



BANK FOR INTERNATIONAL SETTLEMENTS

Gross Capital Inflows to Banks, Corporates and Sovereigns

Stefan Avdjiev, Bryan Hardy,
Sebnem Kalemli-Ozcan, and Luis Servén

CEPII Research Seminar

Paris, 28 June 2017

The views expressed in this presentation are those of the authors and not necessarily those of the Bank for International Settlements, the National Bureau of Economic Research or the World Bank.



Motivation

- Massive body of empirical literature on international capital flows
- However, there is virtually no empirical work gross capital flows, broken down by sector
 - Gross flows, but no sectoral breakdown
 - *Forbes and Warnock (2012), Broner, Didier, Erce, and Schmukler (2013), Milesi-Ferretti and Tille (2011), and Bluedorn, Duttagupta, Guajardo, and Topalova (2013)*
 - Sectoral breakdown, but of net (rather than gross) flows
 - *Forbes Aguiar and Amador (2011), Gourinchas and Jeanne (2013), and Alfaro, Kalemli-Ozcan, and Volosovych (2014)*



Our contribution

- Construct a dataset on gross capital inflows
 - quarterly frequency; from 1996q1 to 2014q4.
 - balanced panel of 85 countries
 - 25 advanced economies,
 - 34 emerging economies,
 - 26 developing economies
 - sectoral break-down of debt inflows:
 - government,
 - central bank,
 - banks,
 - corporates.
- Examine relationship between different flow types and:
 - global (push) factors
 - local (pull) factors



Preview of main results

- Aggregate capital flows patterns do not hold up consistently across different borrowing sectors.
- Low global risk appetite (i.e. high VIX) is associated with
 - **Falling** external debt flows to **banks** and **corporates**
 - **No response** in external debt flows to **sovereigns**
- External debt flows are:
 - procyclical for **banks** and **corporates** (especially in EMEs)
 - acyclical for AE sovereigns
 - countercyclical for EME sovereigns
- Our results highlight the importance of separating capital flows
 - by borrowing sector (public vs. private)
 - by borrowing country group (AEs vs. EMEs).



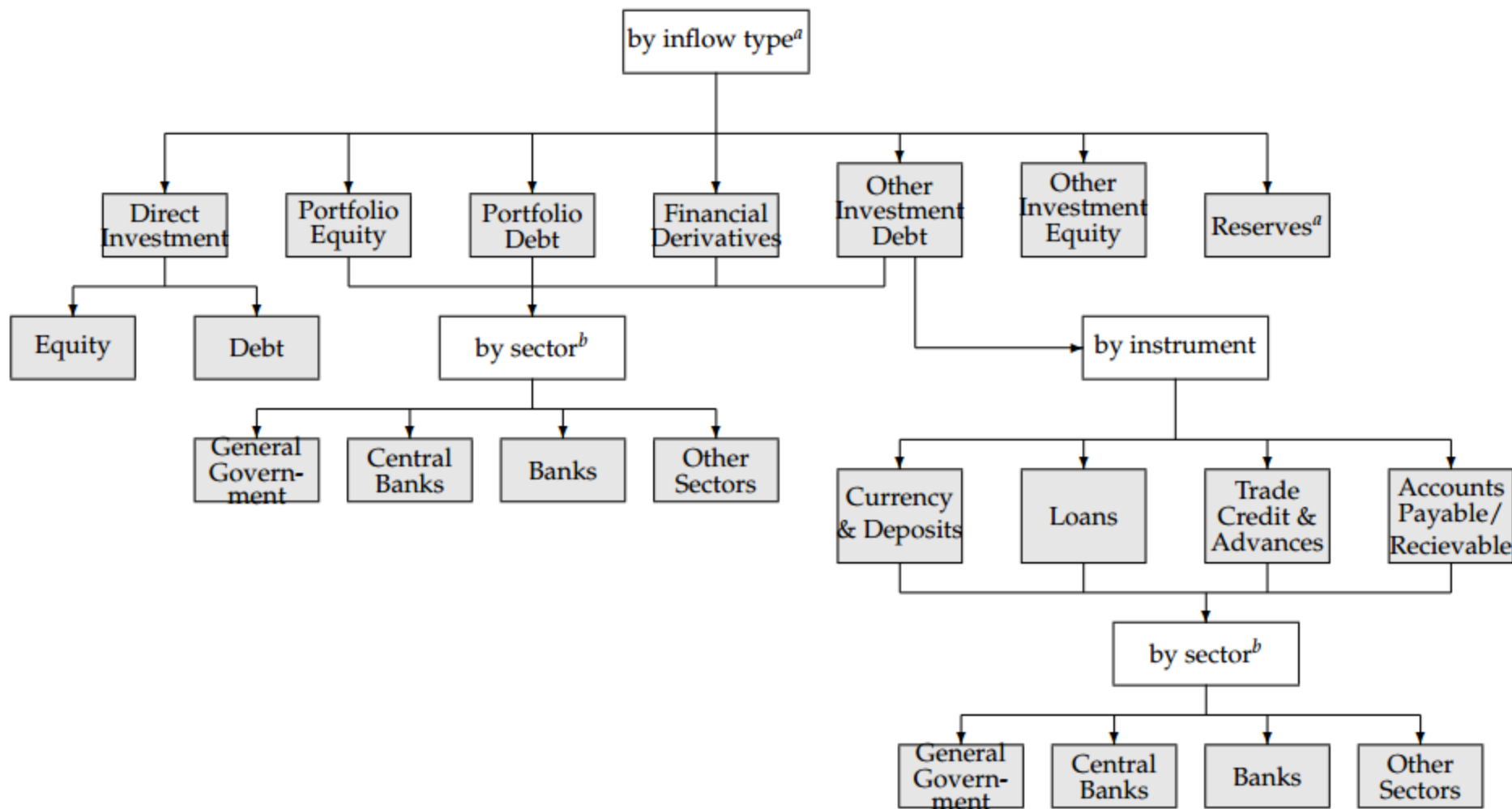
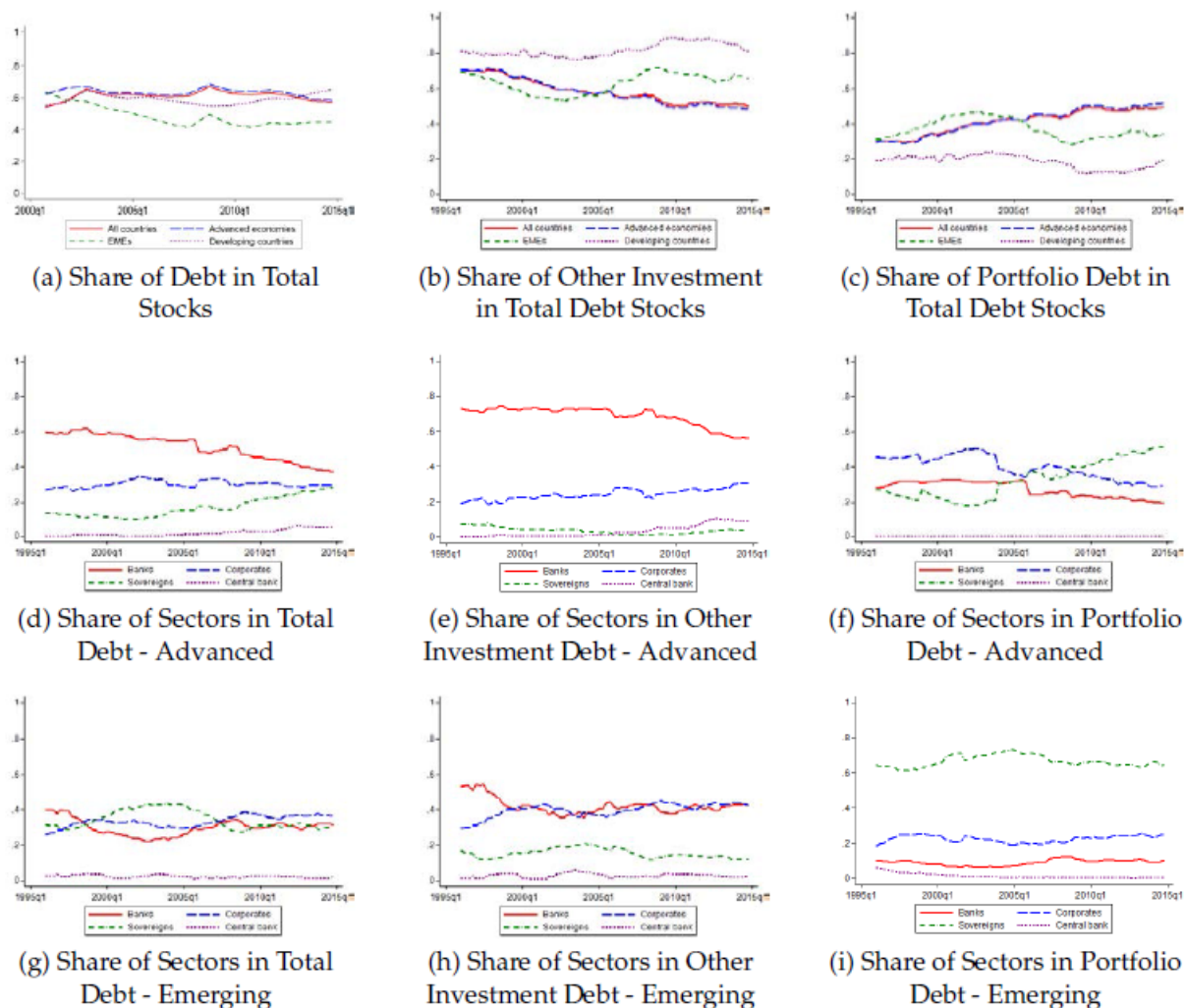


Figure 1: Composition of External Debt Stocks - Share by Sector



Source: IIP, QEDS, and BIS, authors' calculations.

Constructing the enhanced Dataset

- **Start with Balance of Payments (BOP)**
- **Internal Fill**
 - When the BOP data covers:
 - total for the category (A)
 - 3 out of the 4 sectors (B)
 - We subtract sum of B from A in order to obtain the fourth sector.
- **External Fill** (using several publicly available sources):
 - IMF International Investment Position (IIP) statistics (IMF)
 - IMF/WB Quarterly External Debt Statistics (QEDS)
 - BIS International Debt Securities (IDS) Statistics
 - BIS International Bank Statistics (IBS)
 - BIS Locational Bank Statistics (LBS)
 - BIS Consolidated Bank Statistics (CBS)
 - WB Debt Reporting System (DRS) data



Table C1: BIS Data Alignment with BOP

Capital Flow Type		Sector			
		Banks	Corporates	Government	Central Bank
Bonds	BOP	PD to DC	PD to OS	PD to GG	PD to CB
	BIS	NI by Banks	NI by Corporates	NI by Government	NI by Central Bank
Loans	BOP	CD to DC	LN to OS	LN to GG	CD to CB
	BIS	Loans to Banks	Loans to Corporates	Loans to Government + IMF Credit to GG (BOP)	Loans to CB + IMF Credit to CB (BOP)
Other Investment Debt	BOP	OID to DC	OID to OS	OID to GG	OID to CB
	BIS	BIS Filled Loans plus any other non-missing other investment debt instruments from BOP, by sector			

DC = Depository Corporations, except the Central Bank; OS = Other Sectors; GG = General Government; CB = Central Bank; CD = Currency & Deposits; LN = Loans; PD = portfolio debt; OID = other investment debt; NI = Net Issues in International Markets by Residency

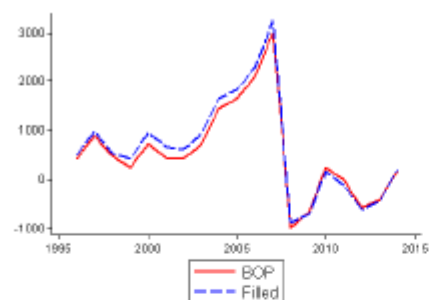


Table 1: Data Filling Summary

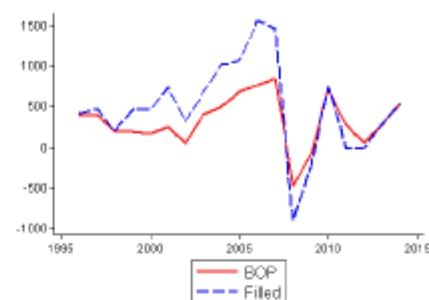
Flow	Sect.	Group	Annual			Quarterly		
			BOP	Int. Fill	Ext. Fill	BOP	Int. Fill	Ext. Fill
PD	GG	Adv.	80.6	0.0	19.4	79.4	0.0	20.6
PD	GG	Em.	82.4	0.3	17.3	74.2	0.8	25.0
PD	GG	Dev.	40.2	0.7	59.1	25.0	0.1	74.9
PD	CB	Adv.	9.5	58.3	32.2	7.5	60.5	32.0
PD	CB	Em.	23.5	40.6	35.9	19.5	35.6	44.9
PD	CB	Dev.	11.2	8.2	80.5	2.6	4.8	92.7
PD	DC	Adv.	67.6	3.6	28.8	67.7	3.4	28.8
PD	DC	Em.	61.7	4.1	34.3	55.6	3.5	40.9
PD	DC	Dev.	18.6	1.6	79.8	10.3	0.7	89.0
PD	OS	Adv.	75.4	0.0	24.6	74.7	0.0	25.3
PD	OS	Em.	69.8	2.3	28.0	64.4	1.9	33.6
PD	OS	Dev.	29.3	0.5	70.2	13.3	0.3	86.5
OID	GG	Adv.	80.0	2.1	17.9	78.4	3.2	18.4
OID	GG	Em.	93.7	0.8	5.6	88.1	0.9	11.0
OID	GG	Dev.	87.7	0.0	12.3	49.7	0.0	50.3
OID	CB	Adv.	68.2	13.9	17.9	65.8	15.4	18.7
OID	CB	Em.	87.4	6.6	6.0	79.2	9.8	11.0
OID	CB	Dev.	74.6	13.3	12.1	46.0	6.7	47.3
OID	DC	Adv.	81.9	0.0	18.1	81.4	0.0	18.6
OID	DC	Em.	94.0	0.0	6.0	89.0	0.0	11.0
OID	DC	Dev.	77.7	6.1	16.1	48.0	1.8	50.2
OID	OS	Adv.	84.0	0.4	15.6	82.8	0.1	17.2
OID	OS	Em.	94.4	0.0	5.6	89.0	0.0	11.0
OID	OS	Dev.	88.4	1.1	10.5	52.5	0.7	46.8
Balanced Sample			12	16	89	0	10	85

This table displays the percentage of total observations in our final sample of Advanced (Adv.), Emerging (Em.) and Developing (Dev.) countries (89 for annual, 85 for quarterly) that is derived from each step of our data construction. BOP = Percent coverage of sample from raw BOP data; Int. Fill = Percent coverage of sample from Internal Filling exercise; Ext. Fill = Percent coverage of sample from non BOP data sources. OID = other investment debt; PD = portfolio debt; GG = General Government; CB = Central Bank; DC = Banks; OS = Corporates. The last line indicates the number of countries in our balanced sample 1996 to 2014 that we have data for each sector non-missing.

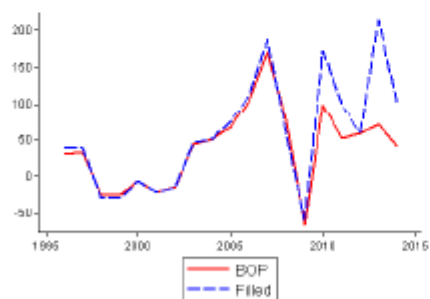
Figure 3: Aggregate External Debt Inflows for Banks and Corporates, Billions 1996 USD



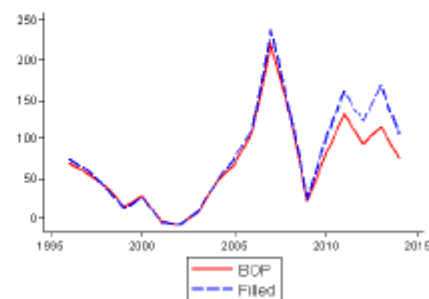
(a) Advanced Bank



(b) Advanced Corporate



(c) Emerging Bank



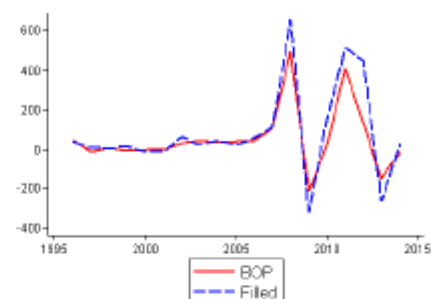
(d) Emerging Corporate

Source: BOP, IIP, QEDS, and BIS, authors' calculations. Debt is portfolio debt + other investment debt. BOP series is only BOP data, Filled is BOP data filled by other data sources when missing.

Figure 4: Aggregate External Debt Inflows for Governments and Central Banks, Billions 1996 USD



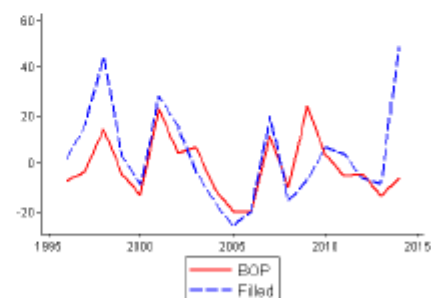
(a) Advanced Government



(b) Advanced Central Bank



(c) Emerging Government



(d) Emerging Central Bank

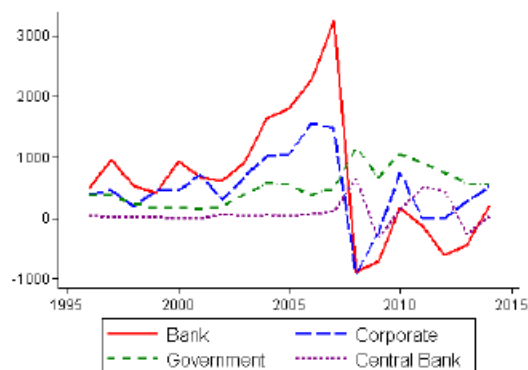
Source: BOP, IIP, QEDS, and BIS, authors' calculations. Debt is portfolio debt + other investment debt. BOP series is only BOP data, Filled is BOP data filled by other data sources when missing.

Dataset Coverage

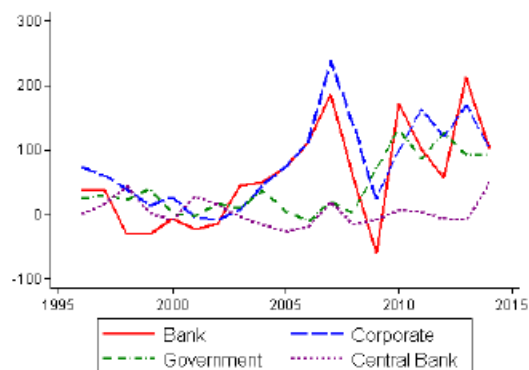
- 89 countries at annual frequency (1996 - 2014)
 - **Advanced (25):** Australia, Austria, Belgium, Canada, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Korea, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States
 - **Emerging (34):** Argentina, Brazil, Bulgaria, Chile, China, Colombia, Croatia, Czech Re- public, Egypt, Estonia, Hungary, India, Indonesia, Jordan, Kazakhstan, Latvia, Lebanon, Lithuania, Macedonia, Malaysia, Mexico, Peru, Philippines, Poland, Romania, Russian Federation, Slovak Republic, Slovenia, South Africa, Thailand, Turkey, Ukraine, Uruguay, Venezuela
 - **Developing (30):** Albania, Angola, Bangladesh, Belarus, Bolivia, Costa Rica, Cote d'Ivoire, Dominican Republic, Ecuador, El Salvador, Gabon, Ghana, Guatemala, Jamaica, Kenya, Liberia, Mongolia, Montenegro, Morocco, Namibia, Nigeria, Pakistan, Papua New Guinea, Paraguay, Serbia, Sri Lanka, Sudan, Trinidad and Tobago, Tunisia, Vietnam
- 85 countries at quarterly frequency (1996q1 - 2014q4)
 - Countries in annual dataset minus *El Salvador, Mongolia, Montenegro, Serbia*.



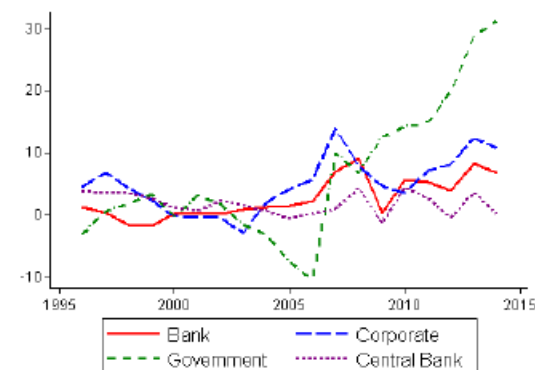
Figure 5: Aggregate External Debt Inflows, Billions 1996 USD



(a) Advanced

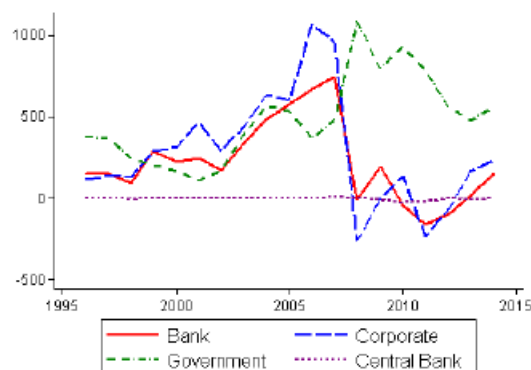


(b) Emerging

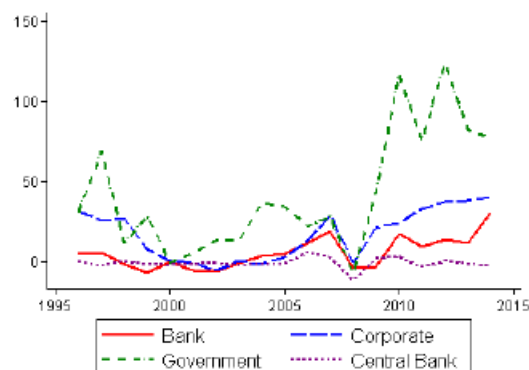


(c) Developing

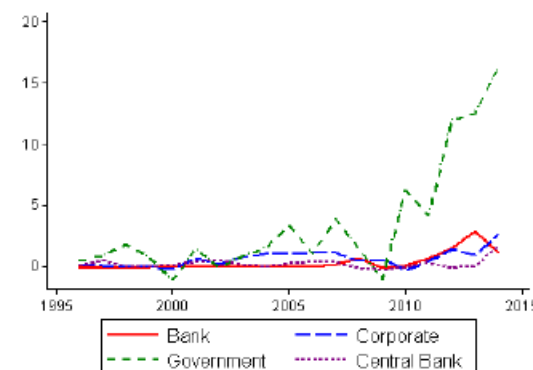
Figure 6: Aggregate Portfolio Debt Inflows, Billions 1996 USD



(a) Advanced



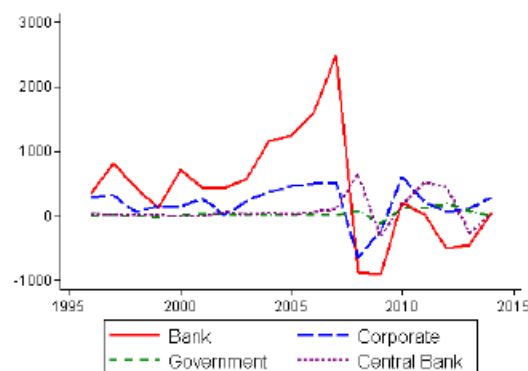
(b) Emerging



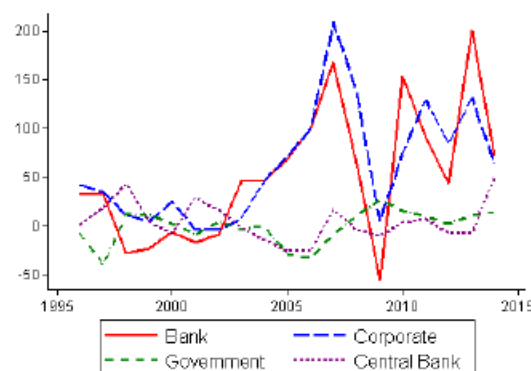
(c) Developing

Source: BOP, IIP, QEDS, and BIS, authors' calculations.

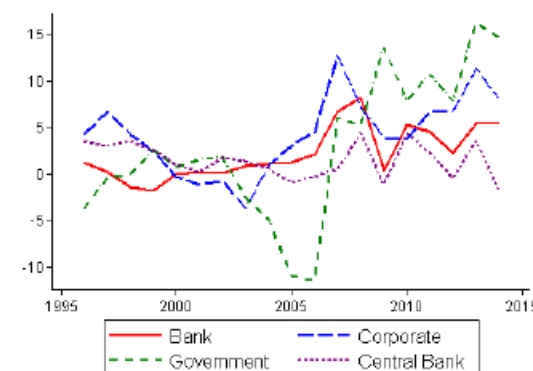
Figure 7: Aggregate Other Investment Debt Inflows, Billions 1996 USD



(a) Advanced



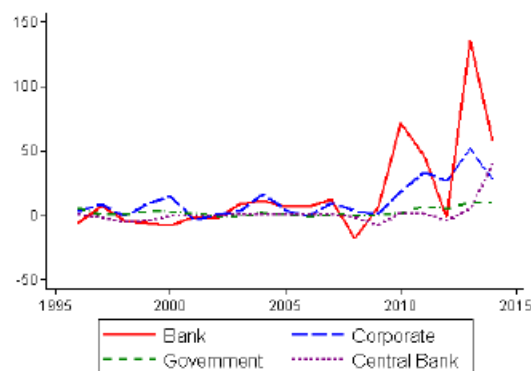
(b) Emerging



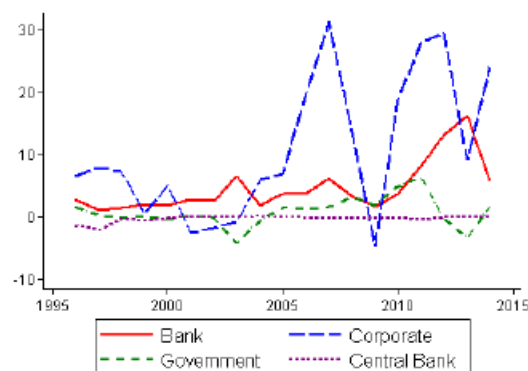
(c) Developing

Source: BOP, IIP, QEDS, and BIS, authors' calculations.

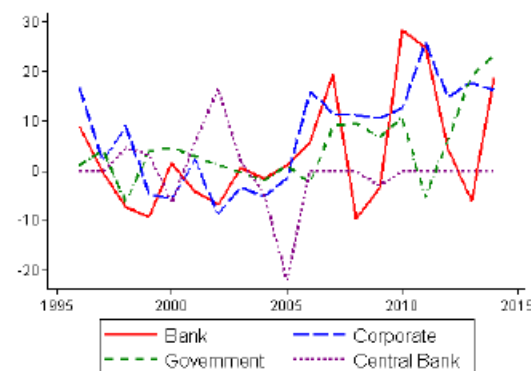
Figure 8: Emerging Market External Debt Inflows, Billions 1996 USD



(a) China Debt



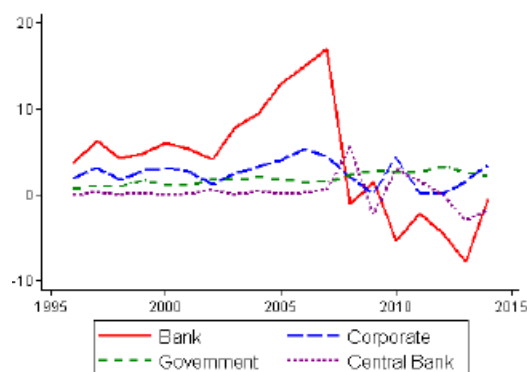
(b) India Debt



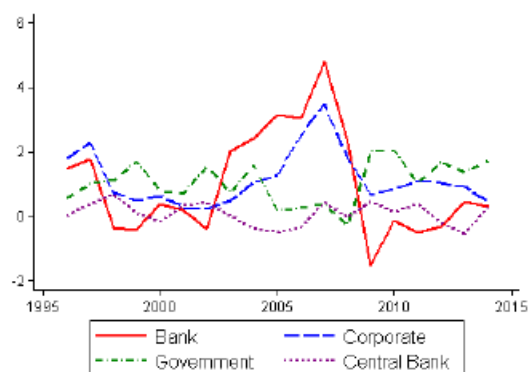
(c) Brazil Debt

Source: BOP, IIP, QEDS, and BIS, authors' calculations. Debt is portfolio debt + other investment debt.

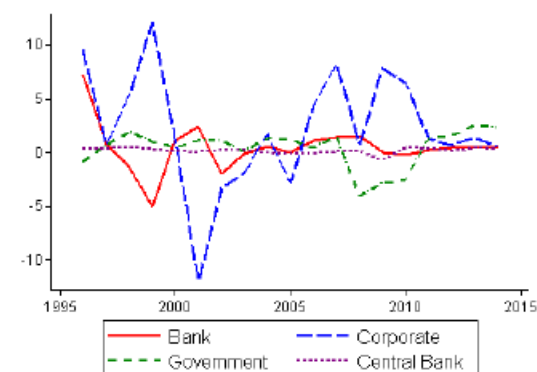
Figure 9: Average External Debt Inflows, Percent of GDP



(a) Advanced



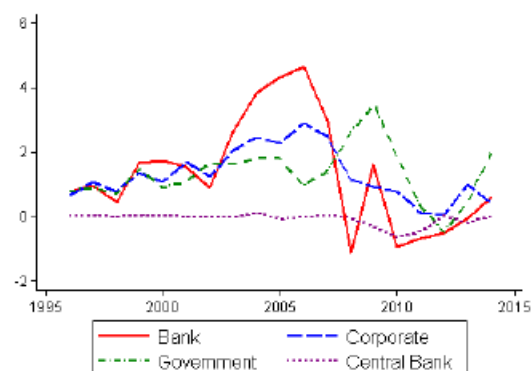
(b) Emerging



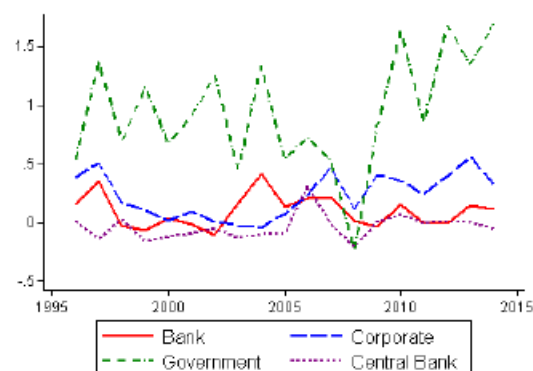
(c) Developing

Source: BOP, IIP, QEDS, and BIS, authors' calculations. Debt is portfolio debt + other investment debt.

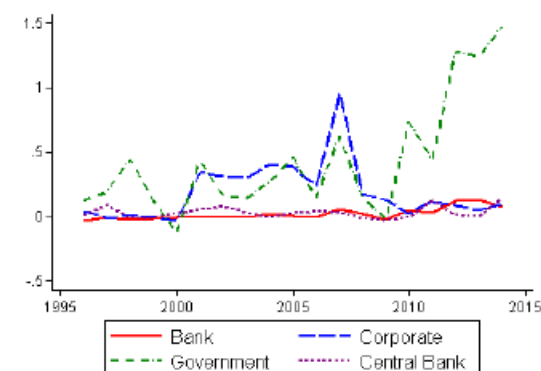
Figure 10: Average Portfolio Debt Inflows, Percent of GDP



(a) Advanced



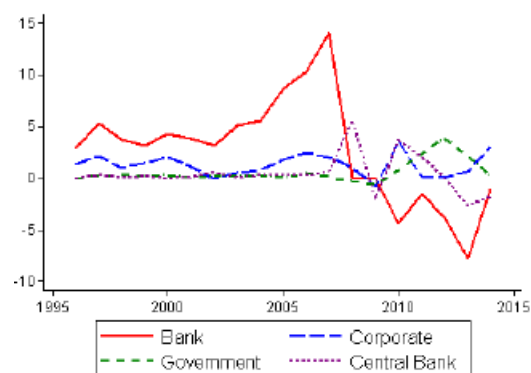
(b) Emerging



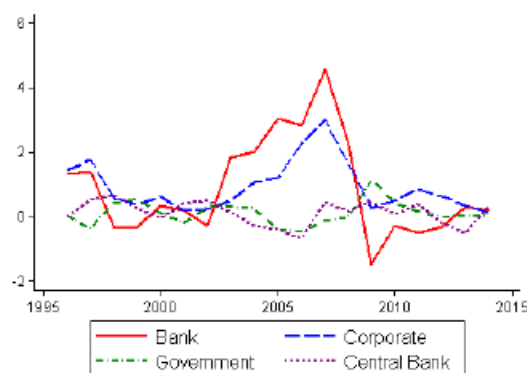
(c) Developing

Source: BOP, IIP, QEDS, and BIS, authors' calculations.

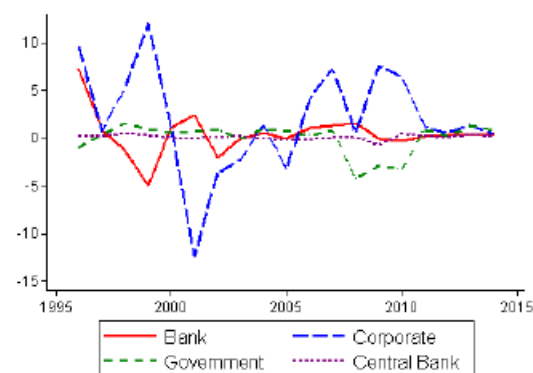
Figure 11: Average Other Investment Debt Inflows, Percent of GDP



(a) Advanced



(b) Emerging



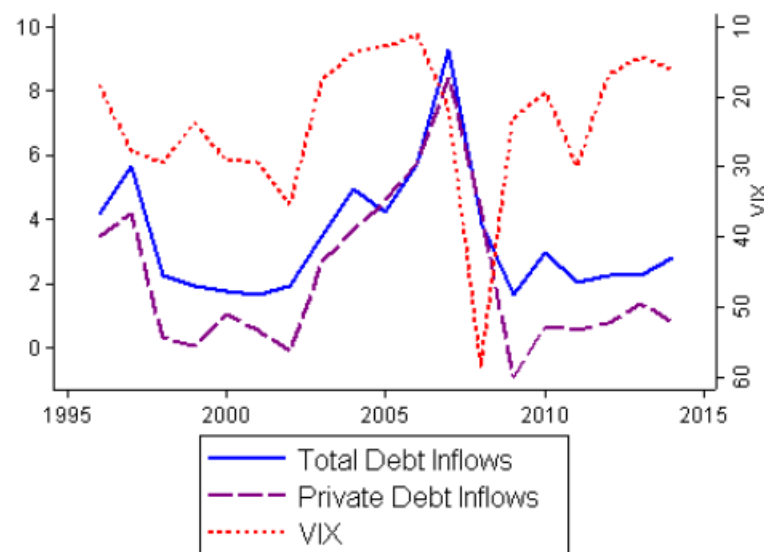
(c) Developing

Source: BOP, IIP, QEDS, and BIS, authors' calculations.

Figure 12: Total vs Private Average Debt Inflows, Percent of GDP



(a) Advanced



(b) Emerging

Source: BOP, IIP, QEDS, and BIS, authors' calculations.

Table 2: Correlation of Aggregate Flows with VIX, by Capital Flow Type

Regions	DI	PE	PD	OID	DID	DIE
World	-0.17	-0.42	-0.46	-0.46	-0.16	-0.14
N. America	-0.19	-0.13	-0.39	-0.43	-0.47	0.08
Lat. America	-0.08	-0.31	-0.41	-0.22	-0.17	-0.00
Cent./East. Europe	0.02	-0.37	-0.58	-0.33	0.02	0.01
West. Europe	-0.17	-0.22	-0.24	-0.42	-0.02	-0.22
Em. Asia	-0.21	-0.23	-0.43	-0.48	-0.15	-0.18
Adv. Asia	0.11	-0.39	-0.38	-0.04	0.06	0.08
ME/Africa	-0.21	-0.37	-0.41	-0.41	-0.18	-0.11

Sample consists of 57 countries over 2001q3-2014q4, and is described in Appendix D. DI = direct investment; PE = portfolio equity; PD = portfolio debt; OID = other investment debt; DID = direct investment debt; DIE = direct investment equity. We allow portfolio equity and direct investment to be zero if missing when computing the aggregate figures. Flows are aggregated by group and normalized by group aggregate GDP.

Table 3: Correlation of Aggregate Debt Flows with VIX, by Geography and Sector

Regions	Gov	CB	Bank	Corp	All
World	0.25	0.31	-0.53	-0.61	-0.51
N. America	0.34	0.04	-0.11	-0.62	-0.49
Lat. America	-0.27	0.41	-0.47	-0.38	-0.38
Cent./East. Europe	-0.10	0.19	-0.56	-0.37	-0.47
West. Europe	0.11	0.31	-0.49	-0.36	-0.43
Em. Asia	-0.25	-0.13	-0.46	-0.52	-0.53
Adv. Asia	-0.15	0.15	-0.06	-0.37	-0.28
ME/Africa	-0.19	-0.20	-0.25	-0.45	-0.53

Sample consists of 57 countries over 2001q3-2014q4, and is described in Appendix D. Debt flows are inflows of portfolio and other investment debt. Flows are aggregated by group and normalized by group aggregate GDP.



Table 4: Correlation of Aggregate Debt Flows with VIX, by Development, Sector, and Capital Flow Type

Group	Portfolio Debt				Other Investment Debt			
	Gov	CB	Bank	Corp	Gov	CB	Bank	Corp
Advanced	0.28	0.03	-0.54	-0.50	0.02	0.29	-0.44	-0.48
Emerging	-0.49	-0.26	-0.65	-0.48	0.30	0.29	-0.61	-0.51
Developing	-0.25	-0.07	-0.11	-0.14	0.10	0.01	-0.29	-0.15

Sample consists of 57 countries over 2001q3-2014q4, and is described in Appendix D. Flows are aggregated by group and normalized by group aggregate GDP.



Table 5: Correlation of Aggregate Flows by Sector

	GG DB	CB DB	DC DB	OS DB
GG DB	1.00			
CB DB	0.21	1.00		
DC DB	-0.11	-0.19	1.00	
OS DB	-0.19	-0.28	0.79	1.00

Sample consists of 57 countries over 2001q3-2014q4, and is described in Appendix D. Aggregate flows are normalized by aggregate GDP. GG = Government; CB = Central Bank; DC = Banks; OS = Corporates; DB = Debt, which is the sum of portfolio debt and other investment debt.



Table 6: Correlation of Aggregate Flows by Sector and Capital Flow Type

	GG PD	CB PD	DC PD	OS PD	GG OID	CB OID	DC OID	OS OID
GG PD	1.00							
CB PD	0.07	1.00						
DC PD	-0.15	0.43	1.00					
OS PD	-0.30	0.33	0.77	1.00				
GG OID	0.04	-0.32	-0.49	-0.31	1.00			
CB OID	0.09	-0.26	-0.45	-0.32	0.45	1.00		
DC OID	-0.01	0.26	0.70	0.53	-0.20	-0.12	1.00	
OS OID	0.04	0.37	0.61	0.44	-0.21	-0.22	0.71	1.00

Sample consists of 57 countries over 2001q3-2014q4, and is described in Appendix D. Aggregate flows are normalized by aggregate GDP. GG = Government; CB = Central Bank; DC = Banks; OS = Corporates; PD = portfolio debt; OID = other investment debt



Panel regressions

$$\frac{INFLOW_{it}}{GDP_{it}} = \alpha_i + \beta \log(VIX_{t-1}) + \gamma GDPGrowth_{it-1} + \epsilon_{it}$$



Table 7: Drivers of Capital Inflows, by Instrument - All Countries (Quarterly BOP data, missing filled with Zero)

	(1)	(2)	(3)	(4)	(5) Other Investment Debt
	Total	Direct Investment	Portfolio Equity	Portfolio Debt	
$\log(\text{VIX}_{t-1})$	-7.986*** (2.654)	-1.166 (0.626)	-1.087 (0.809)	-1.252 (0.670)	-4.481*** (1.347)
GDP Growth_{it-1}	0.218*** (0.0472)	0.0366 (0.0199)	-0.0245 (0.0178)	0.0104 (0.0190)	0.196*** (0.0473)
Observations	2695	2695	2695	2695	2695
R^2	0.041	0.008	0.006	0.005	0.037
CountryFE	Yes	Yes	Yes	Yes	Yes

Sample is from 2002q4-2014q4, countries as listed in Appendix D. Capital inflow data is from Balance of Payments, with any missing data replaced with zeros. Dependent variables are expressed as a percentage of GDP. VIX is the implied volatility of S&P 500 index options. GDP growth is calculated as a year-on-year percentage growth. Errors are clustered at the country level. ** $p < 0.05$, *** $p < 0.01$

Table 8: Drivers of Capital Inflows, by Instrument - Advanced Economies (Quarterly BOP data, missing filled with Zero)

	(1)	(2)	(3)	(4)	(5) Other Investment Debt
	Total	Direct Investment	Portfolio Equity	Portfolio Debt	
$\log(\text{VIX}_{t-1})$	-14.87** (5.998)	-1.801 (1.444)	-2.286 (1.874)	-1.961 (1.575)	-8.823*** (2.897)
GDP Growth_{it-1}	0.370*** (0.100)	-0.00381 (0.0342)	-0.0651 (0.0500)	0.0883 (0.0501)	0.350** (0.128)
Observations	1127	1127	1127	1127	1127
R^2	0.055	0.005	0.012	0.015	0.049
CountryFE	Yes	Yes	Yes	Yes	Yes

Sample is from 2002q4-2014q4, advanced countries as listed in Appendix D. Capital inflow data is from Balance of Payments, with any missing data replaced with zeros. Dependent variables are expressed as a percentage of GDP. VIX is the implied volatility of S&P 500 index options. GDP growth is calculated as a year-on-year percentage growth. Errors are clustered at the country level. ** $p < 0.05$, *** $p < 0.01$

Table 9: Drivers of Capital Inflows, by Instrument - Emerging Markets (Quarterly BOP data, missing filled with Zero)

	(1)	(2)	(3)	(4)	(5)
	Total	Direct Investment	Portfolio Equity	Portfolio Debt	Other Investment Debt
$\log(\text{VIX}_{t-1})$	-3.344*** (0.831)	-0.788*** (0.251)	-0.204 (0.115)	-0.734*** (0.238)	-1.618** (0.787)
GDP Growth_{it-1}	0.165*** (0.0518)	0.0552** (0.0239)	-0.00324 (0.00233)	-0.0246 (0.0120)	0.138*** (0.0365)
Observations	1372	1372	1372	1372	1372
R^2	0.074	0.020	0.003	0.010	0.094
CountryFE	Yes	Yes	Yes	Yes	Yes

Sample is from 2002q4-2014q4, emerging market countries as listed in Appendix D. Capital inflow data is from Balance of Payments, with any missing data replaced with zeros. Dependent variables are expressed as a percentage of GDP. VIX is the implied volatility of S&P 500 index options. GDP growth is calculated as a year-on-year percentage growth. Errors are clustered at the country level. ** $p < 0.05$, *** $p < 0.01$

Table 10: Drivers of Other Investment Debt Inflows, by Sector - All Countries (Quarterly AHKS data, missing filled from Public Sources)

	(1) Total	(2) Public	(3) Banks	(4) Corp.
$\log(\text{VIX}_{t-1})$	-3.814*** (1.148)	1.017 (0.636)	-3.645*** (0.878)	-1.186*** (0.301)
GDP Growth_{it-1}	0.202*** (0.0459)	-0.00423 (0.0161)	0.166*** (0.0380)	0.0397*** (0.00780)
Observations	2695	2695	2695	2695
R^2	0.035	0.002	0.043	0.022
CountryFE	Yes	Yes	Yes	Yes

Sample is from 2002q4-2014q4, countries as listed in Appendix D. Other Investment Debt inflow data is constructed by AHKS, as described in Section 3. Public inflows are defined as the sum of General Government and Central Bank inflows. Dependent variables are expressed as a percentage of GDP. VIX is the implied volatility of S&P 500 index options. GDP growth is calculated as a year-on-year percentage growth. Errors are clustered at the country level. ** $p < 0.05$, *** $p < 0.01$

Table 11: Drivers of Other Investment Debt Inflows, by Sector - Advanced Economies
(Quarterly AHKS data, missing filled from Public Sources)

	(1)	(2)	(3)	(4)	(5) Corp. (BOP Only)
	Total	Public	Banks	Corp.	
$\log(\text{VIX}_{t-1})$	-7.365*** (2.380)	0.287 (1.269)	-6.073*** (1.817)	-1.579** (0.672)	-1.535** (0.597)
GDP Growth_{it-1}	0.360*** (0.120)	0.0304 (0.0490)	0.294*** (0.0938)	0.0353** (0.0159)	0.0473 (0.0265)
Observations	1127	1127	1127	1127	1008
R^2	0.044	0.001	0.048	0.012	0.014
CountryFE	Yes	Yes	Yes	Yes	Yes

Sample is from 2002q4-2014q4, countries as listed in Appendix D. Other Investment Debt inflow data is constructed by AHKS, as described in Section 3. Public inflows are defined as the sum of General Government and Central Bank inflows. Dependent variables are expressed as a percentage of GDP. VIX is the implied volatility of S&P 500 index options. GDP growth is calculated as a year-on-year percentage growth. Column (5) uses data solely from BOP, with missing data left unfilled. Errors are clustered at the country level.

** $p < 0.05$, *** $p < 0.01$

Table 12: Drivers of Other Investment Debt Inflows, by Sector - Emerging Markets (Quarterly AHKS data, missing filled from Public Sources)

	(1)	(2)	(3)	(4)	(5)
	Total	Public	Public (BOP Only)	Banks	Corp.
$\log(\text{VIX}_{t-1})$	-1.511 (0.875)	1.500** (0.704)	1.502*** (0.534)	-2.130*** (0.719)	-0.880*** (0.213)
GDP Growth_{it-1}	0.140*** (0.0360)	-0.0167 (0.00855)	-0.0183* (0.00786)	0.113*** (0.0330)	0.0440*** (0.00917)
Observations	1372	1372	1270	1372	1372
R^2	0.087	0.018	0.028	0.113	0.090
CountryFE	Yes	Yes	Yes	Yes	Yes

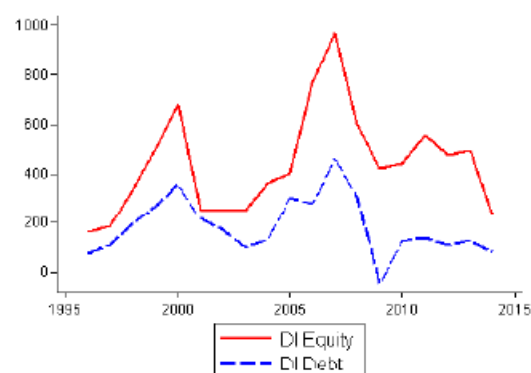
Sample is from 2002q4-2014q4, countries as listed in Appendix D. Other Investment Debt inflow data is constructed by AHKS, as described in Section 3. Public inflows are defined as the sum of General Government and Central Bank inflows. Dependent variables are expressed as a percentage of GDP. VIX is the implied volatility of S&P 500 index options. GDP growth is calculated as a year-on-year percentage growth. Column (3) uses data solely from BOP, with missing data left unfilled. Errors are clustered at the country level. ** $p < 0.05$, *** $p < 0.01$

Table 13: Drivers of Portfolio Debt Inflows, by Sector - Emerging Markets (Quarterly AHKS data, missing filled from Public Sources)

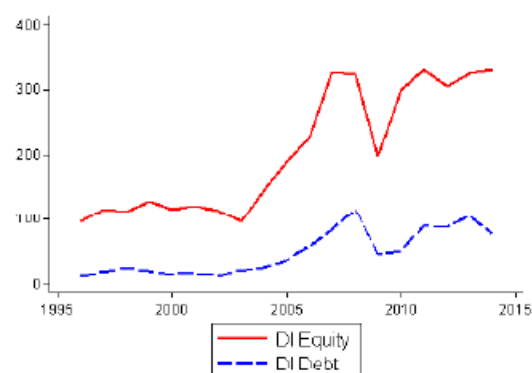
	(1) Total	(2) Public	(3) Banks	(4) Corp.
$\log(\text{VIX}_{t-1})$	-0.750*** (0.234)	-0.423 (0.207)	-0.135 (0.108)	-0.192*** (0.0567)
GDP Growth_{it-1}	-0.0242 (0.0121)	-0.0228** (0.00906)	0.00457 (0.00625)	-0.00596*** (0.00170)
Observations	1372	1372	1372	1372
R^2	0.010	0.010	0.003	0.010
CountryFE	Yes	Yes	Yes	Yes

Sample is from 2002q4-2014q4, countries as listed in Appendix D. Portfolio Debt inflow data is constructed by AHKS, as described in Section 3. Dependent variables are expressed as a percentage of GDP. VIX is the implied volatility of S&P 500 index options. GDP growth is calculated as a year-on-year percentage growth. Errors are clustered at the country level. ** $p < 0.05$, *** $p < 0.01$

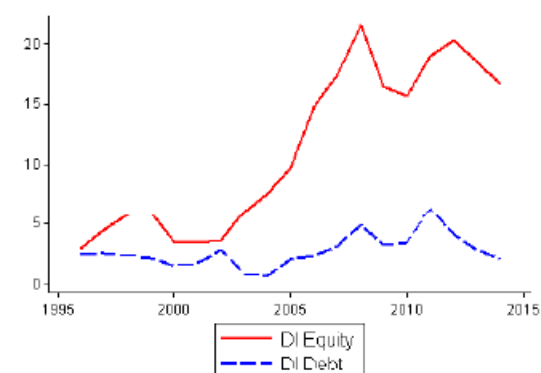
Figure 13: Aggregate Direct Investment Inflows, Billions 1996 USD



(a) Advanced



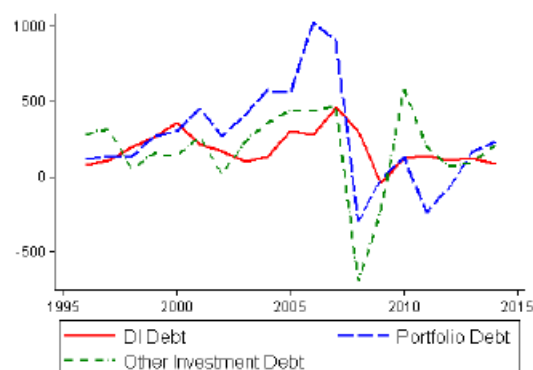
(b) Emerging



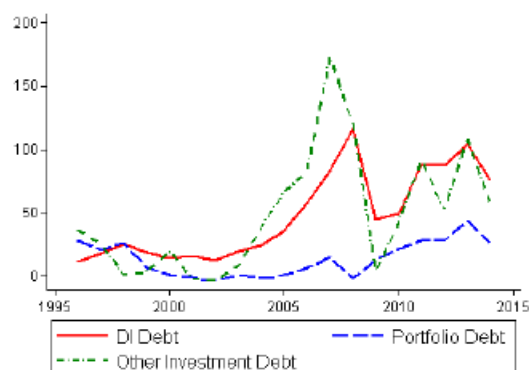
(c) Developing

Source: BOP data and authors' calculations.

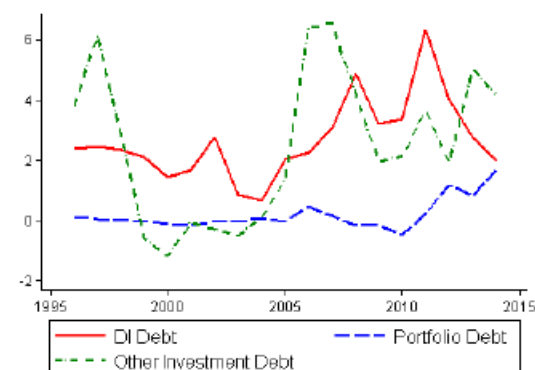
Figure 14: Aggregate Corporate Debt Inflows, Billions 1996 USD



(a) Advanced



(b) Emerging



(c) Developing

Source: BOP data and authors' calculations.

Table 14: Drivers of Total Debt Inflows, by Sector - All Countries (Quarterly AHKS data, missing filled from Public Sources)

	(1)	(2)	(3)	(4)	(5)	(6)
	Total	Public	Banks	Corp.	Total w/DI Debt	Corp. w/DI Debt
$\log(\text{VIX}_{t-1})$	-4.974*** (1.260)	0.960 (0.667)	-4.362*** (0.989)	-1.572*** (0.419)	-5.744*** (1.516)	-2.003*** (0.696)
GDP Growth_{it-1}	0.232*** (0.0650)	-0.00864 (0.0146)	0.190*** (0.0490)	0.0501*** (0.0156)	0.239*** (0.0541)	0.0730*** (0.0164)
Observations	2695	2695	2695	2695	2615	2615
R^2	0.041	0.002	0.045	0.028	0.044	0.028
CountryFE	Yes	Yes	Yes	Yes	Yes	Yes

Sample is from 2002q4-2014q4, countries as listed in Appendix D. Total Debt is the sum of Portfolio Debt and Other Investment Debt inflow data, constructed by AHKS as described in Section 3. Public inflows are defined as the sum of General Government and Central Bank inflows. Dependent variables are expressed as a percentage of GDP. VIX is the implied volatility of S&P 500 index options. GDP growth is calculated as a year-on-year percentage growth. Errors are clustered at the country level. ** $p < 0.05$, *** $p < 0.01$

Table 15: Drivers of Total Debt Inflows, by Sector - Advanced Economies (Quarterly AHKS data, missing filled from Public Sources)

	(1)	(2)	(3)	(4)	(5)	(6)
	Total	Public	Banks	Corp.	Total w/DI Debt	Corp. w/DI Debt
$\log(\text{VIX}_{t-1})$	-9.101*** (2.676)	0.813 (1.400)	-7.630*** (2.068)	-2.284** (0.962)	-10.57*** (3.132)	-3.196 (1.563)
GDP Growth_{it-1}	0.506*** (0.179)	0.0616 (0.0340)	0.363** (0.131)	0.0819 (0.0466)	0.480*** (0.141)	0.101** (0.0420)
Observations	1127	1127	1127	1127	1109	1109
R^2	0.065	0.002	0.056	0.026	0.065	0.027
CountryFE	Yes	Yes	Yes	Yes	Yes	Yes

Sample is from 2002q4-2014q4, countries as listed in Appendix D. Total Debt is the sum of Portfolio Debt and Other Investment Debt inflow data, constructed by AHKS as described in Section 3. Public inflows are defined as the sum of General Government and Central Bank inflows. Dependent variables are expressed as a percentage of GDP. VIX is the implied volatility of S&P 500 index options. GDP growth is calculated as a year-on-year percentage growth. Errors are clustered at the country level. ** $p < 0.05$, *** $p < 0.01$

Table 16: Drivers of Total Debt Inflows, by Sector - Emerging Markets (Quarterly AHKS data, missing filled from Public Sources)

	(1)	(2)	(3)	(4)	(5)	(6)
	Total	Public	Banks	Corp.	Total w/DI Debt	Corp. w/DI Debt
$\log(\text{VIX}_{t-1})$	-2.261** (0.829)	1.077 (0.652)	-2.265*** (0.706)	-1.073*** (0.253)	-2.336** (0.922)	-1.117*** (0.374)
GDP Growth_{it-1}	0.116*** (0.0347)	-0.0394*** (0.0123)	0.118*** (0.0346)	0.0381*** (0.00928)	0.142*** (0.0416)	0.0635*** (0.0161)
Observations	1372	1372	1372	1372	1310	1310
R^2	0.071	0.021	0.116	0.075	0.073	0.053
CountryFE	Yes	Yes	Yes	Yes	Yes	Yes

Sample is from 2002q4-2014q4, countries as listed in Appendix D. Total Debt is the sum of Portfolio Debt and Other Investment Debt inflow data, constructed by AHKS as described in Section 3. Dependent variables are expressed as a percentage of GDP. VIX is the implied volatility of S&P 500 index options. GDP growth is calculated as a year-on-year percentage growth. Errors are clustered at the country level. ** $p < 0.05$, *** $p < 0.01$

Summary

- Construct a new dataset on gross capital inflows
 - sectoral break-down of debt inflows:
 - quarterly panel from 1996q1 to 2014q4 for 85 countries
- Low global risk appetite (i.e. high VIX) is associated with
 - **Falling private** external debt flows
 - **No response** in **public** external debt flows
- External debt flows are:
 - procyclical for **banks** and **corporates** (especially in EMEs)
 - acyclical for AE sovereigns
 - countercyclical for EME sovereigns
- Our results highlight the importance of separating capital flows
 - by borrowing sector (public vs. private)
 - by borrowing country group (AEs vs. EMEs).



Thank you!

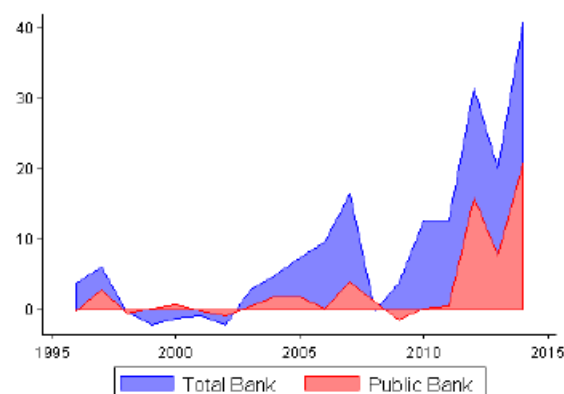
Stefan Avdjiev (stefan.avdjiev@bis.org)



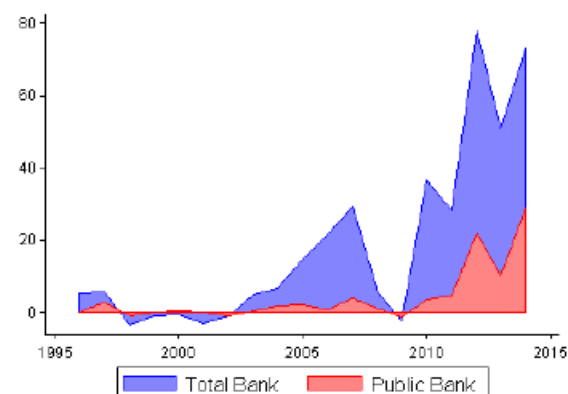
Supplementary Slides



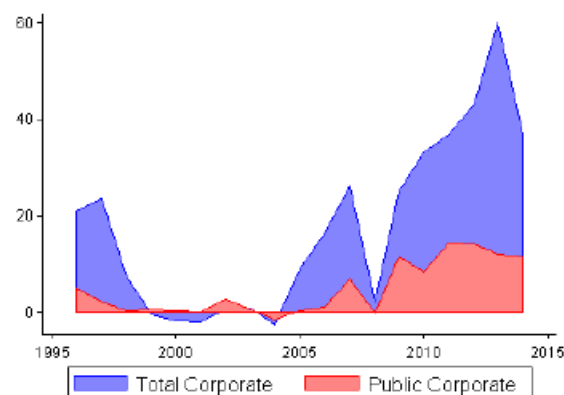
Figure 15: Emerging Market Aggregate Bond Issuance, Billions 1996 USD



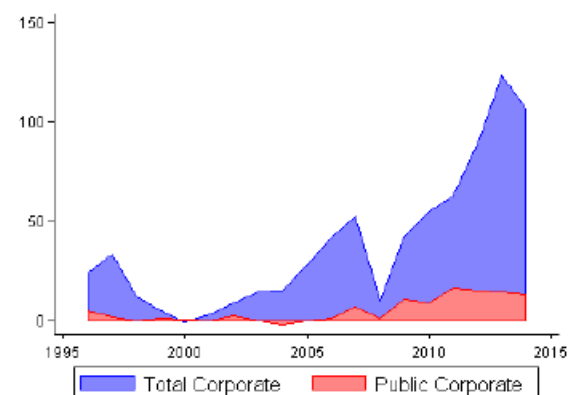
(a) Bank (by Residence)



(b) Bank (by Nationality)



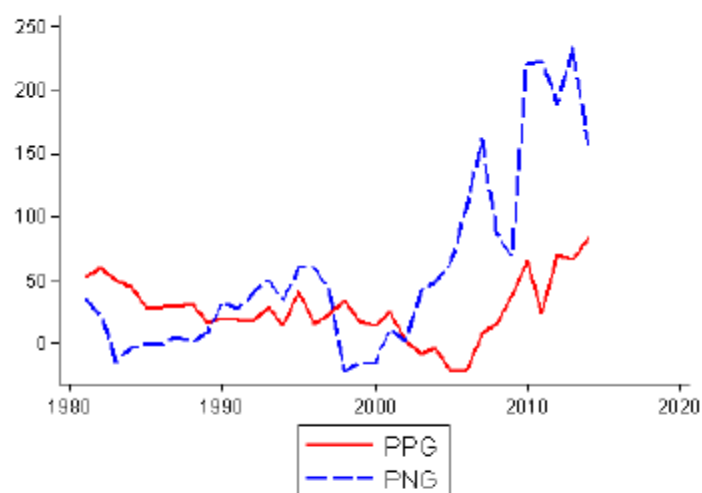
(c) Corporate (by Residence)



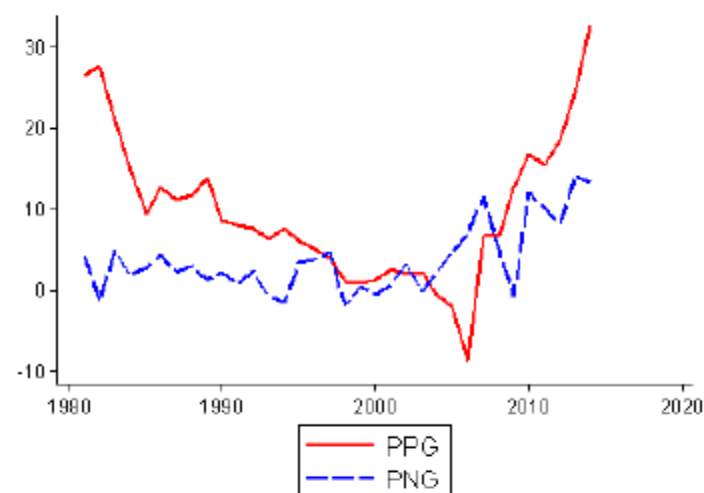
(d) Corporate (by Nationality)

Source: BIS data and authors' calculations.

Figure 16: PPG vs. PNG Aggregate Debt Inflows, Billions 1996 USD



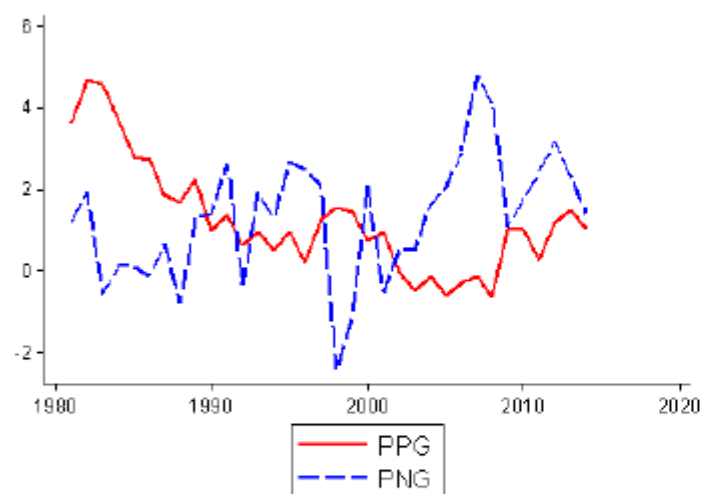
(a) Emerging



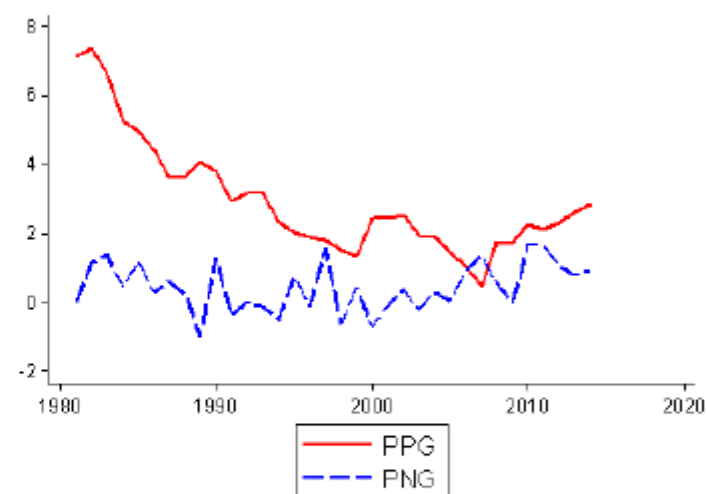
(b) Developing

Source: DRS data and authors' calculations.

Figure 17: PPG vs. PNG Average Debt Inflows, Percent GDP



(a) Emerging



(b) Developing

Source: DRS data and authors' calculations.

Borrowing Sector Splits for Outstanding Stocks

$$\widehat{XBS}_{nbp,j,t} = XBC_{nb,j,t} \frac{INTC_{nbp,j,t}}{INTC_{nbp,j,t} + INTC_{pub,j,t}}$$
$$\widehat{XBS}_{pub,j,t} = XBC_{nb,j,t} \frac{INTC_{pub,j,t}}{INTC_{nbp,j,t} + INTC_{pub,j,t}}$$

Borrowing Sector Splits for Outstanding Flows

Non-bank private sector

$$\widehat{XBS}_{i,t}^{j,nbp} = \widehat{XBS}_{i,t}^{all,nbp} \left(\frac{XBS_{i,t}^{j,nb}}{XBS_{i,t}^{all,nb}} \right)$$
$$\widehat{XBF}_{i,t}^{j,nbp} = \frac{\widehat{XBS}_{i,t}^{j,nbp} FX_t^{j,usd} - \widehat{XBS}_{i,t-1}^{j,nbp} FX_{t-1}^{j,usd}}{\widetilde{FX}_t^{j,usd}}$$
$$\widehat{XBF}_{i,t}^{all,nbp} = \sum_j \widehat{XBF}_{i,t}^{j,nbp}$$

Borrowing Sector Splits for Outstanding Flows

Public sector

$$\widehat{XBS}_{i,t}^{j, pub} = \widehat{XBS}_{i,t}^{all, pub} \left(\frac{XBS_{i,t}^{j, nb}}{XBS_{i,t}^{all, nb}} \right)$$

$$\widehat{XBF}_{i,t}^{j, pub} = \frac{\widehat{XBS}_{i,t}^{j, pub} FX_t^{j, usd} - \widehat{XBS}_{i,t-1}^{j, pub} FX_{t-1}^{j, usd}}{\widetilde{FX}_t^{j, usd}}$$

$$\widehat{XBF}_{i,t}^{all, pub} = \sum_j \widehat{XBF}_{i,t}^{j, pub}$$

Table E1: Correlation of Aggregate Portfolio Debt Flows with VIX, by Geography and Sector

Region	Gov	CB	Bank	Corp	All
World	0.23	-0.11	-0.55	-0.53	-0.46
N. America	0.32	-0.02	-0.59	-0.52	-0.39
Lat. America	-0.36	-0.38	-0.45	-0.3	-0.41
Cent./East. Europe	-0.4	-0.02	-0.63	-0.43	-0.58
West. Europe	0.16	0.11	-0.47	-0.22	-0.24
Em. Asia	-0.34	-0.24	-0.42	-0.38	-0.43
Adv. Asia	-0.22	-0.11	-0.47	-0.41	-0.38
ME/Africa	-0.33	-0.14	-0.13	-0.29	-0.41

Sample consists of 57 countries over 2001q3-2014q4, and is described in Appendix D. Flows are aggregated by group and normalized by group aggregate GDP.



Table E2: Correlation of Aggregate Other Investment Debt Flows with VIX, by Geography and Sector

Region	Gov	CB	Bank	Corp	All
World	0.11	0.31	-0.49	-0.52	-0.46
N. America	0.28	0.04	0.00	-0.58	-0.43
Lat. America	0.17	0.43	-0.42	-0.29	-0.22
Cent./East. Europe	0.26	0.20	-0.52	-0.33	-0.33
West. Europe	-0.11	0.31	-0.46	-0.31	-0.42
Em. Asia	-0.04	-0.03	-0.42	-0.51	-0.48
Adv. Asia	0.16	0.15	0.10	-0.31	-0.04
ME/Africa	0.23	-0.14	-0.24	-0.39	-0.41

Sample consists of 57 countries over 2001q3-2014q4, and is described in Appendix D. Flows are aggregated by group and normalized by group aggregate GDP.



Table E3: Correlation of Flows

Variables	Advanced								Emerging							
	Gov.		Cent. Bank		Bank		Corp.		Gov.		Cent. Bank		Bank		Corp.	
	PD	OID	PD	OID	PD	OID	PD	OID	PD	OID	PD	OID	PD	OID	PD	OID
AE GG PD	1.00															
AE GG OID	0.02	1.00														
AE CB PD	0.08	-0.21	1.00													
AE CB OID	0.12	0.44	-0.15	1.00												
AE DC PD	-0.21	-0.39	0.28	-0.46	1.00											
AE DC OID	-0.08	-0.12	0.12	-0.10	0.68	1.00										
AE OS PD	-0.33	-0.25	0.14	-0.32	0.76	0.53	1.00									
AE OS OID	-0.06	-0.10	0.03	-0.24	0.58	0.67	0.43	1.00								
EM GG PD	0.10	0.01	-0.04	-0.17	0.23	0.28	0.09	0.55	1.00							
EM GG OID	0.18	-0.08	-0.05	0.03	-0.42	-0.42	-0.43	-0.32	0.08	1.00						
EM CB PD	-0.07	-0.21	0.13	-0.29	0.42	0.33	0.43	0.61	0.37	-0.10	1.00					
EM CB OID	-0.07	0.05	0.17	0.02	-0.15	-0.11	-0.16	-0.04	-0.23	-0.07	-0.01	1.00				
EM DC PD	-0.01	0.06	-0.03	-0.16	0.37	0.38	0.33	0.53	0.53	-0.10	0.35	-0.09	1.00			
EM DC OID	0.02	0.16	-0.07	-0.16	0.49	0.48	0.35	0.56	0.37	-0.25	0.28	-0.21	0.47	1.00		
EM OS PD	0.05	-0.02	-0.12	-0.13	0.15	0.15	0.12	0.33	0.61	0.18	0.35	-0.21	0.62	0.39	1.00	
EM OS OID	0.00	0.09	0.09	0.09	0.44	0.38	0.38	0.28	0.11	-0.25	0.19	-0.23	0.46	0.71	0.35	1.00

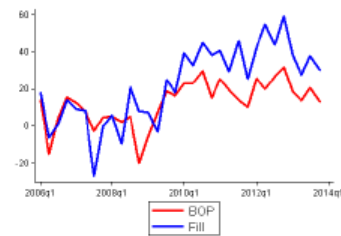
Sample consists of 57 countries over 2001q3-2014q4, and is described in Appendix D. Flows are aggregated by group and normalized by group aggregate GDP. AE = Advanced Economies; EM = Emerging Markets; GG = Government; CB = Central Bank; DC = Banks; OS = Corporates; PD = portfolio debt; OID = other investment debt



Figure C1: Aggregate Portfolio Debt, Billions USD



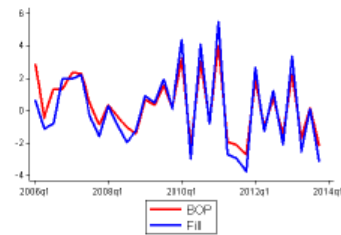
(a) Advanced Government



(b) Emerging Government



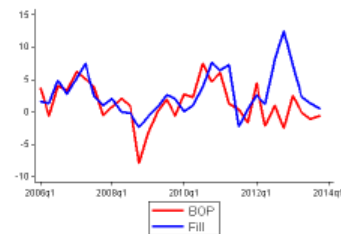
(c) Advanced Central Bank



(d) Emerging Central Bank



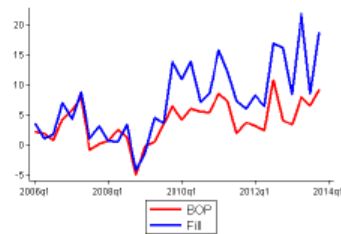
(e) Advanced Banks



(f) Emerging Banks



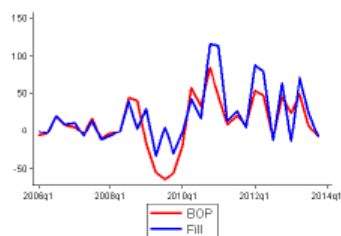
(g) Advanced Corporates



(h) Emerging Corporates



Figure C2: Aggregate Other Investment Debt , Billions USD



(a) Advanced Government



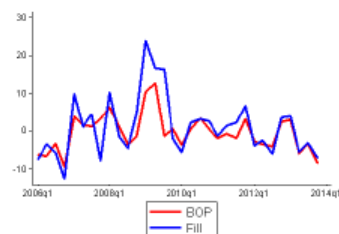
(b) Emerging Government



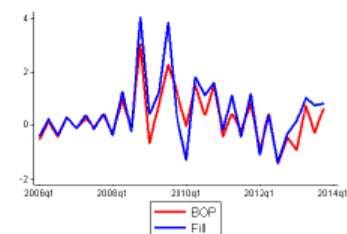
(c) Developing Government



(d) Advanced Central Bank



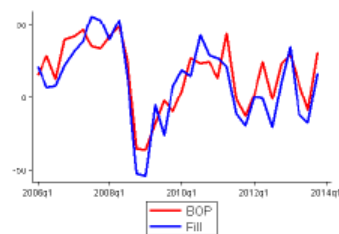
(e) Emerging Central Bank



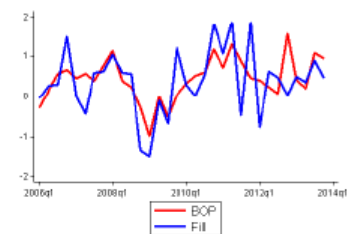
(f) Developing Central Bank



(g) Advanced Banks



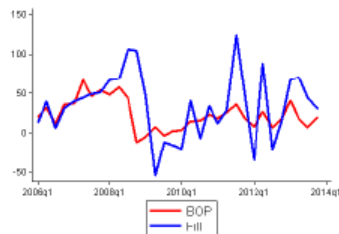
(h) Emerging Banks



(i) Developing Banks



(j) Advanced Corporates

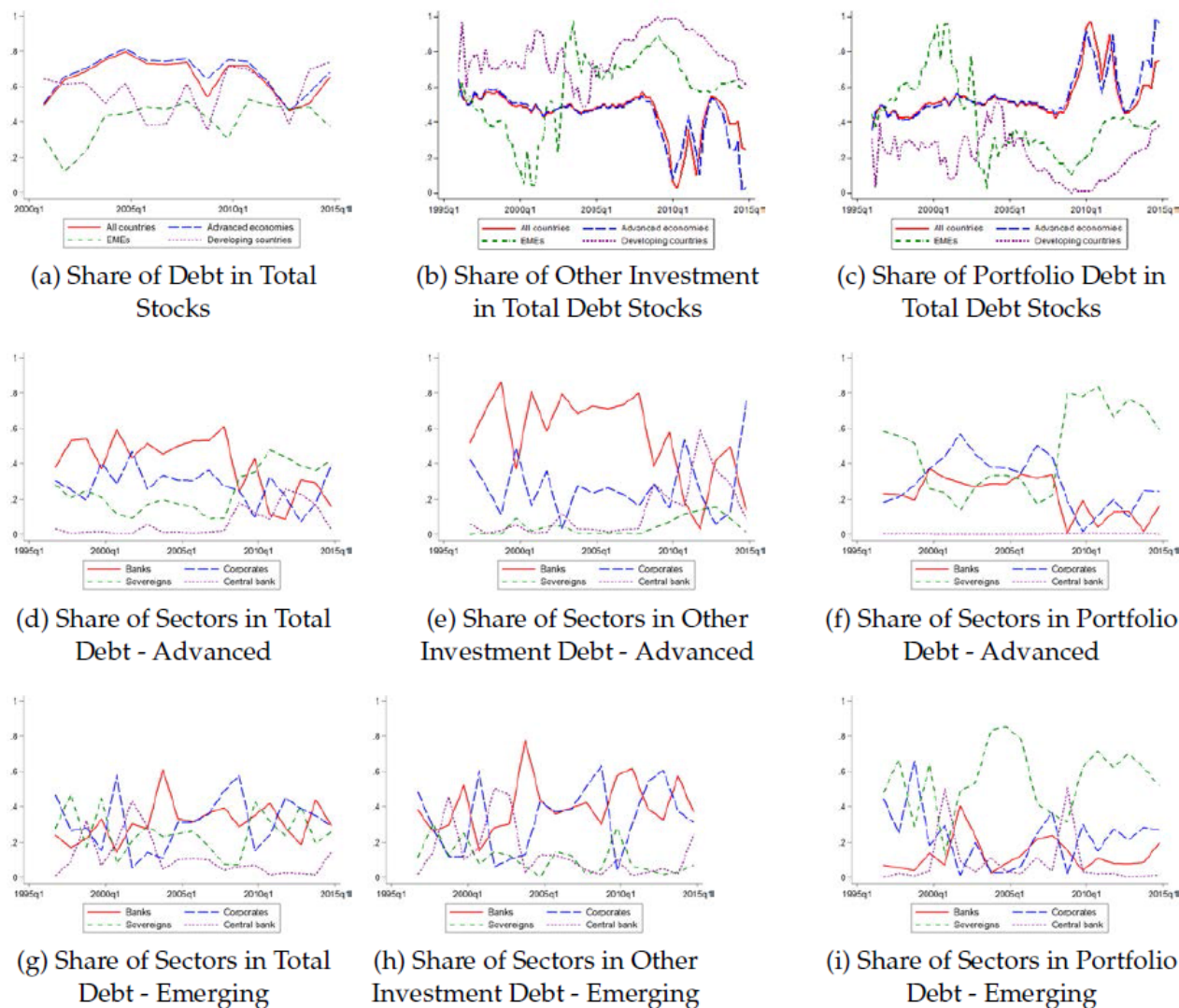


(k) Emerging Corporates



(l) Developing Corporates

Figure E1: Composition of External Debt Flows - Share by Sector



Source: BOP, IIP, QEDS, and BIS, authors' calculations. Panel (a) uses annual data after 2001 in order to get a balanced sample.