Cormier and Naqvi "Delegating Discipline"
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Appendix

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Appendix A: Descriptive Statistics for Full-case Observations of Eligible EMs (N=926)

variable	mean	p50	min	max	sd	iqr
DV	0.43	0.40	0.00	1.00	0.38	0.79
Included	0.38	0.00	0.00	1.00	0.48	1.00
IndexWeight	1.11	0.00	0.00	19.93	2.59	0.62
GDPpcap	3742.78	2998.62	194.87	13853.10	2605.22	3212.10
GDPgrowth	4.27	4.43	-14.76	18.66	3.65	3.76
Inflation	26.78	6.36	-60.50	7481.66	282.05	6.64
DebtLevels	51.77	42.56	3.90	244.99	33.81	39.18
ka_open	0.39	0.00	0.00	1.00	0.49	1.00
FinancialDepth	47.31	43.83	-45.59	194.21	31.92	35.64
Deficit	-6.23	-5.53	-26.25	6.42	5.39	7.08
CreditRating	13.83	14.00	6.00	19.00	3.79	8.00
Democracy	0.39	0.38	0.05	0.88	0.20	0.32
Transparency	0.53	0.45	-2.23	3.11	0.96	1.35
newLeftGovt	0.12	0.00	0.00	1.00	0.32	0.00
USIRates	4.37	4.28	1.80	8.55	1.76	2.85

Appendix B:
60 EMs in sample of full case observations
(see replication data for specific years)

Angola	Kazakhstan
Albania	Kenya
Armenia	Kyrgyz Republic
Azerbaijan	Lebanon
Burkina Faso	Sri Lanka
Bangladesh	Lesotho
Bulgaria	Morocco
Bosnia and Herzegovina	Moldova
Belarus	Mexico
Bolivia	North Macedonia
Brazil	Mongolia
Botswana	Mozambique
Cameroon	Mauritius
Congo, Rep.	Nicaragua
Colombia	Peru
Cabo Verde	Philippines
Costa Rica	Papua New Guinea
Dominican Republic	Paraguay
Egypt, Arab Rep.	Russian Federation
Ethiopia	Rwanda
Fiji	Senegal
Gabon	Solomon Islands
Georgia	El Salvador
Ghana	Thailand
Guatemala	Tunisia
Honduras	Turkey
Indonesia	Uganda
India	Ukraine
Jamaica	South Africa
Jordan	Zambia

Appendix Ci: DID 2x2 Decomposition Tests

Our step one estimator is a fixed effects dummy estimator, somewhat akin to a staggered DID estimator but with reversions (i.e. treated [included] units may return to untreated [excluded] after initial treatment). So while imperfect, we use recent developments on DID estimators as a tool to test whether there is evidence of heterogenous treatment effects over time (see Goodman-Bacon citations in main text).

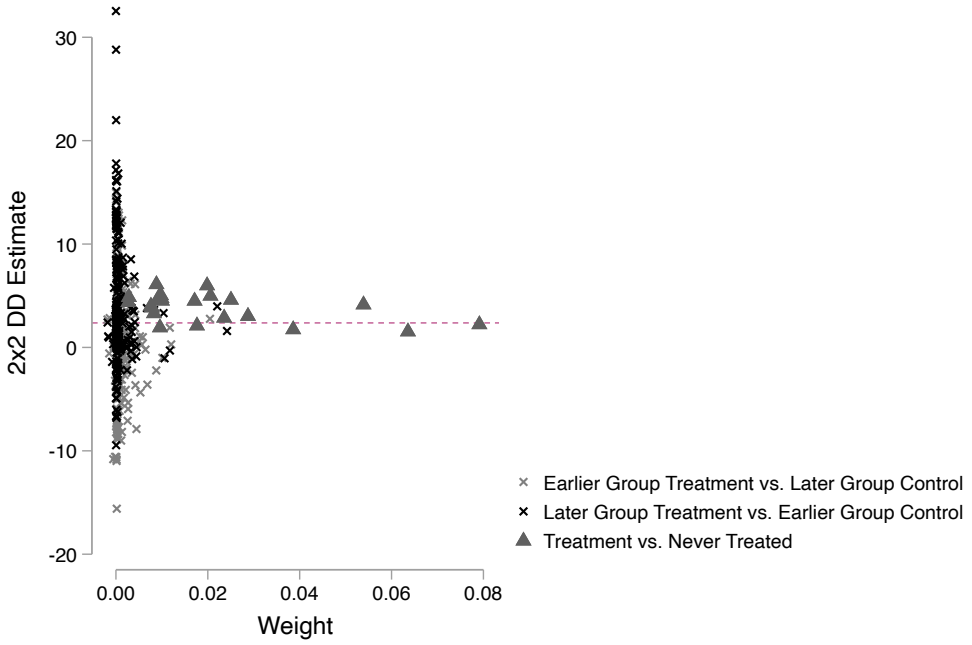
The table below shows the estimated effect of *Included* is positive across treatment timings. The similarity between Table 1's estimate in the main text and this overall estimate (both equal 2.37) indicates consistency. The sample begins in 1990, and the EMBIG did not exist until 1993, so all countries in the sample have pre-treatment observations against which to measure the within-unit effect of *Included*.

The plot below then shows that none of the treated vs never-treated estimations are negative. It also shows that a relatively small percentage of the estimations are negative. Both ease concern that the dummy estimation of index inclusion's treatment effect may be biased.

The consistency of the estimate across different manipulations lends further confidence. For example, if the smaller-magnitude estimation (Early T vs. Later C) is removed to ensure this doesn't hugely change the estimate (i.e. the overall is recalculated to only include "Later T vs. Earlier C" and "T vs Never T" estimations and weights), the result is an overall estimation of 3.03, which is not only the same sign but not hugely different from the initial estimation. Indeed, rescaling the weights of these two groups to equal 1, then multiplying by the estimate, yields 3.03:

$$[0.236 / (0.236 + 0.474)] * 2.607 + [0.474 / (0.236 + 0.474)] * 3.245 = 3.033$$

Decomposed Estimations		
Comparison	Weight	Avg. Estimation
Earlier T vs. Later C	0.290	0.754
Later T vs. Earlier C	0.236	2.607
T vs. Never treated	0.474	3.245
Overall Diff-in-diff estimate: 2.373		
Note: T = Treatment; C = Control		


30
20
10
0
-10
-20
2x2 DD Estimate
0.00
0.02
0.04
0.06
0.08
Weight
Earlier Group Treatment vs. Later Group Control
Later Group Treatment vs. Earlier Group Control
Treatment vs. Never Treated

Appendix Cii: Chow test

We also run a Chow test to identify whether the coefficients and slopes between Included and Excluded countries are statistically different. Test results indicate so. Included and Excluded subgroups have significantly different intercepts and 5 of the 6 slopes of the interacted covariates vary significantly across the subgroups. This further indicates a structural break in the data, in that the data should not be pooled and two regression lines can fit the data better than one.

In other words, this is further evidence that being included leads to significantly different bond market access than when a country is excluded, both in terms of level of the borrowing and in the relationship between country characteristics and market access.

Chow test (on model of only interaction terms)

	df	F	P>F
HardInclusionDummy	1	17.74	0
HardInclusionDummy#GDPpcap	1	19.46	0
HardInclusionDummy#ExtDebtStock	1	13.09	0.0003
HardInclusionDummy#Def_PerGDP	1	13.59	0.0002
HardInclusionDummy#NewLeftGov	1	0.39	0.5309
HardInclusionDummy#USIrates	1	4.57	0.0327
Overall	6	29.15	0
Denominator	1067		

Appendix D: Price Models

These estimations below model the effect of covariates on bond yields in the secondary market (also obtained from JPMorgan), which are a complementary measure of market access to our volume based measure of market access, as it gives information on the *terms* at which countries can borrow. The first model identifies which theoretically relevant covariates are significantly associated to bond yields. The second model interacts these covariates with index weight. The panel is quarterly so uses quarter effects instead of year effects for time. The dependent variable is the log of the yield spread.

The results suggest similar index effects on bond yields as on volume, which suggest the same mechanism is at work with respect to yields/price. But important data limitations and measurement biases require cautious interpretation and thus relegate this work on yields to the appendix. But evidence suggests this is an important and plausible path for future research.

The main limitations to studying EMBIG's interaction effect on how country characteristics affect yields are twofold: data limitations and statistical bias. First, the data includes only secondary yields from EMBIG countries. We do not have comparable data on countries excluded from the EMBIG. This is for both historical data availability reasons and the fact that many of these excluded bonds do not have liquid secondary markets, so the data does not exist in the first place. So while recent studies use EMBIG-only yield data for other research questions (e.g. Brooks, Cunha, Mosely 2015, ISQ) our study is about the *effect* of the EMBIG itself, so we need non-EMBIG data that does not exist. As a result, we can only consider index weights in this analysis. Because all data has a value of Included =1, we cannot contrast the performance of covariates to instances where included = 0.

Second and relatedly, this gives rise to selection bias. We are able to identify the effect of a variable when included=0 in our main text because the constituent terms of the interactions are meaningful (i.e. indicate the performance of a covariate when a country is excluded, where Included = 0). Here, however, we have no data on what yields are when Included = 0. This means we cannot make inferences about how the effect of a covariate on yields may or may not depend on index weights without making claims that suffer from serious selection bias.

Indeed, this suggests studies that only use data from a subset of countries that are included in a major index suffer from selection bias.

Nevertheless, we can check for evidence that index weights affect yields through a similar mechanism as we see with respect to volume in the main analysis. Our theory leads us to expect that the higher the weight a country receives in the index, the less effect domestic variables should have on that country's yield.

The relationships below suggest the index conditioning mechanism may plausibly affect price/yield as much as volume. The table on the left indicates that without accounting for index weights significant variables correspond to bond yields in the expected way: GDP growth decreases yields, capital account openness decreases yields, poor credit ratings increase yields, higher US interest rates increase yields, and higher debt levels increase yields.

But (emphasizing all the important caveats discussed above) when these variables are interacted with the country's index weight these relationships are conditioned to varying degrees. Interacted GDP growth has an insignificant effect on yields, interacted capital account openness no longer has the theoretically expected downward effect on yields, interacted poor credit ratings no longer increase yields, and interacted higher US interest rates no longer increase yields. Interacted debt levels continue to increase yields, which is an exception that does not indicate an index effect.

In sum, we find provocative but incomplete and biased evidence that EMBIG has a significant conditioning effect on the relationship between traditional covariates and a country's bond yields. This warrants further research.

Initial Model of Price	
GDPpcap	0.000
	(0.000)
GDPgrowth	-0.013***
	(0.002)
Inflation	0.000
	(0.000)
DebtLevels	0.004***
	(0.001)
ka_open	-0.105***
	(0.021)
DomFinDepth	0.001
	(0.001)
Deficit	0.001
	(0.002)
CreditRating	0.067***
	(0.005)
Democracy	-0.023
	(0.103)
Transparency	0.010
	(0.022)
NewLeftGovt[1]	0.007
	(0.023)
USIRates	0.068*
	(0.032)
N	6215
Selected N	1317
* 0.05 ** 0.01 *** 0.001	
Country and Quarter fixed effects	
Heckman twostep standard errors	
All covariates lagged	

Interaction Effects on Price	
IndexWeight	-0.004
	(0.020)
GDPpcap	-0.000
	(0.000)
GDPgrowth	-0.017***
	(0.003)
GDPgrowth x IndexWeight	0.001
	(0.000)
Inflation	0.000**
	(0.000)
DebtLevels	0.000
	(0.001)
DebtLevels x IndexWeight	0.001***
	(0.000)
ka_open	-0.126***
	(0.031)
ka_open x IndexWeight	0.017***
	(0.005)
FinancialDepth	0.001
	(0.001)
Deficit	0.002
	(0.002)
CreditRating	0.068***
	(0.007)
CreditRating x IndexWeight	-0.003
	(0.002)
Democracy	-0.040
	(0.101)
Transparency	0.013
	(0.022)
NewLeftGovt[1]	0.005
	(0.022)
USIRates	0.060
	(0.033)
USIRates x IndexWeight	-0.002
	(0.002)
Full N	6215
Selected N	1317
* 0.05 ** 0.01 *** 0.001	

[1] NewLeftGovt limited to four quarters (1 year) for a new government to have an effect.

	Country and Quarter fixed effects Heckman twostep standard errors All variables lagged

Appendix Ei: No Lag Dummy Interaction Models

These models are the same as the dummy interactions in the main text, but do not lag the covariates. Inferences do not change.

Included	0.329***
	(0.085)
GDPpcap	0.000***
	(0.000)
GDPpcap x Included	-0.000***
	(0.000)
GDPgrowth	0.003
	(0.002)
Inflation	-0.000
	(0.000)
DebtLevels	-0.002***
	(0.000)
DebtLevels x Included	0.000
	(0.001)
ka_open	0.055
	(0.029)
FinancialDepth	0.001
	(0.001)
Deficit	-0.017***
	(0.003)
Deficit x Included	0.013**
	(0.004)
CreditRating	-0.002
	(0.004)
Democracy	-0.010
	(0.121)
Transparency	0.050*
	(0.024)
NewLeftGovt	-0.061*
	(0.030)
NewLeftGovt x Included	0.009
	(0.049)
USIRates	-0.060***
	(0.014)
USIRates x Included	-0.000
	(0.013)
Full N	2015
Selected N	876
* 0.05 ** 0.01 *** 0.001	
Country and Year fixed effects	
Heckman twostep standard errors	

Appendix Eii: No Lag Weight Interaction Models

These models are the same as the weight interactions in the main text, but do not lag the covariates. Inferences do not change.

IndexWeight	-0.017
	(0.040)
GDPpcap	0.000*
	(0.000)
GDPpcap x IndexWeight	-0.000
	(0.000)
GDPgrowth	0.004
	(0.004)
Inflation	-0.000
	(0.000)
DebtLevels	-0.002**
	(0.001)
DebtLevels x IndexWeight	0.000
	(0.000)
ka_open	0.032
	(0.046)
FinancialDepth	0.001
	(0.001)
Deficit	-0.017***
	(0.005)
Deficit x IndexWeight	0.002
	(0.001)
CreditRating	-0.003
	(0.006)
Democracy	0.110
	(0.186)
Transparency	0.041
	(0.037)
NewLeftGovt	-0.077^
	(0.041)
NewLeftGovt x IndexWeight	0.012
	(0.018)
USIRates	-0.083***
	(0.021)
USIRates x IndexWeight	0.008
	(0.004)
Full N	2015
Selected N	876
^0.07 * 0.05 ** 0.01 *** 0.001	
Country and Year fixed effects	
Heckman twostep standard errors	

Appendix Eiii: ka_open Interaction Appendix

In Table 4, ka_open takes on statistical significance despite not being significant in Table 3. This appendix model interacts this ka_open variable with the *Included* dummy to see if the inclusion/exclusion distinction conditions ka_open in a systematic way. This model shows this is not the case, and ka_open taking on significance in Table 4 is more likely random than subject to the theory in the paper.

Included	0.378***
	(0.083)
GDPpcap	0.000***
	(0.000)
GDPpcap x Included	-0.000***
	(0.000)
GDPgrowth	-0.001
	(0.002)
Inflation	-0.000
	(0.000)
DebtLevels	-0.001***
	(0.000)
DebtLevels x Included	-0.000
	(0.001)
ka_open	0.046
	(0.035)
ka_open X Included	0.035
	(0.042)
FinancialDepth	0.001
	(0.001)
Deficit	-0.008*
	(0.003)
Deficit x Included	0.005
	(0.004)
CreditRating	0.002
	(0.004)
Democracy	0.029
	(0.122)
Transparency	0.030
	(0.024)
NewLeftGovt	-0.074*
	(0.030)
NewLeftGovt x Included	0.043
	(0.048)
USIRates	-0.035**
	(0.012)
USIRates x Included	-0.019
	(0.013)
Full N	2041
Selected N	902
* 0.05 ** 0.01 *** 0.001	
Country and Year fixed effects	
Heckman twostep standard errors	
All variables lagged	

Appendix Eiv: Adding commercial bank loans to the DV

EMs also, though relatively minimally in the timeframe of this study, may use commercial bank loans alongside or instead of bonds and official creditors. We add commercial bank loans to the DV's denominator from the International Debt Statistics (IDS) database as a robustness test.

It is a robustness check for two reasons. First, there is much less data (i.e. many more NAs in the IDS database) than the BMW bond data and official credit flows from the IDS (we thus transform many NAs to 0s to keep the N up here). Second, it is not clear the extent to which sovereign bank loans are subject to the same or different "disciplinary" pressures as sovereign bond markets, so it is not obvious how bank loans compare and contrast to bonds. These both mean our main DV is simpler and cleaner test of the study's argument.

Regardless, results persist when adding bank loans to the DV's denominator. Below are both initial tests, dummy interactions, and weight interactions.

Bank DV Initial Correlations	
GDPpcap	0.000*
	(0.000)
GDPgrowth	-0.001
	(0.003)
Inflation	-0.000
	(0.000)
DebtLevels	-0.001***
	(0.000)
ka_open	0.049
	(0.034)
DomFinDepth	0.001
	(0.001)
Deficit	-0.008*
	(0.003)
CreditRating	-0.003
	(0.005)
Democracy	0.057
	(0.139)
Transparency	0.034
	(0.028)
NewLeftGovt	-0.072*
	(0.029)
USIRates	-0.054***
	(0.014)
N	2041
Selected N	902
* 0.05 ** 0.01 *** 0.001	
Country and Year fixed effects	
Heckman twostep standard errors	
All covariates lagged	

Bank DV Dummy Interaction Models		Bank DV Weight Interaction Models	
Included	0.324***	IndexWeight	-0.016
	(0.086)		(0.041)
GDPpcap	0.000***	GDPpcap	0.000*
	(0.000)		(0.000)
GDPpcap x Included	-0.000**	GDPpcap x IndexWeight	-0.000
	(0.000)		(0.000)
GDPgrowth	0.003	GDPgrowth	0.004
	(0.002)		(0.004)
Inflation	-0.000	Inflation	-0.000
	(0.000)		(0.000)
DebtLevels	-0.002***	DebtLevels	-0.002**
	(0.000)		(0.001)
DebtLevels x Included	0.000	DebtLevels x IndexWeight	0.000
	(0.001)		(0.000)
ka_open	0.058	ka_open	0.035
	(0.030)		(0.047)
FinancialDepth	0.001	FinancialDepth	0.001
	(0.001)		(0.001)
Deficit	-0.018***	Deficit	-0.017***
	(0.003)		(0.005)
Deficit x Included	0.013**	Deficit x IndexWeight	0.002
	(0.004)		(0.001)
CreditRating	-0.002	CreditRating	-0.004
	(0.004)		(0.007)
Democracy	-0.002	Democracy	0.117
	(0.122)		(0.191)
Transparency	0.048*	Transparency	0.039
	(0.024)		(0.038)
NewLeftGovt	-0.070*	NewLeftGovt	-0.086*
	(0.030)		(0.042)
NewLeftGovt x Included	0.011	NewLeftGovt x IndexWeight	0.015
	(0.050)		(0.018)
USIRates	-0.060***	USIRates	-0.083***
	(0.014)		(0.022)
USIRates x Included	-0.001	USIRates x IndexWeight	0.008
	(0.013)		(0.005)
Full N		Full N	
Selected N		Selected N	
* 0.05 ** 0.01 *** 0.001		* 0.05 ** 0.01 *** 0.001	
Country and Year fixed effects		Country and Year fixed effects	
Heckman twostep standard errors		Heckman twostep standard errors	

Appendix Ev: Central Bank Independence as a control

Available CBI data at the time of this study significantly affects the N here. At the time of writing, the Garriga dataset is only available through 2012 with gaps. Moreover the missing country-years require a simplified selection first-stage (the first-stage here only includes a lag of whether a country was included last year, not the three-deep lags of the actual criteria and other variables). We thus control for inflation in the main models to capture the key observable output of monetary policy and institutions of interest to investors, and relegate inclusion of CBI measures to a robustness check. Despite the large drop in N the initially-significant relationships do not change outside of the degree of statistical significance, and CBI is far from statistically significant.

GDPpcap	0.000^
	(0.000)
GDPgrowth	-0.001
	(0.003)
Inflation	-0.000
	(0.000)
DebtLevels	-0.001***
	(0.000)
ka_open	0.035
	(0.033)
DomFinDepth	0.000
	(0.001)
Deficit	-0.005+
	(0.003)
CreditRating	-0.000
	(0.004)
Democracy	0.134
	(0.133)
Transparency	0.003
	(0.028)
NewLeftGovt	-0.073**
	(0.027)
USIRates	-0.074***
	(0.012)
CBI	0.034
	(0.097)
Selected N	727

+ 0.12 ^0.10 * 0.05 ** 0.01 *** 0.001

Country and Year fixed effects

Heckman twostep standard errors

All covariates lagged

Appendix F: 2015 snapshot of eligible and included countries

Across all versions of the index criteria, candidate countries included at least all low and middle income countries. This purposefully casts a wide net, increasing the representativeness of the emerging-country market and expanding the coverage of JP Morgan's product. In 2015, for example, there were 135 low and middle income countries according to World Bank income categories. The index included 65 with 11 high income countries either (a) making it under the JPM income threshold despite being high income according to World Bank categories, (b) having older bonds remaining in the index despite having reached high income levels since JPM phases out the bonds of countries that have been excluded from the index gradually.

In the analysis, we define eligibility by whether a country was a L or MIC for two consecutive years. This criteria meets eligibility across all versions of the index. It also eliminates larger countries or outliers that may be affecting the results after significant growth and graduation into HIC levels of wealth and market access, who may be less-subject to discipline and thus be responsible for identifying lack of discipline. We then model selection into this identifier in first-stage models by the variables noted in the main text.

Our analysis is most relevant for the EMBIG included countries. It is also relevant for the eligible but excluded group of countries that are hoping to borrow on international bond markets, because they are likely to be aware that inclusion in the index is the best way to create a floor of natural demand for their bonds and are likely to manipulate issuance (by issuing bonds of over 500mn USD) in order to get into the index. For eligible but excluded countries not hoping to borrow on international bond markets, our analysis is not directly relevant.

Countries Included in EMBIG in 2015

Angola	Ghana	Panama
Argentina	Guatemala	Paraguay
Armenia	Honduras	Peru
Azerbaijan	Hungary	Philippines
Belarus	India	Poland
Belize	Indonesia	Romania
Bolivia	Iraq	Russian Federation
Brazil	Jamaica	Senegal
Cameroon	Jordan	Serbia
Chile	Kazakhstan	Slovak Republic
China	Kenya	South Africa
Colombia	Latvia	Sri Lanka
Costa Rica	Lebanon	Tanzania
Cote d'Ivoire	Lithuania	Trinidad and Tobago
Croatia	Malaysia	Tunisia
Dominican Republic	Mexico	Turkey
Ecuador	Mongolia	Ukraine
Egypt, Arab Rep.	Morocco	Uruguay
El Salvador	Mozambique	Venezuela, RB
Ethiopia	Namibia	Vietnam
Gabon	Nigeria	Zambia
Georgia	Pakistan	