cdot p$			0.91	-9.45^{*}			-6.51^{***}	-6.03^{*}
$r \cdot b \cdot p$				7.53^{*}				-1.11
R^2	0.01	0.34	0.36	0.39	0.01	0.24	0.45	0.45
Obs	30	30	30	30	30	30	30	30

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$r \cdot b \cdot p$				7.53^{*}				-1.11
R^2	0.01	0.34	0.36	0.39	0.01	0.24	0.45	0.45
Obs	30	30	30	30	30	30	30	30

Macro Risk-Return Tradeoff and Fiscal Policy

	GDP Volatility				Inflation Volatility			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
r	0.74^{***}	-0.64	-0.86	-2.24^{***}	0.40^{*}	0.34^{**}	0.34^{**}	0.35^{*}
$r \cdot b$		0.67^{*}	0.83^{**}	1.75^{***}		0.29	0.26	0.24
$r \cdot p$			-0.31	2.15^{**}			-0.11	-0.13
$r \cdot b \cdot p$				-1.66^{**}				0.06
R^2	0.37	0.48	0.51	0.57	0.27	0.33	0.34	0.34
Obs	30	30	30	30	30	30	30	30

	Crisis Peak NPL				Bank Credit Volatility			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
r	4.80	-37.96^{***}	-37.90^{***}	-30.87^{***}	0.54^{***}	0.58^{**}	0.52^{*}	0.17
$r \cdot b$		23.69^{***}	23.50^{***}	19.19^{***}		-0.02	0.03	0.26
$r \cdot p$			0.88	-28.44^{***}			-0.27	0.63
$r \cdot b \cdot p$				16.44^{***}				-0.55
R^2	0.05	0.43	0.43	0.44	0.35	0.35	0.39	0.42
Obs	23	23	23	23	27	27	27	27

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	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
r	-0.38	-6.66^{***}	-6.60^{***}	-3.94	0.96	-1.71	-0.57	-2.12
$r \cdot b$		4.44^{***}	4.53^{***}	2.59		6.88^{**}	5.66^{*}	11.18^{***}
$r \cdot p$			-0.56	-5.62			-2.55^{***}	1.52
$r \cdot b \cdot p$				3.67				-16.51^{***}
R^2	0.01	0.34	0.35	0.36	0.01	0.24	0.32	0.44
Obs	30	30	30	30	30	30	30	30

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$r \cdot p$			-0.56	-5.62			-2.55^{***}	1.52
$r \cdot b \cdot p$				3.67				-16.51^{***}
R^2	0.01	0.34	0.35	0.36	0.01	0.24	0.32	0.44
Obs	30	30	30	30	30	30	30	30

Macro Risk-Return Tradeoff and Fiscal Policy

	GDP Volatility				Inflation Volatility			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
r	0.74^{***}	-0.64	-0.86	-2.24^{***}	0.40^{*}	0.34^{**}	0.34^{**}	0.35^{*}
$r \cdot b$		0.67^{*}	0.83^{**}	1.75^{***}		0.29	0.26	0.24
$r \cdot p$			-0.31	2.15^{**}			-0.11	-0.13
$r \cdot b \cdot p$				-1.66^{**}				0.06
R^2	0.37	0.48	0.51	0.57	0.27	0.33	0.34	0.34
Obs	30	30	30	30	30	30	30	30

	Crisis Peak NPL				Bank Credit Volatility			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
r	4.80	-37.96^{***}	-37.90^{***}	-30.87^{***}	0.54^{***}	0.58^{**}	0.52^{*}	0.17
$r \cdot b$		23.69^{***}	23.50^{***}	19.19^{***}		-0.02	0.03	0.26
$r \cdot p$			0.88	-28.44^{***}			-0.27	0.63
$r \cdot b \cdot p$				16.44^{***}				-0.55
R^2	0.05	0.43	0.43	0.44	0.35	0.35	0.39	0.42
Obs	23	23	23	23	27	27	27	27

	Equity Downside Volatility				Bond Downside Volatility			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
r	-0.38	-6.66^{***}	-6.60^{***}	-3.94	0.96	-1.71	-0.57	-2.12
$r \cdot b$		4.44^{***}	4.53^{***}	2.59		6.88^{**}	5.66^{*}	11.18^{***}
$r \cdot p$			-0.56	-5.62			-2.55^{***}	1.52
$r \cdot b \cdot p$				3.67				-16.51^{***}
R^2	0.01	0.34	0.35	0.36	0.01	0.24	0.32	0.44
Obs	30	30	30	30	30	30	30	30

Macro Risk-Return Tradeoff and Macroprudential Policy

	GDP Volatility				Inflation Volatility			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
r	0.76^{***}	-0.87	0.04	-0.19	0.40^{*}	0.34^{**}	0.55^{***}	0.67^{***}
$r \cdot b$		0.76^{*}	0.43	0.68		0.29	0.32	0.07
$r \cdot p$			-0.48^{*}	0.88			-0.33^{***}	-0.55^{***}
$r \cdot b \cdot p$				-1.04				0.50
R^2	0.36	0.49	0.56	0.58	0.25	0.32	0.50	0.52
Obs	28	28	28	28	28	28	28	28

	Crisis Peak NPL				Bank Credit Volatility			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
r	4.26	-38.49^{***}	-38.05^{***}	-35.24^{***}	0.53^{***}	0.61^{**}	0.87^{*}	0.78
$r \cdot b$		23.69^{***}	23.66^{***}	22.16^{***}		-0.04	-0.13	-0.06
$r \cdot p$			-1.09	-15.71			-0.26	0.17
$r \cdot b \cdot p$				7.99				-0.30
R^2	0.04	0.43	0.43	0.43	0.34	0.35	0.36	0.37
Obs	22	22	22	22	26	26	26	26

	Equity Downside Volatility				Bond Downside Volatility			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
r	-0.43	-7.09^{***}	-9.08^{***}	-5.95^{*}	0.88	-1.60	-1.23	-1.77
$r \cdot b$		4.59^{***}	5.37^{***}	3.24		6.60^{**}	6.51^{**}	8.57^{**}
$r \cdot p$			1.15^{***}	-4.64			-1.41	0.32
$r \cdot b \cdot p$				4.25				-5.85
R^2	0.01	0.34	0.41	0.43	0.01	0.22	0.24	0.27
Obs	28	28	28	28	28	28	28	28

Macro Risk-Return Tradeoff and Macroprudential Policy

	GDP Volatility				Inflation Volatility			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
r	0.76^{***}	-0.87	0.04	-0.19	0.40^{*}	0.34^{**}	0.55^{***}	0.67^{**}
$r \cdot b$		0.76^{*}	0.43	0.68		0.29	0.32	0.07
$r \cdot p$			-0.48^{*}	0.88			-0.33^{***}	-0.55^{**}
$r \cdot b \cdot p$				-1.04				0.50
R^2	0.36	0.49	0.56	0.58	0.25	0.32	0.50	0.52
Obs	28	28	28	28	28	28	28	28

	Crisis Peak NPL				Bank Credit Volatility			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
r	4.26	-38.49^{***}	-38.05^{***}	-35.24^{***}	0.53^{***}	0.61^{**}	0.87^{*}	0.78
$r \cdot b$		23.69^{***}	23.66^{***}	22.16^{***}		-0.04	-0.13	-0.06
$r \cdot p$			-1.09	-15.71			-0.26	0.17
$r \cdot b \cdot p$				7.99				-0.30
R^2	0.04	0.43	0.43	0.43	0.34	0.35	0.36	0.37
Obs	22	22	22	22	26	26	26	26

	Equity Downside Volatility				Bond Downside Volatility			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
r	-0.43	-7.09^{***}	-9.08^{***}	-5.95^{*}	0.88	-1.60	-1.23	-1.77
$r \cdot b$		4.59^{***}	5.37^{***}	3.24		6.60^{**}	6.51^{**}	8.57^{**}
$r \cdot p$			1.15^{***}	-4.64			-1.41	0.32
$r \cdot b \cdot p$				4.25				-5.85
R^2	0.01	0.34	0.41	0.43	0.01	0.22	0.24	0.27
Obs	28	28	28	28	28	28	28	28

Macro Risk-Return Tradeoff and Macroprudential Policy

	GDP Volatility				Inflation Volatility			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
r	0.76^{***}	-0.87	0.04	-0.19	0.40^{*}	0.34^{**}	0.55^{***}	0.67^{***}
$r \cdot b$		0.76^{*}	0.43	0.68		0.29	0.32	0.07
$r \cdot p$			-0.48^{*}	0.88			-0.33^{***}	-0.55^{***}
$r \cdot b \cdot p$				-1.04				0.50
R^2	0.36	0.49	0.56	0.58	0.25	0.32	0.50	0.52
Obs	28	28	28	28	28	28	28	28

	Crisis Peak NPL				Bank Credit Volatility			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
r	4.26	-38.49^{***}	-38.05^{***}	-35.24^{***}	0.53^{***}	0.61^{**}	0.87^{*}	0.78
$r \cdot b$		23.69^{***}	23.66^{***}	22.16^{***}		-0.04	-0.13	-0.06
$r \cdot p$			-1.09	-15.71			-0.26	0.17
$r \cdot b \cdot p$				7.99				-0.30
R^2	0.04	0.43	0.43	0.43	0.34	0.35	0.36	0.37
Obs	22	22	22	22	26	26	26	26

	Equity Downside Volatility				Bond Downside Volatility			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
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$r \cdot b$		4.59^{***}	5.37^{***}	3.24		6.60^{**}	6.51^{**}	8.57^{**}
$r \cdot p$			1.15^{***}	-4.64			-1.41	0.32
$r \cdot b \cdot p$				4.25				-5.85
R^2	0.01	0.34	0.41	0.43	0.01	0.22	0.24	0.27
Obs	28	28	28	28	28	28	28	28

Macro Risk-Return Tradeoff and Macroprudential Policy

	GDP Volatility				Inflation Volatility			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
r	0.76^{***}	-0.87	0.04	-0.19	0.40^{*}	0.34^{**}	0.55^{***}	0.67^{***}
$r \cdot b$		0.76^{*}	0.43	0.68		0.29	0.32	0.07
$r \cdot p$			-0.48^{*}	0.88			-0.33^{***}	-0.55^{***}
$r \cdot b \cdot p$				-1.04				0.50
R^2	0.36	0.49	0.56	0.58	0.25	0.32	0.50	0.52
Obs	28	28	28	28	28	28	28	28

	Crisis Peak NPL				Bank Credit Volatility			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
r	4.26	-38.49^{***}	-38.05^{***}	-35.24^{***}	0.53^{***}	0.61^{**}	0.87^{*}	0.78
$r \cdot b$		23.69^{***}	23.66^{***}	22.16^{***}		-0.04	-0.13	-0.06
$r \cdot p$			-1.09	-15.71			-0.26	0.17
$r \cdot b \cdot p$				7.99				-0.30
R^2	0.04	0.43	0.43	0.43	0.34	0.35	0.36	0.37
Obs	22	22	22	22	26	26	26	26

	Equity Downside Volatility				Bond Downside Volatility			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
r	-0.43	-7.09^{***}	-9.08^{***}	-5.95^{*}	0.88	-1.60	-1.23	-1.77
$r \cdot b$		4.59^{***}	5.37^{***}	3.24		6.60^{**}	6.51^{**}	8.57^{**}
$r \cdot p$			1.15^{***}	-4.64			-1.41	0.32
$r \cdot b \cdot p$				4.25				-5.85
R^2	0.01	0.34	0.41	0.43	0.01	0.22	0.24	0.27
Obs	28	28	28	28	28	28	28	28

Conclusion

We document that:

1. Global pricing of risk can be recovered from nonlinear VIX forecasting regressions

2. Exposure to the global pricing of risk is correlated with both risk and return of macroeconomic and financial performance measures

3. Monetary, fiscal, and macroprudential policies interact with macroeconomic and financial risk-return tradeoffs through the global price of risk

These **stylized facts** suggest that exposures to the global price of risk play an important role in explaining global macroeconomic and financial linkages.

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