

Multidimensional Innovation Responses and Foreign Competition: Online appendix

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Appendix

Table A1: Definition of variables

Variable	Definition	Source
Product innovation	Dummy variable = 1 if the firm has introduced a good or service that is new or significantly improved with respect to its characteristics or intended uses in the last three years.	IS
Process innovation	Dummy variable = 1 if the firm has implemented a new or significantly improved production or delivery method in the last three years.	IS
Marketing innovation	Dummy variable = 1 if the firm has implemented a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing in the last three years.	IS
Organizational innovation	Dummy variable = 1 if the firm has implemented a new organizational method in the firm's business practices, workplace organization or external relations in the last three years.	IS
Non-technological innovation	Dummy variable = 1 if the firm has introduced a marketing or organizational innovation in the last three years.	IS
Any innovation	Dummy variable = 1 if the firm has introduced a product, process, marketing or organizational innovation in the last three years.	IS
Positive exp. R&D	Dummy variable = 1 if the firm has spent on intramural and extramural research and development (R&D) in the last three years.	IS
Positive exp. on innovation capital	Dummy variable = 1 if the firm has spent on machinery, equipment or software linked to innovation in the last three years.	IS

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Table A1 – *Continued from previous page*

Variable	Definition	Source
Positive total innovative exp.	Dummy variable = 1 if the firm has spent on innovation activities, including intramural and extramural R&D, acquisition of new machinery, equipment and software, and other innovative expenditures (acquisition of external knowledge, engineering and design, training, and innovation management) in the last three years.	IS
R&D exp.	Expenditure on intramural and extramural research and development (R&D) in the last year. In constant 2010 pesos.	IS
Exp. on innovation capital	Expenditure on machinery, equipment or software linked to innovation (proxy of embodied technical change) in the last year. In constant 2010 pesos.	IS
Total innovative exp.	All the expenditures on innovation activities, including intramural and extramural R&D, acquisition of new machinery, equipment and software, and other innovative expenditures (acquisition of external knowledge, engineering and design, training, and innovation management) in the last year. In constant 2010 pesos.	IS
Sales	Value of sales in the last year. In constant 2010 pesos.	IS
Total employment	Total number of employees in the last year.	IS
Skilled employment	Total number of professional and technicians employees in the last year.	IS
Unskilled employment	total employment - skilled employment	IS
Business group	Dummy variable = 1 if the firm belongs to a group of firms.	IS
Foreign capital	Dummy variable = 1 if the firm has foreign capital.	IS
Large firm	Dummy variable = 1 if the firm has an average (over time) of 50 or more employees.	IS
Age	Firm's age in years	IS
Import penetration from China	Ratio imports from China over apparent consumption in the sector (4-digit ISIC codes).	Comtrade & SEA
Import penetration from China IV	Instrument for import penetration from China using imports to other Mercosur's countries. See text for details.	Comtrade & SEA
Labor productivity	Sales/ total employment. Average over the period 1998-2003	SEA
Distance to the frontier	(max labor productivity - labor productivity)/max labor productivity where max labor productivity is the maximum labor productivity in the sector (4-digit ISIC codes).	SEA
Close to the frontier	Dummy variable = 1 if distance to the frontier is less or equal than .75 (4-digit ISIC codes).	SEA

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Table A1 – *Continued from previous page*

Variable	Definition	Source
Share skilled labor	skilled employment/total employment	IS
High share skilled labor	Dummy variable = 1 if share skilled employment is higher than median in the sector (4-digit ISIC codes).	IS

Source: Innovation Survey (IS) and Survey of Economic Activity (SEA)

Table A2: Effect of Import Competition from China on Sales and Employment: Robustness with import penetration from China as a ratio over total imports in the sector

	Log sales	Log total employment	Log unskilled employment	Log skilled employment
<i>Panel A. OLS</i>				
Import penetration from China (imports)	−1.351** (0.528)	−0.913*** (0.298)	−0.813** (0.316)	−0.775** (0.379)
<i>Panel B. IV</i>				
Import penetration from China (imports)	−2.990*** (0.346)	−2.334*** (0.370)	−2.260*** (0.389)	−2.052*** (0.336)
First stage F-stat	13.9	13.9	13.9	13.9
Mean DV	11.085	3.942	3.809	1.499
Observations	3,115	3,115	3,115	3,115

Note: This table presents the OLS and IV estimates for the effect of import competition from China on sales and employment. “Import penetration from China (imports)” is defined as the ratio of import from China to total imports in the sector. Each column estimates the effect of competition on a different employment variables. Panel A reports OLS estimates, and Panel B reports IV estimates where import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm’s age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses..

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A3: Effect of Import Competition from China on Innovation Inputs: Robustness with import penetration from China as a ratio over total imports in the sector

	Positive total innovation exp.	Positive R&D exp.	Positive exp. on innovation capital	Positive other innovation exp.
<i>Panel A. OLS</i>				
Import penetration from China (imports)	-0.304 (0.222)	-0.134 (0.105)	-0.449*** (0.154)	-0.072 (0.193)
<i>Panel B. IV</i>				
Import penetration from China (imports)	-0.689** (0.266)	-0.153 (0.110)	-0.681*** (0.170)	-0.058 (0.179)
First stage F-stat	15.8	15.8	15.8	15.8
Mean DV	0.472	0.192	0.388	0.309
Observations	3,115	3,115	3,115	3,115

Note: This table presents the OLS and IV estimates for the effect of import competition from China on innovation inputs. “Import penetration from China (imports)” is defined as the ratio of import from China to total imports in the sector. Each column estimates the effect of competition on a different variable. Panel A reports OLS estimates, and Panel B reports IV estimates where import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm’s age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A4: Effect of Import Competition from China on Innovation Outputs: Robustness with import penetration from China as a ratio over total imports in the sector

	Any innovation	Product innovation	Process innovation	Non- technological innovation
<i>Panel A. OLS</i>				
Import penetration from China (imports)	-0.417* (0.210)	-0.225 (0.157)	-0.332* (0.175)	-0.070 (0.139)
<i>Panel B. IV</i>				
Import penetration from China (imports)	-0.772*** (0.219)	-0.356** (0.137)	-0.213* (0.120)	-0.256** (0.108)
First stage F-stat	15.8	15.8	15.8	15.8
Mean DV	0.465	0.251	0.352	0.217
Observations	3,115	3,115	3,115	3,115

Note: This table presents the OLS and IV estimates for the effect of import competition from China on innovation outputs. “Import penetration from China (imports)” is defined as the ratio of import from China to total imports in the sector. Each column estimates the effect of competition on a different variable. Panel A reports OLS estimates, and Panel B reports IV estimates where import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm’s age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A5: Effect of Import Competition from China on Innovation Inputs: Logs of expenditure

	Log total innovation exp.	Log R&D exp.	Log exp. on innovation capital	Log other innovation exp.
<i>Panel A. OLS</i>				
Import penetration from China (year)	-2.744** (1.135)	-1.089 (0.821)	-2.138 (1.398)	0.346 (0.946)
<i>Panel B. IV</i>				
Import penetration from China (year)	-2.781** (1.061)	-0.500 (1.037)	-2.949** (1.397)	1.876 (1.311)
First stage F-stat	29.7	29.7	29.7	29.7
Mean DV	3.218	1.131	2.528	1.613
Observations	3,115	3,115	3,115	3,115

Note: This table presents the OLS and IV estimates for the effect of import competition from China on innovation inputs using the logarithm of the expenditure. Each column estimates the effect of competition on a different variables. Panel A reports OLS estimates, and Panel B reports IV estimates where import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm's age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A6: Effect of Import Competition from China on Sales and Employment: Robustness with firm fixed effects

	Log sales	Log total employ- ment	Log unskilled employ- ment	Log skilled employ- ment
<i>Panel A. OLS-FE</i>				
Import penetration from China (year)	-1.257 (1.022)	-1.099* (0.591)	-1.020 (0.627)	-0.817 (0.619)
<i>Panel B. IV-FE</i>				
Import penetration from China (year)	-3.279*** (0.669)	-2.421*** (0.628)	-2.314*** (0.735)	-2.401*** (0.372)
First stage F-stat	26.2	26.2	26.2	26.2
Mean DV	11.290	4.055	3.921	1.594
Observations	2,616	2,616	2,616	2,616

Note: This table presents the OLS and IV estimates for the effect of import competition from China on sales and employment using firm fixed effects. Each column estimates the effect of competition on a different variable. Panel A reports OLS estimates, and Panel B reports IV estimates where import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include firm fixed effects, time fixed effects, and the following controls: firm's age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses..

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A7: Effect of Import Competition from China on Innovation Inputs: Robustness with firm fixed effects

	Positive total innovation exp.	Positive R&D exp.	Positive exp. on innovation capital	Positive other innovation exp.
<i>Panel A. OLS-FE</i>				
Import penetration from China (period)	-0.553** (0.237)	-0.137 (0.201)	-0.581*** (0.189)	0.021 (0.224)
<i>Panel B. IV-FE</i>				
Import penetration from China (period)	-0.885** (0.371)	-0.039 (0.279)	-1.040*** (0.291)	0.023 (0.308)
First stage F-stat	27.2	27.2	27.2	27.2
Mean DV	0.496	0.206	0.410	0.332
Observations	2,616	2,616	2,616	2,616

Note: This table presents the OLS and IV estimates for the effect of import competition from China on innovation inputs using firm fixed effects. Each column estimates the effect of competition on a different variable. Panel A reports OLS estimates, and Panel B reports IV estimates where import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include firm fixed effects, time fixed effects, and the following controls: firm's age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A8: Effect of Import Competition from China on Innovation Outputs: Robustness with firm fixed effects

	Any innovation	Product innovation	Process innovation	Non- technological innovation
<i>Panel A. OLS-FE</i>				
Import penetration from China (period)	-0.662*** (0.225)	-0.267 (0.195)	-0.082 (0.189)	-0.263* (0.155)
<i>Panel B. IV-FE</i>				
Import penetration from China (period)	-0.965*** (0.346)	-0.252 (0.197)	-0.156 (0.252)	-0.449** (0.213)
First stage F-stat	27.2	27.2	27.2	27.2
Mean DV	0.488	0.261	0.372	0.224
Observations	2,616	2,616	2,616	2,616

Note: This table presents the OLS and IV estimates for the effect of import competition from China on innovation outputs using firm fixed effects. Each column estimates the effect of competition on a different variable. Panel A reports OLS estimates, and Panel B reports IV estimates where import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include firm fixed effects, time fixed effects, and the following controls: firm's age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A9: Effect of Import Competition from China on Sales and Employment: Robustness without sectors with import penetration $\geq .9$

	Log sales	Log total employ- ment	Log unskilled employ- ment	Log skilled employ- ment
<i>Panel A. OLS</i>				
Import penetration from China (year)	-1.049 (0.868)	-1.009* (0.514)	-0.877 (0.541)	-0.832 (0.589)
<i>Panel B. IV</i>				
Import penetration from China (year)	-2.813*** (0.566)	-2.123*** (0.507)	-2.003*** (0.519)	-2.137*** (0.379)
First stage F-stat	29.2	29.2	29.2	29.2
Mean DV	11.112	3.956	3.827	1.504
Observations	3,028	3,028	3,028	3,028

Note: This table presents the OLS and IV estimates for the effect of import competition from China on sales and employment. For this exercise we drop all sectors where average (total) import penetration is greater than .9. Each column estimates the effect of competition on a different employment variables. Panel A reports OLS estimates, and Panel B reports IV estimates where import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm's age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses..

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A10: Effect of Import Competition from China on Innovation Inputs: Robustness without sectors with import penetration $\geq .9$

	Positive total innovation exp.	Positive R&D exp.	Positive exp. on innovation capital	Positive other innovation exp.
<i>Panel A. OLS</i>				
Import penetration from China (period)	-0.392 (0.241)	-0.223** (0.105)	-0.491*** (0.156)	0.115 (0.203)
<i>Panel B. IV</i>				
Import penetration from China (period)	-0.523 (0.339)	-0.229* (0.118)	-0.648*** (0.187)	0.139 (0.254)
First stage F-stat	32.5	32.5	32.5	32.5
Mean DV	0.475	0.195	0.391	0.310
Observations	3,028	3,028	3,028	3,028

Note: This table presents the OLS and IV estimates for the effect of import competition from China on innovation. For this exercise we drop all sectors where average (total) import penetration is greater than .9. Each column estimates the effect of competition on a different variable. Panel A reports OLS estimates, and Panel B reports IV estimates where import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm's age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A11: Effect of Import Competition from China on Innovation Outputs: Robustness without sectors with import penetration $\geq .9$

	Any innovation	Product innovation	Process innovation	Non- technological innovation
<i>Panel A. OLS</i>				
Import penetration from China (period)	-0.548** (0.217)	-0.269* (0.155)	-0.167 (0.158)	-0.136 (0.115)
<i>Panel B. IV</i>				
Import penetration from China (period)	-0.644** (0.284)	-0.304* (0.178)	-0.200 (0.158)	-0.196 (0.143)
First stage F-stat	32.5	32.5	32.5	32.5
Mean DV	0.467	0.254	0.353	0.216
Observations	3,028	3,028	3,028	3,028

Note: This table presents the OLS and IV estimates for the effect of import competition from China on innovation. For this exercise we drop all sectors where average (total) import penetration is greater than .9. Each column estimates the effect of competition on a different variable. Panel A reports OLS estimates, and Panel B reports IV estimates where import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm's age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A12: Effect of Import Competition from China on Share of Unskilled Labor

	Share unskilled labor	Share unskilled labor
<i>Panel A. OLS</i>		
Import penetration from China (year)	0.058 (0.056)	0.056 (0.069)
Import pen from China \times large firm		0.003 (0.040)
<i>Panel B. IV</i>		
Import penetration from China (year)	0.093 (0.071)	0.116 (0.082)
Import pen from China \times large firm		-0.036 (0.031)
First stage F-stat	29.7	29.9
First stage F-stat (interaction)		24.0
Mean DV	0.892	0.892
Observations	3,114	3,114

Note: This table presents the OLS and IV estimates for the effect of import competition from China on the share of unskilled labor. Each column estimates the effect of competition on a different variable. Panel A reports OLS estimates, and Panel B reports IV estimates where import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm's age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses..

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A13: Effect of Import Competition from China on Innovation Inputs: Main model using a sample of firms with information on skilled labor for 1998–2003

	Positive total innovation exp.	Positive R&D exp.	Positive exp. on innovation capital	Positive other innovation exp.
Import penetration from China (period)	−1.067** (0.455)	−0.247 (0.372)	−1.103*** (0.347)	−0.280 (0.233)
First stage F-stat	28.5	28.5	28.5	28.5
Mean DV	0.630	0.297	0.536	0.459
Observations	1,108	1,108	1,108	1,108

Note: This table presents the OLS and IV estimates for the effect of import competition from China on innovation. The sample is firms with information on skilled labor for the period 1998–2003. Each column estimates the effect of competition on a different variable. Panel A reports OLS estimates, and Panel B reports IV estimates where import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm’s age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A14: Effect of Import Competition from China on Innovation Outputs: Main model using a sample of firms with information on skilled labor for 1998–2003

	Any innovation	Product innovation	Process innovation	Non- technological innovation
Import penetration from China (period)	−1.064** (0.453)	−0.459* (0.250)	−0.161 (0.213)	−0.508** (0.193)
First stage F-stat	28.5	28.5	28.5	28.5
Mean DV	0.625	0.353	0.486	0.292
Observations	1,108	1,108	1,108	1,108

Note: This table presents the OLS and IV estimates for the effect of import competition from China on innovation. The sample is firms with information on skilled labor for the period 1998–2003. Each column estimates the effect of competition on a different variable. Panel A reports OLS estimates, and Panel B reports IV estimates where import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm’s age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A15: Effect of Import Competition from China on Innovation Inputs: Main model using a sample of firms with information on firm productivity for 1998–2003

	Positive total innovation exp.	Positive R&D exp.	Positive exp. on innovation capital	Positive other innovation exp.
Import penetration from China (period)	−1.050** (0.463)	−0.220 (0.340)	−1.103*** (0.356)	−0.246 (0.249)
First stage F-stat	28.9	28.9	28.9	28.9
Mean DV	0.628	0.301	0.534	0.456
Observations	1,147	1,147	1,147	1,147

Note: This table presents the OLS and IV estimates for the effect of import competition from China on innovation. Each column estimates the effect of competition on a different variable. Panel A reports OLS estimates, and Panel B reports IV estimates where import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm’s age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A16: Effect of Import Competition from China on Innovation Outputs: Main model using a sample of firms with information on firm productivity for 1998–2003

	Any innovation	Product innovation	Process innovation	Non- technological innovation
Import penetration from China (period)	−1.023** (0.452)	−0.411* (0.241)	−0.184 (0.237)	−0.402** (0.192)
First stage F-stat	28.9	28.9	28.9	28.9
Mean DV	0.622	0.356	0.483	0.289
Observations	1,147	1,147	1,147	1,147

Note: This table presents the OLS and IV estimates for the effect of import competition from China on innovation. Each column estimates the effect of competition on a different variable. Panel A reports OLS estimates, and Panel B reports IV estimates where import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm’s age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A17: Effect of Import Competition from China on Innovation Inputs: Alternative specification for heterogeneous effects by firm productivity

	Positive total in- novation exp.	Positive R&D exp.	Positive exp. on innova- tion capital	Positive other in- novation exp.
Import penetration from China (period)	-1.596*** (0.387)	-0.484 (0.438)	-1.601*** (0.311)	-0.682** (0.305)
Import pen from China \times $.75 \leq \text{Distance} \leq .85$	0.102 (0.253)	0.197 (0.236)	0.373 (0.242)	0.623* (0.328)
Import pen from China \times $.50 \leq \text{Distance} \leq .75$	0.920*** (0.268)	0.186 (0.229)	0.738*** (0.205)	0.367 (0.273)
Import pen from China \times $\text{Distance} \leq .50$	0.662 (0.580)	0.763 (0.456)	0.561 (0.475)	0.753 (0.472)
First stage F-stat	407.9	407.9	407.9	407.9
First stage F-stat (prod 1)	213.0	213.0	213.0	213.0
First stage F-stat (prod 2)	272.2	272.2	272.2	272.2
First stage F-stat (prod 3)	507.4	507.4	507.4	507.4
Mean DV	0.628	0.301	0.534	0.456
Observations	1,147	1,147	1,147	1,147

Note: This table presents IV estimates for the effect of import competition from China on innovation inputs by firm productivity using an alternative specification. “Distance” is the distance between the labor productivity for the firm and the most productive firm in the sector for 1998–2003. This specification allocates firms to different groups using the variable distance: (i) a distance smaller than .5, (ii) a distance between .5 and .75, (iii) a distance between .75 and .85, (iv) a distance greater than .85. Each column estimates the effect of competition on a different variable. Import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm’s age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A18: Effect of Import Competition from China on Innovation Outputs: Alternative specification for heterogeneous effects by firm productivity

	Any in- novation	Product innova- tion	Process innova- tion	Non- technological innova- tion
Import penetration from China (period)	-1.580*** (0.369)	-0.900*** (0.305)	-0.589** (0.293)	-0.706*** (0.235)
Import pen from China $\times .75 \leq \text{Distance} \leq .85$	0.119 (0.248)	0.335 (0.331)	0.172 (0.308)	0.206 (0.356)
Import pen from China $\times .50 \leq \text{Distance} \leq .75$	0.930*** (0.264)	0.613** (0.277)	0.925*** (0.275)	0.426** (0.207)
Import pen from China $\times \text{Distance} \leq .50$	0.687 (0.559)	0.805** (0.385)	-0.104 (0.382)	0.394 (0.391)
First stage F-stat	407.9	407.9	407.9	407.9
First stage F-stat (prod 1)	213.0	213.0	213.0	213.0
First stage F-stat (prod 2)	272.2	272.2	272.2	272.2
First stage F-stat (prod 3)	507.4	507.4	507.4	507.4
Mean DV	0.622	0.356	0.483	0.289
Observations	1,147	1,147	1,147	1,147

Note: This table presents IV estimates for the effect of import competition from China on innovation outputs by firm productivity using an alternative specification. “Distance” is the distance between the labor productivity for the firm and the most productive firm in the sector for 1998–2003. This specification allocates firms to different groups using the variable distance: (i) a distance smaller than .5, (ii) a distance between .5 and .75, (iii) a distance between .75 and .85, (iv) a distance greater than .85. Each column estimates the effect of competition on a different variable. Import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm’s age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Import Penetration in Intermediate Goods

We follow the approach in [Bloom, Draca, and Van Reenen \(2015\)](#) and compute import penetration from China in intermediate goods for each sector. We use the input-output matrix in 2005 for Uruguay to compute the share of industry l on industry k ’s total expenditure on intermediate goods, $w_{k,l}$. Using these shares, we compute import penetration

from China in intermediate goods for industry k as

$$\text{Import Penetration}_{kt}^{\text{inputs}} = \sum_l w_{k,l} \text{Import Penetration}_{lt}^{\text{products}},$$

where $\text{Import Penetration}_{lt}^{\text{products}}$ is import penetration from China in final products for industry l at time t , and $w_{k,l}$ is the share of industry l on industry k 's total expenditure on intermediate goods.

Similarly our instrument for import penetration in intermediate goods in industry k at time period t is:

$$\text{Import Penetration IV}_{kt}^{\text{inputs}} = \sum_l w_{k,l} \text{Import Penetration IV}_{lt}^{\text{products}},$$

where $\text{Import Penetration IV}_{lt}^{\text{products}}$ is our instrument for import penetration in final products for sector l .

Table A19: Effect of Import Competition from China on Sales and Employment: Robustness using import penetration in intermediate goods

	Log sales	Log total employ- ment	Log unskilled employ- ment	Log skilled em- ployment
<i>Panel A. OLS</i>				
Import penetration from China (products)	-0.380 (1.117)	-0.372 (0.601)	-0.287 (0.638)	-0.425 (0.769)
Import penetration from China (inputs)	-5.389 (3.662)	-5.460*** (1.796)	-4.871** (2.007)	-3.663 (2.687)
<i>Panel B. IV</i>				
Import penetration from China (products)	-1.794** (0.868)	-1.747*** (0.632)	-1.726** (0.714)	-2.255*** (0.806)
Import penetration from China (inputs)	-5.839 (4.737)	-2.463 (2.777)	-1.659 (2.963)	0.026 (4.327)
First stage F-stat (products)	18.2	18.2	18.2	18.2
First stage F-stat (inputs)	112.2	112.2	112.2	112.2
Mean DV	11.085	3.942	3.809	1.499
Observations	3,115	3,115	3,115	3,115

Note: This table presents the OLS and IV estimates for the effect of import competition from China in final and intermediate goods on sales and employment. Each column estimates the effect of competition on a different variable. Panel A reports OLS estimates, and Panel B reports IV estimates where import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm's age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses..

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A20: Effect of Import Competition from China on Innovation Inputs: Robustness using import penetration in intermediate goods

	Positive total innovation exp.	Positive R&D exp.	Positive exp. on innovation capital	Positive other innovation exp.
<i>Panel A. OLS</i>				
Import penetration from China (products)	-0.601* (0.331)	-0.251 (0.160)	-0.579*** (0.178)	-0.092 (0.207)
Import penetration from China (inputs)	0.935 (1.087)	-0.052 (0.773)	0.545 (0.851)	1.306 (1.019)
<i>Panel B. IV</i>				
Import penetration from China (products)	-0.682 (0.549)	0.099 (0.275)	-0.748** (0.325)	-0.021 (0.333)
Import penetration from China (inputs)	0.483 (1.392)	-1.719** (0.819)	0.263 (1.101)	0.630 (1.424)
First stage F-stat (products)	28.4	28.4	28.4	28.4
First stage F-stat (inputs)	90.5	90.5	90.5	90.5
Mean DV	0.472	0.192	0.388	0.309
Observations	3,115	3,115	3,115	3,115

Note: This table presents the OLS and IV estimates for the effect of import competition from China in final and intermediate goods on innovation inputs. Each column estimates the effect of competition on a different variable. Panel A reports OLS estimates, and Panel B reports IV estimates where import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm's age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A21: Effect of Import Competition from China on Innovation Outputs: Robustness using import penetration in intermediate goods

	Any innovation	Product innovation	Process innovation	Non- technological innovation
<i>Panel A. OLS</i>				
Import penetration from China (products)	-0.819** (0.324)	-0.241 (0.205)	-0.251 (0.193)	-0.274 (0.165)
Import penetration from China (inputs)	1.399 (1.065)	-0.547 (0.999)	0.124 (0.657)	0.646 (0.967)
<i>Panel B. IV</i>				
Import penetration from China (products)	-0.795* (0.447)	-0.203 (0.250)	0.030 (0.214)	-0.413 (0.262)
Import penetration from China (inputs)	0.452 (1.241)	-0.506 (1.041)	-1.293 (1.097)	0.711 (1.155)
First stage F-stat (products)	28.4	28.4	28.4	28.4
First stage F-stat (inputs)	90.5	90.5	90.5	90.5
Mean DV	0.465	0.251	0.352	0.217
Observations	3,115	3,115	3,115	3,115

Note: This table presents the OLS and IV estimates for the effect of import competition from China in final and intermediate goods on innovation outputs. Each column estimates the effect of competition on a different variable. Panel A reports OLS estimates, and Panel B reports IV estimates where import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm's age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Foreign Capital and Business Groups

In this exercise, we exclude “foreign capital”, and “business group” from our list of control variables. Tables A22 to A24 report the results. Observe that excluding these variables as controls barely changes our results. Thus, one may safely conclude that our results are robust to the presence of endogeneity in both variables “foreign capital” and “business group.”

Table A22: Effect of Import Competition from China on Sales and Employment: IV estimates with and without controlling for business group and foreign ownership

	Log sales	Log total employ- ment	Log unskilled employ- ment	Log skilled employ- ment
<i>Panel A. Includes control for business group and foreign capital</i>				
Import penetration from China (year)	-2.686*** (0.599)	-2.123*** (0.511)	-1.980*** (0.529)	-2.251*** (0.441)
First stage F-stat	29.7	29.7	29.7	29.7
Mean DV	11.085	3.942	3.809	1.499
Observations	3,115	3,115	3,115	3,115
<i>Panel B. Does not include control for business group or foreign capital</i>				
Import penetration from China (year)	-2.638*** (0.561)	-2.100*** (0.504)	-1.959*** (0.525)	-2.212*** (0.438)
First stage F-stat	29.7	29.7	29.7	29.7
Mean DV	11.085	3.942	3.809	1.499
Observations	3,115	3,115	3,115	3,115

Note: This table presents the IV estimates for the effect of import competition from China on sales and employment. Each column estimates the effect of competition on a different variable. Panel A reports estimates controlling for business group and foreign capital, and Panel B reports estimates without controlling for business group or foreign capital. Import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm's age and its square, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses..

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A23: Effect of Import Competition from China on Innovation Inputs: IV estimates with and without controlling for business group and foreign ownership

	Positive total innovation exp.	Positive R&D exp.	Positive exp. on innovation capital	Positive other innovation exp.
<i>Panel A. Includes control for business group and foreign capital</i>				
Import penetration from China (period)	-0.587* (0.341)	-0.240* (0.125)	-0.696*** (0.206)	0.103 (0.248)
First stage F-stat	33.4	33.4	33.4	33.4
Mean DV	0.472	0.192	0.388	0.309
Observations	3,115	3,115	3,115	3,115
<i>Panel B. Does not include control for business group or foreign capital</i>				
Import penetration from China (period)	-0.572* (0.338)	-0.223* (0.128)	-0.686*** (0.205)	0.119 (0.242)
First stage F-stat	33.4	33.4	33.4	33.4
Mean DV	0.472	0.192	0.388	0.309
Observations	3,115	3,115	3,115	3,115

Note: This table presents the IV estimates for the effect of import competition from China on innovation inputs. Each column estimates the effect of competition on a different variable. Panel A reports estimates controlling for business group and foreign capital, and Panel B reports estimates without controlling for business group or foreign capital. Import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm's age and its square, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A24: Effect of Import Competition from China on Innovation Outputs: IV estimates with and without controlling for business group and foreign ownership

	Any innovation	Product innovation	Process innovation	Non- technological innovation
<i>Panel A. Includes control for business group and foreign capital</i>				
Import penetration from China (period)	-0.706** (0.287)	-0.303* (0.178)	-0.225 (0.170)	-0.273* (0.153)
First stage F-stat	33.4	33.4	33.4	33.4
Mean DV	0.465	0.251	0.352	0.217
Observations	3,115	3,115	3,115	3,115
<i>Panel B. Does not include control for business group or foreign capital</i>				
Import penetration from China (period)	-0.693** (0.284)	-0.298* (0.177)	-0.224 (0.169)	-0.263* (0.152)
First stage F-stat	33.4	33.4	33.4	33.4
Mean DV	0.465	0.251	0.352	0.217
Observations	3,115	3,115	3,115	3,115

Note: This table presents the IV estimates for the effect of import competition from China on innovation outputs. Each column estimates the effect of competition on a different variable. Panel A reports estimates controlling for business group and foreign capital, and Panel B reports estimates without controlling for business group or foreign capital. Import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm's age and its square, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

IV Estimates for the Controls in the Main Specification

Table A25: IV Estimates of the Effect of Import Competition from China on Sales and Employment

	Log sales	Log total employ- ment	Log unskilled employ- ment	Log skilled employ- ment
Import penetration from China (year)	-2.686*** (0.599)	-2.123*** (0.511)	-1.980*** (0.529)	-2.251*** (0.441)
Large firm	1.783*** (0.072)	1.482*** (0.038)	1.501*** (0.040)	0.922*** (0.059)
Age	0.014*** (0.002)	0.007*** (0.002)	0.008*** (0.002)	0.005** (0.002)
Age ²	-0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
Business group	0.673*** (0.102)	0.243*** (0.055)	0.196*** (0.063)	0.445*** (0.071)
Foreign capital	0.688*** (0.109)	0.206** (0.085)	0.157 (0.097)	0.409*** (0.078)
First stage F-stat	29.7	29.7	29.7	29.7
Mean DV	11.085	3.942	3.809	1.499
Observations	3,115	3,115	3,115	3,115

Note: This table presents the IV estimates for the effect of import competition from China on sales and employment. Each column estimates the effect of competition on a different variable.

Import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm's age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses..

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A26: IV Estimates of the Effect of Import Competition from China on Innovation Inputs

	Positive total innovation exp.	Positive R&D exp.	Positive exp. on innovation capital	Positive other innovation exp.
Import penetration from China (period)	-0.587* (0.341)	-0.240* (0.125)	-0.696*** (0.206)	0.103 (0.248)
Large firm	0.232*** (0.028)	0.142*** (0.028)	0.195*** (0.026)	0.217*** (0.022)
Age	0.001 (0.001)	0.000 (0.001)	0.001 (0.001)	-0.000 (0.001)
Age ²	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Business group	0.082** (0.033)	0.073** (0.030)	0.070** (0.033)	0.075* (0.039)
Foreign capital	0.015 (0.037)	-0.028 (0.037)	0.037 (0.035)	-0.007 (0.039)
First stage F-stat	33.4	33.4	33.4	33.4
Mean DV	0.472	0.192	0.388	0.309
Observations	3,115	3,115	3,115	3,115

Note: This table presents the IV estimates for the effect of import competition from China on innovation inputs. Each column estimates the effect of competition on a different variable.

Import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm's age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A27: IV Estimates of the Effect of Import Competition from China on Innovation Outputs

	Any innovation	Product innovation	Process innovation	Non- technological innovation
Import penetration from China (period)	-0.706** (0.287)	-0.303* (0.178)	-0.225 (0.170)	-0.273* (0.153)
Large firm	0.234*** (0.027)	0.153*** (0.023)	0.198*** (0.028)	0.120*** (0.022)
Age	0.001 (0.001)	-0.000 (0.001)	0.001 (0.001)	-0.000 (0.001)
Age ²	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
Business group	0.077** (0.033)	0.030 (0.032)	0.031 (0.033)	0.028 (0.021)
Foreign capital	0.018 (0.035)	0.009 (0.034)	0.045 (0.033)	-0.035 (0.032)
First stage F-stat	33.4	33.4	33.4	33.4
Mean DV	0.465	0.251	0.352	0.217
Observations	3,115	3,115	3,115	3,115

Note: This table presents the IV estimates for the effect of import competition from China on innovation outputs. Each column estimates the effect of competition on a different variable. Import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm's age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Foreign Ownership: Heterogeneous Effects

Here, we estimate a specification of our model allowing for heterogeneous effects by foreign ownership. The results are reported in Tables A28 and A29. The estimates of the interaction are negative but non-statistically significant. In other words, we do not find clear evidence that the rising import penetration has a larger negative effect on multinationals firms.

One possible concern is that the variable “business group” be correlated with “foreign capital” and that the interaction with “business group” may be capturing some of the effects through the variable “foreign capital.” To ease this concern, we estimate a specification

with interactions between the variables “business group” and “foreign capital.” Tables A30 and A31 report the findings. The results are similar to those found in the specification in which we only interact import penetration with the variable “business group.” The findings suggest that the negative effect of import penetration is driven by the variable “business group” rather than by the variable “foreign capital.”

Table A28: Effect of Import Competition from China on Innovation Inputs: Heterogeneous effects by foreign ownership

	Positive total innovation exp.	Positive R&D exp.	Positive exp. on innovation capital	Positive other innovation exp.
Import penetration from China (period)	−0.563 (0.346)	−0.226* (0.122)	−0.678*** (0.200)	0.116 (0.258)
Import pen from China × foreign cap.	−0.473 (0.309)	−0.289 (0.207)	−0.349 (0.261)	−0.241 (0.302)
First stage F-stat	19.3	19.3	19.3	19.3
First stage F-stat (interaction)	116.7	116.7	116.7	116.7
Mean DV	0.472	0.192	0.388	0.309
Observations	3,115	3,115	3,115	3,115

Note: This table presents IV estimates for the effect of import competition from China on innovation inputs by foreign ownership dummy. Each column estimates the effect of competition on a different variable. Import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details). “Foreign capital” is a dummy variable that indicates if the firm has some foreign ownership.

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm’s age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A29: Effect of Import Competition from China on Innovation Outputs: Heterogeneous effects by foreign ownership

	Any innovation	Product innovation	Process innovation	Non- technological innovation
Import penetration from China (period)	-0.685** (0.292)	-0.279 (0.178)	-0.202 (0.167)	-0.258 (0.156)
Import pen from China \times foreign cap.	-0.402 (0.299)	-0.477*** (0.171)	-0.455 (0.343)	-0.299 (0.278)
First stage F-stat	19.3	19.3	19.3	19.3
First stage F-stat (interaction)	116.7	116.7	116.7	116.7
Mean DV	0.465	0.251	0.352	0.217
Observations	3,115	3,115	3,115	3,115

Note: This table presents IV estimates for the effect of import competition from China on innovation outputs by foreign ownership dummy. Each column estimates the effect of competition on a different variable. Import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details). “Foreign capital” is a dummy variable that indicates if the firm has some foreign ownership. All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm’s age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees. The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A30: Effect of Import Competition from China on Innovation Inputs: Heterogeneous effects by business group status and foreign ownership

	Positive total innovation exp.	Positive R&D exp.	Positive exp. on innovation capital	Positive other innovation exp.
Import penetration from China (period)	-0.517 (0.324)	-0.208 (0.131)	-0.611*** (0.204)	0.188 (0.244)
Import pen from China \times business group	-0.373 (0.344)	-0.148 (0.266)	-0.544** (0.255)	-0.585* (0.300)
Import pen from China \times foreign cap.	-0.254 (0.438)	-0.202 (0.262)	-0.030 (0.341)	0.102 (0.430)
First stage F-stat	13.6	13.6	13.6	13.6
First stage F-stat (inter. business group)	96.8	96.8	96.8	96.8
First stage F-stat (inter. foreing cap.)	98.6	98.6	98.6	98.6
Mean DV	0.472	0.192	0.388	0.309
Observations	3,115	3,115	3,115	3,115

Note: This table presents IV estimates for the effect of import competition from China on innovation inputs by business group status and foreign ownership dummy. Each column estimates the effect of competition on a different variable. Import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details). “Business group” is a dummy variable that indicates if the firm belongs to a group of firms. “Foreign capital” is a dummy variable that indicates if the firm has some foreign ownership.

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm’s age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A31: Effect of Import Competition from China on Innovation Outputs: Heterogeneous effects by business group status and foreign ownership

	Any innovation	Product innovation	Process innovation	Non- technological innovation
Import penetration from China (period)	-0.612** (0.287)	-0.234 (0.182)	-0.142 (0.167)	-0.208 (0.146)
Import pen from China \times business group	-0.593* (0.299)	-0.359* (0.211)	-0.486* (0.282)	-0.399** (0.177)
Import pen from China \times foreign cap.	-0.054 (0.398)	-0.266 (0.202)	-0.170 (0.451)	-0.065 (0.319)
First stage F-stat	13.6	13.6	13.6	13.6
First stage F-stat (inter. business group)	96.8	96.8	96.8	96.8
First stage F-stat (inter. foreign cap.)	98.6	98.6	98.6	98.6
Mean DV	0.465	0.251	0.352	0.217
Observations	3,115	3,115	3,115	3,115

Note: This table presents IV estimates for the effect of import competition from China on innovation outputs by business group status and foreign ownership dummy. Each column estimates the effect of competition on a different variable. Import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details). “Business group” is a dummy variable that indicates if the firm belongs to a group of firms. “Foreign capital” is a dummy variable that indicates if the firm has some foreign ownership.

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm’s age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Exporting Status

We create the new variable “firm exporting status” –i.e., a time-invariant dummy that indicates whether the firm has exported in at least one period in the sample. We choose to use a time-invariant variable to avoid concerns about whether an increase in foreign competition in a certain period could affect firm exports in that period. Tables A32 to A34 show the differences in the effect of import penetration on sales, employment, innovation inputs and outputs, when we include this new variable and when we do not it. Tables A35 to A37 show the estimates for the controls in the IV estimation.

We find that the effect of foreign competition barely changes when we include this new variable. Curiously, and even though the main effect of interest is not affected, the variable

“firm exporting status” is a good predictor of sales, employment, innovation inputs, and outputs. To test whether the variable “firm exporting status” affects innovation inputs and outputs, we included an interaction between foreign competition and the variable “firm exporting status.” Tables A38 and A39 show the results. We find that, though the estimates for the interaction positively affect innovation inputs and outputs, they are not significant. Thus, the evidence does not allow us to conclude that exporters are more resilient to foreign competition.

Table A32: Effect of Import Competition from China on Sales and Employment: Robustness controlling for firm exporting status

	Log sales	Log total employ- ment	Log unskilled employ- ment	Log skilled employ- ment
<i>Panel A. Does not include control for firm exporting status</i>				
Import penetration from China (year)	-2.686*** (0.599)	-2.123*** (0.511)	-1.980*** (0.529)	-2.251*** (0.441)
First stage F-stat	29.7	29.7	29.7	29.7
Mean DV	11.085	3.942	3.809	1.499
Observations	3,115	3,115	3,115	3,115
<i>Panel B. Includes control for firm exporting status</i>				
Import penetration from China (year)	-2.583*** (0.564)	-2.084*** (0.461)	-1.942*** (0.479)	-2.199*** (0.466)
First stage F-stat	29.6	29.6	29.6	29.6
Mean DV	11.085	3.942	3.809	1.499
Observations	3,115	3,115	3,115	3,115

Note: This table presents the IV estimates for the effect of import competition from China on sales and employment. Each column estimates the effect of competition on a different variable. Panel A reports estimates controlling for firm exporting status, and Panel B reports estimates without controlling for firm exporting status. Firm exporting status is a time-invariant dummy that indicates if the firm has positive exports in at least one period in the sample. Import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm’s age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A33: Effect of Import Competition from China on Innovation Inputs: Robustness controlling for firm exporting status

	Positive total innovation exp.	Positive R&D exp.	Positive exp. on innovation capital	Positive other innovation exp.
<i>Panel A. Does not include control for firm exporting status</i>				
Import penetration from China (period)	-0.587* (0.341)	-0.240* (0.125)	-0.696*** (0.206)	0.103 (0.248)
First stage F-stat	33.5	33.5	33.5	33.5
Mean DV	0.472	0.192	0.388	0.309
Observations	3,115	3,115	3,115	3,115
<i>Panel B. Include control for firm exporting status</i>				
Import penetration from China (period)	-0.575* (0.319)	-0.232* (0.128)	-0.685*** (0.193)	0.115 (0.238)
First stage F-stat	33.4	33.4	33.4	33.4
Mean DV	0.472	0.192	0.388	0.309
Observations	3,115	3,115	3,115	3,115

Note: This table presents the IV estimates for the effect of import competition from China on innovation inputs. Each column estimates the effect of competition on a different variable. Panel A reports estimates controlling for firm exporting status, and Panel B reports estimates without controlling for firm exporting status. Firm exporting status is a time-invariant dummy that indicates if the firm has positive exports in at least one period in the sample. Import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm's age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A34: Effect of Import Competition from China on Innovation Outputs: Robustness controlling for firm exporting status

	Any innovation	Product innovation	Process innovation	Non- technological innovation
<i>Panel A. Does not include control for firm exporting status</i>				
Import penetration from China (period)	-0.706** (0.287)	-0.303* (0.178)	-0.225 (0.170)	-0.273* (0.153)
First stage F-stat	33.5	33.5	33.5	33.5
Mean DV	0.465	0.251	0.352	0.217
Observations	3,115	3,115	3,115	3,115
<i>Panel B. Include control for firm exporting status</i>				
Import penetration from China (period)	-0.693** (0.266)	-0.294* (0.165)	-0.214 (0.158)	-0.270* (0.151)
First stage F-stat	33.4	33.4	33.4	33.4
Mean DV	0.465	0.251	0.352	0.217
Observations	3,115	3,115	3,115	3,115

Note: This table presents the IV estimates for the effect of import competition from China on innovation outputs. Each column estimates the effect of competition on a different variable. Panel A reports estimates controlling for firm exporting status, and Panel B reports estimates without controlling for firm exporting status. Firm exporting status is a time-invariant dummy that indicates if the firm has positive exports in at least one period in the sample. Import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm's age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, and a dummy variable that indicates if the firm has, on average, 50 or more employees.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A35: IV Estimates of the Effect of Import Competition from China on Sales and Employment

	Log sales	Log total employ- ment	Log unskilled employ- ment	Log skilled employ- ment
Import penetration from China (year)	-2.583*** (0.564)	-2.084*** (0.461)	-1.942*** (0.479)	-2.199*** (0.466)
Large firm	1.625*** (0.067)	1.422*** (0.034)	1.443*** (0.040)	0.843*** (0.064)
Age	0.014*** (0.003)	0.007*** (0.002)	0.008*** (0.002)	0.005** (0.002)
Age ²	-0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
Business group	0.601*** (0.101)	0.215*** (0.052)	0.169*** (0.060)	0.409*** (0.069)
Foreign capital	0.538*** (0.105)	0.149** (0.074)	0.102 (0.087)	0.334*** (0.078)
Firm exporting status	0.584*** (0.128)	0.222*** (0.077)	0.215** (0.081)	0.293*** (0.080)
First stage F-stat	29.6	29.6	29.6	29.6
Mean DV	11.085	3.942	3.809	1.499
Observations	3,115	3,115	3,115	3,115

Note: This table presents the IV estimates for the effect of import competition from China on sales and employment. Each column estimates the effect of competition on a different variable. Import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm's age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, a dummy variable that indicates if the firm has, on average, 50 or more employees, and dummy variable that indicates if the firm has positive exports in at least one period in the sample.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses..

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A36: IV Estimates of the Effect of Import Competition from China on Innovation Inputs

	Positive total innovation exp.	Positive R&D exp.	Positive exp. on innovation capital	Positive other innovation exp.
Import penetration from China (period)	-0.575* (0.319)	-0.232* (0.128)	-0.685*** (0.193)	0.115 (0.238)
Large firm	0.201*** (0.027)	0.119*** (0.027)	0.167*** (0.027)	0.188*** (0.022)
Age	0.001 (0.001)	-0.000 (0.001)	0.001 (0.001)	-0.000 (0.001)
Age ²	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Business group	0.068** (0.033)	0.062** (0.029)	0.058* (0.033)	0.062 (0.039)
Foreign capital	-0.014 (0.038)	-0.049 (0.040)	0.010 (0.035)	-0.034 (0.040)
Firm exporting status	0.116*** (0.022)	0.083*** (0.022)	0.102*** (0.025)	0.105*** (0.023)
First stage F-stat	33.4	33.4	33.4	33.4
Mean DV	0.472	0.192	0.388	0.309
Observations	3,115	3,115	3,115	3,115

Note: This table presents the IV estimates for the effect of import competition from China on innovation inputs. Each column estimates the effect of competition on a different variable.

Import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm's age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, a dummy variable that indicates if the firm has, on average, 50 or more employees, and dummy variable that indicates if the firm has positive exports in at least one period in the sample.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A37: IV Estimates of the Effect of Import Competition from China on Innovation Outputs

	Any innovation	Product innovation	Process innovation	Non- technological innovation
Import penetration from China (period)	-0.693** (0.266)	-0.294* (0.165)	-0.214 (0.158)	-0.270* (0.151)
Large firm	0.203*** (0.027)	0.131*** (0.024)	0.171*** (0.029)	0.114*** (0.021)
Age	0.001 (0.001)	-0.000 (0.001)	0.001 (0.001)	-0.000 (0.001)
Age ²	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
Business group	0.062* (0.033)	0.020 (0.032)	0.018 (0.034)	0.025 (0.021)
Foreign capital	-0.011 (0.036)	-0.012 (0.035)	0.019 (0.033)	-0.040 (0.033)
Firm exporting status	0.115*** (0.023)	0.081*** (0.022)	0.102*** (0.023)	0.022 (0.020)
First stage F-stat	33.4	33.4	33.4	33.4
Mean DV	0.465	0.251	0.352	0.217
Observations	3,115	3,115	3,115	3,115

Note: This table presents the IV estimates for the effect of import competition from China on innovation outputs. Each column estimates the effect of competition on a different variable.

Import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm's age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, a dummy variable that indicates if the firm has, on average, 50 or more employees, and dummy variable that indicates if the firm has positive exports in at least one period in the sample.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A38: Effect of Import Competition from China on Innovation Inputs: Heterogeneous effects by firm exporting status

	Positive total innovation exp.	Positive R&D exp.	Positive exp. on innovation capital	Positive other innovation exp.
Import penetration from China (period)	-0.725** (0.279)	-0.292* (0.153)	-0.753*** (0.196)	0.075 (0.261)
Import pen from China \times exporter	0.271* (0.155)	0.102 (0.116)	0.113 (0.172)	0.055 (0.111)
First stage F-stat	28.4	28.4	28.4	28.4
First stage F-stat (interaction)	53.0	53.0	53.0	53.0
Mean DV	0.472	0.192	0.388	0.309
Observations	3,115	3,115	3,115	3,115

Note: This table presents IV estimates for the effect of import competition from China on innovation inputs by firm exporting status. Each column estimates the effect of competition on a different variable. Import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details). “Exporter” is a dummy variable that indicates if the firm has positive exports in at least one period in the sample. All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm’s age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, a dummy variable that indicates if the firm has, on average, 50 or more employees, and dummy variable that indicates if the firm has positive exports in at least one period in the sample. The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table A39: Effect of Import Competition from China on Innovation Outputs: Heterogeneous effects by firm exporting status

	Any innovation	Product innovation	Process innovation	Non- technological innovation
Import penetration from China (period)	−0.834*** (0.253)	−0.360** (0.169)	−0.293** (0.144)	−0.272 (0.179)
Import pen from China × exporter	0.252* (0.150)	0.112 (0.156)	0.132 (0.128)	−0.002 (0.096)
First stage F-stat	28.4	28.4	28.4	28.4
First stage F-stat (interaction)	53.0	53.0	53.0	53.0
Mean DV	0.465	0.251	0.352	0.217
Observations	3,115	3,115	3,115	3,115

Note: This table presents IV estimates for the effect of import competition from China on innovation outputs by firm exporting status. Each column estimates the effect of competition on a different variable. Import penetration from China in Uruguay is instrumented using imports from China to Argentina, Brazil, and Paraguay (see text for details).

“Exporter” is a dummy variable that indicates if the firm has positive exports in at least one period in the sample. All models include industry fixed effects (4-digit ISIC codes), time fixed effects, and the following controls: firm’s age and its square, a dummy variable that indicates if the firm belongs to a group of firms, a dummy variable that indicates if the firm has foreign capital, a dummy variable that indicates if the firm has, on average, 50 or more employees, and dummy variable that indicates if the firm has positive exports in at least one period in the sample.

The first stage F-statistic is the cluster-robust F-statistic. Asymptotic standard errors clustered at the industry level (4-digit ISIC codes) are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

References

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