

Table 1: Examples of models in the universal gravity framework

Model	Demand elasticity ( $\phi$ )	Supply elasticity ( $\psi$ )	Model parameters
<a href="#">Armington (1969)</a> ; <a href="#">Anderson (1979)</a> ; <a href="#">Anderson and Van Wincoop (2003)</a> (with intermediates)	$\sigma - 1$	$\frac{1-\zeta}{\zeta}$	$\sigma$ subs. param. $\zeta$ intermediate good share
<a href="#">Krugman (1979)</a>	$\sigma - 1$	$\frac{1-\zeta}{\zeta}$	$\sigma$ subs. param. $\zeta$ intermediate good share
<a href="#">Eaton and Kortum (2002)</a>	$\theta$	$\frac{1-\zeta}{\zeta}$	$\theta$ heterogeneity param. $\zeta$ intermediate good share
<a href="#">Melitz (2003)</a>	$\theta$	$\frac{1-\zeta}{\zeta}$	$\theta$ heterogeneity param. $\zeta$ intermediate good share
<a href="#">Di Giovanni and Levchenko (2009)</a>	$\frac{\sigma-1}{\theta\sigma+(\sigma-1)}$	0	$\sigma$ subs. param. $\theta$ heterogeneity param.
<a href="#">Allen and Arkolakis (2014)</a>	$\sigma - 1$	$-\frac{1}{a+b}$	$\sigma$ subs. param. $a$ productivity spillover $b$ amenity spillover
<a href="#">Redding (2016)</a>	$\theta$	$\alpha \times \varepsilon$	$\theta$ heterogeneity (goods) param. $\varepsilon$ heterogeneity (labor) param. $\alpha$ goods expenditure share
Economic geography with intermediate goods and spillovers	$\sigma - 1$	$\frac{1-\zeta}{\zeta} - \frac{1+\frac{a}{\zeta}}{\zeta b+a}$	$\sigma$ subs. param. $\zeta$ intermediate good share $a$ productivity spillover $b$ amenity spillover
Economic geography with intermediate goods, idiosyncratic preferences, and spillovers	$\theta$	$\frac{1-\zeta}{\zeta} + \varepsilon \frac{1+\frac{a}{\zeta}}{\zeta - \varepsilon(\beta\zeta+a)}$	$\theta$ heterogeneity (goods) param. $\varepsilon$ heterogeneity (labor) param. $\zeta$ intermediate good share $a$ productivity spillover $b$ amenity spillover

*Notes:* This table includes a (non-exhaustive) list of trade and economic geography models that can be examined within the universal gravity framework.

Table 2: ESTIMATING THE GRAVITY CONSTANTS

	(1) OLS	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV
Log Income (Demand elasticity)	-0.403** (0.171)	1.484 (1.157)	3.278 (2.674)	4.364* (2.371)	3.882** (1.838)	3.539*** (1.356)	3.715*** (1.312)
Log Own Expenditure Share (Supply Elasticity)	3.381** (1.600)	92.889*** (13.417)	108.592** (48.104)	116.649** (47.944)	71.859** (35.883)	64.968** (33.014)	68.488** (32.198)
Land controls	No	No	Yes	Yes	Yes	Yes	Yes
Geographic controls	No	No	No	Yes	Yes	Yes	Yes
Historical controls	No	No	No	No	Yes	Yes	Yes
Institutional controls	No	No	No	No	No	Yes	Yes
Schooling and R&D controls	No	No	No	No	No	No	Yes

First stage Sanderson-Windmeijer F-test:

Income	25.909	3.994	6.349	20.095	34.198	25.763
(p-value)	0.004	0.102	0.053	0.007	0.002	0.004
Own expenditure share	72.702	4.388	4.923	3.561	4.577	5.205
(p-value)	0.000	0.090	0.077	0.118	0.085	0.071
Observations	94	94	94	94	94	94

*Notes:* The dependent variable is the estimated country fixed effect of a gravity regression of the log ratio of bilateral trade flows to destination own trade flows on categorical deciles of distance variables, where the coefficient is allowed to vary by continent of origin and destination. Hence, each observation in the regressions above is a country. Instruments for income and own expenditure share are the equilibrium values from a trade model where the bilateral trade frictions are those predicted from the same gravity equation and countries are either identical in their supply shifters (column 2) or their supply shifters are estimated from a regression of observed income on observables (columns 3 through 7). In the latter case, the observables determining the supply shifters are controlled for directly in the second stage regression, so identification of the demand and supply elasticities arise only from the general equilibrium effect of distance on income and own expenditure shares. Land controls include land area interacted with fraction fertile soil, desert, and tropical areas. Geographic controls include the distance to nearest coast and the fraction of country within 100 km of an ice free coast. Historical controls include the log population in 1400 and the percentage of the population of European descent. Institutional controls include the quality of the rule of law. Schooling and R&D controls are average years of schooling (from UNESCO) and the R&D stocks (from Coe et al. (2009)), where a dummy variable is included if the country is not in each respective data set. Land, geographic, and historical control are from Nunn and Puga (2012). Standard errors clustered at the continent level are reported in parentheses. Stars indicate statistical significance: \* p<.10 \*\* p<.05 \*\*\* p<.01.

## References

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