

Online Appendix

This online appendix provides supplementary information on the empirical results presented in the article “Natural Resource Sector FDI, Government Policy, and Economic Growth: Quasi-Experimental Evidence from Liberia.”

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1 Tables of Main Analysis

1.1 Regression Outputs for Main Models

Summary *Tables containing the regression outputs for the models presented in the manuscript are displayed in this section.*

This section presents the tables with the main results reported in the manuscript. These numerical results are the basis for the various Figures illustrating our findings.

1.1.1 Main Results: All Concessions

Table 1: All Concessions (2006-2012), 25 km.

	Whole	Early	Late
Treatment	0.035 (0.124)	0.12 (0.14)	0.350*** (0.105)
Urban/Rural	2.390*** (0.634)	0.001 (0.001)	-1.115 (1.626)
Elevation	0.001 (0.001)	0.002*** (0.001)	0.01 (0.01)
Pop. Density	0.004*** (0.001)	-0.00000 (0)	0.003 (0.003)
Aid Projects	0.00001* (0.000)	0 (0.00001)	0.00003*** (0.00001)
Nat. Resource Location	-0.00001 (0.00001)	0.046 (0.151)	0.0001 (0.0001)
Home Regions	-0.167* (0.09)	-0.00001 (0.0001)	-7.490 (5.023)
Dist. to Roads	0.00002 (0.00003)	-0.010 (0.062)	0.0001 (0.0001)
Slope	-0.038 (0.065)	-0.001 (0.001)	-0.906 (1.06)
Urban Travel Time	-0.0001 (0.0004)	-0.002 (0.006)	-0.003 (0.002)
Pre-Period Precipitation	0.003 (0.007)	0.143 (0.113)	0.037 (0.035)
Pre-Period Temperature	-0.052 (0.098)	-0.261 (0.162)	-0.491 (1.213)
Pre-Period NTL (Avg)	-0.462 (0.318)	3.197* (1.696)	-0.988 (0.812)
Pre-Period NTL (Trend)	3.247 (7.659)	0.009 (0.032)	5.826 (19.95)
Household Numbers	0.099* (0.059)	0.732 (0.56)	0.758** (0.337)
Gender	-0.728 (0.839)	-0.012** (0.005)	-7.959* (4.228)
Age	-0.015* (0.009)	0.378* (0.221)	0.206** (0.099)
Edu. (Primary)	-0.041 (0.132)	-1.068* (0.645)	0.981* (0.53)
Edu. (Secondary)	0.16 (0.499)	0.00001*** (0.000)	-10.300* (5.874)
Wealth	0.000 (0.000)	-0.336* (0.18)	-0.00002 (0.00001)
Employment (Yes)	-1.142** (0.475)	-0.364 (0.455)	0.72 (0.449)
Religion	0.323 (0.412)	0.432 (0.674)	19.474 (12.016)
Occupation (44)	0.964** (0.447)	0.481 (0.378)	-4.971 (4.541)

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Table 1 – Continued			
	Whole	Early	Late
Occupation (62)	0.604* (0.354)	−3.394** (1.372)	−4.702 (4.47)
Occupation (65)	−0.012 (0.511)	−3.051** (1.433)	
DHS - North Central	6.764* (3.472)	−2.900** (1.274)	
DHS - North Western	6.091* (3.494)	−2.839** (1.418)	−5.306* (3.071)
DHS - South Central	7.162** (3.4)	−2.990* (1.702)	0.996 (1.155)
DHS - S. East A	7.156** (3.465)	−0.332 (2.904)	−0.570 (2.813)
DHS - S. East B	6.941** (3.478)		−2.733 (2.435)
Constant	−5.233 (4.065)		7.786 (28.362)

1.1.2 Main Results: Agriculture, Forestry, and Mining Concessions

Table 2: Agriculture, Forestry, and Mining Concessions (2006-2012), 25 km

	Agriculture		Forestry			Mining		
	All	Late	All	Early	Late	All	Early	Late
Treatment	-0.346 (0.188)	-0.595*** (0.146)	-0.102 (0.084)	0.064** (0.026)	-0.130* (0.075)	0.174*** (0.052)	0.014** (0.006)	0.131** (0.056)
Urban/Rural	-0.836 (1.878)	2.681*** (0.687)			-0.0002 (0.0003)	2.262*** (0.45)	-0.028 (0.03)	0.678 (0.45)
Elevation	-0.007* (0.004)	-0.003** (0.001)	-0.0004 (0.0004)	0.0004 (0.0003)	0.001* (0.001)	0.0001 (0.001)	0.0001 (0.0001)	-0.0004 (0.001)
Pop. Density	0.003 (0.002)	-0.0001 (0.001)	0.002** (0.001)	-0.003** (0.001)	0.0000 (0.000)	0.002*** (0.001)	-0.0002 (0.0003)	0.001 (0.001)
Aid Projects	0.00001 (0.00001)	-0.00000 (0.000)	0.00000** (0.000)	0.0000 (0.000)	0.0000 (0.000)	-0.00000* (0.000)	0.0000 (0.000)	-0.00000 (0.000)
Nat. Resource Location	0.0001** (0.00002)	0.00001 (0.00001)	0.0000 (0.000)	0.0000 (0.000)	-0.007 (0.045)	0.0000 (0.000)	0.0000 (0.000)	-0.00000 (0.000)
Home Regions	0.119 (0.084)	0.140*** (0.05)	-0.035 (0.057)	0.074 (0.08)	0.0000 (0.00001)	0.216*** (0.07)	0.005 (0.005)	0.034 (0.058)
Dist. to Roads	0.0001 (0.0001)	-0.00000 (0.0001)	-0.00002 (0.00002)	-0.00001 (0.00002)	-0.008 (0.015)	-0.00001 (0.00003)	0.0000 (0.00001)	-0.00000 (0.00002)
Slope	0.259** (0.121)	0.249*** (0.076)	-0.002 (0.017)	-0.003 (0.007)	-0.0002 (0.0002)	-0.034 (0.042)	-0.001 (0.002)	-0.029 (0.036)
Urban Travel Time	-0.004 (0.003)	-0.002 (0.003)	0.0001 (0.0002)	-0.0002 (0.0002)	-0.067 (0.071)	-0.0002 (0.0001)	-0.0002 (0.0002)	-0.0001 (0.0002)
Pre-Period Precipitation	-0.055 (0.038)	-0.034 (0.021)	-0.044 (0.075)	-0.023 (0.025)	0.002 (0.003)	0.008 (0.005)	0.659 (0.522)	0.012 (0.008)
Pre-Period Temperature	2.226** (1.117)	0.333 (0.28)	0.006 (0.004)	0.002 (0.002)	4.613*** (1.402)	0.067 (0.117)	-12.531 (23.374)	-0.097 (0.098)
Pre-Period NTL (Avg)	-0.060 (0.242)	-1.060*** (0.153)	3.376** (1.527)	16.054*** (2.714)	-0.304*** (0.086)	-0.421*** (0.067)	6.694 (6.596)	-0.815*** (0.136)
Pre-Period NTL (Trend)	1.105 (2.444)	16.741*** (1.84)	-0.01 (0.102)	-0.805** (0.392)	-0.024 (0.017)	8.247*** (2.059)	-0.062 (0.194)	13.084*** (2.901)
Household Numbers	-0.011 (0.095)	0.177*** (0.061)	-0.029 (0.021)	0.01 (0.007)	0.073 (0.12)	0.059 (0.06)	-0.003 (0.003)	0.003 (0.038)
Gender	0.275 (0.862)	1.301*** (0.429)	-0.066 (0.097)	-0.214 (0.184)	0.002 (0.005)	0.651 (0.57)	0.019 (0.035)	0.934* (0.535)
Age	-0.062** (0.024)	-0.024** (0.011)	0.0003 (0.005)	0.0003 (0.002)	0.200 (0.124)	-0.003 (0.004)	0.0004* (0.0003)	0.006 (0.005)
Edu. (Primary)	0.742** (0.31)	0.624*** (0.172)	0.320** (0.144)	0.757 (0.673)	1.914*** (0.653)	0.014 (0.076)	0.023* (0.012)	-0.003 (0.095)
Edu. Level (Secondary)	-0.242 (0.887)	0.249 (0.475)	0.293 (0.357)		0.0000 (0.000)	0.088 (0.44)	-0.042* (0.022)	-0.274 (0.279)
Wealth	-0.00001** (0.000)	-0.00001*** (0.000)	0.00000* (0.000)	0.00000*** (0.000)	-0.142 (0.093)	0.0000 (0.000)	0.0000 (0.000)	0.0000 (0.000)
Employment (Yes)	0.812 (0.517)	-0.299 (0.216)	-0.134 (0.099)	-0.052 (0.047)	0.048 (0.13)	-0.142 (0.157)	-0.043** (0.021)	-0.308* (0.184)
Religion	1.756** (0.872)	0.672 (0.441)	0.003 (0.145)	-0.157 (0.164)	-0.105 (0.167)	0.491 (0.314)	-0.0001 (0.033)	0.896 (0.695)
Occupation (44)	-2.708*** (0.938)	-0.682* (0.405)	-0.139 (0.203)	0.109 (0.119)	-0.041 (0.129)	0.138 (0.154)	0.019 (0.029)	0.156 (0.16)
Occupation (62)	-3.250*** (0.967)	-1.130*** (0.412)	-0.114 (0.154)	0.065 (0.081)	-0.317 (0.391)	0.096 (0.182)	-0.038 (0.029)	-0.086 (0.159)
Occupation (65)	-1.284 (1.074)			0.118 (0.164)	5.290** (2.325)	0.184 (0.221)	0.027 (0.066)	0.272 (0.221)
DHS - North Central	0.322 (1.013)		3.512 (3.145)	0.141 (0.126)	5.179** (2.366)	6.850*** (2.236)	0.023 (0.049)	-0.186 (2.031)
DHS - North Western		-0.616 (0.465)	3.432 (3.175)	0.118 (0.164)	5.947*** (2.284)	6.332*** (2.296)	0.032 (0.037)	-1.125 (2.359)
DHS - South Central	-3.886* (2.067)	-0.119 (0.395)	4.271 (3.088)	0.141 (0.126)	5.587** (2.331)	6.673*** (2.219)	-0.002 (0.037)	-0.442 (1.999)

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Table 2 – Continued

	Agriculture		All	Forestry		All	Mining	
	All	Late		Early	Late		Early	Late
DHS - S. East A	-42.645*	-1.495*	3.859	0.026	5.337**	6.633***	0.143	-0.191
	(22.742)	(0.843)	(3.183)	(0.077)	(2.325)	(2.274)	(0.135)	(2.066)
DHS - S. East B		-1.686*	3.491		-3.81	6.703***		-0.220.000
		(0.867)	(3.19)		(2.911)	(2.21)		(1.956)
Constant		-2.802	-2.983	0.167	0.167	-9.751***		0.619
		(5.104)	(3.718)	(0.422)	(0.422)	(3.77)		(3.401)

1.1.3 Main Results: Iron Ore and Non-Iron Ore Mining Concessions

Table 3: Iron Ore and Non-Iron Ore Concessions (2006-2012), 25 km

	Iron Ore		Non-Iron Ore Mining	
	All	Late	All	Late
Treatment	0.253** (0.104)	0.165* (0.089)	0.005 (0.05)	0.047 (0.052)
Urban/Rural	2.247*** (0.513)	0.848 (0.52)	2.371*** (0.375)	1.124*** (0.42)
Elevation	0.001 (0.001)	0.001* (0.001)	0.001 (0.001)	0.0005 (0.001)
Pop. Density	0.003*** (0.001)	0.001 (0.001)	0.001*** (0.0005)	0.001*** (0.001)
Aid Projects	0.0000 (0.000)	0.00000* (0.000)	-0.00000 (0.000)	-0.00000 (0.000)
Nat. Resource Location	0.00000 (0.000)	-0.00000 (0.000)	0.00000* (0.000)	0.00000 (0.000)
Home Regions	-0.050 (0.038)	0.013 (0.034)	0.173** (0.08)	0.013 (0.074)
Dist. to Roads	0.00004* (0.00002)	0.00003 (0.00002)	0.00002 (0.00002)	0.00004* (0.00002)
Slope	-0.021 (0.045)	-0.057 (0.04)	-0.008 (0.019)	-0.019 (0.02)
Urban Travel Time	-0.0005* (0.0003)	-0.0005* (0.0002)	-0.00005 (0.0001)	-0.00003 (0.0001)
Pre-Period Precipitation	0.006 (0.004)	0.0004 (0.004)	-0.001 (0.004)	0.004 (0.005)
Pre-Period Temperature	-0.064 (0.097)	-0.054 (0.084)	-0.020 (0.092)	-0.201* (0.107)
Pre-Period NTL (Avg)	-0.339*** (0.108)	-0.741*** (0.107)	-0.395*** (0.085)	-0.889*** (0.097)
Pre-Period NTL (Trend)	9.676*** (2.248)	12.268*** (1.953)	8.407*** (0.956)	13.079*** (2.267)
Household Numbers	0.004 (0.022)	-0.004 (0.02)	0.037 (0.041)	0.039 (0.032)
Gender	0.183 (0.354)	0.299 (0.329)	0.473* (0.255)	0.366 (0.258)
Age	0.002 (0.004)	0.003 (0.004)	0.0004 (0.003)	-0.001 (0.003)
Edu. (Primary)	0.523** (0.213)	0.427** (0.181)	0.225 (0.34)	0.336 (0.358)
Edu. (Secondary)	0.857*** (0.244)	0.938*** (0.317)	0.099* (0.057)	0.078 (0.06)
Wealth	0.00000 (0.000)	-0.00000 (0.000)	0.987** (0.426)	0.807*** (0.28)
Employment (Yes)	-0.313** (0.144)	-0.326** (0.163)	0.00000 (0.000)	-0.00000 (0.000)
Religion	0.068 (0.145)	0.115 (0.136)	-0.050 (0.153)	-0.016 (0.128)
Occupation (44)	0.467* (0.26)	0.153 (0.163)	0.115 (0.339)	0.23 (0.303)
Occupation (62)	-0.012 (0.132)	0.0001 (0.118)	0.1 (0.335)	0.241 (0.327)
Occupation (65)	-0.436 (0.64)	-0.028 (0.365)	-1.574*** (0.35)	0.241 (0.499)
DHS - North Central	9.158*** (2.625)	2.306 (2.697)	0.400** (0.179)	0.231* (0.137)
DHS - North Western	9.307*** (2.611)	2.634 (2.699)	0.149 (0.122)	0.166 (0.126)
DHS - South Central	9.842*** (2.601)	3.155 (2.656)	-3.347*** (0.744)	-0.467 (0.689)
DHS - S. East A	9.415***	2.836	3.682**	2.071

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Table 3 – Continued

	Iron Ore		Non-Iron Ore Mining	
	All	Late	All	Late
DHS - S. East B	(2.653)	(2.72)	(1.511)	(1.591)
	9.223***	2.643	3.650**	1.766
	(2.613)	(2.679)	(1.636)	(1.806)
Region - S. East B			3.979***	2.291
			(1.432)	(1.549)
Constant	-9.071**	-1.975	-4.313	1.316
	(3.689)	(3.322)	(2.639)	(2.828)

1.1.4 Main Results: US and Chinese Concessions

Table 4: US and Chinese Concessions (2006-2012), 25 km

	China		USA	
	All	Late	All	Late
Treatment	0.829*** (0.2)	0.614*** (0.199)	0.017 (0.072)	0.045 (0.06)
Urban/Rural	-2.389 (3.194)	-6.416** (2.579)	-0.0003 (0.001)	-0.0005 (0.0004)
Elevation	-0.002 (0.002)	-0.001 (0.002)	0.001*** (0.0003)	0.001** (0.0004)
Pop. Density	0.002** (0.001)	0.002*** (0.0004)	0.00001*** (0.000)	0.00000** (0.000)
Aid Projects	0.00000 (0.00001)	0.00001* (0.00001)	-0.00000 (0.000)	-0.00000 (0.000)
Nat. Resource Location	0.00001 (0.00001)	-0.00002 (0.00001)	-0.155*** (0.039)	-0.075** (0.031)
Home Regions	-0.006 (0.081)	0.02 (0.058)	-0.00001 (0.00002)	-0.00000 (0.00001)
Dist. to Roads	-0.0002** (0.0001)	-0.00003 (0.0001)	-0.013 (0.019)	0.004 (0.015)
Slope	-0.043 (0.078)	-0.011 (0.064)	-0.0002 (0.0002)	-0.0002 (0.0001)
Urban Travel Time	-0.005** (0.002)	-0.004* (0.002)	0.002 (0.003)	0.003 (0.003)
Pre-Period Precipitation	-0.031* (0.016)	0.039** (0.019)	-0.071 (0.075)	-0.065 (0.061)
Pre-Period Temperature	-0.138 (0.198)	-0.660** (0.269)	-0.097 (0.08)	-0.668*** (0.208)
Pre-Period NTL (Avg)	-0.552*** (0.086)	-0.865*** (0.1)	4.222*** (0.913)	11.767*** (3.137)
Pre-Period NTL (Trend)	9.956*** (2.02)	13.150*** (1.818)	-0.025 (0.02)	-0.028 (0.017)
Household Numbers	-0.129** (0.066)	-0.040 (0.061)	-0.235 (0.27)	-0.092 (0.177)
Gender	-0.399 (0.702)	-0.407 (0.663)	0.004 (0.004)	0.004 (0.003)
Age	0.019** (0.01)	0.019* (0.01)	0.271** (0.125)	0.246** (0.108)
Religion	-0.199 (0.326)	0.115 (0.413)	0.729*** (0.269)	0.582** (0.259)
Edu. (Primary)	1.138*** (0.33)	1.162*** (0.404)	0.00000*** (0.000)	0.0000 (0.000)
Edu. (Secondary)	0.436 (1.013)	0.219 (1.156)	-0.338** (0.143)	-0.228** (0.102)
Wealth	0.0000 (0.000)	-0.00000 (0.000)	-0.321 (0.317)	-0.535** (0.254)
Employment (Yes)	0.265 (0.293)	0.897* (0.505)	-0.014 (0.328)	-0.317 (0.288)
Marital Status	0.579 (0.371)	0.705 (0.435)	-0.468 (0.475)	-0.767*** (0.284)
Occupation (44)	1.150*** (0.433)	1.570*** (0.583)	0.18 (0.201)	0.005 (0.111)
Occupation (62)			0.099 (0.129)	0.005 (0.091)
Occupation (65)	-1.207** (0.489)	-1.366** (0.585)		
DHS - North Central	-0.425 (0.34)	-0.926* (0.507)	0.511 (0.649)	2.618*** (0.772)
DHS - North Western	-0.370 (1.415)	-2.113 (1.36)	0.144 (0.608)	2.312*** (0.783)

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Table 4 – Continued				
	China		USA	
	All	Late	All	Late
DHS - South Central	-0.236 (1.425)	-5.081** (2.477)	0.991* (0.583)	2.926*** (0.726)
DHS - S. East A	0.775 (1.437)	-5.065** (2.502)	0.862 (0.673)	2.868*** (0.77)
DHS - S. East B	1.668 (1.226)	-4.036 (2.522)	0.262 (0.669)	2.475*** (0.765)
Constant	7.057 (4.599)	13.583** (5.89)	1.636 (1.94)	-0.610 (1.653)

1.1.5 Main Results: US and Chinese Mining Concessions

Table 5: US and Chinese Mining Concessions (2006-2012), 25 km

	China		USA	
	All	Late	All	Late
Treatment	1.032*** (0.194)	0.599*** (0.154)	-0.006 (0.078)	-0.006 (0.061)
Urban/Rural	-4.577* (2.362)	-0.027 (2.576)	2.054*** (0.497)	0.776* (0.408)
Elevation	0.003 (0.003)	-0.001 (0.002)	-0.0003 (0.001)	-0.0003 (0.0005)
Pop. Density	0.002*** (0.0004)	0.001** (0.001)	0.002*** (0.001)	0.003*** (0.001)
Aid Projects	-0.00001 (0.00001)	0.00001 (0.00001)	0.00001*** (0.000)	0.00000** (0.000)
Nat. Resource Location	0.00002* (0.00001)	0.0000 (0.00001)	-0.00000 (0.0000)	-0.00000 (0.00000)
Home Regions	0.085 (0.101)	0.103 (0.069)	-0.119*** (0.041)	-0.051 (0.036)
Dist. to Roads	-0.0001 (0.0001)	0.00005 (0.0001)	-0.00001 (0.00002)	-0.00001 (0.00001)
Slope	-0.095 (0.096)	-0.062 (0.078)	-0.024 (0.024)	-0.012 (0.019)
Urban Travel Time	-0.003 (0.003)	-0.001 (0.001)	-0.0004** (0.0002)	-0.0002* (0.0001)
Pre-Period Precipitation	-0.020 (0.014)	0.023 (0.018)	0.003 (0.004)	0.002 (0.003)
Pre-Period Temperature	-0.101 (0.229)	-0.462* (0.262)	0.009 (0.07)	-0.025 (0.056)
Pre-Period NTL (Avg)	-0.573*** (0.097)	-0.844*** (0.113)	-0.164* (0.098)	-0.922*** (0.124)
Pre-Period NTL (Trend)	10.027*** (1.838)	12.825*** (1.839)	4.670*** (1.169)	15.415*** (1.781)
Household Numbers	-0.155* (0.081)	0.02 (0.071)	-0.028 (0.021)	-0.026 (0.018)
Gender	-0.621 (0.719)	-0.371 (0.758)	0.015 (0.29)	0.012 (0.222)
Age	0.042*** (0.009)	0.044*** (0.01)	0.004 (0.004)	0.002 (0.003)
Religion	-0.280 (0.514)	-0.800* (0.44)	0.011 (0.143)	0.144 (0.139)
Edu. (Primary)	1.193*** (0.352)	1.095*** (0.277)	0.342** (0.147)	0.204* (0.105)
Edu. (Secondary)	0.149 (1.205)	0.769 (1.086)	0.646** (0.284)	0.343* (0.206)
Wealth	0.00000* (0.000)	-0.00000 (0.000)	0.00000** (0.000)	0.0000 (0.000)
Employment (Yes)	-0.306 (0.312)	0.474 (0.543)	-0.316* (0.176)	-0.207 (0.141)
Marital Status	-0.089 (0.368)	0.835 (0.728)	-0.303 (0.255)	-0.713*** (0.209)
Occupation (44)	0.527 (0.398)	1.836*** (0.696)	0.1 (0.268)	-0.456** (0.221)
Occupation (62)	-1.327*** (0.489)		-0.663** (0.288)	-0.933*** (0.257)
Occupation (65)	-0.073 (0.34)	-0.916 (0.589)	0.239 (0.224)	0.042 (0.143)
DHS - North Central		-0.347 (0.438)	0.13 (0.173)	0.109 (0.141)
DHS - North Western	-0.489 (1.241)	0.026 (0.894)		

Continued on Next Page...

Table 5 – Continued					
	China		USA		
	All	Late	All	Late	
DHS - South Central	0.368 (1.318)	0.583 (0.91)			
DHS - S. East A	1.227 (1.226)	1.215 (0.937)	-0.316* (0.175)	-0.240* (0.134)	
DHS - S. East B	0.871 (0.909)	1.937*** (0.63)	0.594** (0.251)	0.377** (0.183)	
Constant	3.962 (4.595)	3.798 (5.076)	-0.228 (1.73)	1.056 (1.297)	

2 Background Information

2.1 A Brief Review of Existing Studies

Summary *In this section, we provide a brief review of existing studies on the causal relationship between FDI and growth. We describe how the conclusions derived depend on the types of data and methods used.*

In order to address the challenge of endogeneity (i.e. the possibility that two-way causation undermines the interpretation of the cross-country regressions reported earlier), previous research has generally taken one of three approaches. The first approach involves analysis of cross-country, macro-economic, panel data. In contrast to cross-country regressions, these studies use panel cointegration techniques to analyze the time-series properties of the aggregated FDI flows for multiple countries to properly identify the direction of (granger) causality. Mello (1999) analyzes 32 countries between 1970-1990 and provides evidence that FDI causes growth in OECD countries, but fails to find the same relationship in developing countries. However, Hansen & Rand (2006) find that FDI increases GDP in 32 developing countries between 1970-2000, and Nair-Reichert & Weinhold (2001) also find that FDI promotes growth in a sample of 24 developing countries between 1971 and 1995, although the relationship is heterogeneous across countries. Others do not identify a one-directional, causal relationship from FDI to growth, but rather bi-directional causality between FDI and growth (Choe, 2003; Basu, Chakraborty & Reagle, 2003).

This literature have been criticized by Banerjee, Marcellino & Osbat (2004) and Gutierrez (2003) on the grounds that it is possible for the null hypotheses of ‘no panel cointegration’ to be rejected, even though this conclusion is driven only by a few cointegrated relationships. Therefore, researchers can mistakenly assume a whole panel to be cointegrated.

As a consequence, a separate group scholars have conducted country-by-country panel analysis of macro-economic data. However, the results from this literature are also inconsistent. FDI has purportedly increased growth in South Africa (Fedderke & Romm, 2006), Mexico (Ramirez, 2000), and Argentina (Cuadros, Orts & Alguacil, 2004), as well as in Singapore, Hong Kong, and Taiwan (Zhang, 2001). Yet others have found that strong economic performance attracts FDI in India (Chakraborty & Basu, 2002), Chile (Chowdhury & Mavrotas, 2006), Brazil (Cuadros, Orts & Alguacil, 2004; Zhang, 2001), and Colombia (Zhang, 2001). Still another groups finds evidence of a bi-directional relationship in Malaysia and Thailand (Chowdhury & Mavrotas, 2006), China (Liu, Burrige & Sinclair, 2002), and Indonesia (Zhang, 2001).

Data limitations have also prevented this literature from reaching its full potential. FDI inflows are usually reported as net flows, making it impossible to differentiate between a host country that had FDI activities and a country that received FDI in-flows and out-flows that cancelled each other out (Kerner, 2014). Also, in spite of the fact

that most theories relate to the effect of specific investment projects or the activities of specific firms, the FDI data used to test the observable implications of these theories are aggregate measures that remove any information about the investor or investment-specific characteristics from the equation. “All that we observe is the cross-national distribution of MNCs’ collective investments (net profit repatriations and other reverse flows) during a given year” (Barry, 2015, p. 247). This disconnect implies that “[aggregate] FDI [flows] are merely a second-best or proxy measure” (Stephan & Pfaffmann, 2001, p. 197).

A third literature uses firm-level panel data instead of cross-country, macroeconomic data. These studies typically analyze panels of firms operating in a single country. They seek to identify the positive spillovers from foreign to domestic firms suggested by the endogenous growth theory. For this reason, the productivity of domestic firms is correlated with the extent of foreign presence in their sector. However, the results from this literature are contradictory. Studies of firms in Morocco (Haddad & Harrison, 1993), Venezuela (Aitken & Harrison, 1999), the Czech Republic (Djankov & Hoekman, 2000), and Bulgaria, Romania, and Poland (Konings, 2001) find no evidence of positive technology spillovers and conclude that FDI does not accelerate growth. By contrast, firm-level studies in Lithuania (Javorcik, 2004), the U.K. (Haskel, Pereira & Slaughter, 2007), and the U.S. (Keller & Yeaple, 2009) suggest that FDI does increase economic growth.¹

These studies also face significant data limitations. Sorens & Ruger (2012) point out that most firm-level datasets are plagued by systematically missing data, resulting in selection bias. For example, many studies utilize data on outward U.S. investment from the Bureau of Economic Analysis, but this dataset only includes “data for countries that are major investment partners of the United States, as detailed information on smaller FDI hosts is not provided due to corporate confidentiality concerns” (Blanton & Blanton, 2012, p. 437). Thus, the data from the Bureau of Economic Analysis are effectively censored both with respect to the set of home countries and host countries.

In summary, these three different empirical approaches — cross-country, panel data analysis, country-by-country panel data analysis, and country-by-country, firm-level, panel data analysis — have failed to produce a consensus about the nature of the relationship between FDI and growth.

¹A review of firm-level studies by Gorg & Greenaway (2004) confirms the heterogeneity in findings by reporting that six studies find evidence of positive spillover effects, while 19 do not.

2.2 Liberia’s Growth Corridors

Summary *This section provides additional information regarding Liberia’s strategy of promoting economic growth through allocating concessions, particularly in the iron ore sector.*

The Johnson-Sirleaf administration initially prioritized the development of three spatial development corridors (see Figure 1) near large population centers and existing markets: one corridor that runs from the iron ore mines in Nimba County to the port city of Buchanan; a second corridor that runs from Monrovia to Tubmanburg and then to Bomi Hills, Bea Mountain, and Mano River (where the Western Cluster iron ore deposits are located); and a third corridor than runs from the Putu Range (where the Putu iron ore deposit is located) in Grand Gedeh county to Greenville.²

²The Government of Liberia also identified a fourth potential development corridor that would run north from Monrovia to the Bong range iron ore deposit in Bong County and the Wologizi iron ore deposit in Lofa county (see Figure 1). However, given that the Wologizi iron ore deposit had “not yet been proven economically viable” at the time the authorities drafted their strategy, this fourth potential development corridor was not assigned a high level of priority (Government of Liberia, 2010: 55).

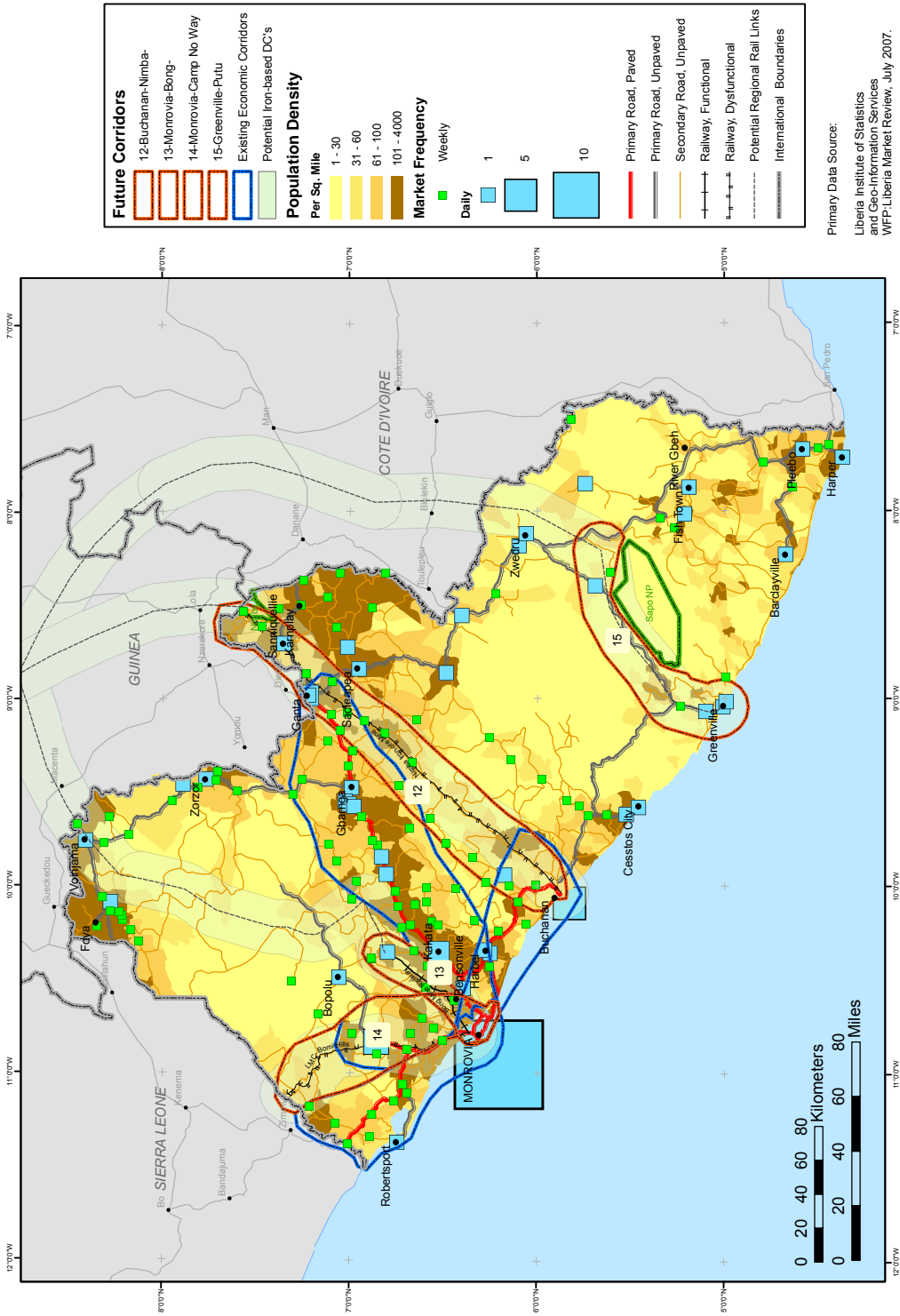


Figure 1: The Johnson-Sirleaf Administration's Development Corridor Priorities.

3 Data Used for Analyses

3.1 The Independent Variable: Geocoding of Natural Resource Concessions

Summary *Our main independent variable are FDI concessions in Liberia. In this section, we describe our process for geo-referencing data on concession boundaries in Liberia. We employ an innovative methodology to translate location information from LEITI contracts into latitude and longitude coordinates, which we are then spatially rendered for our analysis.*

We first compiled all natural resource concession contracts published by the Liberian Extractive Industries Transparency Initiative (Government of Liberia, 2016). Since approximately 95% of Liberia’s FDI is concentrated in the natural resource sector (Werker & Beganovic, 2011; Mlachila & Takebe, 2011), we are confident that this dataset of FDI activities provides a close approximation of the full universe of FDI projects in Liberia between 2004 and 2015. We then use the information contained in these detailed contracts to code various attributes (described at greater length below) of concessions that the Government of Liberia granted to investors in the mining, agriculture, forestry, and oil/gas sectors between 2004 and 2015. We then sourced additional data from two other publicly available databases owned and operated by the Liberian government: (a) the Ministry of Lands, Mines, and Energy’s Mining Cadastre Administration System (MCAS), which contains detailed, historic, and up-to-date information on mining licenses and agreements, but does not capture licenses in other sectors; and (b) the Liberia National Concessions Portal, which displays attribute data for all active concessions, but does not contain historical data. Standardizing and synthesizing the data from these two official sources allowed us to eliminate many missing data problems (specific to each source).

Following this process of merging and de-duplicating data from different sources, we searched for missing attributes — particularly the financial amounts associated with each investment — through open-source data collection and triangulation methods. In addition, each data source contained geographic information regarding the approximate shape of each concession area,³ which we used to geo-reference the concession areas as

³The data sources provide different types of spatial information. Concession contracts published by the Liberia Extractive Industries Transparency Initiative (LEITI) generally consist of one of four types: (1) decimal degrees representing the vertices of a concession area, which we then map and compare to digitized maps of concession areas provided by the Ministry of Lands, Mines, and Energy; (2) UTM coordinates corresponding to the vertices of a concession area; (3) survey coordinates that provide the approximate locations of the vertices of a concession area; or (4) survey coordinates that do not provide the approximate locations of the vertices of a concession area. The third and fourth types presented the greatest geo-referencing challenge because survey coordinates had to be converted into sequential points, and then mapped as best as possible. By contrast, the Liberia National Concessions Portal and the MCAS provide readily available geometries for each concession area within their respective databases. Therefore, in cases where we uncovered overlapping concessions (reported in either of these portals and

polygons in our investment-level database. Geo-referencing the specific tracts of land upon which investors (concessionaires) were granted rights to explore, extract, or sell natural resources was a crucial first step to operationalize our different measures of what geographic areas were impacted by FDI.

In order to test whether and when different types of concessions have different treatment effects, we further coded each natural resource concession in our dataset on several key dimensions, including the sector of the concession (agriculture, mining, or forestry) and the nationality of the concessionaire or its parent company. These concession attribute variables are described in greater detail below:

- **Sectors:** Our dataset categorizes each concession according to its sector. These sectors including mining, agriculture, and forestry. Mining accounts for approximately two-thirds of investments in Liberia. The lion's share of concessions (about 95%) granted to investors during the treatment period (2006-2012) were in the mining and forestry sector, with mining licenses comprising of 77% of total licenses and forestry accounting for another 18%. The Liberian government has recently begun to grant more agricultural concessions to foreign investors (e.g. to establish palm oil plantations).⁴ We therefore focus our empirical tests on the independent effects of mining, agriculture, and forestry concessions.⁵
- **Nationalities:** To test for differential impacts of Chinese and U.S.-based investors, we first obtained data on the nationality of the companies that applied for concession licenses. Since most of these firms are subsidiaries of foreign companies, we obtained information on the country in which the parent company is incorporated. In cases where the parent company itself is a subsidiary, we sought information on its owner. In instances where ownership is shared among multiple partners, we used the information of the majority investor (more specifically, greater than 50%) to code nationality. Data sources include self-reported data by concessionaires; proprietary databases such as Dun and Bradstreet, CompuStat, and ORBIS; and annual reports obtained from the websites of companies. All of our empirical analyses rely on the nationality of the ultimate owner – that is, the final company in the path of ownership.

The full dataset has been made available to the public. It can be downloaded at <http://aiddata.org/data/liberia-concessions-geocoded-research-release-level-1-v-1-0>

the LEITI contracts) and there was some degree of uncertainty about the survey information contained in LEITI contracts, we relied upon the spatial information contained in the Liberia National Concessions Portal and the MCAS.

⁴The remaining foreign concessions exist in the oil and natural gas sector.

⁵Mining concessions involve the exploration or extraction of more than 15 mineral resources, including gold, diamond, bauxite, iron ore, and base metals. Agriculture concessions involve extraction of palm oil and rubber products, whereas forestry concessions consist of harvesting timber products.

3.2 The Dependent Variable: Advantages and Disadvantages of Nighttime lights

Summary *This section discusses the advantages and limitations associated with using remotely-sensed nighttime light growth as an outcome measure.*

We measure our outcome of interest—local economic growth—using satellite data on nighttime light emissions. There are four important caveats and points of clarification about this outcome measure that merit discussion. First, nighttime light growth is not a direct measure of subnational economic growth, but it is widely used by economists, political scientists, and geographers as a strong proxy measure of subnational economic growth (Henderson, Storeygard & Weil, 2011; Henderson, Storeygard & Weil, 2012; Weidmann & Schutte, 2017; Gennaioli et al., 2014; Hodler & Raschky, 2014; Khomba & Trew, 2017).⁶ Henderson, Storeygard & Weil (2011) and Henderson, Storeygard & Weil (2012) demonstrate that there is a strong, positive correlation between GDP growth and nighttime light growth.⁷ Hodler & Raschky (2014, pp. 1028-1031) use subnational GDP estimates from Gennaioli et al. (2014), covering 1,503 subnational regions within 82 countries, to estimate the relationship between nighttime lights and subnational GDP. They estimate elasticities between nighttime lights and GDP at the national and subnational levels, respectively, of around 0.3.

Second, comparisons of nighttime light over time can be problematic due to sensor degradation and the fact that satellites capture both persistent lighting (e.g. street lights) and ephemeral lights (e.g. fires) (Wu et al., 2013). To address this problem, we remove all ephemeral events, such as fires, from the data. Our measurements are also calibrated across sensors and years using the coefficients reported in Elvidge et al. (2014, p. 102).

Third, nighttime light measurements suffer from a so-called ‘overglow’ problem, whereby light from one spatial unit can spill over from one spatial unit to an adjacent unit, making it difficult to reliably detect changes at fine spatial scales Weidmann & Schutte (2017). However, this problem is most acute in well-lit, urban areas and virtually all of our units of observation are in poorly-lit rural and urban areas.

A fourth potential problem is that nighttime light is measured on a 0-63 scale that is subject to top-coding and bottom-coding (Jean et al., 2016); that is to say, exceptionally

⁶Chen & Nordhaus (2011) present an A-E grading system for the quality of a country’s statistical systems (A indicating a high quality system and E indicating extremely weak or non-existent system) and provide evidence that “luminosity is likely to add value as a proxy for [economic] output for countries with the poorest statistical systems, those that receive a D or an E grade.... and [t]his is true at the national level and at subnational levels where data are available” (Chen & Nordhaus, 2011, p. 8594). Liberia receives a “D” in their grading system. They conclude that “luminosity data may be a useful supplement to current economic indicators in countries and regions with very poor quality or missing data” (Chen & Nordhaus, 2011, p. 8594).

⁷Weidmann & Schutte (2017) demonstrate that nighttime light correlates strongly (.73) with survey-based measures of asset wealth at the local level. Khomba & Trew (2017) also find a strong, positive correlation between nighttime light growth and household consumption gains.

high levels of light cannot be detected beyond the threshold of 63, and exceptionally low but non-zero levels of light may result in a score of 0. Top coding is not a significant challenge in our study because baseline and endline levels of nighttime light are low across the entire country. However, bottom coding is a potential problem since Liberia contains a large number of very poor, totally unlit areas (where growth may occur outside the sensor’s detection capabilities). We address this issue by testing (in Section 5.1 of this Online Appendix) whether our empirical results hold after we control for a grid cell’s underlying ‘propensity to light up.’

Finally, several additional notes of clarification are in order regarding the way in which we have operationalized our outcome measures. Since nighttime light is measured many times over the course of a calendar year, we use average annual estimates of nighttime light. Also, to ensure that we fully capture any treatment effects that may have accrued during the 2006-2012 period, we measure nighttime light growth by subtracting its mean value in 2005 from its mean value in 2013. We use 2005, rather than 2006, as our baseline year of measurement to ensure that our baseline outcome measurement is not contaminated by treatment effects. We use 2013 as our endline year of measurement to allow concessions granted near the end of the treatment period (e.g. 2012) to register detectable effects.

4 Matching Algorithm

4.1 Description of matching process

Summary *This section provides details regarding the matching process we use in our paper. Specifically, we discuss the variables we use to identify locations that are as similar as possible. In addition, we present the logit models using these variables to predict whether a location was treated or not.*

Matching only helps address endogeneity if it is possible to measure the variables that influence treatment assignment (i.e. investment siting decisions).⁸ For this reason, we carefully reviewed the existing literature on the determinants of investment project siting decisions at subnational scales (e.g., Ledyeva, 2009; Ledyeva, Karhunen & Kosonen, 2013; Mukim & Nunnenkamp, 2012; Meyer & Nguyen, 2005; Cheng & Kwan, 2000; Wattanadumrong, Collins & Snell, 2010). We identified a set of factors that influence where investor site their projects within countries, including market size, market access, human capital, transportation infrastructure, institutional quality, proximity to natural resources, and domestic political considerations.

In our analysis, we attempt to account for as many of these factors as possible by drawing on data from satellite imagery, weather stations, household surveys, and administrative records. For instance, we control for slope, elevation, temperature and precipitation as these physical characteristics are known to influence the siting decisions of investors in the natural resource sector. The slope and elevation data are sourced from the NASA Shuttle Radar Topography Mission and the temperature and precipitation data are drawn from the Center for Climactic Research at the University of Delaware. We also include a variable that measures a grid cell’s proximity to known natural resources—including iron ore, gold, and diamonds—as this too may influence siting decisions.⁹

We account for access to markets by including a measure of distance to roads from CIESIN’s Global Roads Open Access Database and a DHS-based measure of the urban or rural nature of a given location. We control for population density because investors are generally more productive and profitable in places where they can source labor.¹⁰

⁸Note that matching approaches are only as useful as the set of observed covariates used to achieve balance between treatment and control units. We cannot completely rule out the possibility that some unobserved confound biases our findings. Therefore, we make similar assumptions as instrumental variable approaches, which need to assume that there are no unobserved variables linking the instrument to the outcome except through the path of the instrumented variable.

⁹We calculate the distance between a DHS grid cell and its nearest natural resource, irrespective of type. We source data pre-treatment locations of iron ore and gold from the Natural Resource Location Dataset (see: <http://civilwardynamics.org/data/>) and the US Geological Survey’s Mineral Resources Data System (MRDS). We draw upon PRIO-GRID 2.0 (<http://grid.prio.org/#/>) for data on diamond deposits.

¹⁰In a 2011 report entitled *Developing Liberia’s Economic Corridors*, Liberia’s Ministry of Planning and Economic Affairs noted that “[o]ne measure of the attraction of areas as targets for investment is the level of population density – the lower the density, the lower the level of its current economic

The population density data are drawn from CIESIN’s Gridded Population of the World (GPW) v4 dataset, which is measured at a resolution of 30-arc seconds and in five-year intervals.¹¹ We also control for urban travel time to capture the ease with which labor can commute to potential project sites. These data come from the European Commission Joint Research Centre.

Additionally, to account for the fact that development and investment projects may be co-located (Li et al. 2013), we include a measure of proximity to Chinese development projects from 2000-2005.¹² The colocation of development and investment projects is a potentially important source of confounding, as previous research suggests development projects themselves have local economic growth effects. (Dreher et al. 2016) and Isaksson and Kotsadam (2016) find that Chinese and World Bank development projects have positive effects on local development outcomes, as measured by nighttime light emissions.¹³

In order to capture potential political bias in the spatial allocation of natural resource concessions, we identify the birth regions of the members of Ellen Johnson-Sirleaf’s first cabinet (who were appointed in early 2006) and construct a ADM1-level measure of the number of cabinet members who were born in a given county (ICHINO & NATHAN, 2013; Soumahoro, 2015; Wahman & Boone, 2017; Hodler & Raschky, 2014). We manually assembled this dataset by first using the CIA’s *Chief of State and Cabinet Members of Foreign Governments* to identify all members of Ellen Johnson-Sirleaf’s first cabinet, and then using a diverse set of publicly available resources to identify the towns, villages, districts, and counties where these public officials were born.¹⁴ Given that this locational information varied in its precision and a common geographical unit of observation was needed to consistently measure the birth regions of cabinet members, we used the raw data to identify the number of cabinet members who were born in a given county (ADM1). We then mapped these county-level data to the 1 km x 1 km grid cell level to facilitate integration with our treatment, outcome, and covariate data.

Another set of matching covariates, which relate to local population characteristics, are drawn from the 2007 Demographic and Health Survey (DHS).¹⁵ Access to skilled and semi-skilled labor is often important to foreign investors and may therefore influence their project siting decisions. We capture the expected productivity of the local workforce by

attractiveness?” (MOPEA 2011: 5).

¹¹We use CIESIN’s 2005 data to avoid endogeneity problems, as nighttime light is one of the input variables that CIESIN uses to model population estimates.

¹²More specifically, we calculate the distance between a DHS grid cell and its nearest Chinese development project. These data are drawn from AidData’s Chinese Official Finance to Africa, Version 1.1.1 dataset (available at <http://aiddata.org/subnational-geospatial-research-datasets>). We only include those projects geocoded with the precision code levels 1 and 2 — that is, projects with latitude and longitude coordinates within 25 km of the exact intervention sites — in our analysis.

¹³We attempted to include both World Bank and Chinese development projects in this measure. However, we were ultimately unable to include World Bank projects in this measure because none were active in our pre-treatment period (prior to 2006).

¹⁴These data and the underlying source materials used to generate the data are available upon request.

¹⁵We use 2007 DHS data, as opposed to subsequent years of DHS data, to minimize endogeneity concerns.

measuring the education and literacy levels of households living at a particular location. Given that baseline skills and work experiences of local residents might also matter to investors, we match on a set of indicators that measure the occupations held by members of local households. We also include a measure of the employment status of local residents in our matching algorithm to capture prevailing levels of wage competition due to available surplus labor. A battery of other indicators that measure potentially consequential characteristics of the local population—gender, age, religion, marital status, household size, household wealth, and residence type—are also included. Regional fixed effects are included to account for other idiosyncratic factors that may affect investor preferences.

Finally, we include pretreatment measures of nighttime light levels (2005) and trends (1992-2005) in our matching routine to maximize covariate balance across our treatment and control locations.¹⁶ These variables capture otherwise unobservable factors (e.g. local conflict, local governance quality, locations of previously active concessions) that may influence treatment assignment (Cook, Shadish & Wong, 2008). By effectively rendering many otherwise unobservable confounding factors observed, we can have greater confidence that we are not omitting key variables that make our treated units more likely to grow economically even in the absence of FDI.

In the following, we report results for the first stage of the matching process for each model reported in our study. We sub-divide this section by results for localities that were treated during our whole treatment period (2006-2012), only early-treated localities (2006-2008), and only late-treated localities (2009-2012).

Our results indicate that localities which are rich in natural resources are more likely to receive treatment. We also find that that concessions tend to be sited in more remote and mountainous areas - specifically, rural areas, areas located at higher elevations, and areas on steeply sloped lands. Additionally, we find that localities which are closer to roads, population centers, and development projects are more likely to receive treatment. Consistent with the notion that concessions might be allocated according to domestic political considerations, we also find the localities in the home regions of cabinet ministers are more likely to receive treatment. Finally and importantly, we find that pretreatment nighttime light levels and trends are correlated with treatment assignment. Areas that registered lower baseline levels of nighttime light (subnational economic development) in the pretreatment period are more likely to be treated, and areas that experienced more nighttime light growth (subnational economic growth) in the pretreatment period are more likely to be treated.¹⁷ The fact that these pretreatment outcome variables correlate with treatment assignment gives us greater confidence that we are expunging otherwise

¹⁶These data, collected nightly using satellite images from the National Oceanic and Atmospheric Administration (NOAA), measure nighttime light activity for pixels that correspond to individual square kilometers. The nightly data are then aggregated into annual measures using the mean for each 1 km x 1 km grid cell. The variable that we use is measured on a 0-63 scale, with higher values indicating more intense economic activity. It excludes exceptional instances (such as fires) and other cases of background noise.

¹⁷These results suggest that relatively underdeveloped localities and localities experiencing some degree of economic growth are more desirable places for investors to site their projects.

unobservable selection effects that would have biased our treatment effect estimates in the second stage of our matching routine (Cook, Shadish & Wong, 2008).

4.1.1 1st Stage Results: All Concessions

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	10320514775294500.0000	41579761.1547	248210054.33	0.0000
Urban/Rural (Urban)	-739130758232651.8750	5500352.9374	-134378787.44	0.0000
Elevation	-1242425046629.2336	9893.7809	-125576365.69	0.0000
Pop. Density	-12112951979.0969	3098.3713	-3909457.79	0.0000
Dist. to Projects	-892769481.5309	29.9611	-29797602.77	0.0000
Dist. to Resources	3614839349.3683	52.1940	69257815.04	0.0000
Home Counties	114303718347777.1562	616971.6332	185265759.70	0.0000
Dist. to Roads	64465650741.7316	430.6035	149709999.92	0.0000
Slope	169068652520421.1875	647372.1230	261161465.75	0.0000
Urban Travel Time	-676670775617.4266	4862.9675	-139147706.59	0.0000
Pre-Period Precipitation (Avg.)	-6652208153835.6699	83368.7539	-79792582.22	0.0000
Pre-Period Temp. (Avg.)	-222775587035852.0000	1700818.2091	-130981421.67	0.0000
Pre-Period NTL (Avg.)	76494045250315.7500	950606.6039	80468665.94	0.0000
Pre-Period NTL (Trend)	-1646018703308301.0000	13769856.7270	-119537823.52	0.0000
Edu. Level (Primary)	82644095263706.6406	1671516.9529	49442570.79	0.0000
Edu. Level (Secondary)	-2196163446888947.5000	9409808.5512	-233390874.53	0.0000
Edu. Level (Tertiary)	-6398196243074239.0000	41645846.2098	-153633479.10	0.0000
Religion	-1649756160622001.7500	3321085.4646	-496752094.53	0.0000
Household Numbers	8444442142095.8193	363050.2931	23259703.42	0.0000
Gender	-294196321228701.9375	4393877.4674	-66955968.48	0.0000
Age	14459876361570.2832	62140.7589	232695522.50	0.0000
Literacy (Partial)	3898883543392628.5000	6124266.8256	636628620.93	0.0000
Literacy (Whole)	1345299858178486.0000	8562515.8041	157115021.91	0.0000
Wealth	3173030017.2188	12.3360	257217194.76	0.0000
Status - Married	-2598228252940122.5000	2990287.1413	-868889217.04	0.0000
Status - Living Together	-407009863145380.7500	3138294.4642	-129691419.27	0.0000
Status - Not Living Together	-2010598092701179.2500	13689723.8980	-146869148.54	0.0000
Residence	-369823291270163.5000	14994089.0619	-24664605.48	0.0000
Working	-437332492038100.3750	2278010.8192	-191979989.01	0.0000
Occupation (44)	-1295735760474135.7500	3106323.4643	-417128407.71	0.0000
Occupation (62)	756878513425077.1250	2443055.9758	309808093.19	0.0000
Occupation (65)	-329183814878708.6250	8089395.5172	-40693252.56	0.0000
Region - North Central	-1409550413878234.0000	14484413.1720	-97314982.47	0.0000
Region - North Western	1894412931016899.2500	14819052.6507	127836304.77	0.0000
Region - South Central	-243246673850339.9688	13994376.5610	-17381744.22	0.0000
Region - South Eastern A	129647196706600.7812	14421876.7197	8989620.37	0.0000
Region - South Eastern B	-1504776869285809.7500	14480771.5358	-103915517.59	0.0000

Table 6: PSM Results (First Stage) for All Concessions (2006-2012), 25 km

Note: Estimates and standard errors of this model are extraordinarily large. The reason for the size of the coefficients are the fixed effects for DHS regions. This results in a small number of observations for a limited number of regions. The default Newton-Raphson algorithm solving the maximum likelihood equation can be sensitive to low N.

Concerned with the accuracy of our results, we conducted two robustness tests. First, we re-estimated the model by replacing the Newton-Raphson OLS approach with a GAM-based Iteratively reweighted least squares approach, restricting the GAM to only linear form (to approximate a GLS), which is more resilient to outliers/small Ns than traditional GLS. It, too, was able to solve and gave us ‘normal’ looking coefficients and standard errors without changing the substantive interpretation of subsequent treatment

effects. Second, we re-estimate the original model but removed the fixed effects for DHS regions from the dataset. Removing the DHS regions out allowed the traditional GLS estimator to solve the maximum likelihood estimation again. The size and direction of the second stage did not change significantly.

In light of these additional tests, we Table 1 shows original estimation which uses the same model specification as all subsequent models reported in this section. For sake of completeness, Table 2 displays the result of the first stage matching process without DHS fixed effects.

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	169.4391	18.4162	9.20	0.0000
Urban/Rural	-12.8353	1.6517	-7.77	0.0000
Elevation	-0.0145	0.0013	-11.23	0.0000
Pop. Density	-0.0048	0.0009	-5.09	0.0000
Dist. to Projects	-0.0000	0.0000	-4.78	0.0000
Dist. to Resources	0.0000	0.0000	2.07	0.0385
Home Counties	-0.4729	0.2072	-2.28	0.0225
Dist. to Roads	0.0002	0.0001	2.32	0.0203
Slope	0.9114	0.1180	7.72	0.0000
Urban Travel Time	-0.0027	0.0006	-4.53	0.0000
Pre-Period Precipitation (Avg.)	0.1592	0.0188	8.48	0.0000
Pre-Period Temp. (Avg.)	-7.0019	0.7847	-8.92	0.0000
Pre-Period NTL (Avg.)	0.6991	0.2243	3.12	0.0018
Pre-Period NTL (Trend)	2.3752	8.3026	0.29	0.7748
Edu. Level (Primary)	0.9820	0.2446	4.01	0.0001
Edu. Level (Secondary)	-3.4288	2.7565	-1.24	0.2135
Edu. Level (Tertiary)	-2.8262	128690.9506	-0.00	1.0000
Religion	-4.9349	0.5200	-9.49	0.0000
Household Numbers	0.4523	0.0840	5.39	0.0000
Gender	-1.4459	0.2795	-5.17	0.0000
Age	0.0378	0.0122	3.09	0.0020
Literacy (Partial)	22.6578	27583.2755	0.00	0.9993
Literacy (Whole)	10.5532	2.3649	4.46	0.0000
Wealth	0.0000	0.0000	6.41	0.0000
Status - Married	-7.6713	2.0023	-3.83	0.0001
Status - Living Together	13.6877	4459.6121	0.00	0.9976
Status - Not Living Together	19.1343	49709.3158	0.00	0.9997
Residence	23.6698	47822.4869	0.00	0.9996
Working	-2.1728	1.0450	-2.08	0.0376
Occupation (44)	-6.4612	1.1905	-5.43	0.0000
Occupation (62)	-2.2039	1.1617	-1.90	0.0578
Occupation (65)	20.7478	41979.0994	0.00	0.9996

Table 7: PSM Results (First Stage) for All Concessions (2006-2012), 25 km, without fixed effects for DHS regions.

4.1.2 1st Stage Results: Agriculture Concessions

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-200.7877	2119.3776	-0.09	0.9245
Urban/Rural (Urban)	-14.3435	1.4508	-9.89	0.0000
Elevation	0.0103	0.0025	4.11	0.0000
Pop. Density	0.0037	0.0005	7.68	0.0000
Dist. to Projects	-0.0001	0.0000	-11.90	0.0000
Dist. to Resources	0.0003	0.0000	15.23	0.0000
Home Counties	-0.0369	0.0414	-0.89	0.3733
Dist. to Roads	-0.0001	0.0001	-1.66	0.0966
Slope	1.0026	0.1158	8.66	0.0000
Urban Travel Time	-0.0063	0.0012	-5.21	0.0000
Pre-Period Precipitation (Avg.)	1.1954	0.0675	17.72	0.0000
Pre-Period Temp. (Avg.)	1.4238	0.5516	2.58	0.0098
Pre-Period NTL (Avg.)	-0.2153	0.1292	-1.67	0.0956
Pre-Period NTL (Trend)	4.9428	1.5592	3.17	0.0015
Edu. Level (Primary)	-1.0687	0.1830	-5.84	0.0000
Edu. Level (Secondary)	-3.5098	1.7908	-1.96	0.0500
Edu. Level (Tertiary)	3.9745	16931.6507	0.00	0.9998
Religion	-18.5159	1.2256	-15.11	0.0000
Household Numbers	-0.7888	0.0721	-10.94	0.0000
Gender	-2.4541	0.5413	-4.53	0.0000
Age	-0.1582	0.0124	-12.75	0.0000
Literacy (Partial)	8.4878	2178.8716	0.00	0.9969
Literacy (Whole)	-4.7214	1.1036	-4.28	0.0000
Wealth	0.0000	0.0000	5.57	0.0000
Status - Married	2.5517	1.0471	2.44	0.0148
Status - Living Together	1.8443	1.0848	1.70	0.0891
Status - Not Living Together	2.7599	7192.7437	0.00	0.9997
Residence	4.6952	3849.4257	0.00	0.9990
Working	3.9341	0.3383	11.63	0.0000
Occupation (44)	-10.0381	0.7792	-12.88	0.0000
Occupation (62)	-13.5069	0.9196	-14.69	0.0000
Occupation (65)	-15.6516	1797.5893	-0.01	0.9931
Region - North Central	36.3251	2119.3132	0.02	0.9863
Region - North Western	50.7159	2119.3139	0.02	0.9809
Region - South Central	23.4180	2119.3128	0.01	0.9912
Region - South Eastern A	-17.0841	2150.0398	-0.01	0.9937
Region - South Eastern B	25.5004	2119.3130	0.01	0.9904

Table 8: PSM Results (First Stage) for Agriculture Concessions (2006-2012), 25 km

4.1.3 1st Stage Results: Forestry Concessions

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	3.50	367.00	0.010	0.992
Urban/Rural (Urban)	-0.36	0.258	-1.38	0.17
Elevation	0.0017	0.0004	4.76	0.0000
Pop. Density	-0.0082	0.0009	-8.40	0.3360
Dist. to Projects	-0.0000	0.0000	-6.32	0.0000
Dist. to Resources	0.0000	0.0000	1.43	0.15
Home Counties	0.0234	0.026	-9.026	0.0000
Dist. to Roads	-0.0002	0.0000	-12.29	0.0000
Slope	0.149	0.0246	6.052	0.0000
Urban Travel Time	-0.0033	0.0002	14.32	0.0000
Pre-Period Precipitation (Avg.)	1028.00	116.20	8.850	0.0000
Pre-Period Temp. (Avg.)	4.14	0.953	4.35	0.0000
Pre-Period NTL (Avg.)	-0.2172	0.0754	-2.88	0.0039
Pre-Period NTL (Trend)	6.709	1.379	4.87	0.0000
Edu. Level (Primary)	0.3812	0.06602	5.774	0.0000
Edu. Level (Secondary)	-18.80	201.00	-0.094	0.9255
Edu. Level (Tertiary)	5.438	1638.0000	0.00	0.9973
Religion	0.9452	0.1235	7.65	0.0000
Household Numbers	-0.07194	0.013	-5.183	0.0000
Gender	-0.3235	0.0876	-3.693	0.0000
Age	0.0225	0.0027	8.45	0.0000
Literacy (Partial)	-16.34	307.6	-0.053	0.9576
Literacy (Whole)	3.757	0.5445	6.899	0.0000
Wealth	-0.0000	0.0000	-0.069	0.945
Status - Married	1.150	0.138	8.331	0.0000
Status - Living Together	-0.2747	0.145	-1.90	0.0573
Status - Not Living Together	2.043	683.60	0.030	0.976
Residence	6.987	667.40	0. 0	0.9916
Working	0.3000	0.0912	3.289	0.0000
Occupation (44)	-0.591	0.1328	-4.437	0.0000
Occupation (62)	0.733	0.1077	6.81	0.0000
Occupation (65)	1.113	0.434	2.565	0.0103
Region - North Central	-9.929	367.00	-0.027	0.979074
Region - North Western	-9.963	367.00	-0.026	0.978418
Region - South Central	-6.42	367.00	-0.018	0.97907
Region - South Eastern A	-7.64	367.00	-0.021	0.983402
Region - South Eastern B	-8.062	367.00	-0.022	0.982475

Table 9: PSM Results (First Stage) for Forestry Concessions (2006-2012), 25 km

4.1.4 1st Stage Results: Mining Concessions

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	34.4591	338.2308	0.10	0.9189
Urban/Rural (Urban)	-1.9263	0.2891	-6.66	0.0000
Elevation	-0.0051	0.0007	-7.79	0.0000
Pop. Density	0.0022	0.0004	4.92	0.0000
Dist. to Projects	0.0000	0.0000	4.44	0.0000
Dist. to Resources	-0.0000	0.0000	-7.30	0.0000
Home Counties	-0.0207	0.0512	-0.41	0.6855
Dist. to Roads	0.0003	0.0000	8.45	0.0000
Slope	0.4957	0.0808	6.13	0.0000
Urban Travel Time	-0.0020	0.0002	-9.10	0.0000
Pre-Period Precipitation (Avg.)	-0.0002	0.0054	-0.03	0.9723
Pre-Period Temp. (Avg.)	-0.6773	0.1219	-5.56	0.0000
Pre-Period NTL (Avg.)	-0.3289	0.0727	-4.52	0.0000
Pre-Period NTL (Trend)	2.8039	1.2353	2.27	0.0232
Edu. Level (Primary)	-0.1956	0.0961	-2.04	0.0417
Edu. Level (Secondary)	0.0403	0.5775	0.07	0.9443
Edu. Level (Tertiary)	-1.1450	2288.5229	-0.00	0.9996
Religion	-2.3429	0.3261	-7.18	0.0000
Household Numbers	0.1026	0.0225	4.55	0.0000
Gender	-3.0152	0.3266	-9.23	0.0000
Age	0.0055	0.0039	1.41	0.1577
Literacy (Partial)	15.8222	328.2578	0.05	0.9616
Literacy (Whole)	0.2694	0.4617	0.58	0.5596
Wealth	-0.0000	0.0000	-3.72	0.0002
Status - Married	-2.0518	0.2624	-7.82	0.0000
Status - Living Together	0.8667	0.3550	2.44	0.0146
Status - Not Living Together	-3.3155	2.0281	-1.63	0.1021
Residence	-4.5771	787.8229	-0.01	0.9954
Working	-0.6704	0.1473	-4.55	0.0000
Occupation (44)	0.7241	0.1580	4.58	0.0000
Occupation (62)	2.0358	0.1270	16.03	0.0000
Occupation (65)	16.9083	436.1394	0.04	0.9691
Region - North Central	-13.1074	338.2188	-0.04	0.9691
Region - North Western	-9.6907	338.2193	-0.03	0.9771
Region - South Central	-11.9686	338.2186	-0.04	0.9718
Region - South Eastern A	-12.1798	338.2188	-0.04	0.9713
Region - South Eastern B	-11.5918	338.2188	-0.03	0.9727

Table 10: PSM Results (First Stage) for Mining Concessions (2006-2012), 25 km

4.1.5 1st Stage Results: Iron Ore Mining Concessions

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	39.8950	2.3365	17.07	0.0000
Urban/Rural (Urban)	-3.5070	0.3291	-10.66	0.0000
Elevation	-0.0068	0.0005	-14.73	0.0000
Pop. Density	-0.0020	0.0003	-6.68	0.0000
Dist. to Projects	-0.0000	0.0000	-1.58	0.1149
Dist. to Resources	-0.0001	0.0000	-26.12	0.0000
Home Counties	-0.1046	0.0231	-4.52	0.0000
Dist. to Roads	-0.0002	0.0000	-6.09	0.0000
Slope	0.1503	0.0271	5.55	0.0000
Urban Travel Time	0.0005	0.0002	1.94	0.0530
Pre-Period Precipitation (Avg.)	0.0170	0.0040	4.28	0.0000
Pre-Period Temp. (Avg.)	-1.1971	0.0904	-13.25	0.0000
Pre-Period NTL (Avg.)	-0.4642	0.0625	-7.43	0.0000
Pre-Period NTL (Trend)	11.8629	1.4629	8.11	0.0000
Edu. Level (Primary)	-0.7141	0.0735	-9.72	0.0000
Edu. Level (Secondary)	-4.1132	0.5018	-8.20	0.0000
Edu. Level (Tertiary)	-18.2681	496.1828	-0.04	0.9706
Religion	0.5121	0.1305	3.92	0.0001
Household Numbers	-0.0493	0.0150	-3.28	0.0010
Gender	-1.3395	0.2015	-6.65	0.0000
Age	0.0022	0.0026	0.82	0.4098
Literacy (Partial)	-0.5575	0.2006	-2.78	0.0054
Literacy (Whole)	3.1642	0.4721	6.70	0.0000
Wealth	0.0000	0.0000	4.30	0.0000
Status - Married	-0.4656	0.1654	-2.82	0.0049
Status - Living Together	0.0506	0.1658	0.31	0.7600
Status - Not Living Together	2.2705	0.9358	2.43	0.0153
Residence	12.8406	128.4718	0.10	0.9204
Working	1.0251	0.1023	10.02	0.0000
Occupation (44)	-1.1843	0.1269	-9.33	0.0000
Occupation (62)	-1.1284	0.1067	-10.58	0.0000
Occupation (65)	1.6285	0.3918	4.16	0.0000
Region - North Central	-5.8537	1.1681	-5.01	0.0000
Region - North Western	-10.0269	1.1806	-8.49	0.0000
Region - South Central	-9.9850	1.1583	-8.62	0.0000
Region - South Eastern A	-7.5963	1.1750	-6.46	0.0000
Region - South Eastern B	-8.4014	1.1802	-7.12	0.0000

Table 11: PSM Results (First Stage) for Forestry Concessions (2006-2012), 25 km

4.1.6 1st Stage Results: Non-Iron Ore Mining Concessions

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	38.4260	2.4795	15.50	0.0000
Elevation	-0.0121	0.0006	-21.12	0.0000
Pop. Density	-0.0021	0.0004	-5.88	0.0000
Dist. to Projects	0.0000	0.0000	13.55	0.0000
Dist. to Resources	-0.0001	0.0000	-30.98	0.0000
Home Counties	-0.1705	0.0243	-7.02	0.0000
Urban/Rural (Urban)	-3.7672	0.3623	-10.40	0.0000
Dist. to Roads	-0.0002	0.0000	-7.54	0.0000
Slope	0.1703	0.0285	5.97	0.0000
Urban Travel Time	0.0006	0.0002	2.68	0.0075
Pre-Period Precipitation (Avg.)	0.0029	0.0040	0.72	0.4728
Pre-Period Temp. (Avg.)	-0.9648	0.0940	-10.27	0.0000
Pre-Period NTL (Avg.)	-0.4779	0.0635	-7.53	0.0000
Pre-Period NTL (Trend)	11.4086	1.4962	7.62	0.0000
Edu. Level (Primary)	-0.6043	0.0753	-8.03	0.0000
Edu. Level (Secondary)	-4.3818	0.5435	-8.06	0.0000
Edu. Level (Tertiary)	-19.6117	815.9927	-0.02	0.9808
Religion	0.3951	0.1345	2.94	0.0033
Household Numbers	-0.0698	0.0155	-4.51	0.0000
Gender	-2.0565	0.2078	-9.90	0.0000
Age	0.0085	0.0027	3.12	0.0018
Literacy (Partial)	-0.4879	0.2020	-2.41	0.0157
Literacy (Whole)	3.2072	0.5136	6.24	0.0000
Wealth	0.0000	0.0000	3.32	0.0009
Status - Married	-0.5614	0.1685	-3.33	0.0009
Status - Living Together	0.1900	0.1686	1.13	0.2599
Status - Not Living Together	1.9786	1.2442	1.59	0.1118
Residence	13.6631	208.6714	0.07	0.9478
Working	0.4597	0.1054	4.36	0.0000
Occupation (44)	-0.6879	0.1311	-5.25	0.0000
Occupation (62)	-0.9069	0.1089	-8.33	0.0000
Occupation (65)	1.1857	0.3957	3.00	0.0027
Region - North Central	-7.7650	1.3455	-5.77	0.0000
Region - North Western	-12.6208	1.3729	-9.19	0.0000
Region - South Central	-11.2415	1.3437	-8.37	0.0000
Region - South Eastern A	-8.6857	1.3602	-6.39	0.0000
Region - South Eastern B	-10.4620	1.3704	-7.63	0.0000

Table 12: PSM Results (First Stage) for Non-Iron Ore Mining Concessions (2006-2012), 25 km

4.1.7 1st Stage Results: US Concessions

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	9.4399	243.7056	0.04	0.9691
Elevation	0.0081	0.0004	19.89	0.0000
Pop. Density	-0.0001	0.0003	-0.28	0.7794
Dist. to Projects	-0.0000	0.0000	-12.70	0.0000
Dist. to Resources	0.0000	0.0000	4.95	0.0000
Home Counties	0.3633	0.0250	14.55	0.0000
Urban/Rural (Urban)	-1.6170	0.2708	-5.97	0.0000
Dist. to Roads	0.0001	0.0000	3.34	0.0008
Slope	-0.0336	0.0226	-1.48	0.1381
Urban Travel Time	-0.0016	0.0002	-9.27	0.0000
Pre-Period Precipitation (Avg.)	0.0290	0.0029	10.14	0.0000
Pre-Period Temp. (Avg.)	0.0307	0.0582	0.53	0.5986
Pre-Period NTL (Avg.)	-0.0312	0.0516	-0.61	0.5450
Pre-Period NTL (Trend)	1.9931	0.6734	2.96	0.0031
Edu. Level (Primary)	-0.0212	0.0570	-0.37	0.7106
Edu. Level (Secondary)	16.0232	227.8833	0.07	0.9439
Edu. Level (Tertiary)	16.4446	1424.3774	0.01	0.9908
Religion	2.0507	0.1313	15.62	0.0000
Household Numbers	0.0099	0.0127	0.78	0.4357
Gender	0.3568	0.1516	2.35	0.0186
Age	-0.0235	0.0022	-10.67	0.0000
Literacy (Partial)	-15.2364	202.4194	-0.08	0.9400
Literacy (Whole)	-15.1740	227.8833	-0.07	0.9469
Wealth	0.0000	0.0000	3.82	0.0001
Status - Married	2.9514	0.1701	17.36	0.0000
Status - Living Together	2.2638	0.1727	13.11	0.0000
Status - Not Living Together	5.4938	0.6485	8.47	0.0000
Residence	0.6049	465.7935	0.00	0.9990
Working	0.2101	0.0830	2.53	0.0114
Occupation (44)	-0.2757	0.1105	-2.50	0.0126
Occupation (62)	-0.3205	0.0842	-3.80	0.0001
Occupation (65)	16.8406	247.0433	0.07	0.9457
Region - North Central	-17.6579	243.7020	-0.07	0.9422
Region - North Western	-16.1663	243.7021	-0.07	0.9471
Region - South Central	-16.6320	243.7020	-0.07	0.9456
Region - South Eastern A	-16.2652	243.7021	-0.07	0.9468
Region - South Eastern B	-15.2495	243.7021	-0.06	0.9501

Table 13: PSM Results (First Stage) for US Concessions (2006-2012), 25 km

4.1.8 1st Stage Results: Chinese Concessions

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	13.2294	500.2725	0.03	0.9789
Elevation	-0.0148	0.0017	-8.77	0.0000
Pop. Density	-0.0013	0.0004	-3.42	0.0006
Dist. to Projects	0.0000	0.0000	8.10	0.0000
Dist. to Resources	-0.0001	0.0000	-8.64	0.0000
Home Counties	-0.0448	0.0374	-1.20	0.2309
Urban/Rural (Urban)	-20.0641	500.2626	-0.04	0.9680
Dist. to Roads	-0.0005	0.0001	-7.34	0.0000
Slope	0.7640	0.0655	11.67	0.0000
Urban Travel Time	-0.0048	0.0009	-5.60	0.0000
Pre-Period Precipitation (Avg.)	0.1429	0.0107	13.34	0.0000
Pre-Period Temp. (Avg.)	-0.3070	0.1409	-2.18	0.0293
Pre-Period NTL (Avg.)	-0.7848	0.0916	-8.57	0.0000
Pre-Period NTL (Trend)	19.1500	1.8553	10.32	0.0000
Edu. Level (Primary)	0.5607	0.1433	3.91	0.0001
Edu. Level (Secondary)	-6.0495	1.2415	-4.87	0.0000
Edu. Level (Tertiary)	-23.8173	26378.2569	-0.00	0.9993
Religion	-1.8077	0.2372	-7.62	0.0000
Household Numbers	0.4714	0.0374	12.61	0.0000
Gender	1.1892	0.3873	3.07	0.0021
Age	-0.0137	0.0052	-2.65	0.0082
Literacy (Partial)	-17.4752	3783.7431	-0.00	0.9963
Literacy (Whole)	1.1019	0.7155	1.54	0.1236
Wealth	0.0000	0.0000	7.37	0.0000
Status - Married	-0.7547	0.2825	-2.67	0.0076
Status - Living Together	0.8814	0.2649	3.33	0.0009
Status - Not Living Together	20.7363	16361.5152	0.00	0.9990
Residence	19.6128	6411.2766	0.00	0.9976
Working	2.8494	0.2665	10.69	0.0000
Occupation (44)	-0.0652	0.3166	-0.21	0.8368
Occupation (62)	-1.8299	0.2673	-6.84	0.0000
Occupation (65)	37.4672	730.1878	0.05	0.9591
Region - North Central	-26.4362	500.2658	-0.05	0.9579
Region - North Western	-25.5753	500.2658	-0.05	0.9592
Region - South Central	-27.8603	500.2656	-0.06	0.9556
Region - South Eastern A	-80.7852	1233.3051	-0.07	0.9478
Region - South Eastern B	-46.4923	1022.1726	-0.05	0.9637

Table 14: PSM Results (First Stage) for Chinese Concessions (2006-2012), 25 km

4.1.9 1st Stage Results: US Mining Concessions

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	10.1986	239.6383	0.04	0.9661
Elevation	0.0090	0.0004	22.20	0.0000
Pop. Density	0.0007	0.0004	1.78	0.0745
Dist. to Projects	-0.0000	0.0000	-14.78	0.0000
Dist. to Resources	0.0000	0.0000	10.48	0.0000
Home Counties	0.3183	0.0253	12.60	0.0000
Urban/Rural (Urban)	-1.1224	0.2605	-4.31	0.0000
Dist. to Roads	0.0002	0.0000	9.69	0.0000
Slope	-0.1161	0.0228	-5.08	0.0000
Urban Travel Time	-0.0034	0.0002	-16.15	0.0000
Pre-Period Precipitation (Avg.)	0.0194	0.0028	6.86	0.0000
Pre-Period Temp. (Avg.)	-0.0827	0.0581	-1.42	0.1548
Pre-Period NTL (Avg.)	-0.0308	0.0507	-0.61	0.5439
Pre-Period NTL (Trend)	2.0743	0.6633	3.13	0.0018
Edu. Level (Primary)	0.2524	0.0591	4.27	0.0000
Edu. Level (Secondary)	16.4841	239.7775	0.07	0.9452
Edu. Level (Tertiary)	16.5875	1426.1690	0.01	0.9907
Religion	1.4152	0.1169	12.10	0.0000
Household Numbers	0.0741	0.0129	5.75	0.0000
Gender	-0.3071	0.1538	-2.00	0.0458
Age	-0.0198	0.0022	-8.84	0.0000
Literacy (Partial)	-14.8493	202.0525	-0.07	0.9414
Literacy (Whole)	-15.6430	239.7774	-0.07	0.9480
Wealth	0.0000	0.0000	6.45	0.0000
Status - Married	2.6850	0.1718	15.62	0.0000
Status - Living Together	2.4724	0.1747	14.15	0.0000
Status - Not Living Together	-12.7900	454.9012	-0.03	0.9776
Residence	-0.0128	462.5993	-0.00	1.0000
Working	0.0734	0.0829	0.89	0.3760
Occupation (44)	0.2510	0.1121	2.24	0.0251
Occupation (62)	0.3864	0.0868	4.45	0.0000
Occupation (65)	17.9298	250.2889	0.07	0.9429
Region - North Central	-15.2360	239.6347	-0.06	0.9493
Region - North Western	-13.6603	239.6348	-0.06	0.9545
Region - South Central	-13.6275	239.6347	-0.06	0.9547
Region - South Eastern A	-13.4086	239.6348	-0.06	0.9554
Region - South Eastern B	-12.5660	239.6348	-0.05	0.9582

Table 15: PSM Results (First Stage) for US Mining Concessions (2006-2012), 25 km

4.1.10 1st Stage Results: Chinese Mining Concessions

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	99.0866	736.3798	0.13	0.8930
Elevation	-0.0059	0.0021	-2.80	0.0051
Pop. Density	-0.0011	0.0006	-1.80	0.0712
Dist. to Projects	0.0000	0.0000	2.59	0.0096
Dist. to Resources	0.0000	0.0000	0.19	0.8479
Home Counties	0.0304	0.0475	0.64	0.5219
Urban/Rural (Urban)	-19.6096	736.3536	-0.03	0.9788
Dist. to Roads	-0.0002	0.0001	-2.80	0.0051
Slope	0.9331	0.0874	10.67	0.0000
Urban Travel Time	-0.0040	0.0011	-3.76	0.0002
Pre-Period Precipitation (Avg.)	0.3068	0.0191	16.03	0.0000
Pre-Period Temp. (Avg.)	-5.0916	0.3351	-15.19	0.0000
Pre-Period NTL (Avg.)	-0.9510	0.1041	-9.14	0.0000
Pre-Period NTL (Trend)	24.7774	2.2840	10.85	0.0000
Edu. Level (Primary)	1.7177	0.1992	8.62	0.0000
Edu. Level (Secondary)	-7.0785	1.3078	-5.41	0.0000
Edu. Level (Tertiary)	-24.7689	43252.1273	-0.00	0.9995
Religion	-6.9705	0.4475	-15.58	0.0000
Household Numbers	0.7996	0.0495	16.14	0.0000
Gender	-0.2405	0.4330	-0.56	0.5786
Age	0.0396	0.0073	5.43	0.0000
Literacy (Partial)	-11.8756	6264.8215	-0.00	0.9985
Literacy (Whole)	-0.0553	0.7278	-0.08	0.9394
Wealth	0.0000	0.0000	9.19	0.0000
Status - Married	-2.1139	0.3457	-6.11	0.0000
Status - Living Together	0.4333	0.3198	1.36	0.1754
Status - Not Living Together	20.4627	34399.0545	0.00	0.9995
Residence	19.8624	10148.2876	0.00	0.9984
Working	5.0299	0.3935	12.78	0.0000
Occupation (44)	-2.3159	0.4118	-5.62	0.0000
Occupation (62)	-2.2335	0.3462	-6.45	0.0000
Occupation (65)	37.0214	1063.0432	0.03	0.9722
Region - North Central	-25.5388	736.3578	-0.03	0.9723
Region - North Western	-21.7601	736.3578	-0.03	0.9764
Region - South Central	-25.9700	736.3577	-0.04	0.9719
Region - South Eastern A	-85.5939	1813.6328	-0.05	0.9624
Region - South Eastern B	-54.8710	1430.8667	-0.04	0.9694

Table 16: PSM Results (First Stage) for Chinese Mining Concessions (2006-2012), 25 km

4.2 Improvement in means across treatment and control groups

Based on the logit models presented in Section 4.1, we create a propensity score to actually identify similar locations. This section provides information on the performance of the matching process. Specifically, we report results for improvements in covariate *means* after matching.

The tables show that the covariate balance improves by approximately 90% after matching (notwithstanding variation across our treatment definitions), which suggests that our analysis compares locations that are only extremely similar and thus minimizes the risk of endogeneity bias. The matching procedure leveraged here optimizes by selecting the best match for each individual treated cell, thus aiming to match along all elements of the distribution. We calculate this overall summary of the balance improvement by observing the change in mean differences after balancing (Ho et al., 2007). Each unit of observation is matched according to its propensity score on a unit-by-unit basis to the best-matched control; we seek to minimize the difference in propensity score between matched pairs.

In sum, the tables report improvements in the covariate balance post-matching, illustrating that our matching approach succeeds at comparing similar locations where one received treatment while the other did not.

4.2.1 Covariance Balance after Matching: All Concessions

Covariate	Means Treated	Means Control	Mean Diff	% Balance Improvement
Propensity Score	0.44	0.44	0.00	100.00
Urban/Rural (Rural)	0.96	0.95	0.01	57.27
Urban/Rural (Urban)	0.04	0.05	-0.01	57.27
Elevation	297.39	296.44	0.95	99.30
Population Density	59.97	50.67	9.30	80.72
Dist. to Projects	143229.44	110298.57	32930.87	-315.88
Dist. to Resources	47792.31	35608.16	12184.14	-179.35
Home Counties	1.86	1.51	0.35	-688.92
Dist. to Roads	809.09	768.80	40.30	90.64
Slope	1.16	0.79	0.37	-18.53
Urban Travel Time	299.21	421.18	-121.97	-10.76
Pre-Period Precipitation (Avg.)	117.17	109.73	7.43	-6.24
Pre-Period Temp. (Avg.)	23.95	24.29	-0.34	0.41
Pre-Period NTL (Avg.)	0.13	0.10	0.02	91.02
Pre-Period NTL (Trend)	0.01	0.01	0.00	83.73
Education (Primary)	0.18	0.21	-0.03	65.80
Education (Secondary)	0.04	0.04	0.00	49.42
Education (Tertiary)	0.00	0.00	0.00	100.00
Religion	0.04	0.12	-0.08	2.43
Household Numbers	5.52	5.62	-0.09	14.46
Gender	0.65	0.68	-0.03	38.12
Age	38.95	39.36	-0.41	88.28
Literacy (Partial)	0.01	0.00	0.01	30.53
Literacy (Full)	0.04	0.04	0.00	68.74
Wealth	-71446.61	-54092.52	-17354.09	-17.95
Status - Married	0.83	0.96	-0.13	52.53
Status - Living Together	0.08	0.04	0.04	78.48
Status - Not Living Together	0.00	0.00	0.00	100.00
Residence	0.00	0.00	0.00	100.00
Working	0.88	0.97	-0.08	50.78
Occupation (44)	0.19	0.36	-0.17	47.07
Occupation (62)	0.38	0.49	-0.11	64.25
Occupation (65)	0.01	0.00	0.01	-22.23
Region - North Central	0.48	0.60	-0.12	58.41
Region - North Western	0.08	0.00	0.08	53.30
Region - South Central	0.08	0.00	0.08	50.50
Region - South Eastern A	0.19	0.36	-0.18	26.99
Region - South Eastern B	0.16	0.04	0.12	29.10

Table 17: Covariance Balance after Matching for All Concessions (2006-2012), 25 km

4.2.2 Covariance Balance after Matching: Agriculture Concessions

Covariate	Means Treated	Means Control	Mean Diff	% Balance Improvement
Propensity Score	0.60	0.51	0.09	89.89
Urban/Rural (Rural)	1.00	0.99	0.01	81.06
Urban/Rural (Urban)	0.00	0.01	-0.01	81.06
Elevation	72.64	68.54	4.10	96.95
Population Density	60.68	47.40	13.28	69.90
Dist. to Projects	71598.34	79338.70	-7740.36	10.03
Dist. to Resources	41757.69	44847.88	-3090.19	80.17
Home Counties	2.06	1.79	0.27	-78.46
Dist. to Roads	777.28	806.19	-28.91	95.29
Slope	0.96	0.90	0.06	-6.39
Urban Travel Time	193.19	212.41	-19.22	87.87
Pre-Period Precipitation (Avg.)	128.90	128.67	0.23	98.36
Pre-Period Temp. (Avg.)	23.63	23.64	-0.00	99.17
Pre-Period NTL (Avg.)	0.34	0.31	0.03	-393.67
Pre-Period NTL (Trend)	0.02	0.02	0.00	47.93
Education (Primary)	0.35	0.33	0.02	59.68
Education (Secondary)	0.00	0.00	0.00	100.00
Education (Tertiary)	0.00	0.00	0.00	100.00
Religion	0.13	0.16	-0.03	15.54
Household Numbers	5.59	5.70	-0.10	79.04
Gender	0.70	0.70	0.00	94.09
Age	37.96	38.45	-0.49	87.83
Literacy (Partial)	0.00	0.00	-0.00	87.01
Literacy (Full)	0.00	0.00	0.00	95.83
Wealth	-46814.87	-47734.06	919.19	94.41
Status - Married	0.52	0.53	-0.01	93.10
Status - Living Together	0.48	0.46	0.02	91.78
Status - Not Living Together	0.00	0.00	0.00	100.00
Residence	0.00	0.00	0.00	100.00
Working	0.63	0.67	-0.04	83.56
Occupation (44)	0.25	0.21	0.05	-54.42
Occupation (62)	0.55	0.64	-0.09	60.57
Occupation (65)	0.00	0.00	0.00	100.00
Region - North Central	0.00	0.01	-0.01	95.55
Region - North Western	0.21	0.22	-0.01	91.66
Region - South Central	0.54	0.48	0.06	68.06
Region - South Eastern A	0.00	0.00	0.00	100.00
Region - South Eastern B	0.25	0.28	-0.03	83.98

Table 18: Covariance Balance after Matching for Agriculture Concessions (2006-2012), 25 km

4.2.3 Covariance Balance after Matching: Forestry Concessions

Covariate	Means Treated	Means Control	Mean Diff	% Balance Improvement
Propensity Score	0.49	0.44	0.05	88.03
Urban/Rural (Rural)	0.98	0.97	0.01	73.48
Urban/Rural (Urban)	0.02	0.03	-0.01	73.48
Elevation	192.45	190.34	2.11	98.86
Pop. Density	39.16	79.96	-40.80	88.31
Dist. to Projects	105431.18	102463.77	2967.40	93.48
Dist. to Resources	47005.95	44427.02	2578.92	89.49
Home Counties	1.48	1.57	-0.10	90.51
Dist. to Roads	1187.83	1121.15	66.69	59.33
Slope	1.25	1.19	0.06	-985.11
Urban Travel Time	347.80	324.49	23.31	78.18
Pre-Period Precipitation (Avg.)	0.0031	.0031	0.00	71.49
Pre-Period Temp. (Avg.)	-0.0757	-0.08	0.05	98.85
Pre-Period NTL (Avg.)	0.12	0.26	-0.13	53.29
Pre-Period NTL (Trend)	0.01	0.01	-0.01	76.92
Education (Primary)	0.29	0.28	0.01	81.79
Education (Secondary)	0.00	0.01	0.01	86.26
Education (Tertiary)	0.00	0.00	0.00	54.68
Religion	0.11	0.11	0.00	71.48
Household Numbers	5.71	5.76	-0.05	47.55
Gender	0.13	0.11	0.02	48.57
Age	42.45	42.82	-0.37	80.32
Literacy (Partial)	0.00	0.01	-0.01	77.34
Literacy (Full)	0.00	0.02	-0.1	79.09
Wealth	-53247.98	-48375.24	-4872.74	81.23
Status - Married	0.78	0.72	0.05	90.08
Status - Living Together	0.18	0.20	-0.03	90.16
Status - Not Living Together	0.00	0.00	0.00	100.00
Residence	0.00	0.00	0.00	90.94
Working	0.77	0.77	0.00	97.63
Occupation (44)	0.17	0.19	-0.02	85.35
Occupation (62)	0.66	0.63	0.03	74.92
Occupation (65)	0.00	0.00	0.00	87.15
Region - North Central	0.22	0.25	-0.03	90.07
Region - North Western	0.21	0.19	0.01	87.95
Region - South Central	0.12	0.13	-0.01	97.17
Region - South Eastern A	0.25	0.22	0.02	85.95
Region - South Eastern B	0.21	0.20	0.00	87.05

Table 19: Covariance Balance after Matching for Forestry Concessions (2006-2012), 25 km

4.2.4 Covariance Balance after Matching: Mining Concessions

Covariate	Means Treated	Means Control	Mean Diff	% Balance Improvement
Propensity Score	0.75	0.71	0.03	88.16
Urban/Rural (Rural)	0.90	0.96	-0.06	-64.49
Urban/Rural (Urban)	0.10	0.04	0.06	-64.49
Elevation	194.46	201.33	-6.86	81.44
Population Density	329.24	40.50	288.74	-362.35
Dist. to Projects	91967.93	96065.24	-4097.31	-216.10
Dist. to Resources	49091.92	53234.91	-4142.99	70.27
Home Counties	1.99	1.58	0.41	-1876.93
Dist. to Roads	893.04	891.68	1.36	99.49
Slope	0.86	0.85	0.01	97.34
Urban Travel Time	468.64	483.90	-15.25	90.97
Pre-Period Precipitation (Avg.)	117.19	116.20	0.99	53.71
Pre-Period Temp. (Avg.)	24.26	24.26	-0.00	99.96
Pre-Period NTL (Avg.)	1.14	0.31	0.84	-1532.04
Pre-Period NTL (Trend)	0.06	0.01	0.05	-365.56
Education (Primary)	0.38	0.43	-0.04	55.63
Education (Secondary)	0.08	0.01	0.07	-147.12
Education (Tertiary)	0.00	0.00	0.00	-263.62
Religion	0.01	0.01	0.00	95.46
Household Numbers	6.25	6.13	0.12	59.05
Gender	0.73	0.73	-0.00	91.15
Age	42.41	42.42	-0.02	96.66
Literacy (Partial)	0.01	0.00	0.01	5.83
Literacy (Full)	0.08	0.03	0.06	-198.18
Wealth	-40246.76	-50784.89	10538.13	-966.68
Status - Married	0.91	0.95	-0.05	83.27
Status - Living Together	0.02	0.02	0.00	98.60
Status - Not Living Together	0.00	0.00	-0.00	-99.41
Residence	0.00	0.00	0.00	-9.09
Working	0.79	0.81	-0.02	33.04
Occupation (44)	0.17	0.18	-0.01	68.65
Occupation (62)	0.47	0.52	-0.05	76.19
Occupation (65)	0.02	0.00	0.02	-148.55
Region - North Central	0.21	0.22	-0.01	45.48
Region - North Western	0.00	0.01	-0.00	98.17
Region - South Central	0.06	0.08	-0.02	84.10
Region - South Eastern A	0.53	0.54	-0.00	98.87
Region - South Eastern B	0.12	0.15	-0.04	34.42

Table 20: Covariance Balance after Matching for Mining Concessions (2006-2012), 25 km

4.2.5 Covariance Balance after Matching: Iron Ore Mining Concessions

Covariate	Means Treated	Means Control	Mean Diff	% Balance Improvement
Propensity Score	0.53	0.46	0.07	86.36
Urban/Rural (Rural)	0.98	0.98	0.00	-73.10
Urban/Rural (Urban)	0.02	0.02	-0.00	-73.10
Elevation	201.73	198.25	3.48	86.09
Population Density	67.67	64.58	3.09	93.55
Dist. to Projects	85742.35	84367.47	1374.88	92.58
Dist. to Resources	21507.78	25482.49	-3974.71	89.38
Home Counties	1.75	1.77	-0.02	92.66
Dist. to Roads	919.65	1077.89	-158.25	71.75
Slope	1.16	1.17	-0.01	47.42
Urban Travel Time	261.28	285.51	-24.23	82.60
Pre-Period Precipitation (Avg.)	116.34	118.31	-1.97	61.81
Pre-Period Temp. (Avg.)	24.00	24.06	-0.06	28.00
Pre-Period NTL (Avg.)	0.23	0.23	0.00	99.07
Pre-Period NTL (Trend)	0.01	0.01	0.00	97.34
Education (Primary)	0.28	0.29	-0.01	92.71
Education (Secondary)	0.05	0.05	0.01	79.45
Education (Tertiary)	0.00	0.00	0.00	100.00
Religion	0.12	0.09	0.02	32.90
Household Numbers	5.53	5.55	-0.02	89.93
Gender	0.68	0.68	0.00	97.58
Age	43.05	43.11	-0.06	96.83
Literacy (Partial)	0.02	0.02	-0.01	19.13
Literacy (Full)	0.06	0.05	0.01	70.59
Wealth	-36557.40	-44466.14	7908.75	74.56
Status - Married	0.67	0.70	-0.03	84.51
Status - Living Together	0.27	0.26	0.02	89.77
Status - Not Living Together	0.00	0.00	0.00	91.74
Residence	0.00	0.00	0.00	94.16
Working	0.80	0.79	0.01	64.29
Occupation (44)	0.17	0.17	0.00	92.71
Occupation (62)	0.64	0.62	0.02	74.16
Occupation (65)	0.01	0.01	0.00	100.00
Region - North Central	0.37	0.31	0.06	81.19
Region - North Western	0.23	0.20	0.02	62.98
Region - South Central	0.23	0.23	0.00	95.57
Region - South Eastern A	0.14	0.22	-0.08	56.32
Region - South Eastern B	0.02	0.03	-0.01	95.72

Table 21: Covariance Balance after Matching for Iron Ore Mining Concessions (2006-2012), 25 km

4.2.6 Covariance Balance after Matching: Non-Iron Ore Mining Concessions

Covariate	Means Treated	Means Control	Mean Diff	% Balance Improvement
Propensity Score	0.51	0.45	0.05	89.12
Elevation	195.70	190.70	5.00	80.01
Population Density	82.16	69.34	12.82	73.26
Dist. to Projects	63284.53	63293.79	-9.27	99.97
Dist. to Resources	22681.59	26600.66	-3919.07	89.53
Home Counties	1.78	1.82	-0.04	82.48
Urban/Rural (Rural)	0.98	0.98	-0.00	24.08
Urban/Rural (Urban)	0.02	0.02	0.00	24.08
Dist. to Roads	929.35	1072.16	-142.81	74.51
Slope	1.14	1.14	-0.00	97.17
Urban Travel Time	261.68	289.93	-28.25	79.72
Pre-Period Precipitation (Avg.)	117.46	118.70	-1.24	75.97
Pre-Period Temp. (Avg.)	24.01	24.06	-0.06	29.26
Pre-Period NTL (Avg.)	0.32	0.24	0.08	77.93
Pre-Period NTL (Trend)	0.02	0.01	0.01	79.67
Education (Primary)	0.28	0.27	0.01	90.01
Education (Secondary)	0.05	0.05	0.01	77.46
Education (Tertiary)	0.00	0.00	0.00	100.00
Religion	0.10	0.10	0.00	97.27
Household Numbers	5.62	5.54	0.08	59.88
Gender	0.68	0.68	0.00	97.68
Age	42.58	42.74	-0.17	91.57
Literacy (Partial)	0.02	0.02	0.00	86.70
Literacy (Full)	0.06	0.05	0.01	67.75
Wealth	-36171.93	-44961.51	8789.58	71.73
Status - Married	0.67	0.69	-0.02	92.50
Status - Living Together	0.27	0.27	0.00	97.56
Status - Not Living Together	0.00	0.00	0.00	63.77
Residence	0.00	0.00	0.00	61.56
Working	0.78	0.80	-0.01	62.19
Occupation (44)	0.18	0.17	0.01	90.55
Occupation (62)	0.62	0.64	-0.01	83.73
Occupation (65)	0.01	0.01	-0.00	64.81
Region - North Central	0.35	0.30	0.04	87.87
Region - North Western	0.21	0.20	0.01	85.50
Region - South Central	0.25	0.23	0.02	35.66
Region - South Eastern A	0.15	0.22	-0.06	63.82
Region - South Eastern B	0.02	0.04	-0.01	94.98

Table 22: Covariance Balance after Matching for Non-Iron Ore Mining Concessions (2006-2012), 25 km

4.2.7 Covariance Balance after Matching: US Concessions

Covariate	Means Treated	Means Control	Mean Diff	% Balance Improvement
Propensity Score	0.50	0.45	0.04	82.24
Elevation	183.09	173.44	9.64	43.97
Population Density	75.46	38.06	37.40	68.99
Dist. to Projects	81241.32	85007.80	-3766.48	66.62
Dist. to Resources	42952.64	47064.11	-4111.47	-11.73
Home Counties	1.60	1.38	0.22	61.96
Urban/Rural (Rural)	0.99	0.99	0.00	82.19
Urban/Rural (Urban)	0.01	0.01	-0.00	82.19
Dist. to Roads	1197.46	1274.85	-77.39	28.19
Slope	1.18	1.17	0.01	84.99
Urban Travel Time	337.63	362.27	-24.64	46.07
Pre-Period Precipitation (Avg.)	119.72	120.10	-0.38	89.49
Pre-Period Temp. (Avg.)	24.02	24.00	0.01	-1531.98
Pre-Period NTL (Avg.)	0.32	0.18	0.14	68.56
Pre-Period NTL (Trend)	0.02	0.01	0.01	74.57
Education (Primary)	0.29	0.28	0.01	89.76
Education (Secondary)	0.03	0.02	0.01	59.74
Education (Tertiary)	0.00	0.00	0.00	100.00
Religion	0.07	0.05	0.03	74.34
Household Numbers	5.61	5.62	-0.01	61.46
Gender	0.71	0.71	0.00	91.51
Age	42.77	42.89	-0.12	93.79
Literacy (Partial)	0.00	0.00	-0.00	97.44
Literacy (Full)	0.03	0.02	0.01	-32.68
Wealth	-51905.29	-55826.96	3921.67	3.71
Status - Married	0.79	0.80	-0.00	97.38
Status - Living Together	0.18	0.19	-0.01	93.72
Status - Not Living Together	0.00	0.00	0.00	100.00
Residence	0.00	0.00	0.00	100.00
Working	0.79	0.83	-0.03	-20.83
Occupation (44)	0.12	0.12	0.01	93.57
Occupation (62)	0.68	0.71	-0.03	75.88
Occupation (65)	0.00	0.00	0.00	100.00
Region - North Central	0.20	0.20	0.00	98.96
Region - North Western	0.15	0.15	-0.00	97.56
Region - South Central	0.20	0.17	0.03	58.71
Region - South Eastern A	0.24	0.25	-0.01	76.26
Region - South Eastern B	0.21	0.23	-0.02	-8.36

Table 23: Covariance Balance after Matching for US Concessions (2006-2012), 25 km

4.2.8 Covariance Balance after Matching: Chinese Concessions

Covariate	Means Treated	Means Control	Mean Diff	% Balance Improvement
Propensity Score	0.44	0.40	0.03	94.49
Elevation	96.93	96.94	-0.01	99.99
Population Density	139.23	120.61	18.62	91.79
Dist. to Projects	46898.89	49029.32	-2130.43	94.82
Dist. to Resources	15136.04	16060.72	-924.68	97.07
Home Counties	2.10	1.98	0.11	80.95
Urban/Rural (Rural)	0.98	0.98	-0.00	90.60
Urban/Rural (Urban)	0.02	0.02	0.00	90.60
Dist. to Roads	705.64	720.26	-14.61	97.73
Slope	1.06	1.06	0.01	-148.98
Urban Travel Time	120.07	123.13	-3.06	98.86
Pre-Period Precipitation (Avg.)	126.08	126.13	-0.05	99.53
Pre-Period Temp. (Avg.)	23.74	23.74	0.00	98.98
Pre-Period NTL (Avg.)	0.57	0.61	-0.04	96.56
Pre-Period NTL (Trend)	0.03	0.03	0.00	98.83
Education (Primary)	0.19	0.18	0.01	88.86
Education (Secondary)	0.02	0.02	-0.00	75.79
Education (Tertiary)	0.00	0.00	0.00	100.00
Religion	0.20	0.20	-0.01	84.93
Household Numbers	5.14	4.98	0.15	59.80
Gender	0.67	0.66	0.02	73.69
Age	41.67	42.81	-1.13	31.54
Literacy (Partial)	0.00	0.00	0.00	100.00
Literacy (Full)	0.02	0.02	-0.00	79.83
Wealth	-24530.44	-28021.94	3491.50	93.44
Status - Married	0.62	0.62	0.00	99.26
Status - Living Together	0.32	0.33	-0.00	97.51
Status - Not Living Together	0.00	0.00	0.00	100.00
Residence	0.01	0.00	0.01	71.61
Working	0.74	0.74	-0.00	97.86
Occupation (44)	0.32	0.25	0.07	64.07
Occupation (62)	0.43	0.51	-0.08	71.22
Occupation (65)	0.00	0.00	0.00	100.00
Region - North Central	0.12	0.10	0.01	93.34
Region - North Western	0.38	0.41	-0.03	90.02
Region - South Central	0.48	0.45	0.02	91.49
Region - South Eastern A	0.00	0.00	-0.00	98.67
Region - South Eastern B	0.00	0.01	-0.01	95.80

Table 24: Covariance Balance after Matching for Chinese Concessions (2006-2012), 25 km

4.2.9 Covariance Balance after Matching: US Mining Concessions

Covariate	Means Treated	Means Control	Mean Diff	% Balance Improvement
Propensity Score	0.46	0.42	0.04	84.82
Elevation	181.99	169.86	12.13	59.88
Population Density	53.20	39.65	13.55	90.59
Dist. to Projects	82170.74	87632.07	-5461.33	55.43
Dist. to Resources	43947.90	48987.15	-5039.26	40.32
Home Counties	1.64	1.43	0.21	65.98
Urban/Rural (Rural)	0.99	0.99	0.00	78.45
Urban/Rural (Urban)	0.01	0.01	-0.00	78.45
Dist. to Roads	1135.41	1189.70	-54.28	59.09
Slope	1.18	1.18	-0.01	73.82
Urban Travel Time	314.80	340.32	-25.52	62.27
Pre-Period Precipitation (Avg.)	119.92	120.75	-0.83	79.69
Pre-Period Temp. (Avg.)	23.99	23.96	0.03	53.10
Pre-Period NTL (Avg.)	0.30	0.20	0.11	80.87
Pre-Period NTL (Trend)	0.02	0.01	0.00	85.80
Education (Primary)	0.28	0.29	-0.01	61.47
Education (Secondary)	0.03	0.03	0.01	74.59
Education (Tertiary)	0.00	0.00	0.00	100.00
Religion	0.07	0.07	-0.00	98.11
Household Numbers	5.67	5.61	0.06	62.93
Gender	0.70	0.71	-0.01	50.79
Age	42.40	42.19	0.21	89.07
Literacy (Partial)	0.00	0.00	-0.00	94.09
Literacy (Full)	0.03	0.03	0.01	60.05
Wealth	-50126.90	-54714.13	4587.23	46.96
Status - Married	0.77	0.77	0.00	100.00
Status - Living Together	0.20	0.21	-0.00	87.61
Status - Not Living Together	0.00	0.00	0.00	100.00
Residence	0.00	0.00	0.00	100.00
Working	0.78	0.80	-0.02	50.96
Occupation (44)	0.13	0.12	0.01	89.10
Occupation (62)	0.68	0.71	-0.03	71.36
Occupation (65)	0.00	0.00	0.00	100.00
Region - North Central	0.19	0.17	0.02	90.03
Region - North Western	0.14	0.16	-0.02	-59.79
Region - South Central	0.23	0.18	0.05	59.68
Region - South Eastern A	0.22	0.24	-0.01	23.71
Region - South Eastern B	0.22	0.26	-0.04	-86.77

Table 25: Covariance Balance after Matching for US Mining Concessions (2006-2012), 25 km

4.2.10 Covariance Balance after Matching: Chinese Mining Concessions

Covariate	Means Treated	Means Control	Mean Diff	% Balance Improvement
Propensity Score	0.39	0.37	0.03	96.38
Elevation	93.05	98.26	-5.22	95.31
Population Density	177.02	155.49	21.53	91.55
Dist. to Projects	37737.21	39005.21	-1268.01	97.37
Dist. to Resources	15245.12	16790.10	-1544.98	94.96
Home Counties	1.85	1.81	0.04	93.15
Urban/Rural (Rural)	0.97	0.98	-0.01	86.16
Urban/Rural (Urban)	0.03	0.02	0.01	86.16
Dist. to Roads	790.83	826.70	-35.87	94.18
Slope	1.06	1.11	-0.05	-36.80
Urban Travel Time	114.13	128.90	-14.76	94.51
Pre-Period Precipitation (Avg.)	127.93	127.94	-0.01	99.88
Pre-Period Temp. (Avg.)	23.71	23.78	-0.07	78.54
Pre-Period NTL (Avg.)	0.81	0.74	0.07	95.24
Pre-Period NTL (Trend)	0.04	0.04	0.01	94.26
Education (Primary)	0.26	0.25	0.01	84.57
Education (Secondary)	0.02	0.02	-0.00	89.49
Education (Tertiary)	0.00	0.00	0.00	100.00
Religion	0.08	0.07	0.00	95.34
Household Numbers	5.05	5.18	-0.12	26.60
Gender	0.69	0.69	-0.00	93.04
Age	40.90	41.29	-0.40	62.51
Literacy (Partial)	0.00	0.00	-0.00	81.51
Literacy (Full)	0.02	0.02	-0.01	82.37
Wealth	-30004.76	-28548.52	-1456.25	97.47
Status - Married	0.63	0.65	-0.02	92.98
Status - Living Together	0.32	0.30	0.02	88.64
Status - Not Living Together	0.00	0.00	0.00	100.00
Residence	0.01	0.00	0.01	45.35
Working	0.68	0.67	0.01	94.95
Occupation (44)	0.24	0.21	0.03	81.86
Occupation (62)	0.45	0.48	-0.03	90.00
Occupation (65)	0.00	0.00	-0.00	-209.43
Region - North Central	0.06	0.07	-0.01	93.26
Region - North Western	0.32	0.30	0.03	88.88
Region - South Central	0.58	0.57	0.02	95.31
Region - South Eastern A	0.00	0.02	-0.02	89.69
Region - South Eastern B	0.00	0.01	-0.01	93.96

Table 26: Covariance Balance after Matching for Chinese Mining Concessions (2006-2012), 25 km

4.3 Improvement of variance across treatment and control groups

While Section 4.2 shows that matching minimizes the differences in *means*, it does not provide information on how matching minimizes the differences in *variances* across treatment and control groups. This section provides information in this regard.

While some studies report average improvements in variance ratios before and after matching, others caution against using any single distributional measurement to assess balance quality (Austin, 2009). Therefore, rather than providing a single measurement, we report the full distribution of propensity scores for our treated and control units before and after matching. Figure 2 presents propensity score histograms for our treatment and control units before and after matching. The Figure suggests that the distribution of propensity scores improves significantly after matching.

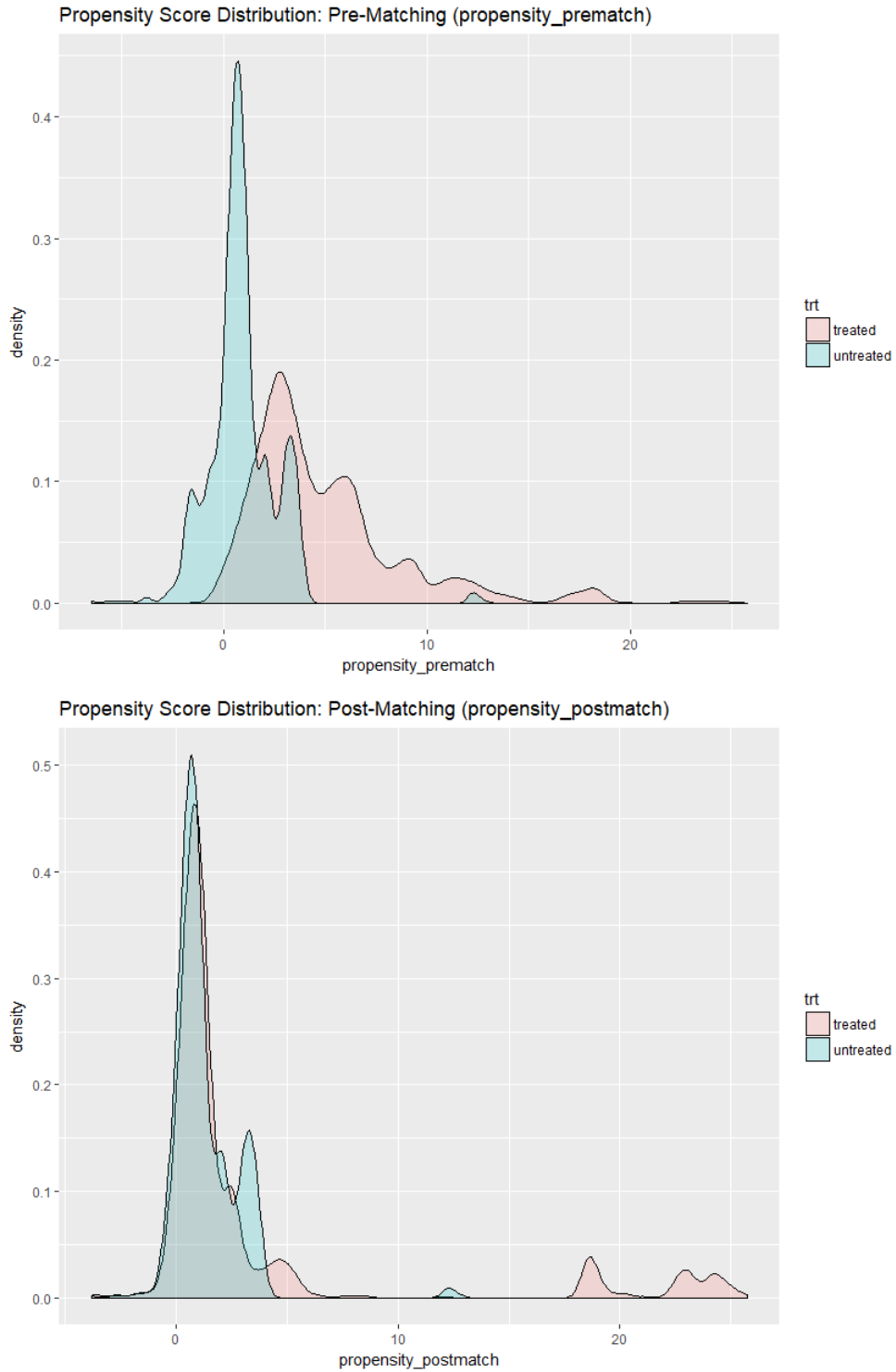


Figure 2: Propensity Score Distribution before and after matching. The Figure shows histograms (for both treatment and control units) of propensity scores pre-matching, and one that shows the same two histograms post-matching.

4.4 Parallel Trends Assumption 1: Group means over time

The key identifying assumption of our difference-in-differences estimation strategy is that, in the absence of treatment, nighttime light trends would have been parallel in treated and control locations (Angrist & Pischke, 2008). In our analysis, we attempt to address this issue by matching on pretreatment nighttime light trends (see Sections 4.1, 4.2, and 4.3 of the Online Appendix).

However, even after matching on pretreatment nighttime light trends, it is challenging to verify whether the parallel trends assumption has been violated. We cannot directly test this 'parallel trends' assumption since we are conducting observational rather than experimental research and it is not possible to observe nighttime light in our treated locations in the absence of treatment. However, we employ three indirect tests of the assumption, which we present in the following Sections 4.4, 4.5, and 4.6 of this Online Appendix.

The first approach examines average nighttime light in our treatment and control units prior to the treatment period. In the top panel of Figure 3, we report pretreatment levels of nighttime light in our treated and control units (including observations where nighttime light equals zero). In the bottom panel of Figure 3, we report the same summary statistics only after excluding all observations when nighttime light equals zero (since the prevalence of zeros in our dataset may arbitrarily introduce parallel developments). In both cases, it appears that nighttime light trends are roughly parallel. This pattern suggests that in the absence of treatment the nighttime light differences across our treated and control cases (matched locational pairs) would have been constant over time. Therefore, the evidence that is presented in Figure 3 does not suggest that the parallel time trend assumption has been violated.

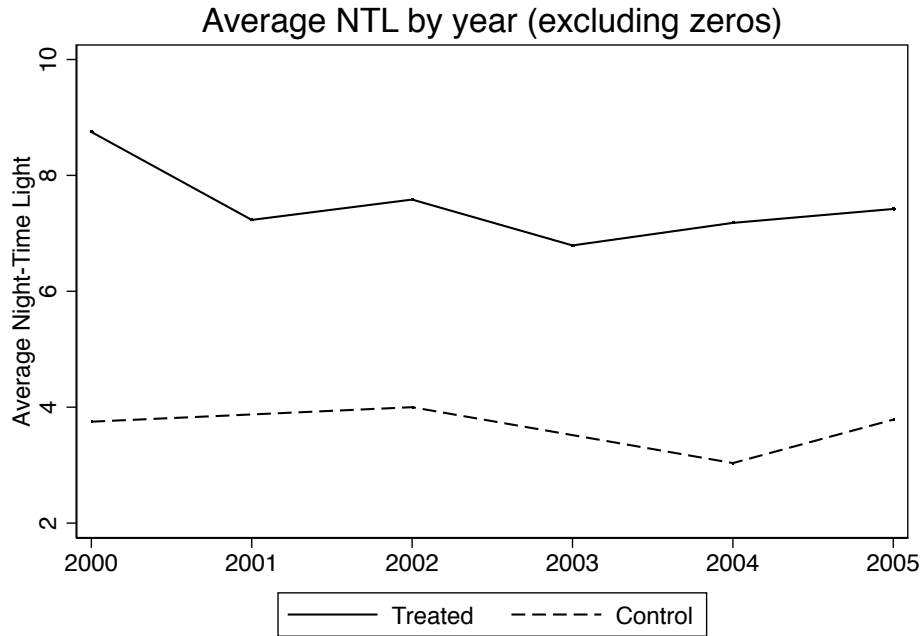
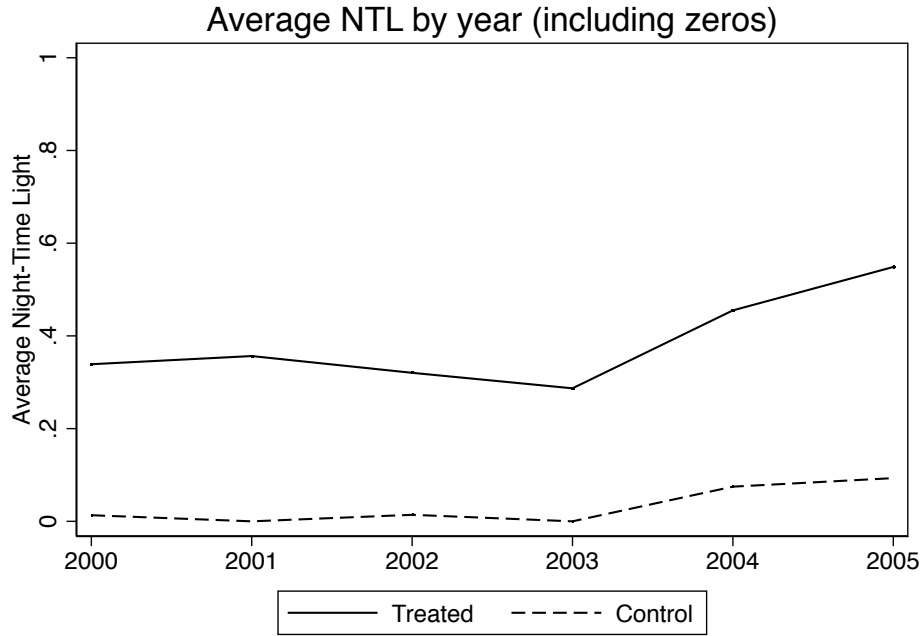


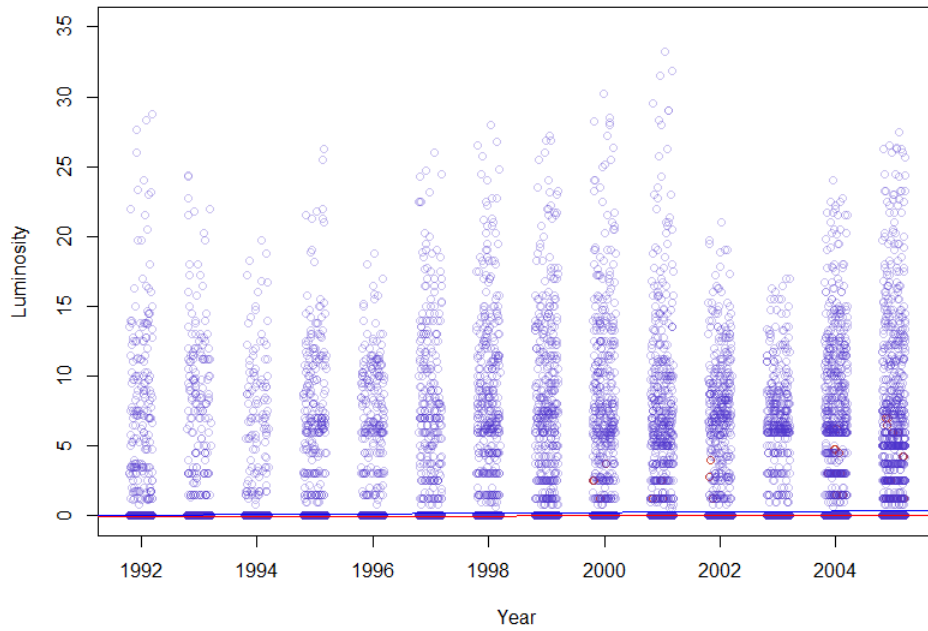
Figure 3: Mean of nighttime lights by year in our pre-treatment period. Top panel shows the trend in average NTL calculated including observations where NTL equals zero. Due to the prevalence of zeros in the data, this may arbitrarily introduce parallel developments. For this reason, the bottom panel plots the mean NTL for both treatment and control group while calculating the average without observations equal to zero. In both cases, the trends appear to be parallel.

4.5 Parallel Trends Assumption 2: Trend lines

Section 4.4 reports mean nighttime light value in our treated and control units prior to the treatment period. A more systematic way to examine whether pretreatment nighttime lights trends are parallel across the treatment and control units is to fit a time trend over the pre-treatment period separately for treatment and control groups. We follow BenYishay & Kranker (2015) and BenYishay et al. (2017) by regressing outcomes over treatment status X time in the pre-treatment sample.

Figure 4 presents the results from our ‘all concessions’ model, as well as the dispersion of observations in each year. The red line represents the control group and the blue line represents the treatment group. The top panel in Figure 4 includes all observations, including those with nighttime light values equal to zero. It shows that the trend lines between the treatment and control groups are roughly parallel over the entire pre-treatment period (1992-2005). This pattern suggests that the parallel trends assumption in this case has not been violated. The bottom panel in Figure 4 presents the results of the same model but excluding all nighttime light observations equal to zero (since the prevalence of zeros in our dataset may again arbitrarily introduce parallel developments). This results in a truncated sample since no non-zero observations are available for the control group prior to 2000. The trend lines are not entirely parallel: the control group (in red) is trending slightly upwards in the pre-treatment period, whereas the treatment group (in blue) is relatively flat. The fact that there is an upward trend in nighttime light in the control group prior to treatment suggests that, if anything, we would likely underestimate the size of our treatment effects by only considering areas that were lit in the first place.

Test of Parallel Trend Assumption in 'All Concessions' Model, With Zeroes Included



Test of Parallel Trend Assumption in 'All Concessions' Model, Without Zeroes

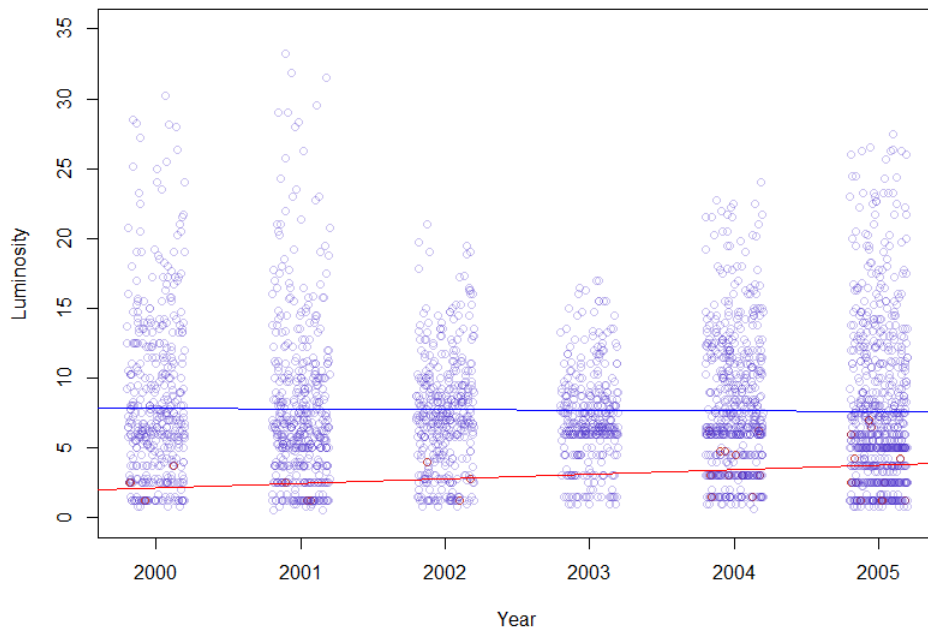


Figure 4: Time trend over the pre-period resulting from regressing outcomes over treatment status X time in the pre-treatment sample. The top panel includes observations equal to zero. Due to the prevalence of zeros in the data, this may arbitrarily introduce parallel developments. The bottom panel thus excludes observations equal to zero.

4.6 Parallel Trends Assumption 3: Statistical Analysis of Pre-Trends

In order to more systematically test whether the parallel trend assumption has been violated, we follow the same approach implemented in Beatty & Shimshack (2011) and Lima & Silveira Neto (2017): we replicate our difference-in-difference analysis during the pretreatment period (1992-2005) using the same treatment and control units from the treatment period. More specifically, in order to replicate the matched difference-in-difference analysis during the pretreatment period (1992-2005), we use the treatment and control units from the model that seeks to identify the effect of being within 25 km of any type of natural resources concession (see Table 22 in Section 4.1 of the Online Appendix). If nighttime light trends were parallel in treated and control locations during the pretreatment period, we would expect to observe no statistically significant effect of being located within 25km of a natural resource concession before the concession was actually granted to an investor.

Table 27 displays the empirical results. Re-estimating the treatment effect for the same treatment and control units, but for the pre-treatment period (i.e., prior to 2006), results in a statistically insignificant treatment effect. These results suggest that in the absence of treatment the nighttime light differences across our treated and control cases (matched locational pairs) would have been constant over time. As such, they do not provide any empirical grounds to believe that the parallel time trend assumption has been violated.

Table 27: All Concessions Pre-Treatment Period (1992-2005), 25 km.

Treatment	0.068 (0.059)
Urban/Rural	0.0003 (0.0003)
Elevation	0.0002 (0.0002)
Pop. Density	0.00000 (0.00000)
Aid Projects	-0.00000 (0.00000)
Nat. Resource Location	-0.018 (0.020)
Home Regions	0.00001 (0.00001)
Dist. to Roads	-0.014 (0.013)
Slope	-0.00001 (0.0001)
Urban Travel Time	0.028 (0.042)
Pre-Period Temperature	0.002** (0.001)
Pre-Period Precipitation	15.271*** (2.605)
Pre-Period NTL (Trend)	-0.753** (0.335)
Pre-Period NTL (Avg)	0.019 (0.014)
Household Numbers	-0.012 (0.066)
Gender	-0.007** (0.003)
Age	0.039 (0.042)
Edu. (Primary)	0.064 (0.231)
Edu. (Secondary)	0.00000 (0.00000)
Wealth	-0.253** (0.125)
Employment	0.172 (0.128)
Religion	0.137 (0.119)
Occupation (44)	0.055 (0.073)
Occupation (62)	0.038 (0.101)
DHS Region NC	-10.089*** (3.216)

Continued on Next Page...

Table 27 – Continued

DHS Region NW	-10.277*** (3.232)
DHS Region SC	-10.206*** (3.222)
DHS Region SE - A	-10.129*** (3.238)
DHS Region SE - B	-10.112*** (3.238)
Constant	9.362*** (3.432)

Note: *p<0.1; **p<0.05; ***p<0.01

5 Robustness Tests

5.1 Robustness test 1: Propensity to ‘light up’

Summary *One potential concern is that the propensity to “light up” in response to treatment by a concession might differ across grid cells. In this section, we present additional analyses to account for such variation. The findings indicate that our results are robust to incorporating potential differences in the propensity to light up.*

The models presented in the manuscript assume that any $1\text{km} \times 1\text{km}$ grid cell will respond in the same manner if exposed to a concession. However, this might not be the case: the propensity to “light up” in response to treatment by a concession might differ across grid cells. We exploit spatial variation in the distance to transportation networks to account for these differences across locations. Specifically, we include an interaction of the treatment variable with the distance to existing roads. The results of this exercise show that our findings remain largely consistent after including this additional control variable.

We have thus far assumed that any $1\text{km} \times 1\text{km}$ grid cell will respond in the same manner if exposed to a concession. However, this might not be the case: the propensity to “light up” in response to treatment by a concession might differ across grid cells. We now exploit spatial variation in the distance to transportation networks to account for these differences across locations. This choice is motivated by three considerations.

First, as we previously noted, the Liberian government requires concessionaires to build infrastructure. However, if an investor is going to build, say, an additional road, it is reasonable to assume that the investor may begin where existing road networks already exist. Second, investment projects require inputs (Aragón & Rud, 2013; Fafchamps, Koelle & Shilpi, 2016). These inputs range from intermediate goods to a pool of readily

available labor. Both are more easily available if a firm or individual entrepreneur is located close to major transportation networks. Third, access to road networks and other transportation networks is a good proxy for market access (Chomitz & Gray, 1996; Arima, 2016). It quantifies the difficulty with which producers can reach consumers and thus a location’s “market potential”. For all of these reasons, one might expect that the propensity of a location to ‘light up’ when exposed to a new concession will be higher when a location is physically proximate to major transportation networks, and it will decline with increasing distance to transportation networks.

Therefore, by interacting a grid cell’s treatment status with a measure of that grid cell’s distance from the pre-treatment road network, our goal is to test the robustness of our findings related to the unconditional, direct effects of treatment. It is not to determine whether the growth impacts of concessions are larger in areas with better access to roads — where local markets can be reached at a lower cost. Our outcome variable (nighttime light intensity) strongly correlates with local economic development outcomes when the full range of possible economic development outcomes are measured (across the 0-63 scale of luminosity). However, in very poor, unlit areas (grid cells with values of 0 on the luminosity scale), it is more difficult to detect (modest) changes in local economic development outcomes with the outcome measure we have selected (Jean et al., 2016). Therefore, if very poor, totally unlit grid cells are also located in the grid cells with limited access to roads (markets), a negative and statistically significant interaction effect between treatment status (concession or no concession) and access to roads (markets) likely reflects the “underlying propensity of a given grid cell to light up” rather than a market access amplification of the treatment effect.¹⁸

We implement this robustness check by rerunning all of our statistical models with this interaction effect. One can think of this interaction effect as a powerful control

¹⁸We thank Ariel BenYishay for his insights on the distinction between detecting changes on the extensive margin (zero to low) and the intensive margin (low to high).

variable. That is to say, if the direct, unconditional effects of treatment (that we previously identified) still hold after we account for the underlying propensity of grid cells to light up, we can have greater confidence in these findings.

The results from these robustness tests are presented below. In short, our findings remain largely consistent. Mining concessions continue to exert a consistently positive effects on local growth, while agricultural concessions do not. The differential effects of Chinese and U.S. concessions also remain unchanged. In model specifications where the interaction term registers a statistically significant effect, it is always a negative, as expected. A negative interactive term implies that there is less nighttime light growth in treated areas located further away from roads (markets). We interpret these effects as evidence that our outcome measure is better able to detect treatment effects in areas with a higher propensity to light up (and vice-versa).

5.1.1 Robustness 1: All Concessions

Table 28: All Concessions (2006-2012), 25 km

	Whole	Early	Late
Treatment	0.04 (0.17)	0.115 (0.195)	-0.234 (0.283)
Urban/Rural	2.566*** (0.729)	0.704 (0.557)	-0.877 (1.067)
Elevation	-0.001 (0.001)	0.002 (0.001)	0.005 (0.012)
Pop. Density	0.003*** (0.001)	0.006*** (0.001)	0.003 (0.005)
Aid Projects	0.00001 (0.000)	-0.00000 (0.000)	-0.00003 (0.00004)
Nat. Resource Location	-0.00001* (0.00001)	0.00001 (0.00001)	0.00001 (0.00004)
Home Regions	0.049 (0.12)	0.066 (0.148)	-0.546 (1.25)
Dist. to Roads	0.000 (0.0001)	-0.00005 (0.0001)	0.0001 (0.0002)
Slope	-0.049 (0.038)	-0.019 (0.066)	-0.668 (0.966)
Urban Travel Time	-0.0001 (0.0003)	-0.001 (0.001)	0.001 (0.001)
Pre-Period Precipitation	-0.002 (0.007)	-0.004 (0.007)	-0.021* (0.011)
Pre-Period Temperature	0.225 (0.181)	0.151 (0.123)	-1.056*** (0.32)
Pre-Period NTL (Avg)	-0.472 (0.382)	-0.284* (0.158)	-1.210*** (0.104)
Pre-Period NTL (Trend)	4.794 (3.355)	3.011** (1.528)	13.056*** (4.082)
Household Numbers	-0.076 (0.066)	0.019 (0.033)	-0.067 (0.064)
Gender	-1.379 (0.897)	1.000* (0.583)	1.174 (1.128)
Age	0.016 (0.013)	-0.015*** (0.005)	-0.063 (0.058)
Edu. (Primary)	-0.050 (0.14)	0.358* (0.202)	-0.137 (0.669)
Edu. (Secondary)	0.896* (0.538)	-0.877 (0.54)	-0.981* (0.519)
Wealth	-0.00000 (0.000)	0.00000** (0.000)	0.000 (0.000)
Employment (Yes)	-0.730 (0.499)	-0.291 (0.19)	0.655 (0.649)
Religion	-0.126 (0.363)	0.329 (0.31)	4.171 (5.786)
Occupation (44)	-0.121 (0.427)	0.320 (0.584)	-6.585 (6.189)

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Table 28 – Continued

	Whole	Early	Late
Occupation (62)	0.012 (0.351)	0.566 (0.356)	-2.977 (2.116)
DHS - North Central	1.549 (3.039)	13.289*** (3.789)	-4.931 (17.357)
DHS - North Western	1.444 (3.048)	13.659*** (3.852)	-6.890 (15.17)
DHS - South Central	2.939 (2.676)	13.903*** (3.788)	-4.657 (16.913)
DHS - S. East A	1.997 (2.997)	13.939*** (3.891)	-2.753 (17.801)
DHS - S. East B	1.944 (2.968)	14.002*** (4.039)	-3.403 (18.252)
Treatment:Dist. to Roads	-0.00003 (0.0001)	-0.00001 (0.0001)	-0.0002 (0.0002)
Constant	-5.611 (4.702)	-17.427*** (4.748)	39.956** (17.375)

5.1.2 Robustness 1: Agriculture, Forestry, and Mining Concessions

Table 29: Agriculture, Forestry, and Mining Concessions (2006-2012), 25 km

	Agriculture		Forestry			Mining		
	All	Late	All	Early	Late	All	Early	Late
Treatment	0.105 (0.278)	-0.558*** (0.149)	-0.092 (0.107)	0.045 (0.031)	-0.098 (0.064)	0.154** (0.064)	0.000** (0.000)	0.262*** (0.089)
Urban/Rural	0.475 (1.195)	1.412 (0.989)	-0.001** (0.0004)	-0.001** (0.0003)	-0.0001 (0.0002)	2.417*** (0.469)	-5.571*** (0.000)	0.681 (0.445)
Elevation	-0.010** (0.004)	-0.003** (0.002)	0.001** (0.001)	0.002** (0.001)	-0.0001 (0.0002)	0.0003 (0.001)	0.0000 (0.000)	-0.0003 (0.001)
Pop. Density	0.002*** (0.001)	0.002 (0.002)	0.0000*** (0.000)	0.00000* (0.000)	0.0000 (0.000)	0.002*** (0.001)	0.000* (0.000)	0.001 (0.001)
Aid Projects	0.0000 (0.00001)	0.000 (0.000)	0.0000 (0.000)	-0.00001*** (0.000)	0.0000 (0.000)	-0.00000 (0.000)	-0.000 (0.000)	-0.00000 (0.000)
Nat. Resource Location	0.00004** (0.00002)	0.00001 (0.00001)	-0.058 (0.052)	-0.006 (0.032)	-0.033 (0.033)	0.0000 (0.000)	0.000 (0.000)	-0.00000 (0.000)
Home Regions	0.127 (0.094)	0.141*** (0.054)	0.0000 (0.00002)	0.00003** (0.00001)	-0.00002 (0.00001)	0.213*** (0.072)	0.0000 (0.000)	0.025 (0.056)
Dist. to Roads	0.0003** (0.0001)	0.0001 (0.0001)	0.014 (0.018)	0.001 (0.013)	0.004 (0.006)	-0.00000 (0.00003)	0.0000 (0.000)	0.00005 (0.00004)
Slope	0.273** (0.132)	0.215*** (0.078)	-0.0002 (0.0002)	-0.0001 (0.0001)	0.00003 (0.0001)	-0.044 (0.041)	-0.000 (0.000)	-0.041 (0.038)
Urban Travel Time	-0.005 (0.004)	-0.002 (0.003)	0.981 (0.956)	1.591** (0.718)	-0.478 (0.6)	-0.0002 (0.0001)	-0.000 (0.000)	-0.0001 (0.0002)
Pre-Period Precipitation	-0.067** (0.031)	-0.020 (0.024)	0.003 (0.003)	-0.0009 (0.002)	0.002 (0.003)	0.007 (0.005)	-0.000 (0.000)	0.012 (0.008)
Pre-Period Temperature	1.039 (0.903)	0.344 (0.286)	-0.682 (0.079)	-0.02 (0.03)	-0.072 (0.078)	0.062 (0.118)	0.0000 (0.000)	-0.096 (0.098)
Pre-Period NTL (Avg)	-0.125 (0.236)	-1.069*** (0.155)	-0.088 (0.122)	-0.304** (0.151)	0.138*** (0.044)	-0.421*** (0.067)	-0.039*** (0.003)	-0.816*** (0.014)
Pre-Period NTL (Trend)	1.523 (2.316)	16.811*** (1.869)	-0.025 (0.02)	-0.017 (0.011)	-0.007 (0.01)	8.022*** (2.101)	6.312** (2.115)	6.923*** (1.763)
Household Numbers	0.074 (0.064)	0.138** (0.07)	-0.042 (0.096)	-0.013 (0.057)	-0.039 (0.053)	0.059 (0.06)	-0.000 (0.000)	0.003 (0.038)
Gender	1.098 (0.73)	1.354*** (0.459)	-0.001 (0.005)	-0.001 (0.003)	0.001 (0.002)	0.694 (0.57)	0.0000 (0.000)	0.911* (0.529)
Age	-0.050** (0.021)	-0.029** (0.012)	0.301** (0.14)	0.043 (0.061)	0.116 (0.073)	-0.003 (0.004)	-0.000 (0.000)	0.006 (0.005)
Edu. (Primary)	0.954*** (0.286)	0.639*** (0.186)	1.234 (0.784)	-0.588* (0.333)	0.408 (0.278)	0.009 (0.077)	0.0000 (0.000)	-0.0005 (0.093)
Edu. (Secondary)	1.455** (0.666)	1.043 (0.855)	0.00000* (0.000)	0.00000*** (0.000)	0.0000 (0.000)	0.042 (0.446)	0.0000 (0.000)	-0.271 (0.281)
Wealth	-0.00001*** (0.000)	-0.00001*** (0.000)	-0.114 (0.101)	-0.057 (0.071)	-0.041 (0.046)	0.0000 (0.000)	0.000** (0.000)	0.0000 (0.000)
Employment (Yes)	0.353 (0.427)	-0.105 (0.224)	-0.033 (0.113)	0.034 (0.082)	-0.032 (0.058)	-0.132 (0.161)	-0.000 (0.000)	-0.313* (0.183)
Religion	0.917* (0.528)	0.545 (0.519)	-0.132 (0.202)	-0.224* (0.123)	0.137 (0.092)	0.624* (0.374)		1.021 (0.731)
Occupation (44)	-1.778** (0.809)	-1.025** (0.453)	-0.156 (0.155)	-0.122 (0.088)	0.087 (0.068)	0.134 (0.16)	-0.000 (0.000)	0.154 (0.159)
Occupation (62)	-2.068*** (0.749)	-1.354*** (0.451)	-0.089 (0.251)	-0.2 (0.192)	0.114 (0.148)	0.085 (0.183)	0.0000 (0.000)	-0.095 (0.155)
Occupation (65)	1.202 (3.163)		2.461 (2.863)	-0.244 (2.963)	0.09 (0.548)	0.21 (0.223)		0.268 (0.225)
DHS - North Central		-1.595 (1.123)	2.389 (2.894)	-0.178 (2.974)	0.002 (0.576)	6.569*** (2.243)	0.000* (0.000)	-0.380 (2.087)
DHS - North Western	0.735 (3.492)	-0.351 (0.469)	3.125 (2.829)	-0.078 (2.938)	0.332 (0.521)	6.024*** (2.316)	0.000** (0.000)	-1.359 (2.438)
DHS - South Central	1.712 (3.212)	-0.066 (0.405)	2.744 (2.89)	-0.045 (2.981)	0.133 (0.549)	6.437*** (2.225)	-0.000 (0.000)	-0.609 (2.057)

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Table 29 – Continued

	Agriculture		Forestry			Mining		
	All	Late	All	Early	Late	All	Early	Late
DHS - S. East A		0.865 (1.314)	2.339 (2.88)	-0.199 (2.97)	0.017 (0.549)	6.360*** (2.281)	0.0000 (0.000)	-0.392 (2.126)
DHS - S. East B	-1.616 (3.889)	-1.520* (0.865)	-0.00002 (0.00003)	-0.0001** (0.00002)	0.00003 (0.00002)	6.429*** (2.221)	-0.000 (0.000)	-0.416 (2.021)
Treatment: Dist. to Roads	-0.001*** (0.0002)	-0.0001 (0.0001)	-2.073 (2.862)	0.879 (2.985)	-0.428 (0.57)	0.00001 (0.00004)	-0.000 (0.000)	-0.0001 (0.00005)
Constant	-15.787 (18.041)	-5.066 (5.635)				-9.354** (3.793)		0.712 (3.41)

5.1.3 Robustness 1: Iron Ore and Non-Iron Ore Mining Concessions

Table 30: Iron Ore and Non-Iron Ore Concessions (2006-2012), 25 km

	Iron Ore		Non-Iron Ore Mining	
	All	Late	All	Late
Treatment	0.369** (0.159)	0.199* (0.126)	-0.013 (0.07)	0.075 (0.08)
Urban/Rural	2.177*** (0.527)	1.023** (0.46)	2.370*** (0.367)	1.104*** (0.425)
Elevation	0.001 (0.001)	0.001* (0.001)	0.001 (0.001)	0.0005 (0.001)
Pop. Dens.	0.002** (0.001)	0.001** (0.0004)	0.001*** (0.0005)	0.001*** (0.001)
Aid Proj.	0.0000 (0.000)	0.00000* (0.000)	-0.00000 (0.000)	-0.00000 (0.000)
Nat. Resource Location	0.0000 (0.000)	-0.00000 (0.000)	0.00000* (0.000)	0.0000 (0.000)
Home Regions	-0.056 (0.038)	0.012 (0.034)	0.173** (0.083)	0.01 (0.073)
Dist. to Roads	0.0001** (0.00003)	0.00003 (0.00002)	0.00002 (0.00002)	0.00005** (0.00002)
Slope	-0.020 (0.046)	-0.059 (0.039)	-0.008 (0.019)	-0.019 (0.02)
Urban Travel Time	-0.0004 (0.0003)	-0.0004 (0.0003)	-0.0001 (0.0001)	-0.00001 (0.0001)
Pre-Precipitation	0.008 (0.005)	0.0003 (0.004)	-0.0003 (0.005)	0.004 (0.005)
Pre-Temperature	-0.029 (0.105)	-0.056 (0.09)	-0.008 (0.093)	-0.198* (0.108)
Pre-NTL (Avg)	-0.340*** (0.117)	-0.774*** (0.114)	-0.394*** (0.086)	-0.895*** (0.098)
Pre-NTL (Trend)	10.012*** (2.513)	12.737*** (2.054)	8.432*** (0.977)	13.200*** (2.308)
Household Numbers	0.002 (0.022)	-0.0004 (0.019)	0.036 (0.041)	0.038 (0.032)
Gender	0.048 (0.361)	0.246 (0.31)	0.487* (0.264)	0.351 (0.257)
Age	0.003 (0.004)	0.003 (0.004)	-0.00001 (0.003)	-0.001 (0.003)
Edu. (Primary)	0.514** (0.219)	0.412** (0.178)	0.131 (0.3)	0.339 (0.365)
Edu. (Secondary)	0.907*** (0.234)	1.051*** (0.26)	0.106* (0.059)	0.072 (0.059)
Wealth	0.0000 (0.000)	-0.00000 (0.000)	1.151** (0.465)	0.773*** (0.272)
Employment (Yes)	-0.313** (0.153)	-0.324** (0.164)	0.0000 (0.000)	-0.00000 (0.000)
Religion	0.083 (0.15)	0.095 (0.137)	-0.058 (0.157)	-0.012 (0.133)
Occupation (44)	0.431* (0.257)	0.126 (0.171)	0.199 (0.338)	0.222 (0.301)
Occupation (62)	-0.003 (0.13)	-0.009 (0.127)	0.184 (0.333)	0.23 (0.325)
Occupation (65)	-0.411 (0.616)	-0.152 (0.443)	-1.529*** (0.347)	-0.191 (0.748)
DHS - North Central	7.081** (3.212)	1.921 (1.861)	0.426** (0.189)	0.216 (0.134)
DHS - North Western	7.129** (3.215)	2.264 (1.85)	0.148 (0.124)	0.159 (0.124)
DHS - South Central	7.728**	2.784	-3.316***	-0.464

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Table 30 – Continued

	Iron Ore		Non-Iron Ore Mining	
	All	Late	All	Late
	(3.187)	(1.809)	(0.767)	(0.685)
DHS - S. East A	7.329**	2.44	3.924***	2.027
	(3.241)	(1.872)	(1.501)	(1.612)
DHS - S. East B	6.900**	2.175	3.939**	1.749
	(3.221)	(1.848)	(1.597)	(1.837)
Treatment:Distance to Roads	-0.0001	-0.00001	0.00001	-0.00002
	(0.0001)	(0.0001)	(0.00004)	(0.00004)
Constant	-7.942*	-1.518	4.183***	2.264
	(4.119)	(2.776)	(1.412)	(1.576)

5.1.4 Robustness 1: US and Chinese Concessions

Table 31: US and Chinese Concessions (2006-2012), 25 km

	China		USA	
	All	Late	All	Late
Treatment	1.008*** (0.228)	0.685** (0.271)	0.071 (0.107)	0.047 (0.097)
Urban/Rural	-0.473 (2.898)	-6.663** (3.103)	-0.0004 (0.001)	-0.001 (0.0005)
Elevation	-0.003 (0.002)	-0.0002 (0.003)	0.001*** (0.0003)	0.001*** (0.0004)
Pop. Density	0.002*** (0.001)	0.002*** (0.001)	0.00001*** (0.000)	0.00000** (0.000)
Aid Projects	0.000 (0.00001)	0.00001 (0.00001)	-0.00000 (0.000)	-0.00000 (0.000)
Nat. Resource Location	0.00001 (0.00001)	-0.00002* (0.00001)	-0.143*** (0.038)	-0.095*** (0.035)
Home Regions	0.005 (0.08)	0.019 (0.06)	-0.00000 (0.00002)	0.0000 (0.00002)
Dist. to Roads	-0.00004 (0.0001)	-0.00003 (0.0001)	-0.013 (0.021)	-0.005 (0.017)
Slope	-0.004 (0.07)	-0.063 (0.065)	-0.0002 (0.0002)	-0.0002 (0.0002)
Urban Travel Time	-0.005** (0.002)	-0.003 (0.002)	0.002 (0.003)	0.002 (0.003)
Pre-Period Precipitation	-0.031** (0.014)	0.021 (0.018)	-0.061 (0.072)	-0.067 (0.064)
Pre-Period Temperature	-0.198 (0.2)	-0.462* (0.24)	-0.118 (0.089)	-0.667*** (0.209)
Pre-Period NTL (Avg)	-0.580*** (0.085)	-0.865*** (0.096)	4.436*** (0.987)	11.727*** (3.149)
Pre-Period NTL (Trend)	10.049*** (1.946)	13.600*** (1.792)	-0.021 (0.019)	-0.030* (0.018)
Household Numbers	-0.126* (0.065)	-0.053 (0.063)	-0.272 (0.259)	-0.036 (0.202)
Gender	-0.498 (0.687)	-0.556 (0.704)	0.004 (0.003)	0.003 (0.003)
Age	0.014 (0.01)	0.017 (0.011)	0.264** (0.121)	0.220** (0.106)
Religion	-0.292 (0.317)	0.244 (0.454)	0.651** (0.303)	0.624*** (0.24)
Edu. (Primary)	1.233*** (0.342)	1.139*** (0.396)	0.00000*** (0.000)	0.0000 (0.000)
Edu. (Secondary)	-1.275 (1.103)	0.571 (0.962)	-0.327** (0.135)	-0.284** (0.123)
Wealth	0.000 (0.000)	-0.00000 (0.000)	-0.061 (0.286)	-0.902** (0.353)
Employment (Yes)	0.504* (0.299)	0.928** (0.467)	0.266 (0.308)	-0.670* (0.389)
Marital Status	0.716* (0.375)	0.966* (0.504)	-0.218 (0.479)	-1.090*** (0.373)
Occupation (44)	1.210*** (0.405)	1.715*** (0.613)	0.112 (0.194)	0.093 (0.139)
Occupation (62)			0.082	0.044
Occupation (65)	-1.594*** (0.531)	-1.456*** (0.529)		
DHS - North Central	-0.601* (0.351)	-0.971** (0.451)	0.485 (0.857)	2.752*** (0.716)
DHS - North Western	0.747 (1.26)	0.482 (0.515)	0.155 (0.813)	2.394*** (0.722)
DHS - South Central	0.598	-2.707	0.99	3.055***

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Table 31 – Continued				
	China		USA	
	All	Late	All	Late
DHS - S. East A	(1.296) 1.757 (1.291)	(1.906) -2.651 (1.955)	(0.809) 0.869 (0.884)	(0.662) 3.010*** (0.708)
DHS - S. East B	2.991** (1.303)	-1.859 (1.966)	0.273 (0.861)	2.629*** (0.697)
Treatment:Distance to Roads	-0.0003** (0.0001)	-0.0001 (0.0001)	-0.00003 (0.00004)	-0.00002 (0.00003)
Constant	7.598* (4.456)	9.447* (5.211)	1.184 (1.935)	-0.207 (1.694)

5.1.5 Robustness 1: US and Chinese Mining Concessions

Table 32: US and Chinese Mining Concessions (2006-2012), 25 km

	China		USA	
	All	Late	All	Late
Treatment	1.395*** (0.272)	0.645*** (0.225)	0.044 (0.115)	0.008 (0.089)
Urban/Rural	6.737*** (0.666)	-6.752*** (2.522)	1.996*** (0.554)	0.972** (0.394)
Elevation	0.002 (0.002)	-0.001 (0.002)	-0.0003 (0.001)	-0.0003 (0.0005)
Pop. Density	0.003*** (0.001)	0.003*** (0.001)	0.002*** (0.001)	0.003*** (0.001)
Aid Projects	-0.00001 (0.00001)	0.00001 (0.00001)	0.00001*** (0.000)	0.00000** (0.000)
Nat. Resource Location	0.00004*** (0.00001)	-0.00000 (0.00001)	-0.00000 (0.000)	-0.00000 (0.000)
Home Regions	0.129 (0.082)	0.096 (0.064)	-0.123*** (0.041)	-0.052 (0.038)
Dist. to Roads	0.00003 (0.0001)	-0.0001 (0.0001)	0.00001 (0.00002)	0.000 (0.00002)
Slope	-0.103* (0.06)	-0.108 (0.077)	-0.014 (0.022)	-0.010 (0.019)
Urban Travel Time	-0.003 (0.002)	-0.001 (0.001)	-0.0005** (0.0002)	-0.0002 (0.0001)
Pre-Period Precipitation	-0.024* (0.013)	-0.009 (0.014)	0.003 (0.004)	0.001 (0.003)
Pre-Period Temperature	-0.022 (0.224)	-0.126 (0.202)	0.015 (0.072)	-0.029 (0.06)
Pre-Period NTL (Avg)	-0.562*** (0.082)	-0.844*** (0.113)	-0.179* (0.098)	-0.902*** (0.122)
Pre-Period NTL (Trend)	9.926*** (1.998)	12.394*** (1.605)	5.000*** (1.152)	14.991*** (1.749)
Household Numbers	-0.099 (0.073)	-0.004 (0.062)	-0.029 (0.021)	-0.026 (0.018)
Gender	-0.686 (0.688)	-0.549 (0.756)	0.058 (0.302)	-0.038 (0.24)
Age	0.036*** (0.01)	0.041*** (0.011)	0.003 (0.004)	0.003 (0.004)
Religion	-0.742* (0.409)	-0.475 (0.379)	0.027 (0.143)	0.123 (0.141)
Edu. (Primary)	1.151*** (0.306)	0.970*** (0.264)	0.326** (0.143)	0.206** (0.103)
Edu. (Secondary)	-1.458 (1.053)	1.382* (0.729)	0.666** (0.284)	0.379 (0.232)
Wealth	0.00000* (0.000)	-0.00000 (0.000)	0.00000** (0.000)	0 (0.000)
Employment (Yes)	0.235 (0.363)	0.186 (0.453)	-0.310* (0.174)	-0.217 (0.148)
Marital Status	0.518 (0.397)	1.185* (0.675)	-0.368 (0.239)	-0.563*** (0.224)
Occupation (44)	1.214*** (0.461)	2.022*** (0.658)	0.021 (0.276)	-0.291 (0.255)
Occupation (62)	-2.046*** (0.513)			
Occupation (65)	-0.260 (0.343)	-0.609 (0.489)	0.255 (0.224)	0.065 (0.15)
DHS - North Central	10.102*** (2.661)	-0.344 (0.42)	0.122 (0.174)	0.141 (0.149)
DHS - North Western	11.286*** (2.777)	0.492 (1.12)		

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Table 32 – Continued				
	China		USA	
	All	Late	All	Late
DHS - South Central	11.839*** (2.592)	0.893 (1.043)		
DHS - S. East A	11.748*** (2.604)	1.41 (1.235)	-0.301* (0.18)	-0.223 (0.139)
DHS - S. East B	10.194*** (2.878)	1.579 (1.061)	0.594** (0.259)	0.424** (0.191)
Treatment:Distance to Roads	-0.0004* (0.0002)	0.00002 (0.0001)	-0.00003 (0.00004)	-0.00002 (0.00003)
Constant	-9.192* (5.065)	0.461 (4.02)	-0.360 (1.824)	0.99 (1.412)

5.2 Robustness test 2: Rural versus urban areas

Summary *A further potential concern is that we ignore a small number of grid cells as we fear that they might be ‘contaminated’ due to concessions granted prior to our treatment period. As a robustness test, this section presents the results if the analyses include these previously omitted observations. The findings are robust to this change.*

The models reported in the manuscript identify the treatment effect of concessions granted between 2006 and 2012, but not for concessions granted prior to 2006. Admittedly, only very few such concessions exist, as the Ellen Johnson-Sirleaf administration entered office only in 2006. Yet, to avoid contaminating our analysis with these pre-2006 observations, we exclude them from our analysis as the observational penalty (i.e., number of grid cells ignored) is quite small.

However, most of these pre-2006 concessions were granted to urban areas, presumably because they were more easily administered by the transitional administration after a long civil war. Ignoring these concessions implies that the results we have presented so far essentially disproportionately capture concessions in rural areas. While most lands in Liberia are in rural areas, an additional robustness check involves including urban areas in the samples of matched location pairs that we analyze. The tables below report the findings of this exercise. In short, the results are not affected by these changes in sample composition.

5.2.1 Robustness 2: All Concessions

Table 33: All Concessions (2006-2012), 25 km

	Whole	Early	Late
Treatment	0.453*** (0.141)	0.02 (0.044)	0.349** (0.172)
Urban/Rural	0.837 (0.677)	1.053*** (0.387)	1.247 (0.775)
Elevation	-0.006* (0.004)	0.0004 (0.0003)	-0.003 (0.002)
Pop. Density	0.003*** (0.001)	0.005*** (0.001)	0.006*** (0.002)
Aid Projects	0.00003*** (0.00001)	0.0000 (0.000)	0.00002*** (0.00001)
Nat. Resource Location	-0.00004** (0.00002)	-0.000 (0.000)	-0.00002* (0.00001)
Home Regions	0.22 (0.379)	0.01 (0.027)	0.360* (0.187)
Dist. to Roads	-0.0001 (0.0001)	0.0000 (0.00002)	-0.00002 (0.0001)
Slope	0.276** (0.134)	-0.001 (0.011)	0.137 (0.111)
Urban Travel Time	0.001 (0.001)	-0.0002 (0.0002)	0.002*** (0.001)
Pre-Period Precipitation	0.006 (0.021)	0.003 (0.002)	-0.015 (0.019)
Pre-Period Temperature	-0.280 (0.396)	0.078* (0.042)	-0.027 (0.327)
Pre-Period NTL (Avg)	-0.896 (0.792)	-0.550*** (0.147)	-0.594** (0.248)
Pre-Period NTL (Trend)	5.563 (11.747)	6.702*** (1.569)	-6.522 (6.599)
Household Numbers	-0.103 (0.153)	-0.005 (0.008)	-0.065 (0.082)
Gender	0.128 (0.87)	0.21 (0.181)	0.265 (0.617)
Age	0.065 (0.05)	-0.004** (0.002)	0.018 (0.025)
Edu. (Primary)	0.357 (0.323)	0.058 (0.07)	0.1 (0.309)
Edu. Level (Secondary)	-0.897 (1.449)	-0.241* (0.134)	-1.327 (0.886)
Wealth	0.0000 (0.000)	0.0000 (0.000)	0.0000 (0.000)
Employment (Yes)	-2.023* (1.135)	-0.083 (0.066)	-3.033*** (0.653)
Religion	-0.868 (0.617)	-0.048 (0.071)	-0.886 (0.573)
Occupation (44)	0.98 (1.326)	0.035 (0.179)	1.522* (0.912)

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Table 33 – Continued			
	Whole	Early	Late
Occupation (62)	−0.034 (0.809)	0.054 (0.097)	1.014* (0.579)
Occupation (65)	−0.165 (2.188)	−0.381 (0.427)	
DHS - North Central		12.703*** (2.623)	
DHS - North Western	−1.352 (1.451)	12.719*** (2.623)	−0.530 (0.918)
DHS - South Central	0.024 (1.418)	12.697*** (2.63)	1.056 (0.85)
DHS - S. East A	2.341* (1.4)	12.793*** (2.658)	1.518** (0.619)
DHS - S. East B	1.322 (0.998)	12.781*** (2.652)	1.364** (0.576)
Constant	3.783 (9.36)	−15.060*** (2.975)	0.759 (7.04)

5.2.2 Robustness 2: Agriculture, Forestry, and Mining Concessions

Table 34: Agriculture, Forestry, and Mining Concessions (2006-2012), 25 km

	Agriculture			Forestry			Mining		
	All	Early	Late	All	Early	Late	All	Early	Late
Treatment	-0.244 (0.166)	0.242 (0.172)	-0.327* (0.172)	-0.116 (0.093)	0.032** (0.015)	-0.148* (0.084)	0.199*** (0.061)	-0.004 (0.032)	0.172*** (0.056)
Urban/Rural	2.024*** (0.72)	2.485*** (0.887)	0.829* (0.451)	-0.0004 (0.0004)	-0.0001 (0.0001)	-0.0003 (0.0003)	2.029*** (0.407)	0.594* (0.355)	0.823** (0.359)
Elevation	0.001 (0.002)	0.006 (0.006)	-0.0001 (0.001)	0.002** (0.001)	-0.001 (0.001)	0.001 (0.001)	0.0001 (0.001)	0.0002 (0.0002)	-0.0003 (0.001)
Pop. Density	0.004*** (0.002)	0.002 (0.002)	0.001* (0.001)	0.000* (0.000)	0.0000 (0.000)	0.0000 (0.000)	0.002*** (0.0005)	0.001*** (0.0003)	0.002 (0.001)
Aid Projects	-0.000 (0.000)	-0.000 (0.00001)	-0.000 (0.000)	0.0000 (0.000)	0.0000 (0.000)	0.0000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.0000 (0.000)
Nat. Resource Location	-0.000 (0.00001)	0.00002 (0.00001)	0.0000 (0.00001)	-0.031 (0.04)	0.02 (0.023)	0.014 (0.033)	-0.000 (0.000)	0.0000 (0.000)	-0.000 (0.000)
Home Regions	0.092** (0.044)	0.015 (0.023)	0.05 (0.04)	-0.00002 (0.00002)	0.0000 (0.00001)	0.0000 (0.00001)	0.229*** (0.089)	-0.059 (0.039)	-0.048 (0.059)
Dist. to Roads	-0.00003 (0.0001)	0.0001 (0.0001)	-0.00001 (0.00005)	-0.005 (0.018)	0.003 (0.004)	-0.003 (0.015)	0.00001 (0.00002)	-0.000 (0.00001)	0.0000 (0.00002)
Slope	-0.030 (0.054)	-0.096 (0.168)	-0.041 (0.056)	-0.0001 (0.0002)	-0.00004 (0.0001)	-0.0002 (0.0002)	-0.042 (0.037)	0.006 (0.006)	-0.042 (0.037)
Urban Travel Time	-0.001 (0.001)	-0.002 (0.002)	-0.001 (0.001)	0.822 (0.899)	-0.018 (0.192)	0.283 (0.687)	-0.0002* (0.0001)	-0.00002 (0.0001)	-0.0002 (0.0001)
Pre-Period Precipitation	-0.016 (0.015)	0.038 (0.033)	-0.009 (0.003)	0.003 (0.003)	0.012 (0.001)	0.08 (0.002)	0.002 (0.006)	0.007*** (0.003)	0.006 (0.005)
Pre-Period Temperature	-0.542** (0.252)	-0.064 (0.444)	-0.155 (0.22)	-0.026 (0.08)	0.027 (0.033)	0.025 (0.05)	0.016 (0.151)	-0.004 (0.036)	-0.125 (0.14)
Pre-Period NTL (Avg)	-0.129 (0.133)	-0.285 (0.432)	-1.145*** (0.106)	-0.014 (0.115)	-0.228 (0.334)	-0.326*** (0.077)	-0.440*** (0.067)	-0.259* (0.136)	-0.794*** (0.16)
Pre-Period NTL (Trend)	3.827** (1.566)	5.431 (4.18)	18.299*** (1.757)	-0.026 (0.019)	0.002 (0.002)	-0.013 (0.016)	9.468*** (1.921)	4.366** (2.209)	12.184*** (3.022)
Household Numbers	-0.006 (0.058)	0.175** (0.083)	-0.012 (0.058)	-0.039 (0.109)	0.032 (0.03)	0.039 (0.099)	0.035 (0.061)	0.002 (0.012)	0.001 (0.038)
Gender	1.019** (0.457)	0.216 (0.593)	0.388 (0.464)	-0.002 (0.005)	0.001 (0.001)	-0.002 (0.004)	1.034* (0.54)	0.152 (0.101)	0.66 (0.506)
Age	0.002 (0.012)	-0.002 (0.009)	0.0001 (0.013)	0.266* (0.152)	0.082 (0.075)	0.241 (0.147)	0.001 (0.004)	-0.001 (0.002)	0.006 (0.004)
Edu. (Primary)	0.869** (0.382)	0.262 (0.271)	0.824** (0.396)	-0.267 (0.543)		1.117* (0.644)	0.009 (0.077)	0.069* (0.038)	0.059 (0.074)
Edu. Level (Secondary)	-0.480 (0.793)		0.384 (0.827)	0.000** (0.000)	0.000** (0.000)	0.0000 (0.000)	0.125 (0.412)	-0.262 (0.18)	-0.277 (0.367)
Wealth	-0.000 (0.000)	0.0000 (0.000)	-0.000 (0.000)	-0.171 (0.119)	-0.039 (0.025)	-0.213** (0.108)	0.0000 (0.000)	0.0000 (0.000)	
Employment (Yes)	-0.011 (0.232)	2.102 (1.768)	0.071 (0.233)	-0.028 (0.127)	-0.044 (0.064)	0.095 (0.105)	-0.217 (0.144)	-0.088 (0.062)	0.0000 (0.000)
Religion	0.269 (0.26)	1.231 (0.976)	0.026 (0.214)	-0.108 (0.187)	0.032 (0.055)	-0.205 (0.163)	0.286 (0.254)	-0.007 (0.109)	-0.345** (0.16)
Occupation (44)	-0.441 (0.465)	-1.675 (1.431)	-0.389 (0.375)	0.068 (0.143)	-0.005 (0.023)	-0.039 (0.139)	0.261 (0.168)	0.382** (0.173)	0.113 (0.251)
Occupation (62)	0.046 (0.312)	-1.483 (1.492)	-0.188 (0.267)	0.108 (0.232)		-0.142 (0.298)	0.077 (0.172)	0.074 (0.066)	0.162 (0.148)
Occupation (65)	0.271 (0.444)	1.674 (1.669)	-2.071*** (0.768)	3.199 (3.575)	-0.001 (0.041)		0.414* (0.222)	0.038 (0.089)	-0.005 (0.153)
DHS - North Central		0.129 (0.797)		3.178 (3.609)	0.012 (0.034)	2.722* (1.62)	4.858*** (1.626)	-0.921 (1.375)	0.307* (0.157)
DHS - North Western	-0.226 (0.337)	-1.127 (1.211)	-0.330 (0.384)	3.74 (3.538)	-0.001 (0.028)	2.568 (1.678)	4.569*** (1.654)	-1.111 (1.371)	2.963 (4.358)
DHS - South Central	0.38 (0.401)		0.054 (0.361)	3.56 (3.601)	0.241 (0.178)	3.106* (1.588)	4.979*** (1.594)	-0.816 (1.386)	2.573 (4.443)
DHS - S. East A	0.483	-5.620	-0.222	3.177		2.930*	4.983***	-0.974	3.202

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Table 34 – Continued

	Agriculture			Forestry			Mining		
	All	Early	Late	All	Early	Late	All	Early	Late
DHS - S. East B	(0.751)	(10.223)	(0.465)	(3.594)		(1.641)	(1.681)	(1.387)	(4.384)
	-0.005		-0.761		0.053	2.749*	4.934***	-1.046	3.459
	(0.655)		(0.596)		(0.107)	(1.635)	(1.612)	(1.37)	(4.476)
Constant	14.047**		5.363	-2.971		-2.454	-6.545	0.207	-1.311
	(6.603)		(6.331)	(3.616)		(1.697)	(4.288)	(1.53)	(5.462)

5.2.3 Robustness 2: Iron Ore and Non-Iron Ore Mining Concessions

Table 35: Iron Ore and Non-Iron Ore Concessions (2006-2012), 25 km

	Iron Ore			Non-Iron Ore Mining		
	All	Early	Late	All	Early	Late
Treatment	0.226** (0.102)	0.176* (0.093)	0.123 (0.082)	0.08 (0.055)	0.06 (0.096)	0.044 (0.044)
Urban/Rural	2.146*** (0.518)	2.312*** (0.538)	0.986** (0.493)	1.925*** (0.414)	0.586 (0.547)	1.164*** (0.407)
Elevation	0.0005 (0.001)	0.00004 (0.001)	0.001 (0.001)	0.001 (0.001)	-0.001 (0.001)	-0.0003 (0.001)
Pop. Density	0.002** (0.001)	0.002* (0.001)	0.001** (0.001)	0.002*** (0.0004)	0.002*** (0.0005)	0.002*** (0.0005)
Aid Projects	0.000** (0.000)	0.0000 (0.000)	0.0000 (0.000)	-0.000 (0.000)	0.0000 (0.000)	-0.000 (0.000)
Nat. Resource Location	-0.000 (0.000)	0.0000 (0.000)	-0.000 (0.000)	0.0000 (0.000)	-0.00001* (0.000)	-0.000 (0.000)
Home Regions	-0.012 (0.033)	-0.016 (0.036)	0.026 (0.028)	-0.061 (0.076)	0.056 (0.046)	-0.121* (0.064)
Dist. to Roads	0.0001*** (0.00002)	0.00004** (0.00002)	0.00003* (0.00002)	0.00001 (0.00002)	-0.000 (0.00002)	0.00003* (0.00002)
Slope	-0.019 (0.038)	-0.013 (0.045)	-0.041 (0.033)	-0.007 (0.019)	0.032 (0.02)	0.003 (0.016)
Urban Travel Time	-0.001** (0.0003)	-0.0005* (0.0002)	-0.0004* (0.0002)	-0.0001 (0.0001)	-0.0002 (0.0002)	0.00001 (0.0001)
Pre-Period Precipitation	0.006 (0.005)	0.007 (0.004)	0.0005 (0.003)	0.008** (0.004)	0.001 (0.006)	0.009** (0.005)
Pre-Period Temperature	-0.007 (0.099)	0.032 (0.104)	-0.039 (0.08)	-0.041 (0.093)	0.072 (0.09)	-0.135 (0.09)
Pre-Period NTL (Avg)	-0.304*** (0.089)	-0.283*** (0.097)	-0.776*** (0.104)	-0.395*** (0.081)	-0.463* (0.262)	-0.884*** (0.108)
Pre-Period NTL (Trend)	7.634*** (1.524)	8.715*** (1.713)	13.173*** (1.91)	7.808*** (1.385)	4.426 (3.779)	13.143*** (2.651)
Household Numbers	-0.014 (0.024)	-0.008 (0.022)	-0.011 (0.018)	0.046 (0.041)	0.024 (0.027)	0.033 (0.027)
Gender	0.261 (0.332)	0.476* (0.281)	0.281 (0.258)	0.4 (0.281)	0.079 (0.267)	0.118 (0.181)
Age	-0.0001 (0.005)	-0.004 (0.005)	-0.001 (0.004)	-0.001 (0.003)	-0.001 (0.004)	0.0004 (0.002)
Edu. (Primary)	0.497** (0.225)	0.479** (0.213)	0.371** (0.178)	0.303 (0.26)	-0.264 (0.224)	0.417 (0.303)
Edu. Level (Secondary)	0.775*** (0.238)	0.984*** (0.233)	1.072*** (0.274)	0.061 (0.056)	0.026 (0.089)	0.04 (0.047)
Wealth	0.0000 (0.000)	0.0000 (0.000)	-0.000 (0.000)	0.565 (0.375)	-0.488* (0.25)	0.870*** (0.292)
Employment (Yes)	-0.267** (0.128)	-0.255* (0.139)	-0.228* (0.132)	0.0000 (0.000)	0.0000 (0.000)	-0.000 (0.000)
Religion	0.047 (0.142)	0.068 (0.142)	0.083 (0.129)	-0.167 (0.143)	-0.209 (0.162)	-0.055 (0.116)
Occupation (44)	0.513* (0.264)	0.394 (0.244)	0.136 (0.143)	-0.198 (0.403)	0.052 (0.146)	0.47 (0.378)
Occupation (62)	0.072 (0.117)	-0.031 (0.115)	0.048 (0.091)	-0.167 (0.407)	0.124 (0.12)	0.412 (0.381)
Occupation (65)	-0.203 (0.614)	-0.723 (0.725)	-0.110 (0.452)	-0.149 (0.485)	-0.358 (0.244)	1.089** (0.481)
DHS - North Central	5.227* (2.785)	6.134** (3.013)	3.133 (2.377)	0.25 (0.158)	0.302 (0.281)	0.194 (0.139)
DHS - North Western	5.230* (2.78)	5.954** (2.989)	3.292 (2.38)	0.093 (0.126)	0.057 (0.11)	0.13 (0.118)
DHS - South Central	5.720** (2.771)	6.359** (2.98)	3.71 (2.352)	-0.382 (0.461)	-0.168 (0.202)	0.143 (0.224)
DHS - S. East A	5.578**	6.153**	3.579	3.739***	-0.806	4.254***

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Table 35 – Continued

	Iron Ore			Non-Iron Ore Mining		
	All	Early	Late	All	Early	Late
	(2.823)	(3.03)	(2.399)	(1.242)	(2.009)	(1.642)
DHS - S. East B	5.311*	6.040**	3.44	3.208**	-0.773	3.576**
	(2.794)	(2.997)	(2.377)	(1.275)	(2.031)	(1.7)
Constant	-6.219*	-7.816*	-2.792	3.919***	-0.467	4.102**
	(3.778)	(4.011)	(2.893)	(1.18)	(1.956)	(1.645)

5.2.4 Robustness 2: US and Chinese Concessions

Table 36: US and Chinese Concessions (2006-2012), 25 km

	China		USA	
	All	Late	All	Late
Treatment	0.561*** (0.2)	0.412** (0.187)	0.027 (0.063)	0.043 (0.049)
Urban/Rural	2.876 (2.171)	1.904* (1.043)	-0.001 (0.0005)	-0.001* (0.0004)
Elevation	-0.003 (0.002)	-0.001 (0.002)	0.001*** (0.0003)	0.001** (0.0003)
Pop. Density	0.003*** (0.001)	0.002*** (0.0004)	0.000*** (0.000)	0.000** (0.000)
Aid Projects	0.00001* (0.00001)	0.00001 (0.00001)	-0.000 (0.000)	-0.000 (0.000)
Nat. Resource Location	-0.000 (0.00001)	-0.00001 (0.00001)	-0.156*** (0.041)	-0.068** (0.028)
Home Regions	-0.017 (0.081)	0.028 (0.072)	-0.00001 (0.00002)	0.0000 (0.00001)
Dist. to Roads	-0.0001 (0.0001)	-0.00005 (0.0001)	0.005 (0.016)	0.012 (0.014)
Slope	0.025 (0.063)	-0.006 (0.047)	-0.0003* (0.0001)	-0.0002** (0.0001)
Urban Travel Time	-0.004** (0.002)	-0.003 (0.002)	0.002 (0.003)	0.001 (0.003)
Pre-Period Precipitation	-0.009 (0.014)	0.013 (0.012)	-0.037 (0.065)	-0.055 (0.057)
Pre-Period Temperature	-0.146 (0.147)	-0.343* (0.19)	-0.104 (0.089)	-0.656*** (0.17)
Pre-Period NTL (Avg)	-0.423*** (0.093)	-0.885*** (0.119)	4.148*** (1.039)	11.930*** (2.506)
Pre-Period NTL (Trend)	8.367*** (1.842)	13.985*** (1.967)	-0.030* (0.018)	-0.023 (0.015)
Household Numbers	-0.077 (0.072)	-0.046 (0.056)	-0.358 (0.251)	-0.127 (0.167)
Gender	-0.218 (0.686)	0.18 (0.74)	0.002 (0.003)	0.003 (0.003)
Age	0.012 (0.013)	0.013 (0.012)	0.232** (0.107)	0.195** (0.087)
Religion	-0.221 (0.32)	-0.168 (0.367)	0.385 (0.316)	0.771*** (0.239)
Edu. (Primary)	0.767** (0.351)	0.757* (0.388)	0.000*** (0.000)	0.000* (0.000)
Edu. Level (Secondary)	0.198 (0.934)	1.267 (0.778)	-0.314** (0.141)	-0.265*** (0.086)
Wealth	0.0000 (0.000)	-0.000 (0.000)	-0.524* (0.309)	-0.328 (0.225)
Employment (Yes)	0.009 (0.308)	0.556 (0.409)	-0.333 (0.323)	-0.216 (0.248)
Marital Status	0.126 (0.313)	0.507 (0.338)	-0.597 (0.422)	-0.585** (0.236)
Occupation (44)	0.539 (0.351)	1.000** (0.469)	0.255 (0.192)	0.06 (0.09)
Occupation (62)			0.126 (0.122)	0.09 (0.078)
Occupation (65)	-0.482 (0.473)	-0.743 (0.457)	0.204 (0.155)	0.114 (0.085)
DHS - North Central	-0.180 (0.351)	-0.544 (0.378)	1.142 (0.746)	0.612 (0.917)
DHS - North Western	-2.347 (2.285)	-1.997 (1.489)	0.72 (0.727)	0.306 (0.923)

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Table 36 – Continued

	China		USA	
	All	Late	All	Late
DHS - South Central	10.393** (4.391)	4.264** (1.656)	1.547** (0.738)	0.873 (0.884)
DHS - S. East A	9.837** (4.412)	4.198** (1.638)	1.408* (0.751)	0.835 (0.909)
DHS - S. East B	10.846** (4.29)	4.831*** (1.58)	0.832 (0.724)	0.462 (0.908)
Constant	-5.456 (5.818)	0.918 (4.476)	0.686 (1.891)	1.284 (1.645)

5.2.5 Robustness 2: US and Chinese Mining Concessions

Table 37: US and Chinese Mining Concessions (2006-2012), 25 km

	China		USA	
	All	Late	All	Late
Treatment	0.792*** (0.21)	0.456** (0.196)	-0.011 (0.052)	-0.009 (0.05)
Urban/Rural	0.097 (1.146)	0.293 (0.993)	2.022*** (0.415)	0.952*** (0.312)
Elevation	0.0002 (0.003)	-0.002 (0.002)	-0.0004 (0.0004)	-0.001 (0.0004)
Pop. Density	0.002*** (0.001)	0.003*** (0.001)	0.004*** (0.001)	0.003*** (0.001)
Aid Projects	0.0000 (0.00001)	0.00001 (0.00001)	0.000*** (0.000)	0.000** (0.000)
Nat. Resource Location	-0.00001 (0.00001)	-0.00001 (0.00001)	-0.000* (0.000)	-0.000* (0.000)
Home Regions	0.046 (0.103)	0.144** (0.07)	-0.093*** (0.029)	-0.062** (0.026)
Dist. to Roads	-0.0002* (0.0001)	-0.00002 (0.0001)	0.0000 (0.00001)	0.00001 (0.00001)
Slope	-0.015 (0.063)	-0.012 (0.065)	-0.007 (0.012)	-0.005 (0.012)
Urban Travel Time	-0.005 (0.003)	-0.001 (0.001)	-0.0002** (0.0001)	-0.0003** (0.0001)
Pre-Period Precipitation	-0.011 (0.017)	0.01 (0.018)	0.002 (0.003)	0.002 (0.002)
Pre-Period Temperature	-0.226 (0.263)	-0.362 (0.278)	0.011 (0.047)	-0.034 (0.05)
Pre-Period NTL (Avg)	-0.508*** (0.101)	-0.823*** (0.127)	-0.303*** (0.08)	-0.834*** (0.108)
Pre-Period NTL (Trend)	7.899*** (2.12)	13.056*** (2.288)	5.904*** (1.061)	13.361*** (1.781)
Household Numbers	-0.168** (0.073)	-0.019 (0.062)	-0.021 (0.02)	-0.030* (0.017)
Gender	-0.093 (0.719)	-0.364 (0.72)	-0.102 (0.202)	-0.110 (0.214)
Age	0.038*** (0.012)	0.038*** (0.011)	0.002 (0.003)	0.004 (0.004)
Religion	-0.269 (0.463)	-0.564 (0.41)	0.015 (0.104)	0.047 (0.112)
Edu. (Primary)	1.483*** (0.451)	1.096*** (0.373)	0.221*** (0.086)	0.177** (0.074)
Edu. Level (Secondary)	0.999 (1.593)	1.798** (0.847)	0.739** (0.354)	0.947*** (0.271)
Wealth	0.000* (0.000)	-0.000 (0.000)	0.000** (0.000)	0.0000 (0.000)
Employment (Yes)	-0.796* (0.463)	0.194 (0.566)	-0.235** (0.099)	-0.207** (0.099)
Marital Status	0.056 (0.353)	0.599 (0.561)	-0.197 (0.259)	0.078 (0.254)
Occupation (44)	0.366 (0.427)	1.368** (0.62)	-0.022 (0.259)	0.186 (0.264)
Occupation (62)	0.006 (0.553)	-1.310* (0.713)		
Occupation (65)	0.366 (0.464)	-0.233 (0.534)	0.174 (0.141)	0.059 (0.095)
DHS - North Central	0.166 (1.381)	-0.077 (0.481)	0.138 (0.095)	0.112 (0.094)
DHS - North Western	3.735 (3.229)	-0.776 (1.24)	0.126 (0.132)	0.139 (0.133)

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Table 37 – Continued

	China		USA	
	All	Late	All	Late
DHS - South Central	3.506 (3.204)	7.664*** (2.573)	11.385*** (3.236)	8.465*** (2.182)
DHS - S. East A	4.338 (3.056)	7.928*** (2.618)	11.130*** (3.242)	8.226*** (2.222)
DHS - S. East B	6.856** (3.061)	8.474*** (2.316)	11.724*** (3.237)	8.760*** (2.173)
Constant	2.894 (6.155)	-3.298 (6.339)	-11.605*** (3.542)	-7.872*** (2.507)

5.3 Robustness test 3: Reduced caliper

Summary *This section presents the findings of an analysis using a stricter criteria for determining whether two locations qualify as a matched pair. The findings are robust to this change in the matching criteria.*

This logit model is then used to derive the propensity that the units will ‘receive the treatment’ of exposure to the concession. The propensity score is, in turn, used in a nearest-neighbor matching routine. To conduct this matching process, we use a caliper of 0.25. The caliper determines the degree of similarity two locations must have to be counted as a matched pair. A 0.25 caliper is best practice in studies using propensity score matching for causal inference (Lunt, 2013; Rosenbaum & Rubin, 2012).

However, as a robustness test, we re-estimate all models using a caliper of 0.1. This stricter criteria for identifying matched pairs results in a reduced sample size. However, our results do not change substantively; see the Online Appendix for accompanying results. Utilizing a different caliper essentially amounts to creating a different dataset; implementing the matching algorithm and subsequent analysis is therefore quite time intensive. For this reason, we implement the new caliper for the iron ore mining concessions, as these — according to the Liberian government’s expectation — should be the most important for stimulating local agglomeration processes. The results show that a stricter caliper of 0.1 does not adversely affect our results.

Table 38: Iron Ore Concessions (2006-2012)

	Caliper = 0.25	Caliper = 0.1
Treatment	0.253** (0.104)	0.278*** (0.103)
Urban/Rural	2.247*** (0.513)	2.644*** (0.539)
Elevation	0.001 (0.001)	0.002* (0.001)
Pop. Density	0.003*** (0.001)	0.002*** (0.0005)
Aid Projects	0.000 (0.000)	-0.000 (0.000)
Nat. Resource Location	0.000 (0.000)	0.00001* (0.000)
Home Regions	-0.050 (0.038)	-0.025 (0.057)
Dist. to Roads	0.00004* (0.00002)	0.00004* (0.00003)
Slope	-0.021 (0.045)	-0.042 (0.050)
Urban Travel Time	-0.0005* (0.0003)	-0.001** (0.0003)
Pre-Period Precipitation	0.006 (0.004)	0.0005 (0.006)
Pre-Period Temperature	-0.064 (0.097)	-1.007 (1.491)
Pre-Period NTL (Avg)	-0.339*** (0.108)	-0.155 (0.120)
Pre-Period NTL (Trend)	9.676*** (2.248)	5.759** (2.278)
Household Numbers	0.004 (0.022)	0.008 (0.028)
Gender	0.183 (0.354)	-0.301* (0.157)
Age	0.002 (0.004)	0.001 (0.005)
Edu. (Primary)	0.523** (0.213)	0.675*** (0.250)
Edu. Level (Secondary)	0.857*** (0.244)	1.206*** (0.307)
Wealth	0.000 (0.00000)	0.000 (0.00000)
Employment (Yes)	-0.313** (0.144)	-0.286* (0.158)
Religion	0.068 (0.145)	-0.036 (0.162)
Occupation (44)	0.467* (0.26)	0.524** (0.224)
Occupation (62)	-0.012 (0.132)	0.097 (0.163)

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Table 38 – Continued

	Caliper = 0.25	Caliper = 0.1
Occupation (65)	-0.436 (0.64)	(.)
DHS - North Central	9.158*** (2.625)	6.215*** (1.714)
DHS - North Western	9.307*** (2.611)	6.452*** (1.745)
DHS - South Central	9.842*** (2.601)	6.953*** (1.664)
DHS - S. East A	9.415*** (2.653)	6.316*** (1.692)
DHS - S. East B	9.223*** (2.613)	6.108*** (1.665)
Constant	-9.071** (3.689)	-4.899** (2.138)

5.4 Robustness test 4: Different thresholds

Summary *We define locations within 25km of a concession as treated, while those beyond 25km are untreated. This section presents additional estimates utilizing different thresholds. These robustness tests are generally consistent with the results presented in the paper.*

We define locations within 25km of a concession as treated, while those beyond 25km are untreated. On a theoretical level, our choice is guided by the expected range across which economic effects of FDI projects might diffuse. We use workers' commuting distance as a proxy. While no information is available for Liberia, data from neighboring Ivory Coast suggest that 25km is a reasonable estimate Kung et al. (2014, p. 6). Empirically, we face constraints that limit the use of certain thresholds. For instance, the larger a radius used to define which locations are treated, the lower the number of available locations suitable as controls. Without a reasonable number of untreated locations available for matching, we cannot conduct the statistical analysis. In a country of Liberia's size, we cannot calculate estimates for most models if we use a radius of 30km and above. Similarly, the smaller the radius used to define which locations are treated, the lower the number of treated observations. In this case, plenty control locations are available for matching, but the lack of treated locations implies that there may not be a sufficient number of matched pairs for the statistical analysis. Taken together, we face both an upper and a lower limit with respect to possible radii. We have chosen 25km because it is the only distance at which we can calculate effects across all our models (across sectors, nationalities, etc.).

As a robustness test, however, we estimate all models for which we have sufficient data. These results, which are reported in the Online Appendix, are largely consistent with the results based on a 25 km-based measure of exposure to treatment. Some differences are to be expected considering the number of estimations performed: Following the frequentist interpretation of confidence intervals, we expect 95%, or 95 of 100, analyses to contain the actual unknown value of the coefficient. In our case, we report 23 models in the manuscript and estimate an additional 92 extensions with different thresholds. Of these 115 models, only 6 models (equivalent to 5% of all models) are significantly different (that is, statistically significant and opposite sign) from the estimates reported in the manuscript.

Note, for reasons of space, the tables below omit all control variables and focus on the treatment effect only. In addition, note that we were unable to estimate some models due to the upper/lower limits on thresholds noted above. For this reason, the tables show all models that our data allowed to be estimated; models that the data did not allow to estimate are noted with 'n/a.'

Table 39: All Concessions (Full Period, 2006-2012)

	5km	10km	15km	20km	25km	30km
Treatment	-0.003 (0.063)	0.034 (0.070)	-0.005 (0.088)	0.142** (0.066)	0.035 (0.124)	n/a (n/a)

Table 40: All Concessions (Early Period, 2005-2009)

	5km	10km	15km	20km	25km	30km
Treatment	-0.056 (0.207)	0.028 (0.143)	0.059 (0.132)	0.059 (0.201)	0.120 (0.140)	0.240** (0.117)

Table 41: All Concessions (Late Period, 2009-2013)

	5km	10km	15km	20km	25km	30km
Treatment	0.038 (0.052)	0.092 (0.059)	0.105 (0.080)	0.113** (0.051)	0.350*** (0.105)	n/a (n/a)

Table 42: Agriculture Concessions (Full Period, 2006-2012)

	5km	10km	15km	20km	25km	30km
Treatment	n/a (n/a)	-0.026 (0.205)	-0.002 (0.212)	0.118 (0.184)	-0.346* (0.188)	0.368** (0.150)

Table 43: Agriculture Concessions (Early Period, 2005-2009)

	5km	10km	15km	20km	25km	30km
Treatment	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)

Table 44: Agriculture Concessions (Late Period, 2009-2013)

	5km	10km	15km	20km	25km	30km
Treatment	n/a (n/a)	-0.106 (0.210)	-0.116 (0.217)	-0.161 (0.193)	-0.595*** (0.146)	-0.039 (0.113)

Table 45: Forestry Concessions (Full Period, 2006-2012)

	5km	10km	15km	20km	25km	30km
Treatment	0.005 (0.031)	0.016 (0.011)	-0.016 (0.018)	0.086 (0.064)	-0.103 (0.086)	-0.094 (0.083)

Table 46: Forestry Concessions (Early Period, 2005-209)

	5km	10km	15km	20km	25km	30km
Treatment	n/a (n/a)	n/a (n/a)	n/a (n/a)	0.054 (0.035)	0.050 (0.035)	n/a (n/a)

Table 47: Forestry Concessions (Late Period, 2009-2013)

	5km	10km	15km	20km	25km	30km
Treatment	0.007 (0.006)	0.001 (0.006)	-0.017 (0.012)	-0.0001 (0.029)	-0.079 (0.056)	0.009 (0.030)

Table 48: Mining Concessions (Full Period, 2006-2012)

	5km	10km	15km	20km	25km	30km
Treatment	-0.077 (0.100)	-0.049 (0.100)	-0.120 (0.106)	0.096 (0.063)	0.174*** (0.052)	n/a (n/a)

Table 49: Mining Concessions (Early Period, 2005-2009)

	5km	10km	15km	20km	25km	30km
Treatment	n/a (n/a)	n/a (n/a)	-0.464 (0.623)	0.000 (0.000)	0.000* (0.000)	-0.042 (0.116)

Table 50: Mining Concessions (Late Period, 2009-2013)

	5km	10km	15km	20km	25km	30km
Treatment	0.019 (0.083)	0.076 (0.084)	0.045 (0.088)	0.095 (0.063)	0.131** (0.056)	0.247** (0.113)

Table 51: Iron Ore Concessions (Full Period, 2006-2012)

	5km	10km	15km	20km	25km	30km
Treatment	-0.184 (0.121)	-0.048 (0.091)	-0.021 (0.068)	0.288*** (0.110)	0.253** (0.104)	0.185* (0.100)

Table 52: Iron Ore Concessions (Early Period, 2005-2009)

	5km	10km	15km	20km	25km	30km
Treatment	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)

Table 53: Iron Ore Concessions (Late Period, 2009-2013)

	5km	10km	15km	20km	25km	30km
Treatment	-0.094 (0.097)	0.005 (0.071)	0.015 (0.066)	0.171* (0.094)	0.165* (0.089)	0.155* (0.089)

Table 54: Mining Non-Iron Ore Concessions (Full Period, 2006-2012)

	5km	10km	15km	20km	25km	30km
Treatment	-0.043 (0.102)	-0.026 (0.098)	-0.095 (0.095)	-0.051 (0.105)	0.005 (0.050)	0.177* (0.096)

Table 55: Non-Iron Ore Concessions (Early Period, 2005-2009)

	5km	10km	15km	20km	25km	30km
Treatment	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)

Table 56: Mining Non-Iron Ore Concessions (Late Period, 2009-2013)

	5km	10km	15km	20km	25km	30km
Treatment	0.080 (0.084)	0.100 (0.077)	0.073 (0.074)	0.044 (0.094)	0.047 (0.052)	0.146** (0.074)

Table 57: USA Concessions (Full Period, 2006-2012)

	5km	10km	15km	20km	25km	30km
Treatment	0.089 (0.099)	0.019 (0.106)	0.037 (0.091)	-0.007 (0.080)	0.017 (0.072)	0.118 (0.080)

Table 58: USA Concessions (Early Period, 2005-2009)

	5km	10km	15km	20km	25km	30km
Treatment	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)

Table 59: USA Concessions (Late Period, 2009-2013)

	5km	10km	15km	20km	25km	30km
Treatment	0.167* (0.091)	0.121 (0.097)	0.159* (0.083)	0.112 (0.072)	0.045 (0.060)	0.121 (0.075)

Table 60: Chinese Concessions (Full Period, 2006-2012)

	5km	10km	15km	20km	25km	30km
Treatment	n/a (n/a)	n/a (n/a)	n/a (n/a)	0.987*** (0.195)	0.829*** (0.200)	0.815*** (0.174)

Table 61: Chinese Concessions (Early Period, 2005-2009)

	5km	10km	15km	20km	25km	30km
Treatment	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)

Table 62: Chinese Concessions (Late Period, 2009-2013)

	5km	10km	15km	20km	25km	30km
Treatment	n/a (n/a)	n/a (n/a)	n/a (n/a)	0.742*** (0.187)	0.614*** (0.199)	0.699*** (0.183)

Table 63: USA Mining Concessions (Full period, 2006-2012)

	5km	10km	15km	20km	25km	30km
Treatment	0.103 (0.103)	-0.028 (0.120)	0.031 (0.102)	-0.027 (0.095)	-0.006 (0.078)	0.063 (0.071)

Table 64: USA Mining Concessions (Early Period, 2005-2009)

	5km	10km	15km	20km	25km	30km
Treatment	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)

Table 65: USA Mining Concessions (Late Period, 2009-2013)

	5km	10km	15km	20km	25km	30km
Treatment	0.183 (0.112)	0.185* (0.107)	0.202** (0.095)	0.103 (0.082)	-0.006 (0.061)	0.048 (0.063)

Table 66: Chinese Mining Concessions (Full period, 2006-2012)

	5km	10km	15km	20km	25km	30km
Treatment	n/a (n/a)	n/a (n/a)	n/a (n/a)	1.222*** (0.188)	1.032*** (0.194)	0.769*** (0.173)

Table 67: Chinese Mining Concessions (Early Period, 2005-2009)

	5km	10km	15km	20km	25km	30km
Treatment	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)

Table 68: Chinese Mining Concessions (Late Period, 2009-2013)

	5km	10km	15km	20km	25km	30km
Treatment	n/a (n/a)	n/a (n/a)	n/a (n/a)	0.876*** (0.261)	0.599*** (0.154)	0.550*** (0.180)

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