

Web appendix to “Trade and market selection: Evidence from manufacturing plants in Colombia”

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September 2012

This Web Appendix, not intended for publication, accompanies the paper “Trade and market selection: Evidence from manufacturing plants in Colombia”, by Marcela Eslava, John Haltiwanger, Adriana Kugler, and Maurice Kugler. It shows robustness checks and other complementary results mentioned in the paper but not directly reported there.

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Table WA1: Descriptive statistics for different measures of TFP.

TFP Measure	Standard deviation	Correlation Coefficients Matrix								
		TFPQ	TFPR	TFP3	TFP4	TFPCA	TFPC	RP1	RPO	RPM
		(1)	(2)	(3)	(4)	(5)	(6)	(9)	(10)	(11)
TFP with factor elasticities from 2SLS (TFPQ)	0.7668	1	0.69	0.68	0.99	0.91	0.90	-0.65	-0.07	0.03
TFP with factor elasticities from 2SLS and deflating output and materials with 3 digit sector-level prices (TFPR)	0.6079		1	0.98	0.68	0.52	0.53	-0.00	-0.30	-0.02
TFP with factor elasticities from 2SLS and deflating output with 3 digit sector-level prices (TFP3)	0.6212			1	0.64	0.54	0.54	0.03	-0.30	0.14
TFP with factor elasticities from 2SLS and deflating materials with 3 digit sector-level prices (TFP4)	0.7710				1	0.88	0.88	-0.67	-0.06	-0.10
TFP with factor elasticities equal to aggregate cost shares (TFPCA)	0.7607					1	0.99	-0.63	0.02	0.19
TFP with factor elasticities equal to cost shares by 3 digit sector (TFPC)	0.7657						1	-0.64	0.01	0.17
Output prices relative to PPI (RP1)	0.5604							1	0.15	0.20
Internally consistent sector-level output prices relative to PPI (RPO)	0.2369								1	0.18
Materials prices relative to PPI (RPM)	0.4332									1
N		85,203	85,203	85,203	85,203	85,203	85,203	85,203	85,203	90,427

Notes: This table reports standard deviations and correlation coefficients for different measures of TFP and for the plant-level output prices. All figures are simple means of statistics calculated at the three-digit sector level. The exception is the total number of observations for the calculation of each correlation coefficient, reported in the last line, which includes all sectors.

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Table WA2a: Descriptive statistics for different fundamentals. Pool Data

TFP Measure	Standard dev.	Correlation Coefficients Matrix										
		TFPQ (1)	TFPR (2)	TFPC (3)	TFPO (4)	RP1 (5)	RPO (4)	RPM (5)	RPMI (6)	RPE (7)	RPEI (8)	DSH (9)
Lag TFPQ	0.7376	1	0.68	0.90	0.86	-0.65	-0.07	0.03	0.00	0.04	0.05	-0.07
Lag TFP deflating output and materials with sector-level prices (TFPR)	0.5844		1	0.52	0.39	0.00	-0.29	-0.02	-0.10	0.14	0.18	0.27
Lag TFP with factor elasticities equal to cost shares (TFPC)	0.7369			1	0.86	-0.64	0.00	0.17	0.07	-0.02	-0.02	-0.25
Lag TFP with factor elasticities from OLS (TFPO)	0.6328				1	-0.72	-0.04	0.23	0.04	0.01	0.02	-0.19
Lag Output prices relative to PPI (RP1)	0.5392					1	0.14	0.20	0.08	-0.01	-0.05	0.40
Lag Internally consistent sector-level output prices relative to PPI (RPO)	0.2175						1	0.15	0.56	-0.22	-0.40	-0.01
Lag Materials prices relative to PPI (RPM)	0.4128							1	0.21	-0.04	-0.06	0.09
Lag Internally consistent material prices relative to PPI (RPMI)	0.1432								1	-0.16	-0.26	0.00
Energy prices relative to PPI (RPE)	0.4879									1	0.37	-0.01
Lag Internally consistent Energy prices relative to PPI (RPEI)	0.2117										1	0.05
Demand Shock (DSH)	1.6882											1
N		72,172	72,172	72,172	72,172	74,499	74,499	74,499	74,499	74,499	74,499	85,197

Notes: This table reports standard deviations and correlation coefficients for different measures of TFP and for the plant-level output prices. All figures are simple means of statistics calculated at the three-digit sector level. The exception is the total number of observations for the calculation of each correlation coefficient, reported in the last line, which includes all sectors. The factor elasticities used to estimate TFPQ (column (1)) are obtained from a 2SLS estimation of the production function, as described in the text. The equivalent factor elasticities used for TFPC (column (3)) are cost shares calculated at the three-digit sector level. For column (4), factor elasticities are obtained from an OLS estimation of the production function. Meanwhile, TFPR in column (2) uses the same factor elasticities as in column (1), but the price indices used to deflate output and materials are calculated at the three-digit sector level rather than at the plant level. Sector level price indices are calculated as the geometric mean of plant level price indices for a given three-digit sector, using output shares as weights. Relative output prices RP1 are constructed as the log difference between plant level price indices and the aggregate log Producer Price Index, and reported in column (5).

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Table WA2b: Descriptive statistics for different fundamentals. Taking out industry effects at the 4 digit level

TFP Measure	Standard deviation	Correlation Coefficients Matrix										
		TFPQ (1)	TFPR (2)	TFPC (3)	TFPO (4)	RP1 (5)	RPO (4)	RPM (5)	RPMI (6)	RPE (7)	RPEI (8)	DSH (9)
Lag TFPQ	0.7020	1	0.68	0.89	0.85	-0.63	-0.09	0.02	-0.01	0.04	0.04	-0.03
Lag TFP deflating output and materials with sector-level prices (TFPR)	0.5856		1	0.50	0.38	0.01	-0.41	-0.01	-0.12	0.16	0.15	0.30
Lag TFP with factor elasticities equal to cost shares (TFPC)	0.6838			1	0.86	-0.64	-0.01	0.16	0.07	-0.02	-0.00	-0.24
Lag TFP with factor elasticities from OLS (TFPO)	0.5939				1	-0.73	-0.06	0.22	0.05	0.01	0.03	-0.18
Lag Output prices relative to PPI (RP1)	0.5083					1	0.16	0.21	0.11	-0.01	-0.04	0.41
Lag Internally consistent sector-level output prices relative to PPI (RPO)	0.2618						1	0.15	0.51	-0.27	-0.31	-0.01
Lag Materials prices relative to PPI (RPM)	0.3916							1	0.30	-0.03	-0.02	0.09
Lag Internally consistent material prices relative to PPI (RPMI)	0.1586								1	-0.15	-0.17	0.01
Energy prices relative to PPI (RPE)	0.4816									1	-0.27	0.00
Lag Internally consistent Energy prices relative to PPI (RPEI)	0.2411										1	0.05
Demand Shock (DSH)	1.6362											1
N		72,172	72,172	72,172	72,172	74,499	74,499	74,499	74,499	74,499	74,499	85,167

Notes: This table reports standard deviations and correlation coefficients for different measures of TFP, plant-level output price and demand shocks. All figures are residuals of regressions of each variable against four-digit sector level fixed effects.

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Table WA3a: Determinants of Exit Probability (Marginal Effects)

	(1)	(2)	(3)	(4)
Lagged TFPQ	-0.0174*** (0.0015)			-0.0158*** (0.0015)
Lagged Energy Prices	0.0079*** (0.0019)			0.0072*** (0.0022)
Lagged Materials Prices	0.0189*** (0.0025)			0.0125*** (0.0028)
Lagged Demand Shock	-0.0221*** (0.0007)			
Lagged TFPR		-0.0235*** (0.0020)	-0.0248*** (0.0020)	
Lagged Sector Energy Prices			0.0315*** (0.0054)	
Lagged Sector Material Prices			-0.0064 (0.0070)	
Sector Effects	4-digit	4-digit	4-digit	4-digit
GDP Growth	YES	YES	YES	YES
Wald Chi2	1520.71 (89df)	814.03 (86df)	847.42 (88df)	807.63 (88df)
N	58,290	58,290	58,290	58,290

Notes: This table reports marginal effects from a Probit estimation of the probability of exit, where exit is 1 for plant i in year t if the plant reported nominal production in year t but not in year $t+1$. Robust standards errors in parentheses. Marginal effects are evaluated at mean values of all the independent variables. The sample is restricted to observations that enter the regression in Table 5. * significant at 10%, ** significant at 5%; *** significant at 1%.

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Table WA3b: Exit Probability at Different Values of Fundamentals (Based on Table WA3a)

	at mean	at mean + one standard deviation	at mean	at mean + one standard deviation	at mean	at mean + one standard deviation
	(1)	(2)	(3)	(4)	(5)	(6)
Based on	Table WA3a Column (1)		Table WA3a Column (4)		Table WA3a Column (3)	
Lagged TFPQ	0.0577	0.0453	0.0660	0.0545		
Lagged Energy Prices	0.0577	0.0616	0.0660	0.0696		
Lagged Materials Prices	0.0577	0.0668	0.0660	0.0719		
Lagged Demand Shock	0.0577	0.0296				
Lagged TFPR					0.0656	0.0506
Lagged Sector Energy Prices					0.0656	0.0736
Lagged Sector Material Prices					0.0656	0.0641

Notes: This table reports predicted exit probabilities calculated at different values for fundamentals. The predicted exit probabilities are based on the models of exit estimated in Table WA3a. Columns 1 and 2 present exit probabilities based on the exit model of Column (1) in Table WA3a. Columns 3 and 4 present exit probabilities based on the exit model of Column (4) in Table WA3a. Columns 5 and 6 present exit probabilities based on the exit model of Column (3) in Table WA3a. Even-numbered columns (1), (3) and (4) present exit probabilities assuming all fundamentals are at their mean value. In odd-numbered columns, the exit probability is calculated setting one fundamental (indicated in the label of the row) at its mean value plus one standard deviation, while all of the other fundamentals are set at their mean value.

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Table WA4: Determinants of Exit Probability. Replacing GDP growth with time effects

Lagged TFPQ	-0.0175*** (0.0014)
Lagged Energy Prices	0.0009 (0.0021)
Lagged Materials Prices	0.0205*** (0.0024)
Lagged Demand Shock	-0.0221*** (0.0006)
Sector Effects	YES
Time Effects	YES
Wald Chi2	1837.60 (100df)
N	58,290

Notes: This table reports marginal effects from a Probit estimation of the probability of exit, equivalent to the estimation in Table WA3a. In contrast to that estimation, time effects rather than GDP growth are used to control for aggregate effects. Robust Standard errors in parentheses.

* indicates significance at the 10% level

** indicates significance at the 5% level

*** indicates significance at the 1% level.

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Table WA5: Determinants of Exit Probability (Marginal Effects). Capital Stock included.

	(1)	(2)	(3)	(4)
Lagged TFPQ	-0.0197*** (0.0015)			-0.0243*** (0.0015)
Lagged Energy Prices	0.0079*** (0.0019)			0.0074*** (0.0021)
Lagged Materials Prices	0.0174*** (0.0025)			0.0111*** (0.0026)
Lagged Demand Shock	-0.0187*** (0.0009)			
Lagged TFPR		-0.0351*** (0.0020)	-0.0373*** (0.0020)	
Lagged Sector Energy Prices			0.0395*** (0.0054)	
Lagged Sector Material Prices			-0.0220*** (0.0067)	
Lagged Log Capital stock	-0.0047*** (0.0008)	-0.0160*** (0.0006)	-0.0165*** (0.0006)	-0.0153*** (0.0006)
Sector Effects	4-digit	4-digit	4-digit	4-digit
GDP Growth	YES	YES	YES	YES
Wald Chi2	1494.02 (90df)	1303.73 (87df)	1364.13 (89df)	1344.34 (89df)
N	58,290	58,290	58,290	58,290

Notes: This table reports marginal effects from a Probit estimation of the probability of exit, equivalent to the estimation in Table WA3a. In contrast to that estimation, we also control for the lagged log capital stock. Robust Standard errors in parentheses. * indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level. 1%.

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Table WA6: Determinants of Exit Probability. Linear Models with Plant-Level Fixed Effects.

	(1)	(2)	(3)	(4)
Lagged Productivity	-0.0344*** (0.0032)	-0.0648*** (0.0046)	-0.0357*** (0.0033)	-0.0346*** (0.0034)
Lagged Energy Prices	0.0461*** (0.0039)	0.0473*** (0.0038)	0.0492*** (0.0040)	0.0082** (0.0036)
Lagged Materials Prices	-0.0082 (0.0053)	0.0172*** (0.0057)	0.0013 (0.0054)	0.0333*** (0.0054)
Lagged Output Prices		-0.0750*** (0.0061)		
Lagged Demand Shock			-0.0223*** (0.0023)	-0.0355*** (0.0024)
Plant Effects	YES	YES	YES	YES
GDP Growth	YES	YES	YES	NO
Time Effects	NO	NO	NO	YES
N	58,290	58,290	58,290	58,290

Notes: This table reports marginal effects from an estimation of the probability of exit, similar to the estimation in Table WA3a. In contrast to that estimation, this model presents a linear model that includes plant-level fixed effects. Robust Standard errors in parentheses. * indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

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Table WA7: Fundamentals AR1 coefficients, taking out industry effects

	Pool Data	Within 4 digit sector
TFPQ	0.9092 (0.0042)	0.8852 (0.0047)
TFPR	0.8973 (0.0051)	0.8436 (0.0061)
Production Prices (relative to ppi)	0.9925 (0.0017)	0.9675 (0.0019)
Setor level Prices (relative to ppi)	1.0506 (0.0009)	0.9763 (0.0016)
Energy Prices	0.6208 (0.0127)	0.6123 (0.0128)
Materials Prices	0.9752 (0.0021)	0.9394 (0.0023)
Demand Shock	0.9737 (0.0015)	0.9742 (0.0015)

Notes: This table reports AR(1) coefficients of TFP and fundamentals using only its idiosyncratic components. Robust standard errors are in parenthesis.

Table WA8: Average TFPQ using exit as projected by the model and equivalent entry. 50 year horizon.

Average TFPQ (Using projected TFPQ _{it} for simulated continuers end entrants)			
Sample	Actual Tariffs (1)	1984 Tariffs (2)	Difference (3)
1986-1991	1,1087 (0,79)	1,1047 (0,79)	0,0039 [0,51]
1992-2048	1,2317 (1,15)	1,1706 (1,19)	0,0611*** [12,66]

This table reports the simple mean of TFPQ for groups of plants simulated to participate in the market using the estimated probit model reported in columns (1) and (2) of Table 5. Figures reported are averages over 100 simulations. Standard deviations in parentheses in columns (1), (2), (4) and (5); T statistics for mean differences in square brackets in columns (3) and (6). The probability that a plant exits is estimated using actual values of tariffs until 1998, and 1998 values from then on, in the results reported in column (1). Meanwhile tariffs are set at their 1984 value in the results reported in column (2). A number of entering plants equal to the simulated number of exiting plants is imposed in the simulation for each year and each three-digit sector, to simulate a steady state number of plants. Entering plants are assigned values of fundamentals drawn from a normal distribution with mean and standard deviation equal to those of the distribution of each fundamental. In column 1 the pre-1992 distribution is used up to 1991, and the 1992-1998 distribution is used for the post-91 part of the simulation. Meanwhile, the pre-1992 distribution is used for all periods in the simulation presented in column 2.

Table WA9: Determinants of Exit Probability in a Model with Reforms and Tariffs. Sample Excludes Plants Belonging to the 20% 4-Digits Sector With Highest Correlation Between TFP and Relative Output Prices

	Ef. Tariffs at 60% (1)	Ef. Tariffs at 20% (2)	Difference (3)
Lagged TFPQ	-0.0179*** (0.0017)	-0.0214*** (0.0027)	0.0035 (0.0029)
Lagged Energy Prices	0.0020 (0.0025)	0.0037 (0.0037)	-0.0017 (0.0034)
Lagged Materials Prices	0.0114*** (0.0030)	0.0259*** (0.0044)	-0.0144*** (0.0043)
Lagged Demand Shock	-0.0221*** (0.0008)	-0.0225*** (0.0013)	0.0004 (0.0014)
Lagged Demand Elasticity	-0.0371 (0.0556)	-0.0174 (0.0461)	-0.0197* (0.0119)
Effective Tariffs	-0.0149** (0.0072)	-0.0164* (0.0087)	0.0015 (0.0015)
Other Reforms Index	YES	YES	
Interactions with Other Reforms Index	YES	YES	
Sector Effects	4-digit	4-digit	
GDP Growth	YES	YES	
N	42,536	42,536	42,536

Notes: This table reports marginal effects from a Probit estimation of the probability of exit, equivalent to the estimation in Table 5 of the paper. In contrast to that estimation, we exclude from the estimation plants belonging to the 4-digits sectors with highest correlations between TFP and relative output prices. These are the sectors where TFP plant prices are most likely to proxy for quality. Robust Standard errors in parentheses. * indicates significance at the 10% level; ** indicates significance at the 5% level; and *** indicates significance at the 1% level.

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Table WA10: Determinants of Exit Probability in a Model with Reforms and Tariffs. Leaving out demand shock and demand elasticity and including output prices. TFPQ.

	Ef. Tariffs at 60% (1)	Ef. Tariffs at 20% (2)	Difference (3)	Ef. Tariffs at 60% (4)	Ef. Tariffs at 20% (5)	Difference (6)
Lagged TFPQ	-0.0298*** (0.0022)	-0.0347*** (0.0038)	0.0049 (0.0033)	-0.0301*** (0.0022)	-0.0321*** (0.0036)	0.0021 (0.0032)
Lagged Energy Prices	0.0030 (0.0024)	0.0071** (0.0036)	-0.0041 (0.0029)	0.0033 (0.0023)	0.0067** (0.0033)	-0.0034 (0.0028)
Lagged Materials Prices	0.0219*** (0.0030)	0.0346*** (0.0050)	-0.0126*** (0.0044)	0.0208*** (0.0030)	0.0284*** (0.0045)	-0.0076** (0.0041)
Lagged Output prices	-0.0330*** (0.0030)	-0.0355*** (0.0049)	0.0025 (0.0045)	-0.0324*** (0.0030)	-0.0309*** (0.0046)	-0.0015 (0.0042)
Effective Tariffs	-0.0179*** (0.0057)	-0.0194*** (0.0068)	0.0016 (0.0010)	-0.0021 (0.0069)	-0.0021 (0.0070)	0.0000 (0.0001)
Other Reforms Index	YES	YES		YES	YES	
Interactions with Other Reforms Index	YES	YES		YES	YES	
Sector Effects	YES	YES		YES	YES	
GDP Growth	YES	YES		NO	NO	
Time Effects	NO	NO		YES	YES	
N	58,290	58,290	58,290	58,290	58,290	58,290

Notes: This table reports marginal effects from a Probit estimation of the probability of exit, equivalent to the estimation in Table 5 of the paper. In contrast to that estimation, we include plant-level output prices as proxies of demand, and leave out our estimates of demand shocks and demand elasticities. Robust Standard errors in parentheses. * indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

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Table WA11: Determinants of Exit Probability in a Model with Reforms and Tariffs. Marginal effects with other reforms at 0.7 and 0.3

	Other refs at 70% (1)	Other refs at 30% (2)	Difference (3)
Lagged TFPQ	-0.0170*** (0.004)	-0.0158*** (0.0022)	-0.0012 (0.0058)
Lagged Energy Prices	-0.0045 (0.0072)	0.0035 (0.0030)	-0.0080 (0.0090)
Lagged Materials Prices	0.0139** (0.0074)	0.0228*** (0.0039)	-0.0089 (0.0100)
Lagged Demand Shock	-0.0194*** (0.0021)	-0.0238*** (0.0011)	0.0044 (0.0029)
Lagged Demand Elasticity	0.0397 (0.0882)	0.0044 (0.0337)	0.0353 (0.0549)
Effective Tariffs	-0.0258*** (0.0065)	-0.0172*** (0.0053)	-0.0086*** (0.0016)
Other Reforms Index	YES	YES	
Interactions with Other Reforms Index	YES	YES	
Sector Effects	YES	YES	
GDP Growth	YES	YES	
N	58,290	58,290	58,290

Notes: This table reports marginal effects from a Probit estimation of the probability of exit, equivalent to the estimation in Table 5 of the paper. Marginal effects are evaluated at mean values of all variables, except for the index of other reforms. In Column (1) this index is set at a value of 70%, while in Column (2) it is set at 30%. Column (3) reports the difference between effects when the index of other reforms is at 30% and at 70%. * significant at 10%; ** significant at 5%; *** significant at 1%.