Supplementary Appendix for "The Effects of Free Trade Agreements on Product-level Trade"

Scott French, Tom Zylkin

January 4, 2024

This Appendix includes some additional details and estimates left out of the paper in order to cut down on the numbers of tables and results and on the amount of technical discussion.

More details on included countries. Table A.1 provides a more detailed version of Table 1. For each of the 109 countries in our data, it shows which years they appear in the data. For 85 countries, we have data for at least 6 periods.

Bias-corrected results. Table A.2 provides some bias-corrected results inspired by the analysis of Weidner and Zylkin (2021). Though our setting differs from that in Weidner and Zylkin (2021), there is still good reason to believe that both our estimated coefficients and standard errors have asymptotic biases of order $1/N$, where N is the number of countries. Heuristically, we expect our exporter-product-year and importer-product-year fixed effect estimates $\widehat{\delta}_{ikt}$ and $\widehat{\psi}_{jkt}$ to converge at a rate of $1/\sqrt{N}$ as $N \to \infty$, which resembles the source of the issue in Weidner and Zylkin (2021). Though our setting adds a product dimension, the size of the product dimension does not affect these convergence rates: if we let K be the number of products, both biases should remain of order $1/N$ as N and K both $\to \infty$.[1]

Unfortunately, the analytical bias corrections from Weidner and Zylkin (2021) are not worked out for this setting. Instead, we implement feasible alternatives based on the bootstrap and jackknife. Specifically, we use a cluster-bootstrap for the standard errors based on Pfaffermayr (2021). For the point estimates, we show results for bias corrections based on

[1] As shown in Weidner and Zylkin (2021), the use of PPML allows us to re-write the panel data gravity model with three-way fixed effects as a multinomial model with 2-way fixed effects, which is what ensures its consistency with fixed T. It also means we can ignore the product-pair fixed effect in the above discussion of incidental parameters. Consequently, as N, $K \to \infty$, we have on the order of $2NK$ incidental parameters to estimate using or the order of N^2K observations.

two different versions of the jackknife, a split-panel jackknife based on the implementation described in Weidner and Zylkin (2021) and a more traditional leave-one-out jackknife. Because these methods are computationally demanding, we report results for 2 digit-level trade flows only. All in all, the results are reassuring. Though the corrections introduce some minor quantitative differences as expected, the qualitative findings remain unchanged.

Further discussion of the pooled estimator. Because the pooled product-level PPML estimators we use in our analysis are not widely used in the gravity literature, we wish to provide some further discussion of their advantages and interpretations. Regarding interpretation, a particularly useful connection that arises in the PPML context is that fact that PPML enables us to re-cast the aggregate-level model as a special case of the product-level one, a perspective that is broadly shared with French (2019).

To see this, consider a product-level version of the gravity model like the one used in column 2 of Table 4 that retains a single coefficient for the effect of FTAs but allows the fixed effects to be heterogeneous across products:

$$X_{ijkt} = \exp\left(\alpha_{ikt} + \gamma_{jkt} + \eta_{ijk} + \beta FTA_{ijt}\right) \varepsilon_{ijkt}. \tag{1}$$

Except for the fact that we do not include the interaction between the FTA variable and our LTP indicator, this equation resembles (2) from the main text. On inspection, (1) appears to be a very different model than the aggregate-level model in (1), both because of the added heterogeneity in the fixed effects and because it is a model for product-level flows rather than aggregate flows. To show that the difference comes solely from the former consideration, consider a restricted version of model that ignores product-level heterogeneity in the fixed effects. This restricted model reads as:

$$X_{ijkt} = \exp\left(\alpha_{it} + \gamma_{jt} + \eta_{ij} + \beta FTA_{ijt}\right) \varepsilon_{ijkt}, \tag{2}$$

where the "k" subscripts have been dropped for each of the fixed effects (but not for the dependent variable or error term). The first-order conditions (FOCs) from PPML associated with (2) for this restricted model are:

$$\begin{aligned}
\widehat{\delta}_{it}: &\quad \sum_j \sum_k \left(X_{ijkt} - \exp\left[\widehat{\delta}_{it} + \widehat{\psi}_{jt} + \widehat{\eta}_{ij} + \widehat{\beta} FTA_{ijt} \right] \right) = 0, \\
\widehat{\psi}_{jt}: &\quad \sum_i \sum_k \left(X_{ijkt} - \exp\left[\widehat{\delta}_{it} + \widehat{\psi}_{jt} + \widehat{\eta}_{ij} + \widehat{\beta} FTA_{ijt} \right] \right) = 0, \\
\widehat{\eta}_{ij}: &\quad \sum_t \sum_k \left(X_{ijkt} - \exp\left[\widehat{\delta}_{it} + \widehat{\psi}_{jt} + \widehat{\eta}_{ij} + \widehat{\beta} FTA_{ijt} \right] \right) = 0, \\
\widehat{\beta}: &\quad \sum_{i,j,t} \sum_k \left(X_{ijkt} - \exp\left[\widehat{\delta}_{it} + \widehat{\psi}_{jt} + \widehat{\eta}_{ij} + \widehat{\beta} FTA_{ijt} \right] \right) FTA_{ijt} = 0.
\end{aligned}$$

Since $\sum_k X_{ijkt} = X_{ijt}$, the FOCs associated with (2) are the same as those associated with a PPML regression for the aggregate-level model up to an innocuous scaling factor.[2] This is consistent with our findings for our initial product-level FTA estimate reported in column 1 of Table 4, which was indeed identical to our earlier aggregate-level result from column 1 of Table 2.

Therefore, PPML estimates of β using (1) may be thought of as differing from those obtained from a typical aggregate-level gravity estimation for exactly one reason: the pooled, product-level estimate from (1) controls for heterogeneity in the fixed effects, whereas the more typical aggregate-level FTA estimate does not. Moreover, this perspective allows us to attribute differences in the two estimates to how the otherwise-omitted heterogeneity in the fixed effects is correlated with the FTA variable, effectively treating the omitted heterogeneity as an omitted variable like in French (2019). Of course, our main estimating equation also features an interaction that varies by product, but this perspective still helps clarify its relation to the typical aggregate model. The product-level fixed effects effectively relax one set of implicit restrictions made by the aggregate model, and allowing the effect of FTAs to vary by product relaxes another.

Though it is helpful to define the coefficients we estimate using pooled PPML in relation to the typical aggregate model, one might still wonder how these pooled estimates aggregate the information from the underlying heterogeneous coefficients we would expect to observe at the product level. A convenient interpretation is given in French (2019), who demonstrates that the difference between fitted aggregate trade flows computed using the pooled estimator versus using individual product-level estimations is orthogonal to the key covariates, what French (2019) calls the "ideal coefficient index" property of PPML.

[2] For each pair, the scaling factor is the total number of products that are ever traded for that pair, which is absorbed by the pair fixed effect.

In the case of the baseline product-level model from Table 4, column 2, which features a dummy variable for FTA as the only covariate, this property from French (2019) can be further refined to show the following. Let $\widehat{X}^*_{ijkt}(\beta_k)$ be a fitted value from estimating a fully separable version of (1) that replaces the single FTA coefficient β with a flexible coefficient β_k that varies by product. Further, let $\widehat{X}_{ijkt}(\widehat{\beta})$ represent the fitted values we obtain using the pooled estimator, with $\widehat{\beta}$ as the single coefficient estimate. Leveraging French (2019)'s results, together with the FOCs for the fixed effects, it can be shown that the pooled estimate $\widehat{\beta}$ satisfies the following:

$$\sum_{(i,j)\in FTA,\, t\geq T_{ij}^{FTA}} \sum_k \left(\widehat{X}^*_{ijkt}(\widehat{\beta}_k) - \widehat{X}_{ijkt}(\widehat{\beta})\right) = 0,$$
$$\sum_{(i,j)\in FTA,\, t< T_{ij}^{FTA}} \sum_k \left(\widehat{X}^*_{ijkt}(\widehat{\beta}_k) - \widehat{X}_{ijkt}(\widehat{\beta})\right) = 0,$$

where $(i,j) \in FTA$ refers to pairs who eventually form FTAs and T_{ij}^{FTA} is the year in which pair (i,j) form their FTA. Thus, the pooled estimate also satisfies

$$\frac{\sum_{(i,j)\in FTA,\, t\geq T_{ij}^{FTA}} \sum_k \widehat{X}_{ijkt}(\widehat{\beta})}{\sum_{(i,j)\in FTA,\, t< T_{ij}^{FTA}} \sum_k \widehat{X}_{ijkt}(\widehat{\beta})} = \frac{\sum_{(i,j)\in FTA,\, t\geq T_{ij}^{FTA}} \sum_k \widehat{X}^*_{ijkt}(\widehat{\beta}_k)}{\sum_{(i,j)\in FTA,\, t< T_{ij}^{FTA}} \sum_k \widehat{X}^*_{ijkt}(\widehat{\beta}_k)}.$$

That is, $\widehat{\beta}$ represents the uniform PPML FTA coefficient estimate that exactly replicates the same predicted average trade growth for FTA pairs as the fitted values obtained using separate product-by-product estimates.

Going one step further than in French (2019), when we add the interaction between the FTA variable and the LTP indicator, we find that the following equalities hold

$$\frac{\sum_{(i,j)\in FTA,\, t\geq T_{ij}^{FTA}} \sum_{k\in\Omega_{ij}^{LTP}} \widehat{X}_{ijkt}(\widehat{\beta})}{\sum_{(i,j)\in FTA,\, t< T_{ij}^{FTA}} \sum_{k\in\Omega_{ij}^{LTP}} \widehat{X}_{ijkt}(\widehat{\beta})} = \frac{\sum_{(i,j)\in FTA,\, t\geq T_{ij}^{FTA}} \sum_{k\in\Omega_{ij}^{LTP}} \widehat{X}^*_{ijkt}(\widehat{\beta}_k)}{\sum_{(i,j)\in FTA,\, t< T_{ij}^{FTA}} \sum_{k\in\Omega_{ij}^{LTP}} \widehat{X}^*_{ijkt}(\widehat{\beta}_k)},$$
$$\frac{\sum_{(i,j)\in FTA,\, t\geq T_{ij}^{FTA}} \sum_{k\notin\Omega_{ij}^{LTP}} \widehat{X}_{ijkt}(\widehat{\beta})}{\sum_{(i,j)\in FTA,\, t< T_{ij}^{FTA}} \sum_{k\notin\Omega_{ij}^{LTP}} \widehat{X}_{ijkt}(\widehat{\beta})} = \frac{\sum_{(i,j)\in FTA,\, t\geq T_{ij}^{FTA}} \sum_{k\notin\Omega_{ij}^{LTP}} \widehat{X}^*_{ijkt}(\widehat{\beta}_k)}{\sum_{(i,j)\in FTA,\, t< T_{ij}^{FTA}} \sum_{k\notin\Omega_{ij}^{LTP}} \widehat{X}^*_{ijkt}(\widehat{\beta}_k)},$$

where, in this case, $\widehat{\beta} = (\widehat{\beta}_{FTA}, \widehat{\beta}_{LTP})$ is the estimated coefficient vector. Likewise, $\widehat{\beta}_k$ now refers to an otherwise equivalent coefficient vector $(\widehat{\beta}_{FTA,k}, \widehat{\beta}_{LTP,k})$ that is obtained for a given product. This result means that we can think of $\widehat{\beta}$ as the set of uniform coefficient estimates that separately replicate the same predicted average trade growth following FTAs for both

LTPs as well as non-LTPs.

To see how we derived this last set of equations, note that the PPML FOCs for the FTA coefficients from the two different estimation approaches give us the following sets of equalities:

$$\sum_{\substack{(i,j)\in FTA,\\ t\geq T_{ij}^{FTA}}} \sum_{k} \widehat{X}_{ijkt}(\widehat{\beta}) \;=\; \sum_{\substack{(i,j)\in FTA,\\ t\geq T_{ij}^{FTA}}} \sum_{k} \widehat{X}^{*}_{ijkt}(\widehat{\beta}_k) \;=\; \sum_{\substack{(i,j)\in FTA,\\ t\geq T_{ij}^{FTA}}} \sum_{k} X_{ijkt}, \tag{3}$$

$$\sum_{\substack{(i,j)\in FTA,\\ t\geq T_{ij}^{FTA}}} \sum_{k\in\Omega_{ij}^{LTP}} \widehat{X}_{ijkt}(\widehat{\beta}) \;=\; \sum_{\substack{(i,j)\in FTA,\\ t\geq T_{ij}^{FTA}}} \sum_{k\in\Omega_{ij}^{LTP}} \widehat{X}^{*}_{ijkt}(\widehat{\beta}_k) \;=\; \sum_{\substack{(i,j)\in FTA,\\ t\geq T_{ij}^{FTA}}} \sum_{k\in\Omega_{ij}^{LTP}} X_{ijkt}. \tag{4}$$

The first line, (3), combines the FOC for $\widehat{\beta}_{FTA}$ from the pooled estimator with the FOCs for all of the $\widehat{\beta}_{FTA,k}$'s from the product-by-product estimator. Similarly, the second line, (4), combines their FOC's for the β_{LTP} and $\beta_{LTP,k}$ coefficient estimates. Combining (3) with (4), we also obtain

$$\sum_{\substack{(i,j)\in FTA,\\ t\geq T_{ij}^{FTA}}} \sum_{k\notin\Omega_{ij}^{LTP}} \widehat{X}_{ijkt}(\widehat{\beta}) \;=\; \sum_{\substack{(i,j)\in FTA,\\ t\geq T_{ij}^{FTA}}} \sum_{k\notin\Omega_{ij}^{LTP}} \widehat{X}^{*}_{ijkt}(\widehat{\beta}_k) \;=\; \sum_{\substack{(i,j)\in FTA,\\ t\geq T_{ij}^{FTA}}} \sum_{k\notin\Omega_{ij}^{LTP}} X_{ijkt}. \tag{5}$$

Next, when we combine the PPML FOCs from each estimator for the product-pair fixed effects, we find that the following equalities also hold

$$\sum_{t} \widehat{X}_{ijkt}(\widehat{\beta}) = \sum_{t} \widehat{X}^{*}_{ijkt}(\widehat{\beta}_k) = \sum_{t} X_{ijkt} \qquad\qquad \forall i,j,k. \tag{6}$$

Summing up the first and middle terms in (6) over all FTA pairs and over each product type gives us

$$\begin{aligned}
\sum_{(i,j)\in FTA} \sum_{t} \sum_{k\in\Omega_{ij}^{LTP}} \widehat{X}_{ijkt}(\widehat{\beta}) \quad &= \sum_{(i,j)\in FTA} \sum_{t} \sum_{k\in\Omega_{ij}^{LTP}} \widehat{X}^{*}_{ijkt}(\widehat{\beta}_k), \\
\sum_{(i,j)\in FTA} \sum_{t} \sum_{k\notin\Omega_{ij}^{LTP}} \widehat{X}_{ijkt}(\widehat{\beta}) \quad &= \sum_{(i,j)\in FTA} \sum_{t} \sum_{k\notin\Omega_{ij}^{LTP}} \widehat{X}^{*}_{ijkt}(\widehat{\beta}_k).
\end{aligned}$$

Finally, combining these last two expressions with (3) and (4) allows us to obtain

$$\sum_{(i,j)\in FTA,\, t<T_{ij}^{FTA}} \sum_{k\in\Omega_{ij}^{LTP}} \widehat{X}_{ijkt}(\widehat{\beta}) = \sum_{(i,j)\in FTA,\, t<T_{ij}^{FTA}} \sum_{k\in\Omega_{ij}^{LTP}} \widehat{X}^{*}_{ijkt}(\widehat{\beta}_k), \tag{7}$$

$$\sum_{(i,j)\in FTA,\, t<T_{ij}^{FTA}} \sum_{k\notin\Omega_{ij}^{LTP}} \widehat{X}_{ijkt}(\widehat{\beta}) = \sum_{(i,j)\in FTA,\, t<T_{ij}^{FTA}} \sum_{k\in\Omega_{ij}^{LTP}} \widehat{X}^{*}_{ijkt}(\widehat{\beta}_k). \tag{8}$$

To summarize, (3) and (4) tell us the that the pooled PPML estimator yields the same fitted values after FTAs for both product groups as product-by-product PPML estimation. Similarly, (7) and (8) tells us that fitted values for both product groups for FTA pairs *before* their FTAs are the same as well. Therefore, average fitted trade growth for both groups is also the same across both estimators, as we have argued.

Results for different disaggregation levels. Lastly, Tables A.3 and A.4 provide more results for different levels of disaggregation. Table A.3 shows that most of the difference between aggregate-level and 5 digit product-level estimates of the baseline FTA effect are also found at the 2 digit level, lending some further validity to our use of higher aggregation levels for some of our robustness checks. Table A.4 then focuses on anticipation effects from the period before the FTA first appears. Though we found negative and significant changes in trade for least-traded products using 5 digit-level data in the main text, these estimates show that this effect loses its significance at the 3 digit level and becomes near-zero at the 2 digit level. Other estimates remain similar to those in the paper.

Table A.1: More Details on Included Countries by Year

country ISO	1991	1995	1999	2003	2007	2011	2015	country ISO	1991	1995	1999	2003	2007	2011	2015
AGO					x	x	x				(continued)				
ARE	x		x	x	x	x	x	KAZ		x	x	x	x	x	x
ARG		x	x	x	x	x	x	KEN	x	x	x	x	x		
AUS	x	x	x	x	x	x	x	KHM				x	x	x	x
AUT	x	x	x	x	x	x	x	KOR	x	x	x	x	x	x	x
AZE			x	x	x	x	x	KWT	x	x	x	x	x	x	x
BEL	x	x	x	x	x	x	x	LBY				x	x		
BGD	x	x		x	x	x	x	LKA	x		x	x	x	x	x
BGR			x	x	x	x	x	LTU		x	x	x	x	x	x
BHR		x		x	x	x	x	LVA		x	x	x	x	x	x
BIH				x	x	x	x	MAR		x	x	x	x	x	x
BLR			x	x	x	x	x	MEX	x	x	x	x	x	x	x
BOL		x	x	x	x	x	x	MKD		x	x	x	x	x	x
BRA	x	x	x	x	x	x	x	MLT	x	x	x	x	x	x	x
BRN				x			x	MUS	x	x	x	x	x	x	x
BWA				x	x	x	x	MYS	x	x	x	x	x	x	x
CAN	x	x	x	x	x	x	x	NGA			x	x	x	x	
CHE	x	x	x	x	x	x	x	NIC		x	x	x	x	x	x
CHL	x	x	x	x	x	x	x	NLD	x	x	x	x	x	x	x
CHN		x	x	x	x	x	x	NOR	x	x	x	x	x	x	x
CIV		x	x	x	x	x	x	NZL	x	x	x	x	x	x	x
CMR		x	x	x	x	x	x	OMN	x	x	x	x	x	x	x
COG					x	x		PAK	x	x	x	x	x	x	x
COL	x	x	x	x	x	x	x	PAN		x	x	x	x	x	x
CRI		x	x	x	x	x	x	PER		x	x	x	x	x	x
CYP	x	x	x	x	x	x	x	PHL	x	x	x	x	x	x	x
CZE		x	x	x	x	x	x	PNG				x		x	
DEU	x	x	x	x	x	x	x	POL		x	x	x	x	x	x
DNK	x	x	x	x	x	x	x	PRT	x	x	x	x	x	x	x
DOM				x	x	x	x	PRY	x	x	x	x	x	x	x
DZA		x	x	x	x	x	x	QAT	x	x	x	x	x		x
ECU	x	x	x	x	x	x	x	ROM	x	x	x	x	x	x	x
EGY		x	x	x	x	x	x	RUS			x	x	x	x	x
ESP	x	x	x	x	x	x	x	SAU	x	x	x	x	x	x	x
EST		x	x	x	x	x	x	SDN		x	x	x	x	x	x
FIN	x	x	x	x	x	x	x	SGP	x	x	x	x	x	x	x
FRA	x	x	x	x	x	x	x	SLV		x	x	x	x	x	x
GAB			x	x	x			SVK		x	x	x	x	x	x
GBR	x	x	x	x	x	x	x	SVN		x	x	x	x	x	x
GHA			x	x	x	x		SWE	x	x	x	x	x	x	x
GRC	x	x	x	x	x	x	x	SYR				x	x		
GTM		x	x	x	x	x	x	THA	x	x	x	x	x	x	x
HND		x	x	x	x	x		TTO	x	x	x	x	x	x	x
HRV		x	x	x	x	x	x	TUN	x	x	x	x	x	x	x
HUN	x	x	x	x	x	x	x	TUR	x	x	x	x	x	x	x
IDN	x	x	x	x	x	x	x	TWN	x	x	x	x	x	x	x
IND	x	x	x	x	x	x	x	UKR			x	x	x	x	x
IRL	x	x	x	x	x	x	x	URY		x	x	x	x	x	x
IRN			x	x		x		USA	x	x	x	x	x	x	x
ISL	x	x	x	x	x	x	x	VEN	x	x	x	x	x	x	
ISR	x	x	x	x	x	x	x	VNM				x	x	x	x
ITA	x	x	x	x	x	x	x	YEM				x	x	x	x
JAM	x	x	x	x	x	x	x	ZAF		x	x	x	x	x	x
JOR	x	x	x	x	x	x	x	ZMB		x	x	x	x	x	x
JPN	x	x	x	x	x	x	x	ZWE	x	x	x		x	x	x

This table provides backing details for Table 1. An “x” indicates that country reported imports in SITC Revision 3 product codes in the indicated year.

Table A.2: Bias-corrected PPML Results for SITC 2 digit-level Trade

	Dependent variable: SITC3 2 digit-level Trade Flows 1991-2015					
Pooled FTA Effects across all products						
All FTAs	0.058	-0.006	0.059	0.004	0.065	0.011
	(0.021)***	(0.022)	(0.021)***	(0.022)	(0.021)***	(0.022)
	[0.025]**	[0.027]	[0.025]**	[0.027]	[0.025]***	[0.027]
$\times \left[\overline{X}_{ijk} < \text{10th perc.}\right]$		0.383		0.376		0.375
		(0.038)***		(0.038)***		(0.038)***
		[0.043]***		[0.043]***		[0.043]***
ikt, jkt and ijk FEs	x	x	x	x	x	x
Bias correction	none	none	SPJ	SPJ	leave-one-out	leave-one-out
Observations	2.3m	2.3m	2.3m	2.3m	2.3m	2.3m

PPML estimates for pooled sample of SITC3 trade flows between 109 countries over the period 1991-2015 at the 2 digit level of disaggregation, every 4 years. $\overline{X}_{ijk}$ is the average trade flow for product k for years before i and j sign an FTA. SPJ stands for split-panel jackknife, implemented as in Weidner and Zylkin (2021). The leave-one-out jackknife inflates the bias by leaving out one country at a time. PPML cluster-robust standard errors, clustered by pair, are shown in parenthesis. Cluster-bootstrap standard errors are shown in square brackets.
* $p < 0.10$, ** $p < .05$, *** $p < .01$.

Table A.3: FTA Estimates at Different Levels of Disaggregation

	Dependent variable: SITC3 Manufacturing Trade 1991-2015					
	Aggregate	*1 digit SITC*	*2 digit SITC*	*3 digit SITC*	*4 digit SITC*	*5 digit SITC*
	(1)	(2)	(3)	(4)	(5)	(6)
All FTAs	0.113***	0.075***	0.058***	0.057***	0.057***	0.054***
	(0.034)	(0.025)	(0.021)	(0.020)	(0.019)	(0.020)
# products / industries	1	10	63	231	895	2,771
Observations	60,614	449,390	2,295,015	6,743,206	18,795,101	39,663,541

PPML estimates for pooled, unbalanced sample of SITC3 bilateral trade flows between 109 countries over the period 1991-2015, using every 4 years. All estimates include exporter-(SITC)-time, importer-(SITC)-time, and exporter-importer-(SITC) FEs. Standard errors are clustered by pair.
* $p < 0.10$, ** $p < .05$, *** $p < .01$.

Table A.4: Results for "Least-traded" Products from Higher Levels of Aggregation, cont'd

	Dependent variable: SITC3 5 digit Trade Flows 1991-2015					
	2 digit SITC		*3 digit SITC*		*4 digit SITC*	
Main FTA effects						
All FTAs	-0.005	0.011	-0.0302	-0.008	-0.071***	-0.039**
	(0.019)	(0.018)	(0.019)	(0.018)	(0.019)	(0.018)
$\times \left[\overline{X}_{ijk} < 10\text{th perc.}\right]$	0.375***	0.325***	0.512***	0.439***	0.661***	0.565***
	(0.030)	(0.030)	(0.033)	(0.032)	(0.035)	(0.033)
One-period-ahead lead effects						
All FTAs$_{t+4}$	0.000	-0.001	0.007	0.006	0.011	0.011
	(0.026)	(0.027)	(0.024)	(0.025)	(0.022)	(0.022)
$\times \left[\overline{X}_{ijk} < 10\text{th perc.}\right]$	0.015	-0.019	-0.029	-0.063	-0.061*	-0.106***
	(0.039)	(0.043)	(0.035)	(0.039)	(0.032)	(0.035)
Control for if trade in LTPs generally grows faster than trade in other products for all pairs						
$[X_{ijk1} < 10\text{th perc.}] \times (\text{year}-\text{first year})$		0.024***		0.031***		0.039***
		(0.001)		(0.001)		(0.001)
ikt, jkt and ijk FEs	x	x	x	x	x	x
Observations	2,161,786	2,161,786	6,407,575	6,407,575	18,033,391	18,033,391

PPML estimates for pooled sample of SITC3 trade flows between 109 countries over the period 1991-2015 at different levels of disaggregation, every 4 years. $\overline{X}_{ijk}$ is the average trade flow for product k for years before i and j sign an FTA. This table focuses on one-period-ahead lead effects of FTAs. Standard errors are clustered by pair.
* $p < 0.10$, ** $p < .05$, *** $p < .01$.

References

French, S. (2019): "Comparative Advantage and Biased Gravity," Working Paper.

Pfaffermayr, M. (2021): "Confidence intervals for the trade cost parameters of cross-section gravity models," *Economics Letters*, 201, 109787.

Weidner, M. and T. Zylkin (2021): "Bias and Consistency in Three-Way Gravity Models," *Journal of International Economics*.