Intraindustry Trade and the Skill Premium: Theory and Evidence

by

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Appendix B: Further Empirical Evidence

B.1 Elasticity Estimates: Robustness Checks

We perform series of experiments in order to check the robustness of our elasticity estimates from Table 1 of the main text. Table B.1 reports our findings. To obtain the estimates in the first row of the table, *Hours of Work*, we use relative labor demand and relative wages calculated on the basis of hours spent at work by each type of workers (as opposed to number of workers). In the next two rows, we replace the time fixed effects with linear and quadratic time trends. The numbers in rows (4) and (5) are obtained after splitting the sample into two periods 1995-1998 and 1999-2003. Next, we construct the first-differences of the variables in our model with two-, three-, and five-year lags. These results are reported in rows (6), (7) and (8), respectively. In row (9), *Endogenous Output*, we follow Dunne et al. (1997) and we use instrumental variables to account for potential endogeneity of output. Finally, motivated by the literature on capital-skill complementarity, we use series of alternative measures of capital and fixed assets (including land) as additional control variables. These estimates are reported in the last six rows of the table and favor the hypothesis of capital-skill complementarity (see column FA, denoting fixed assets, of Table B.1). Overall, the elasticity numbers from Table B.1 provide further empirical support for the output-skill substitutability hypothesis.

B.2 Output-Skill Complementarity

The hypothesis of output-skill substitutability, which is evidently true in Mexican manufacturing, is but one component of the Chamberlinian mechanism of income distribution. This subsection presents evidence from the existing empirical literature on trade and wages that is consistent with the output-skill complementarity ($\lambda > 0$) hypothesis. Under this hypothesis, Proposition 1 predicts that the skill premium is positively related to the degree of economic openness and negatively related to an economy's skill abundance. Further, Proposition 2 predicts that free intraindustry trade does not necessarily bring equalization of skill premia across countries.[1] Put alternatively, in the presence of free intraindustry trade, an increase in a country's skill abundance reduces its skill premium. These predictions are consistent with the empirical findings of Epifani and Gancia (2008, Table 1). Using a panel of 35 countries for the years 1980 and 1990 they use regression analysis to identify the determinants of the skill premium, measured by the ratio of non-production wage to production wage. They regress the skill premium on market size (measured by the total labor force) on skill abundance (measured by the share of workers with secondary education) and on economic openness (measured by the ratio of exports and imports to GDP). They find that the skill premium is positively correlated to market size and economic openness and negatively correlated to skill abundance. All three variables are highly significant. According to their analysis, ceteris paribus, doubling of market size is associated with a 9% increase in the skill premium, doubling of economic openness is related to a 41% increase in the skill-premium, and doubling a country's skill abundance is associated with a 21% reduction in the skill premium.

In our model, a move from autarky to free intraindustry trade reduces the number of active firms in each country. However, these firms become more efficient and produce more output for the domestic and foreign markets. Since the equilibrium ratio of high-skilled to low-skilled labor is equal to the fixed economy-wide ratio *H/L*, there are no labor movements within each firm (plant), but instead all movements occur between firms.[2] Therefore the model predicts a positive correlation between the skill premium, the degree of labor movements across firms, and each firm's output, measured by either domestic and/or for-

[1] Although the model analyzes the effects of a move from autarky to free intraindustry trade, Proposition 1 can be derived from a more general version of the model that incorporates trade barriers and/or transport costs, where a reduction in trade barriers (as opposed to a move from autarky to trade) increases the degree of intraindustry trade.

[2] Notice that the within-firm effect is zero if the equilibrium share of high-skilled labor in total firm employment $\alpha_H / (\alpha_H + \alpha_L) = 1/[1 + (\alpha_H / \alpha_L)]$ is exogenous. In our model this is due to (13), which states that $\alpha_H / \alpha_L = H / L$.

eign shipments. These predictions are consistent with the seminal work of Bernard and Jensen (1997). Using U.S. plant-level data from the Census Bureau's Annual Survey of Manufacturers for the period 1976 to 1987, they analyze the relationship between exporting and labor market outcomes. They report (Table 8) a positive and significant correlation between changes in the skill premium and output per plant shipped to domestic and foreign consumers after controlling for several other variables including changes in the capital to labor ratio and the export status of an establishment. They state (Bernard and Jensen 1997, p. 26) "The determinants of increased wage inequality at the plant level are almost entirely driven by between plant shifts, as shown in Table 1 and Table 2. These increases are much more strongly linked to the demand variables, especially foreign sales, than technology or investment variables". Therefore, U.S. plant-level evidence supports the empirical relevance of the output-skill complementarity hypothesis ($\lambda > 0$) which is consistent with a positive correlation between trade the skill premium.

Table B.1: Elasticity Estimates: Robustness Checks

	(1)	(2)	(3)	(4)	(5)
	σ	λ	$\gamma_H - \gamma_L$	**FA**	N
(1) Hours of Work	.320**	-.089**	.131**		51207
	(.009)	(.005)	(.008)		
(2) Linear Time Trend	.288**	-.078**	.109**		51581
	(.011)	(.005)	(.008)		
(3) Quadratic Time Trend	.288**	-.077**	.108**		51581
	(.011)	(.006)	(.008)		
(4) 1995-1999	.295**	-.068**	.096**		27860
	(.014)	(.007)	(.010)		
(5) 1999-2003	.277**	-.081**	.0112**		23721
	(.014)	(.008)	(.011)		
(6) 2-year Lags	.283**	-.082**	.114**		25087
	(.012)	(.007)	(.009)		
(7) 3-year Lags	.254**	-.076**	.102**		14895
	(.014)	(.009)	(.011)		
(8) 5-year Lags	.283**	-.069**	.096**		9457
	(.016)	(.011)	(.013)		
(9) Endogenous Output	.282**	-.179**	.249**		9457
	(.032)	(.096)	(.051)		
(10) Capital (Total)	.287**	-.074**	.104**	.016**	48853
	(.011)	(.006)	(.008)	(.005)	
(11) Capital (Equipment)	.288**	-.075**	.105**	.012**	48674
	(.011)	(.006)	(.008)	(.004)	
(12) Capital (Buildings)	.291**	-.079**	.111**	.007*	32820
	(.013)	(.007)	(.009)	(.003)	
(13) Capital (Transport)	.291**	-.073**	.103**	.013**	46303
	(.011)	(.006)	(.008)	(.003)	
(14) Capital (Other)	.286**	-.076**	.106**	.013**	47538
	(.010)	(.006)	(.007)	(.004)	
(15) Land	.282**	-.079**	.110**	.007*	23133
	(.015)	(.009)	(.012)	(.003)	

Standard errors in parentheses. + p<0.10, * p<.05, ** p<.01. All elasticity numbers are obtained under specification (15). Columns (1), (2) and (3) report estimates of the wage elasticity of substitution, the output elasticity of substitution, and the difference between the output elasticities of labor efficiency of high- and low-skilled labor. Standard errors in column (3) are obtained with the Delta method. Column (4) reports estimates of the coefficients on various fixed assets (FA) used as covariates in (15).

References

Bernard, A.B., Jensen, J.B., 1997. Exporters, skill upgrading, and the wage gap. Journal of International Economics 42, 3-31.

Dunne, T., Haltiwanger, J., Troske, K.R., 1997. Technology and jobs: secular changes and cyclical dynamics. Carnegie-Rochester Conference Series on Public Policy 46(1), 107-178.

Epifani, P., Gancia, G.A., 2008. The skill bias of world trade. Economic Journal 118 (530), 297-960.