

Appendix for Beazer, Quintin H. & Byungwon Woo. 2015.
“IMF CONDITIONALITY, GOVERNMENT PARTISANSHIP, AND THE PROGRESS OF
ECONOMIC REFORMS”

This appendix contains the additional analyses that space considerations prevent from reporting in full in the main document.

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Discussion & Details

Description: Coding IMF Conditionality

Bayesian Multilevel Model, Instrumental Variables (IV) Specification

Table 1: **Sampled Post-Communist Countries & IMF Programs**

Countries	Years of IMF Agreement
Albania	1998, 2002, 2006
Armenia	1995, 1996, 2001, 2005, 2008, 2009
Azerbaijan	1995, 1996, 2001
Belarus	1995, 2009
Bulgaria	1994, 1996, 1997, 1998, 2002, 2004
Croatia	1994, 1997, 2001, 2003, 2004
Estonia	1995, 1996, 1997, 2000
Georgia	1995, 1996, 2001, 2004, 2008
Hungary	1996, 2008
Kazakhstan	1994, 1995, 1996, 1999
Kyrgyz Republic	1994, 1998, 2001, 2005, 2008
Latvia	1995, 1996, 1997, 1999, 2001
Lithuania	1994, 2000, 2001
Macedonia	1995, 1997, 2000, 2003, 2005
Moldova	1995, 1996, 2000, 2006, 2010
Poland	1994
Romania	1994, 1997, 1999, 2001, 2004, 2009
Russian Federation	1995, 1996, 1999
Slovak Republic	1994
Slovenia	
Tajikistan	1996, 1998, 2002, 2009
Turkmenistan	
Ukraine	1995, 1996, 1997, 1998, 2004, 2008
Uzbekistan	1995

Table 2: IMF Conditionality, by Year

Year	Number of IMF Programs	Structural Conditions (Avg.)	(Std. Dev.)
1994	8	6.750	6.274
1995	12	18.667	14.581
1996	12	16.333	8.690
1997	7	22.429	14.339
1998	5	31.200	13.461
1999	4	22.000	9.557
2000	4	8.000	5.033
2001	8	11.500	5.555
2002	3	14.333	0.577
2003	2	9.500	2.121
2004	5	19.200	11.256
2005	3	16.000	11.358
2006	2	19.000	5.657
2007	0		
2008	5	6.200	2.490
2009	4	8.750	4.500
2010	1	10.000	.
Total	85	15.518	11.182

Table 3: **Extending Partisanship Data from Frye (2010)**

Country	Program	L/C/R	Executive
Albania	2006	R	Berisha (Democratic Party of Albania)
Armenia	2005, 2008, 2009	R	Kocharian (Independent) , Sargsyan (Republican Party)
Belarus	2009	L	Lukashenko (Independent)
Georgia	2008	R	Saakashvili (United National Movement Party)
Hungary	2008	R	Schmitt (Fidesz Party)
Kyrgyzstan	2005, 2008	R	Bakiyev (Ak Jol)
Macedonia	2005	L	Crvenkovski (Social Democratic Union)
Moldova	2006	L	Voronin (Party of Communists of Republic of Moldova)
Romania	2009	R	Boc (Democratic Liberal Party)
Tajikistan	2009	L	Rahmon (People's Democratic Party of Tajikistan)
Ukraine	2008	R	Yanukovych (Party of Regions)

Note: **Bold font** represents cases from Frye (2010) that are simply extended into the 2005-2009 time period. All others coded by authors, based on coding rules in Frye (2010) and drawing from various sources on parties'/politicians' ideological positions.

Table 4: Summary Statistics

Variable	Obs	Mean	Std. Dev.	[Min, Max]
EBRD REFORM INDEX / REFORM BASELINE	83	0.269	0.495	[-0.968, 1.366]
PUBLIC SECTOR CONDITIONS (LOGGED)	85	1.335	0.827	[0, 3.296]
PUBLIC SECTOR CONDITIONS (ORDINAL)	85	-0.129	0.828	[-1, 1]
TOTAL CONDITIONS (LOGGED)	85	2.519	0.883	[0, 3.951]
EXECUTIVE PARTISANSHIP	85	1.188	0.893	[0, 2]
GDP PER CAPITA	85	8.459	0.725	[6.743, 9.767]
IMF PROGRAM HISTORY	85	3.729	1.809	[1, 8]
IMF PROGRAM DURATION	85	2.576	1.209	[1, 5]
DEMOCRACY	85	0.494	0.503	[0, 1]
INFLATION	84	2.935	1.747	[-0.693, 7.545]
GDP GROWTH	85	1.686	6.911	[-20.085, 13.866]
1992 REFORM CONDITIONS	80	-1.642	0.487	[-1.977, -0.230]
GLOBAL ECONOMY	85	36.813	19.931	[17.01, 98.58]
UNEMPLOYMENT RATE	82	10.904	8.161	[0.300, 37.264]
GOVERNMENT DEBT	84	131.920	83.069	[22.499, 506.144]
TOTAL IMF DISBURSEMENT	85	13.835	7.638	[2.693, 26.581]
YEARS TO REVIEW	85	2.188	1.539	[0, 4]

Note: Reform data and economic data from the European Bank of Reconstruction and Development (EBRD). Partisanship data from Frye (2010), extended by authors. IMF program-specific data collected by authors. Democracy data from Polity IV.

Table 5: **Comparing IMF Conditionality, by Government Partisanship (1994-2009)**

DV: Structural Conditions <i>number of conditions</i>	Group Means			
	Right Gov'ts	Comparison Group	n ₁ , n ₂	p-value
<u>Total Conditions</u>				
Right vs. Non-Right Governments <i>sample: all programs</i>	15.67 (2.02)	15.36 (1.34)	(43, 42)	0.90
Right vs. Left Governments <i>sample: all programs, excluding center gov'ts</i>	15.67 (2.02)	17.11 (1.74)	(43, 27)	0.62
<u>Public Sector Conditions</u>				
Right vs. Non-Right Governments <i>sample: all programs</i>	4.02 (0.70)	4.43 (0.66)	(43, 42)	0.67
Right vs. Left Governments <i>sample: all programs, excluding center gov'ts</i>	4.02 (0.70)	5.44 (0.93)	(43, 27)	0.22

Note: Partisanship data from Frye (2010), extended by authors. IMF program-specific data collected by authors. Standard errors in parentheses below group means; p-values are two-tailed.

Table 6: No Group Differences in Government Turnover and IMF Program Design (1994-2009)

	Subgroup Means		n ₁ , n ₂	p-value
DV: Government Partisanship				
<i>ordinal; 0=left, 2=right</i>				
	<u>No</u>	<u>Yes</u>		
Government switch during IMF program? <i>sample: country-years with IMF program</i>	1.19 (0.06)	1.14 (0.17)	(211, 21)	0.82
DV: Structural Conditions				
<i>number of total conditions</i>				
Government switch during IMF program? <i>sample: country-years under IMF agreement</i>	16.03 (0.76)	15.14 (2.38)	(203, 21)	0.72
Leftward shift during IMF program? <i>sample: country-years under IMF w/ gov't switch</i>	17.44 (3.69)	13.42 (3.15)	(9, 12)	0.42
Delayed leftward shift during IMF program? <i>sample: country-years under IMF directly preceding switch</i>	17.30 (2.89)	12.56 (3.73)	(10, 9)	0.32

Note: Partisanship data from Frye (2010), extended by authors. IMF program-specific data collected by authors. Standard errors in parentheses below group means; p-values are two-tailed.

Table 7: Robustness Check: Ordinary Least Squares & Clustered Standard Errors

DV: REFORM PROGRESS $\Delta_{t+2,t}$ Economic Reform Index	IMF Structural Conditions					
	Public Sector (logged)		Public Sector (ordinal: low, med., high)		Total Conditions (logged)	
STRUCTURAL CONDITIONS <i>measure varies by column</i>	0.148** (0.060)	0.191** (0.070)	0.185** (0.064)	0.216** (0.064)	0.136** (0.052)	0.197** (0.057)
EXECUTIVE PARTISANSHIP <i>ordinal; 0=left, 2=right</i>	0.138** (0.056)	0.160** (0.062)	0.048 (0.032)	0.045 (0.034)	0.182** (0.081)	0.238** (0.089)
CONDITIONS × PARTISANSHIP	-0.064* (0.035)	-0.077** (0.035)	-0.085** (0.034)	-0.085** (0.034)	-0.056* (0.029)	-0.080** (0.028)
REFORM BASELINE <i>EBRD score at start of IMF program</i>	-0.246* (0.128)	-0.379** (0.090)	-0.259** (0.110)	-0.409** (0.075)	-0.250** (0.135)	-0.405** (0.096)
GDP PER CAPITA <i>constant USD per capita (logged)</i>	0.079 (0.061)	0.016 (0.080)	0.090* (0.052)	0.041 (0.067)	0.084 (0.063)	0.014 (0.083)
IMF PROGRAM HISTORY <i>count of past IMF programs</i>		0.055** (0.024)		0.058** (0.021)		0.063** (0.022)
IMF PROGRAM DURATION <i>duration of current program, in years</i>		-0.065 (0.039)		-0.058 (0.039)		-0.074* (0.041)
DEMOCRACY <i>dummy; 1= 7 or greater on Polity scale</i>		-0.101 (0.066)		-0.108* (0.060)		-0.076 (0.070)
INFLATION <i>annual inflation rate, in % (logged)</i>		-0.054* (0.030)		-0.065** (0.031)		-0.061* (0.034)
GDP GROWTH <i>year-on-year GDP change, in %</i>		-0.001 (0.006)		-0.002 (0.006)		0.001 (0.006)
1992 REFORM CONDITIONS <i>EBRD score at communism's collapse</i>		0.108 (0.073)		0.101 (0.071)		0.098 (0.068)
GLOBAL ECONOMY <i>avg. price of oil per barrel, in constant USD</i>		0.004 (0.003)		0.004 (0.002)		0.004 (0.003)
TIME TREND		-0.047* (0.025)		-0.046** (0.021)		-0.055** (0.025)
<i>Number of Observations</i>	83	79	83	79	83	79

Note: Reform data and economic data from the EBRD. Partisanship data from Frye (2010), extended by authors. IMF program-specific data collected by authors. Coefficients represent estimates from ordinary least squares. Constant and dummies for years withheld to conserve space; standard errors are clustered by country and appear in parentheses. ** indicates $p < 0.05$; * indicates $p < 0.10$

Table 8: **Robustness Check: Times-Series Cross-Sectional Analyses**

DV: REFORM PROGRESS $\Delta_{t+2,t}$ <i>Economic Reform Index</i>	IMF Structural Conditions					
	Public Sector <i>(logged)</i>		Public Sector <i>(ordinal: low, med., high)</i>		Total Conditions <i>(logged)</i>	
STRUCTURAL CONDITIONS <i>measure varies as noted</i>	0.075** (0.020)	0.076** (0.021)	0.069** (0.026)	0.074** (0.025)	0.059** (0.016)	0.053** (0.015)
EXECUTIVE PARTISANSHIP <i>ordinal; 0=left, 2=right</i>	0.055** (0.018)	0.049** (0.018)	0.025* (0.013)	0.023* (0.012)	0.056** (0.018)	0.048** (0.017)
CONDITIONS × PARTISANSHIP	-0.030** (0.010)	-0.025** (0.010)	-0.035** (0.016)	-0.034** (0.014)	-0.017** (0.006)	-0.014** (0.006)
IMF PARTICIPATION <i>dummy, 1 = current IMF program</i>	-0.065** (0.022)	-0.075** (0.034)	-0.008 (0.021)	-0.010 (0.035)	-0.105** (0.038)	-0.103** (0.048)
REFORM BASELINE <i>EBRD score at start of IMF program</i>	-0.640** (0.066)	-0.689** (0.064)	-0.622** (0.065)	-0.668** (0.064)	-0.634** (0.065)	-0.675** (0.064)
GDP PER CAPITA <i>constant USD per capita (logged)</i>	-0.021 (0.066)	0.026 (0.062)	-0.031 (0.072)	0.022 (0.075)	-0.026 (0.065)	0.017 (0.064)
IMF PROGRAM HISTORY <i>count of past IMF programs</i>		0.032** (0.015)		0.029* (0.016)		0.028* (0.014)
IMF PROGRAM DURATION <i>duration of current program, in years</i>		0.003 (0.009)		0.005 (0.009)		0.003 (0.009)
DEMOCRACY <i>dummy; 1= 7 or greater on Polity scale</i>		0.014 (0.031)		0.024 (0.027)		0.022 (0.029)
INFLATION <i>annual inflation rate, in % (logged)</i>		0.007 (0.008)		0.008 (0.008)		0.006 (0.008)
GDP GROWTH <i>year-on-year GDP change, in %</i>		-0.003 (0.002)		-0.004* (0.002)		-0.003 (0.002)
GLOBAL ECONOMY <i>avg. price of oil per barrel, in constant USD</i>		0.001 (0.001)		0.001 (0.000)		0.001 (0.001)
TIME TREND		0.007 (0.006)		0.006 (0.006)		0.006 (0.006)
<i>Country Fixed Effects</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Year Fixed Effects</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Number of Observations</i>	396	384	396	384	396	384

Note: Reform data and economic data from the EBRD. Partisanship data from Frye (2010), extended by authors. IMF program-specific data collected by authors. IMF program-specific data collected by authors. Coefficients represent estimates from ordinary least squares. Constant, country fixed effects and dummies for years withheld to conserve space; standard errors are clustered by country and appear in parentheses. ** indicates $p < 0.05$; * indicates $p < 0.10$

Table 9: Robustness Check: Alternate Measures of the Dependent Variable

DV: VARIOUS $\Delta_{t+2,t}$ Reform Variable	Dependent Variables				
	Competition Policy	Large-Scale Privatization	Narrow Index (Additive)	Full Index (Additive)	Private Sector % of GDP
STRUCTURAL CONDITIONS <i>public sector conditions (logged)</i>	0.141** (0.062)	0.193** (0.076)	0.520** (0.129)	0.974** (0.236)	1.971 (2.172)
EXECUTIVE PARTISANSHIP <i>ordinal; 0=left, 2=right</i>	0.213** (0.064)	0.292** (0.084)	0.740** (0.145)	1.302** (0.267)	4.484** (2.030)
CONDITIONS × PARTISANSHIP	-0.116* * (0.037)	-0.119** (0.047)	-0.344** (0.080)	-0.541** (0.142)	-2.086* (1.258)
REFORM BASELINE <i>DV at start of IMF program</i>	-0.243** (0.068)	-0.762** (0.088)	-0.771* * (0.085)	-0.757** (0.091)	-0.446** (0.098)
GDP PER CAPITA <i>constant USD per capita (logged)</i>	0.071* (0.041)	0.129 (0.111)	0.425** (0.203)	0.660 (0.522)	1.717 (1.766)
IMF PROGRAM HISTORY <i>count of past IMF programs</i>	0.010 (0.022)	0.103** (0.049)	0.145* (0.080)	0.153 (0.151)	1.559* (0.917)
IMF PROGRAM DURATION <i>duration of current program, in years</i>	-0.016 (0.022)	-0.039 (0.029)	-0.100** (0.048)	-0.135 (0.082)	-0.127 (0.681)
DEMOCRACY <i>dummy; 1= 7 or greater on Polity scale</i>	0.116* (0.062)	-0.052 (0.093)	0.318** (0.162)	0.100 (0.310)	-2.457 (2.203)
INFLATION <i>annual inflation rate, in % (logged)</i>	0.009 (0.024)	-0.025 (0.035)	-0.078 (0.062)	0.044 (0.116)	-0.278 (0.791)
GDP GROWTH <i>year-on-year GDP change, in %</i>	0.000 (0.004)	0.003 (0.005)	-0.003 (0.009)	0.014 (0.015)	-0.048 (0.152)
1992 REFORM CONDITIONS <i>DV at communism's collapse</i>	0.022 (0.076)	0.067 (0.289)	0.337* (0.190)	0.256* (0.142)	0.091 (0.130)
GLOBAL ECONOMY <i>avg. price of oil/barrel, constant USD</i>	-0.001 (0.002)	-0.001 (0.003)	-0.005 (0.005)	-0.018* (0.009)	0.046 (0.173)
TIME TREND	0.001 (0.013)	-0.012 (0.021)	0.005 (0.035)	0.104 (0.067)	-0.707 (0.559)
N	84	84	84	79	63

Note: Reform data and economic data from the EBRD. Partisanship data from Frye (2010), extended by authors. IMF program-specific data collected by authors. IMF program-specific data collected by authors. Coefficients represent estimates from multilevel regression; constant term and random intercepts countries and year withheld to conserve space. Standard errors in parentheses. ** indicates $p < 0.05$; * indicates $p < 0.10$

Table 10: Robustness Check: Extra Controls & Partisanship Indicator Variables

DV: REFORM PROGRESS $\Delta_{t+2,t}$ Economic Reform Index	IMF Structural Conditions					
	Public Sector (logged)		Public Sector (ordinal: low, med., high)		Total Conditions (logged)	
STRUCTURAL CONDITIONS <i>measure varies by column</i>	0.180** (0.042)	0.049 (0.073)	0.149** (0.037)	0.092 (0.060)	0.150** (0.039)	0.016 (0.058)
EXECUTIVE PARTISANSHIP <i>ordinal; 0=left, 2=right</i>	0.275** (0.048)		0.092** (0.028)		0.339** (0.071)	
CONDITIONS × PARTISANSHIP	-0.114** (0.025)		-0.093** (0.023)		-0.093** (0.024)	
LEFT PARTISANSHIP <i>dummy; 1=left executive</i>		-0.456** (0.153)		-0.233** (0.091)		-0.560** (0.205)
RIGHT PARTISANSHIP <i>dummy; 1=right executive</i>		0.183* (0.100)		-0.008 (0.069)		0.187 (0.160)
CONDITIONS × LEFT		0.156* (0.087)		0.070 (0.072)		0.151** (0.070)
CONDITIONS × RIGHT		-0.097 (0.073)		-0.127** (0.062)		-0.050 (0.060)
REFORM BASELINE <i>EBRD score at start of IMF program</i>	-0.790** (0.087)	-0.820** (0.092)	-0.770** (0.090)	-0.784* (0.095)	-0.800** (0.093)	-0.826** (0.097)
GDP PER CAPITA <i>constant USD per capita (logged)</i>	0.168* (0.095)	0.177* (0.094)	0.150 (0.093)	0.150* (0.089)	0.177* (0.098)	0.190* (0.098)
IMF PROGRAM HISTORY <i>count of past IMF programs</i>	0.037 (0.027)	0.030 (0.028)	0.046* (0.027)	0.042 (0.028)	0.042 (0.029)	0.039 (0.030)
IMF PROGRAM DURATION <i>duration of current program, in years</i>	-0.038** (0.016)	-0.034** (0.016)	-0.038** (0.017)	-0.033* (0.017)	-0.038** (0.017)	-0.035** (0.017)
DEMOCRACY <i>dummy; 1= 7 or greater on Polity scale</i>	0.040 (0.057)	0.047 (0.059)	0.019 (0.059)	0.017 (0.060)	0.048 (0.057)	0.055 (0.058)
INFLATION <i>annual inflation rate, in % (logged)</i>	-0.008 (0.021)	-0.016 (0.022)	-0.016 (0.022)	-0.023 (0.024)	-0.009 (0.022)	-0.014 (0.023)
GDP GROWTH <i>year-on-year GDP change, in %</i>	0.004 (0.003)	0.003 (0.003)	0.003 (0.003)	0.002 (0.003)	0.005* (0.003)	0.005* (0.003)
UNEMPLOYMENT RATE <i>in % of working age population</i>	-0.011** (0.005)	-0.009 (0.006)	-0.010* (0.005)	-0.006 (0.006)	-0.010* (0.005)	-0.009 (0.006)
GOVERNMENT DEBT <i>debt-to-export ratio, in %</i>	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
1992 REFORM CONDITIONS <i>EBRD score at communism's collapse</i>	0.261* (0.150)	0.217 (0.147)	0.258* (0.142)	0.220 (0.135)	0.238 (0.150)	0.193 (0.152)
GLOBAL ECONOMY <i>avg. price of oil per barrel, constant USD</i>	-0.004** (0.002)	-0.003 (0.002)	-0.003* (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.001 (0.002)
TIME TREND	0.012 (0.013)	0.010 (0.013)	0.010 (0.013)	0.008 (0.014)	0.007 (0.014)	0.004 (0.014)
<i>Number of Observations</i>	77	77	77	77	77	77

Note: Reform data and economic data from the EBRD. Partisanship data from Frye (2010), extended by authors. IMF program-specific data collected by authors. Coefficients represent estimates from multilevel regression; constant term and random intercepts countries and year withheld to conserve space. Standard errors in parentheses. ** indicates $p < 0.05$; * indicates $p < 0.10$

Table 11: Revisiting Main Maximum-Likelihood Results: Bayesian Multilevel Analyses

DV: REFORM PROGRESS <i>Δ</i> _{t+2,t} Economic Reform Index	Public Sector (logged)		Public Sector (ordinal)		Total Conditions (logged)	
	Estimate	St. Dev. 95% CI	Estimate	St. Dev. 95% CI	Estimate	St. Dev. 95% CI
STRUCTURAL CONDITIONS <i>measure varies as noted</i>	0.190	0.044 [0.010, 0.276]	0.157	0.039 [0.080, 0.235]	0.163	0.041 [0.085, 0.245]
EXECUTIVE PARTISANSHIP <i>ordinal; 0=left, 2=right</i>	0.111	0.028 [0.053, 0.164]	0.088	0.029 [0.031, 0.146]	0.094	0.029 [0.036, 0.150]
CONDITIONS × PARTISANSHIP	-0.105	0.027 [-0.156, -0.051]	-0.086	0.025 [-0.137, -0.037]	-0.088	0.026 [-0.139, -0.037]
REFORM BASELINE <i>EBRD score at start of IMF program</i>	-0.775	0.095 [-0.956, -0.583]	-0.755	0.102 [-0.951, -0.546]	-0.785	0.102 [-0.978, -0.584]
GDP PER CAPITA <i>constant USD per capita (logged)</i>	0.138	0.101 [-0.058, 0.335]	0.133	0.094 [-0.050, 0.318]	0.159	0.104 [-0.038, 0.366]
IMF PROGRAM HISTORY <i>count of past IMF programs</i>	0.034	0.027 [-0.020, 0.086]	0.043	0.029 [-0.014, 0.102]	0.032	0.030 [-0.026, 0.092]
IMF PROGRAM DURATION <i>duration of current program, in years</i>	-0.025	0.016 [-0.057, 0.006]	-0.025	0.017 [-0.059, 0.008]	-0.026	0.017 [-0.060, 0.007]
DEMOCRACY <i>dummy; 1 = 7 or greater on Polity scale</i>	0.019	0.058 [-0.095, 0.135]	0.016	0.060 [-0.102, 0.135]	0.038	0.057 [-0.073, 0.152]
INFLATION <i>annual inflation rate, in % (logged)</i>	0.000	0.022 [-0.045, 0.044]	-0.010	0.024 [-0.057, 0.036]	-0.002	0.023 [-0.048, 0.042]
GDP GROWTH <i>year-on-year GDP change, in %</i>	0.001	0.003 [-0.005, 0.007]	0.001	0.003 [-0.005, 0.007]	0.003	0.003 [-0.003, 0.009]
1992 REFORM CONDITIONS <i>EBRD score at communism's collapse</i>	0.278	0.151 [0.013, 0.586]	0.243	0.140 [0.044, 0.518]	0.254	0.153 [-0.054, 0.570]
GLOBAL ECONOMY <i>avg. price of oil per barrel, in constant USD</i>	-0.003	0.002 [-0.006, 0.001]	-0.002	0.002 [-0.006, 0.002]	-0.002	0.002 [-0.005, 0.002]
TIME TREND	0.016	0.014 [-0.012, 0.042]	0.010	0.015 [-0.018, 0.038]	0.012	0.015 [-0.017, 0.040]
<i>Number of Observations</i>	79		79		79	

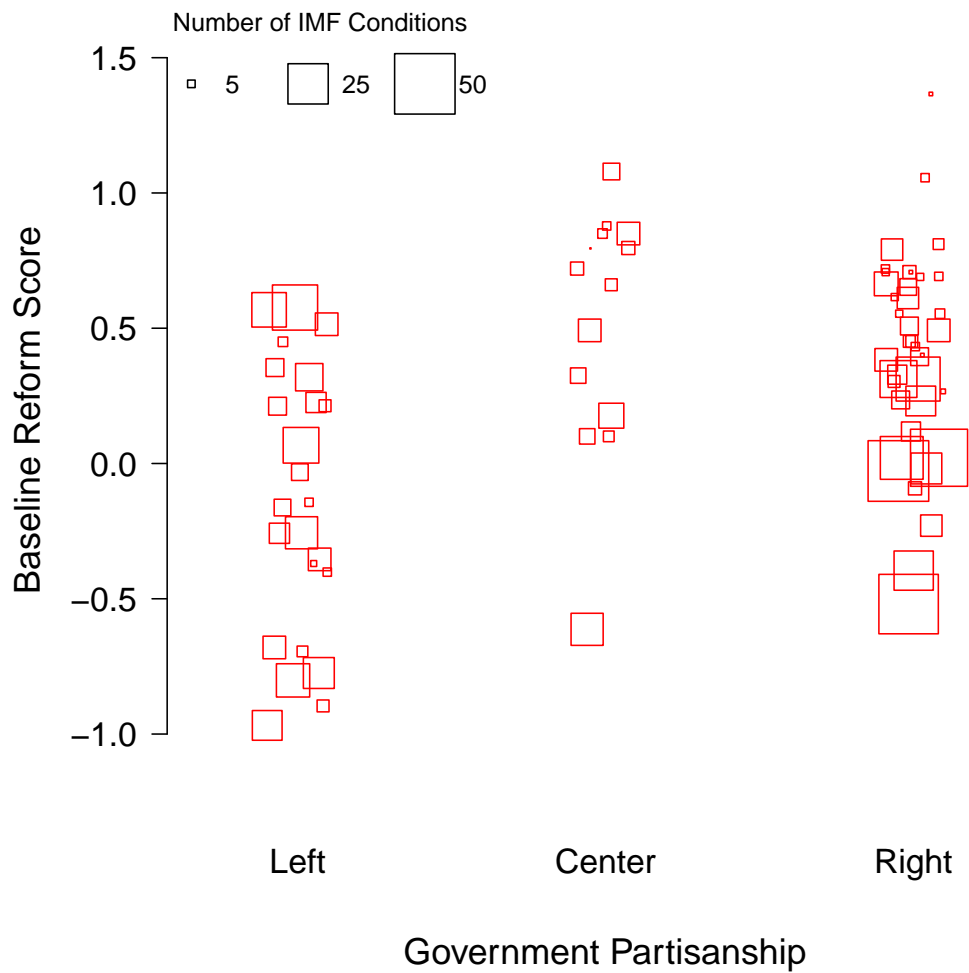
Note: Reform and economic data from the EBRD. Partisanship data from Frye (2010), extended by authors. IMF program-specific data collected by authors. Estimates represent posterior means from Bayesian multilevel analyses. 95% credible intervals posterior distributions' 2.5th and 97.5th percentiles, respectively. To conserve space, random intercepts for countries and years not presented. Analyses use three MCMC chains at 50,000 iterations each; 3,000 samples remain after discarding the first 10,000 of each chain, then keeping every fourth sample. To speed MCMC convergence, all non-dummy variables standardized.

Table 12: Bayesian Instrumental Variables Analyses (First- & Second-Stage Results)

DV: REFORM PROGRESS $\Delta_{t+2,t}$ <i>Economic Reform Index</i>	Public Sector Conditions			Total Conditions		
	Estimate	St. Dev.	95% CI	Estimate	St. Dev.	95% CI
Second-Stage Results						
STRUCTURAL CONDITIONS <i>number of conditions (logged)</i>	0.221	0.080	[0.062, 0.385]	0.163	0.071	[0.026, 0.300]
EXECUTIVE PARTISANSHIP <i>ordinal; 0=left, 2=right</i>	0.110	0.030	[0.050, 0.169]	0.091	0.030	[0.031, 0.149]
CONDITIONS × PARTISANSHIP	-0.117	0.027	[-0.170, -0.065]	-0.095	0.025	[-0.145, -0.044]
REFORM BASELINE <i>EBRD score at start of IMF program</i>	-0.694	0.099	[-0.883, -0.494]	-0.725	0.097	[-0.908, -0.529]
GDP PER CAPITA <i>constant USD per capita (logged)</i>	0.227	0.093	[0.051, 0.415]	0.246	0.093	[0.066, 0.434]
INFLATION <i>annual inflation rate, in % (logged)</i>	-0.017	0.018	[-0.050, 0.018]	-0.019	0.018	[-0.055, 0.019]
1992 REFORM CONDITIONS <i>EBRD score at communism's collapse</i>	0.183	0.130	[-0.069, 0.443]	0.180	0.134	[-0.087, 0.454]
First-Stage Results						
TOTAL DISBURSEMENT (IV) <i>IV1: total annual IMF disbursement</i>	0.022	0.021	[-0.022, 0.062]	0.020	0.021	[-0.021, 0.060]
YEARS TO REVIEW (IV) <i>IV2: yrs to IMF governors' review</i>	0.168	0.112	[-0.056, 0.386]	0.190	0.114	[-0.035, 0.412]
EXECUTIVE PARTISANSHIP <i>ordinal; 0=left, 2=right</i>	-0.034	0.111	[-0.258, 0.188]	0.083	0.126	[-0.159, 0.335]
REFORM BASELINE <i>EBRD score at start of IMF program</i>	-0.547	0.325	[-1.183, 0.099]	-0.326	0.401	[-1.092, 0.489]
GDP PER CAPITA <i>constant USD per capita (logged)</i>	-0.195	0.192	[-0.585, 0.171]	-0.240	0.238	[-0.746, 0.203]
INFLATION <i>annual inflation rate, in % (logged)</i>	0.073	0.081	[-0.093, 0.231]	0.117	0.092	[-0.056, 0.303]
1992 REFORM CONDITIONS <i>EBRD score at communism's collapse</i>	0.085	0.274	[-0.454, 0.642]	-0.204	0.324	[-0.869, 0.398]
<i>Number of Observations</i>	79			79		

Note: Reform and economic data from the EBRD. Partisanship data from Frye (2010), extended by authors. IMF program-specific data collected by authors. Estimates represent posterior means from Bayesian multilevel analyses. 95% credible intervals report posterior distributions' 2.5th and 97.5th percentiles, respectively. To conserve space, random intercepts for countries and years not presented. Analyses use three MCMC chains at 50,000 iterations each; 3,000 samples remain after discarding the first 10,000 of each chain, then keeping every fourtieth sample. To speed MCMC convergence, all non-dummy variables standardized.

Figure 1: Baseline Reform Scores, by Government Partisanship & IMF Conditionality



Note: Reform data taken from the EBRD; partisanship coded based on Frye (2010); IMF program data collected by authors. “Baseline” reform scores refer to countries’ REFORM INDEX value at the initiation of an IMF program. Squares’ size represents the number of conditions within a given IMF program. Observations jittered along the x-axis to improve visibility of overlapping values.

DESCRIPTION: CODING IMF CONDITIONALITY

The original dataset from Woo (2010) contains all 268 IMF lending programs that were signed between 1994 and 2006.¹ The dataset was updated to include all programs signed between 2007 and 2009 in the post-communist countries. In total, the IMF signed 85 programs between 1994 and 2010.

Each Letter of Intent was either downloaded from the official IMF website, where most of letters signed after 2000 are available or gathered through archival research at the IMF Archives in Washington D.C. A Letter of Intent often lays out a broad scheme of intended economic reforms with supplementary tables and is often supplemented by a Memorandum of Economic Policies. IMF conditions are listed explicitly with their types at the end of Letter of Intent or embedded in the main text of the Letter of Intent.

Only initial Letters of Intent are coded. Scheduled reviews and revised Letters of Intent are often published after each review, but those tend to be slight modifications of what the IMF and the country initially agreed on. Counting conditions from these follow-up reviews runs the danger of multiple-counting same conditions, thus inflating the number of conditions when a program involves more reviews or when a program is not interrupted or cancelled prematurely.

Conditions in each program are coded by targeted economic sectors and by conditionality types. The targeted economic sectors are divided into four economic sectors: public sector, financial sector, fiscal sector, and the other. This is simplification of the scheme used by the Independent Evaluation Office (IEO) of the IMF.² Public sector conditions in our dataset include sectors 4, 5, and 6 of the IEO's classification: state-owned enterprise reform, privatization, and civil service reform respectively. Fiscal sector conditions include sectors 1 and 2, which are tax policies and public expenditure measures. Financial sector conditions cover category 3. The rest are grouped into the other conditions. The dataset only contains structural conditions as the quantitative performance criteria and indicative targets are constantly present in all IMF programs.

¹Specifically, the types of IMF lending programs included in our data come under a few different names, including "Stand-by", "Extended Fund Facility", and "Poverty Reduction and Growth Facility." We do not include any "Flexible Credit Line" or "Extended Credit Facility" programs since the IMF introduced these new types of programs around in or after the end year of our data. Among those 268 programs, five programs outside the post-communist region do not have a publicly available Letter of Intent and/or Memorandum on Economic Policies.

²The IEO uses nine categories to classify reform conditions in IMF programs. Reform categories are as follows: 1. tax policy and tax administration; 2. public expenditure measures; 3. financial sector reforms and development; 4. state-owned enterprises reform; 5. privatization; 6. civil service reform; 7. social policies; 8. other Fund core; 9. other World Bank core. These 9 categories are combined into 4 different categories.

BAYESIAN MULTILEVEL MODEL, INSTRUMENTAL VARIABLES (IV) SPECIFICATION

Model Specification

The empirical model for the Bayesian IV model follows the form of the MLE multilevel model detailed in the main text, but adds a ‘first-stage’ equation to model the potentially endogenous regressor, STRUCTURAL CONDITIONS using the instruments TOTAL IMF DISBURSEMENT and YEARS TO GOVERNORS’ REVIEW. We estimate the following model in WinBUGS through R:

$$\begin{aligned} \mathbf{y}_i &= \beta_1 \hat{C}_i + \beta_2 P_i + \beta_3 \hat{C}_i P_i + \mathbf{X}_i \Theta + \alpha_{j[i]} + \eta_{t[i]} + \varepsilon_i \\ \hat{C}_i &= \delta_1 z_{1i} + \delta_2 z_{2i} + \delta_3 P_i + \mathbf{X}_i \Omega + \gamma_{j[i]} + \phi_{t[i]} + \zeta_i \end{aligned}$$

$$\begin{aligned} \begin{pmatrix} \varepsilon_i \\ \zeta_i \end{pmatrix} &\sim \mathbf{N} \left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \sigma_y^2 & \rho_1 \sigma_y \sigma_C \\ \rho_1 \sigma_y \sigma_C & \sigma_C^2 \end{pmatrix} \right) \\ \begin{pmatrix} \alpha_j \\ \gamma_j \end{pmatrix} &\sim \mathbf{N} \left(\begin{pmatrix} \mu_\alpha \\ \mu_\gamma \end{pmatrix}, \begin{pmatrix} \sigma_\alpha^2 & \rho_2 \sigma_\alpha \sigma_\gamma \\ \rho_2 \sigma_\alpha \sigma_\gamma & \sigma_\gamma^2 \end{pmatrix} \right) \\ \begin{pmatrix} \eta_t \\ \phi_t \end{pmatrix} &\sim \mathbf{N} \left(\begin{pmatrix} \mu_\eta \\ \mu_\phi \end{pmatrix}, \begin{pmatrix} \sigma_\eta^2 & \rho_3 \sigma_\eta \sigma_\phi \\ \rho_3 \sigma_\eta \sigma_\phi & \sigma_\phi^2 \end{pmatrix} \right) \end{aligned}$$

where i indexes individual IMF programs, j indexes countries, and t indexes years; \mathbf{y}_i is REFORM PROGRESS, the dependent variable as described above; C_i is the measure of STRUCTURAL CONDITIONS in a given IMF program; P_i measures the PARTISANSHIP of the borrowing country’s government at the program’s initiation; z_{1i} and z_{2i} are the instrumental variables, which are included in the equation predicting the number of structural conditions; \mathbf{X} is vector of control variables that enter into both equations; β , δ , Θ , and Ω are parameters to be estimated; α_j , γ_j , η_t , and ϕ_t are group-level random intercepts for countries and years assumed to come from normal distributions with means (μ_α , μ_γ , $\mu_\eta = 0$, and $\mu_\phi = 0$), group-specific variances (σ_α^2 , σ_γ^2 , σ_η^2 , and σ_ϕ^2), and within-group, cross-equation covariances ($\rho_2 \sigma_\alpha \sigma_\gamma$, $\rho_3 \sigma_\eta \sigma_\phi$) to be estimated; and ε_i and ζ_i are error terms with mean zero, estimated variances σ_y^2 and σ_C^2 , and estimated covariance $\rho_1 \sigma_y \sigma_C$.

Priors

To estimate these model using Bayesian methods, we must also specify priors for each parameter to be estimated. As noted in the text, we impose diffuse priors to allow the data to dictate the posterior distribution. Also as noted in the text, we model the variance parameters indirectly, using inverse-variances (τ) as suggested by Gelman and Hill (2007): $\tau_{\text{country}} = 1/\sigma_{\text{country}}^2$, $\tau_{\text{year}} = 1/\sigma_{\text{year}}^2$, and $\tau_{\varepsilon} = 1/\sigma_{\varepsilon}^2$. The prior distributions are as follows:

$$\begin{aligned}
\beta_k &\sim \text{N}(0, 1 \times 10^4), & k = 1, 2, 3 \\
\delta_k &\sim \text{N}(0, 1 \times 10^4), & k = 1, 2 \\
\Theta_k &\sim \text{N}(0, 1 \times 10^4), & k = 1, \dots, 4 \\
\Omega_k &\sim \text{N}(0, 1 \times 10^4), & k = 1, \dots, 4 \\
\mu_{\alpha} &\sim \text{N}(0, 1 \times 10^4) \\
\mu_{\gamma} &\sim \text{N}(0, 1 \times 10^4) \\
\sigma_{\alpha} &\sim \text{U}(0, 100) \\
\sigma_{\gamma} &\sim \text{U}(0, 100) \\
\sigma_{\eta} &\sim \text{U}(0, 100) \\
\sigma_{\phi} &\sim \text{U}(0, 100) \\
\sigma_{\varepsilon} &\sim \text{U}(0, 100) \\
\sigma_{\zeta} &\sim \text{U}(0, 100) \\
\rho_1 &\sim \text{U}(-1, 1) \\
\rho_2 &\sim \text{U}(-1, 1) \\
\rho_3 &\sim \text{U}(-1, 1)
\end{aligned}$$

Estimation & Convergence

The IV analyses use three MCMC chains at 100,000 iterations each. We retain 3,000 samples in total after discarding the first 40,000 of each chain, then thinning to every sixtieth sample. To ease MCMC convergence, we standardize all non-dummy variables. While this large number of iterations is meant to give simulation chains the chance to mix thoroughly, we also use test statistics suggested by Gelman and Hill (2007) to assess convergence of the MCMC iterations. For each parameter, we look at \hat{R} , the square root of the variance of the mixture of all chains divided by the average within-chain variance. All parameters from the model report $\hat{R} \approx 1$, suggesting MCMC chains have mixed well. Similarly, to help evaluate the autocorrelation in the Bayesian models' simulations, we also examine the effective number of simulation draws per parameter reported by the statistical software. Gelman and Hill (2007) suggest that 100 effective independent draws is sufficient for typical estimates and credible intervals; our lowest reported value for parameters of interest is 940. All the available evidence suggests that our Bayesian models have converged and are based on well-behaved MCMC chains.