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Does Gross or Net Debt Matter More for Emerging Market Spreads?

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Abstract

Does gross or net debt matter for long-term sovereign spreads in emerging markets? The topic is important for undestanding the borrowing cost implications of public asset-liability management decisions (e.g. using assets to lower debt). We investigate this question using data on emerging market economies (EMEs) over the period 1998–2014. We find that both gross debt and assets have a significant impact on long-term sovereign bond spreads in emerging markets, with effects roughly offsetting each other (coefficients of opposite sign and similar magnitude). Hence, net debt seems more appropriate than gross debt when evaluating the impact of indebtedness on spreads. The empirical results suggest that an increase in net debt by 10 percentage points of GDP implies an increase in the spread by 100–120 basis points, and the effect is larger during periods of domestic distress. The key results from this empirical study are quite robust to alternative specifications and subgroups of EMEs.

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I. Introduction[1]

While there is compelling theoretical rationale for a positive relationship between the level of government debt and spreads (or interest rates) on sovereign bonds, the literature is agnostic when it comes to whether gross debt or debt net of government financial assets is the relevant measure to consider. While standard economic intuition would suggest that debt net of assets (at least liquid ones) should be more important, most of the empirical literature has focused on gross debt. This paper aims to shed empirical evidence on this matter for emerging markets, on the basis of data that has recently become available.

According to standard economic arguments, an increase in government debt through issuance of new liabilities raises the sovereign default risk, which should in turn increase the corresponding spreads in order to compensate investors for the higher risk. Similarly, a rapid expansion of government debt creates an excess supply of such assets relative to the diversified portfolio benchmark investors aim to hold. In turn, investors would require a higher return (and spread) for their demand to exceed the original benchmark.[2]

However, the literature has generally remained silent on whether gross or net debt matters for sovereign spreads, most likely because the limited data availability on net debt until recently would limit the ability to test which measure was more relevant. As recent data gathering efforts have provided the availability of such data, it is natural to wonder what should we expect, as theoretical arguments can go both ways.

On the one hand, if the government owns assets that are publicly known, liquid, and not tied to specific (fiscal or monetary) policy objectives (such as pension obligations), these assets should matter for the considerations above. In other words, if markets have information on assets that can be liquidated, then net debt should be a more relevant measure of indebtedness. On the other hand, the lack of a comprehensive and well established dataset on assets for emerging markets until recently would tilt the argument in favor of gross debt: to the extent the lack of public data prevented financial markets from adequately assessing assets when gauging sovereign risk, assets would have been ignored and gross debt would be the relevant variable to consider. However, one may also think that financial experts rely on a broader set of sources of information than public data, and that they have generally been aware of significant asset positions. It is then an empirical matter.

As an illustration, Figure 1 depicts the relationship between gross sovereign debt and sovereign spreads (left panel) or assets and spreads (right panel) for emerging markets in 2014. Both relations seem to hold with the right sign (positive and negative respectively), which would tend to suggest that net debt matters. The paper formally investigates this claim by testing the relative importance of gross debt and assets for emerging market sovereign spreads.

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[2] For example, see Gruber and Kamin (2012) for some theoretical arguments about the relationship between government debt levels and spreads/interest rates on government debt.

Figure 1. Government Debt and Sovereign Spreads (2014): Gross or Net Debt?
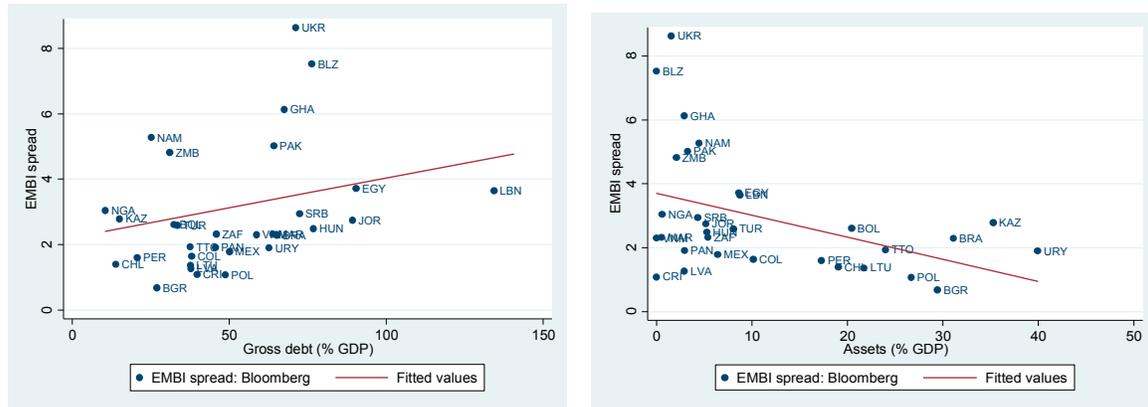
The question is very important for all policy decisions related to public asset-liability management decisions, especially for countries with significant asset positions. For instance, the findings of our analysis may shed light on the overall cost of building emergency buffers via government borrowing: such costs are correspondingly higher or lower, depending on whether gross or net matters for spreads. In this context, the findings from this investigation are particularly relevant for countries that have been making, or plan to make, such asset-liability decisions, especially when the cost of borrowing is a key factor in the decision.

As an example, we compare the cases of Brazil and Colombia over the period 2003–2012 (Figure 2). Gross debt declined in both countries, but somewhat more in Colombia than in Brazil. Studies based exclusively on gross debt would imply that spreads in Colombia should drop more than in Brazil, *ceteris paribus*. However, Brazil accumulated significantly more financial assets over the same time period, implying a sharper drop in net debt. Hence, in contrast to the conclusion implied by gross debt, focusing on net debt would suggest a larger drop in sovereign spreads for Brazil than for Colombia. In fact, the empirical evidence supports the conclusion based on net debt: spreads dropped for both countries, but the drop was larger for Brazil.

Figure 2. Example: Debt, Assets, and Spreads in Brazil and Colombia (2003–2012)

Debt, Assets, and Spreads in Brazil and Colombia (2003-2012)
(changes in percentage points)

Debt, Assets, and Spreads in Brazil and Colombia (2003-2012)
(changes in percentage points)
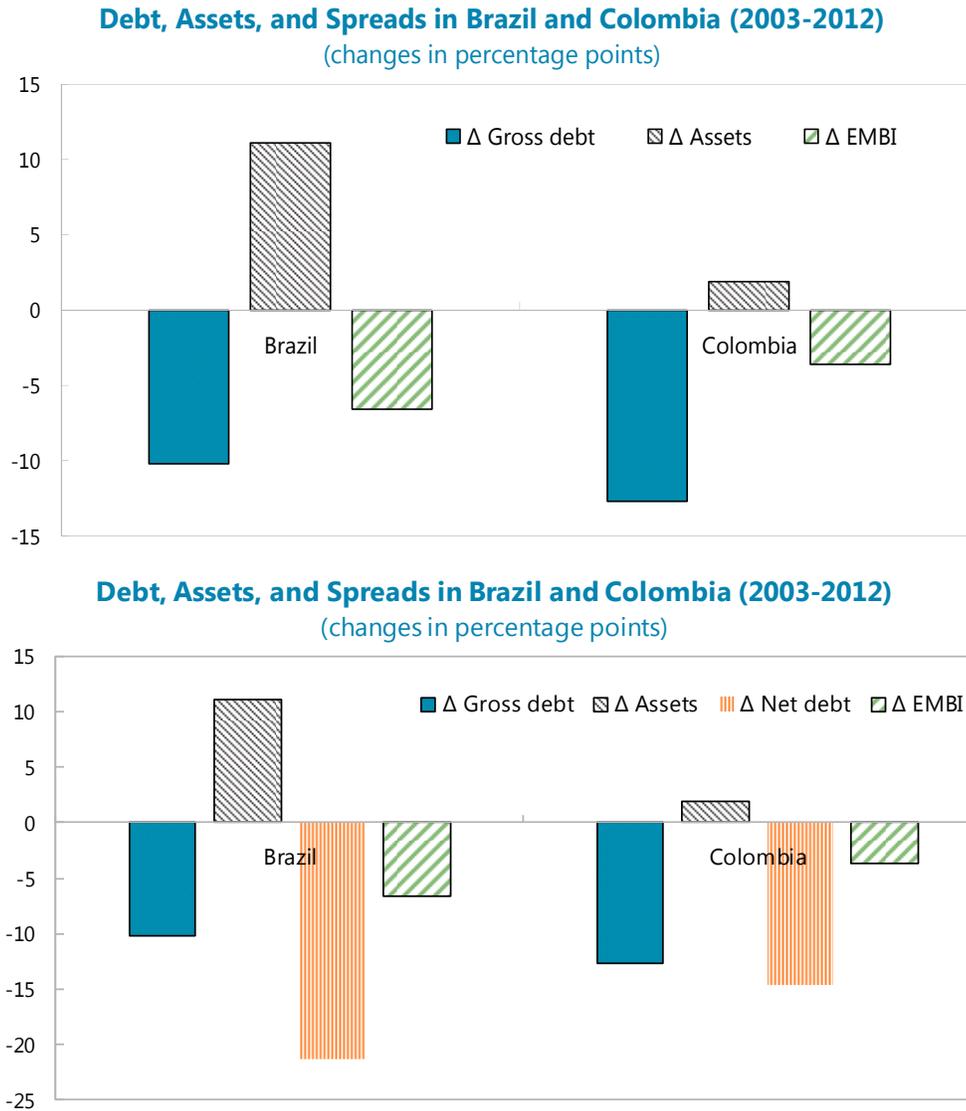
The rest of this paper is organized as follows. Section II provides a short literature review. Section III describes the methodology, dataset used and the empirical specification. The empirical results from the baseline as well as various alternative specifications are reported in Section IV, which is followed by Section V that gives a glance at results from some additional explorations. Finally, Section VI provides concluding remarks and presents several venues for future research.

II. Literature Review

Starting with the seminal work by Edwards (1984), determinants of sovereign bond spreads in emerging markets have been a topic of wide research interest. For instance, some of the studies that examine alternative factors that have an impact on sovereign spreads in EMEs include Ciarlone, Piselli, and Trebeschi (2009), Bellas, Papaioannou, and Petrova (2010), Baldacci, Supta, and Mati (2011) and Csonto and Ivaschenko (2013).

Many papers investigate the impact of gross government debt on spreads[3]. For example, Dell'Erba, Hausmann, and Panizza (2013), Akitoby and Stratmann (2008), Baldacci and Kumar (2010), Dell'Erba and Sola (2013), Ardagna, Caselli, and Lane (2007), and Jaramillo and Weber (2013) all study the importance of public debt in determining spreads, but all focus on gross debt without considering government assets.

A few papers analyze the impact of net government debt, but typically focus on a sample of advanced economies, either G-7 or OECD countries. For instance, Gruber and Kamin (2012) include net debt series (from the OECD database) in their investigation of the impact of fiscal indicators on sovereign spreads for OECD countries. Similarly, Chinn and Frankel (2005) employ net government debt in their analysis about the impact of European monetary integration on interest rates. Haugh, Ollivaud, and Turner (2009) underline the relevance of government net debt and provide an overview about studies that examine the impact of net debt for advanced economies. For a recent theoretical contribution of how gross debt and assets (or reserves) affect spread, see Bianchi, Hatchondo, and Martinez (2012).

Hence, the empirical literature focuses mainly on gross debt, and existing papers that analyze the effects of net debt do not include emerging markets. We are not aware of any study for emerging markets that empirically investigates whether gross or net debt is more relevant when assessing the impact of indebtedness on spreads, with the exception of ongoing work by Henao-Arbelaez and Sobrinho (2016) on the impact of government assets on risk premia and probability of default.

The question should be seen in the context of a broader agenda of a comprehensive cost benefit analysis of public asset-liability management, which is of course highly contingent on the underlying objectives for such management.

III. Methodology

A. Data on net debt

Data on net debt is generally scarce and incomplete, mainly due to the complexity of measuring financial assets that need to be subtracted from gross debt[4]. To our knowledge, the IMF World Economic Outlook (WEO) database provides the widest country coverage on general government net debt series for emerging market economies. This data on net debt has been reported within the context of Fiscal Monitor since spring 2010. It currently

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[3] Some of these studies concentrate on overall government debt, other distinguish between domestic and external debt, or alternatively, between debt issued in domestic and foreign currencies.

[4] On complexities of measuring government net debt see Eurostat (2014).

encompasses 28 advanced economies and 67 emerging and developing countries. One alternative that has been around for some time is the OECD main economic indicators, which also include gross debt and financial wealth series, but refers to a more restrictive sample, covering mainly advanced economies and a few EMEs. The OECD series are generally consistent with the WEO series for advanced economies. An additional dataset is GFS (Government Finance Statistics), which provides a breakdown of the assets (see list below), but unfortunately would unduly restrict our regression sample (only 10 emerging markets have data in our sample and only four of them would have more than 10 observations)[5].

The compilation of data series in the WEO is guided by the definitions in the *Government Finance Statistics Manual 2014* (GFSM). All series correspond to general government. In this context, the key statistical definitions from the GFSM are the following:

- **Gross debt:** all liabilities that require payment of interest and/or principal (SDRs, currency and deposits, debt securities, loans, insurance, pensions and standardized guarantee schemes, and other accounts payable).
- **Financial assets corresponding to debt instruments:** monetary gold and SDRs, currency and deposits, debt securities, loans, insurance, pension, and standardized guarantee schemes, and other accounts receivable.[6]
- **Net debt:** difference between gross debt and financial assets corresponding to debt instruments.

Figure 3 describes the evolution of the WEO series for general government gross and net debt for the world as a whole. There are several interesting observations. First, gross and net debt increased substantially over the last three and a half decades, both in nominal terms as well as a share of GDP. Second, government financial assets are quite sizable, as indicated by the difference between the bars for gross debt (when net debt is available) and net debt. Third, sample coverage for net debt is more limited than the one for gross debt as shown by the difference between "gross debt (all countries)" and "gross debt (when net debt available)". In fact, while coverage for advanced economies is almost complete, it is poorer for emerging markets, especially those in Asia and the Commonwealth of Independent States (CIS). Annex I provides charts for general government gross and net debt for different regions of the world and Annex II offers the series for individual countries.

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[5] There is a significant positive relationship between the data series for government financial assets from WEO and the corresponding series from GFS, for the sample of countries used in this paper.

[6] Note that official reserves held by the Central Bank are excluded from the definition of financial assets. Indeed, we conducted a short survey among emerging market country IMF desks that actually report net debt series in WEO: in 18 out of 20 responses desks confirmed that international/official reserves are not included, while in two cases they are included for comparability with the authorities' current definition practice.

Figure 3. Evolution of Gross Debt and Net Debt

World
(as % of GDP)

World
(in US$ billions)
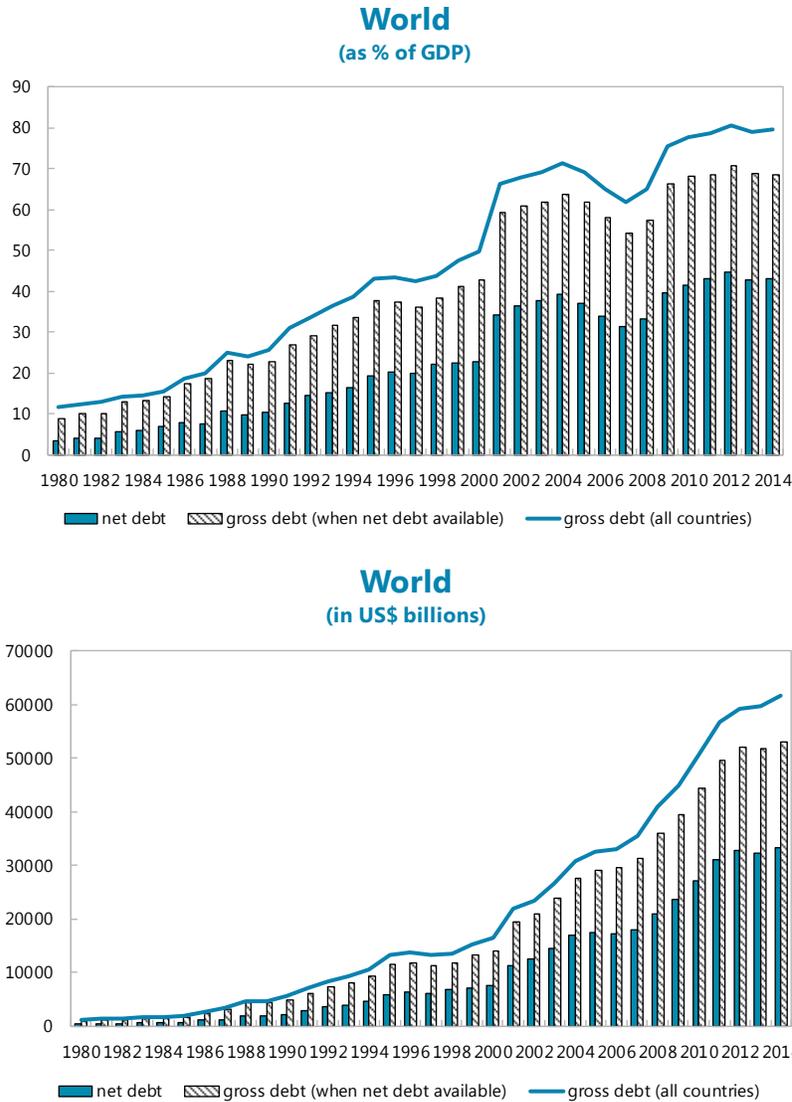
Source: WEO database.

B. Overall dataset

The dataset employed in this paper includes annual series for 31 emerging economies over the period 1998–2014 (unbalanced), as data for spreads are not available for all emerging markets and developing countries for which net debt data is available. Data on general government gross and net debt is from the World Economic Outlook (WEO) dataset. Data on sovereign bond spreads comes from JP Morgan's Emerging Market Bond Index Global (EMBIG). In some specifications, we use data on 5-year credit default swaps from Bloomberg. VIX is the implied volatility index calculated by the Chicago Board Options Exchange (CBOE). Long-term (10-year) US interest rate series are retrieved from Bloomberg. Data on GDP growth, inflation, and primary fiscal balance comes from the WEO, and data on official international reserves is retrieved from the International Financial Statistics (IFS). Table 1 provides the summary statistics.

Table 1. Summary Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
EMBI spread (%)	336	3.5	2.9	0.4	18.5
Gross debt (% of GDP)	336	50.4	30.9	3.9	185.2
Net debt (% of GDP)	336	39.2	33.1	-20.1	180.2
Assets (% of GDP)	336	11.2	11.7	0.0	54.4
VIX	336	20.9	6.5	12.8	32.7
US interest rate (%)	336	3.7	1.1	1.8	6.0
GDP growth (%)	336	4.0	3.4	-16.4	13.1
Inflation (%)	336	6.2	5.0	-1.3	43.4
Gross debt/Assets	302	16.2	44.7	0.2	524.4

Data coverage of emerging markets varies across geographical regions. While coverage is quite good for Latin America and the Caribbean (LAC) and Emerging Europe, it is very restrictive for Emerging and Developing Asia. For instance, the dataset includes 11 countries from LAC and 7 countries from Emerging Europe, but only one country from Emerging and Developing Asia. Unavailability of data series for general government net debt is the main limiting factor for the last group of countries.

Table 2. Country Groups

Emerging market economies					
Latin America and the Caribbean	Emerging and Developing Europe	Middle East, North Africa, Afghanistan, and Pakistan	Sub-Saharan Africa	Commonwealth of Independent States	Emerging and Developing Asia
Belize	Bulgaria	Egypt	Ghana	Kazakhstan	Vietnam
Bolivia	Hungary	Jordan	Namibia	Ukraine	
Brazil	Latvia	Lebanon	Nigeria		
Chile	Lithuania	Morocco	South Africa		
Colombia	Poland	Pakistan	Zambia		
Costa Rica	Serbia				
Mexico	Turkey				
Panama					
Peru					
Trinidad and Tobago					
Uruguay					

* country groups according to the WEO classification

C. Empirical strategy

We estimate panel regressions according to the following empirical specification:

$$y_{it} = \alpha_i + \beta X_{it} + \gamma Z_{it} + \varepsilon_{it}$$

where the dependent variable y_{it} is the EMBIG spread for country i at time t, X_{it} stands for either gross debt, net debt, government financial assets, or a combination of them, and Z_{it} is a set of macroeconomic controls and indicators of global financial conditions such as VIX and U.S. interest rates. The results from the Hausman specification test suggest that the fixed effects model is preferred compared to the random effects model. Hence, unless stated otherwise, we present results from fixed effects specifications throughout the analysis.

If higher levels of government debt are associated with higher spreads, as theory suggests, the coefficients in front of gross debt as well as net debt should be positive and statistically significant. Following a similar argument, the coefficient in front of financial assets would be expected to be negative. Higher market volatility, as measured by VIX, is expected to be associated with lower investor risk appetite, and therefore, higher spreads for emerging markets. Higher inflation, as an indicator of possible domestic vulnerabilities, should enter the equation with a positive sign. Finally, higher GDP growth, as an indicator of stronger performance and higher investor interest, is expected to be associated with lower spreads.

IV. RESULTS

A. Preview

Table 3 presents a preview of estimation results without controls. There are three key findings about the impact of the stock variables on spreads. First, gross debt, net debt, and financial assets are all statistically significant individually and have the expected signs. Second, the results in column four (in bold) suggest that gross debt and financial assets offset each other, as their coefficients are similar in magnitude, but have opposite signs. Indeed, the results from the F-test imply that the sum of these coefficients is not statistically different from zero; it is then not surprising that the R-squared from column 2 and column 4 are very similar. Third, the last two columns show that the effect of net debt dominates the effects of either gross debt or financial assets, as each of the last two vanish and lose statistical significance (even switch sign in one case) when included in the same equation with net debt, while the effect of net debt remains virtually unchanged from the individual specification.

Table 3. A Preview Without Controls

Panel regression results						
Gross debt	0.119***			**0.127*****	-0.00655	
	(0)			**(0)**	(0.824)	
Net debt		0.128***			0.134***	0.127***
		(0)			(6.00e-06)	(0)
Assets			-0.0786**	**-0.134*** **		-0.00655
			(0.0232)	**(6.00e-06)**		(0.824)
Constant	-2.460***	-1.469***	4.424***	**-1.376** **	-1.376**	-1.376**
	(2.49e-05)	(0.000808)	(0)	**(0.0234)**	(0.0234)	(0.0234)
Observations	336	336	336	**336**	336	336
R-squared	0.272	0.320	0.017	**0.320**	0.320	0.320
Countries	30	30	30	30	30	30
F-test: β(gross debt)+β(assets)=0				**0.050**		
p-value				**0.820**		

p-val in parentheses
*** p<0.01, ** p<0.05, * p<0.1

B. Baseline

The results remain largely unchanged when including a set of control variables (Table 4), suggesting that the initial findings are quite robust to the inclusion of additional controls. In particular, the effects of gross debt and financial assets are both significant and offset each other: as before, there is no statistical evidence that the sum of their coefficients is different from zero, suggesting that net debt is the appropriate measure to consider. Not surprisingly, net debt again dominates gross debt.

The counterbalancing of gross debt and financial assets is particularly interesting from a practical point of view. In fact, our empirical results indicate that counties cannot lower spreads by decreasing gross debt with the proceeds from the sale of financial assets. Or alternatively, countries can build financial assets by increasing their gross debt, without affecting the spread. In sum, our baseline findings suggest that markets rightly focus on net debt.

In terms of economic interpretation, our empirical results imply that an increase in the net debt-to-GDP ratio by 10 percentage points is associated with an increase of 100–120 basis points in the country's EMBIG spread. Similarly, a reduction in the level of net debt by half a standard deviation in our sample (about 16.5 percentage points) would be associated with lower spreads in the order of about 150–200 basis points.

In addition, the variables in the set of controls are strongly significant and have the expected signs. For instance, an increase in the VIX or domestic inflation rates are both associated with higher spreads, while stronger growth performance is associated with lower spreads. All these effects are statistically significant and quite robust. The only exception is the US interest rate that enters with the expected positive signs, but typically is not statistically significant[7].

The effect of these variables has an economic interpretation as well. For example, an increase in inflation by one percentage point leads to an increase in sovereign spreads by about 10 basis points. On the contrary, an increase in GDP growth by one percentage point is associated with a reduction in sovereign spreads by about 10 basis points. Finally, sovereign spreads rise by about 13 basis points for each unit increase in VIX.

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[7] As the spread over the US Treasuries is the dependent variable, US interest rates exert two, somewhat counterbalancing effects: on the one hand, higher US rates indicate more restrictive global financing conditions and should be expected to lead to higher EM interest rates; one the other hand, they imply subtraction of a larger component when calculating EM spreads. In sum, the overall effect will be significantly positive only when the impact of higher US rates on EM rates is substantially higher than one-to-one.

Table 4. Baseline Results

Panel regression results						
Gross debt	0.113***			**0.122***	0.0202	
	(0)			**(0)**	(0.408)	
Net debt		0.121***			0.102***	0.122***
		(0)			(4.97e-05)	(0)
Assets			-0.0282	**-0.102***		0.0202
			(0.344)	**(4.97e-05)**		(0.408)
VIX	0.125***	0.127***	0.0883***	**0.127***	0.127***	0.125***
	(0)	(0)	(1.02e-05)	**(0)**	(0)	(0)
US interest rate	0.152	0.0607	0.406***	**0.0688**	0.0688	0.0688
	(0.130)	(0.538)	(0.000693)	**(0.489)**	(0.489)	(0.489)
GDP growth	-0.141***	-0.111***	-0.226***	**-0.113*****	-0.113***	-0.113***
	(5.35e-05)	-0.00124	(6.00e-08)	**(0.00101)**	(0.00101)	(0.00101)
Inflation	0.112***	0.111***	0.138***	**0.111***	0.111***	0.111***
	(3.64e-05)	-0.00283	(2.43e-05)	**(3.03e-05)**	(3.03e-05)	(3.03e-05)
Constant	-5.423***	-4.289***	0.576	**-4.606***	-4.606***	-4.606***
	(0)	(0)	(0.414)	**(2.37e-10)**	(2.37e-10)	(2.37e-10)
Observations	336	336	336	**336**	336	336
R-squares	0.521	0.546	0.306	**0.547**	0.547	0.547
Countries	30	30	30	**30**	30	30
F-test: β(gross debt)+β(assets)=0				**0.690**		
p-value				**0.408**		

p-val in parentheses
*** p<0.01, ** p<0.05, * p<0.1

C. Robustness checks

In Tables 5a and 5b, we check the robustness of our baseline findings using alternative country groupings and empirical methods, for our key specification that simultaneously includes gross debt and financial assets. Our key results are very robust to alternative samples (Table 5a): the full sample of EMEs, LAC, EMEs outside Europe and LAC, and EMEs excluding MENA[8]. The estimation results are also qualitatively similar for European EMEs, though the coefficient for financial assets (and, to a lower extent, gross debt) decrease in absolute value. Moreover, our baseline results are quite robust to alternative estimation methods (Table 5b), some of which help address possible endogeneity: we lag domestic right hand side variables, or instrument them with two lags[9], include time fixed effects, add a lagged dependent variable, perform GMM, and implement the mean-group estimator. The F-tests for all but one case (emerging Europe) clearly suggest that the sum of the coefficients for gross debt and financial assets is not statistically different from zero. In addition, our controls (VIX, GDP growth, inflation) retain their correct signs and statistical significance across all specifications.

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[8] We provide estimations that exclude EMEs from the MENA region in order to control for the possibility that our baseline results are affected by the large variability in asset figures for countries in this region.

[9] The instrumental variable regression standard errors are corrected via the Newey-West HAC method, which accounts for heteroskedasticity both within countries and across countries, as well as serial correlation within countries.

Table 5a. Robustness: Different Country Groups

Panel regression results

	All EMEs	LAC	EM Europe	EM Europe II^	Other EMEs	All ex MENA
Gross debt	0.122***	0.105***	0.0778***	0.0776***	0.147***	0.115***
	(0)	(0)	(7.81e-09)	(8.03e-10)	(0)	(0)
Assets	-0.102***	-0.104***	-0.0293	-0.0370*	-0.156**	-0.072***
	(4.97e-05)	(0.00392)	(0.205)	(0.0701)	(0.0136)	(0.007)
VIX	0.127***	0.0754***	0.104***	0.122***	0.169***	0.120***
	(0)	(4.03e-05)	(8.08e-08)	(4.13e-10)	(2.26e-06)	(0.000)
US interest rate	0.0688	0.0817	-0.0673	0.0794	0.0713	0.175*
	(0.489)	(0.509)	(0.557)	(0.456)	(0.742)	(0.098)
GDP growth	-0.113***	-0.139***	-0.0608**	-0.0598**	-0.188**	-0.106***
	(0.00101)	(0.00113)	(0.0469)	(0.0293)	(0.0113)	(0.002)
Inflation	0.111***	0.258***	0.0669***	0.0569***	0.175***	0.102***
	(3.03e-05)	(2.43e-08)	(0.00617)	(0.00843)	(0.00313)	(0.000)
Constant	-4.606***	-2.813***	-2.515***	-2.777***	-7.482***	-4.472***
	(2.37e-10)	(0.00673)	(0.000206)	(5.54e-06)	(4.36e-06)	(0.000)
Observations	336	130	72	62	134	289
R-squared	0.547	0.701	0.788	0.849	0.543	0.561
Countries	30	10	7	6	13	26
F-test: β(gross debt)+β(ass	0.69	0.00	7.67	6.91	0.02	2.70
p-value	0.41	0.98	0.01	0.01	0.88	0.11

p-val in parentheses
*** p<0.01, ** p<0.05, * p<0.1
^ excludes Hungary

Table 5b. Robustness: Different Methodologies

Panel regression results

	Lagged vars [1]	IV results [2]	Time fixed effects	Dynamic [3]	GMM [4]	MG Estimates [5]	FE for MG sample [6]
Gross debt	0.0948***	0.121***	0.105***	0.0546***	0.0664***	0.101***	0.122***
	(0)	(1.25e-07)	(0)	(1.28e-07)	(2.84e-09)	(0.00161)	(0)
Assets	-0.125***	-0.142***	-0.0882***	-0.0494**	-0.0571*	-0.163	-0.111***
	(1.42e-06)	(8.85e-05)	(0.000343)	(0.0218)	(0.0515)	(0.314)	(3.66e-05)
VIX	-0.0888***	0.0839***		0.0870***	0.0846***	0.120***	0.126***
	(0.00558)	(0.000160)		(1.51e-09)	(0)	(9.01e-08)	(0)
US interest rate	0.133***	-0.189		-0.0107	0.0349	-0.130	0.0720
	(3.42e-07)	(0.227)		(0.900)	(0.699)	(0.518)	(0.485)
GDP growth	0.140***	-0.163	-0.0504	-0.152***	-0.167***	-0.176***	-0.118***
	(0)	(0.213)	(0.182)	(1.11e-06)	(1.16e-08)	(4.44e-06)	(0.00183)
Inflation	-0.129	0.355***	0.115***	0.103***	0.149***	0.0729**	0.114***
	(0.217)	(0.000966)	(1.06e-05)	(6.95e-06)	(2.20e-08)	(0.0206)	(2.99e-05)
Embig lagged				0.434***	0.358***		
				(0)	(0)		
Constant	-2.862***	-1.422	0.493	-2.131***	-2.705***	-3.112	-4.632***
	(4.65e-05)	(0.304)	(0.648)	(0.000685)	(5.84e-05)	(0.351)	(1.12e-09)
Observations	329	310	336	315	284	310	310
R-squared	0.474	0.633	0.609	0.683			0.549
Countries	30	30.000	30	30	30	23	23
F-test: β(gross debt)+β(assets)=0	1.49	0.35	0.50	0.07	0.10	0.12	0.18
p-value	0.22	0.55	0.48	0.80	0.75	0.72	0.67

p-val in parentheses
*** p<0.01, ** p<0.05, * p<0.1
[1] All RHS variables apart from VIX and US interest rate are lagged.
[2] All RHS variables are instrumented with 2 lags apart from VIX and US interest rate.
[3] Includes lagged dependent variable.
[4] GMM results using Arellano-Bond estimator.
[5] Mean-group estimator.
[6] Fixed-effects estimates for the set included in the mean-group estimation.

Table 6 shows that replacing the EMBI spread with the credit default swap does not alter the results (note that the sample is substantially smaller, but even when restricting the sample for the original EMBI regression table to the sample used in the credit default swap regressions, results are also similar[10]).

Table 6. Robustness: Credit Default Swaps (Instead of EMBI)

	Panel regression results (CDS)					
Gross debt	0.0868***			0.0944***	0.00398	
	(3.25e-06)			(4.01e-07)	(0.910)	
Net debt		0.0937***			0.0905***	0.0944***
		(7.72e-08)			(0.00740)	(4.01e-07)
Assets			-0.0626*	-0.0905***		0.00398
			(0.0818)	(0.00740)		(0.910)
VIX	0.0452**	0.0489**	0.0253	0.0490**	0.0490**	0.0490**
	(0.0387)	(0.0223)	(0.264)	(0.0225)	(0.0225)	(0.0225)
US interest rate	-0.356**	-0.377***	-0.396***	-0.376***	-0.376***	-0.376***
	(0.0107)	(0.00563)	(0.00765)	(0.00603)	(0.00603)	(0.00603)
GDP growth	-0.275***	-0.264***	-0.312***	-0.263***	-0.263***	-0.263***
	(1.10e-09)	(2.35e-09)	(5.09e-11)	(2.69e-09)	(2.69e-09)	(2.69e-09)
Inflation	0.194***	0.201***	0.144***	0.202***	0.202***	0.202***
	(0.000244)	(0.000100)	(0.00798)	(0.000105)	(0.000105)	(0.000105)
Constant	-1.037	-0.375	4.415***	-0.451	-0.451	-0.451
	(0.373)	(0.691)	(4.73e-08)	(0.698)	(0.698)	(0.698)
Observations	174	174	174	174	174	174
R-squares	0.495	0.518	0.429	0.518	0.518	0.518
Countries	17	17	17	17	17	17
F-test: β(gross debt)+β(assets)=0				**0.01**		
p-value				**0.91**		

p-val in parentheses
*** p<0.01, ** p<0.05, * p<0.1

[10] Results available upon request.

D. Controlling for official reserves and primary balance

The definition of government financial assets excludes official reserves held at the central bank. Moreover, accounting for central bank reserves may give raise to double counting, for example when a government borrows abroad and builds both assets and reserves, or, conversely, uses assets to buy reserves in order to pay back debt (which would lower both central bank reserves and government assets). Nonetheless, it is useful to check the robustness of the results to the inclusion of official reserves, as these have been found to be a relevant factor for sovereign bond spreads in EMEs (Edwards, 1984; Ciarlone et al., 2009; Baldacci et al., 2011), mainly because they offer an indication of the ability to service external debt. The first two columns in Table 7 encompass reserves and show that the main results still hold: the coefficients for gross debt and assets are both statistically significant with opposite signs, and their sum is not significantly different from zero; international reserves have a negative sign and are statistically significant (similarly to financial assets and with a coefficient about half the one for assets).

Table 7. Results with Other Determinants

Panel Regressions for Other Possible Determinants			
Gross debt	0.0895***	0.0898***	0.122***
	(0)	(0)	(0)
Assets	-0.0663***	-0.0647***	-0.103***
	(0.00539)	(0.00669)	(4.43e-05)
International reserves	-0.0335**	-0.0330*	
	(0.0492)	(0.0555)	
Primary fiscal balance		-0.00254	0.0472
		(0.956)	(0.301)
VIX	0.118***	0.118***	0.129***
	(0)	(0)	(0)
US interest rate	-0.00176	-0.0144	0.0216
	(0.985)	(0.886)	(0.837)
GDP growth	-0.132***	-0.132***	-0.123***
	(3.41e-05)	(7.48e-05)	(0.000547)
Inflation	0.130***	0.131***	0.106***
	(1.78e-07)	(2.54e-07)	(8.55e-05)
Constant	-2.481***	-2.481***	-4.389***
	(0.00362)	(0.00548)	(4.46e-09)
Observations	322	321	335
R-squared	0.531	0.532	0.549
Countries	29	29	30
F-test: β(gross debt)+β(assets)=0	1.07	1.23	0.58
p-value	0.30	0.27	0.45

p-val in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

The second factor considered here is the effect of fiscal policy as measured by the primary balance.[11] Studies find that the primary balance helps explain spreads in emerging markets (Ciarlone et al., 2009; Baldacci and Kumar, 2010). However, the results in Table 7 indicate that the primary balance is not statistically significant in our specification, suggesting that the impact of fiscal policy developments has already been captured by the stock variables (gross debt and financial assets).

E. Effect of distress episodes

Having provided several robustness checks of our baseline results, here we turn our attention to analyzing whether global or domestic distress episodes affect the estimated relationship. For this purpose, we re-estimate our baseline equation with gross debt and assets for periods of excessive market volatility (defined as VIX above 20) and for cases when the respective country EMBIG spread is over two standard deviations above its mean. For each of these cases, we introduce a dummy variable and interact it with the variables of our primary interest (gross debt and financial assets). Table 8 presents the estimation results.

Table 8. Distress Episodes
Panel Regressions for Distress Episodes

Episodes:	VIX>20	EMBI>EMBI+2σ	VIX>20	EMBI>EMBI+2σ
Gross debt	0.118***	0.0850***		
	(0)	(0)		
Gross debt*Dummy	0.00792	0.144***		
	(0.116)	(0)		
Assets	-0.0931***	-0.0689***		
	(0.000436)	(0.000290)		
Assets*Dummy	-0.0151	-0.392***		
	(0.341)	(0)		
Net debt			0.116***	0.0862***
			(0)	(0)
Net debt*Dummy			0.00817	0.112***
			(0.102)	(0)
VIX	0.112***	0.0968***	0.105***	0.100***
	(1.17e-05)	(0)	(8.20e-07)	(0)
US interest rate	0.0494	0.0847	0.0373	0.0701
	(0.624)	(0.259)	(0.709)	(0.372)
GDP growth	-0.116***	-0.119***	-0.115***	-0.0945***
	(0.000790)	(6.82e-06)	(0.000789)	(0.000510)
Inflation	0.112***	0.0939***	0.113***	0.0894***
	(2.42e-05)	(3.09e-06)	(2.03e-05)	(2.20e-05)
Constant	-4.208***	-2.654***	-3.717***	-2.590***
	(3.39e-06)	(1.83e-06)	(1.90e-07)	(2.69e-07)
Observations	336	336	336	336
R-squared	0.551	0.744	0.550	0.716
Countries	0.551	0.744	0.550	0.716
F-test (Gross debt+Assets=0)	0.88	0.77		
p-value	0.35	0.38		
F-test (Gross debt+Gross debt*D+Assets+Assets*D=0)	0.49	25.2		
p-value	0.49	0.00		

p-val in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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[11] We use primary instead of headline fiscal balance in order to eliminate the interest rate payments which are heavily affected by the debt variables already present in the regression.

The first column indicates that the coefficients for gross debt and financial assets during periods of high global volatility remain similar to those in the baseline and retain their significance. Moreover, the crisis interaction terms (Gross debt*Dummy and Assets*Dummy) have the same sign as the primary variables of interest, suggesting that the baseline effects are possibly being amplified during periods of excessive market volatility. However, none of these amplification effects is statistically significant at conventional levels, suggesting that the role of debt and assets is not really altered by global volatility.

The second column of Table 8 reports the results of the specification that accounts for episodes in which spreads move over two standard deviations above the mean. Similar to the case of VIX, the crisis interaction terms have the same signs as the baseline effects, suggesting once again an amplification during periods of turbulence. However, this time both of these amplifying effects are statistically significant, suggesting that domestic distress tends to amplify the effect of debt and assets on spreads.

F. Nonlinearities

This section focuses on the role of the composition of net debt. The same level of net debt (as share of GDP) can be obtained with different combinations of gross debt and financial assets. For instance, two countries may have the same net debt level of 50 percent of GDP, but one country may have gross debt of 60 percent of GDP and financial assets that amount to 10 percent of GDP, while the other country may have gross debt 150 percent of GDP and 100 percent of GDP in financial assets. Would these differences between the two countries be relevant for determining the effect of debt and assets on their spreads?

Table 9[12] investigates this issue by including the ratio of gross debt-to-financial assets in the specification with net debt, as a proxy for "leverage" defined as more debt per unit of financial assets[13]. The positive coefficient in front of the gross debt-to-financial assets ratio seems to suggest that higher "leverage" (higher gross debt-to-financial assets ratio) for the same level of net debt is penalized by markets through higher spreads. In other words, the interpretation would be that when considering two countries with the same level of net debt, financial markets reward the country that accumulated more financial assets.

However, this effect is not very large nor very robust. For our sample, a decline in the gross debt-to-assets ratio from its country average of about 16 to 5 (which would result from an across the board increase in both gross debt and financial assets of 5 percent of GDP) is associated with lower spreads by about 5 basis points, on the basis of results in the first column. This effect loses statistical significance when controls are included in the specification (column 4 in Table 9).

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[12] The sample size is slightly smaller than in the baseline because there are a few observations with zero assets, which drop out of the specifications that include the gross debt-to-assets ratio.

[13] In our earlier example, the country with 60 percent of GDP gross debt and 10 percent of GDP in financial assets has a leverage ratio of 6, while the other country with 150 percent of GDP in gross debt and 100 percent of GDP in financial assets has a leverage ratio of 1.5.

Table 9. Nonlinearities

	Panel regression results			
Net debt	0.0983***	0.0939***	0.0899***	0.0875***
	(0)	(0)	(0)	(0)
Gross debt/Assets		0.00580*		0.00368
		(0.0871)		(0.177)
VIX			0.113***	0.112***
			(0)	(0)
US interest rate			0.0441	0.0257
			(0.650)	(0.794)
GDP growth			-0.131***	-0.129***
			(6.15e-05)	(7.84e-05)
Inflation			0.140***	0.142***
			(1.30e-07)	(8.54e-08)
Constant	-0.383	-0.308	-2.897***	-2.788***
	(0.399)	(0.498)	(1.82e-06)	(4.97e-06)
Observations	302	302	302	302
R-squared	0.215	0.224	0.515	0.518
Countries	28	28	28	28

pval in parentheses
*** p<0.01, ** p<0.05, * p<0.1

V. ADDITIONAL EXPLORATIONS: ADVANCED ECONOMIES AND LOCAL INTEREST RATES

The previous sections showed robust results for the offsetting effects of gross debt and financial assets on EMBIG spreads suggesting that net debt matters for spreads (across different empirical specifications, country samples, and estimation methods). Here, we briefly complement the main analysis by checking to what extent similar results extend also to risk measures in advanced economies as well as long-term interest rates in local currency.

A. Advanced economies

Table 10 investigates the role of government debt and assets for the credit default spread of advanced economies (a comparable measure to the spread of emerging markets): no effect is visible. For advanced economies, the more relevant price could be the one imbedded in long term local currency rates, so it would be more interesting to check the effect of debt and assets on such rates.

Table 10. Additional Explorations: Credit Default Swaps in Advanced Economies

	Panel regression results (CDS)					
Gross debt	-0.0315			-0.0421	0.0269	
	(0.502)			(0.413)	(0.829)	
Net debt		-0.0418			-0.0690	-0.0421
		(0.415)			(0.612)	(0.413)
Assets			0.0234	0.0690		0.0269
			(0.850)	(0.612)		(0.829)
VIX	-0.156*	-0.157*	-0.146	-0.156*	-0.156*	-0.156*
	(0.0942)	(0.0918)	(0.116)	(0.0965)	(0.0965)	(0.0965)
US interest rate	-0.665	-0.677	-0.253	-0.614	-0.614	-0.614
	(0.416)	(0.379)	(0.716)	(0.457)	(0.457)	(0.457)
GDP growth	-0.908***	-0.895***	-0.928***	-0.891***	-0.891***	-0.891***
	(0.00336)	(0.00396)	(0.00265)	(0.00431)	(0.00431)	(0.00431)
Inflation	1.391***	1.388***	1.443***	1.395***	1.395***	1.395***
	(0.00392)	(0.00391)	(0.00263)	(0.00392)	(0.00392)	(0.00392)
Constant	7.969	7.545	3.254	6.507	6.507	6.507
	(0.195)	(0.116)	(0.554)	(0.339)	(0.339)	(0.339)
Observations	175	175	175	175	175	175
R-squares	0.104	0.105	0.101	0.105	0.105	0.105
Countries	20	20	20	20	20	20

p-val in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The results for local currency interest rates in advanced economies are presented in Table 11.[14] First, both gross debt and net debt seem relevant when entered individually. Second, gross debt seems to dominate net debt when jointly included in a specification. Similar to other findings in the literature, the estimate coefficient indicates a much smaller effect (about one fifth) than for emerging market spreads[15]. Assets are typically insignificant or have the wrong sign, which may reflect the fact that assets held by governments in advanced economies are not as liquid as assets held in emerging markets.

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[14] Note that the sample is much larger than the one for credit default swap, due to much larger data availability for interest rates. However, the results are qualitatively the same when restricting the interest rate sample to the one of the credit default swap (results available upon request).

[15] For instance, Dell'Erba, Hausmann, and Panizza (2013) find that the impact of debt on spreads in advanced economies is about one fifth of the effect for emerging markets.

Table 11. Additional Explorations: Local Currency Interest Rates in Advanced Economies

	Panel regression results (Local currency interest rates)					
Gross debt	0.0201***			**0.0204*** **	0.0171***	
	(1.25e-10)			**(8.97e-11)**	(0.000202)	
Net debt		0.0141***			0.00333	0.0204***
		(1.04e-07)			(0.386)	(8.97e-11)
Assets			0.000276	**-0.00333**		0.0171***
			(0.945)	**(0.386)**		(0.000202)
VIX	-0.0168*	-0.0218**	-0.0245**	**-0.0173***	-0.0173*	-0.0173*
	(0.0748)	(0.0222)	(0.0134)	**(0.0672)**	(0.0672)	(0.0672)
US interest rate	1.108***	1.034***	1.047***	**1.096*** **	1.096***	1.096***
	(0)	(0)	(0)	**(0)**	(0)	(0)
GDP growth	-0.241***	-0.253***	-0.253***	**-0.243*** **	-0.243***	-0.243***
	(0)	(0)	(0)	**(0)**	(0)	(0)
Inflation	0.315***	0.290***	0.249***	**0.315*** **	0.315***	0.315***
	(1.58e-10)	(4.00e-09)	(6.95e-07)	**(1.58e-10)**	(1.58e-10)	(1.58e-10)
Constant	-1.204***	0.171	0.676*	**-1.048** **	-1.048**	-1.048**
	(0.00259)	(0.563)	(0.0682)	**(0.0167)**	(0.0167)	(0.0167)
Observations	429	429	429	**429**	429	429
R-squared	0.667	0.656	0.631	**0.668**	0.668	0.668
Countries	22	22	22	**22**	22	22

p-val in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In terms of other variables, similarly to the results for emerging market EMBIG spreads, higher growth and higher inflation are associated respectively with lower and higher local currency interest rates in advanced economies. However, in contrast to the findings for emerging markets, higher market volatility as implied by VIX is now associated with lower interest rates: this asymmetry is consistent with the standard argument of a flight to quality toward advanced economies and away from emerging markets during periods of higher volatility. The coefficient for the US interest is obviously higher for advanced economies local rates (Table 11) than for emerging markets spreads (Table 4), as in the former case the left hand side is an interest rate while in the latter case it is a spread (indeed there is no effect on advanced economies CDS spread, shown in Table 10).

B. Emerging markets

We now inspect whether the same specification developed for EMBIG spread can also adequately explain local currency interest rates in emerging markets. The results in Table 12 convey two interesting messages. First, net debt and assets both matter for local currency (10-year) interest rates, and each of them dominates gross debt. Second, in contrast to the findings in advanced economies, financial assets matter the most for emerging markets and have a coefficient that is comparable to that for net debt in the baseline specifications for spreads. Surprisingly, gross debt no longer seems relevant. Unfortunately, the sample is much smaller compared to the baseline specification with EMBIG spread as dependent variable, due to the smaller availability of interest rate data; hence it is essential to check whether the difference in results is due to the change in sample.

Table 12. Additional Explorations: Local Currency Interest Rates in Emerging Markets

Panel regression results (Local currency interest rates)

	(1)	(2)	(3)	(4)	(5)	(6)
Gross debt	0.0321			**0.0295**	-0.101*	
	(0.236)			**(0.259)**	(0.0569)	
Net debt		0.0557**			0.131***	0.0295
		(0.0148)			(0.00437)	(0.259)
Assets			-0.133***	**-0.131*****		-0.101*
			(0.00393)	**(0.00437)**		(0.0569)
VIX	0.0130	0.0120	0.0143	**0.0131**	0.0131	0.0131
	(0.570)	(0.589)	(0.516)	**(0.551)**	(0.551)	(0.551)
US interest rate	0.893***	0.889***	0.738***	**0.788*****	0.788***	0.788***
	(1.21e-08)	(2.31e-09)	(4.81e-07)	**(3.19e-07)**	(3.19e-07)	(3.19e-07)
GDP growth	-0.190***	-0.181***	-0.177***	**-0.175*****	-0.175***	-0.175***
	(0.000389)	(0.000534)	(0.000630)	**(0.000727)**	(0.000727)	(0.000727)
Inflation	0.354***	0.371***	0.352***	**0.366*****	0.366***	0.366***
	(8.14e-08)	(1.26e-08)	(2.16e-08)	**(1.33e-08)**	(1.33e-08)	(1.33e-08)
Constant	2.269	1.796*	5.723***	**4.169****	4.169**	4.169**
	(0.142)	(0.0935)	(1.49e-09)	**(0.0114)**	(0.0114)	(0.0114)
Observations	123	123	123	**123**	123	123
R-squared	0.529	0.549	0.559	**0.565**	0.565	0.565
Countries	14	14	14	**14**	14	14

p-val in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 13. Additional Explorations: Spreads in Emerging Markets (Restricted Sample)

Panel regression results (EMBI spreads)

	(1)	(2)	(3)	(4)	(5)	(6)
Gross debt	0.0727***			**0.0715*****	0.0105	
	(0.000764)			**(0.000840)**	(0.803)	
Net debt		0.0688***			0.0610*	0.0715***
		(0.000171)			(0.0924)	(0.000840)
Assets			-0.0652*	**-0.0610***		0.0105
			(0.0871)	**(0.0924)**		(0.803)
VIX	0.0550***	0.0552***	0.0580***	**0.0551*****	0.0551***	0.0551***
	(0.00245)	(0.00207)	(0.00216)	**(0.00222)**	(0.00222)	(0.00222)
US interest rate	-0.206*	-0.266**	-0.376***	**-0.255****	-0.255**	-0.255**
	(0.0697)	(0.0143)	(0.00151)	**(0.0288)**	(0.0288)	(0.0288)
GDP growth	-0.0933**	-0.0857**	-0.0917**	**-0.0864****	-0.0864**	-0.0864**
	(0.0227)	(0.0339)	(0.0319)	**(0.0338)**	(0.0338)	(0.0338)
Inflation	0.254***	0.260***	0.226***	**0.260*****	0.260***	0.260***
	(5.77e-07)	(2.66e-07)	(1.05e-05)	**(2.94e-07)**	(2.94e-07)	(2.94e-07)
Constant	-1.840	-0.709	2.810***	**-0.955**	-0.955	-0.955
	(0.126)	(0.397)	(0.000180)	**(0.462)**	(0.462)	(0.462)
Observations	123	123	123	**123**	123	123
R-squared	0.483	0.497	0.440	**0.498**	0.498	0.498
Countries	14	14	14	**14**	14	14

p-val in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 13 shows that it is not the case. When we restrict the sample for the baseline EMBIG spreads regressions to the sample used in the local currency interest rates regressions, the

baseline results continue to hold. Gross debt, net debt, and financial assets all have the expected signs and retain statistical significance. At the same time, net debt dominates, and gross debt and financial assets offset each other.

One possible explanation for the differences in results is that sovereign debt profiles are different for FX (US dollar) liabilities and local currency-denominated liabilities[16]. For instance, one may need to look separately at the effect of US dollar-denominated debt on EMBIG spreads and at the effect of local currency debt on local currency interest rates. This possible segmentation across debt currency denominations is an interesting issue for future investigation.

VI. CONCLUSION

Using a panel dataset on emerging market economies over the period 1998–2014 we investigate the importance of gross debt, net debt, and government financial assets for long-term sovereign bond spreads. We arrive at three key results. First, both gross debt and net debt have a significant impact on long-term sovereign bond spreads in EMEs. Second, the effect of net debt seems to dominate the gross debt effect. Third, the effects of gross debt and financial assets offset each other, suggesting that net debt is the relevant measure.

This implies that countries cannot easily lower spreads by building up financial assets through debt accumulation or by reducing gross debt through asset sales. In other words, our results suggest that financial markets rightly focus on net debt, which implies that even if a comprehensive public database was not readily available during the period corresponding to the regression sample, market participants had their way of accessing such information. These results suggest that in principle net debt may be a superior measure for assessing debt sustainability (as measured by the spread), of course provided that measurement concerns do not pollute the assessment.

The findings are quite robust across alternative empirical specifications, measures of risk, country samples, and estimation methods. Net debt retains its significance, while the effects of gross debt and government assets roughly counterbalance across a range of specifications. In terms of magnitude, an increase in the net debt-to-GDP ratio by 10 percentage points is found to be typically associated with an increase in sovereign spreads by about 100–120 basis points.

The effects of gross debt and assets on spreads are not significantly altered during the period of global volatility (high VIX), but they become larger during periods of domestic distress,

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[16] Another explanation may be related to the liquidity and usability of government financial assets in emerging markets: the stronger impact of assets on interest rates in emerging markets—compared to advanced economies—may be due to the "signaling" effect of the higher share of liquid assets in emerging markets compared to advanced countries.

particularly for the role of assets. When it comes to effects from the composition of net debt (i.e. different combinations of gross debts and asset), there is no clear evidence of large or robust nonlinearities.

Our analysis pointed at several aspects that deserve further research. First, the depth and quality of the data on assets is limited, an issue also reflected in significant data revisions for some countries. This highlights the need for further efforts in broadening the dataset to a larger set of emerging markets and frontier markets.

Second, it is valuable to investigate the role of the different composition, degree of liquidity, and maturity of government financial assets, as well as the signaling effect of assets. This would particularly help understand why government assets seem to influence spreads in emerging markets, but not CDS or local currency rates in advanced economies. Liquidity of assets may play a role even for emerging markets as part of the assets may be tailored to specific policy purposes (like savings for future generations, smoothing the business cycle, and coverage of pension liabilities). At the same time, it is important to further understand the role of central bank reserves versus government assets: the two are clearly correlated in emerging markets (for example, when governments contribute to building up reserves by borrowing), and it would be valuable to disentangle the separate role in reducing spreads in emerging markets, a role that is likely to depend on the degree of central bank independence. It would be also valuable to further investigate why the effect of gross debt on local currency rates in advanced economies is five times smaller than on spreads in emerging markets.

Third, the different impact of government debt on local currency rates and EMBIG spreads for the same sample of emerging markets highlights the value of investigating the extent to which there is market segmentation between local currency-denominated debt and foreign currency-denominated debt.

Fourth, in order to better understand the role of assets, it would also be valuable to undertake event studies focusing on cases with large asset accumulation and hence significant divergence between gross and net debt; studying whether the effect of accumulation or reduction of assets is asymmetric; and how sensitive are the results to debt restructuring, re-profiling, default, or of an IMF program[17].

Finally, our findings should be brought into the broader agenda of the importance of a comprehensive investigation of the costs and benefits associated with public asset and liability management, as the composition of the public balance sheet may matter for other aspects of public finance, such as insurance benefits or managing roll-over risk. For instance, for the same level of net debt, holding more liquid financial assets provides higher insurance, but also implies higher gross debt and correspondingly higher net borrowing costs (even if the impact on spread is neutral) as returns on assets are generally lower than borrowing costs. More generally, such an investigation will require a comprehensive comparison of returns on government asset portfolios (including sovereign wealth funds), yields on its sovereign liabilities, and the benefit of insurance versus opportunity costs of investing government assets on alternative uses.

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[17] For the impact of sovereign restructurings on subsequent sovereign spreads see Cruces and Trebesch (2013).

VII. REFERENCES

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ANNEX I.

Annex I, Figure 1. Evolution of Gross Debt and Net Debt in Regional Groupings

Advanced Economies
(as % of GDP)
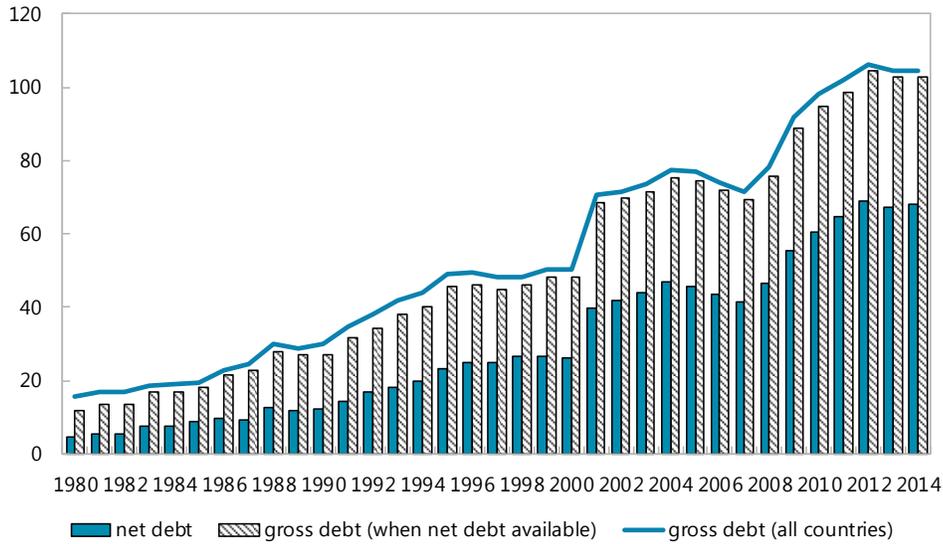
Advanced Economies
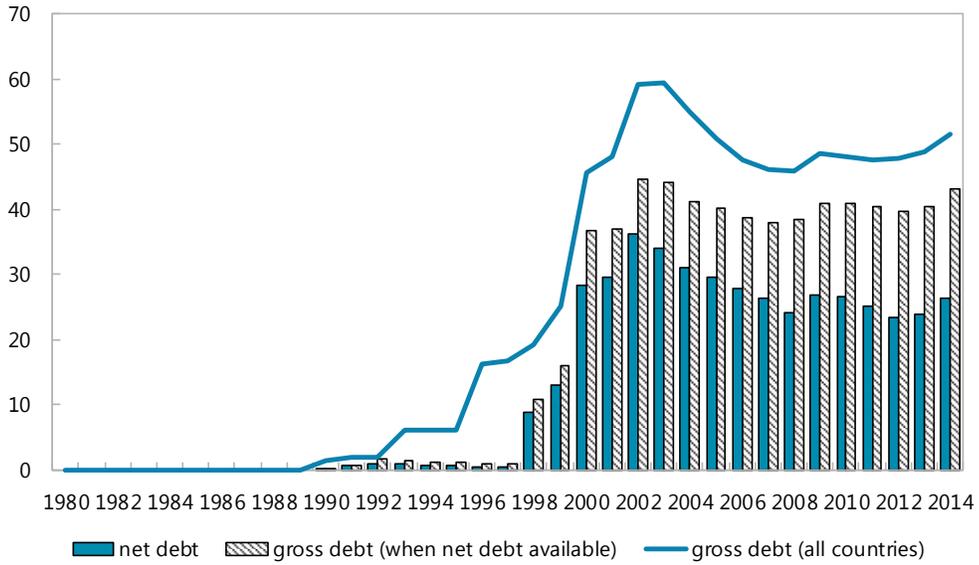**(in US$ billions)**
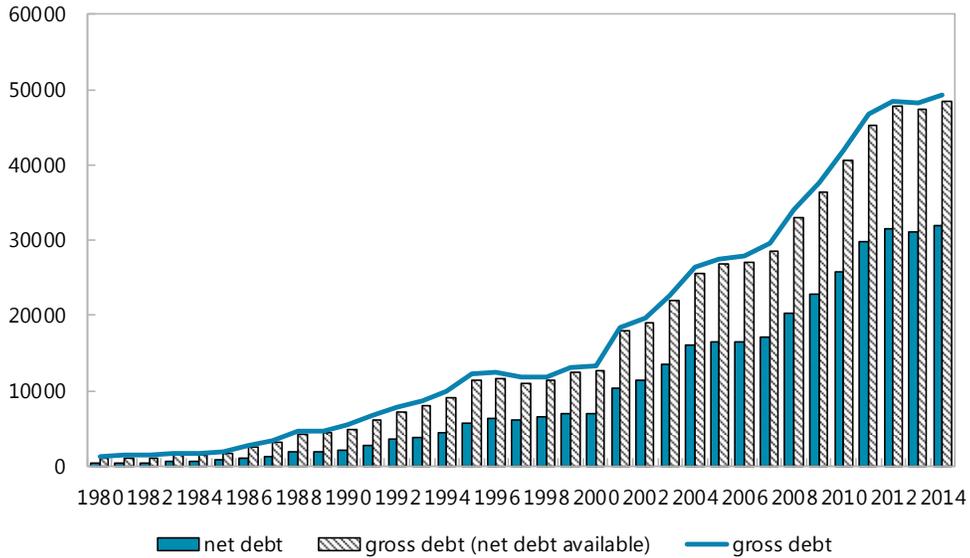
Source: WEO database.

Emerging and Developing Economies
(as % of GDP)

net debt   gross debt (when net debt available)   gross debt (all countries)
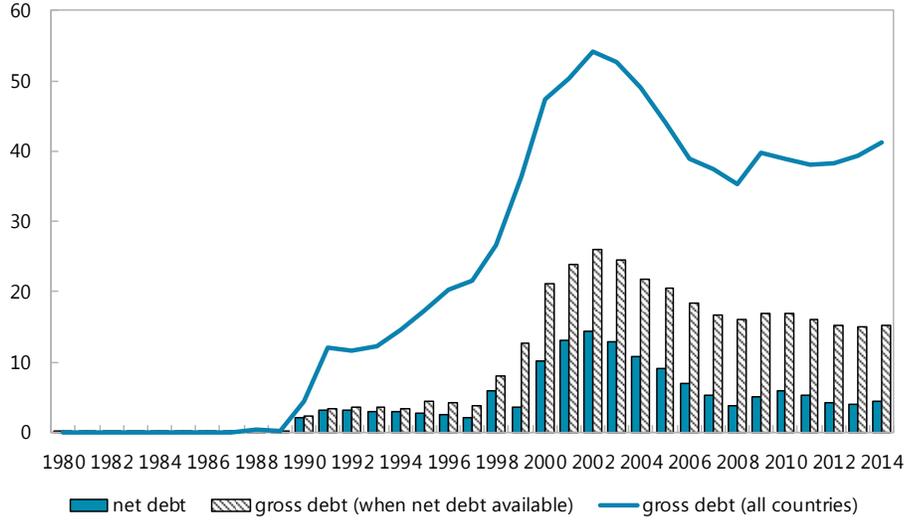
Emerging and Developing Economies
(in US$ billions)

net debt   gross debt (net debt available)   gross debt
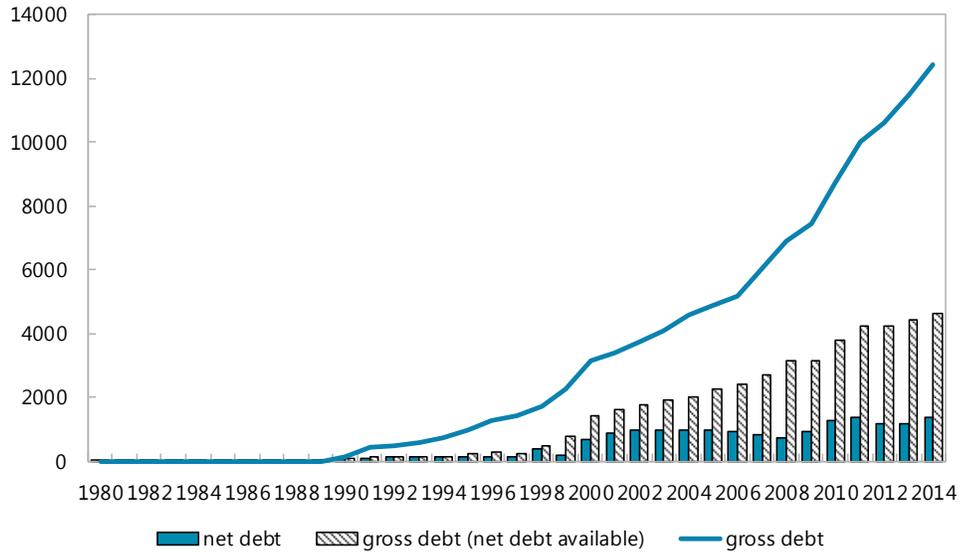
Latin America and the Caribbean
(as % of GDP)

net debt   gross debt (when net debt available)   gross debt (all countries)

Latin America and the Caribbean
(in US$ billions)

net debt   gross debt (net debt available)   gross debt
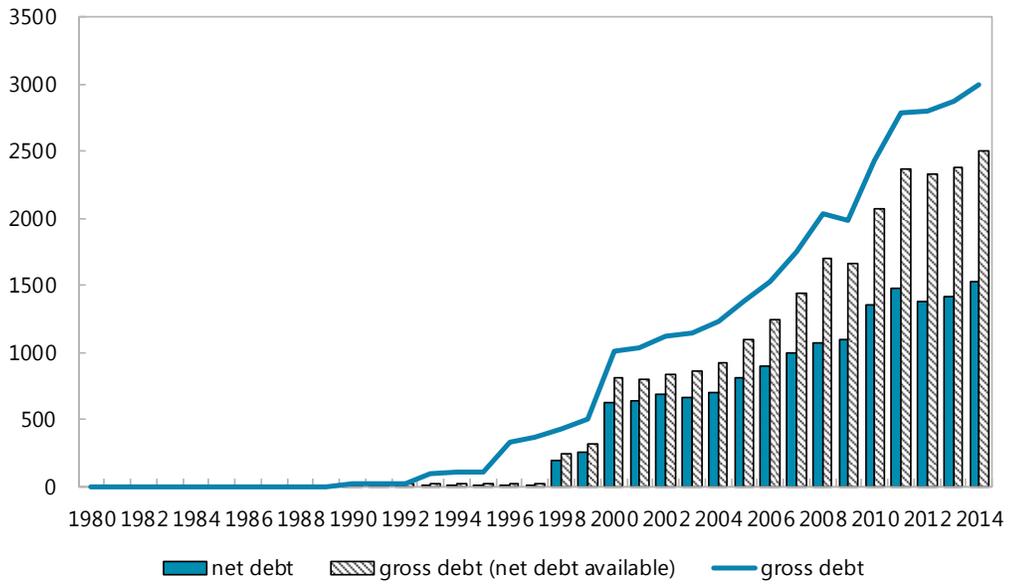
Emerging Europe
(as % of GDP)

net debt   gross debt (when net debt available)   gross debt (all countries)
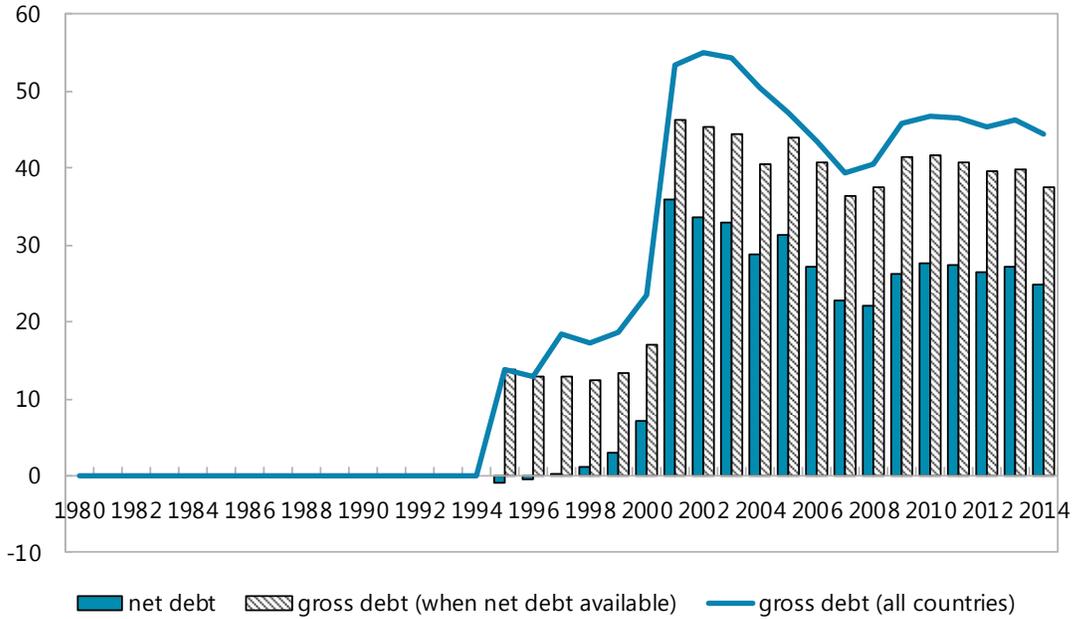
Emerging Europe
(in US$ billions)

net debt   gross debt (net debt available)   gross debt
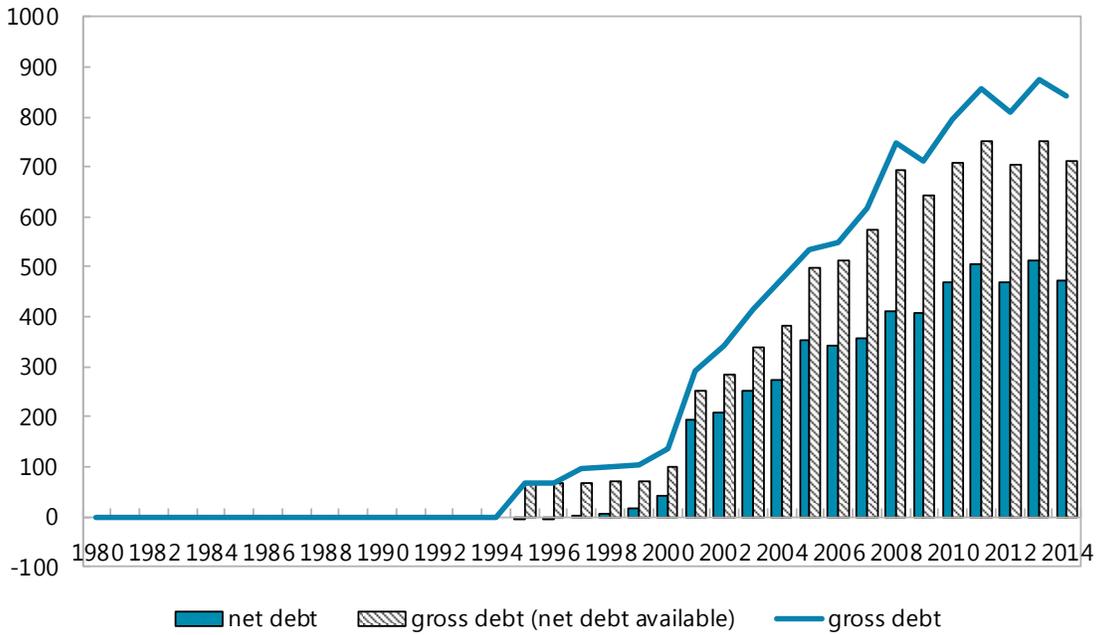
Middle East, North Africa, Afghanistan, and Pakistan
(as % of GDP)

net debt　　gross debt (when net debt available)　　gross debt (all countries)
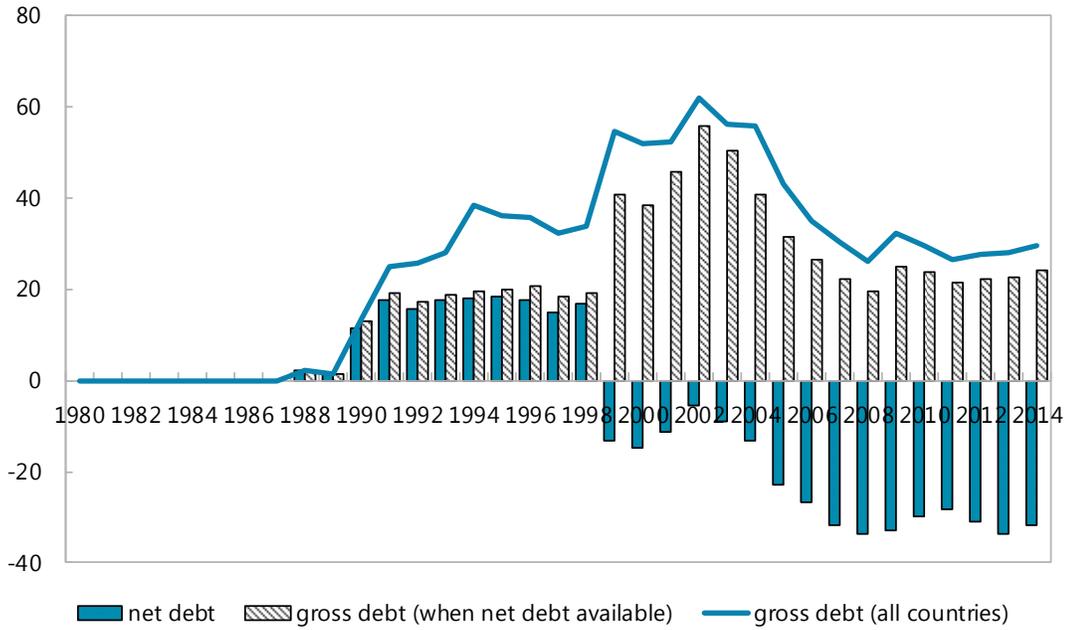
Middle East, North Africa, Afghanistan, and Pakistan
(in US$ billions)

net debt　　gross debt (net debt available)　　gross debt
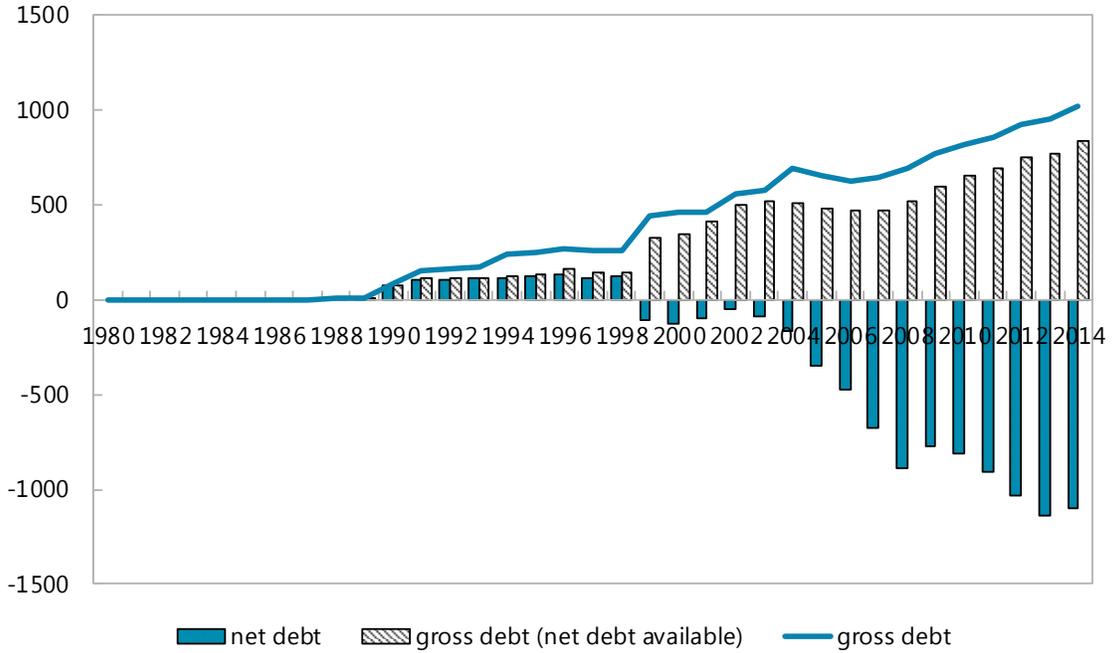
Sub-Saharan Africa
(as % of GDP)

net debt ▨ gross debt (when net debt available) — gross debt (all countries)
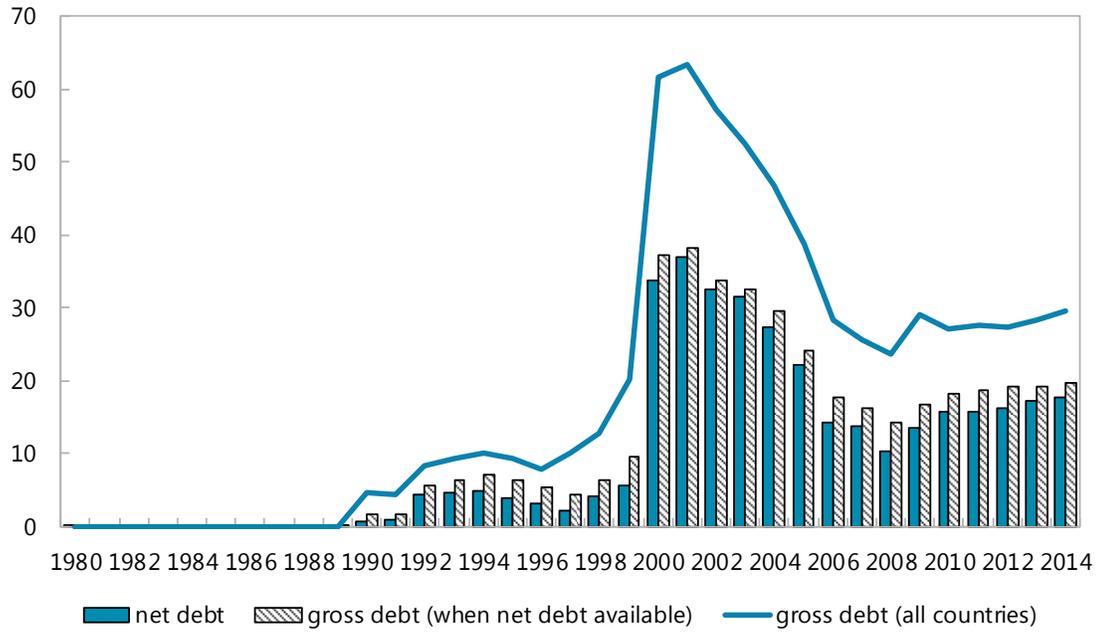
Sub-Saharan Africa
(in US$ billions)

net debt ▨ gross debt (net debt available) — gross debt
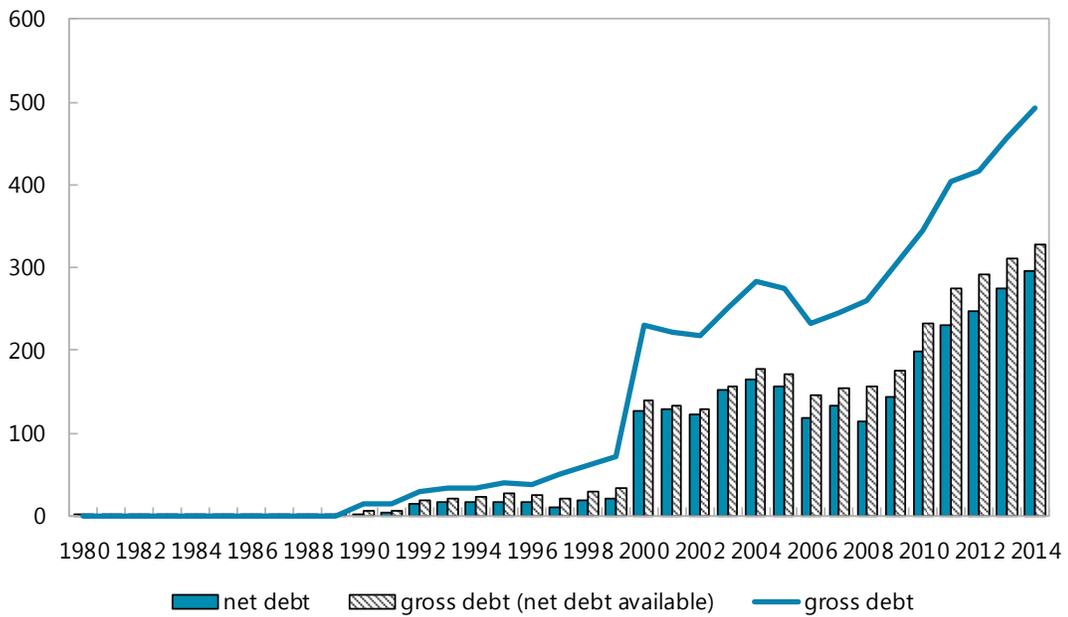
Commonwealth of Independent States
(as % of GDP)

net debt   gross debt (when net debt available)   gross debt (all countries)
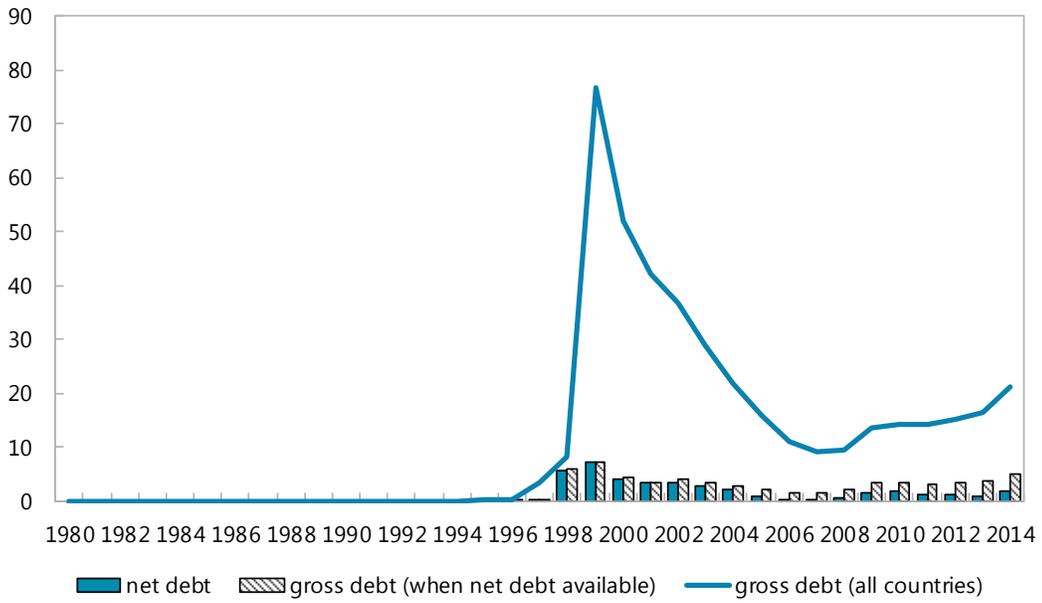
Commonwealth of Independent States
(in US$ billions)

net debt   gross debt (net debt available)   gross debt
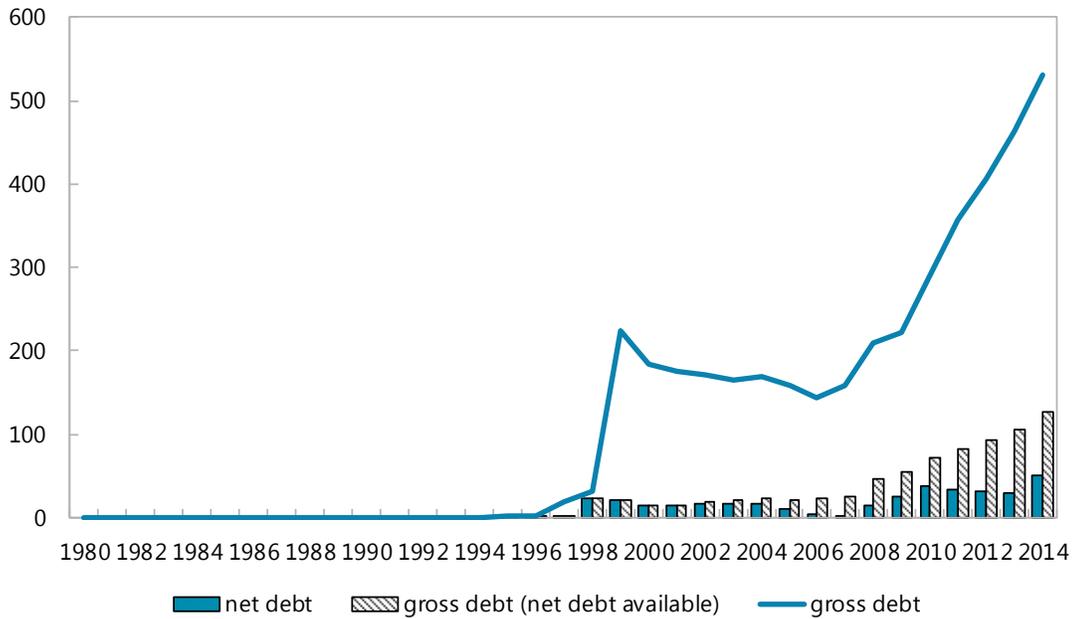
Emerging and Developing Asia
(as % of GDP)

net debt | gross debt (when net debt available) | gross debt (all countries)
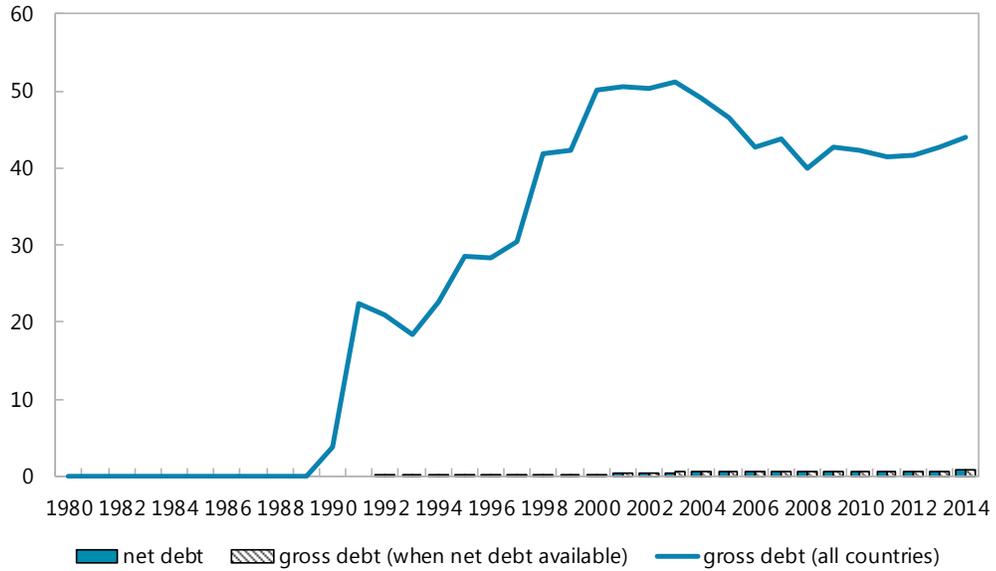
Emerging and Developing Asia
(in US$ billions)

net debt | gross debt (net debt available) | gross debt
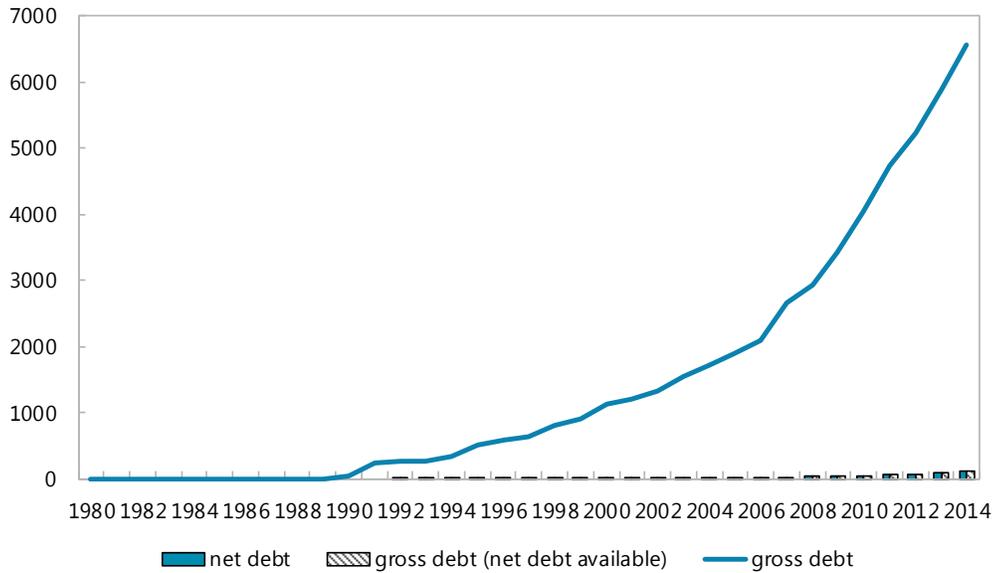
ANNEX II

Annex II, Figure 1. Evolution of Gross Debt and Net Debt, by Country