Online Supplemental Materials for

Trade Policy, Economic Interests and Party Politics in a Developing Country: The Political Economy of CAFTA

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Appendix 1: The Provisions of CAFTA, Costa Rican trade, and Costa Rican FDI

We examine the details of the agreement in order to understand its distributional consequences and thus to identify which groups in Costa Rica should support and oppose it on purely economic grounds. We find that the distributional consequences of CAFTA-DR are unclear. High-skilled workers should benefit more from the agreement than low-skilled workers who will, in turn, face a mix of benefits and costs.[1]

[1] We use an occupational status measure that indicates the extent to which an occupation maps individual education to income based (International Social Economic Index' (ISEI)) 'as a *proxy* for skill level. The measure differentiates across occupations on the basis of how much human capital is required. As a result our proxy measure correlates at a

Tariffs

The aggregate effect on workers of tariff changes on US products in Costa Rica and on Costa Rican products to the US is ambiguous. On the one hand, sectors of the Cost Rican economy using low skill labor will experience the greatest declines in tariffs on products from the US, causing increased competition for low skill Cost Rican workers. On the other hand, the reduction in US tariff rates will be much greater for low-skilled Cost Rican industries than for high-skilled labor, boosting low skill exports from Costa Rica.

Once CAFTA-DR goes into effect for Costa Rica, Costa Rica's tariff rate on all products from the US will be cut in half, from about 6.3% to 3.2%.[2] The trade-weighted tariff on US imports into Costa Rica is 3.4% and will drop to 1.8% under CAFTA-DR. In comparison, the pre-CAFTA-DR tariff rate on Costa Rican products into the US was 5.1% which will decrease to 0.4% after CAFTA-DR goes into effect. Weighted by trade, the pre-CAFTA rate is 3.9% while the post-CAFTA rate is 0.3%.[3] Overall tariff rates hide sectoral variations in tariff rate cuts which may affect support for the agreement. Workers in sectors that are subject to a larger decline in tariffs may be less likely to support the agreement because they will suffer more from the cuts.

Costa Rican tariffs on US imports.

We identify 10 industries that made up 76% of Costa Rica's imports from the United States in 2005, representing a range of products from agriculture to labor intensive to human

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very high level with alternative measures, such as educational attainment. Because the trade agreement is written in terms of specific industries, alternative skill measures such as education have little direct correspondence with the terms of the agreement, making our measure more appropriate given our substantive focus.

[2] The average tariff rate once CAFTA-DR goes into effect was derived by combining the 2005 Costa Rican tariff schedule with the schedule of tariff cuts mandated by CAFTA-DR. The schedule of reduction was then applied to the 2005 tariffs to obtain a tariff rate for the first year after CAFTA-DR goes into effect. To get an aggregate rate, this tariff rate was averaged across all tariff lines.

[3] The US tariffs are calculated using the MFN rate rather than the Caribbean Basin Initiative rate because it was uncertain whether the CBI would be renewed (Morley, 2006).

capital and technology intensive. The list of the top 10 industries and their proportion of imports and tariff rates are available in Table 1. Pre-CAFTA-DR Costa Rica imposed the highest tariff rates on low-skilled labor and agricultural products from the US. These industries will also experience the largest decline in tariffs once CAFTA-DR goes into effect. In contrast, the industries using high-skilled labor had lower tariffs pre-CAFTA and, for the most part, were able to maintain their tariffs after CAFTA goes into effect.

US tariffs on Costa Rican imports.

Turning to Costa Rican exports to the United States, we identified 8 industries that comprised a little more than three-quarters of Costa Rican exports to the United States. Costa Rica's export mix has been changing in recent years, so the eight industries represent not only agricultural products (edible fruits, coffee, and rubber) and low skilled labor (articles of apparel), but also technology-intensive goods (instruments, machinery, and electrical machinery).[4]

Low-skilled labor industries exporting to the US face higher tariff rates than do skilled labor industries.[5] In contrast, the average tariff rate on the leading high skilled industries such as precision instruments (HS 90), electrical machinery (HS 85), and mechanical appliances (HS 84) all had pre-CAFTA tariff rates of less than 2%. Once CAFTA-DR goes into effect, the US tariff rate for all of these industries will be reduced to 0%.[6] Because the low-skilled industries faced higher tariff rates pre-CAFTA, the reduction in US tariff rates will be much greater for them than for high-skilled labor, boosting low skill exports from Costa Rica and potentially decreasing low-skilled unemployment (Francois et al., 2008).

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[4] Following Morley (2006) we calculate the tariff rate that would apply in each of these 8 industries in the absence of the Caribbean Basin Initiative and what the resulting tariff will be after CAFTA-DR passes in Table 2.

[5] US tariff rates on bananas and coffee, two of the largest Costa Rican exports, are both 0%.

[6] The Caribbean Basin Initiative substantially reduces tariffs on textiles and apparel, among other goods. Morley excludes the CBI from calculation of tariffs because the US has to periodically renew the agreement, so the rates are not locked in.

Low-skilled workers, and the country as a whole, will benefit from the liberalization of agriculture as increased competition from U.S. agriculture will decrease the price of food staples (Taylor et al., 2007). Agricultural sectors of the economy that produced for the domestic market and competed against imports feared that the liberalization from CAFTA would increase imports from the US (Dickerson, 9/21/2007; Murphy, 10/01/2007). These sectors, which included rice, poultry, pork, dairy, onions, potatoes, and oils, were among the most protected agricultural industries in Costa Rica pre-CAFTA, with tariff rates ranging from 30 to 50% (also see (Francois et al., 2008, pg. 49)). They lobbied the Costa Rican government hard to be excluded from the agreement. Most secured tariff quota safeguards, albeit weak ones, and onions and potatoes were excluded from tariff reductions, largely because of fear they would not be able to compete with the US (Murphy, 10/01/2007). Academic studies on the effect of CAFTA suggest some reason for this fear: lower prices will cause dislocation in the staple products, forcing many to seek new livelihoods (Materer and Taylor, 2003; Sanchez and Vos, 2007; Taylor et al., 2007).

Overall, then, the economic effects of CAFTA's tariff changes are unclear, but our data suggest that low-skilled and agricultural workers will bear the brunt of the impact (i.e., increased import competition), but also get more of the benefits (i.e., greater export access to the US, lower costs of food).

High Skill Industries and Multinational Production

Other aspects of the agreement will have a much stronger and positive impact on higher-skilled workers, especially the investment chapter. Trade and direct foreign investment can enhance skill-biased technological change in which relative wages may change in a country due to the adoption of new technologies (e.g., (Acemoglu, 2003)). If such technologies are complementary to skills, then workers with high skills will benefit from increased productivity of

these skills and consequently receive increased compensation. DFI and its related trade flows will work to the advantage of high skill workers. DFI in Costa Rica seems to have followed this process.

By the time CAFTA-DR was negotiated, Costa Rica had become a large destination for high-skilled DFI. As a consequence of CINDE's push in the mid-1990s, (mentioned in the text), technology-intensive products increased from less than 5% of exports to the US in 1994 to 37% in 1998, when they surpassed the share of primary products. From 1998 to 2005, technology-intensive exports have remained steady at just over 40% of exports, while primary exports have stabilized at about 35% of exports (see figure 1).[7] Companies, both foreign technology companies and some Costa Rican based companies, were also among the biggest supporters of CAFTA-DR, threatening to leave Costa Rica if the agreement was not passed since a decision to reject CAFTA-DR would put their operations at a severe disadvantage compared to other firms set up in countries that had signed on to CAFTA-DR. This fact was pointed out a number of times by proponents of the agreement.

Intel launched a mass media pro-CAFTA-DR campaign, at times indicating that a rejection of CAFTA-DR would make them relocate their operations to countries that had passed the agreement. Anecdotal evidence suggests that this had some impact.[8] Intel CEO Barrett came out strongly in favor of CAFTA, emphasizing benefits both to the US and the other signatory countries (Barrett, 2005) as did the site leader for U.S.-based Procter & Gamble (InsideCostaRica, 2007). Costa Rican-based multinationals also threatened to take their

[7] Using the factor intensity classification from Hinloopen and van Marrewijk (http://people.few.eur.nl//vanmarrewijk/eta/intensity.htm), we grouped Costa Rican trade with the US into 5 categories: Primary products; Natural-resource intensive products; Unskilled-labor intensive products; technology intensive products; and human-capital intensive products.

[8] "Pablo Chacon, a 63-year-old former truck driver, said he planned to vote 'yes' because that would mean more opportunities for his children. "I have children who are studying and one even works for Intel, and if they took it away, what would my children do?" he said" (AssociatedPress, 2007).

operations elsewhere if the referendum did not pass. Sardimar, a Costa-Rican large-scale tuna producer which exports to 29 countries, expanded its production facilities in 2002 (Sardimar, 2009). Fearing the consequences of a referendum rejection, Sardimar General Manager Thomas Gilmore told IPS that "we have decided to transfer operations to another country in the region if Costa Rica does not approve CAFTA in its entirety by March 2008. We're leaning towards El Salvador" (Zueras, 2006). Thus, the high-skilled workers employed in these types of companies had strong incentives to support CAFTA-DR.

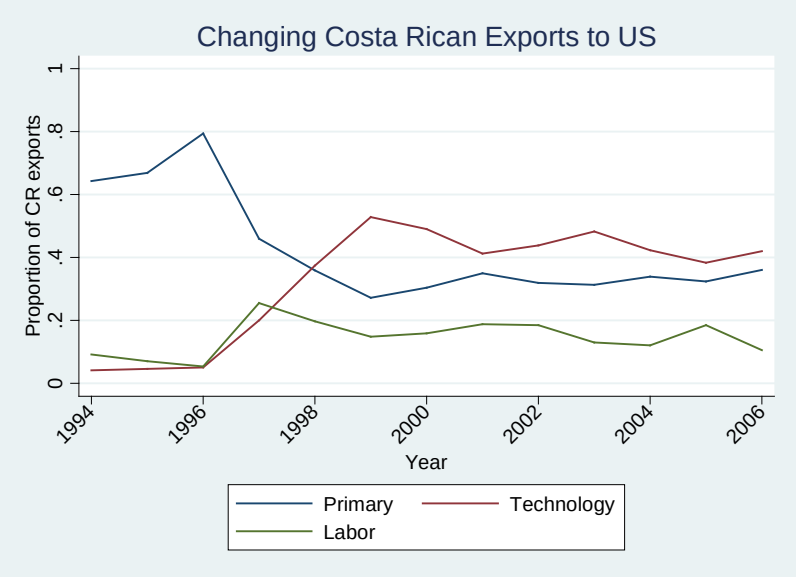
Table 1: Costa Rica's Top Import Industries from the US, 2005

HS number	Description	% of total imports	Average tariff	Trade-weighted tariff	CAFTA-DR tariff
85	Electrical machinery and equipment and parts thereof	31.4	3.44	0.86	2.72
84	Machinery and mechanical appliances	13.2	1.31	0.98	1.10
39	Plastics and articles thereof	8.0	4.42	2.27	3.93
48	Paper and paperboard	5.3	5.58	1.82	2.91
90	Optical, measuring, precision instruments and apparatus	3.7	1.46	0.22	0.39
62	Articles of apparel, not knitted or crocheted	3.3	14.88	15.00	0.00
27	Mineral fuels, mineral oils and products of their distillation	3.2	4.44	4.42	1.67
10	Cereals	3.1	11.96	9.82	3.85
61	Articles of apparel, knitted or crocheted	2.5	14.75	14.99	0.00
38	Miscellaneous chemical products	2.0	3.19	3.28	2.58

Table 2: Costa Rica's Top Export Industries to the US, 2005

HS number	Description	% of total exports	Average tariff	Trade-weighted tariff	CAFTA-DR tariff
90	Optical, measuring, precision instruments and apparatus	17.4	1.36	0.02	0.0
08	Edible fruits and nuts	15.8	4.67	2.20	0.0
85	Electrical machinery and equipment and parts thereof	10.5	1.62	0.47	0.0
62	Articles of apparel, not knitted or crocheted	10.1	12.44	10.38	0.0
84	Machinery and mechanical appliances	9.4	0.93	0.06	0.0
09	Coffee, tea, maté and spices	4.7	0.99	0.02	0.0
61	Articles of apparel, knitted or crocheted	4.7	15.13	9.52	0.0
40	Rubber and articles thereof	3.7	2.67	3.10	0.0

Figure 1



Appendix 2: Summary Statistics and Additional Analyses

Table 3: Summary Statistics of Regression Variables

Descriptive Statistics

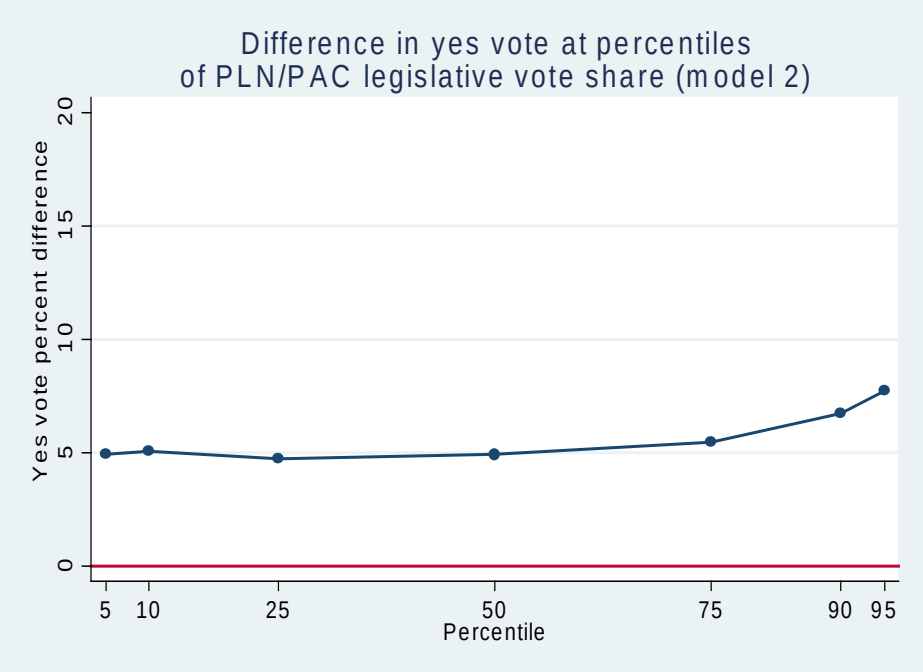
	N	Mean	SD	Min	Max
LowSocEcon%	459	0.254	0.224	0.013	0.926
%Libert06	459	0.078	0.050	0.003	0.404
%PUSC06	459	0.092	0.056	0.020	0.377
%PAC06	459	0.231	0.078	0.020	0.487
%PLN06	459	0.405	0.098	0.164	0.839
ExpManuf%	459	0.004	0.005	0	0.043
%Unempl	459	4.872	1.786	2	13.1
PubEmp%	459	0.123	0.071	0.008	0.393
TV%	459	0.782	0.159	0.074	0.996
FTZ	459	0.100	0.301	0	1

Table 4: Correlation Matrix

	%Libert06	%PUSC06	%PAC06	%PLN06	ExpManuf%	LowSocEcon%	%Unempl	PubEmp%	TV%	FTZ
%Libert06	1									
%PUSC06	-0.171	1								
%PAC06	-0.089	-0.386	1							
%PLN06	-0.248	0.081	-0.468	1						
ExpManuf%	0.227	-0.237	0.267	-0.241	1					
LowSocEcon%	-0.316	0.212	-0.118	0.291	-0.367	1				
%Unempl	-0.036	0.306	-0.486	0.272	-0.337	0.061	1			
PubEmp%	-0.015	-0.124	0.311	-0.241	0.192	-0.580	-0.120	1		
TV%	0.262	-0.407	0.388	-0.388	0.499	-0.708	-0.399	0.480	1	
FTZ	0.077	0.014	0.064	-0.078	0.154	-0.221	-0.012	0.154	0.168	1

Appendix 3: Substantive effect of PLN and PAC vote share

In models 2 and 5, the PLN and PAC vote share coefficients are both significant. The coefficients are about the same size in model 2 which implies that the parties have similar effects on the vote. This similarity, however, hides important differences in the distributions of the PLN and PAC vote share. If we look at any objective comparison of the PAC and PLN values, the PLN always has a larger vote share. That is, the PLN has a larger share at the 5th percentile, 25th percentile, 75th percentile, etc. These differences amplify the stronger effect of the PLN on the referendum. In the graph below, we calculate the difference in the yes vote if both PLN and PAC are held at different percentiles. This is not to claim a statistical relationship—it is extremely unlikely that both the PLN and PAC will be at the 5th or 95th percentile in the same district—but merely to show that the relationship holds across all the percentiles and not just at the mean. As the graph shows, the effect of the PLN on the yes vote was consistently 5% greater than the effect of the PAC. Since the difference between the yes and no vote in the referendum was only 3%, this larger effect could have meant the difference between the yes side winning and losing the referendum.



Appendix 4: Presidential vote share results

Table 5: Replication of Table 1 in manuscript using Presidential vote shares

	Prez1	Prez2	Prez3	Prez4	Prez5	Prez6	Prez7
%PLN06	0.34	0.41			0.61**		0.62**
	(0.23)	(0.25)			(0.11)		(0.14)
%PAC06	-0.27	-0.11			0.08		0.13
	(0.26)	(0.28)			(0.11)		(0.16)
%PUSC06	0.44	0.56			0.40*		0.27
	(0.34)	(0.36)			(0.18)		(0.19)
%Libert06	0.43	0.33			0.73**		0.68**
	(0.34)	(0.40)			(0.19)		(0.22)
PLN-%Change			0.19**	0.15**		0.08**	
			(0.03)	(0.02)		(0.01)	
PAC-%Change			0.01*	-0.00		-0.00	
			(0.00)	(0.00)		(0.00)	
PUSC-%Change			0.41**	0.40**		0.19*	
			(0.13)	(0.11)		(0.09)	
LIB-%Change			0.00**	0.00*		0.00**	
			(0.00)	(0.00)		(0.00)	
Manuf%	3.26**	1.49*	3.11**	1.79+	2.31*	1.28	
	(1.11)	(0.73)	(0.96)	(0.91)	(0.97)	(1.19)	
FTZ	0.04**	0.02*	0.02*	0.02*	0.04**	0.04**	
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	
LowSocEcon%	-0.15**	-0.14**	-0.11**	-0.13**	-0.20**	-0.24**	
	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)	
%Unempl	0.00		0.01**				
	(0.00)		(0.00)				
%PubEmpl	-0.38**	-0.22+	-0.55**	-0.39**	-0.65**	-0.71**	
	(0.11)	(0.11)	(0.10)	(0.10)	(0.11)	(0.09)	
TV%	0.34**	0.19**	0.38**	0.21**	0.28**	0.17**	
	(0.07)	(0.07)	(0.05)	(0.05)	(0.04)	(0.04)	
Constant	0.17	0.21	0.51**	0.70**	0.00	0.63**	0.07
	(0.24)	(0.27)	(0.11)	(0.10)	(0.11)	(0.09)	(0.14)
Observations	459	459	453	453	1745	1389	1774
Level	*District*	*District*	*District*	*District*	*Electoral district*	*Electoral district*	*Electoral district*
Fixed effects	*None*	*Canton*	*None*	*Canton*	*Canton*	*Canton*	*District*
BIC	-962.77	-1274.39	-953.32	-1267.12	-2473.36	-1939.40	-3401.02
r2	0.55	0.34	0.55	0.34	0.46	0.39	0.67
r2_b		0.65		0.60			

+ p<.1, * p<.05, ** p<.01; Standard errors, clustered at canton level, in parentheses. The number of observations is lower in columns 3 and 4 because the Libertarian candidate did not receive votes in some districts in 2002. Not all parties will receive votes in all electoral districts in 2002 so the number of observation changes in models 5 and 6. Redistricting between the 2000 census and the 2006 elections also means that census variables could not be matched up with all districts; models with district fixed effects will have more observations.

These results show a positive impact of the PLN and a more minor impact of the PAC. The coefficients on the PLN variables are all greater than the PAC. In models Prez1 and

Prez2, the coefficients are borderline significant using a more conservative two tail test, with respective t-statistics of 1.48 and 1.64. t-statistics for the PAC are 1 or lower. The PLN is highly significant in all other models.
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Appendix 5: Occupational and FTZ coding

The precise creation of district or canton level export exposure variables is not possible because trade data at these levels is not available (conversation with former director of Unit of the Ministry of Foreign Trade 10/9/2010). Even in the US this data is only at the state level. To make some headway on this potential problem of an omitted variable we matched our occupational level census data and information to data on aggregate Costa Rica/US trade. The Costa Rican occupational codes were used to create both the manufacturing variable and our skill variable. In the text we discussed the creation of the skill variable; here we will discuss how the three export variables were created before discussing the relation between the manufacturing and skill variables.

To create our three variables measuring export employment (ExpManuf%,Agric%, Textile%), we first had to code each occupation if it fit into one of the top 8 industries exported to the US (listed in Table 2 of Appendix 1). Occupations that did not fit into one of these industries were coded as an other category. For example, occupation code 8261 is "machine operators, fiber, thread and reel production" which we classified according to the trade code for "apparel, non-knit" (HS 62). The occupation code 8282 ("Assembly – electric equipment") was coded as trade code "Electrical machinery and equipment and parts" (HS 85). Occupations such as firemen or plumbers were placed in the other category.

After coding each occupational code, we matched the occupation data with trade data of the top 8 industries that Costa Rica exports to the US (listed in Appendix 1). Three of these industries were manufacturing and three were agriculture. Within each district, we then summed the percentage of total workers in the three export-heavy manufacturing industries for a specific export-orientation measure. As before, the lower tariffs from the trade agreement should boost exports from Costa Rica to the US so districts with a higher percentage of workers in these industries should have higher levels of support for the agreement. (The two textile industries both were in the top industries exported to the US and imported from the US, so the trade effects are unclear because the trade agreement could increase competition from imports.)

It is also important to note that most of these manufacturing industries, especially high-tech industries, are concentrated in the Zona Francas (or Free Trade Zones) in Costa Rica where foreign direct investment is also concentrated (Cordero and Paus 2008). Investment by Intel has led to the huge increase in the exports of electrical machinery as "between 2001 and 2006, Intel accounted for 39 percent of Zona Franca exports and 20 percent of Costa Rica's total exports" (Cordero and Paus 2008, p. 9). So the manufacturing industries have grown largely because of increases in FDI.

We obtained a list of companies associated with the FTZs Costa Rica from CINDE. Based on information about their location, we placed each of the businesses into one of Costa Rica's administrative districts. (In some cases we contacted the companies to locate their administrative districts.) A total of 46 of the 473 districts (9.7%) contained a business affiliated with an FTZ. An alternative measure of whether or not a district had a full FTZ park produced similar results.

Relation between skill variable and manufacturing variable. The census occupational data was also used to create our socio-economic skill measure, based on the international social economic index, as mentioned in the text. The skill measure codes

each occupation separately and includes service as well as manufacturing industries whereas the manufacturing variable only codes manufacturing industries. Most occupations end up coded as Middle SocioEconomic occupations: 343 of the 491 occupations. About 17% are coded as high skill and 13% as low skill. Some examples of high skilled occupations are information technology programmers; mechanical engineers; physicians; and historians and political scientists. Low skill occupations tend to be agricultural workers; manual labourers; and assembly workers. Machine operators tend to be in the middle-skilled occupations.

The occupations in the manufacturing variable tend to range across all three of the skill categories rather than being concentrated in one. Some of the manufacturing occupations are low skilled, most are middle and some are high skilled.

Appendix 6: Survey Analyses

Public opinion surveys allow us to ask whether individual-level attitudes toward CAFTA-DR were affected either by economic factors like relative factor endowments (i.e., bottom up influences) or by party affiliation, which is our best proxy for top-down political influences. We use three surveys surrounding the referendum to examine these effects; the University of Costa Rica's (UCR) School of Statistics and Center for the Study of Public Opinion issued three waves (non-panel) of a CAFTA-DR survey in 2007, one in July, one in September, and one in October immediately following the referendum.[9]

Dependent Variables

The Universidad surveys conducted in July and September 2007 asks respondents how they intend to vote in the referendum. The October survey asks how they voted. Responses to these questions form our dependent variable, coded as 1 for the pro-CAFTA-DR position and 0 for the anti-CAFTA position.[10]

Independent Variables

We estimate models with a set of independent variables used by a number of other scholars looking at trade policy: individual factor endowments, political preferences, gender, and age (Scheve and Slaughter, 2001). Additional variables, such as general preferences for international engagement or cultural attitudes (Hainmueller and Hiscox, 2006; Margalit, 2006), were not available. We follow the literature and proxy for factor endowments by including dummy variables for either educational attainment or income level (Scheve and Slaughter, 2001), omitting the lowest category as the reference, so as to make the fewest parametric assumptions. Sectoral occupation data was not collected in the surveys so we cannot examine the specific factor model. Gender is measured with a dummy variable equal to 1 if the respondent was male and 0 if female. Age is measured continuously.

[9] The surveys used telephone interviews and were nationally representative but not a panel of citizens over time.

[10] We exclude "don't know" responses.

For political preferences, we use dummy variables for the political party of the presidential candidate for whom the respondent voted in the 2006 election.[11] We estimate a model where the omitted party variable is the category where someone did not vote for a Presidential candidate. This gives a rough sense of how much differentiation over CAFTA the PLN and PAC were able to generate among voters versus those who did not support a Presidential candidate in 2006 and hence were less invested in a political party.

Estimation

We pool the July and September surveys (allowing for a mean difference, separate estimation gives similar results) and present results of vote intention and vote choice. For each survey set use a probit model with robust standard errors. For each of our economic variables, we estimate models with and without the party variables. Below each model we list the proportional reduction in error and the Bayesian Information Criterion to give a sense of the model's fit to the data.[12] The models in table 6 do not support our Stolper-Samuelson economic hypothesis (H1a) that skill levels should affect support for CAFTA-DR. Relative to respondents with higher income levels, the low income voter was less likely to support CAFTA. Results using the alternative education-based measure show a similar story but were not significant. Overall these results once again do not support SS models of preferences, but do suggest that the specific factor model might find corroboration.

In contrast, our party measures are more consistent and provide a substantially improved fit. Including the party variables improves the proportion reduction in error an additional 22-26%. Furthermore, the BIC measure decreases substantially, by over 50 points in each model, which is evidence of significant improvement in model fit after including partisan affiliations. In unreported results this improvement in fit is primarily via the inclusion of the PLN, rather than the PAC, indicator. These results support hypothesis 2, which predicts significant differences in individual preferences for CAFTA across parties. Controlling for economic factors that could influence opinions about CAFTA-DR, individual preferences over CAFTA-DR were split along party lines: PLN supporters were more likely to prefer CAFTA, and PAC voters were less likely to do so. Amongst PLN supporters, 63% of the lowest income individuals voted in favor and 90% of highest income voters. Our results suggest that economic factors, proxied by skill levels, were less salient than party affiliation, but to the extent that such economic factors were important, there is little support for the Stolper-Samuelson hypothesis.

We calculate changes in predicted probabilities for our key variables holding other variables constant using the Clarify procedure (King et al., 2000). Table 7 displays the change in predicted probability of voting/intending to vote for CAFTA-DR when either *income* level is changed from low to high, party changes from no party to PLN, or party changes from no party to PAC, while holding the other variables constant.[13] The probability of an individual being in the pro-CAFTA-DR category increases when

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[11] The only other vote choice question in the surveys was for 1998, when the PAC did not yet exist, and hence we do not use this question.

[12] To make these measures more comparable across models, the samples include only those observations where respondents answered both the income and party questions, though our results change little if we do not do this.

[13] We held gender at male and age at the median values.

income is changed from the low to high category. While the magnitude of this change varied depending on the survey (from 15% to 24%), the effects were consistently greater than zero. Looking at the party variables, we observe a positive and highly significant coefficient on our PLN vote variable. Shifting an individual from the omitted base case of not identifying with a party to being a PLN supporter results in a 15% to 27% increase in the probability of supporting CAFTA-DR. For the PAC, the result is similar but in the opposite direction, producing a –18% to –29% change in probability of voting in favor of CAFTA.

Our results here are less supportive of hypothesis 3, which suggests that the PLN should have been more influential than the PAC. Our estimates of party influence across the two parties are relatively similar, though in the key model of actual vote choice the coefficient on the PLN is larger in magnitude. However, it could be that those who did not cast a vote for any of the parties in 2006 (our excluded category) were more similar to either PLN or PAC voters. While we control for economic and demographic characteristics, we cannot definitively say that our estimated PLN and PAC coefficients represent a clean identification of the differential impact of the two parties compared to a third group "uninfluenced" by the parties.[14] [15] [16] These models of course rely on exogeneity assumptions.

Again, though, other survey evidence suggests that the PLN was more influential in swaying opinion than was the PAC. Results from a Universidad de Costa Rica's survey taken in October after the referendum asked respondents what factor most influenced their vote in the referendum. As shown below, more than twice as many pro-CAFTA voters gave a political source for their decision as did anti-CAFTA voters. Anti-

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[14] An assumption in this type of model is that the joint effect of the two parties is additively separable. This would not hold if there were any *substitution* effects from the efforts of parties. Given the opposing preferences of the parties, though, we can rule out *complementary* effects.

[15] We also tested various mediation models where we let the effect of income affect party choice which then influences CAFTA support, as well as allowing a direct effect between income and CAFTA support. We did not find significant mediation effects in the public opinion or district data, implying that party associations were not merely linking economic preferences to vote choices.

[16] The decline of the PUSC between 1998 and 2006 may have led those with pro-CAFTA-DR preferences to migrate to the PLN and thus the observed party relationships could be a function of static economic preferences and a changing set of parties. There are several reasons to doubt this. First, the Universidad de Costa Rica public opinion polls asked respondents who they sympathized with in the 1998 Presidential election. Of the 286 persons sympathizing with the PUSC in 1998, 69 voted for the PLN Presidential candidate in 2006 and 96 voted for the PAC candidate. Hence more PUSC supporters switched to the PAC than switched to the PLN, which suggests are results are not biased by the disintegration of the PUSC. Second, in January, prior to the 2006 election, three former PUSC party leaders defected to the PAC (Murillo, 2006). Similarly, Wilson (2007) argues that the PUSC encouraged voters to engage in split ticket voting in 2006. Finally, we found no significant correlations between changes in PUSC and PLN vote share.

CAFTA voters were more likely, however, to say that specialists or members of the University community were the most influential. This data provides additional evidence that the anti-CAFTA-DR campaign depended less on political groups compared to the pro campaign.[17]

[17]Media sources (e.g., television debates, opinion shows, radio) had an important impact on both pro and anti CAFTA-DR voters but it is hard to separate out the independent role of "media" from the larger political discourse of the country. For example, several of the TV debates featured Arias administration officials, such as 1st Vice President Laura Chinchilla, a prominent PLN official and Presidential candidate for the 2010 elections.

Table 6 Vote Intention Pre-referendum (July/September) and Vote Choice (October). Universidad de Costa Rica survey.

	Pre1	Pre2	Pre3	Pre4	Post1	Post2	Post3	Post4
HighEdu	-0.06	0.12			0.18	0.37		
	[0.16]	[0.16]			[0.22]	[0.23]		
MiddleEdu	0.01	0.20			-0.08	0.04		
	[0.15]	[0.15]			[0.21]	[0.23]		
LowMiddleEdu	0.18	0.28*			0.08	0.11		
	[0.14]	[0.14]			[0.19]	[0.21]		
HighIncome			0.27+	0.50**			0.28	0.52**
			[0.14]	[0.15]			[0.18]	[0.18]
MiddleIncome			-0.12	-0.01			0.53**	0.66**
			[0.14]	[0.14]			[0.19]	[0.20]
LowMiddleIncome			0.11	0.21*			0.00	0.12
			[0.10]	[0.10]			[0.14]	[0.15]
PLN_PrezVote		0.53**		0.52**		0.70**		0.71**
		[0.11]		[0.11]		[0.19]		[0.20]
PAC_PrezVote		-0.59**		-0.65**		-0.57**		-0.50*
		[0.12]		[0.13]		[0.20]		[0.20]
Libertario_Prez		0.35		0.37		0.30		0.42
		[0.26]		[0.26]		[0.37]		[0.39]
PUSC_PrezVote		0.08		0.04		0.65		0.66+
		[0.20]		[0.22]		[0.39]		[0.39]
OtherParty_Prez		-0.47+		-0.58*		-0.13		-0.13
		[0.25]		[0.26]		[0.32]		[0.33]
1=Male	0.15+	0.23**	0.12	0.19*	0.18	0.20	0.19	0.16
	[0.08]	[0.08]	[0.08]	[0.09]	[0.11]	[0.12]	[0.12]	[0.13]
Age	0.01**	0.01**	0.01*	0.01*	0.01**	0.01+	0.01**	0.01+
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
SurveyFE	-0.07	-0.12	-0.05	-0.10				
	[0.08]	[0.08]	[0.08]	[0.09]				
cut1								
Constant	0.27	0.48*	0.22	0.35*	0.54+	0.64*	0.65**	0.76**
	[0.19]	[0.21]	[0.14]	[0.16]	[0.28]	[0.31]	[0.20]	[0.24]
Observations	1034	1034	968	968	507	507	460	460
BIC	1454.11	1357.12	1366.47	1267.56	725.54	665.59	653.86	609.86
pre	0.04	0.28	0.06	0.28	0.13	0.38	0.14	0.40

Standard errors in brackets
+ p<0.10, * p<0.05, ** p<0.01

Table 7: Probability of voting for CAFTA-DR

Type	Month	Estimated Pr Change	Upper CI	Lower CI
Income	July	15.01%	0.9%	28.87%
Income	Sept	23.71%	8.51%	37.15%
Income	October	20.08%	6.69%	34.11%
PLN	July	21.93%	10.01%	33.89%
PLN	Sept	15.31%	3.38%	27.69%
PLN	October	27.13%	12.39%	40.75%
PAC	July	-20.43%	-33.85%	-7.98%
PAC	Sept	-28.90%	-41.58%	-15.70%
PAC	October	-17.68%	-32.78%	-3.67%

A second survey source comes from the 2008 LAPOP survey which asked respondents about their vote in the referendum. We code support as a 1 and opposition as a 0. In each model below we use a probit model. Models 1 and 2 use district level measures of whether there was a Free Trade Zone in their district, as well as the Manuf% variable used in the main analysis. The survey did not ask respondents about their sector of employment. Models 3 and 4 introduce dummy variables indicating the party the person supports and additional controls. The PUSC is the excluded category. Consistent with hypothesis 2 the effect of the PLN is positive and PAC negative. Given the introduction of individual level variables, it is not surprising that the sectoral models become insignificant.

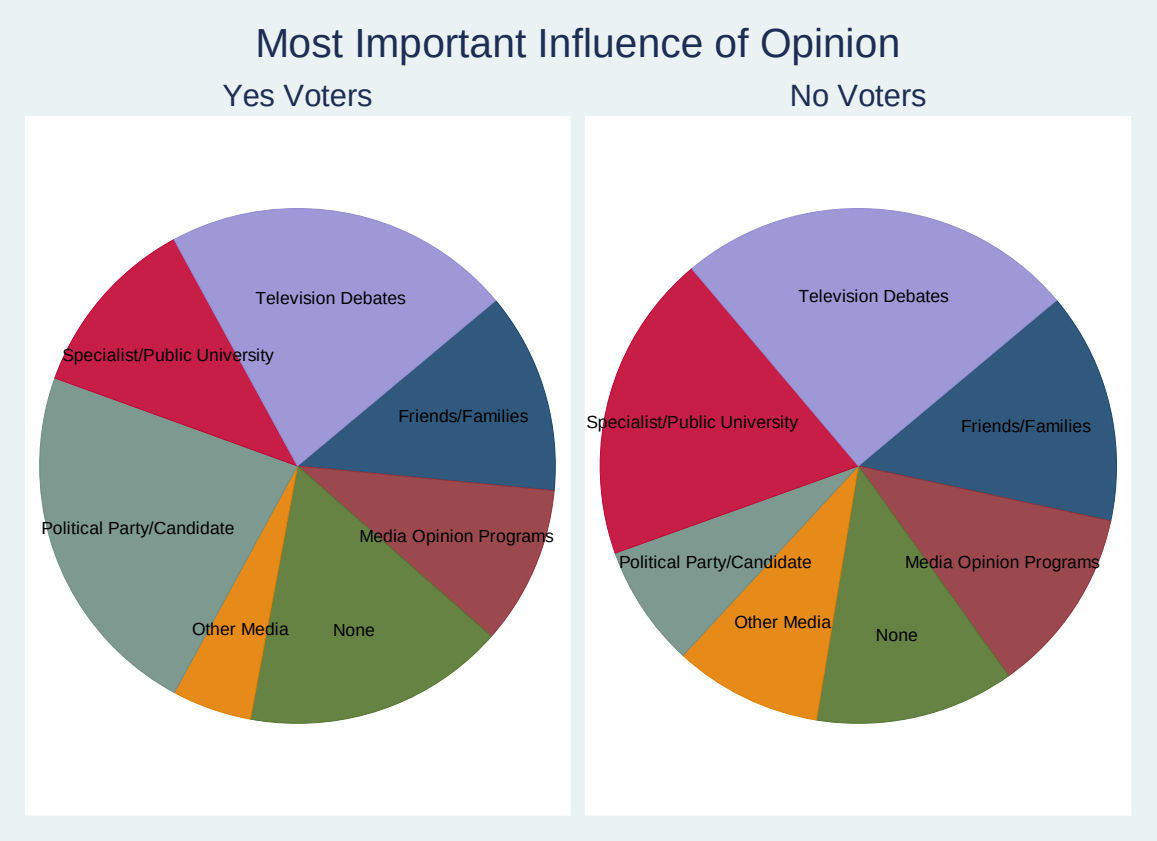
Table 8: CAFTA vote choice from 2008 LAPOP survey

	model1	model2	model3	model4
PLN			0.86**	0.90**
			[0.17]	[0.18]
PAC			-0.55**	-0.46*
			[0.18]	[0.19]
Libertarian			0.18	0.11
			[0.30]	[0.33]
FreeTradeZone	0.34+	0.33+	0.13	0.12
	[0.18]	[0.19]	[0.22]	[0.23]
Manuf%		1.44	6.67	6.72
		[11.00]	[13.13]	[13.76]
Middle income				0.28*
				[0.13]
Upper income				0.11
				[0.25]
Years education				-0.00
				[0.02]
Male				0.11
				[0.12]
Age				0.01*
				[0.00]
Constant	0.27**	0.26**	0.05	-0.52+
	[0.05]	[0.07]	[0.16]	[0.30]
Observations	756	756	625	563

Standard errors in brackets
+ p<0.10, * p<0.05, ** p<0.01
Probit regression with robust standard errors. All variables at individual level except FreeTradeZone and Manuf%.

Appendix 7

Distribution of responses to post-CAFTA survey on who the most important influence on their vote was.



Appendix 8: Data sources and measurement

Canton/District level data

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