

Capital Flows, Cross-Border Banking and Global Liquidity

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2011 Ely Lectures, Johns Hopkins University
Lecture 3

Two Themes

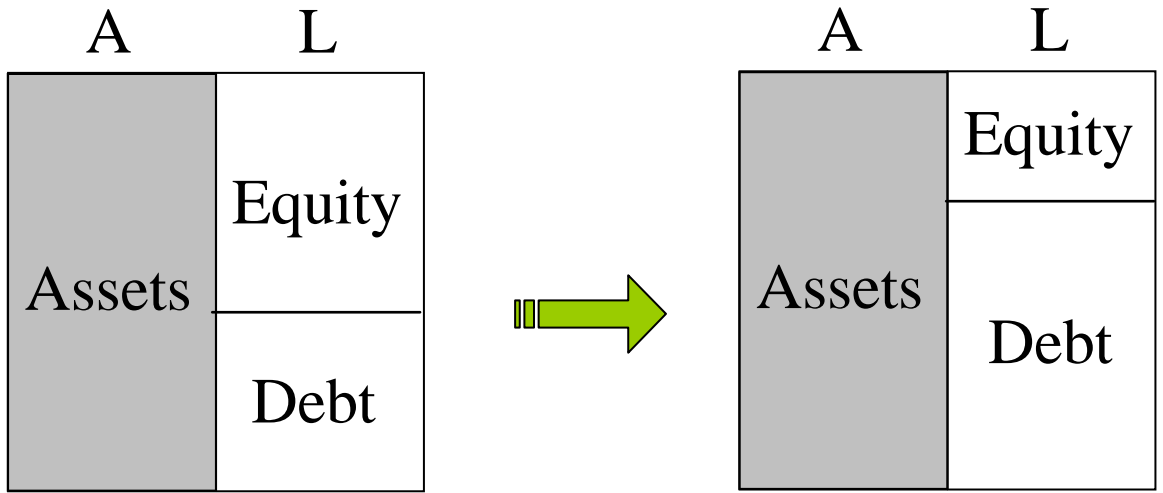
- Financial intermediary leverage drive fluctuations in risk premiums
- Transmission of liquidity conditions through global banking system

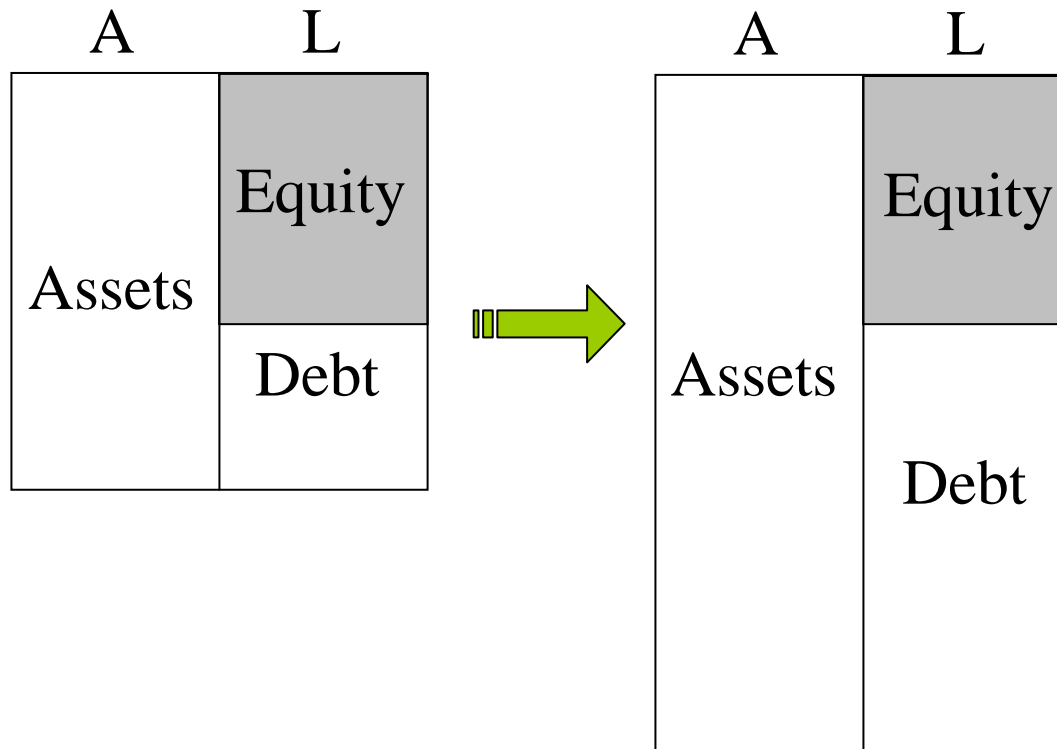
Outline

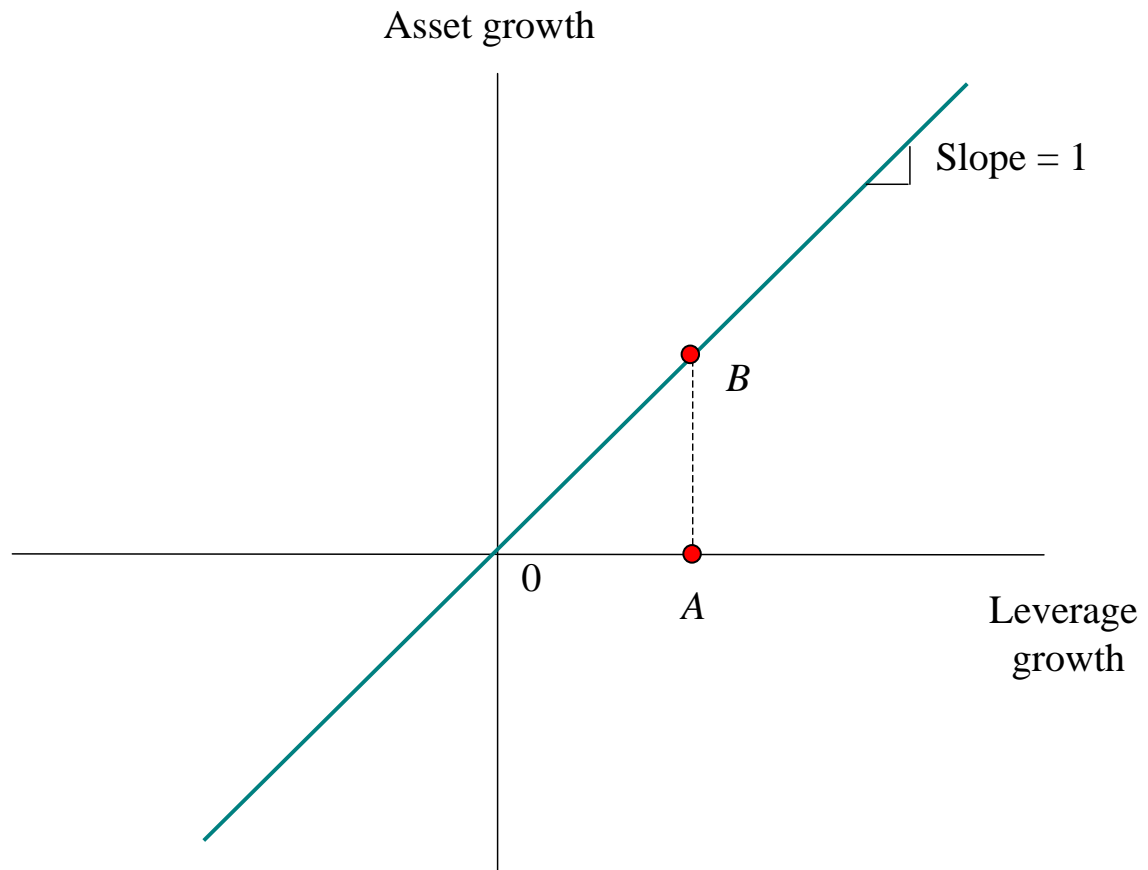
- “Double-decker” model of credit supply
 - Global banks
 - Local banks
- Credit supply driven by credit risk model
 - Lending increases to use up any spare balance sheet capacity
 - Liquidity conditions transmitted to local banks

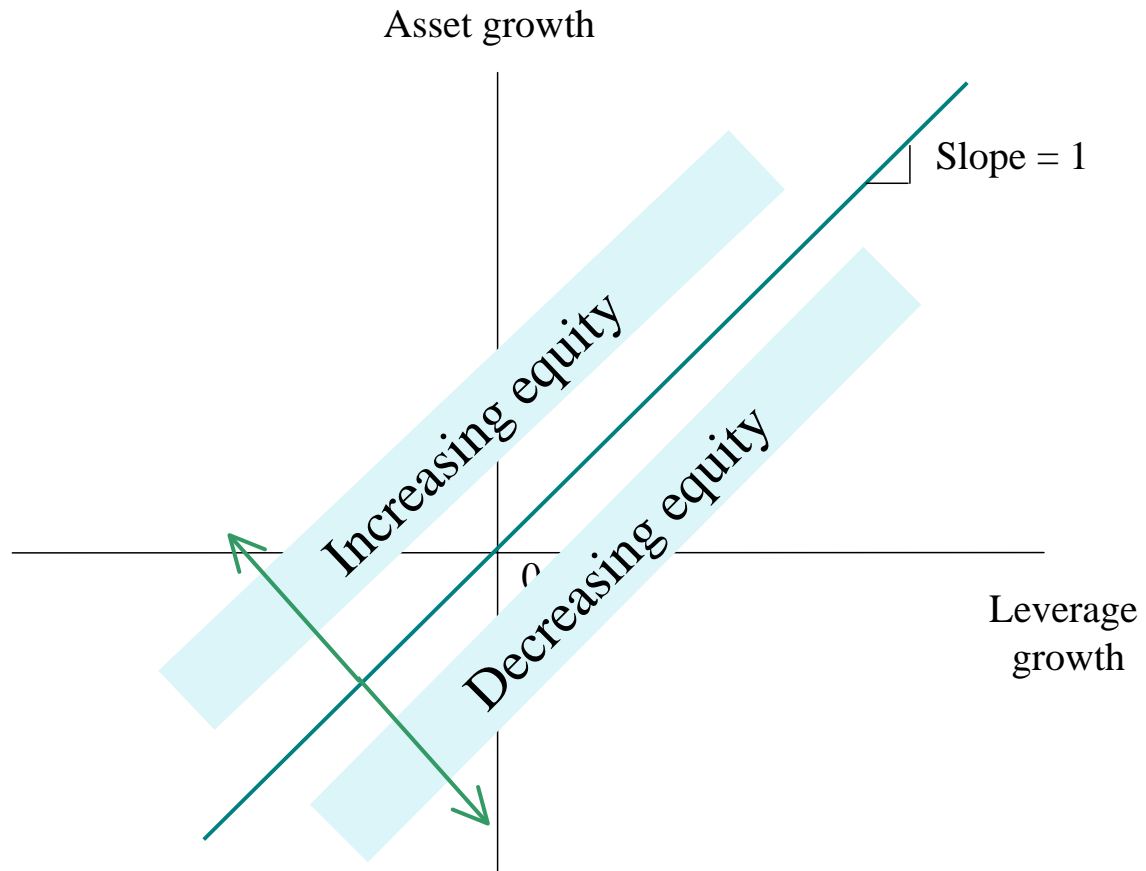
Corporate Finance of Banking

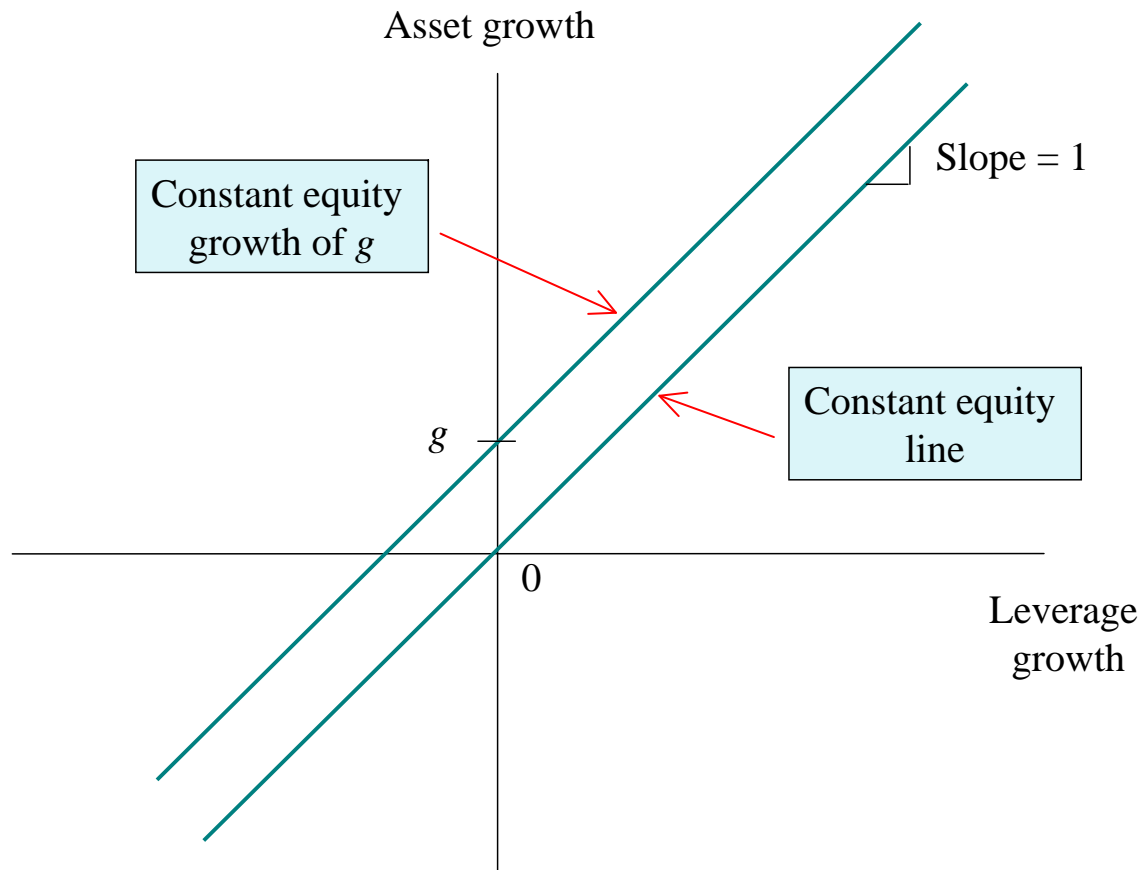
A	L
	Equity
Assets	Debt



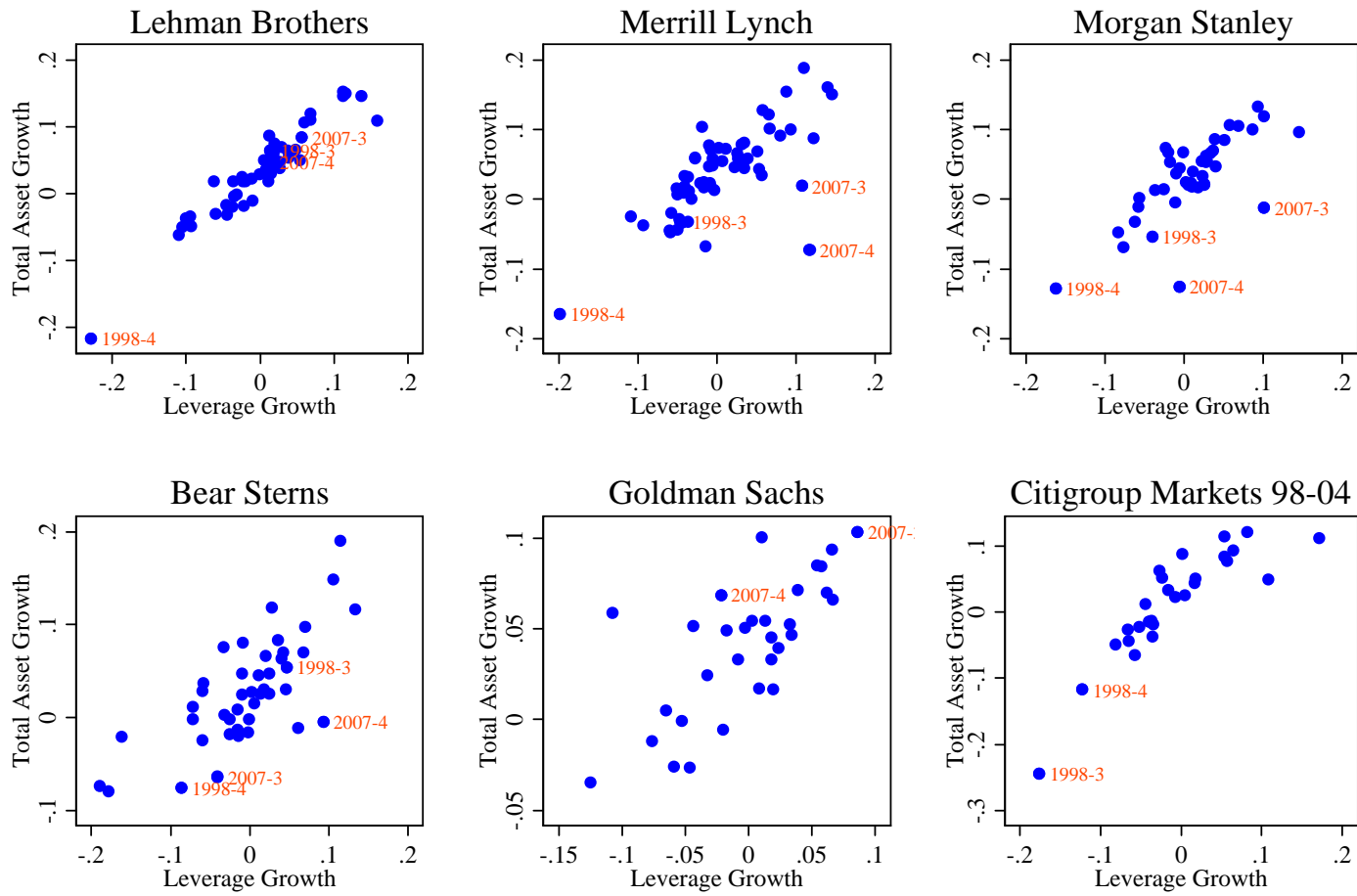




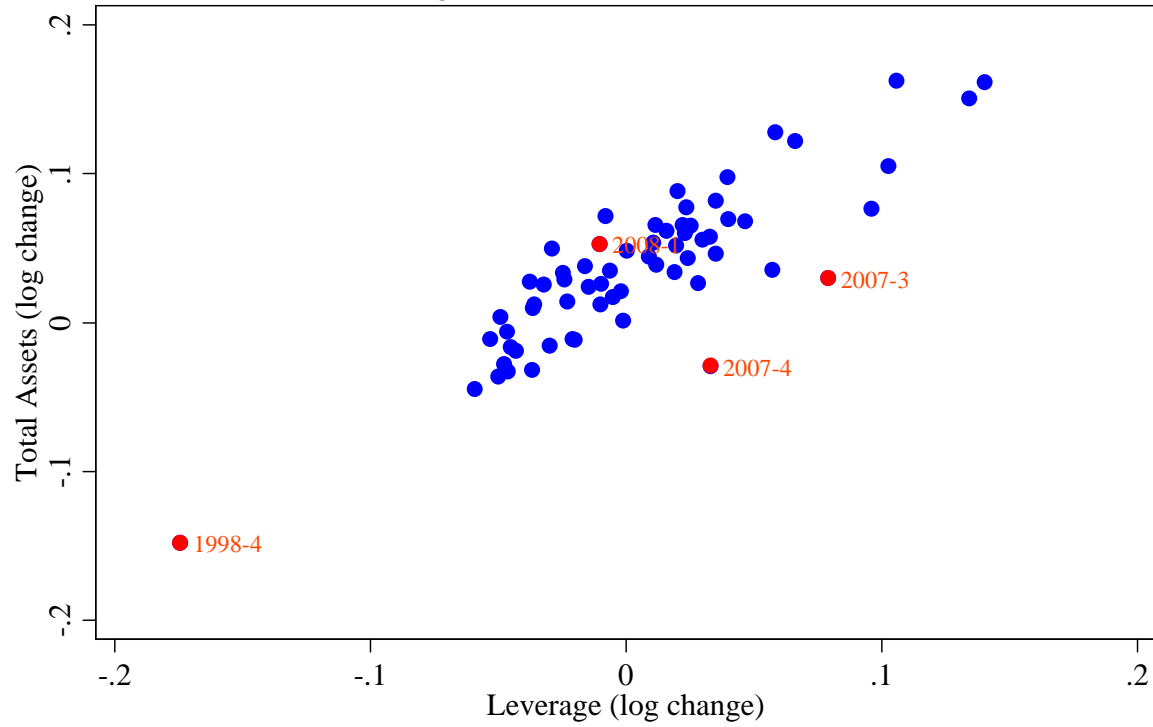




Total Assets and Leverage



Leverage and Total Assets Growth
Asset weighted, 1992Q3-2008Q1, Source: SEC



Explaining Deleveraging

Value at risk (VaR) at confidence level c relative to some base level A_0 is smallest non-negative number V such that

$$\text{Prob}(A < A_0 - V) \leq 1 - c$$

Equity E meets total value at risk

$$E = V = v \times A$$

v is Unit VaR (Value-at-Risk per dollar of assets). Leverage L satisfies

$$L \equiv \frac{A}{E} = \frac{1}{v}$$

Empirical implication:

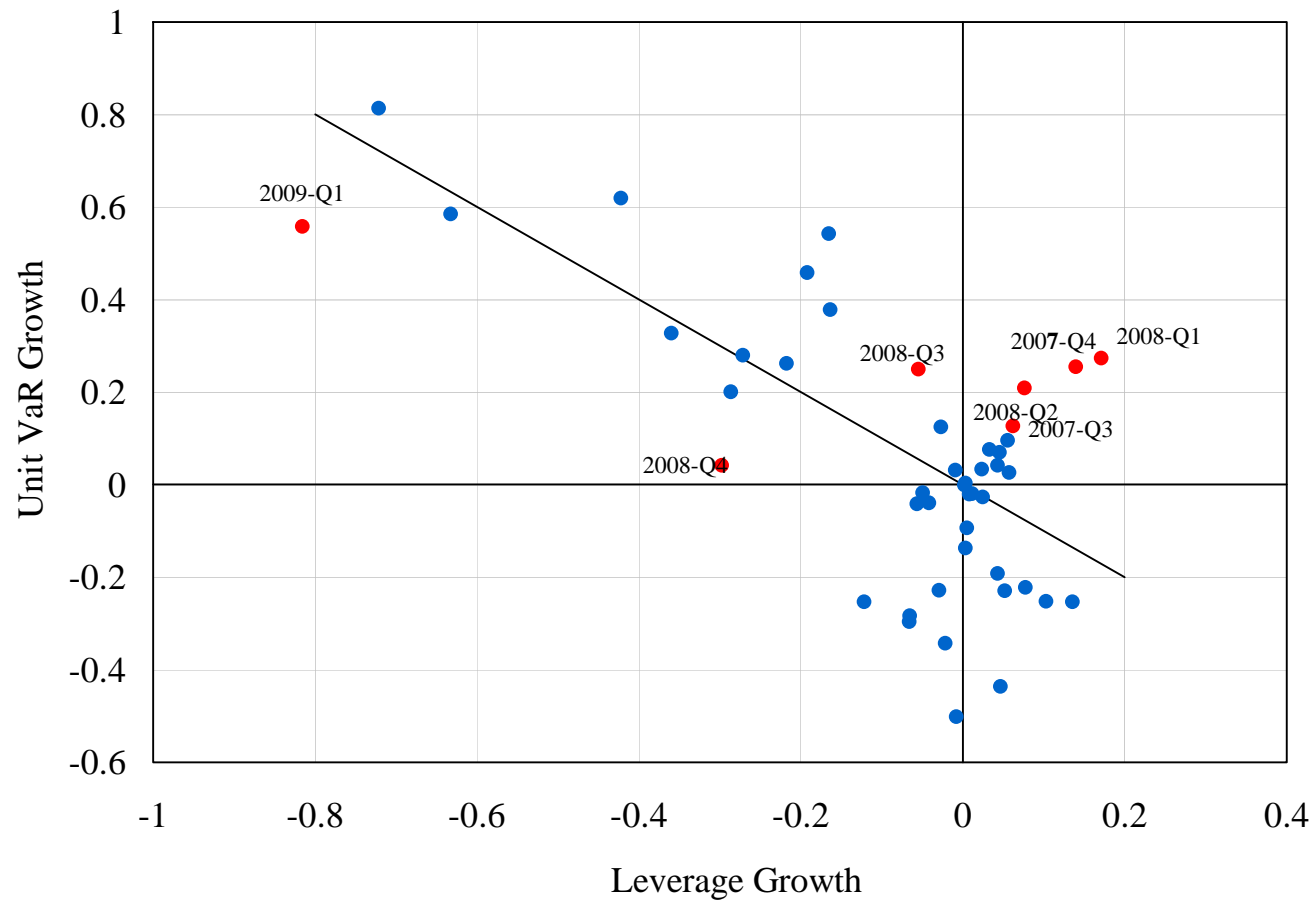
$$\ln L = -\ln v$$

so that

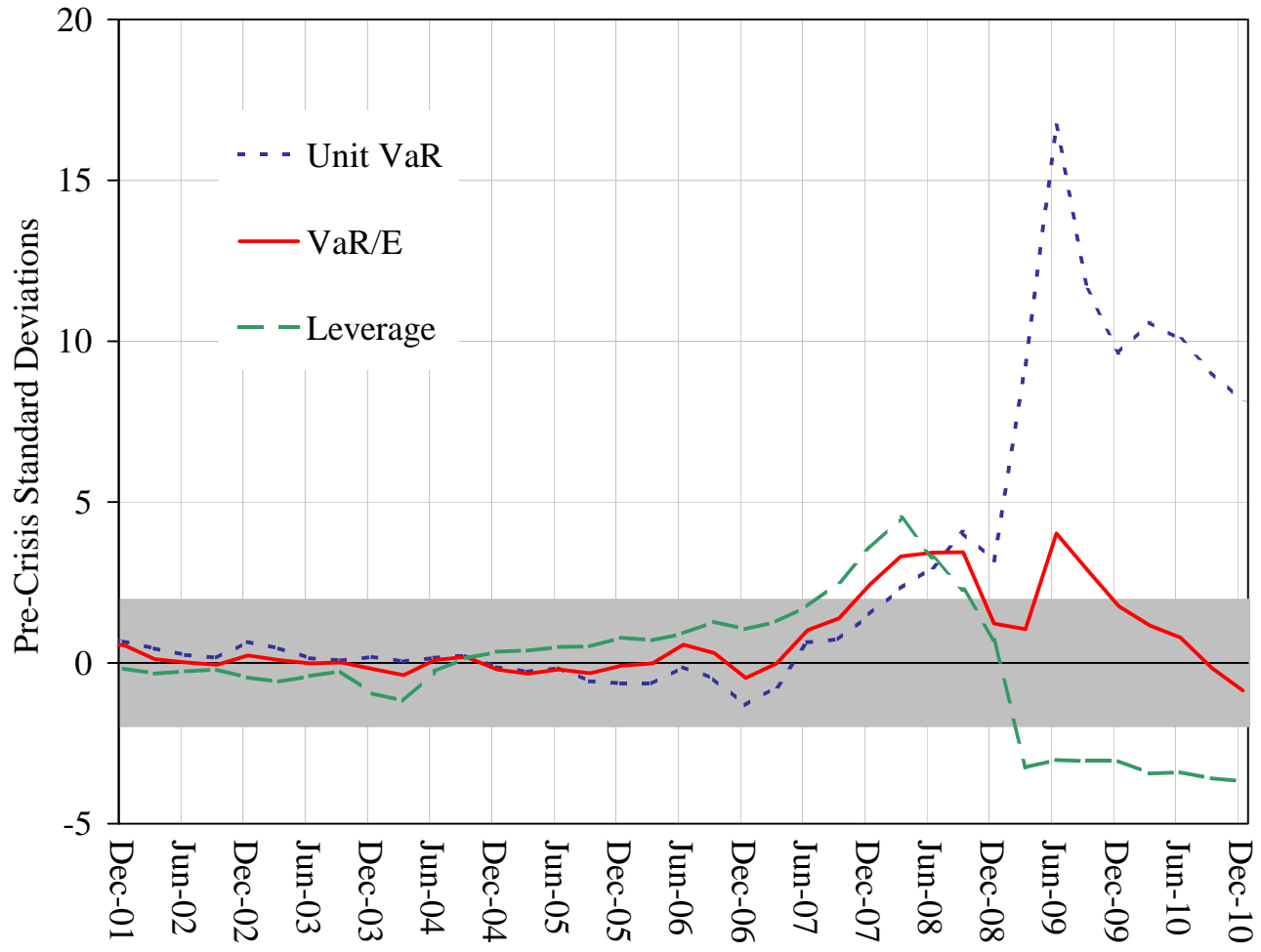
$$\ln L_t - \ln L_{t-1} = -(\ln v_t - \ln v_{t-1}) \quad (*)$$

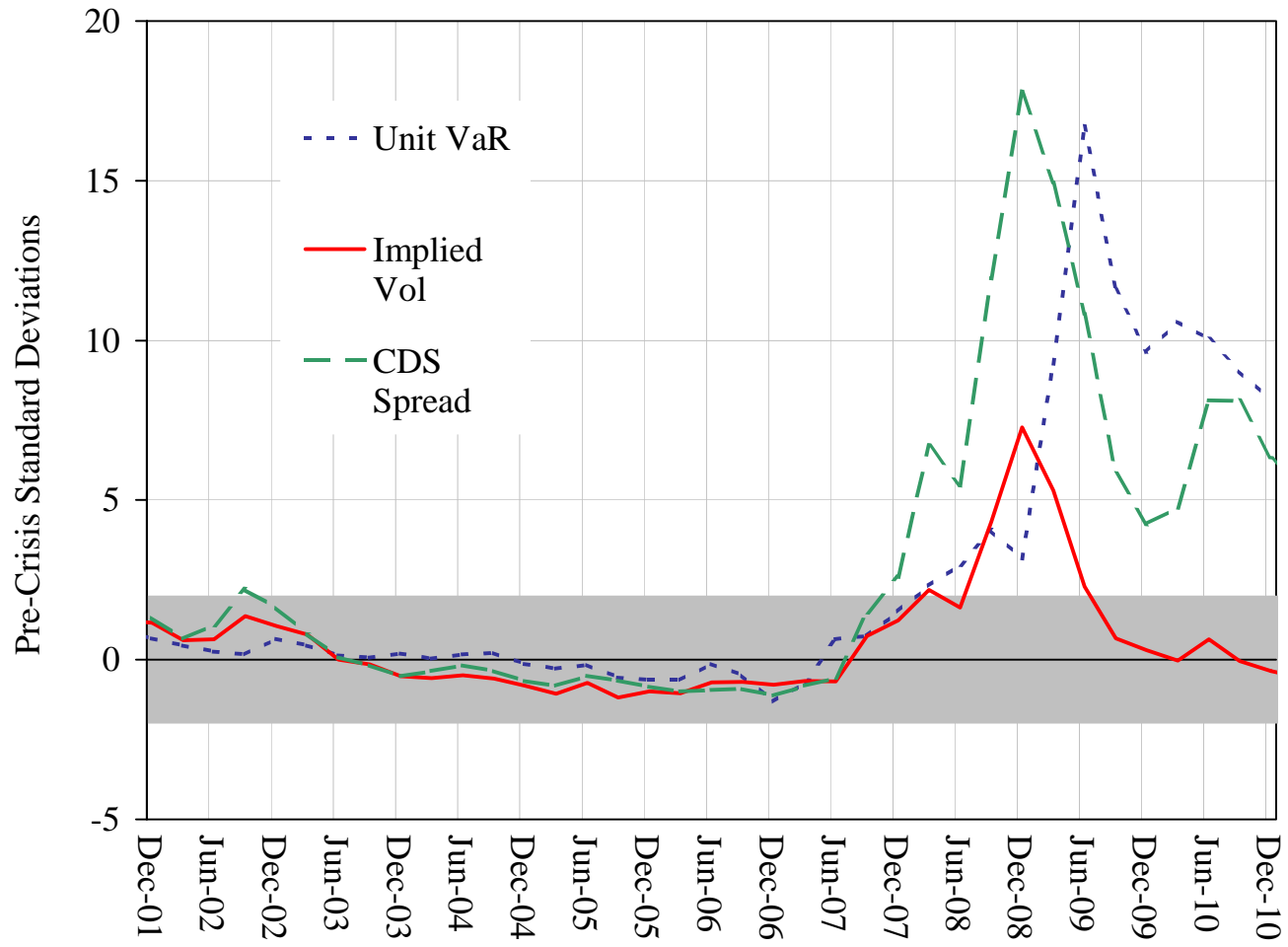
Scatter chart of leverage changes against unit VaR changes should have slope -1 .

Evidence?

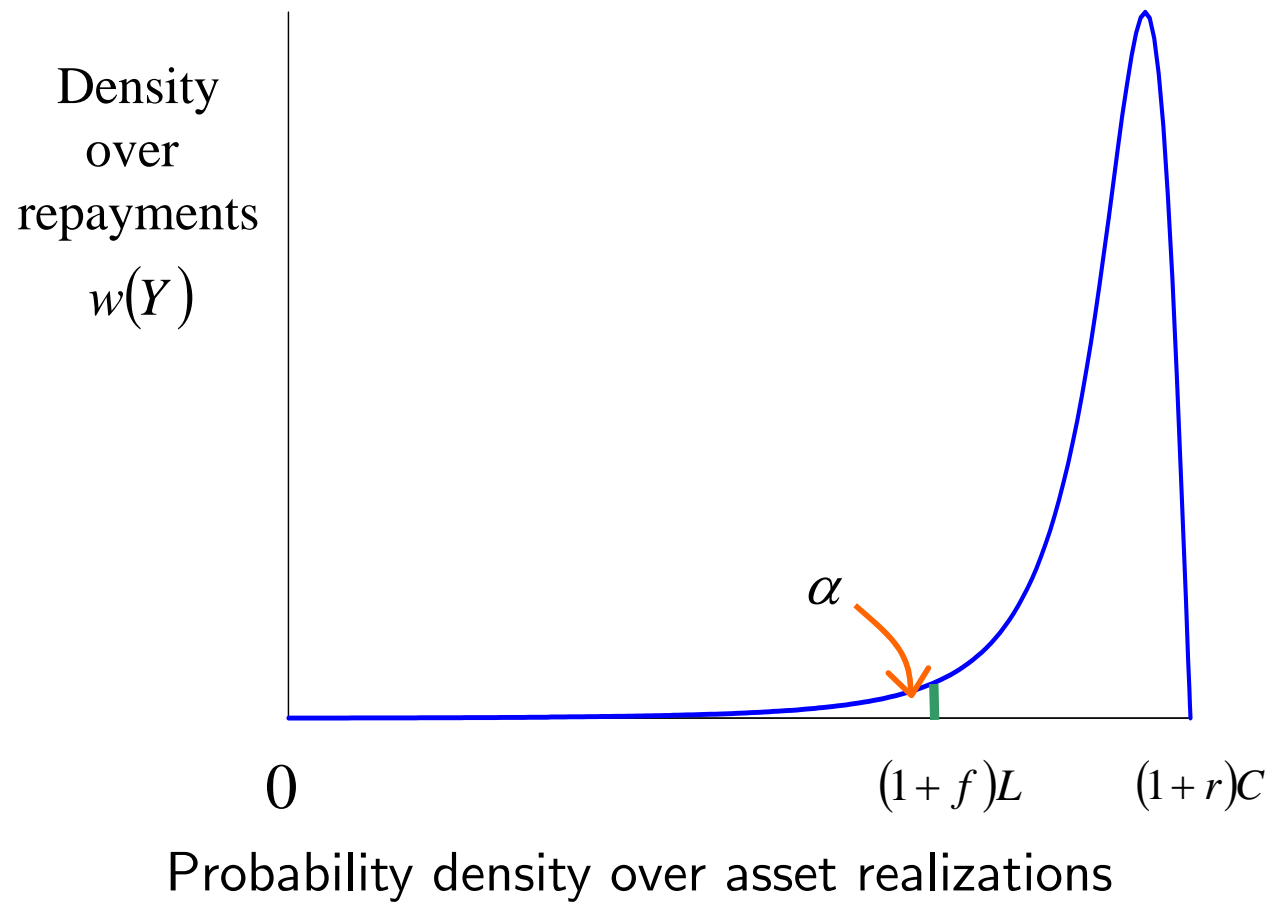


Five (then four, three, then two) Wall Street banks, Adrian and Shin (2011)





Bank Credit Supply and Value-at-Risk



Turning Credit Risk Model on Its Head

- Vasicek one factor credit risk model (backbone of Basel)
- Turn Vasicek model on its head as credit supply model
 - Fix E . Determine credit supply S

$$S = \frac{E}{1 - \frac{1+r}{1+f}\varphi(\rho, \alpha, \varepsilon)}, \quad \varphi \in (0, 1)$$

φ is ratio of **notional assets** to **notional debt**

[φ is normalized leverage measure, with $\varphi \in (0, 1)$]

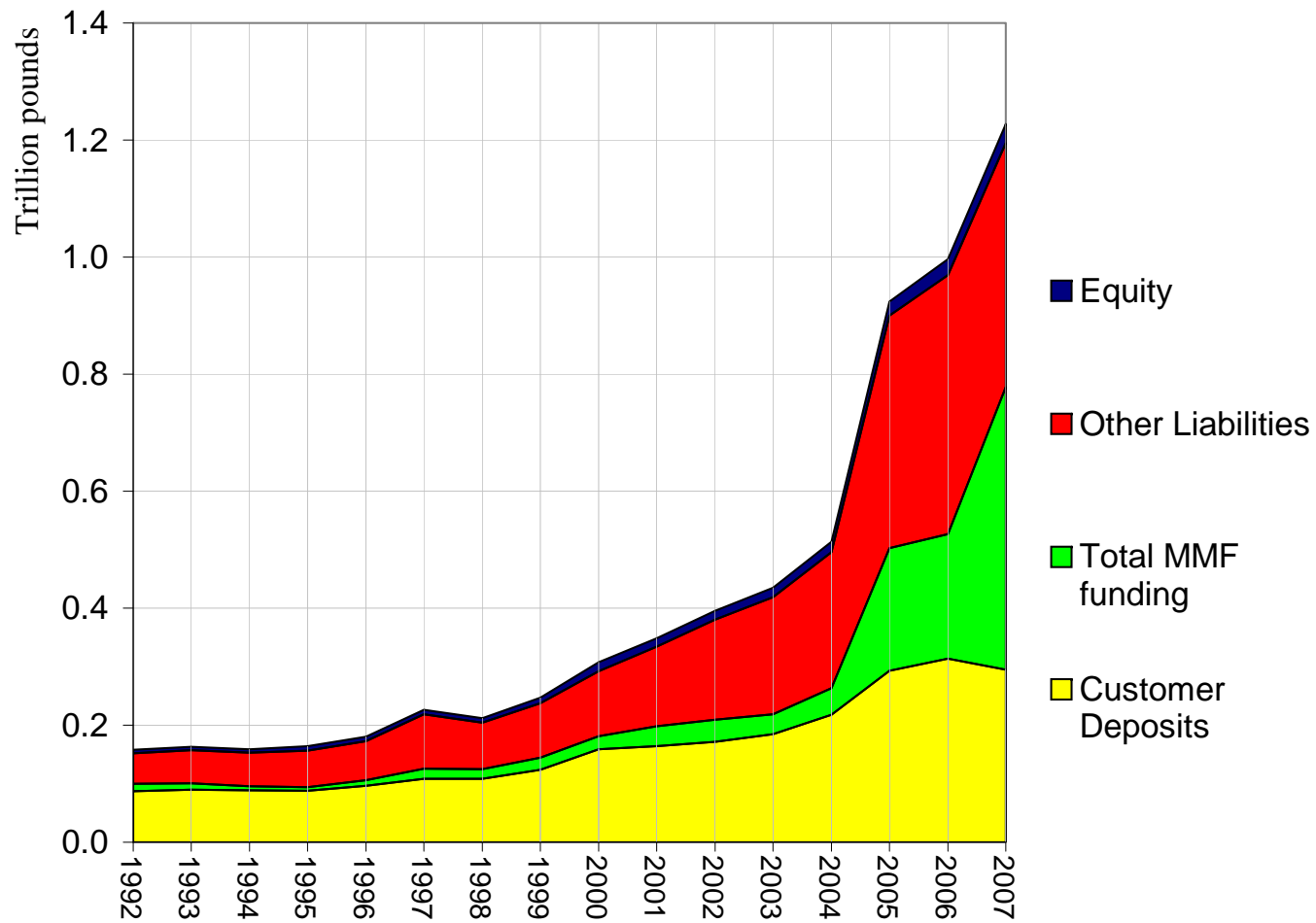


Figure 1: Total Liabilities of Barclays (1992 - 2007) (Source: Bankscope)

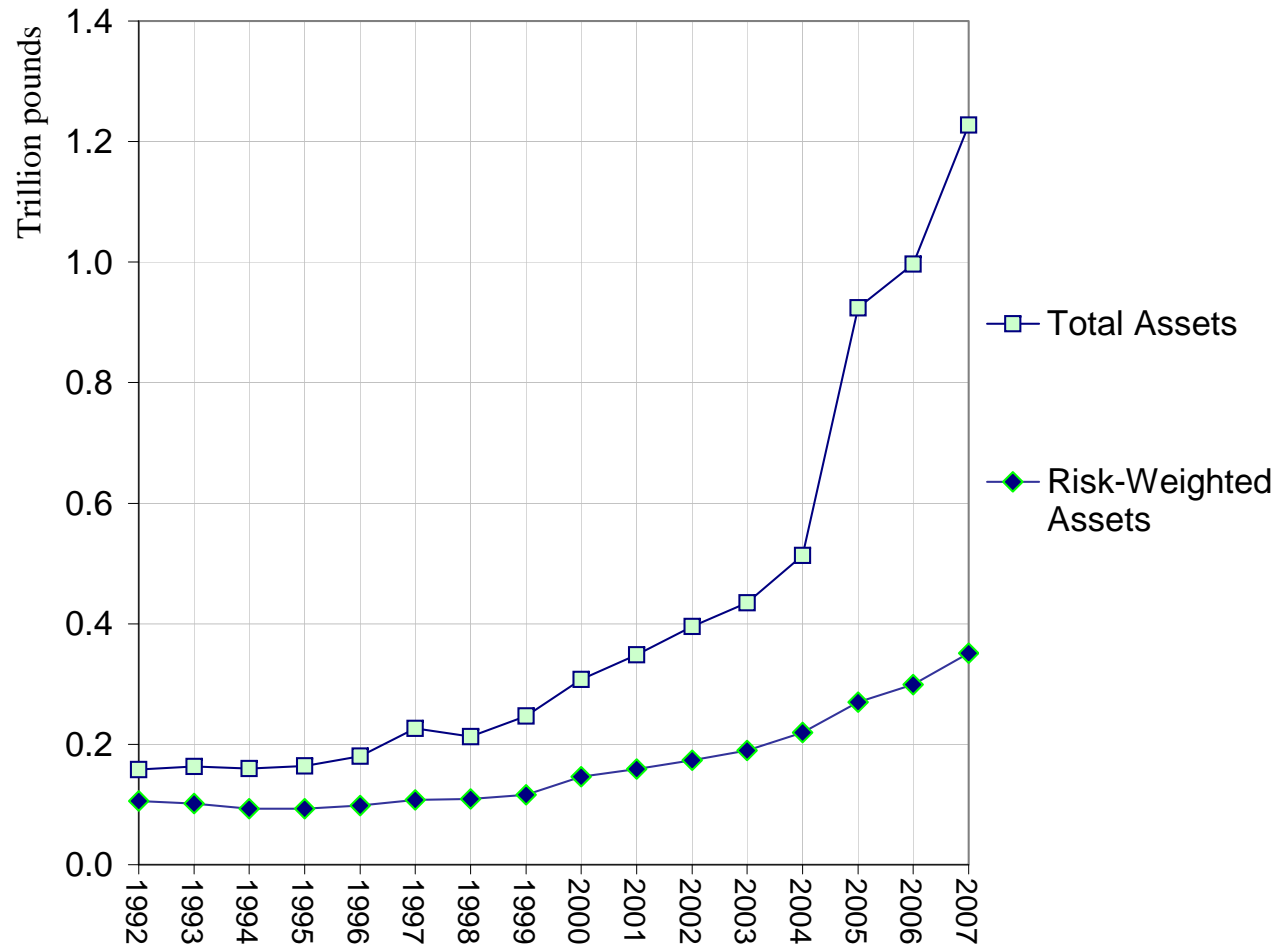


Figure 2: Barclays, risk-weighted assets and total assets (Source: Bankscope)

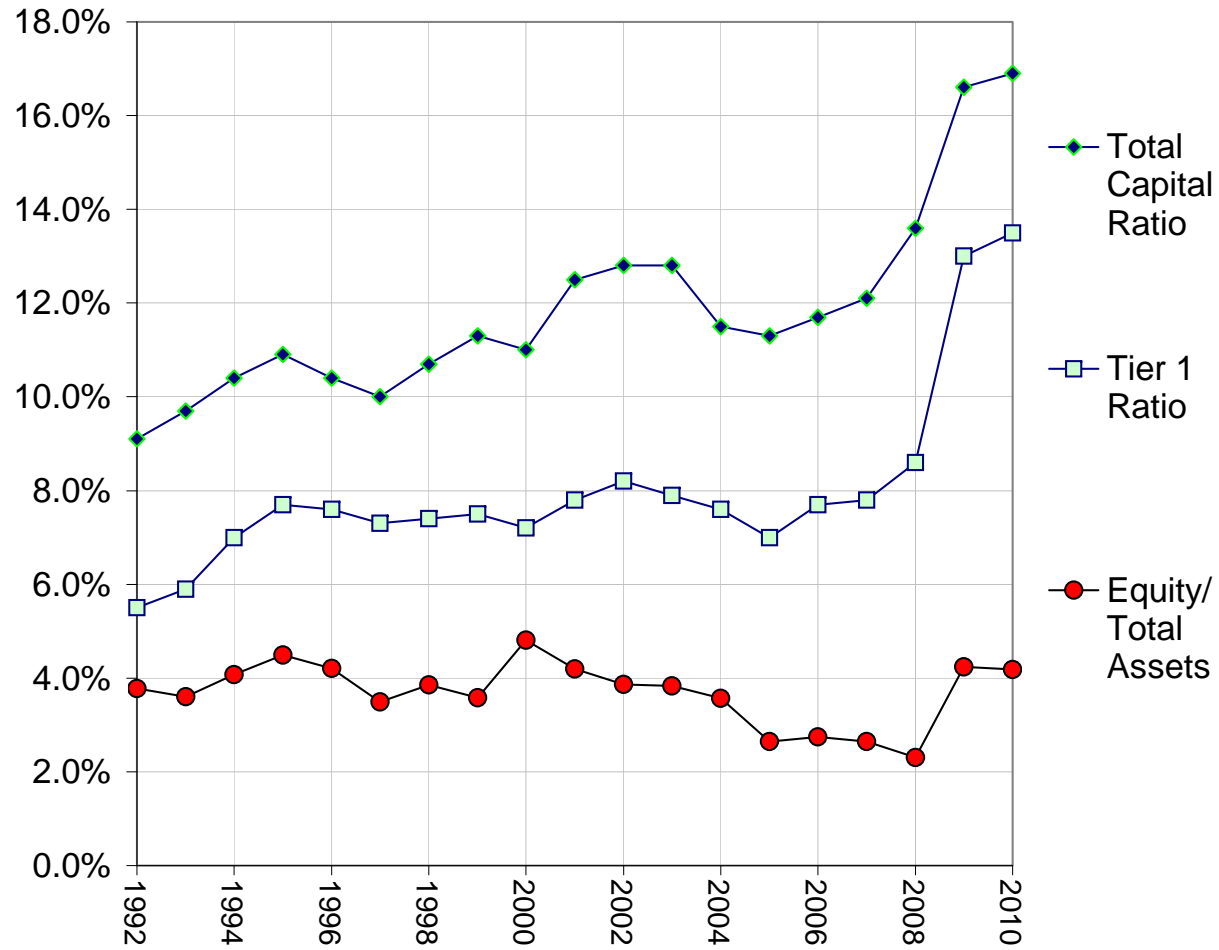


Figure 3: Barclays, capital ratios (Source: Bankscope)

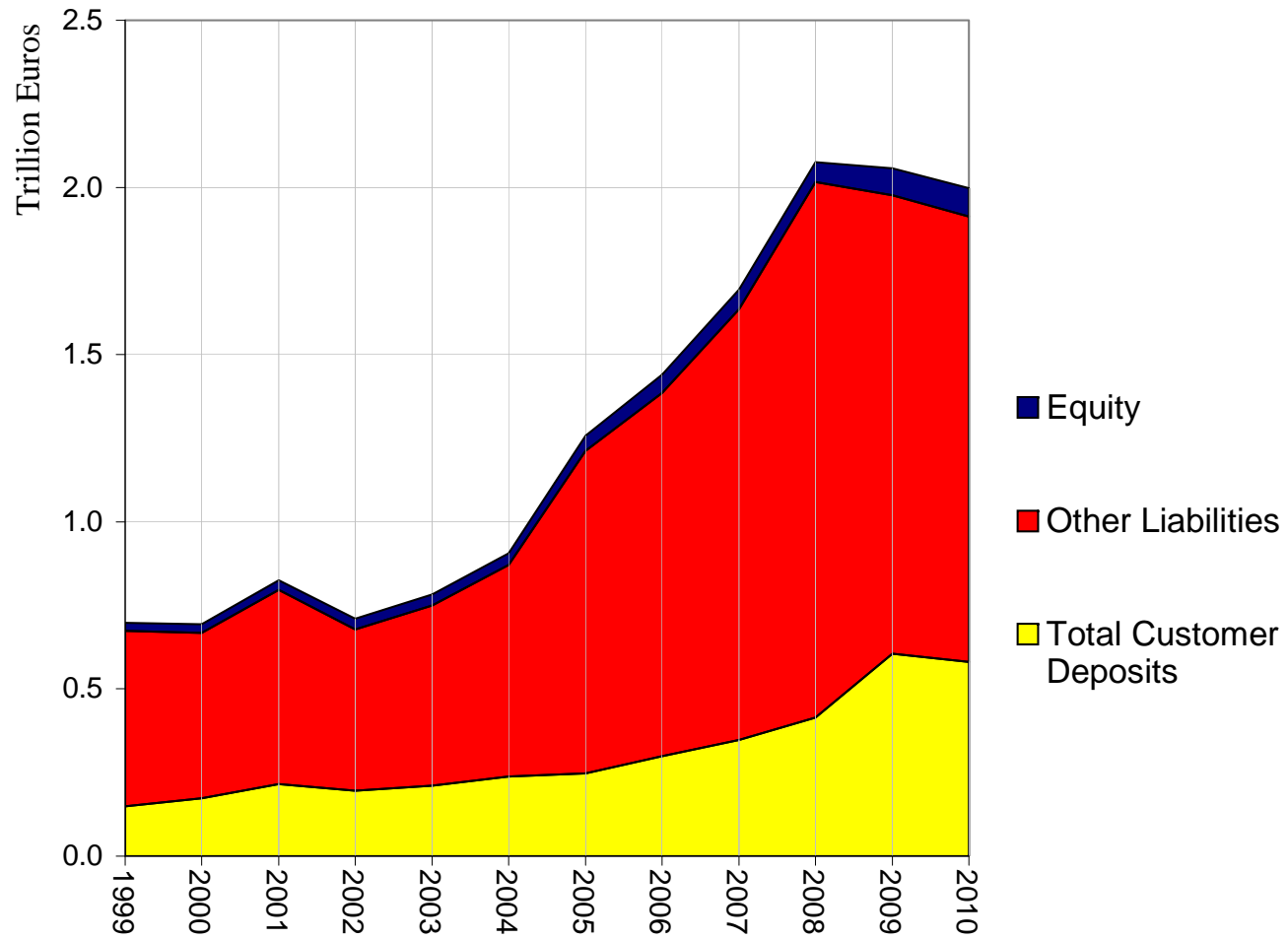


Figure 4: BNP Paribas total liabilities (Source: Bankscope)

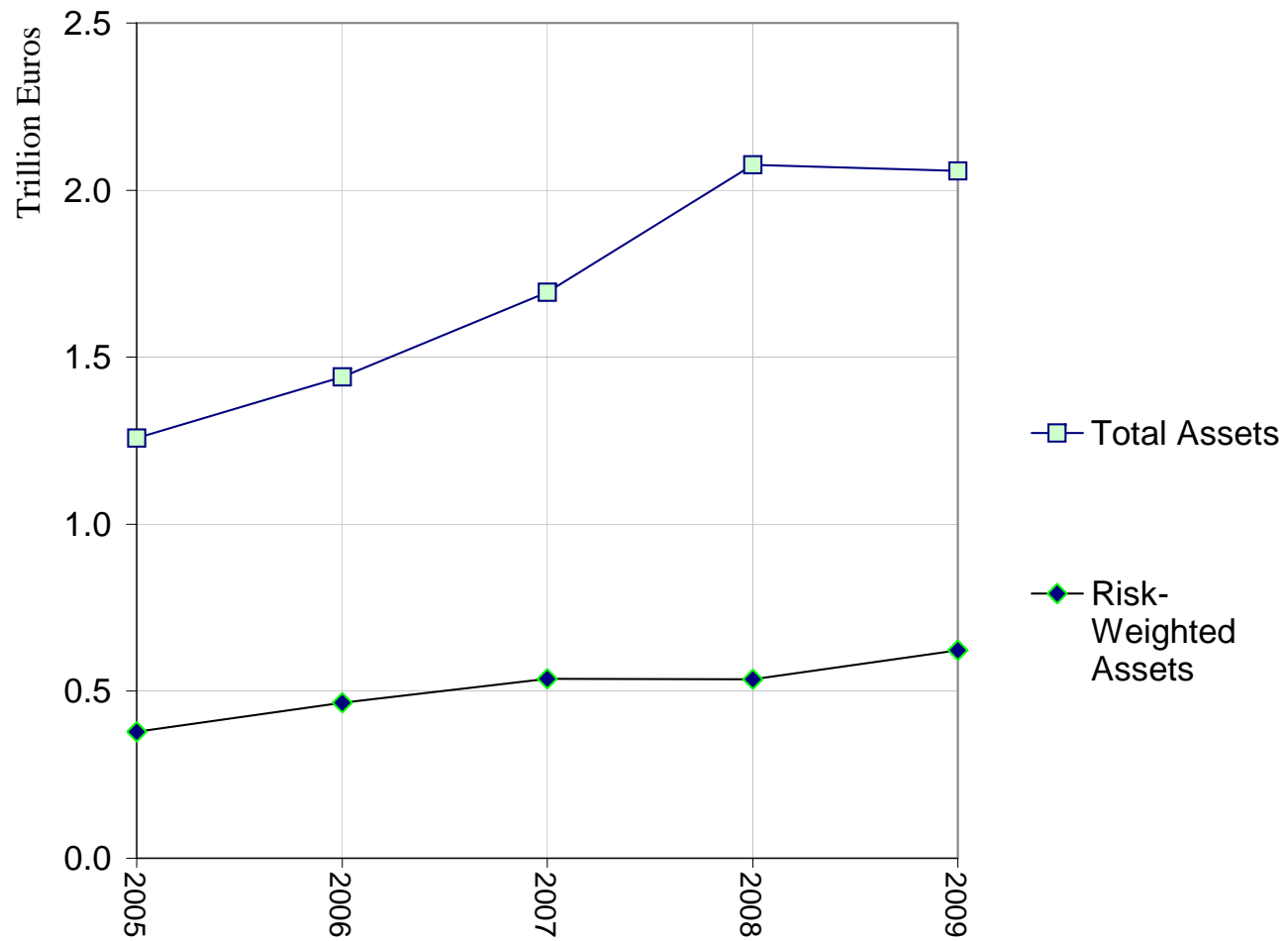


Figure 5: BNP Paribas risk-weighted assets and total assets (Source: Bankscope)

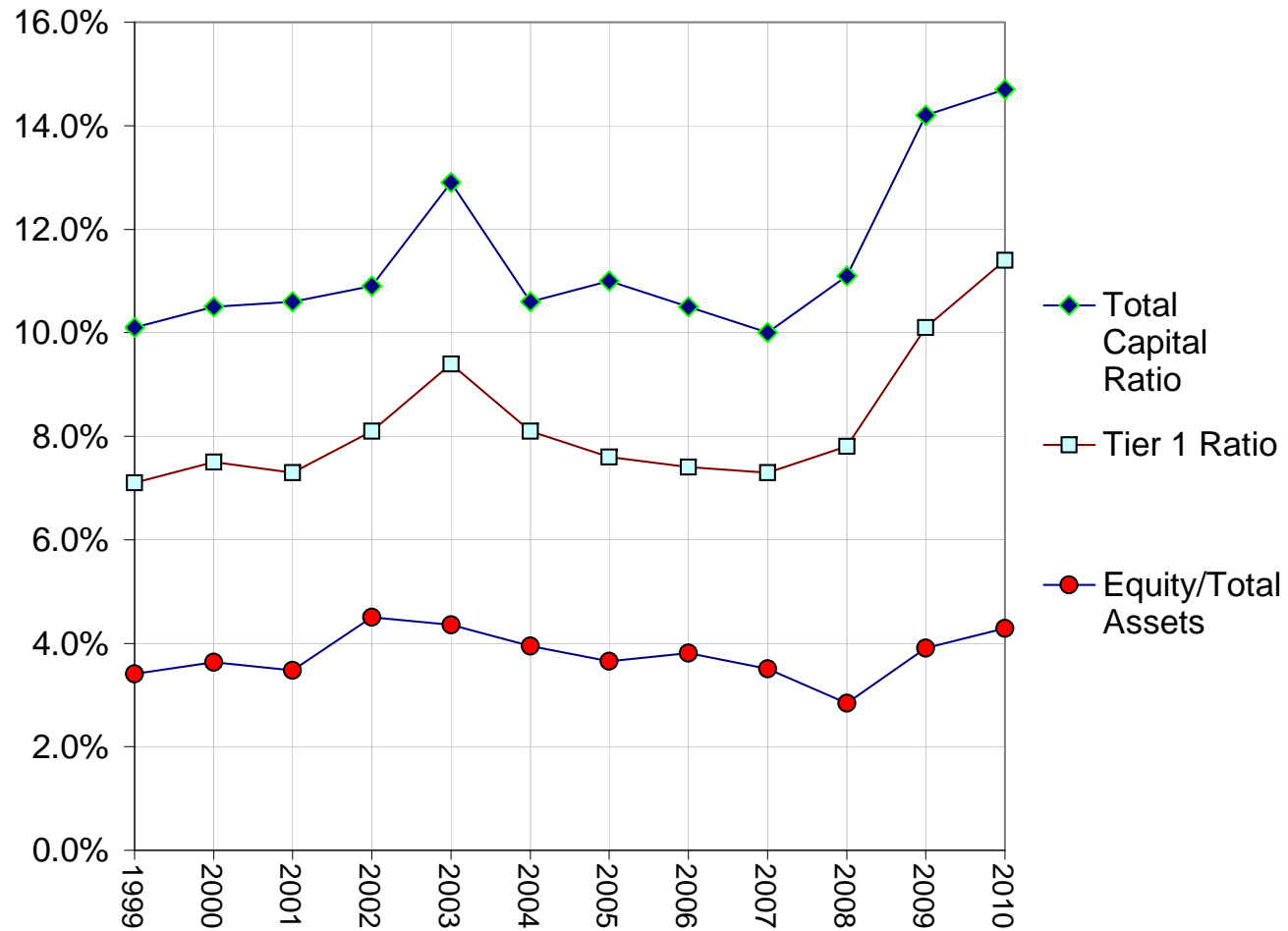
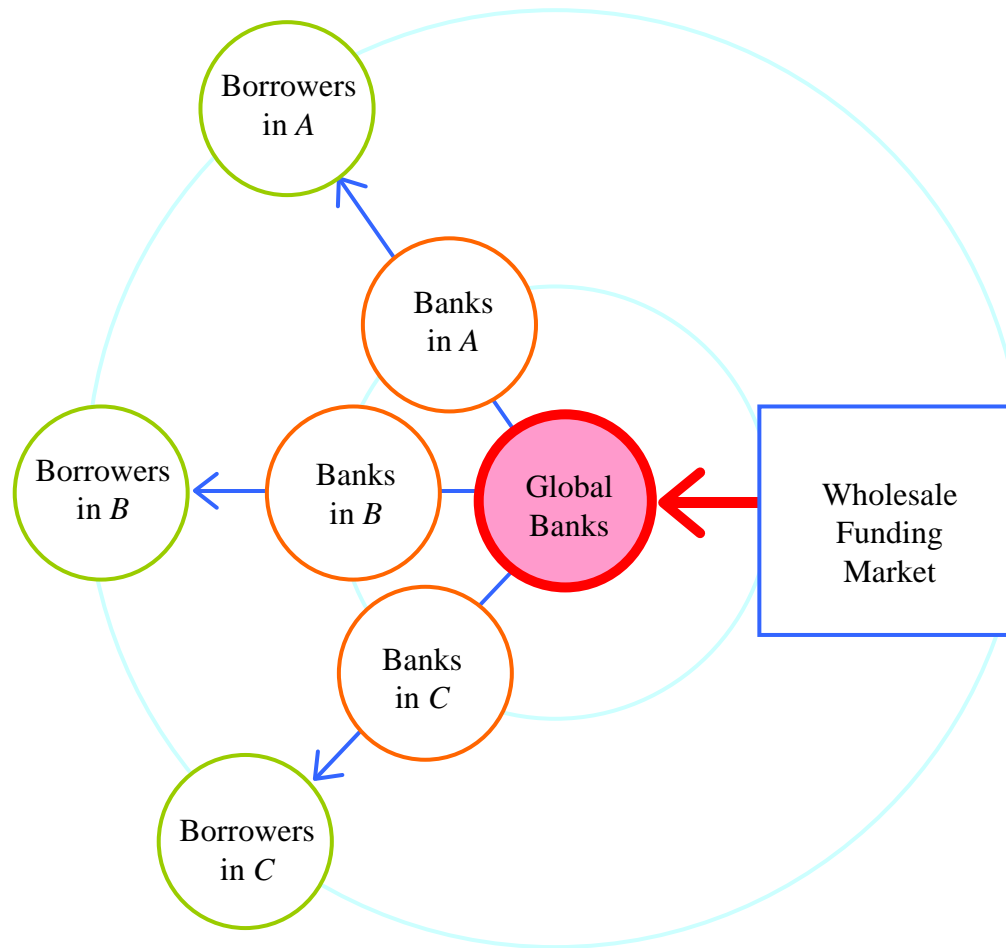


Figure 6: BNP Paribas capital ratios (Source: Bankscope)

Landscape of Global Banking



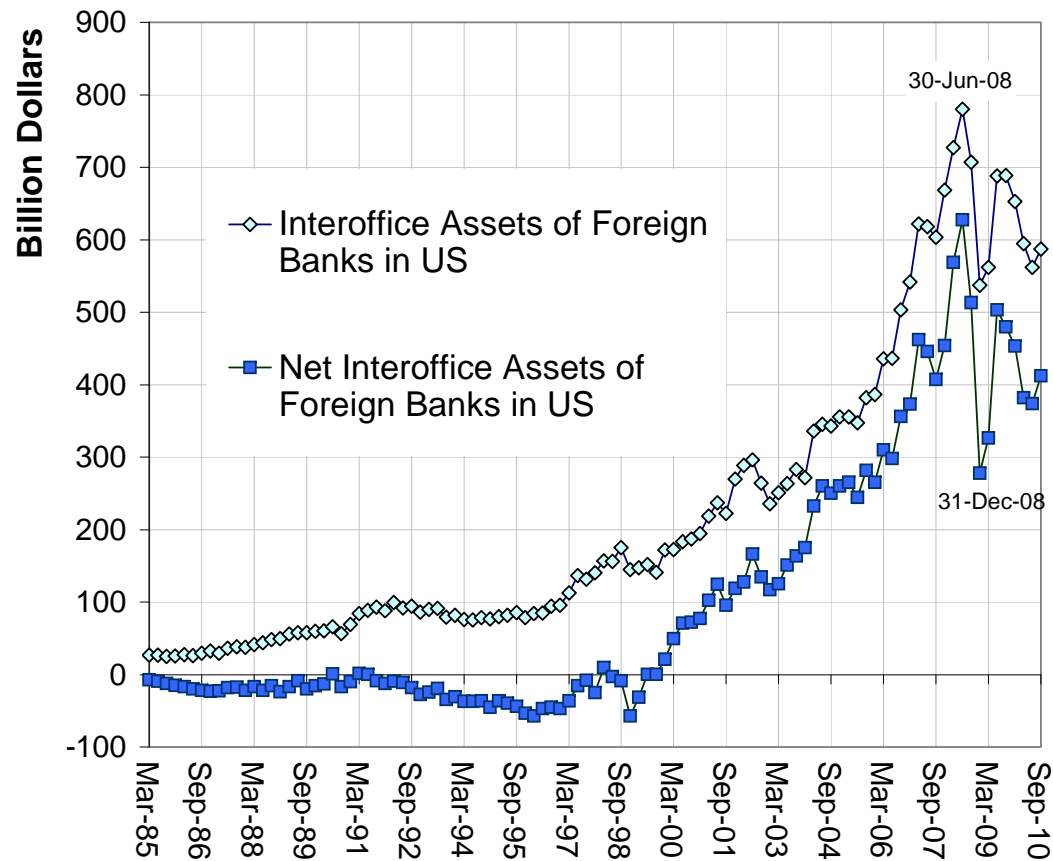


Figure 7: Interoffice assets of foreign banks in the United States (Source: Federal Reserve, series on “Assets and Liabilities of U.S. Branches and Agencies of Foreign Banks”)

Fund	CDs and time deposits	Commercial paper	Corporate notes	Repos	Total	Net assets, \$ billions
Fidelity Cash Reserves	91 / 73	28 / 27	54 / 34	70 / 70	63 / 51	128
JPMorgan Prime Money Market	98 / 94	35 / 31	57 / 39	73 / 73	67 / 62	120
Vanguard Prime Money Market	94 / 69	39 / 25	0 / 0	68 / 68	33 / 24	106
BlackRock Liquidity Temp Reserve Primary	95 / 91	4 / 4	37 / 17	13 / 13	51 / 47	68
Schwab Value Advantage	98 / 88	24 / 18	54 / 51	18 / 18	43 / 37	65
GS FS Prime Obligations	91 / 64	24 / 19	58 / 48	67 / 67	54 / 40	61
Dreyfus Inst Cash Advantage	0 / 0	0 / 0	0 / 0	2/2	0 / 0	56
Fidelity Inst Money Market	85 / 71	32 / 25	33 / 24	0 / 0	62 / 51	49
Morgan Stanley Inst Liq Prime	100 / 91	44 / 44	51 / 36	45 / 45	61 / 54	47
Dreyfus Cash Management	4 / 4	19 / 19	0 / 0	91 / 91	37 / 37	34
AIM STIT Liquid Assets	92 / 75	46 / 30	31 / 31	0 / 0	70 / 56	33
Barclays Inst Money Market	95 / 69	25 / 20	27 / 16	84 / 84	57 / 45	32
Merrill Lynch Premier Inst Portfolio	67 / 57	10/6	30 / 21	21 / 21	24 / 19	31
Fidelity Inst Money Market: Prime	92 / 80	32 / 25	46 / 36	45 / 45	60 / 51	26
Total	100 / 90	33 / 33	51 / 34	15 / 15	56 / 47	21
Total	92 / 78	26 / 22	47 / 33	51 / 51	50 / 42	878
Share of asset class in assets	34	26	13	11	100	

Figure 8: US prime money funds' assets in non-US/European bank obligations (% each asset class) mid-2008 (Source: Baba, McCauley and Ramaswamy, BIS Quarterly Review 2009)

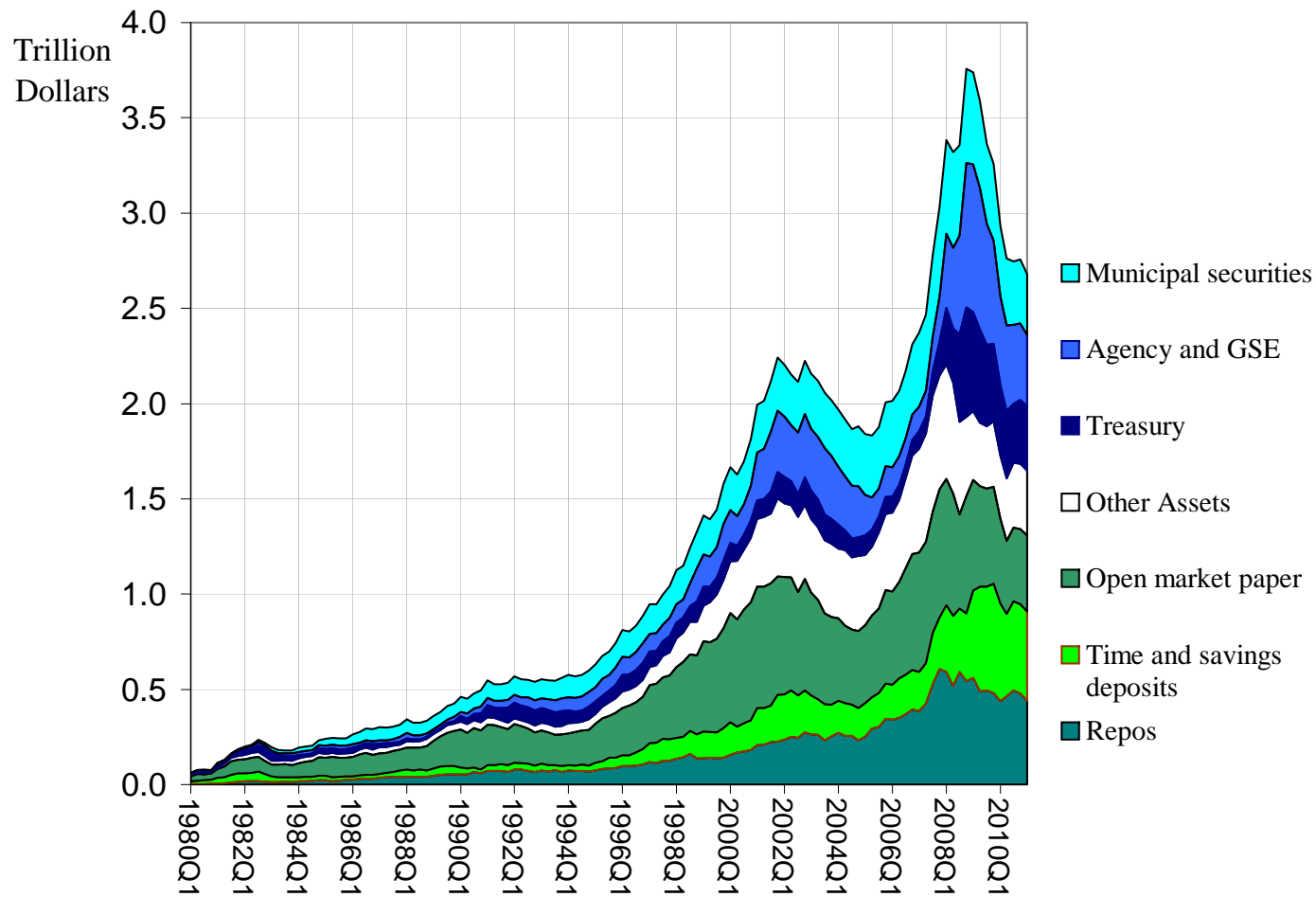


Figure 9: US Money market mutual fund assets (Source: Federal Reserve, Flow of Funds)

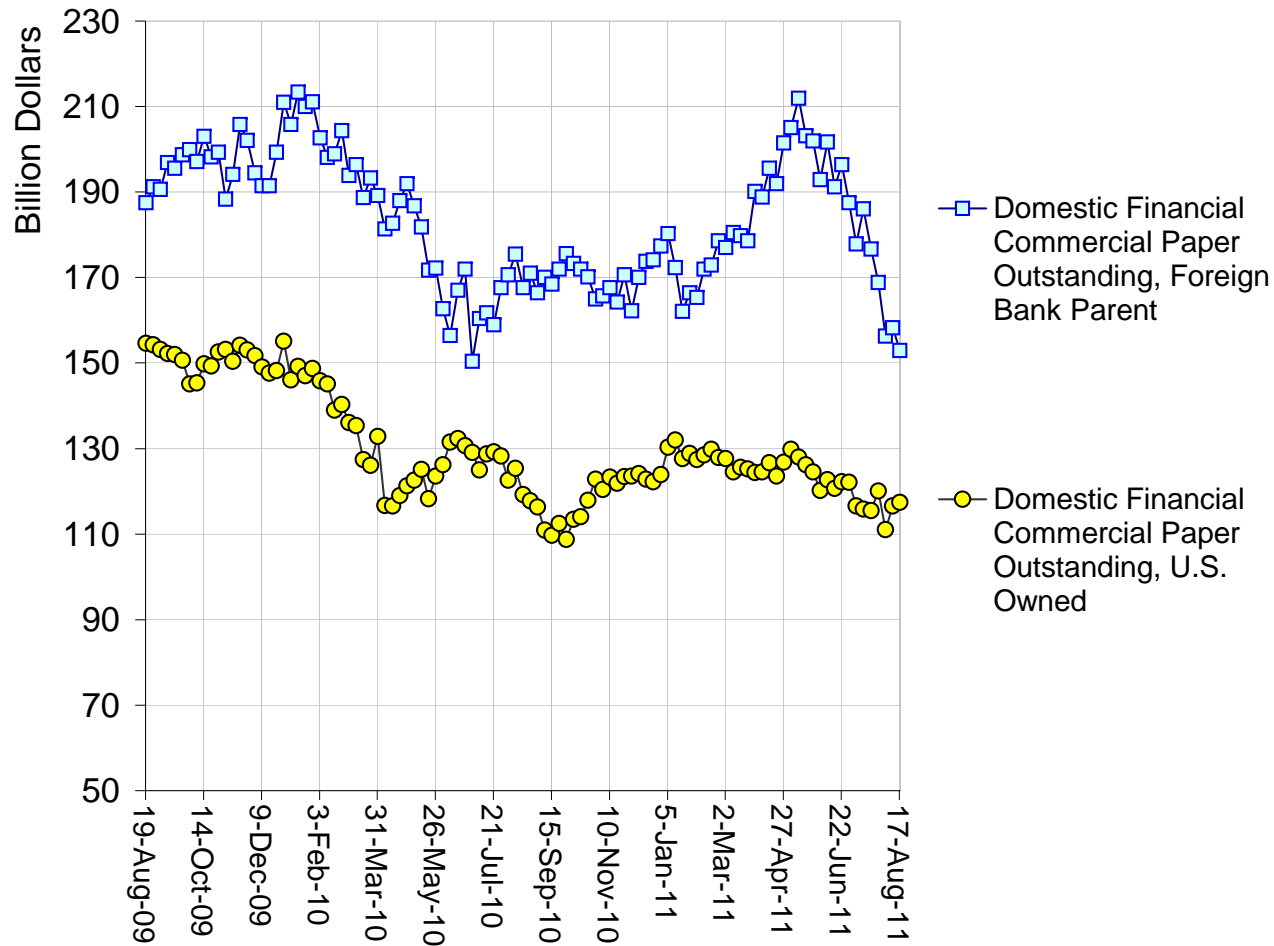
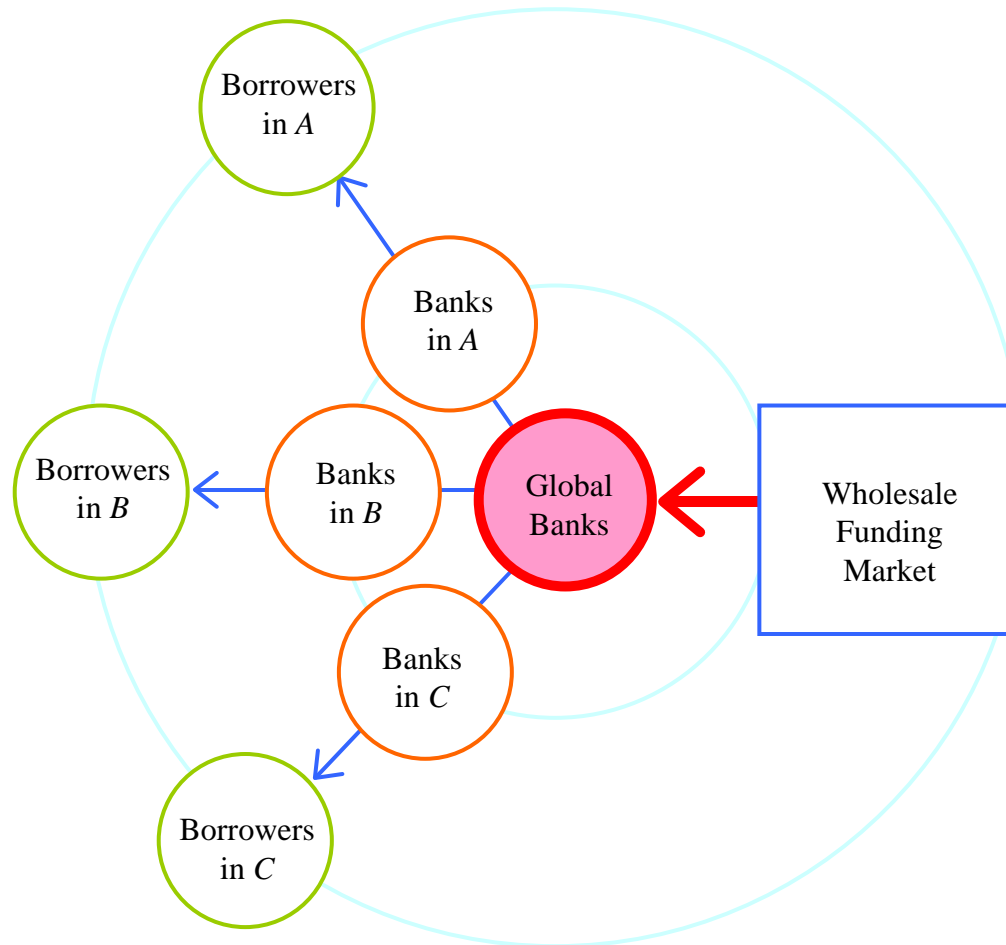
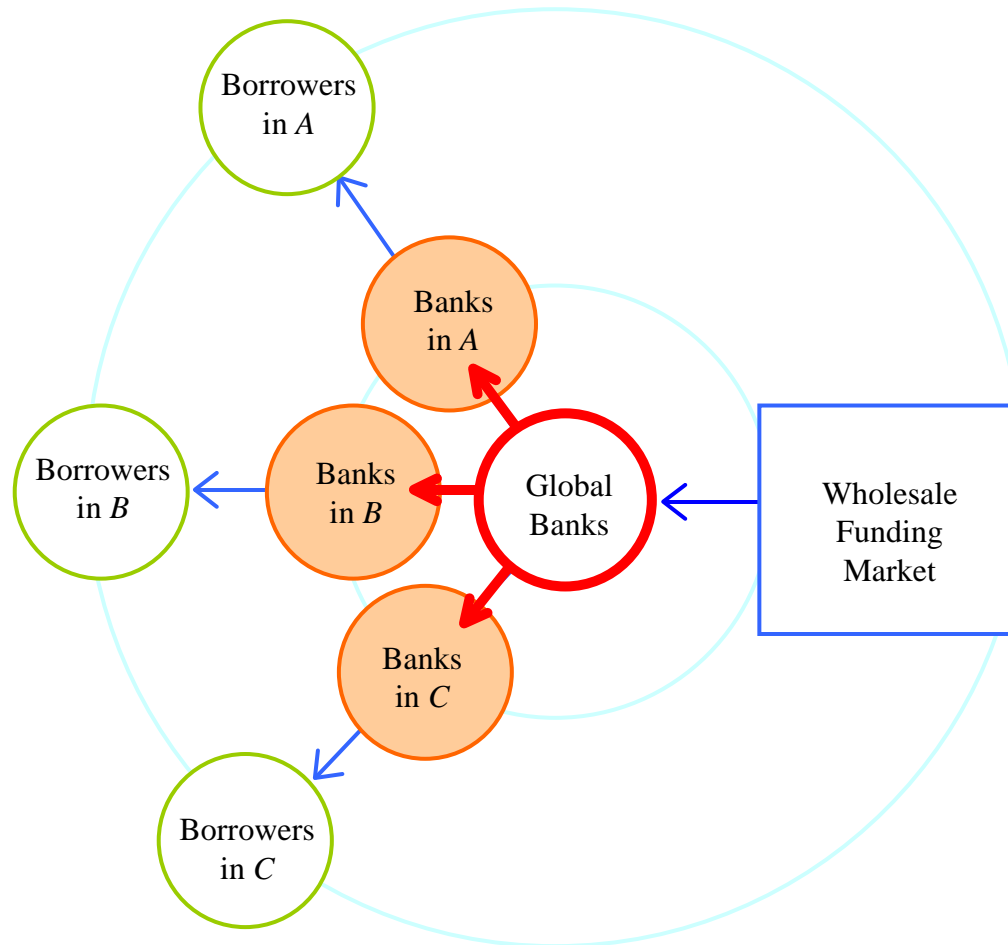


Figure 10: US domestic financial commercial paper (CP) amounts outstanding (Source: Federal Reserve, weekly series on CP)





BIS Banking Statistics

- BIS **locational** banking statistics
 - Classification based on **residence**
 - Branches/subsidiaries of global banks classified under host country
 - Consistent with balance of payments and national income statistics
 - **Cross-border claims**
- BIS **consolidated** banking statistics
 - Classification based on **nationality** of parent
 - **Foreign claims** = cross-border claims + local claims
 - **International claims** = cross-border claims + local claims in foreign currency

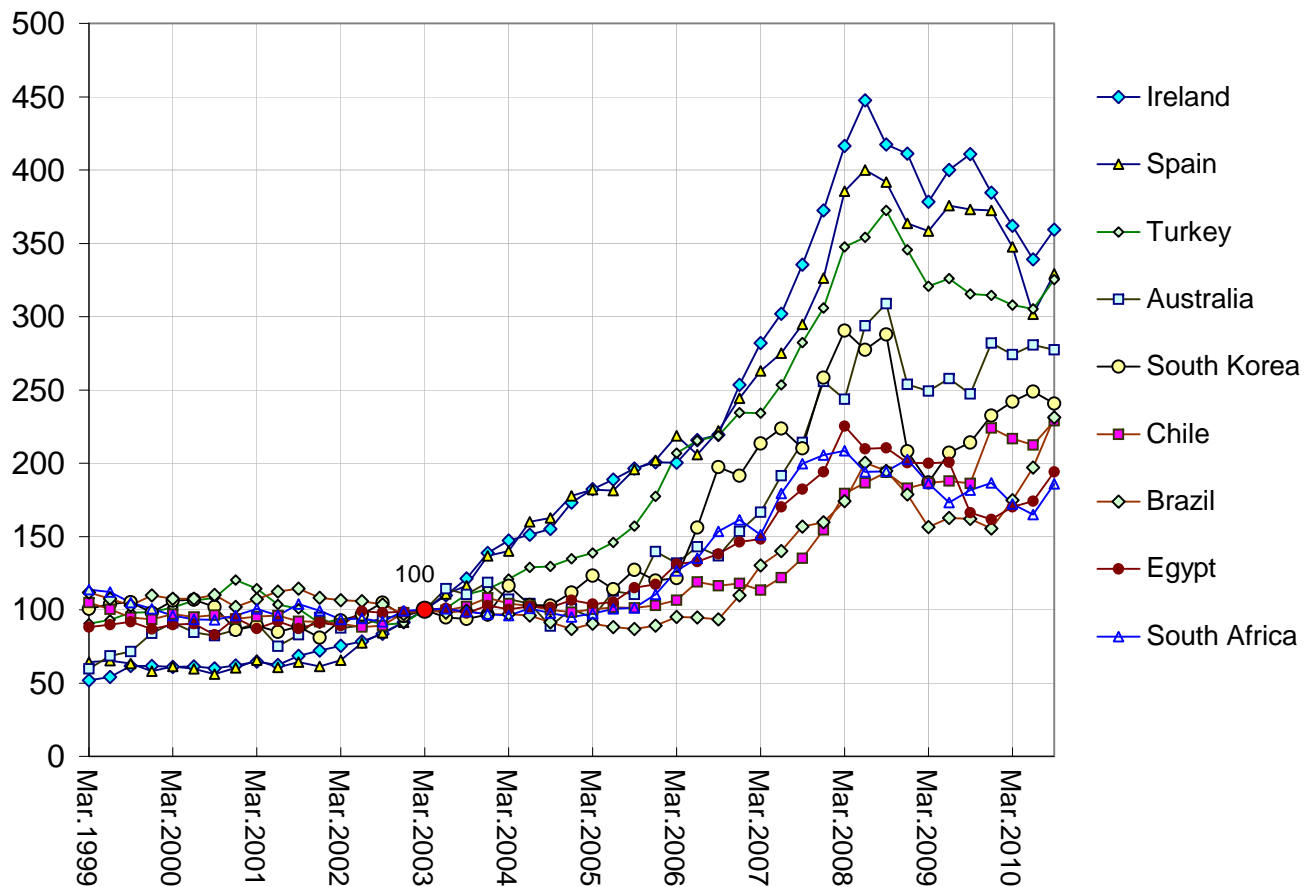


Figure 11: External claims (loans and deposits) of BIS reporting banks on counterparties listed on right (Source: BIS locational banking statistics Table 7A)

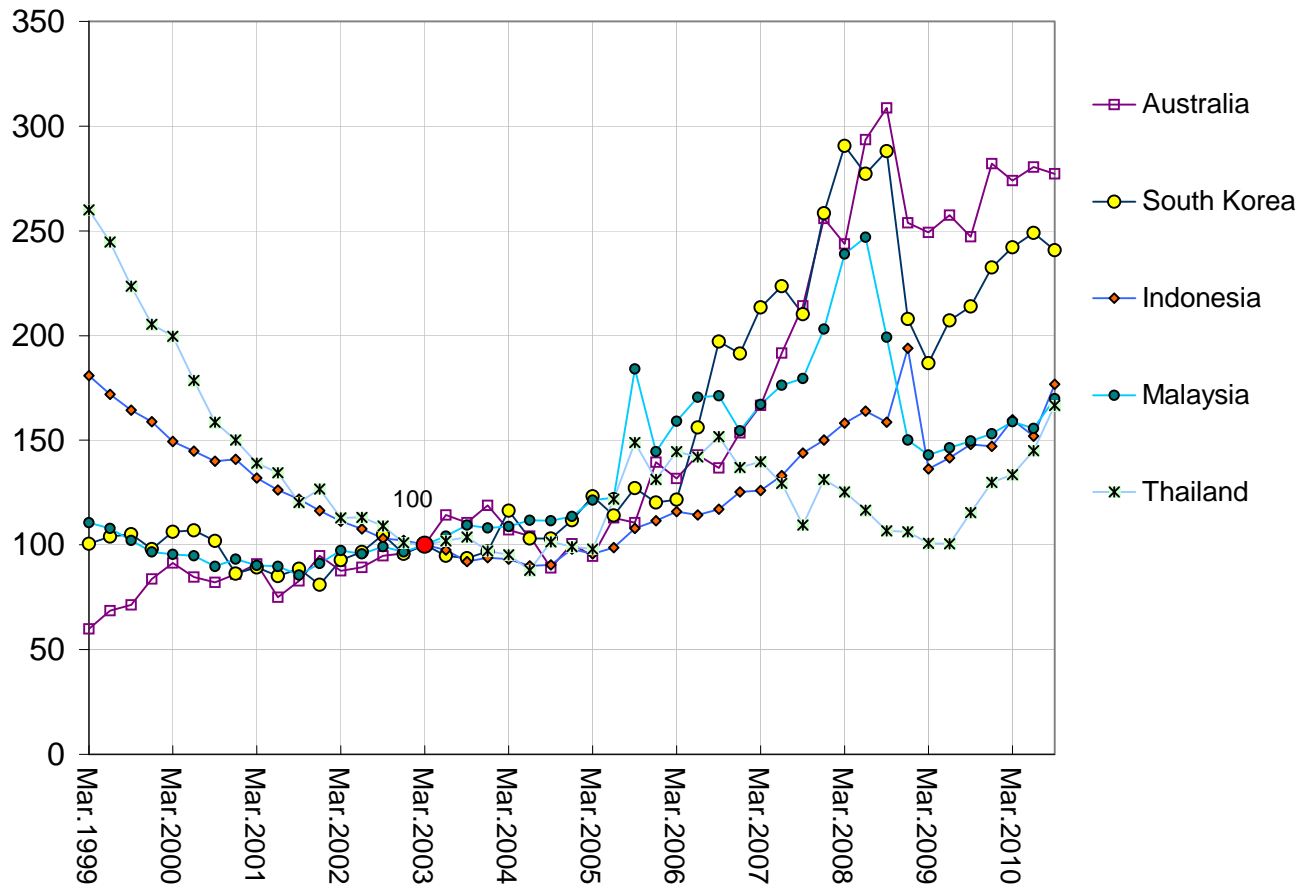


Figure 12: External claims (loans and deposits) of BIS reporting banks on counterparties listed on right (Source: BIS locational banking statistics Table 7A)

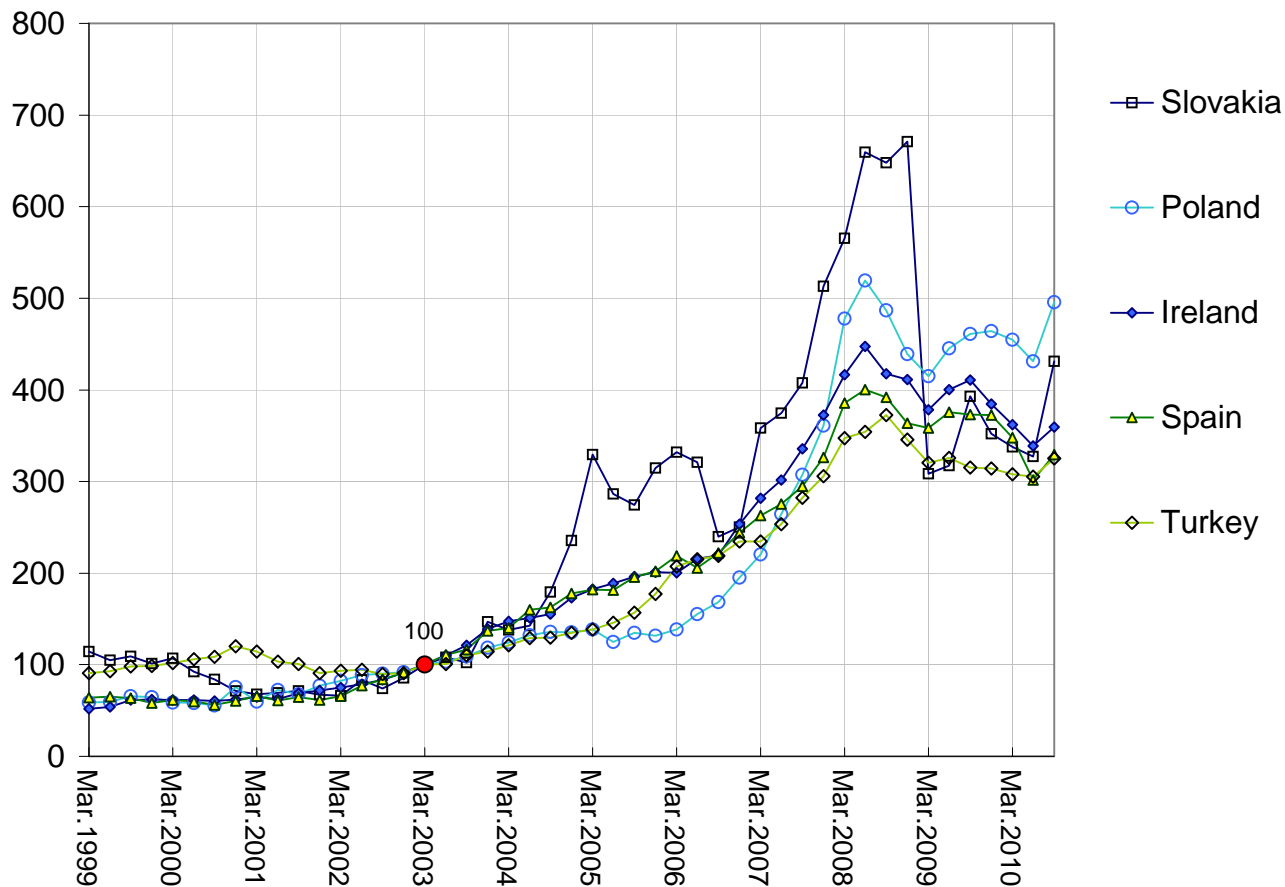


Figure 13: External claims (loans and deposits) of BIS reporting banks on counterparties listed on right (Source: BIS locational banking statistics Table 7A)

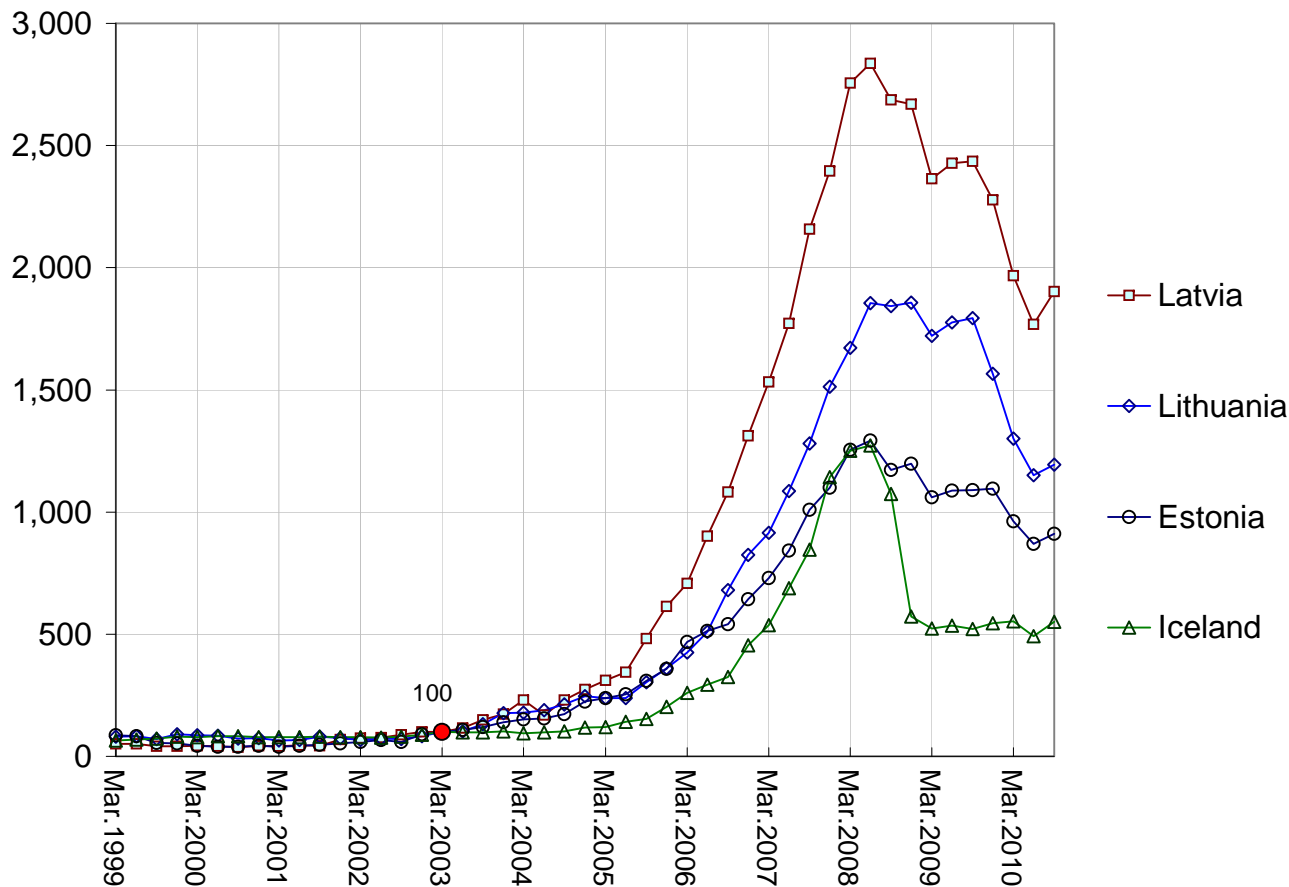


Figure 14: External claims (loans and deposits) of BIS reporting banks on counterparties listed on right (Source: BIS locational banking statistics Table 7A)

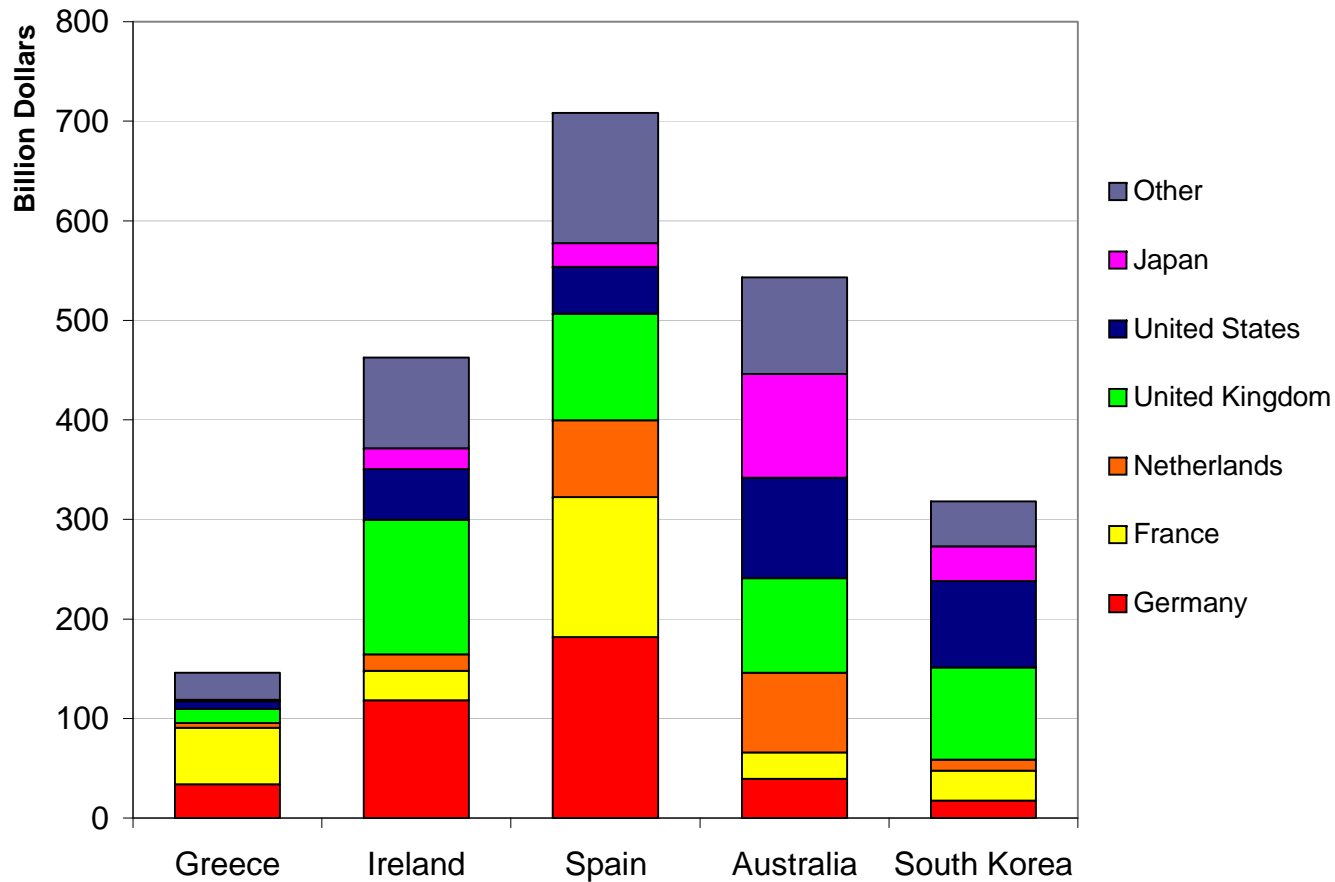


Figure 15: International claims of BIS reporting banks on counterparties in countries listed on right (Dec 2010) (Source: BIS consolidated banking statistics Table 9D)

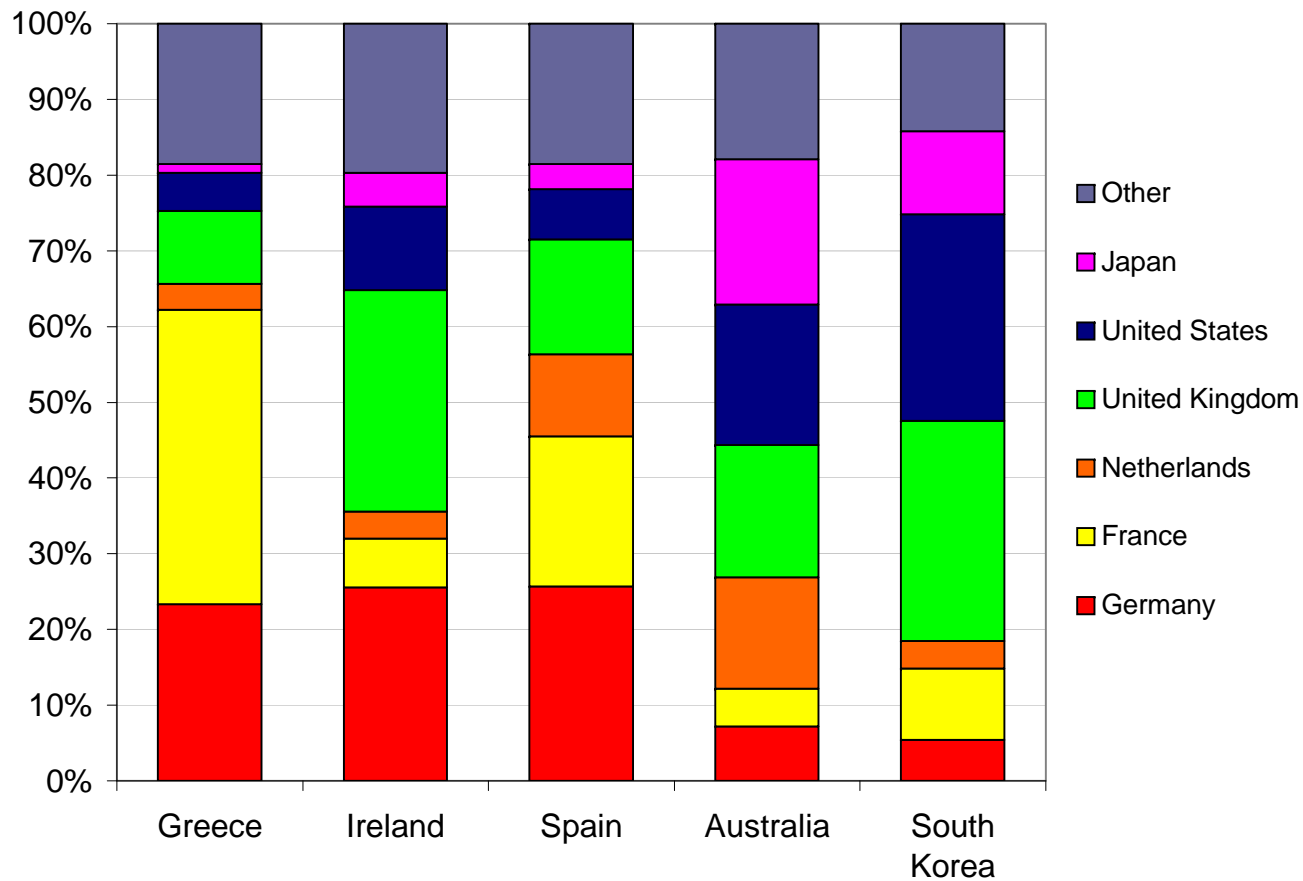


Figure 16: International claims (by percent) of BIS reporting banks on counterparties in countries listed on right (Dec 2010) (Source: BIS consolidated banking statistics Table 9D)

Claims of European Banks on Counterparties in Korea

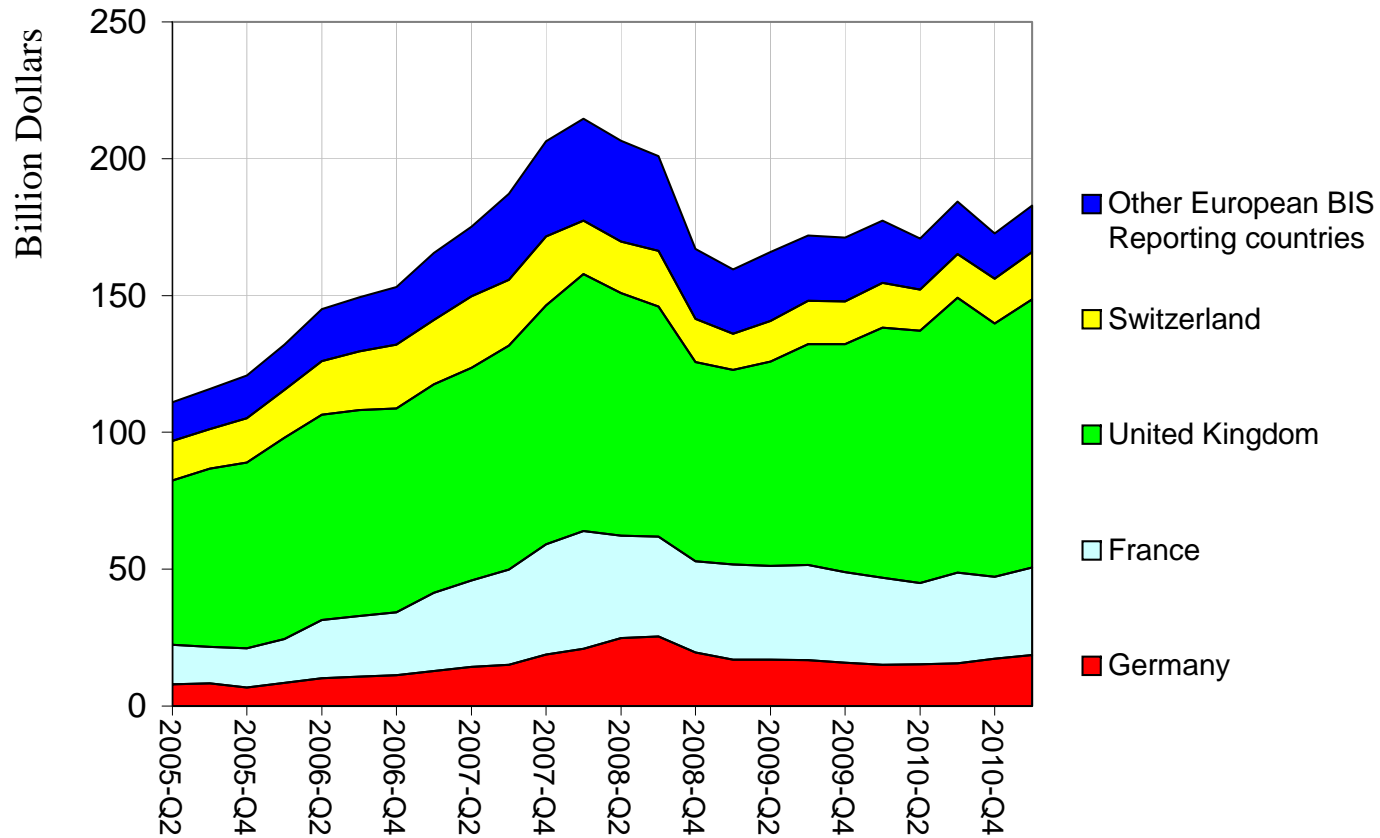
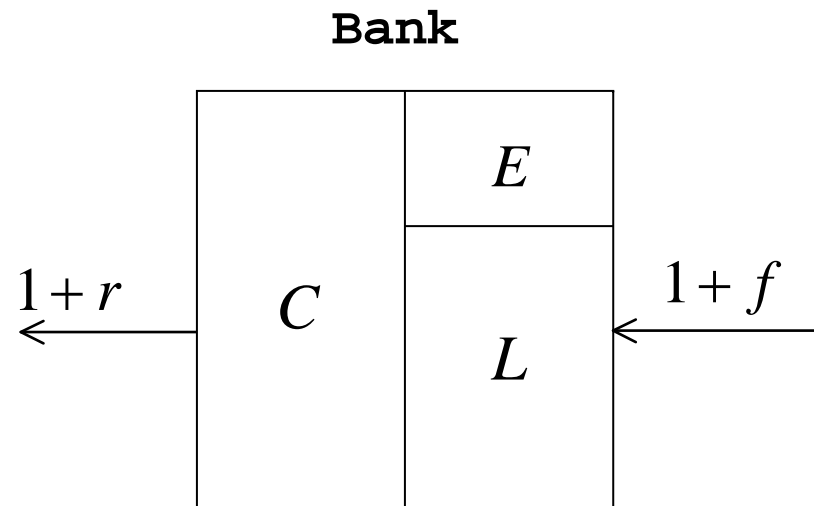


Figure 17: International claims of European BIS-reporting banks on counterparties in Korea (Source: BIS consolidated banking statistics Table 9D)

Credit Supply

Notation for balance sheet of bank



Borrower j repays the loan when $Z_j > 0$

$$Z_j = -\Phi^{-1}(\varepsilon) + \sqrt{\rho}Y + \sqrt{1-\rho}X_j$$

where $Y, \{X_j\}$ independent standard normal

$$\begin{aligned}\Pr(Z_j < 0) &= \Pr\left(\sqrt{\rho}Y + \sqrt{1-\rho}X_j < \Phi^{-1}(\varepsilon)\right) \\ &= \Phi\left(\Phi^{-1}(\varepsilon)\right) = \varepsilon\end{aligned}$$

Realized value of assets at date 1

$$\begin{aligned}w(Y) &\equiv (1+r)C \cdot \Pr(Z_j \geq 0|Y) \\ &= (1+r)C \cdot \Pr\left(\sqrt{\rho}Y + \sqrt{1-\rho}X_j \geq \Phi^{-1}(\varepsilon) | Y\right) \\ &= (1+r)C \cdot \Phi\left(\frac{Y\sqrt{\rho} - \Phi^{-1}(\varepsilon)}{\sqrt{1-\rho}}\right)\end{aligned}$$

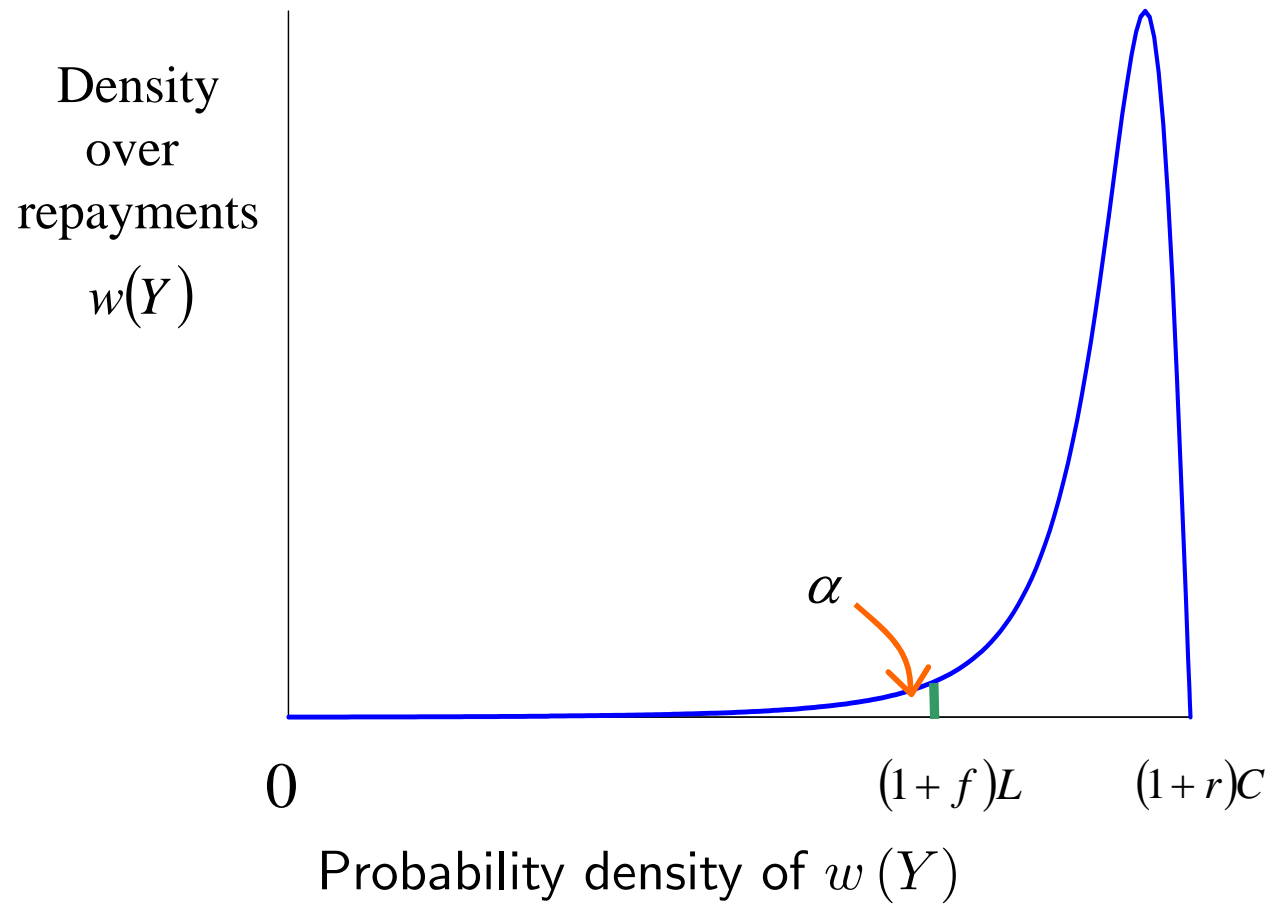
c.d.f. of w

$$\begin{aligned} F(z) &= \Pr(w \leq z) \\ &= \Pr(Y \leq w^{-1}(z)) \\ &= \Phi(w^{-1}(z)) \\ &= \Phi\left(\frac{1}{\sqrt{\rho}}\left(\Phi^{-1}(\varepsilon) + \sqrt{1-\rho}\Phi^{-1}\left(\frac{z}{(1+r)C}\right)\right)\right) \end{aligned}$$

Density over asset realizations can be obtained from c.d.f. in the usual way.

Common risk factor ρ determines shape of the density, with larger ρ implying fatter tail.

Value-at-Risk (VaR) rule with insolvency probability to $\alpha > 0$ when notional liability is $(1+f)L$.



Private credit C determined from

$$\Pr(w < (1 + f) L) = \Phi \left(\frac{\Phi^{-1}(\varepsilon) + \sqrt{1 - \rho} \Phi^{-1} \left(\frac{(1 + f)L}{(1 + r)C} \right)}{\sqrt{\rho}} \right) = \alpha$$

$$\frac{\text{Notional liabilities}}{\text{Notional assets}} = \frac{(1 + f) L}{(1 + r) C} = \Phi \left(\frac{\sqrt{\rho} \Phi^{-1}(\alpha) - \Phi^{-1}(\varepsilon)}{\sqrt{1 - \rho}} \right) \quad (1)$$

where

$$\varphi(\alpha, \varepsilon, \rho) \equiv \Phi \left(\frac{\sqrt{\rho} \Phi^{-1}(\alpha) - \Phi^{-1}(\varepsilon)}{\sqrt{1 - \rho}} \right)$$

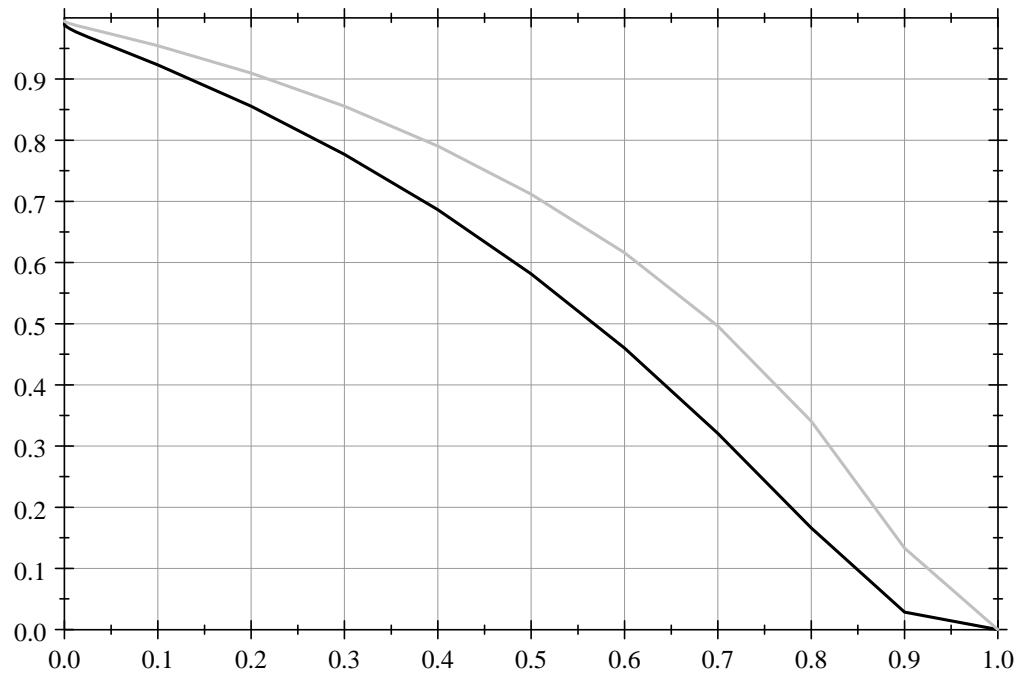


Figure 18: **Plot of notional debt to assets ratio** $\varphi(\alpha, \varepsilon, \rho)$. This chart plots φ as a function of ρ with $\alpha = 0.001$. Dark line is when $\varepsilon = 0.01$. Light line is when $\varepsilon = 0.005$.

Supply of Credit

Credit supply C and demand for funding L is obtained from (1) and balance sheet identity $C = E + L$

$$C = \frac{E}{1 - \frac{1+r}{1+f} \cdot \varphi}, \quad L = \frac{E}{\frac{1+f}{1+r} \cdot \frac{1}{\varphi} - 1}$$

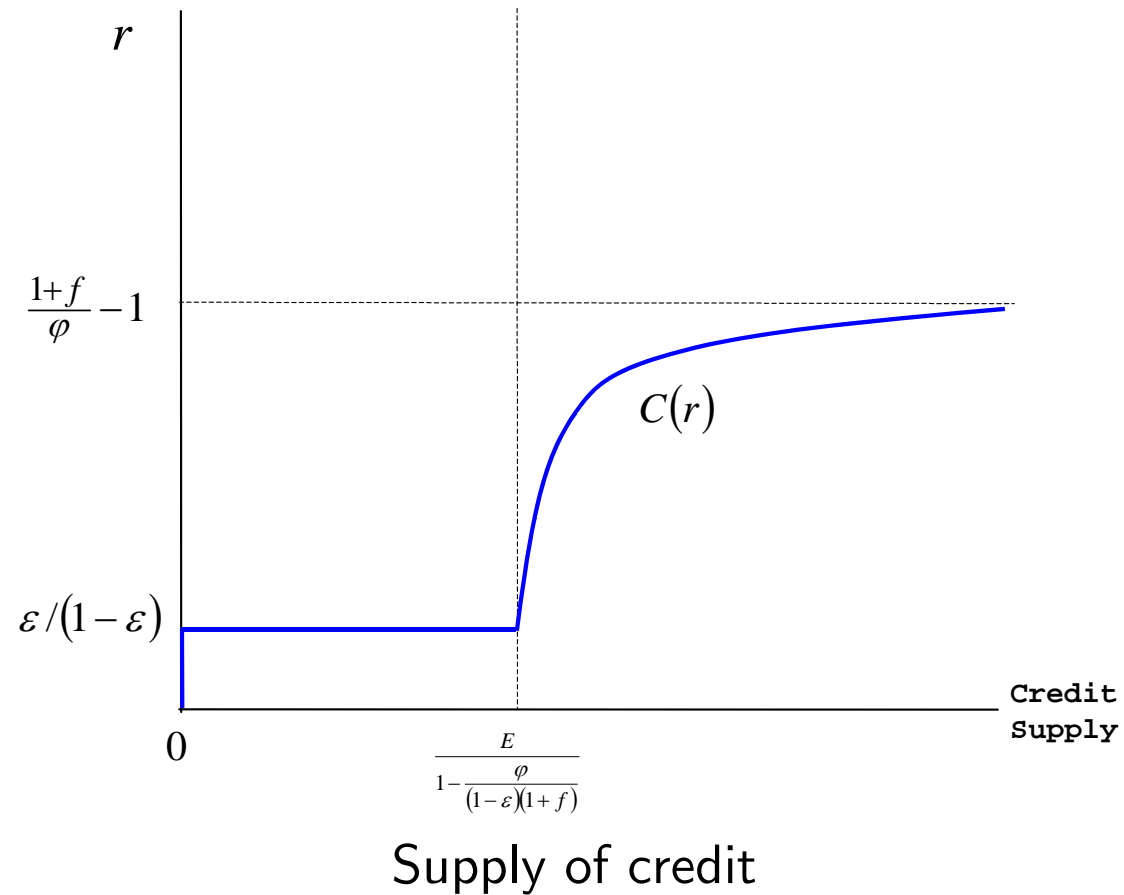
Aggregation holds due to proportionality

$$\text{Leverage} = \frac{1}{1 - \frac{1+r}{1+f} \cdot \varphi}$$

Risk premium is well-defined

$$\text{Risk premium} = (1 - \varepsilon)(1 + r) - 1$$

Risk premium is decreasing as assets expand by sliding down the credit demand curve. Lending standards are eroded in this sense.



Double-decker model of Global Liquidity

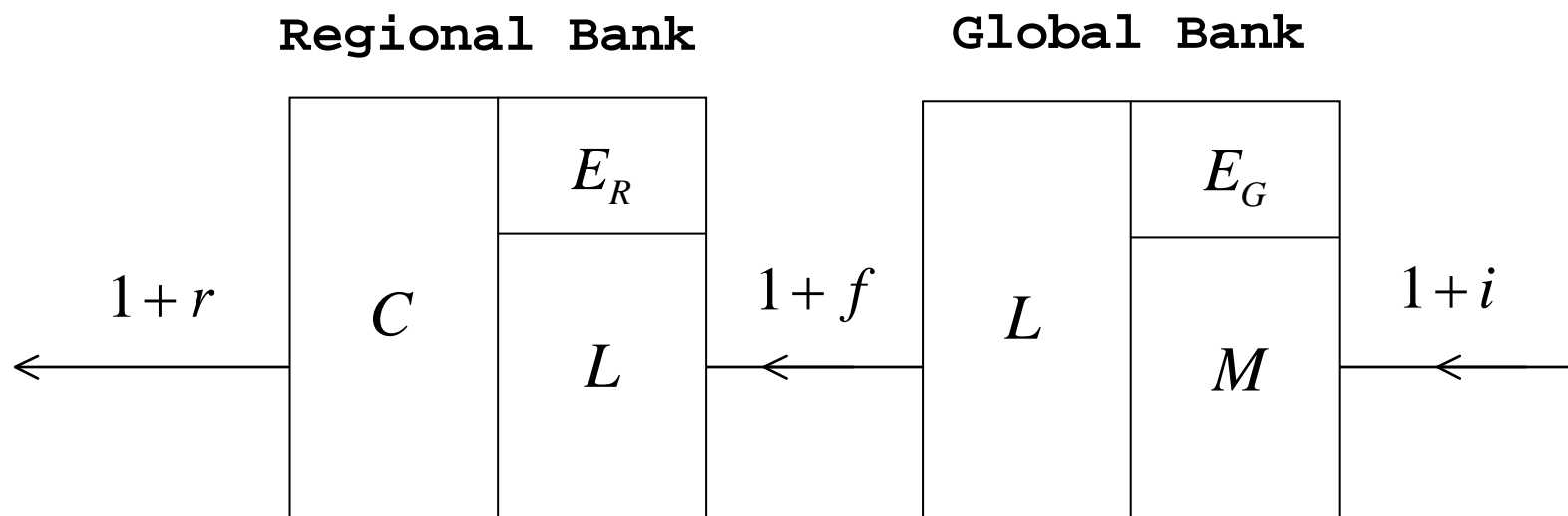


Figure 19: Regional and global bank balance sheets

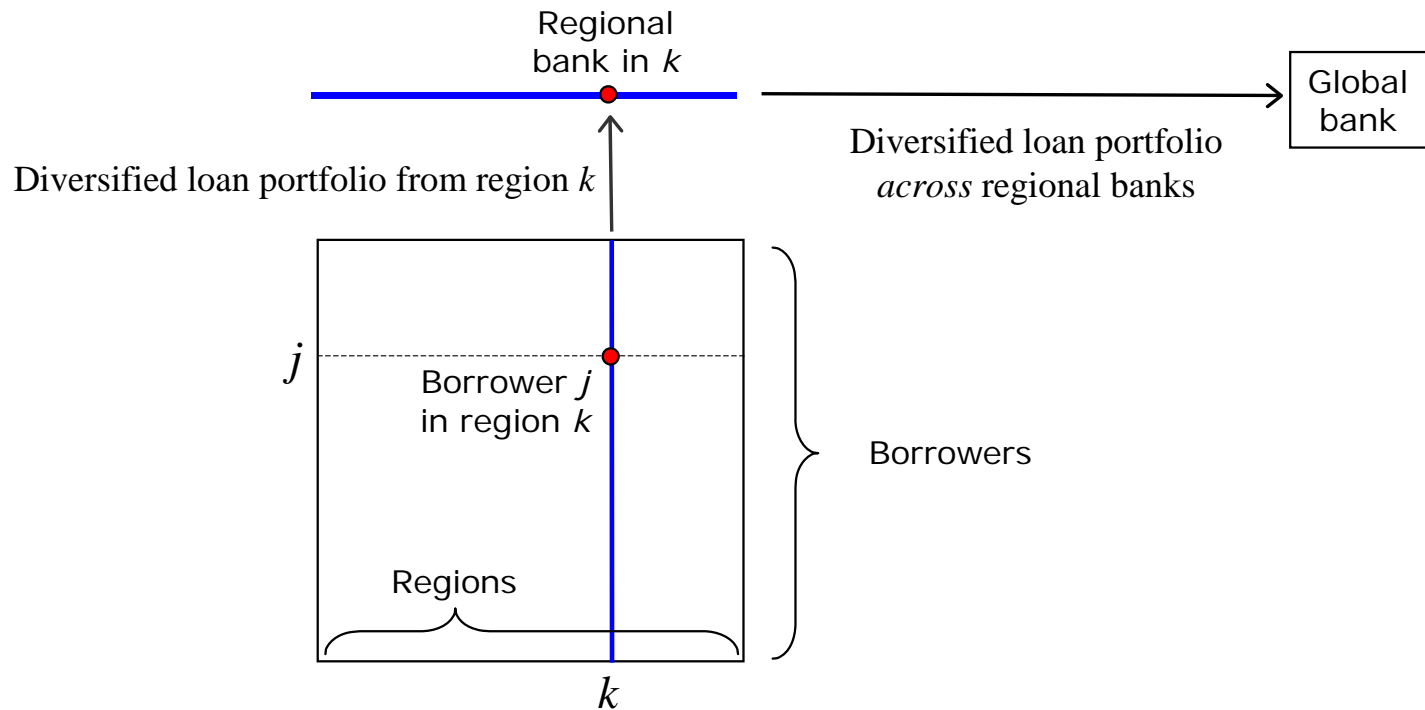


Figure 20: Global and regional banks

Global, Regional and Idiosyncratic Risk Factors

$$Z_{kj} \equiv -\Phi^{-1}(\varepsilon) + \sqrt{\rho}Y_k + \sqrt{1-\rho}X_{kj}$$

$$Y_k = \sqrt{\beta}G + \sqrt{1-\beta}R_k$$

Regional bank k defaults when

$$Y_k < w^{-1}((1+f)L) = \frac{1}{\sqrt{\rho}} \left(\Phi^{-1}(\varepsilon) + \sqrt{1-\rho}\Phi^{-1}(\varphi) \right)$$

Or when $\xi_k < 0$

$$\begin{aligned} \xi_k &\equiv \sqrt{\rho}Y_k - \Phi^{-1}(\varepsilon) - \sqrt{1-\rho}\Phi^{-1}(\varphi) \\ &= \sqrt{\rho\beta}G + \sqrt{\rho(1-\beta)}R_k - \Phi^{-1}(\varepsilon) - \sqrt{1-\rho}\Phi^{-1}(\varphi) \end{aligned}$$

Asset realization is deterministic function of global risk factor G

$$\begin{aligned}
 w(G) &= (1 + f) L \cdot \Pr(\xi_k \geq 0 | G) \\
 &= (1 + f) L \cdot \Pr\left(R_k \geq \frac{\Phi^{-1}(\varepsilon) + \sqrt{1-\rho}\Phi^{-1}(\varphi)}{\sqrt{\rho(1-\beta)}} - \sqrt{\frac{\beta}{1-\beta}}G \mid G\right) \\
 &= (1 + f) L \cdot \Phi\left(\sqrt{\frac{\beta}{1-\beta}}G - \frac{\Phi^{-1}(\varepsilon) + \sqrt{1-\rho}\Phi^{-1}(\varphi)}{\sqrt{\rho(1-\beta)}}\right)
 \end{aligned}$$

Quantiles follow from the c.d.f. of $w(G)$.

$$\begin{aligned}
 F(z) &= \Pr(w(G) \leq z) \\
 &= \Pr(G \leq w^{-1}(z)) \\
 &= \Phi(w^{-1}(z))
 \end{aligned}$$

where

$$w^{-1}(z) = \sqrt{\frac{1-\beta}{\beta}} \left[\Phi^{-1} \left(\frac{z}{(1+f)L} \right) + \frac{\Phi^{-1}(\varepsilon) + \sqrt{1-\rho} \Phi^{-1}(\varphi)}{\sqrt{\rho(1-\beta)}} \right]$$

Global bank Value-at-Risk (VaR) rule with insolvency probability $\gamma > 0$.
Notional liability of the global bank is $(1+i)M$.

$$\begin{aligned} \gamma &= \Pr(w(G) < (1+i)M) \\ &= \Phi \left(\sqrt{\frac{1-\beta}{\beta}} \left[\Phi^{-1} \left(\frac{(1+i)M}{(1+f)L} \right) + \frac{\Phi^{-1}(\varepsilon) + \sqrt{1-\rho} \Phi^{-1}(\varphi)}{\sqrt{\rho(1-\beta)}} \right] \right) \end{aligned}$$

$$\begin{aligned}
\frac{\text{Notional liabilities}}{\text{Notional assets}} &= \frac{(1+i)M}{(1+f)L} \\
&= \Phi \left(\frac{\sqrt{\rho\beta}\Phi^{-1}(\gamma) - \Phi^{-1}(\varepsilon) - \sqrt{1-\rho}\Phi^{-1}(\varphi)}{\sqrt{\rho(1-\beta)}} \right) \\
&\equiv \psi(\gamma, \alpha, \beta, \varepsilon, \rho)
\end{aligned}$$

Cross-border loan supply

$$L = \frac{E_G}{1 - \frac{1+f}{1+i}\psi}$$

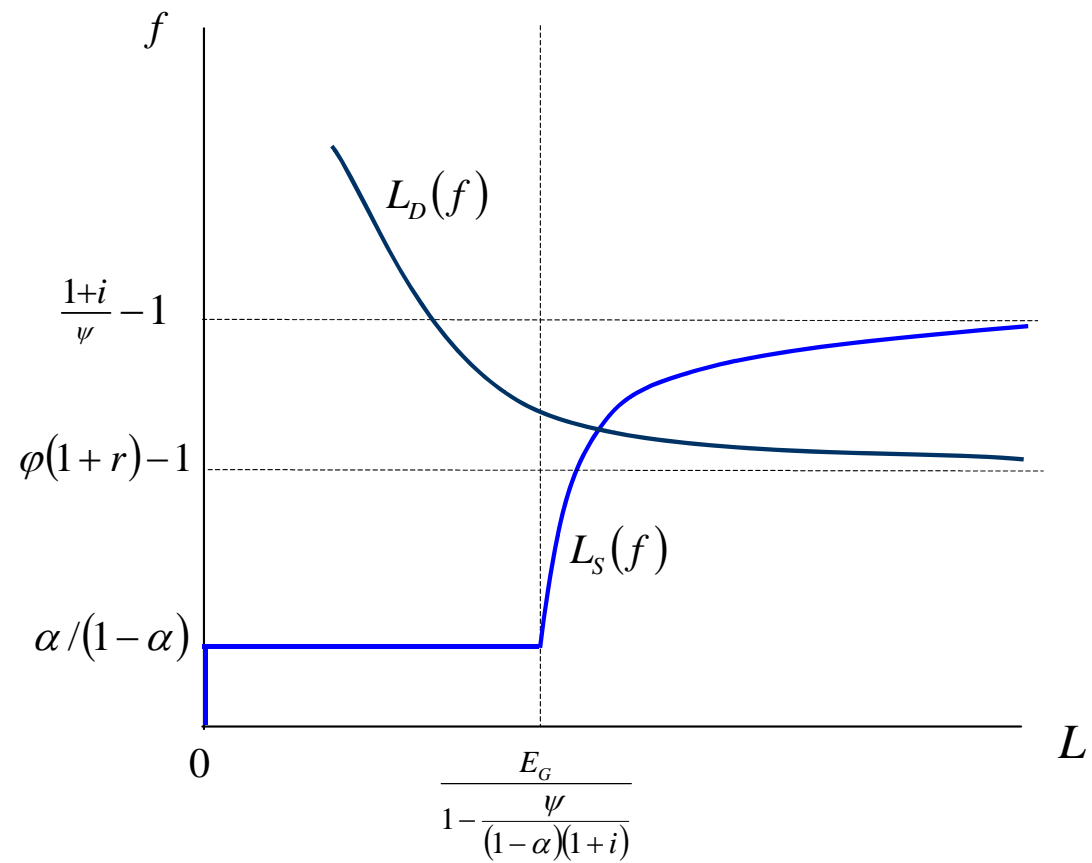


Figure 21: Equilibrium cross-border lending L

Capital Flows and Domestic Credit

Market clearing for L

$$\frac{E_R}{\frac{1+f}{1+r} \cdot \frac{1}{\varphi} - 1} = \frac{E_G}{1 - \frac{1+f}{1+i}\psi}$$

Private credit

$$C = \frac{E_G + E_R}{1 - \frac{1+r}{1+i}\varphi\psi}$$

$$\text{Total private credit} = \frac{\text{Aggregate bank capital (regional + global)}}{1 - \text{spread} \times \frac{\text{regional leverage}}{\text{global leverage}}}$$

Risk premium in recipient economy

$$\pi \equiv (1 - \varepsilon)(1 + r) - 1$$

Equilibrium stock of cross-border lending L

$$L = \frac{E_G + E_R \cdot \frac{1+r}{1+i} \varphi \psi}{1 - \frac{1+r}{1+i} \varphi \psi}$$

$$\text{Total cross-border lending} = \frac{\text{Global and weighted regional bank capital}}{1 - \text{spread} \times \frac{\text{regional leverage}}{\text{global leverage}}}$$

Comparative Statics

Effect on capital flow of shifts in E_R (demand pull) and ψ (supply push)

$$\begin{aligned}\Delta L &\simeq \frac{\partial L}{\partial E_R} \Delta E_R + \frac{\partial L}{\partial \psi} \Delta \psi \\ &= \frac{\varphi\psi}{1 - \varphi\psi} \Delta E_R + \left(\frac{(1 - \varphi\psi) E_R \varphi - (E_G + E_R \varphi\psi) (-\varphi)}{(1 - \varphi\psi)^2} \right) \Delta \psi \\ &= \frac{\varphi\psi}{1 - \varphi\psi} \Delta E_R + C \frac{\varphi}{1 - \varphi\psi} \Delta \psi\end{aligned}$$

Banking sector capital flows (i) increase with ΔE_R (bank ROE) (ii) increase with bank leverage (fall with VIX) (iii) increase in *change* in bank leverage (fall with ΔVIX) (iv) fall with *interaction* between ROE and VIX

Sample

Sample of 47 countries with largest foreign bank penetration (Claessens, van Horen, Gurcanlar and Mercado (2008))

Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, Cyprus, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Ireland, Israel, Italy, Japan, Latvia, Lebanon, Lithuania, Malaysia, Malta, Mexico, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, South Korea, Spain, Sweden, Switzerland, Thailand, Turkey, Ukraine, United Kingdom and Uruguay.

Variable	Frequency	Obs	Mean	Std. Dev.	Min	Max
External Loans Growth	quarter	2572	0.030	0.102	-0.777	0.655
VIX	quarter	56	22.135	8.310	11.035	58.596
Δ VIX	quarter	56	0.010	0.207	-0.332	0.849
Interoffice Assets Growth	quarter	56	0.038	0.095	-0.274	0.211
Interest Spread	quarter	56	-0.356	1.487	-2.833	2.417
Private Credit Growth	year	636	0.148	0.183	-0.685	1.774
VIX	year	14	22.137	6.378	12.807	32.693
Interoffice Assets Growth	year	14	0.148	0.130	-0.060	0.373
Interest Spread	year	14	-0.356	1.482	-2.521	1.979
Δ Money Stock	year	14	0.056	0.053	-0.023	0.138
Global Growth	year	14	3.376	1.651	-1.111	4.998
ROE	year	636	0.087	0.146	-0.768	0.500
Openness	year	636	1.362	1.383	-1.844	2.478
Bank Crisis	year	636	0.135	0.342	0.000	1.000
Δ Inflation	year	609	0.062	0.136	-0.046	2.450
Creditor Rights	year	296	2.010	0.983	0.000	4.000

Three Regressions

Funding of Global Banks (quarterly)

$$\Delta \text{Interoffice}_t = \alpha + \beta \text{VIX}_t + \gamma \text{Spread}_t + \delta \text{Controls} + \varepsilon_{i,t}$$

Capital Flows (fixed effects panel, quarterly)

$$\begin{aligned} \Delta L_{c,t} = & \beta_0 + \beta_1 \cdot \Delta \text{Interoffice}_t + \beta_2 \text{VIX}_{t-1} + \beta_3 \cdot \Delta \text{VIX}_{t-1} \\ & + \beta_4 \text{ROE}_{c,t} + \beta_5 \text{VIX}_{t-1} * \text{ROE}_{c,t} + \text{controls}_{c,t} + e_{c,t} \end{aligned}$$

Domestic Private Credit (fixed effects panel, annual)

$$\begin{aligned} \Delta C_{c,t} = & \beta_0 + \beta_1 \cdot \Delta \text{Interoffice}_t + \beta_2 \text{VIX}_{t-1} + \beta_4 \text{ROE}_{c,t} \\ & + \beta_5 \text{VIX}_{t-1} * \text{ROE}_{c,t} + \text{controls}_{c,t} + e_{c,t} \end{aligned}$$

Regression for Δ Interoffice

	1	2	3	4
VIX	-0.0043** [0.036]		-0.0039* [0.070]	-0.0049** [0.015]
Interest Spread		-0.0143 [0.159]	-0.0042 [0.627]	-0.0043 [0.755]
Δ Money stock				-0.0089 [0.546]
Global Growth				-0.2358 [0.411]
Constant	0.1326*** [0.002]	0.0327** [0.025]	0.1236*** [0.009]	0.1882** [0.014]
Observations	56	56	56	56
R-squared	0.141	0.05	0.144	0.183

ΔL panel regression

	1	2	3	4	5	6	7
Δ Interoffice	0.1080***			0.0992***	0.1085***	0.1194***	0.1147***
	[0.000]			[0.000]	[0.000]	[0.000]	[0.000]
VIX		-0.0023***		-0.0023***	-0.0020***	-0.0018***	-0.0019***
		[0.000]		[0.000]	[0.000]	[0.001]	[0.000]
Δ VIX			-0.0281***	0.0074	0.0084	0.0131	0.0145
			[0.005]	[0.437]	[0.397]	[0.130]	[0.105]
ROE					0.1407***	0.1342***	0.1093**
					[0.001]	[0.002]	[0.011]
ROE*VIX					-0.0037***	-0.0037***	-0.0033**
					[0.003]	[0.004]	[0.014]
Interest spread					0.0021	-0.0017	-0.0025
					[0.241]	[0.434]	[0.231]

ΔL panel regression continued

	1	2	3	4	5	6	7
Δ Money stock						0.1926***	0.2093***
						[0.000]	[0.000]
Global growth						-0.0015	-0.0046**
						[0.493]	[0.033]
Openness						0.0082**	0.0064
						[0.038]	[0.131]
Bank crisis							-0.0396***
							[0.000]
Observations	2,572	2,572	2,572	2,572	2,572	2,572	2,572
R-squared	0.01	0.037	0.003	0.045	0.052	0.065	0.079
Countries	47	47	47	47	47	47	47

ΔC panel regression

	1	2	3	4	5	6	7
Δ Interoffice	0.2728*** [0.000]		0.1739*** [0.004]	0.1495** [0.034]	0.1520** [0.039]	0.1389** [0.050]	0.4773** [0.013]
VIX		-0.0058*** [0.000]	-0.0039*** [0.001]	-0.0043** [0.014]	-0.0050** [0.016]	-0.0035** [0.027]	-0.0193** [0.049]
ROE				-0.1185 [0.607]	-0.1133 [0.628]	0.0275 [0.901]	-0.0384 [0.944]
ROE*VIX				0.0042 [0.621]	0.0042 [0.631]	-0.0009 [0.916]	0.004 [0.867]
Interest Spread				-0.0035 [0.599]	-0.003 [0.654]	-0.006 [0.351]	-0.0334** [0.034]
Δ Money stock					0.0115 [0.931]	0.1643 [0.198]	3.0882** [0.041]

(ΔC panel regression continued)

	1	2	3	4	5	6	7
Global growth				-0.0035	-0.0093*	0.016	
				[0.443]	[0.086]	[0.218]	
Openness				-0.0135	-0.0038	0.0054	
				[0.188]	[0.480]	[0.808]	
Inflation					0.5235***	0.5533***	
					[0.000]	[0.000]	
Bank crisis					-0.0906***		
					[0.005]		
Creditor Rights						0.1651***	
						[0.002]	
Observations	636	636	636	636	636	609	282
R-squared	0.057	0.06	0.076	0.078	0.083	0.254	0.269
Countries	47	47	47	47	47	46	41

Individual Country Effects

Separate panel regressions for each country:

$$\begin{aligned}\Delta L_{c,t} = & \beta_{c,0} + \beta_{c,1} \text{VIX}_{t-1} + \beta_{c,2} \text{VIX}_{t-1} * \text{Country}_c \\ & + \beta_{c,3} \Delta \text{Interoffice}_t + \text{controls}_{c,t} + e_{c,t}\end{aligned}$$

$$\begin{aligned}\Delta L_{c,t} = & \beta_{c,0} + \beta_{c,1} \Delta \text{Interoffice}_t + \beta_{c,2} \Delta \text{Interoffice}_t * \text{Country}_c \\ & + \beta_{c,3} \text{VIX}_{t-1} + \text{controls}_{c,t} + e_{c,t}\end{aligned}$$

Sum $\beta_{c,1} + \beta_{c,2}$ measures the total effect on country c . $\beta_{c,2}$ measures incremental country-specific effect.

			sum=0			sum=0
$\beta_{c,2}$	VIX*Estonia	-0.0034*** [0.000]	Reject	Δ Interoffice*Estonia	0.4104*** [0.000]	Reject
$\beta_{c,2}$	VIX*Latvia	-0.0033*** [0.000]	Reject	Δ Interoffice*Latvia	0.4439*** [0.000]	Reject
$\beta_{c,2}$	VIX*Lithuania	-0.0025*** [0.000]	Reject	Δ Interoffice*Lithuania	0.2192*** [0.000]	Reject
$\beta_{c,2}$	VIX*Romania	-0.0030*** [0.000]	Reject	Δ Interoffice*Romania	0.0205 [0.316]	Reject
$\beta_{c,2}$	VIX*Turkey	-0.0013*** [0.002]	Reject	Δ Interoffice*Turkey	-0.0258 [0.404]	Reject
$\beta_{c,2}$	VIX*Brazil	-0.0012*** [0.000]	Reject	Δ Interoffice*Brazil	0.0792*** [0.003]	Reject
$\beta_{c,2}$	VIX*Chile	0.0022*** [0.000]	Not Reject	Δ Interoffice*Chile	-0.1263*** [0.000]	Not Reject
$\beta_{c,2}$	VIX*Spain	0.0013*** [0.000]	Reject	Δ Interoffice*Spain	0.0566** [0.027]	Reject
$\beta_{c,2}$	VIX*Ireland	0.0012*** [0.001]	Reject	Δ Interoffice*Ireland	-0.0028 [0.912]	Reject

$\beta_{c,2}$	VIX*UK	-0.0001 [0.827]	Reject	Δ Interoffice*UK	0.0025 [0.924]	Reject
$\beta_{c,2}$	VIX*Germany	0.0020*** [0.000]	Not Reject	Δ Interoffice*Germany	-0.0636** [0.015]	Reject
$\beta_{c,2}$	VIX*France	0.0004 [0.251]	Reject	Δ Interoffice*France	-0.0161 [0.529]	Reject
$\beta_{c,2}$	VIX*Italy	0.0014*** [0.000]	Reject	Δ Interoffice*Italy	-0.0085 [0.739]	Reject
$\beta_{c,2}$	VIX*Australia	0.0010*** [0.001]	Reject	Δ Interoffice*Australia	-0.0516** [0.019]	Reject
	Constant	Y			Y	
	Controls	Y			Y	
	Observations	2572			2572	
	Number of countries	47			47	