Appendix

Electoral Systems and Trade-Policy Outcomes: The Effects of Personal-Vote Incentives on Barriers to International Trade

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Variable Data Sources

Variable	Variable Name	Data Source
Personal-Vote Incentive Index		See text
Logged GDP Per Capita (PPP)		World Development Indicators (WDI)
Loged Land Mass		WDI
Logged Unemployment		WDI
Logged World GDP		IMF
Legal Origins		La Porta et al. (1997)
EU		
Average Tariff	AT	WDI
Overall Trade Restrictiveness Index	OTRI	Kee et al. (2009)
Trade Freedom Index	TFI	Heritage Foundation
Legal/colonial/constitution IVs		Persson and Tabellini (2003)

District Magnitude

We initially intended to include national-average district magnitude as a regressor in keeping with common practice. After preliminary regressions its effects were shown to be very near zero in all cases and its effects on other variables were similarly near non-existent. Our electoral-system index proxies that effect as well as national-average magnitude might, by giving a higher or lower value to systems that would otherwise have scored similarly on Carey and Shugart's original ranking based on whether they use multimember or single member districts. In the original publication, where there is an incentive to cultivate a personal vote (that is, in any electoral system other than CLPR), an increase in district magnitude should lead to an increase in the relative weight of personal reputation against party reputation and thus an increase in incentive to pursue the cultivation of a personal vote. Here, that would translate to more protectionist rather than open trade policies. Although this cannot perfectly model the effect of magnitude theorized originally, which is thought to be determined by the ratio of candidates put forth in each election in each district or a derivative strategy (see Crisp et al., 2007), it will be able to provide a rough approximation of the effects and will be suitable here. Additionally, the original argument behind the effect of M on intraparty competition and personal-vote incentives was on a per district basis, not a national average, meaning that including the average M per nation would be an attempt to include the effect of that particular

value of M. This would be less reflective of its effects in a nation than in a district with a value of M the same as the national average value. Explicitly modelling the actual effect of M would require a cross-national, district level study which is beyond constraints imposed by time and space here.

Table A1 – Electoral System with Magnitude

	AvTariff	**TFI**
Electoral System	0.048***	-0.068***
	(0.010)	(0.020)
District Magnitude	0.000	0.001
	(0.001)	(0.001)
R^2	0.135	0.043
Adj. R^2	0.133	0.040
Num. obs.	993	638

***p < 0.001, **p < 0.01, *p < 0.05

VIF Multicollinearity Test

Table A2 – VIF Results

VIF Multicollinearity Test	
Variable	Score
Electoral Systems	1.624
L. GDP pc within	2.106
L. GDP pc between	1.493
L. Land Area	1.717
L. Pop. Density within	1.709
L. Pop. Density between	1.949
Unemployment within	1.061
Unemployment between	1.171
EU Member	1.427
UK Legal Origin	5.023
French Legal Origin	5.684
Socialist Leg. Origin	4.151
German Leg. Origin	2.198
L. World GDP	1.034

TFI Outliers

When assessing the distribution of TFI measures, we observed some potentially significant outliers. Each of these observations is more than three standard deviations away from the mean TFI score. Outliers can exert influence on outcomes and potentially drive results, so further investigation was warranted. The outlying TFI observations come from India, Suriname, Nigeria, Tanzania, Trinidad and Tobago (TT), and Papua New Guinea (PNG) between the years 1995 and 2000. All told, these outliers constitute less than 1% of the total sample observations. We begin by investigating the outliers to check against potential measurement or data-entry error. Each of the outliers comes from a developing nation in years during or immediately surrounding events which could arguably constitute extenuating circumstances. India had been a closed economy prior to the 1980s with tariffs often exceeding 200% and had only begun economic and political reforms in the 1990s (the time-period where the outliers occur and the sample begins). Nigeria and Suriname are both notoriously corrupt countries where the former's political system has been criticized as "opaque and arbitrary" and the latter's described as rife with corruption and drugs money at all levels. (UK DFIT 2016 and Fasan 2015) PNG had experienced a drought and frost during and prior to 1997 which led to the collapse of numerous sectors and death throughout the country. (McLaughlin and Webb 1998) TT, similar to India, was undergoing political and economic reforms during its first year of inclusion in the dataset: 1996 (the year where TT is an outlier). (World Bank, 1999) Rerunning the TFI REWB model without the outliers slightly improves the link between our electoral-system index and model fit, but the substantive effect is essentially the same as when the outlying observations are included in the analysis.

Multiple Imputation

Initially, missing values were addressed by default via listwise deletion in R. In order to ensure that results obtained were not the product of biases introduced by systematically missing information we decided to fill in missing observations and rerun the relevant regressions. There are a number of methods used in political economy and other social science research to fill in or address missing observations ("missingness"), each with their own issues. Aggregating covariates into averages over, say, 5 or 10 year periods, while a common strategy, "can reduce the number of observations on the dependent variable by 80 or 90% [and] limits the complexity of possible functional forms estimated and number of control variables included, due to the restricted degrees of freedom… greatly affect[ing] empirical results – a point regularly discussed and lamented in numerous articles." (Honaker & King 2010: 562) Beyond averaging, other, ad hoc approaches have been developed: linear interpolation, imputation with means, and researchers' "best guess." These alternatives have been found to produce biased and inefficient inferences, standard errors, confidence intervals, and are "almost uniformly dominated by appropriate multiple imputation-based approaches." (Little and Rubin, 2002)

Multiple imputation creates many datasets with imputed values plugged into missing observations and then takes a mean for each imputed value across the multiple sets. Uncertainty in the predictive model is represented by the variation across the multiple imputations for each missing value which is included in the standard errors of the ultimate quantity of interest. Honaker & King (2010) shows that the bootstrapping method utilized by Gary King's Amelia II package for R produces reliable and efficient estimates for missing observations in social science data. It is this package with which multiple imputation was carried out. Results are reported below for the average tariff uni- and multivariate regression run with the imputed dataset with m=5 imputations. The imputed-data regression results for average tariff show a slight in-absolute-terms increase in the estimated effect of personal vote cultivation in electoral systems and average tariff levels and an increase in statistical significance to a p-value of 0.001.

Although we ran multiple imputation on the Trade Freedom Index variable in Amelia II, as well, the proportion of missing observations was simply too high for the estimates to be dependable. For this reason, results are not included here, although regressions showed no change to the significance of the results despite a slightly diminished coefficient.

Table A3 – REWB Analyses with Imputed Data

	Model 1	**Model 2**	**Model 3**
Electoral System	0.046***	0.030***	0.028***
	(0.009)	(0.007)	(0.007)
L.GDP pc Within		-1.026***	-1.041***
		(0.057)	(0.056)
L.GDP pc Between		-0.292***	-0.246***
		(0.034)	(0.038)
L.Land Area		-0.019	-0.029
		(0.023)	(0.022)
L.Pop.Den Within		-0.356*	-0.336*
		(0.170)	(0.167)
L.Pop.Den Between		0.019	0.016
		(0.032)	(0.033)
Unemployment Within		-0.017**	-0.017**
		(0.006)	(0.006)
Unemployment Between		-0.002	0.002
		(0.006)	(0.006)
UK Legal Origin		0.005	-0.003
		(0.006)	(0.006)
FR Leg. Origin			0.469*
			(0.196)
Socialist Leg. Origin			0.411*
			(0.199)
DL Leg. Origin			-0.099
			(0.200)
L. WOrld GDP			0.130
			(0.250)
AVTariff Diffusion			-0.003
			(0.007)
R^2	0.134	0.524	0.543
Adj. R^2	0.133	0.519	0.536
Num. obs.	993	971	971

***p < 0.001, **p < 0.01, *p < 0.05

Binary PR Indicator

Table A4 – REWB Regressions with a Binary PR Indicator

PR REWB Regressions		
	AVTariff	**TFI**
PR	-0.087	0.269
	(0.089)	(0.145)
L.GDP pc Within	-0.941***	1.462***
	(0.063)	(0.137)
L.GDP pc Between	-0.258***	0.339***
	(0.043)	(0.077)
L.Land Area	-0.028	-0.001
	(0.025)	(0.040)
L.Pop.Den Within	-0.546**	0.651
	(0.187)	(0.415)
L.Pop.Den Between	0.032	-0.141*
	(0.037)	(0.063)
Unemployment Within	-0.009	-0.009
	(0.006)	(0.013)
Unemployment Between	0.001	-0.009
	(0.008)	(0.013)
UK Legal Origin	0.439*	-0.003
	(0.220)	(0.428)
FR Leg. Origin	0.314	0.035
	(0.217)	(0.435)
Socialist Leg. Origin	-0.179	0.318
	(0.218)	(0.434)
DL Leg. Origin	-0.100	0.659
	(0.288)	(0.604)
L. WOrld GDP	-0.007	-0.041**
	(0.007)	(0.014)
AVTariff Diffusion	0.000	
	(0.006)	
TFI Diffusion		0.183
		(0.098)
R^2	0.544	0.453
Adj. R^2	0.536	0.437
Num. obs.	788	504

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$