Is Banks' Home Bias Good or Bad for Public Debt Sustainability?

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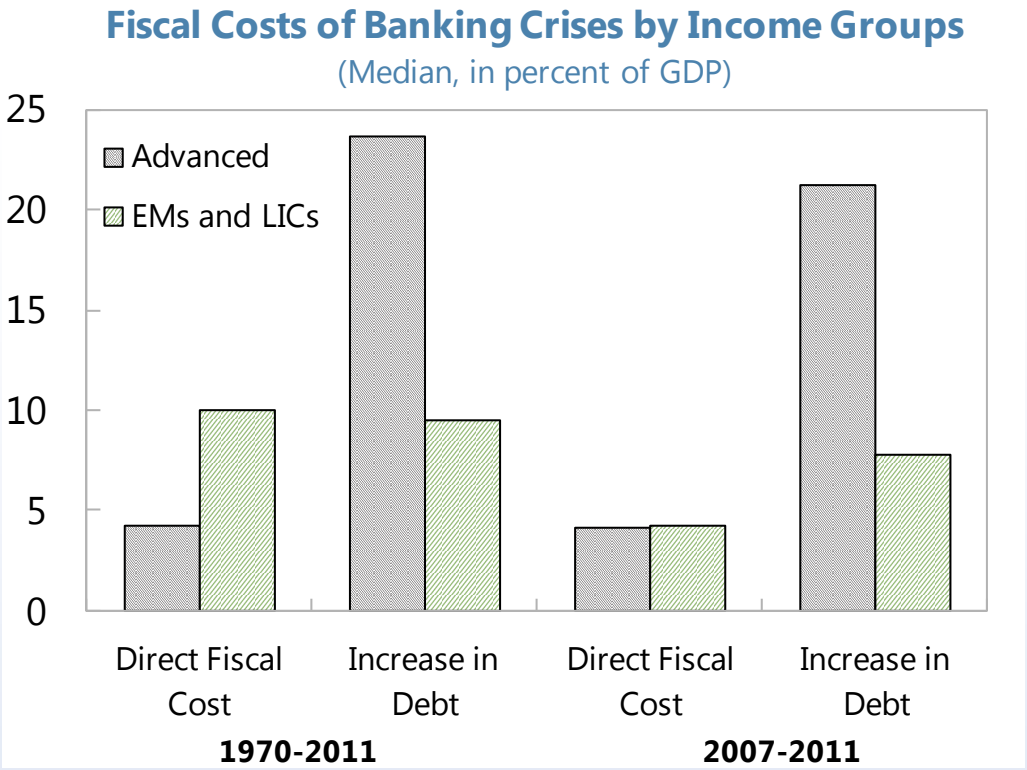
Overview of the Paper

- Empirical and policy analysis on AMs and EMs' public debt sustainability.

- Two main contributions of the paper
  - New dataset on banks' home bias in AMs and EMs (wider cross-country and time-series coverage).
  - New empirical/policy implications on banks' home bias and public debt sustainability.

Motivations

- **In a banking crisis, public debt is hit directly and indirectly**
  - Direct costs– bank recap, asset purchases, calls on guarantees
  - Indirect costs– lower revenue from lower growth and asset prices, higher spending from automatic stabilizers, higher borrowing costs, exchange rate effects

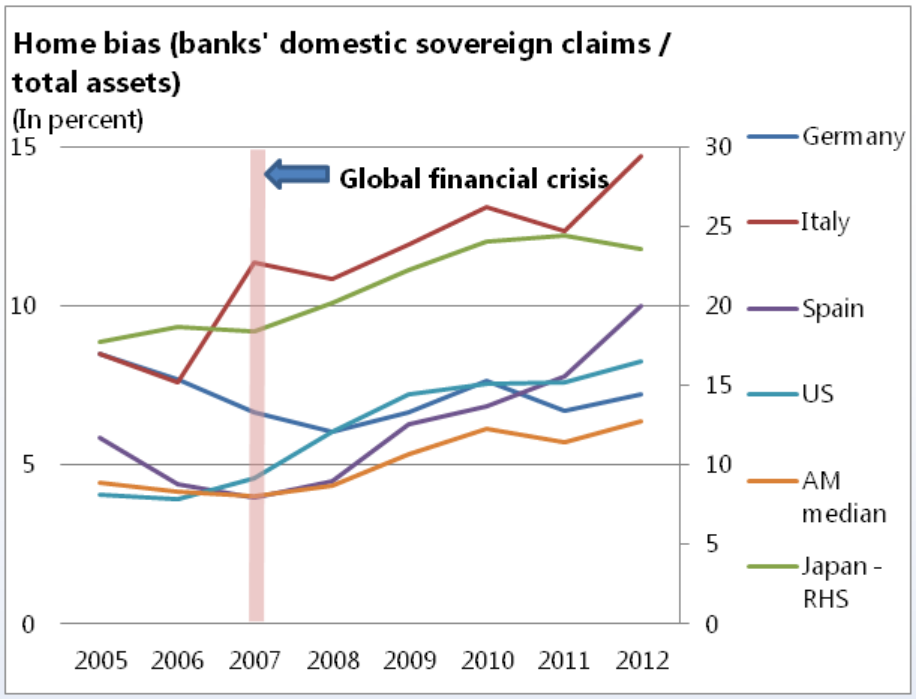


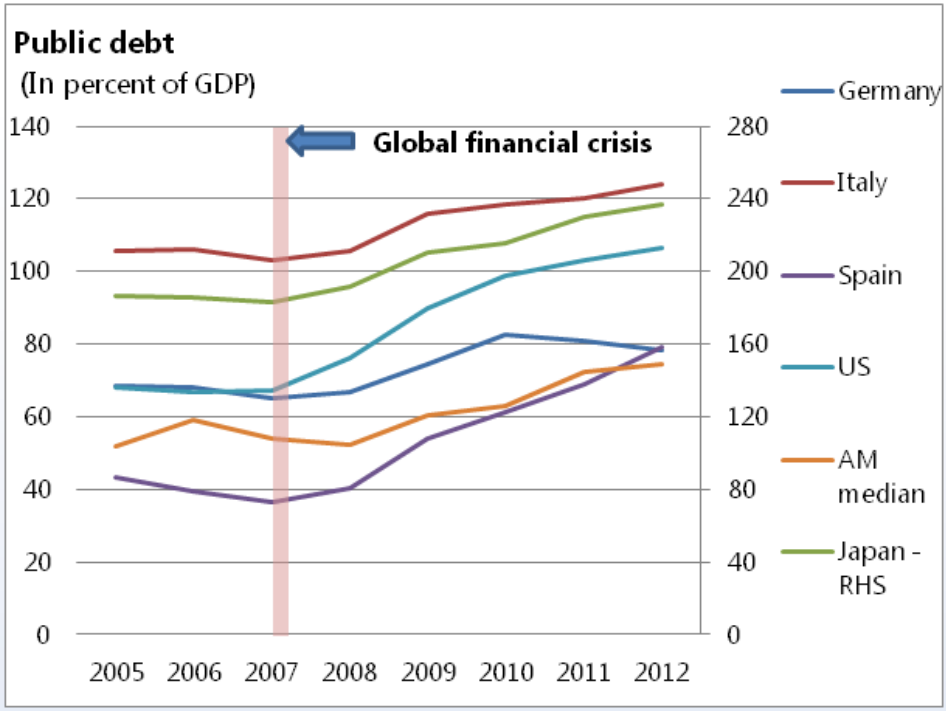
Sources: Laeven and Valencia (2013); Fund staff estimates.

Motivations (cont.)

- **Since the onset of the global financial crisis, both home bias and public debt have increased in European peripheries and across AMs.**

- **The entrenched sovereign-bank nexus has raised concerns not only about the health of the banking sector but also its potential impact on sovereign debt sustainability.**





Sources: Arslanalp and Tsuda (2012), IMF IFS, IMF WEO.

Main Questions and Results

- ***Home Bias is banks' holdings of domestic sovereign debt as a share of total assets***

I. Is the cost of borrowing lower for sovereigns with higher home bias?

- Yes, for both Advanced Markets (AMs) and Emerging Markets (EMs) using bond spreads and domestic yields respectively.
- The negative relationship is milder for EMs than AMs.

II. Is the level of public debt higher in countries with greater home bias?

Yes. Panel regressions show that this is the case for both AMs and EMs.

Main Questions and Results (cont.)

III. Is fiscal primary balance adjustment slower in sovereigns with higher home bias?

Yes. The presence of domestic banks able to absorb the domestic debt issuances can provide a significant breathing space to sovereigns but could potentially delay needed fiscal adjustment.

IV. Do sovereigns with higher home bias enter into debt difficulties at higher levels of public debt?

Yes. Our findings suggest a positive relationship between the level of debt at which countries are assessed to have experienced debt difficulties and home bias.

Outline

- Motivation
- Main Questions and Implications
- Home Bias Measures and the Academic Literature
- Empirical Analysis on Banks' Home Bias
  - I. Sovereign Borrowing Costs
  - II. Level of Public Debt
  - III. Primary Balance Adjustment
  - IV. Home Bias and Public Debt Distress
- Conclusion
  - Appendix: Other Home Bias Issues

Banks' Home Bias and Literature Review

I. Our measure of Home Bias:
Banks' holding of domestic sovereign claims / Banks' total assets

Also used by Battistini et al. (2013), BIS (2011), Gennaioli et al. (2014) and Merler and Pisani-Ferry (2012)

II. Existing Studies

Arslanalp and Poghosyan (2014) and Andritzky (2012), who examine the diversification angle of sovereign claims find that an increase in the share of government debt held by domestic investors, leads to an increase in sovereign bond yields.

Acharya and Steffen (2013) find that home bias (also measured by banks' holding of domestic sovereign debt relative to total assets) actually helped to lower spreads in the European periphery after the systemic crisis.

III. Our paper

(i) examines several aspects of the relationship;

(ii) explicitly accounts for the level of public debt and market sentiment when examining the relationship between home bias and borrowing cost;

and (iii) and account for potential differences between AMs and EMs.

Other Measure of Banks' Home Bias

I. Our measure of Home Bias:

Banks' holding of domestic sovereign claims / Banks' total assets

- Sources: IMF IFS and Arslanalp and Tsuda (2012, IMF WP)
- AMs and EMs
- Wider cross-country (51 countries) and time series (1999-2012) coverage

II. Home Bias Measure (A)

Banks' holding of domestic sovereign claims / Banks' holding of sovereign claims

- Only for AMs (not EMs)
- Shorter time-series coverage (2005-2012) – Not enough "normal" times (proxy for banks' exposure to foreign public claims)

III. Home Bias Measure (B)

Banks' holding of domestic sovereign claims / Total Public Debt

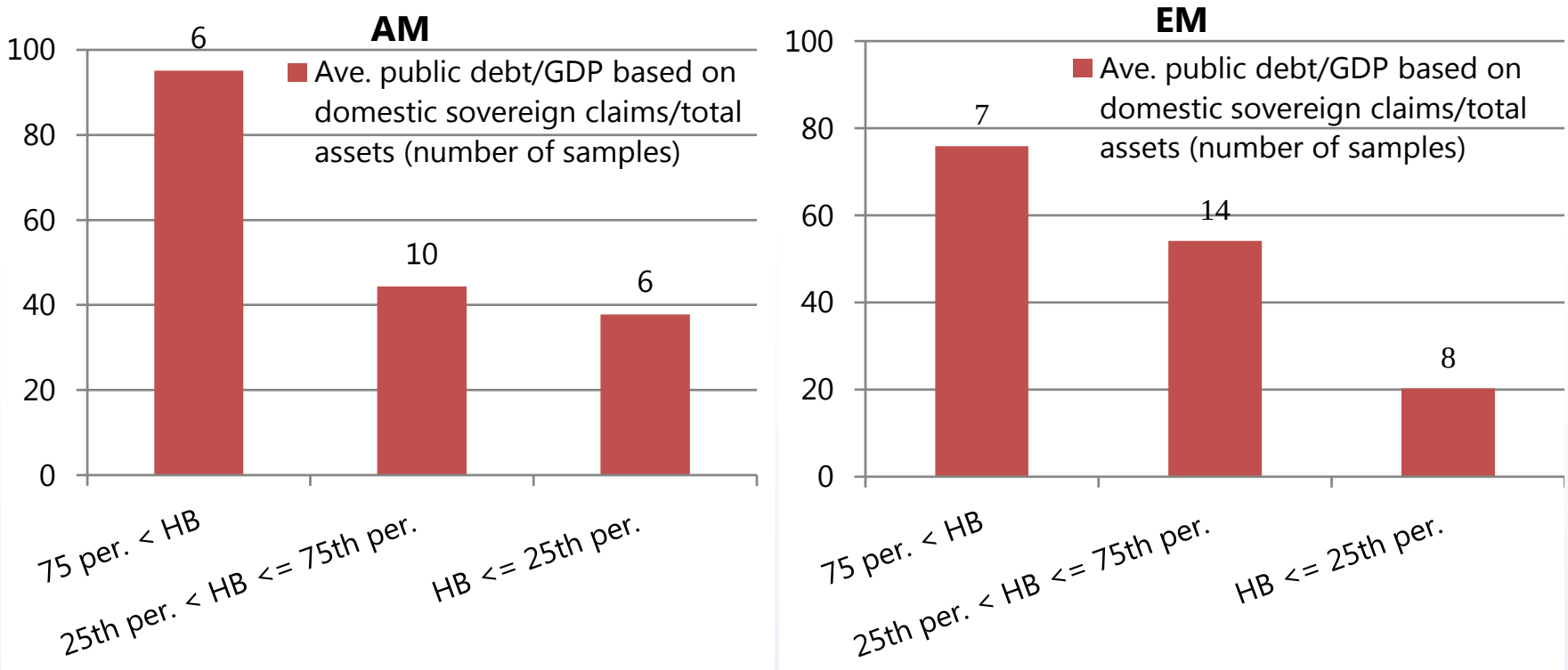
- Both AMs and EMs
- Diversifications of public debt

Home Bias Measure (A) & (B) are used for robustness check.

Stylized fact on Home Bias

- **AMs and EMs with high home bias tend to have high public debt in both pre- and post-global financial crisis periods.**

Average Public Debt (2007) and Home Bias (average, 2005-7) in AM and EM[1]



Source: Arslanalp and Tsuda (2012), IMF IFS, IMF WEO

[1] Excluding Japan, average public debt for AMs is 76 percent of GDP in countries whose HB fall in the top quartile of the distribution.

Potential Determinants of Home Bias

- **It is worth noting that a multitude of factors could potentially explain differences in home bias across countries:**
  - The preferential regulatory treatment of domestic sovereign debt
  - Increasing importance of domestic sovereign debt for central bank collateral
  - Increasing supply of public debt
  - Structural factors such as market infrastructure or lack of investment opportunities
  - Business cycle considerations (e.g. flight-to-safety)
- **Ongoing project: Asonuma and Erce (2016)**
- **IMF (2015) - macro-financial factors matter significantly for home bias.**
- **The increased home bias for European peripheral banks during the crisis can be also explained by some of the above factors.**

HB and Borrowing Costs (AMs)

• **Panel regression —**controlling for growth rate, inflation rate, institutional quality, ER depreciation, and credit-to-GDP ratio, and VIX (investors' risk aversion).

•**Spreads/Yields on long-term bonds (10-year maturity)**

(1) AM—difference in domestic bond yields and those of German bond yields (European) and US bond yields (non-European).

(2) EM—Domestic bond yields (IMF WEO)

•**Sample period:** 1999-2012

•**Specification** (Ardagna et al., 2007):

$$r_{i,t} = \beta_1 b_{i,t-1} + \gamma_0 (hb_{i,t} - \overline{hb}_t) + \gamma_1 ((hb_{i,t} - \overline{hb}_t) * b_{i,t-1}) + \gamma_2 ((hb_{i,t} - \overline{hb}_t) * VIX_t) + x_{i,t}\delta + y_t\phi + \varepsilon_{it}$$

•**Two-step GMM** – controlling banks' home bias with (i) housing price, (ii) lagged credit-to-GDP

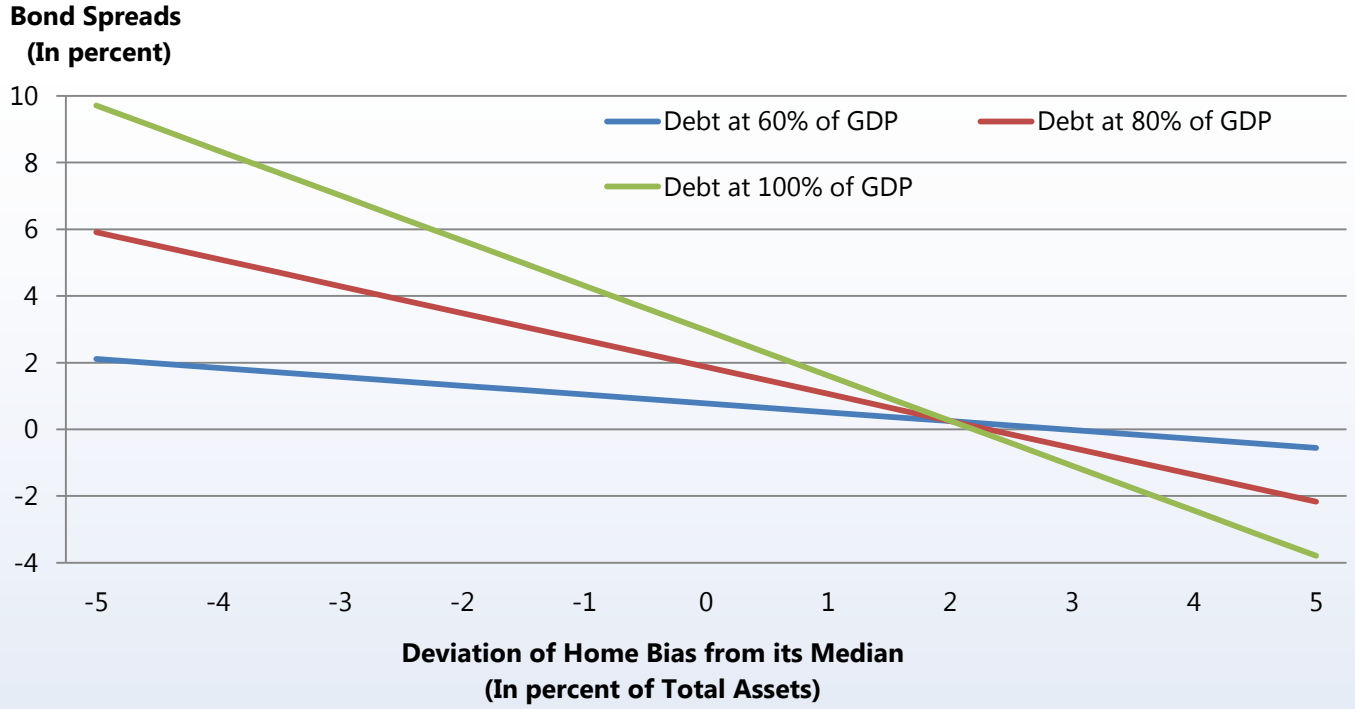
HB and Borrowing Costs (AMs, cont.)

Dependent variable: **Bond Spreads 1/**	**(1) Baseline – HB HB/Debt**	(2) HB. HB/Debt, HB/VIX	(3) Quartile regression
	IV pooled estimation	IV pooled estimation	Quartile regression
β_1 (Public debt/GDP, lagged)	**0.055*** (0.013)**	0.054*** (0.013)	-0.0068 (0.016)
β_1 (Public debt/GDP, square, lagged)	-	-	0.000014 (0.00006)
γ_0 (Deviation of home bias from median	**1.361*** (0.493)**	1.255** (0.515)	
γ_1 (Deviation of home bias from median * Public debt/GDP, level, lagged)	**-0.027*** (0.009)**	-0.027*** (0.012)	-0.013** (0.0065)
γ_2 (Deviation of home bias from median * VIX)	-	0.004 (0.012)	0.0084 (0.021)
δ_1 (GDP growth rate)	**-0.045*** (0.012)**	-0.045*** (0.016)	-0.139*** (0.052)
δ_2 (Inflation rate, 3-year MA)	**-0.089 (0.101)**	-0.087 (0.101)	0.178 (0.124)
δ_3 (Institutional quality)	**-0.046*** (0.012)**	-0.045*** (0.012)	-0.118*** (0.022)
δ_4 (Exchange rate depreciation)	**-0.009* (0.005)**	-0.009* (0.005)	-0.019 (0.019)
δ_5 (Credit-to-GDP ratio)	**0.009** (0.004)**	0.009** (0.004)	-0.007** (0.003)
ϕ_1 (VIX)	**0.011* (0.006)**	0.007 (0.016)	-0.017 (0.031)
Adj. R-squared	**0.252**	0.253	-
Sample of years	**1999-2012**	1999-2012	1999-2012
Sample of observations	**313**	313	313
Sample of countries	**25**	25	25
Root MSE	**0.682**	0.682	-

HB and Borrowing Costs (AMs, cont.)

- **At moderate to high debt levels, borrowing costs generally decline as home bias increases.** Expectation of default decline when domestic banks hold a sizable portion of domestic debt.

- **The higher the debt level is, the larger the impact of an increase in home bias is on spreads.** The intuition is that at low debt levels, spreads tend to be already low which limits the favorable impact of HB.



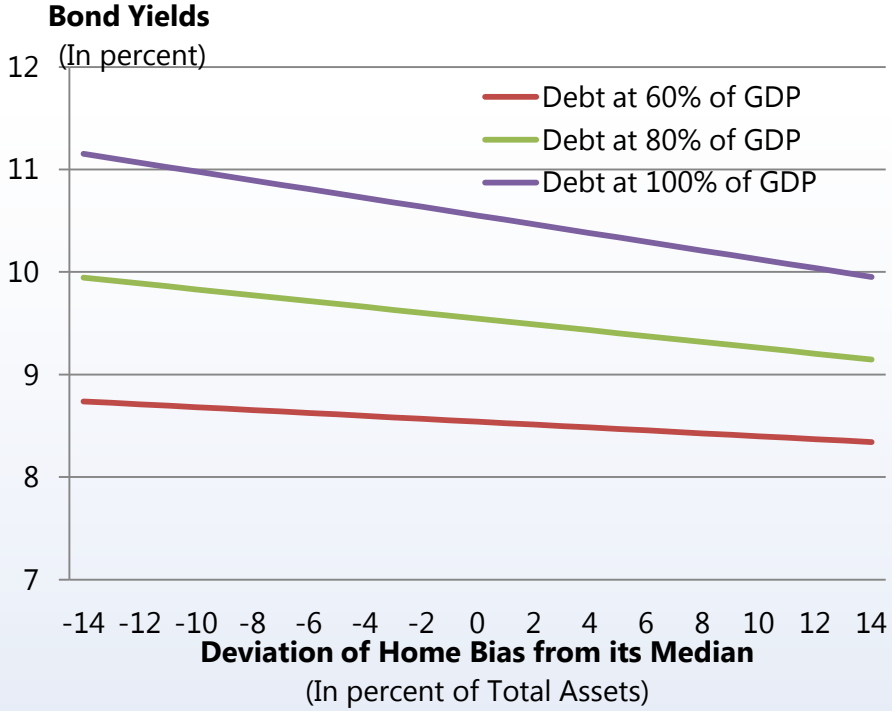
Sources: IMF WEO and Fund staff estimates.

HB and Borrowing Costs (EMs)

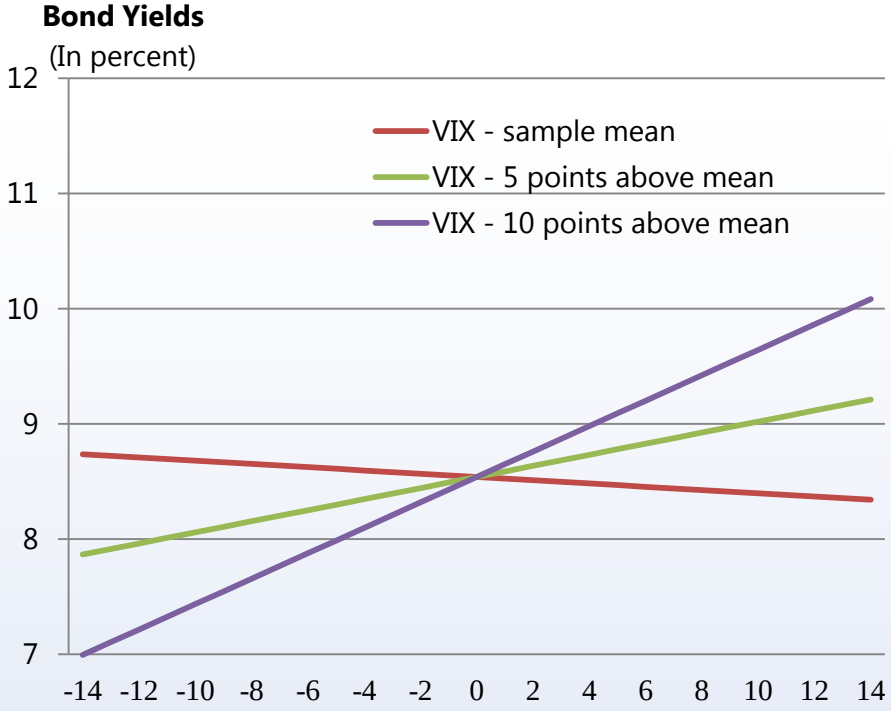
Dependent variable:	Local Currency Bond Yields (long-term)	
	(1) HB, HB/VIX	(2) Baseline - HB, HB/debt, HB/VIX
	IV pooled	IV pooled
β_1 (Public debt/GDP, lagged)	0.046***	0.050***
	(0.010)	(0.015)
γ_0 (Deviation of Home bias from median)	-0.223**	-0.202**
	(0.088)	(0.088)
γ_1 (Deviation of Home bias from median * Public debt/GDP, level, lagged)	-	-0.0007
		(0.002)
γ_2 (Deviation of Home bias from median * VIX)	0.012***	0.012***
	(0.0035)	(0.0036)
δ_1 (GDP growth rate)	-0.258***	-0.264***
	(0.063)	(0.066)
δ_2 (Inflation rate, 3-year MA)	0.201*	0.202*
	(0.102)	(0.105)
δ_3 (Exchange rate depreciation)	-0.0012	-0.002
	(0.021)	(0.021)
δ_4 (Capital restriction)	0.054	0.068
	(0.214)	(0.217)
δ_5 (Credit-to-GDP ratio)	0.0028	0.0028
	(0.015)	(0.015)
ϕ_1 (VIX)	0.057**	0.055**
	(0.026)	(0.026)
ϕ_2 (US long-term bonds)	0.977***	0.960***
	(0.313)	(0.313)
Adj. R-squared	0.747	0.742
Sample periods	1999-2012	1999-2012
Sample of observations	113	113
Root MSE	1.574	1.578

HB and Borrowing Costs (EMs, cont.)

- Home bias is generally negatively associated with domestic bond yields in EMs (similar to AMs).
- The higher the debt level, the larger is the impact of an increase in home bias is (similar to AMs).
- An increase in investors' risk aversion weakens the favorable impact of HB on yields, and can turn it positive. At times of stress, risk-averse banks, while still willing to hold debt, ask for higher premia.
- (A) "Normal Times"



(B) "Increased risk aversion" Period



Sources: IMF WEO and Fund staff estimates.

HB and Public Debt

• **Panel regression on public debt —**controlling for growth rate, inflation rate, institutional quality, ER depreciation, and credit-to-GDP ratio, and VIX (investors' risk aversion).

•**Public debt**

(1) AM
(2) EM
(3) AM & EM

•**Sample period:** 1999-2012

•**Specification**:

$$b_{i,t} = \gamma_1 hb_{i,t} + x_{i,t}\delta + \varepsilon_{it}$$

$$b_{i,t} = \gamma_2 hb_{i,t-1} + x_{i,t}\delta + \varepsilon_{it}$$

•**Two-step GMM** – controlling banks' home bias with (i) housing price, (ii) lagged credit-to-GDP

HB and Public Debt (cont.)

	(A) AM	(B) EM	(C) AM & EM
Dependent variable: **Public debt to GDP ratio**	**IV pooled regression**	IV pooled estimation	**Least Square – pooled regression**
γ_1 (Home bias)	**2.307**** **(1.127)**	1.104*** (0.392)	-
γ_1 (Home bias, lagged)			**2.529***** **(0.242)**
δ_1 (Output gap)	**-1.742***** **(0.669)**	-0.913*** (0.320)	**-0.907***** **(0.307)**
δ_2 (Government expenditure gap)	**-1.095** **(1.146)**	-0.132 (0.165)	**0.188** **(0.160)**
δ_3 (Trade openness)	**-0.074*** **(0.045)**	-0.082 (0.070)	**-0.052***** **(0.032)**
δ_4 (Inflation rate, 3-year MA)	**-4.318**** **(1.901)**	0.093*** (0.028)	**0.087***** **(0.032)**
δ_5 (Oil price, lagged)	-	-5.186*** (1.145)	**-1.018** **(0.782)**
δ_6 (Capital account restriction)	**18.223***** **(3.036)**	-4.301*** (1.073)	**7.821***** **(1.251)**
δ_7 (Credit-to-GDP ratio)	**0.087** **(0.068)**	-0.111 (0.126)	**0.181***** **(0.049)**
δ_8 (Institutional quality)	**-1.243**** **(0.484)**	-0.225 (0.350)	**-0.865***** **(0.279)**
Constant	**118.25**** **(46.961)**	56.22 (36.016)	**63.275***** **(20.937)**
Dummy variable for AM	-	-	**23.936***** **(6.174)**
Sample period	**1999-2012**	1999-2012	**1999-2012**
Adj. R-squared	**0.420**	0.879	**0.493**
Sample of observations	**202**	70	**391**
Sample of countries	**19**	9	**38**
Root MSE	**21.654**	11.084	**27.388**
Wald chi-squared	**210.73**	2227.36	-

HB and Primary Balance

- **Panel regression on AM&EM fiscal balance-to-GDP ratio (following Ghosh et al. 2013 EJ)** —controlling for output gap, govern. expenditure gap, trade openness, inflation rate, oil price, capital restriction, and credit-to-GDP ratio.

- **Fiscal balance-to-GDP:** AM&EM

- **Sample period:** 1999-2012

- **Specification**: fiscal reaction function (Ghosh et al. 2013 EJ):

$$pb_{i,t} = \beta_1 b_{i,t-1} + \beta_2 b_{i,t-1}^2 + \beta_3 b_{i,t-1}^3 + \gamma_0 (hb_{i,t} - \overline{hb}_t) + \gamma_1 ((hb_{i,t} - \overline{hb}_t) * b_{i,t-1} + x_{i,t}\delta + \varepsilon_{it}$$

- **Two-step GMM** – controlling banks' home bias with (i) housing price, (ii) lagged credit-to-GDP

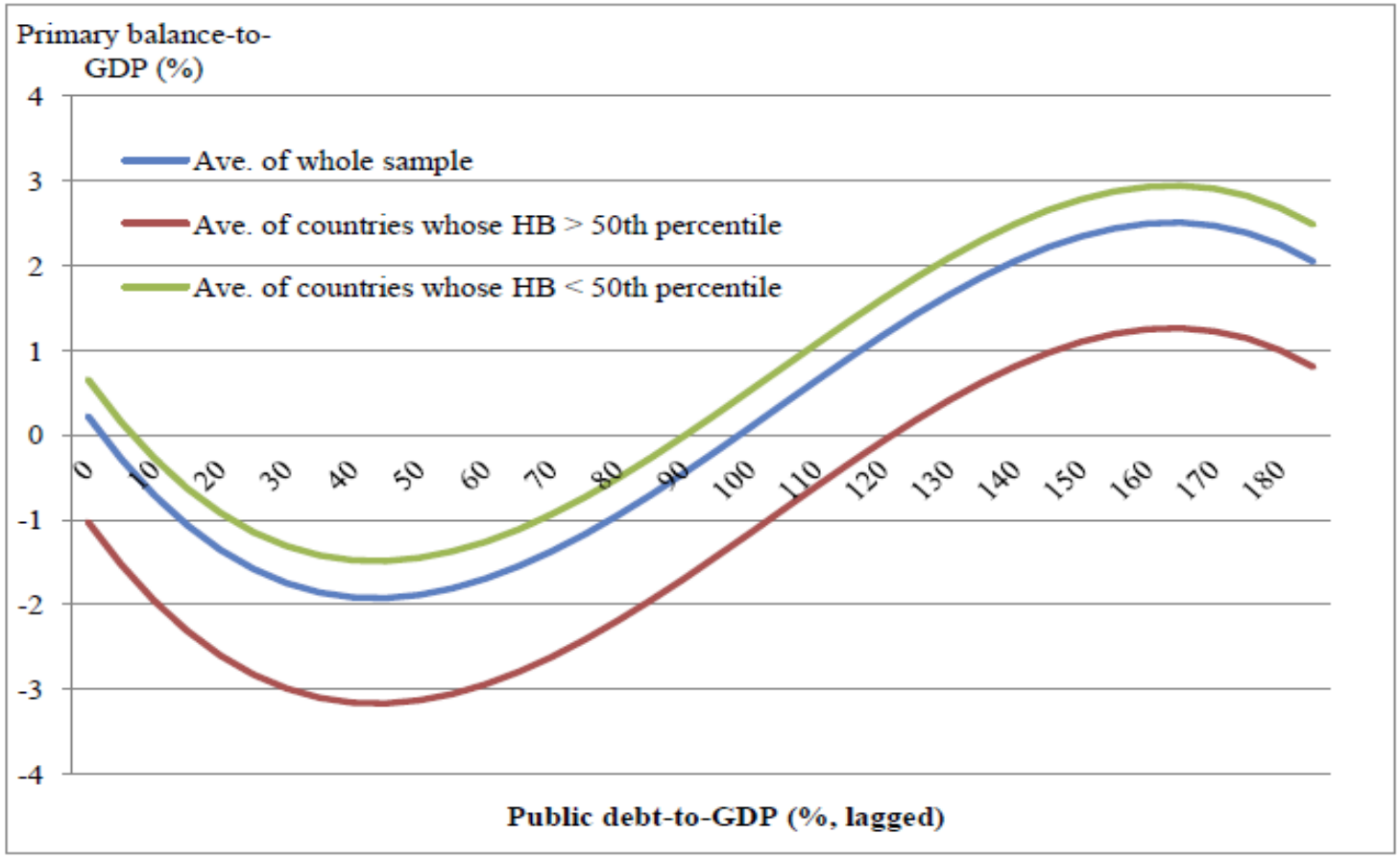
HB and Primary Balance (cont.)

Dependent variable: **Primary balance to GDP ratio**	**(1) HB indicator – constant**	(2) HB indicator – constant/linear	(3) HB indicator – linear interactive
β_1 (Public debt/GDP, lagged)	**-0.141***	-0.129	-0.147*
	(0.084)	(0.083)	(0.086)
β_2 (Public debt/GDP, square, lagged)	**0.00167****	0.0015*	0.00178**
	(0.00070)	(0.00075)	(0.00073)
β_3 (Public debt/GDP, cubic, lagged)	**-0.00000408****	-0.0000045**	-0.0000052***
	(0.0000020)	(0.0000020)	(0.0000020)
γ_0 (Deviation of HB from median)	**-0.086***	-0.160*	-
	(0.051)	(0.094)	
γ_1 (Deviation of HB from median * Public debt/GDP, lagged)	-	0.00098	-0.00015
		(0.00099)	(0.00046)
δ_1 (Output gap)	**0.151*****	0.139***	0.154***
	(0.051)	(0.050)	(0.052)
δ_2 (Government expenditure gap)	**-0.063****	-0.059**	-0.060**
	(0.028)	(0.027)	(0.029)
δ_3 (Trade openness)	**0.071*****	0.072***	0.071***
	(0.020)	(0.020)	(0.020)
δ_4 (Inflation rate, lagged)	**-6.070**	-7.612	-7.429
	(7.797)	(7.797)	(7.881)
δ_5 (Oil price, lagged)	**-12.671*****	-13.066***	-12.472***
	(3.913)	(3.857)	(4.008)
δ_6 (Capital account restriction)	**0.065**	-0.0051	0.104
	(0.347)	(0.348)	(0.343)
δ_7 (Credit-to-GDP ratio)	**-0.067*****	-0.067***	-0.067***
	(0.013)	(0.013)	(0.013)
Adj. R-squared	**0.423**	0.434	0.420
Sample of years	**1999-2012**	1999-2012	1999-2012
Sample of observations	**452**	452	452
Sample of countries	**45**	45	45
Root MSE	**2.418**	2.417	2.426
Transformed DW	**1.674**	1.664	1.682

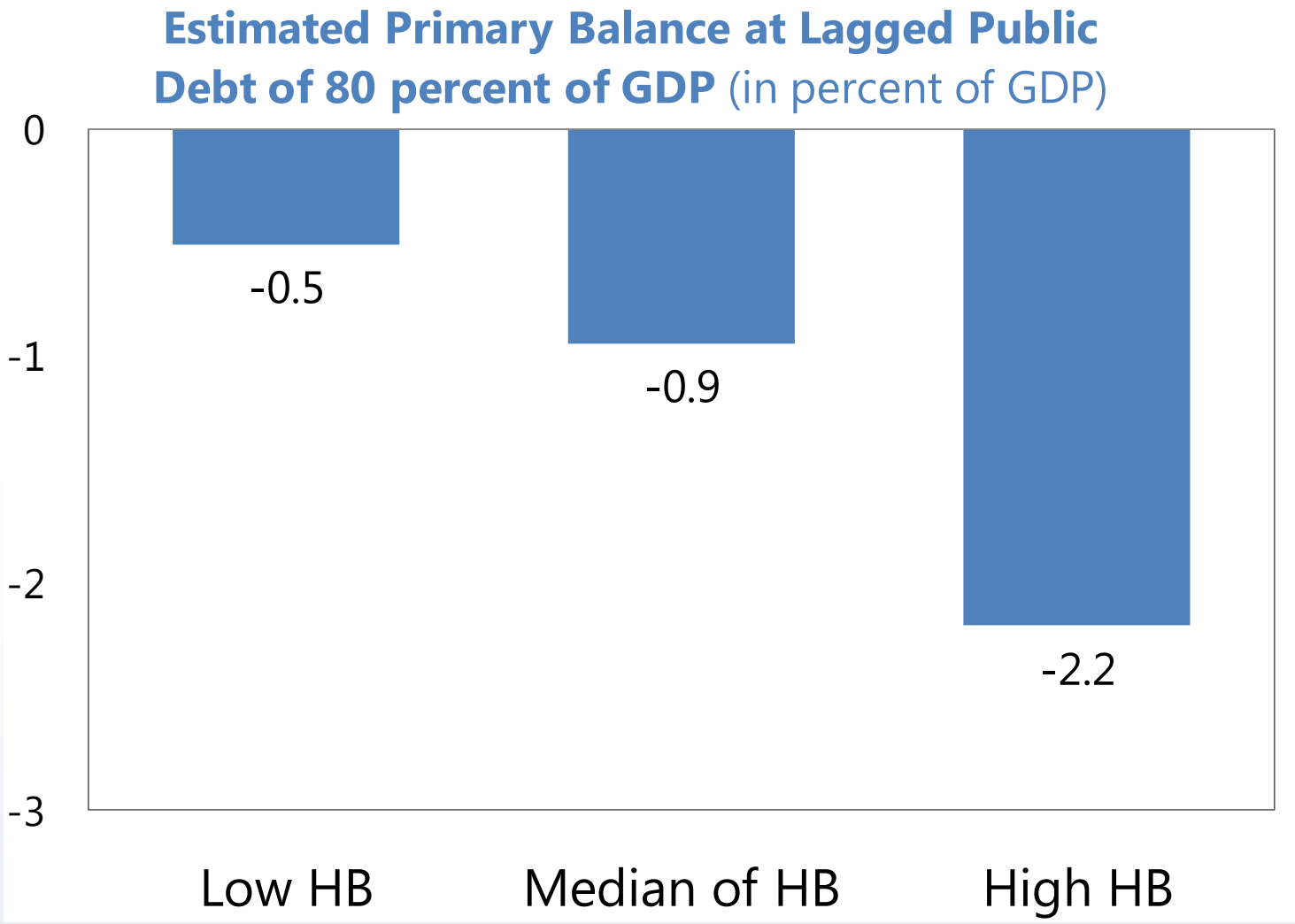
HB and Primary Balance (cont.)

- **Primary balance adjustment is less responsive to lagged public debt in AMs and EMs that have higher home bias.**

- **With domestic banks' high demand for domestic sovereign claims, the sovereign might be less willing to commit to fiscal consolidation, ceteris paribus, despite a high level of debt.**



HB and Primary Balance (cont.)



HB and Public Debt under Distress

- **Database:** Baldacci et al.(2011) and Cruces and Trebesch (2013)

- **Sample:** AM & EM—17 episodes in 1999-2012

- **Criteria**

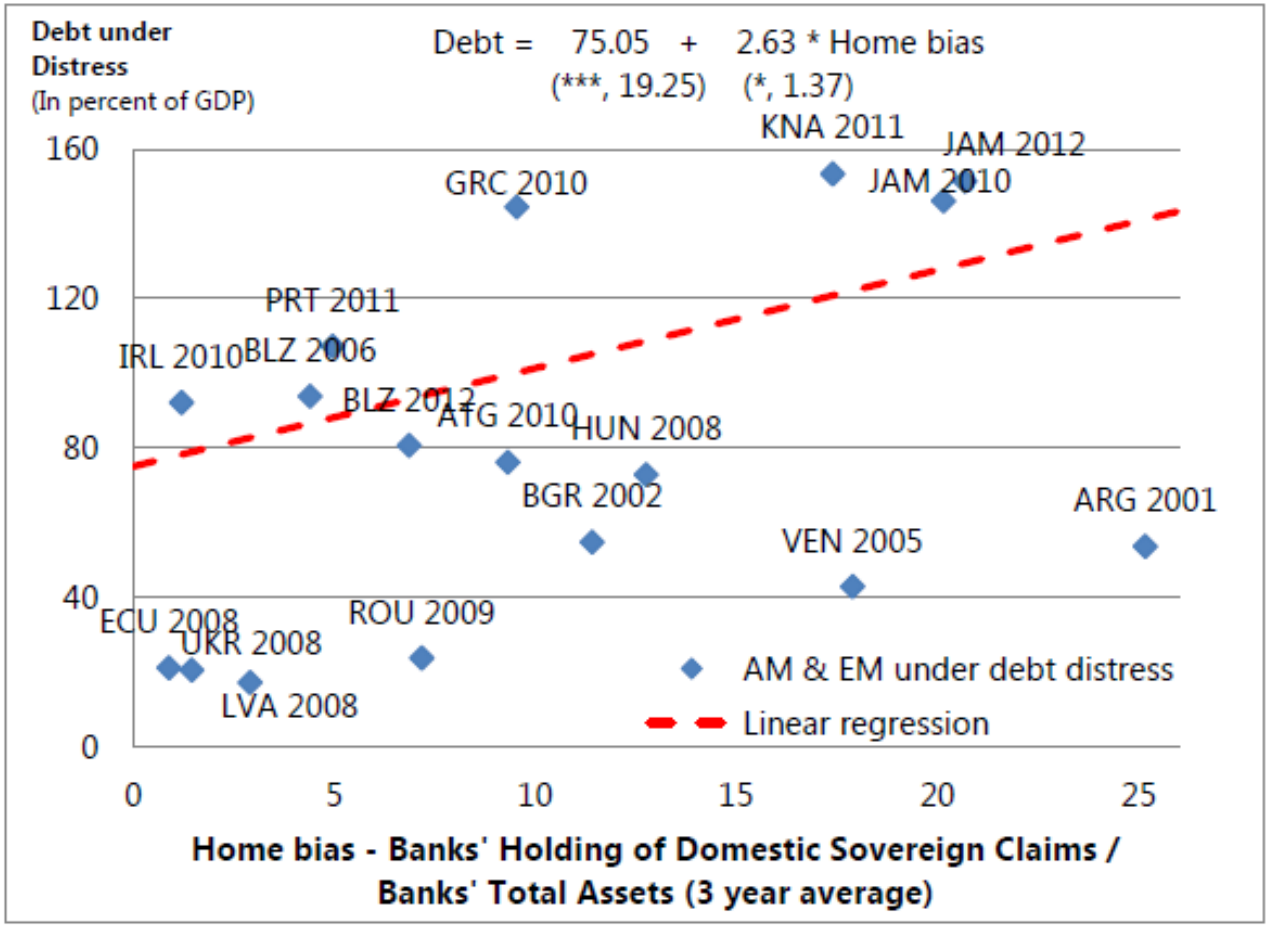
AM: (1) Default; (2) Restructuring and rescheduling; (3) IMF financing (in excess of 100 percent of quota); and (4) Inflation (greater than 35% per annum).

EM: (1) Default; (2) Restructuring and rescheduling; and (3) IMF financing (addressing liquidity issues associated with sovereign debt distress).

HB and Public Debt under Distress (cont.)

- **AMs and EMs with high home bias tend to experience debt difficulties at a higher level of public debt.**

- **Sovereigns are less likely to default when a large portion of domestic debt is held by banks** because defaults would have severe adverse effects on banks (Gennaioli et al. 2014).



Sources: Baldacci and others (2001), and Cruces and Trebesch (2013).

Robustness Analysis – Other Measures

Dependent variable:	(A) Banks' holding of domestic sovereign claims / Total sovereign claims—AM	(B) Banks' holding of domestic sovereign claims / Public Debt—AM & EM	
	Bond spreads-AM	Bond spreads-AM	Bond yields-EM
β_1 (Public debt/GDP, lagged)	0.032*** (0.012)	0.052*** (0.012)	0.049*** (0.014)
γ_0 (Deviation of Home bias from median)	-	0.657** (0.274)	-0.201** (0.087)
γ_1 (Deviation of Home bias from median * Public debt/GDP, level, lagged)	-0.0012** (0.00047)	-0.014*** (0.005)	-0.001 (0.016)
γ_2 (Deviation of Home bias from median * VIX)	0.0018** (0.00086)	0.0019 (0.006)	0.012*** (0.0035)
δ_1 (GDP growth rate)	-0.049*** (0.016)	-0.045*** (0.013)	-0.264*** (0.066)
δ_2 (Inflation rate, 3-year MA)	-0.059 (0.095)	-0.086 (0.101)	0.201* (0.105)
δ_3 (Exchange rate depreciation)	-0.0085 (0.0053)	-0.009* (0.005)	-0.002 (0.021)
δ_4 (Capital account openness)	-	-	0.068 (0.217)
δ_5 (Credit-to-GDP ratio)	0.009** (0.004)	0.009** (0.004)	0.0026 (0.015)
ϕ_1 (VIX)	0.012* (0.007)	0.007 (0.015)	0.059** (0.026)
ϕ_2 (U.S. long-term bonds)	-	-	0.952*** (0.312)
Adj. R-squared	0.228	0.252	0.744
Sample periods	1999–2012	1999–2012	1999–2012
Sample of observations	313	313	113
Sample of countries	25	25	16
Root MSE	0.689	0.682	1.576

Note: ***, **, * show significance at 1%, 5%, and 10%. Error term assumed to follow an AR(1) process.

Robustness Analysis – Other Measures

Dependent variable: **Primary balance to GDP ratio**	**(A) Banks' holding of domestic sovereign claims / Total sovereign claims - AM**
β_1 (Public debt/GDP, lagged)	-0.270*
	(0.108)
β_2 (Public debt/GDP, square, lagged)	0.0033***
	(0.00070)
β_3 (Public debt/GDP, cubic, lagged)	-0.0000094**
	(0.0000031)
γ_0 (Deviation of HB from median)	-0.117*
	(0.067)
γ_1 (Deviation of HB from median * Public debt/GDP, lagged)	0.0019**
	(0.00094)
δ_1 (Output gap)	0.811***
	(0.102)
δ_2 (Government expenditure gap)	-0.450***
	(0.097)
δ_3 (Trade openness)	0.048**
	(0.020)
δ_4 (Inflation rate, lagged)	0.978
	(0.350)
δ_5 (Oil price, lagged)	19.756***
	(19.756)
δ_6 (Capital account openness)	-1.141
	(0.1.422)
δ_7 (Credit-to-GDP ratio)	-0.041
	(0.015)
Adj. R-squared	0.851
Sample of years	2005–12
Sample of observations	181
Sample of countries	28
Root MSE	2.060
Transformed DW	1.691

Note: ***, **, * show significance at 1%, 5%, and 10%. Country-specific fixed effect included, and error term assumed to follow an AR(1) process.

Conclusion

- **Banks' home bias matters for debt sustainability: (i) borrowing costs, (ii) level of debt, (iii) fiscal adjustment.**
- **It may provide fiscal breathing space, but delays in fiscal consolidation may actually delay problems until debt reaches dangerously high levels.**
- **The presence of domestic banks able to absorb the debt issuances can provide a significant breathing space to struggling sovereigns.**
- **Simultaneously, this also deepens the negative sovereign-bank feedback loop.**

Remark

Thank you!!

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FISCAL SUSTAINABILITY, XXI CENTURY
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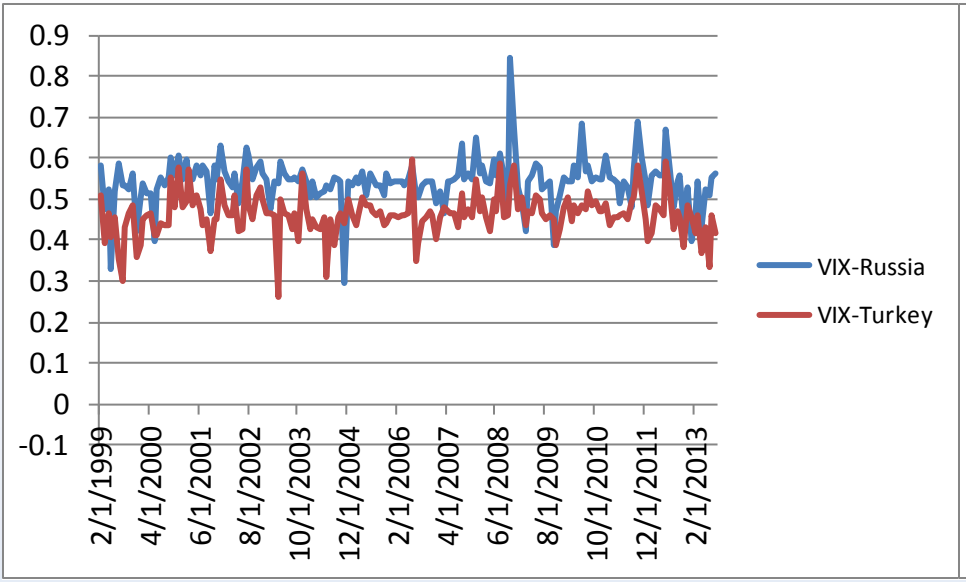
http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2585430

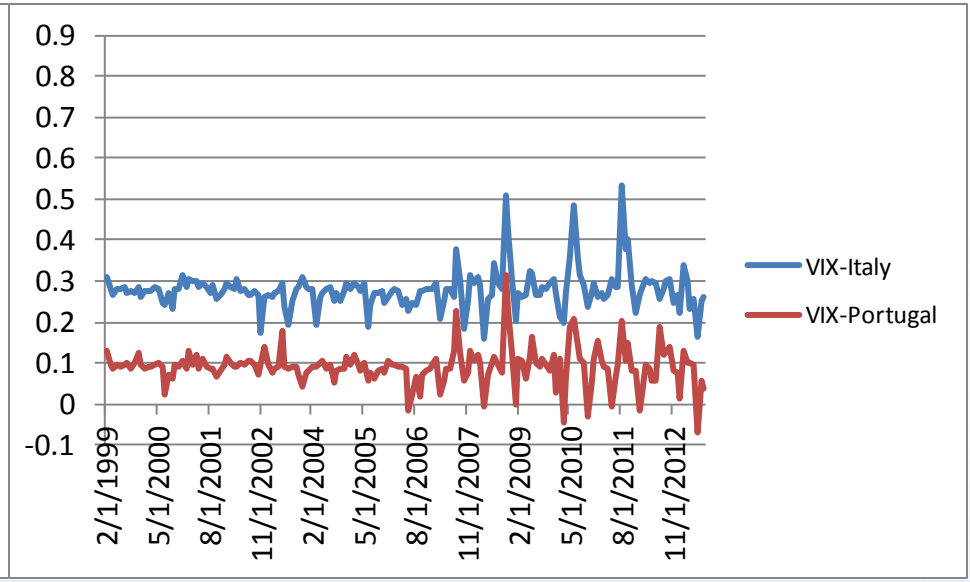
HB and Borrowing Costs (EMs, cont.)

- Relative importance of VIX for EMs is consistent with the high correlation between the VIX and EM bond spreads.

- Using a multivariate GARCH framework on a sample of monthly data from 1999 to end August 2013 confirms that EM borrowing costs are more sensitive to global risk factors.

- The average estimated co-movement between EM spreads and the VIX is 43 percent for the full sample period (1999-2013) compared with 14 percent for AM countries.





Sources: Bloomberg and Fund staff estimates.

Other Home Bias Issues: European case

Drivers of the increased home bias for European peripheral banks during the crisis:

- The ECB's cheap LTROs

- Peripheral banks absorbed much of the sovereign debt sales of nonresidents as well as new debt issuances.

- A higher level of sovereign debt also augmented banks' eligible amount of collateral for both ECB and other market funding.

- With the credit crunch, peripheral banks tended to invest in sovereign debt during times of crisis (flight-to-safety).