

# Introduction to Gravity in R

dr. Ruben Dewitte

March 4, 2022

Table 1: Traditional Gravity Estimates

	(1) OLS	(2) OLS Remoteness	(3) OLS Fixed Effects	(4) PPML Fixed Effects
Intercept	-11.283 (0.296)	-40.492 (2.414)		
Log Distance	-1.002 (0.027)	-1.185 (0.031)	-1.216 (0.038)	-0.841 (0.032)
Contiguity	0.574 (0.185)	0.247 (0.177)	0.223 (0.203)	0.437 (0.084)
Common language	0.802 (0.082)	0.739 (0.078)	0.661 (0.082)	0.247 (0.078)
Colony	0.735 (0.144)	0.842 (0.150)	0.670 (0.149)	-0.222 (0.118)
Log output	1.190 (0.009)	1.164 (0.009)		
Log expenditure	0.908 (0.010)	0.903 (0.010)		
Exporter remoteness		0.972 (0.068)		
Importer remoteness		0.274 (0.060)		
N	25689	25689	25689	28152
R2	0.759	0.765	0.843	
logLik	-50720	-50370	-45171	-2194537
AIC	101455	100757	92004	4390736
Exporter-time fixed effects	No	No	Yes	Yes
Importer-time fixed effects	No	No	Yes	Yes

Notes: Statistics based on author's calculations. All estimates are obtained with data for the years 1986, 1990, 1994, 1998, 2002, and 2006. Columns (1)-(3) use the OLS estimator. Column (1) does not control for the multilateral resistances. Column (2) uses remoteness indexes to control for multilateral resistances. Column (3) uses importer-time and exporter-time fixed effects, whose estimates are omitted for brevity, to control for multilateral resistances. Finally, column (4) employs the PPML estimator. Standard errors are clustered by country pair and are reported in parentheses.

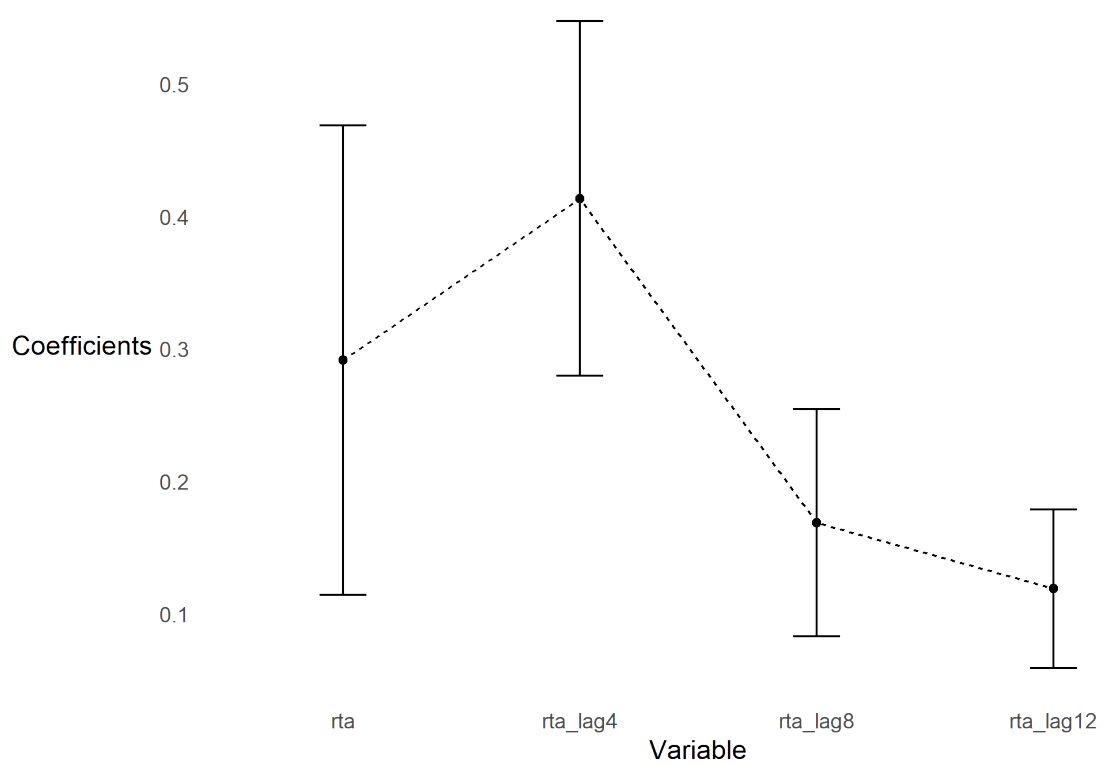


Figure 1: Evolution of RTA impact on trade over time.

**Source:** Author's calculations.

Table 2: A simple solution to the “distance puzzle” in trade

	(1) OLS	(2) PPML	(3) INTRA	(4) BRDR	(5) FEs
Log distance 1986	-1.168 (0.044)	-0.859 (0.038)	-0.980 (0.073)	-0.857 (0.064)	-0.910 (0.033)
Log distance 1990	-1.155 (0.042)	-0.834 (0.038)	-0.940 (0.074)	-0.819 (0.064)	-0.879 (0.033)
Log distance 1994	-1.211 (0.046)	-0.835 (0.036)	-0.915 (0.073)	-0.796 (0.064)	-0.860 (0.032)
Log distance 1998	-1.248 (0.043)	-0.847 (0.036)	-0.887 (0.072)	-0.770 (0.064)	-0.833 (0.032)
Log distance 2002	-1.241 (0.044)	-0.848 (0.032)	-0.884 (0.072)	-0.767 (0.064)	-0.829 (0.033)
Log distance 2006	-1.261 (0.044)	-0.836 (0.032)	-0.872 (0.072)	-0.754 (0.063)	-0.811 (0.033)
Contiguity	0.223 (0.203)	0.437 (0.084)	0.371 (0.142)	0.574 (0.157)	0.442 (0.083)
Colony	0.670 (0.149)	-0.222 (0.118)	0.019 (0.159)	0.027 (0.127)	-0.220 (0.118)
Common language	0.661 (0.082)	0.248 (0.078)	0.337 (0.171)	0.352 (0.139)	0.241 (0.077)
Log intra-national distance			-0.488 (0.102)	-0.602 (0.111)	
Intra-national trade dummy				1.689 (0.582)	
N	25689	28152	28566	28566	28566
R <sup>2</sup>	0.843				
logLik (in thousands)	-45	-2194	-7610	-7335	-2556
AIC (in thousands)	92	4390	15221	14673	5114
Intra-national trade	No	No	Yes	Yes	Yes
Country-specific intra-national fixed effects	No	No	No	No	Yes

Notes: All estimates are obtained with data for the years 1986, 1990, 1994, 1998, 2002, and 2006, and use exporter-time and importer-time fixed effects. The estimates of the fixed effects are omitted for brevity. Columns (1) and (2) use data on international trade flows only. Column (1) employs the OLS estimator and column (2) uses the PPML estimator. Column (3) adds internal trade observations and uses intra-national distance as an additional covariate. Column (4) adds an indicator covariate for international trade. Finally, column (5) uses country-specific dummies for intra-national trade. Standard errors are clustered by country pair and are reported in parentheses. The bottom panel of the table reports the percentage change in the estimates of the effects of bilateral distance between 1986 and 2006.

Table 3: Estimating the Effects of Regional Trade Agreements

	(1) OLS	(2) PPML	(3) INTRA	(4) ENDG	(5) LEAD	(6) PHSNG	(7) GLBZN
Log distance	-1.216 (0.039)	-0.822 (0.031)	-0.800 (0.031)				
Contiguity	0.223 (0.203)	0.416 (0.084)	0.393 (0.080)				
Colony	0.670 (0.149)	-0.205 (0.116)	-0.182 (0.115)				
Common language	0.661 (0.082)	0.250 (0.078)	0.244 (0.078)				
RTA	-0.004 (0.054)	0.191 (0.067)	0.409 (0.070)	0.557 (0.104)	0.520 (0.087)	0.291 (0.091)	0.116 (0.088)
RTA(t+4)					0.077 (0.094)		
RTA(t-4)						0.414 (0.068)	0.288 (0.063)
RTA(t-8)						0.169 (0.044)	0.069 (0.049)
RTA(t-12)						0.119 (0.031)	0.002 (0.030)
Int. border 1986							-0.706 (0.049)
Int. border 1990							-0.480 (0.044)
Int. border 1994							-0.367 (0.034)
Int. border 1998							-0.158 (0.024)
Int. border 2002							-0.141 (0.017)
N	25689	28152	28566	28482	28482	28482	28482
R2	0.843						
logLik (in thousands)	-45	-2176	-2836	-1380	-1379	-1296	-1030
AIC (in thousands)	92	4354	5675	2766	2764	2599	2067
Intra-national trade	No	No	Yes	Yes	Yes	Yes	Yes

Notes: All estimates are obtained with data for the years 1986, 1990, 1994, 1998, 2002, and 2006, and use exporter-time and importer-time fixed effects. The estimates of the fixed effects are omitted for brevity. Columns (1) and (2) use data on international trade flows only. Column (1) applies the OLS estimator and column (2) uses the PPML estimator. Column (3) adds intra-national trade observations and uses country-specific dummies for internal trade. Column (4) adds pair fixed effects. The estimates of the pair fixed effects are omitted for brevity. Column (5) introduces RTA lead. Column (6) allows for phasing-in effects of RTAs. Finally, column (7) accounts for the effects of globalization. Standard errors are clustered by country pair and are reported in parentheses.