ONLINE APPENDIX - NOT FOR PUBLICATION

"Import Competition, Heterogeneous Preferences of Managers, and Productivity"

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C ONLINE APPENDIX - Data Description

C.1 Description of variables

This paper uses panel data from a Spanish survey of manufacturing firms (ESEE; Encuesta Sobre Estrategias Empresariales) that is collected by the Fundación SEPI, a foundation affiliated with the Spanish Ministry of Finance and Public Administration. The ESEE started in 1990. Since then, about 1,800 firms are surveyed every year. SEPI points out that they put special effort in systematically tracking changes in the firms legal status (e.g., mergers, acquisitions, etc.). ESEE is designed to be a representative sample of Spanish manufacturing firms. All firms with more than 200 employees are included in the survey; firms between 10 and 200 employees were selected through a stratified, proportional and systematic sampling. In 1990, 2,188 firms were part of the survey. The initial firms are tracked annually until they either exit or become non-responsive. Non-responsive firms are contacted by SEPI repeatedly to encourage participation and their legal status is tracked down (e.g., exit); if this is fruitless, new firms are incorporated in the panel designed to preserve the consistency of the sample.

More information about the data set and researcher access are provided on their website: https://www.fundacionsepi.es/investigacion/esee/en/spresentacion.asp.

We used the following variables in the analysis:

Family firms

The variable PAFDG gives the "Number of owners and working family members who hold managing positions in the company on December 31" of a year. Note that an owner is not necessarily a majority owner and a founder is not necessarily an owner. Our main regressor, called family firm or family-managed firm, is a dummy variable that is 1 if the number of owners and working relatives holding managing positions is bigger than or equal to one. Also note that while the data set includes information on the number of family managers, it does not contain information of the number of overall managers (i.e., professional managers).

Figure D.1 shows the distribution of the number of family managers for family-managed firms in 1993. Figure D.2 shows the distribution of family firms across industries in 1993.

The share of family firms varies between 17% in industries like beverages and vehicles to 69% in leather/fur/footwear and furniture. Table E.2 shows the number of family firms across all years in the sample. Table E.3 shows that there is no significant relationship between the changes in import tariffs and the changes in the share of family firms across industries. Furthermore, Table E.4 runs regressions at the firm level and shows that neither the number of family managers nor the probability of being a family firm is correlated with tariff changes or the firm's initial productivity.

The variable PAFOO gives the "Number of owners and working family members who hold non-managing positions in the company on December 31" of a year. Figure D.3 shows the distribution of the number of family members in non-managing positions for firms that have at least 1 family member in non-managing positions in 1993.

In order to distinguish family management from family ownership, we use the indicator variable FAMILI which indicates whether "a family group participates actively in the control and/or management of the company." As this variable is only available in 2006, we use this value to classify firms as family-owned throughout the sample period, assuming family ownership is persistent.

Productivity

Our main productivity measure is labor productivity, defined as deflated value added per worker (using input and output deflators at the firm level):

$$labprod93_i = (VENTAS * OUTPR - COINT * INPR) / PERTOT$$

using the following variables from ESEE as inputs into in the calculation:

The variable VENTAS gives sales in euro. This variable includes the sales of goods, the sales of transformed products (finished and half-finished), and the provision of services and other sales (packages, packaging, byproducts and waste). Discounts and sales returns are excluded. We use the variable VPV, which reports the percentage change in sales prices compared to the previous year, to construct an annual firm level output deflator OUTPR that equals 1 in 1993, our base year.

We use the variable COINT, which gives the sum of purchases of goods and external services minus the variation in the stock of purchases in euro, as a measure of intermediate inputs. We use the variable VPCOINT, which reports the percentage change in prices of intermediate consumption compared to the previous year, to construct an annual firm level input deflator INPR that equals 1 in 1993, our base year.

Notice that we use the term *value added* to denote $VENTAS * OUTPR - COINT * INPR$ in the paper.

We use the variable PERTOT, which gives the total personnel employed at the company as of December 31st, as a measure of employment.

Notice that our price correction can only be applied to *changes* in prices, not in order to compare differences across firms. We normalize the price indices for each firm to be equal to 1 in 1993 (our base year), which means that we measure labor productivity in 1993 in values. The price adjustment therefore compares changes in productivity with respect to their initial

levels in 1993.

In robustness checks we use an alternative productivity measure, denoted as $TFPOP$, to measure total factor productivity (TFP). We use the Olley and Pakes (1996) estimation approach augmented with a De Loecker-type correction, which allows for the family status (of the firm) and import tariffs to directly affect the evolution of firm TFP (i.e., De Loecker, 2007, 2013). This is important, as in our model the incentive to invest would depend on the level of market competition which in turn depends on import tariffs. In addition, when the zero-profit condition binds, whether the firm is family managed or not matters for the evolution of its productivity. Taking into account family management and import competition in the TFP estimation therefore results in a model-consistent proxy estimator for TFP.

In Olley and Pakes (1996), the value of investment is used as the proxy in the estimation. The variable CIM gives the value of investment. The variable IN gives value of total net fixed assets, which is the value of fixed assets minus the accumulated depreciation and reserves in euro. Note that this is based on firm-specific depreciation so we do not need to use industry-specific or even economy-wide depreciation rates. In our data, 83% of observations have positive investment values; the problem of too-frequent zeros in investment is not a big concern in this case. For the De Loecker (2007)-type correction we include a dummy variable for family firms in the production function in order to account for the possibility that family firms might have different technologies than non-family firms; and we include a dummy variable for family firms as well as import tariffs into the inversion step of the Olley-Pakes-style TFP estimation (i.e., the second step) as our empirical finding suggests that these two variables may affect firm productivity (even conditioning on the same technology). Finally, as we do not have enough observations in each of the twenty industries, we group firms into light manufacturing industries (NACECLIO industry codes: 1-10) and heavy manufacturing industries (NACECLIO industry codes: 11-20) to implement the productivity estimation.

We also alternatively divide deflated value added by total hours worked (using the variable HETN denoting total effective hours worked) or by the total wage bill (using the variable CP which records gross salaries and wages, compensation, social security contributions paid by the company, contributions made to supplementary pension systems, and other social expenses).

Innovation and R&D

The variable GTID reports total expenses in R&D (including internal and external R&D expenses) from which we construct the R&D dummy and log R&D expenses.

Variables PATESP and PATEXT report the number of patents registered in Spain and abroad, respectively. We use the sum of both to construct the total number of patents registered in a given year.

The variable TIPSO is a categorical variable that records the kind of process innovation undertaken by the company during the course of the year. Possible answers include organizational methods and/or the introduction of new machinery.

Exit

The variable IDSIT has four values: 0 without access (impossible to contact the firm or temporary closure); 1 if the firm answers; 2 if the firm disappears (definite closure or company in liquidation or change to non-manufacturing activity or taken over by another company or less important company merged with other company), 3 if the firm refuses to collaborate. We treat observations whose value for IDSIT is 2 as firm-year pairs that exit in a given year.

Profits

We use gross profits defined as value added minus wages to measure profits. We use the variable VA from the data set to denote value added (in Euros), this is defined as the sum of sales, the variation in stocks and other management income, minus the purchases and external services in Euros). We use the variable CP (labor costs) to measure wages, this is defined as gross salaries including social security contributions.

Industry classification and trade-related variables

The variable NACECLIO indicates the industry within which the firm operates. In total, we have 20 industries (it is not possible to obtain a more disaggregated split due to confidentiality issues). The 20 industries are: meat related products; food and tobacco; beverage; textiles and clothing; leather, fur, and footwear; timber; paper; printing and publishing; chemicals; plastic and rubber products; nonmetal mineral products; basic metal products; fabricated metal products; industrial and agricultural equipment; office machinery, data processing, precision instruments and similar; electric materials and accessories; vehicles and accessories; other transportation materials; furniture; miscellaneous. The industries are based on the Spanish CNAE classification.

The variables VEXPOR and VIMPOR report the value of exports and imports in euro, respectively.

The variable IMPTEC indicates the value of imported technologies (i.e. payments for licenses and technical aid from abroad) from which we construct a dummy variable for whether the firm used imported technologies in a given year.

C.2 Propensity score matching estimation

We implement two propensity score matching (PSM) techniques: inverse propensity score re-weighting and nearest neighbor matching. We predict family firm status based on firm's initial TFP, sales, employment, and exporting status. The results of this estimation are provided in Table E.13 of the online appendix.

Figure D.6 in the online appendix shows the resulting distribution of propensity scores for family and non-family firms. The propensity scores for family firms range from 0.06 to 0.95; while the propensity scores for non-family firms range from 0.004 to 0.95.

Figure D.7 shows the distribution of TFP, sales, and employment in the raw data (left-most graphs), and then how the inverse propensity reweighting (middle graphs) and the nearest neighbor matching (right-most graphs) implicitly construct a control group (non-family firms) that has a more similar distribution to the treatment group (family firms).

We report the final estimation results in Table E.14. The inverse propensity score reweight-

ing method uses the full sample; while the nearest neighbor matching method imposes common support, thereby dropping 3 firms. We implement the latter using the Stata package `psmatch2` provided by Leuven and Sianesi (2003).

C.3 Accounting for missing observations

In the sample there are some firm-year observations missing because firms do not respond or cannot be tracked down; and these patterns may be non-random and correlated with our treatment. We undertake the following robustness checks, distinguishing between the following types of missing observations that we find in the data (based on the variable IDSIT that describes the reason for no-response in the Spanish data set):

1. **Firms that exist but refuse to provide answers** (coded IDSIT = 3 in the survey). In column (1) of Table E.20 we create a dummy variable that indicates firm-year observations in which firms refuse to collaborate, and check whether these observations show up differentially for family and non-family firms, repeating our baseline specification. The results show that there is no differential effect of import competition on collaboration refusal. As additional test in column (2) of Table E.20 we add these observations to our main specifications by *interpolating* productivity within firms across years whenever the firm is observed again after the refusal. This adds only 14 observations to our sample, so a pretty marginal change, and as expected, our results are basically unaffected. To be a bit broader, we then interpolate and *extrapolate* productivity within firms across years whenever the firm refuses participation, and add these observations in column (3) of Table E.20. This adds 229 observations to the data set, but our results are again unaffected. Overall, the participation-refusal only creates 1.6% additional firm-year observations (14,570/14,341), so this problem is rather negligible.

2. **Broader measure of refusal to collaborate.** There are additional missing observations when firms do not respond but SEPI does not know whether they exited or still exist (coded IDSIT = 0 in the survey). A fraction of these firms report values again in later years, so we interpret these firms as existing but refusing to collaborate, and add them to the sample from column (3) for a broader definition of collaboration refusal. In column (4) of Table E.20 we regress a dummy variable that indicates this broader definition of refusal on our regressors, and see again that there is no systematic relationship to our variables of interest in participation refusal. In column (5) of Table E.20 we interpolate productivity by firm across years for these firms as well and add these observations to the interpolated or extrapolated measures from column (3). Overall, this broad definition now adds at most 412 firm-year observations, or 4.2% of our baseline observations, and our regression results are almost unchanged.

3. **Firms that cannot be located but appear as exited later.** Sometimes firms cannot be located (coded IDSIT = 0 in the survey), but an exit is reported in a later year. It is possible that SEPI miscoded the exit years of these firms, and that they ceased to exist earlier than we thought for the exit analysis. We repeat the exit analysis by recoding these observations to the earlier year in Figure D.8 in the online appendix. The pattern in the graph remains very similar.

4. **Firms that cannot be located and are not observed again in later years.** The last group is firms that do not respond (IDSIT = 0) but are not observed again in the survey. This may be because at some point SEPI gives up trying to locate the firms and replaces them with similar other firms. To check whether there is a systematic pattern among firms that cannot be located, we regress a dummy variable that indicates a firm that disappears from the survey (IDSIT = 1, and not again observed later) using our main specification. Column (6) of Table E.20 shows that there is no significant pattern across unproductive or productive family firms versus non-family firms.

D ONLINE APPENDIX - Figures

Figure D.1: Number of family managers per family firm, 1993

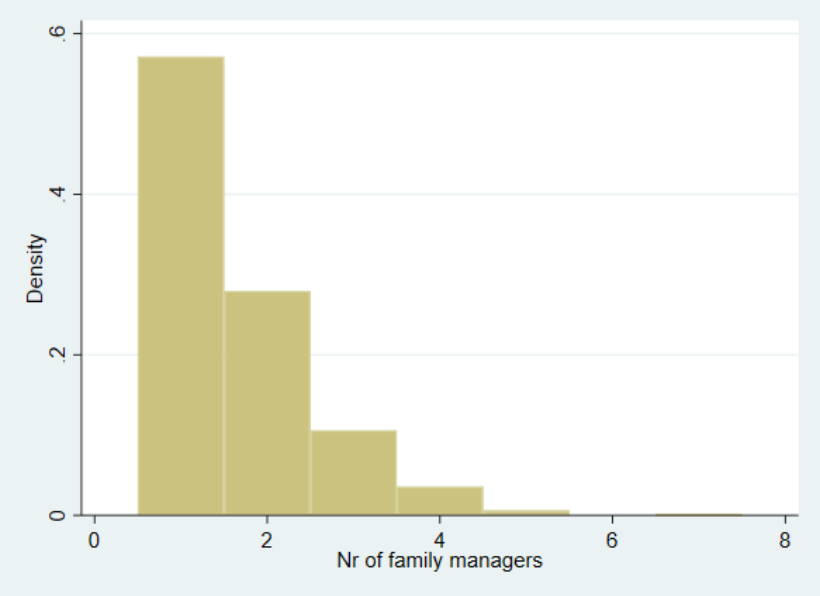


Figure D.2: Distribution of family firms across industries, 1993

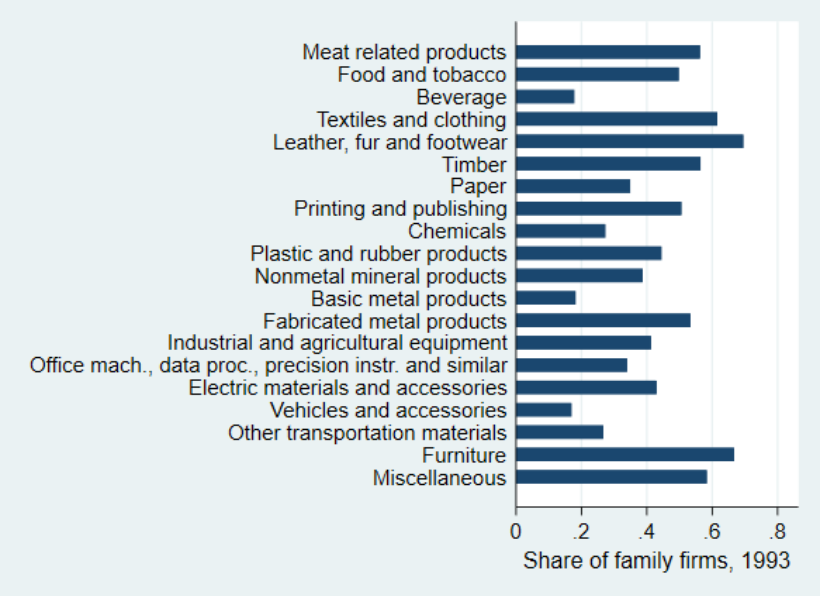


Figure D.3: Number of family members in non-managing positions for firms that have any, 1993

Figure D.4: Distribution of initial labor productivity, by type of firm, 1993

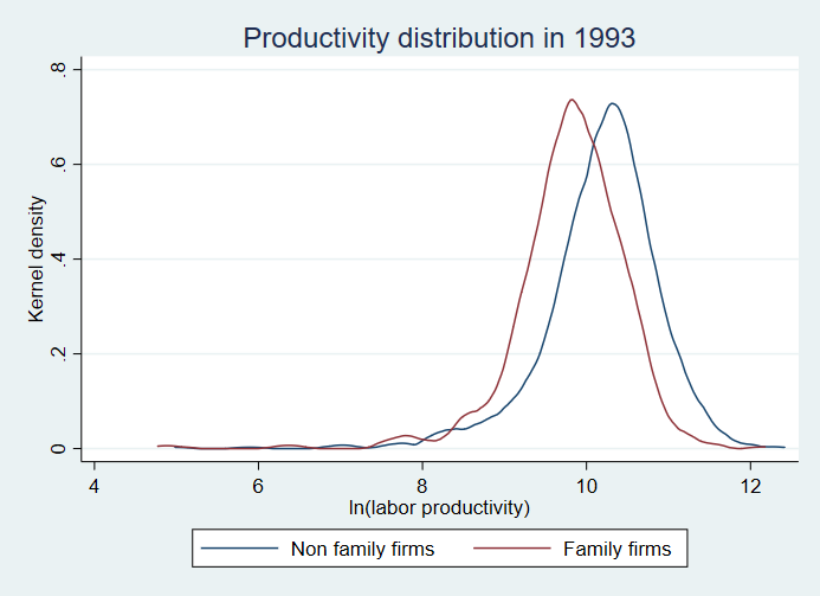
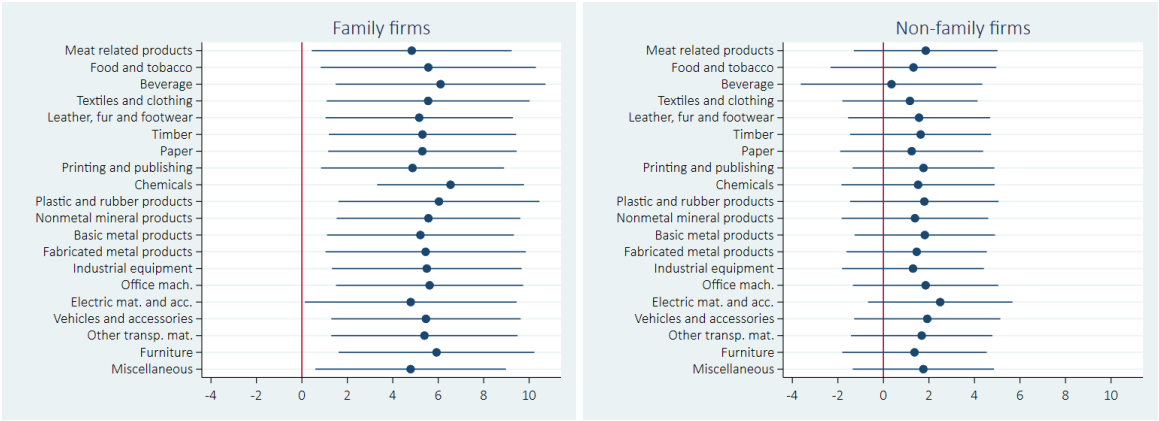


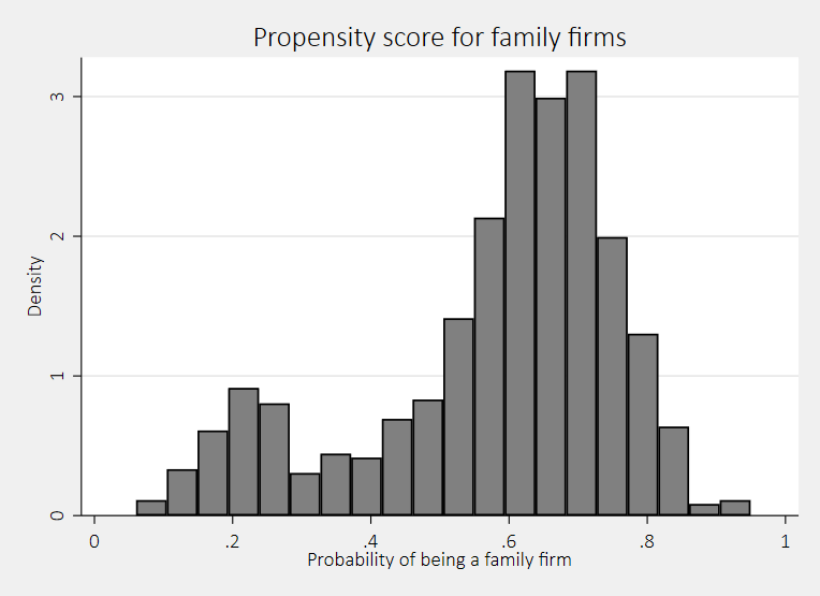
Figure D.5: Pooled regression, dropping one industry at a time



Notes: Each line represents our baseline specification from column (1) in Table 3, where the respective industry is dropped. The estimated effects for family firms and non-family firms are estimated in the same regression.

Figure D.6: Histogram of propensity scores

(a) Propensity score for family firms



(b) Propensity score for non-family firms

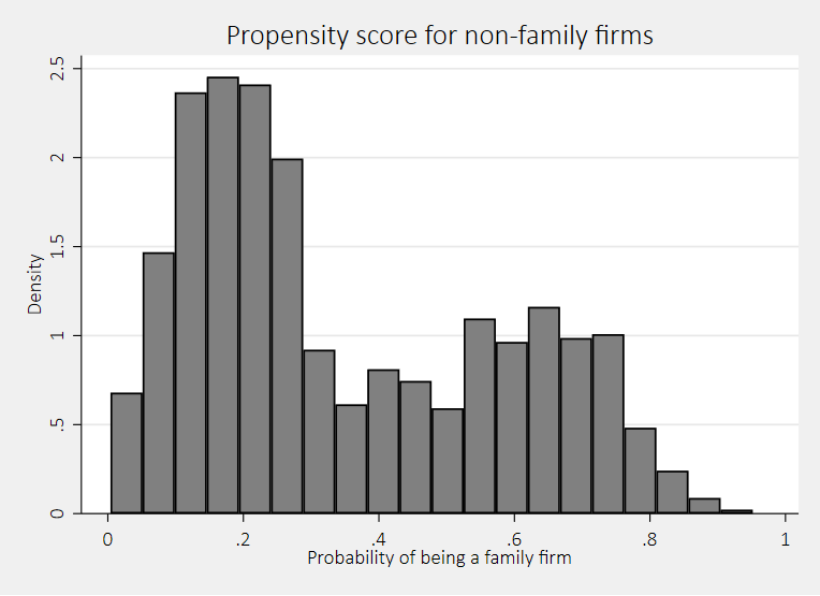
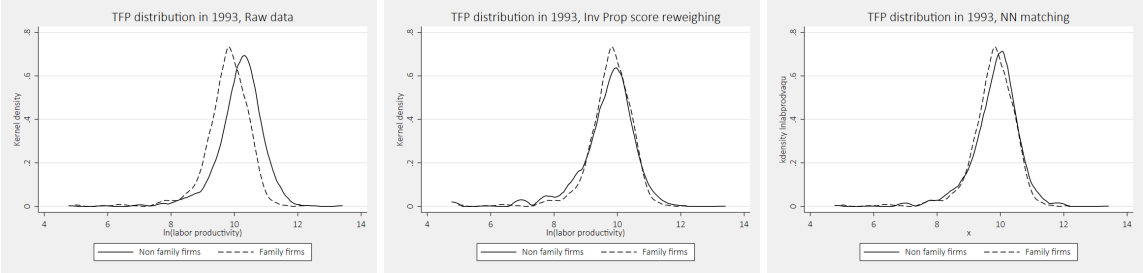
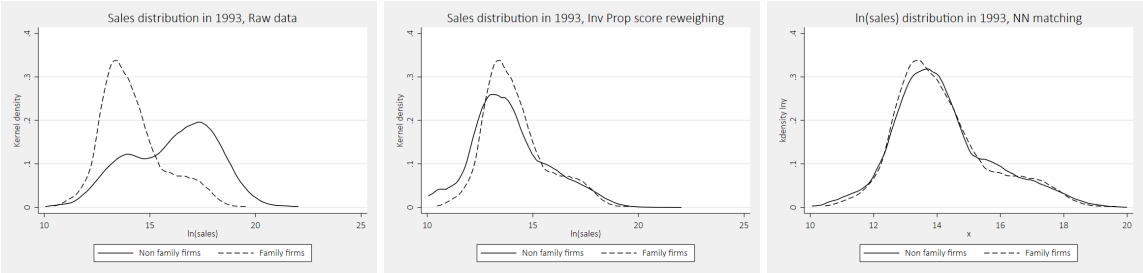


Figure D.7: Distributions of TFP, sales, and employment, with and without adjusting for propensity score matching

(a) TFP distribution, 1993



(b) Sales distribution, 1993



(c) Employment distribution, 1993

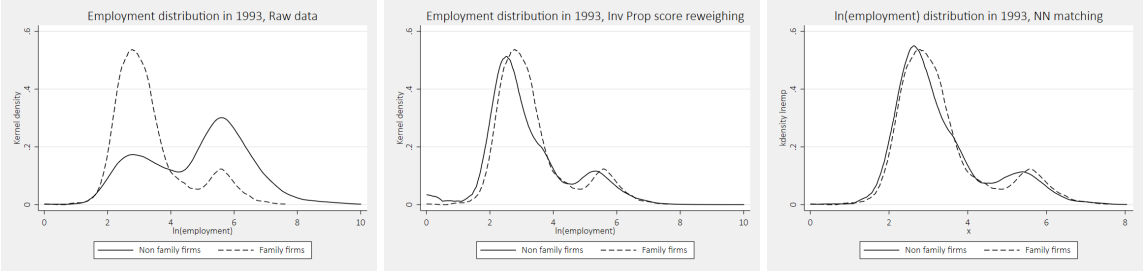
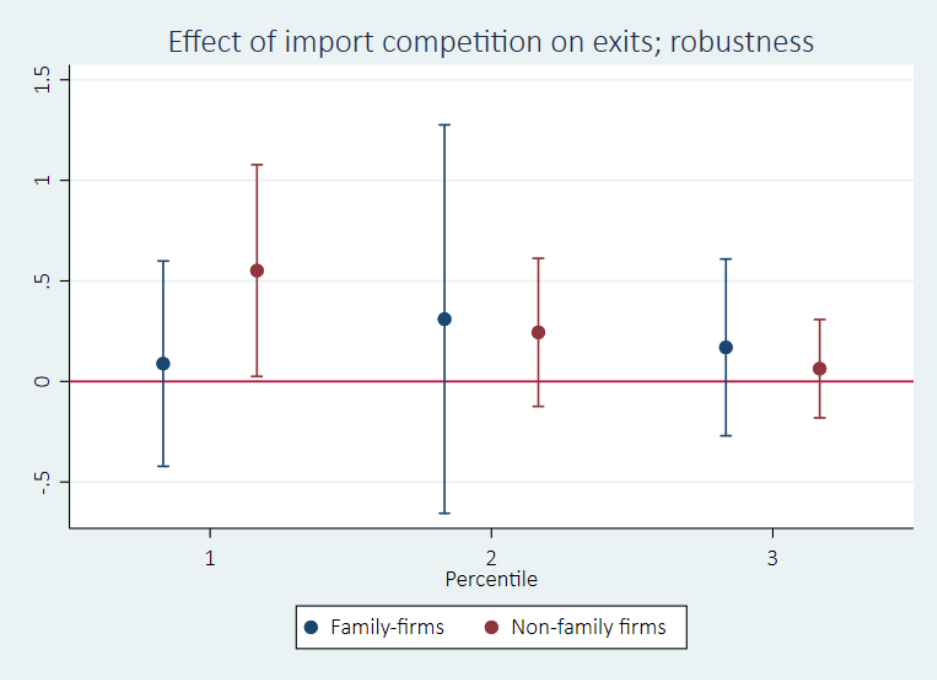


Figure D.8: Robustness check: Effect of import competition on exit probabilities; exit year adjusted for earlier non-response; by initial productivity



Notes: For firms that report a non-response in a year before exiting, the exit year is moved forward to the earliest non-response year.

E ONLINE APPENDIX - Tables

Table E.1: Changes in import tariffs, across time

	Change in import tariff, percentage points			
Year	Mean	Std. dev.	Min	Max
1994	-0.196	0.311	-0.865	0.259
1995	-0.635	0.757	-2.828	0.540
1996	-1.100	0.818	-2.948	0.123
1997	-0.036	0.248	-0.706	0.672
1998	-0.811	0.926	-3.854	-0.090
1999	-0.326	0.294	-0.857	0.391
2000	-0.615	1.456	-6.565	-0.005
2001	-0.041	0.250	-0.624	0.630
2002	0.015	0.321	-0.401	1.256
2003	-0.097	0.296	-1.015	0.201
2004	-0.231	0.228	-0.875	0.054
2005	-0.007	0.088	-0.142	0.186
2006	0.0002	0.154	-0.289	0.475
2007	-0.055	0.322	-0.808	0.530
All years	-0.295	0.672	-6.565	1.256

Notes: Summary statistics are computed as arithmetic means across industries or industry-years (last row).

Table E.2: Number of family firms in sample, across time

Year	Non-family firms	Family firms
1993	1,018	848
1994	1,092	784
1995	973	725
1996	950	766
1997	1,121	799
1998	1,188	588
1999	1,087	667
2000	1,300	570
2001	1,129	595
2002	1,127	581
2003	809	571
2004	801	573
2005	1,052	859
2006	1,038	985
2007	984	1,029

Table E.3: Relationship between tariff changes and changes in family firm share, industry-level

Dependent variable:	(1)	(2)	(3)
Δshare of family firms			
ΔIMP_{st}	0.044	0.139	0.300
	(0.186)	(0.222)	(0.275)
Observations	280	280	280
Year FEs	no	yes	yes
Industry FEs	no	no	yes

Notes: The data for this table is collapsed to the industry-year level. This table shows that there is no significant relationship between changes in import tariffs and changes in the share of family-managed firms of an industry. * p<0.05, ** p<0.01, *** p<0.001. Robust standard errors in parentheses are two-way clustered (by industry-year pairs and firms).

Table E.4: Relationship between tariff changes and changes in family firms, firm-level

	(1) Δnumber fam mgr	(2) Δnumber fam mgr	(3) Δnumber fam mgr	(4) ΔProb fam mgd firm	(5) ΔProb fam mgd firm	(6) ΔProb fam mgd firm
ΔIMP_{st}	-0.626	-0.624	1.726	-0.544	-0.543	2.508
	(0.983)	(0.982)	(9.850)	(0.649)	(0.649)	(5.439)
$\ln(labprod93_i)$		0.005	0.006		0.002	0.003
		(0.005)	(0.006)		(0.002)	(0.003)
$\Delta IMP_{st} \cdot \ln(labprod93_i)$			-0.229			-0.297
			(0.917)			(0.506)
Observations	14,354	14,354	14,354	14,507	14,507	14,507

Notes: * p<0.05, ** p<0.01, *** p<0.001. Standard errors in parentheses are two-way clustered (by industry-year pairs and firms). All regressions include year and industry fixed effects.

Table E.5: Relationship between tariff changes and share of family firms in 1993, firm-level

	(1) mean of ΔIMP_{st}	(2) max of ΔIMP_{st}	(3) min of ΔIMP_{st}	(4) SD of ΔIMP_{st}	(5) mean of ΔIMP_{st}	(6) max of ΔIMP_{st}	(7) min of ΔIMP_{st}	(8) SD of ΔIMP_{st}
Share of family firms in 1993	0.004	-0.009	0.025	-0.009				
	(0.005)	(0.005)	(0.027)	(0.008)				
Share of family firms, average					0.004	-0.009	0.026	-0.009
					(0.005)	(0.005)	(0.028)	(0.008)
Observations	20	20	20	20	20	20	20	20
R-squared	0.076	0.196	0.086	0.114	0.069	0.184	0.084	0.109

Notes: Mean, maximum, minimum and standard deviation of annual changes in import tariffs are calculated across years, by industry. Share of family firms is for 1993 in columns (1) to (4), and is averaged across all years in columns (5) to (8). * p<0.05, ** p<0.01, *** p<0.001. Robust standard errors in parentheses.

Table E.6: Effect of import competition for family versus non-family firms

Dep var: $\Delta \ln(labprod_{it})$	(1)	(2)	(3)
Sample:	All firms	Family firms	Non-family firms
ΔIMP_{st}	0.224	2.078**	-1.062
	(0.660)	(0.838)	(0.912)
$\ln(labprod93_i)$	-0.061***	-0.063***	-0.065***
	(0.013)	(0.023)	(0.011)
Observations	14,355	6,507	7,834
Year FE	yes	yes	yes
Industry FE	yes	yes	yes

Notes: * p<0.05, ** p<0.01, *** p<0.001. Standard errors in parentheses are two-way clustered (by industry-year pairs and firms).

Table E.7: Productivity responses are immediate

	(1)	(2)	(3)	(4)
Dep var:	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$
Sample:	Family firms	Non-family firms	Family firms	Non-family firms
ΔIMP_{st}	23.201**	-4.137	33.120**	13.148
	(10.341)	(12.376)	(14.724)	(13.459)
$\Delta IMP_{st} \cdot \ln(labprod93_i)$	-2.088**	0.296	-3.200**	-1.325
	(1.022)	(1.172)	(1.462)	(1.274)
ΔIMP_{st-1}			-8.659	-0.088
			(21.861)	(12.446)
$\Delta IMP_{st-1} \cdot \ln(labprod93_i)$			0.620	0.086
			(2.142)	(1.185)
$\ln(labprod93_i)$	-0.057**	-0.066***	0.001	-0.015*
	(0.024)	(0.013)	(0.010)	(0.008)
Current effects evaluated at:				
10th prod percentile	4.013***	-1.413	3.715**	0.970
	(1.239)	(1.815)	(1.501)	(1.924)
90th prod percentile	0.651	-0.936	-1.437	-1.163
	(1.104)	(0.949)	(1.345)	(0.922)
Lagged effects evaluated at:				
10th prod percentile			-2.965	0.703
			(2.491)	(1.784)
90th prod percentile			-1.967	0.841
			(1.817)	(1.005)
Observations	6,507	7,834	5,788	6,952

Notes: * p<0.05, ** p<0.01, *** p<0.001. Standard errors in parentheses are two-way clustered (by industry-year pairs and firms). All regressions include year and industry fixed effects. Marginal effects are calculated for different percentiles of the initial productivity distribution, analogous to the main tables.

Table E.8: Effect of import competition — non-parametric regressions

Dep var: $\Delta\ln(labprod_{it})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Family firms				Non-family firms			
ΔIMP_{st}	3.311***	3.841***	3.001*	3.333**	-1.284	-1.677	-1.790	-1.018
	(1.081)	(1.299)	(1.666)	(1.555)	(1.386)	(1.396)	(1.886)	(1.686)
$\Delta IMP_{st} \cdot Perc2$	0.629	0.507	3.524**	2.763*	-0.930	-2.633	-0.824	-1.313
	(1.067)	(1.278)	(1.460)	(1.538)	(0.958)	(1.604)	(1.498)	(1.670)
$\Delta IMP_{st} \cdot Perc3$		1.144	-0.048	2.062		0.014	-3.296***	-2.430*
		(1.169)	(1.708)	(2.169)		(1.084)	(1.273)	(1.474)
$\Delta IMP_{st} \cdot Perc4$			1.352	1.264			0.669	-1.663
			(1.101)	(1.623)			(1.128)	(1.630)
$\Delta IMP_{st} \cdot Perc5$				0.497				0.115
				(1.316)				(1.243)
Observations	6,507	6,507	6,507	6,507	7,834	7,834	7,834	7,834
No of percentiles	2	3	4	5	2	3	4	5
Percentile FE	yes	yes	yes	yes	yes	yes	yes	yes

Notes: * p<0.05, ** p<0.01, *** p<0.001. Standard errors in parentheses are two-way clustered (by industry-year pairs and firms). All regressions include year and industry fixed effects.

Table E.9: Effect of import competition — pooled regression; period 1993 to 2000

	(1)	(2)	(3)	(4)
Dependent variable:	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$
Marginal effects:				
Non-family firms, p10	-2.925	-2.993		-3.072
	(2.239)	(2.256)		(2.831)
Non-family firms, p90	-0.112	-0.0610		0.198
	(1.221)	(1.210)		(1.341)
Family firms, p10	3.354**	3.418**		4.814**
	(1.492)	(1.533)		(2.414)
Family firms, p90	2.845	2.844		2.342
	(2.203)	(2.206)		(2.399)
Family versus non-family firms,	6.279**	6.411**	3.807**	7.886***
p 10	(2.447)	(2.498)	(1.490)	(2.999)
Family versus non-family firms,	2.957	2.905	3.486	2.144
p 90	(2.702)	(2.686)	(2.796)	(2.678)
Observations	8,958	8,958	8,958	8,958
Region * famfirm FE		yes		
Industry * year FE			yes	
Firm FE				yes

Notes: * p<0.05, ** p<0.01, *** p<0.001. Standard errors in parentheses are two-way clustered (by industry-year pairs and firms). All regressions include family-firm specific industry and year fixed effects. Family firms are indicated by a dummy variable. There are 17 regions in our data (corresponding to autonomous regions in Spain). We estimate regression equation (2) and calculate the marginal effects for non-family firms as $\frac{\partial\Delta\ln(labprod_{it})}{\partial\Delta IMP_{st}}\Big|_{FAM93_i=0} = \beta_1 + \beta_2\ln(labprod93_i)$ and the ones for family-firms as $\frac{\partial\Delta\ln(labprod_{it})}{\partial\Delta IMP_{st}}\Big|_{FAM93_i=1} = \beta_1 + \beta_3 + (\beta_2 + \beta_4)\ln(labprod93_i)$, while the marginal differential effects for family versus non-family firms are given by $\frac{\partial\Delta\ln(labprod_{it})}{\partial\Delta IMP_{st}}\Big|_{FAM93_i=1} - \frac{\partial\Delta\ln(labprod_{it})}{\partial\Delta IMP_{st}}\Big|_{FAM93_i=0} = \beta_3 + \beta_4\ln(labprod93_i)$. We evaluate all marginal effects at the 10th and 90th percentile of the initial productivity distribution (i.e., across non-family and family firms).

Table E.10: Effect of import competition — number of family managers

	(1)	(2)	(3)	(4)
Dependent variable:	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$
Marginal effects (family firms = firms with average number of family managers):				
Non-family firms, p10	-0.569	-0.566		-0.627
	(1.680)	(1.695)		(1.908)
Non-family firms, p90	-0.393	-0.391		-0.232
	(0.888)	(0.887)		(0.979)
Family firms, p10	3.499***	3.499***		4.797***
	(1.184)	(1.193)		(1.808)
Family firms, p90	-0.767	-0.793		-0.941
	(0.956)	(0.955)		(1.065)
Family versus non-family firms,	4.068**	4.065**	3.603***	5.424**
p 10	(1.824)	(1.821)	(1.303)	(2.391)
Family versus non-family firms,	-0.375	-0.403	-0.581	-0.709
p 90	(1.274)	(1.270)	(1.447)	(1.324)
Observations	14,341	14,341	14,341	14,195
Family firm	# members	# members	# members	# members
Region * famfirm FE		yes		
Industry * year FE			yes	
Firm FE				yes

Notes: * p<0.05, ** p<0.01, *** p<0.001. Standard errors in parentheses are two-way clustered (by industry-year pairs and firms). All regressions include family-firm specific industry and year fixed effects. Same regressions as in Table 3, except that the family firm dummy is replaced by $NRFAM93_i$; the number of family managers in 1993. Famfirm for the fixed effects is still a family firm dummy. The marginal effects for family firms are computed for family firms with the average number of family managers (1.6). Marginal effects are computed with respect to different percentiles of the initial productivity distribution. Regression coefficients are omitted to preserve space. For the specification in column (1) we evaluate the differential marginal effects also separately for different number of family managers:

	By number of family managers						
Marginal effects	1	2	3	4	5	6	7
Family versus non-family firms,	2.522**	5.043**	7.565**	10.087**	12.609**	15.130**	17.652**
p 10	(1.131)	(2.262)	(3.393)	(4.524)	(5.655)	(6.786)	(7.917)
Family versus non-family firms,	-0.232	-0.465	-0.697	-0.929	-1.161	-1.394	-1.626
p 90	(0.789)	(1.579)	(2.369)	(3.158)	(3.948)	(4.737)	(5.527)

Table E.11: Effect of import competition — lagged TFP instead of TFP in 1993

	(1)	(2)
Dependent variable:	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$
Marginal effects:		
Family versus non-family firms,	3.180**	3.892*
p 10	(1.544)	(2.36)
Family versus non-family firms,	1.035	-0.574
p 90	(1.625)	(2.223)
Observations	14,341	21,868
Family firm status FAM_i	1993	$t-1$
Industry * year FE	yes	yes

Notes: * p<0.05, ** p<0.01, *** p<0.001. Standard errors in parentheses are two-way clustered (by industry-year pairs and firms). All regressions include family-firm specific industry and year fixed effects. Family firms are indicated by a dummy variable. In column (2), we group lagged labor productivity into 20 percentiles per calendar year (the results are not sensitive to the number of percentile bins used). We estimate regression equation (2) and calculate the marginal differential effects for family versus non-family firms by $\frac{\partial\Delta\ln(labprod_{it})}{\partial\Delta IMP_{st}}\Big|_{FAM93_i=1} - \frac{\partial\Delta\ln(labprod_{it})}{\partial\Delta IMP_{st}}\Big|_{FAM93_i=0} = \beta_3 + \beta_4\ln(labprod_{i,t-1})$, evaluated at the 10th and 90th percentile of the overall productivity distribution (i.e., across non-family and family firms). Regression coefficients are not reported to save space.

Table E.12: Robustness — alternative productivity measures

Dependent variable: $\Delta\ln(prod_{it})$	(1)	(2)	(3)	(4)	(5)	(6)
Productivity measure (in logs):	TFP OP	TFP OP	VA/hours	VA/hours	VA/wages	VA/wages
Marginal effects:						
Family versus non-family firms,	5.506***	3.752**	4.824**	3.270**	6.241***	4.797***
p 10	(2.022)	(1.535)	(2.038)	(1.466)	(1.950)	(1.833)
Family versus non-family firms,	0.847	1.332	2.111	2.288	2.946***	1.702
p 90	(1.563)	(1.697)	(1.472)	(1.593)	(1.107)	(1.097)
Observations	13,418	13,418	13,838	13,838	14,341	14,341
Industry * year FE		yes		yes		yes

Notes: * p<0.05, ** p<0.01, *** p<0.001. Standard errors in parentheses are two-way clustered (by industry-year pairs and firms). All regressions include family-firm specific industry and year fixed effects. Family firms are indicated by a dummy variable. TFPOP uses estimated total factor productivity using a Olley-Pakes type estimation approach augmented with a De Loecker-type correction (details in online appendix). VA/hours= deflated value added per hour worked. VA/wages=deflated value added divided by the total wage-bill. All TFP measures are logged. We estimate regression equation (2) and calculate the marginal differential effects for family versus non-family firms by $\frac{\partial\Delta\ln(labprod_{it})}{\partial\Delta IMP_{st}}\Big|_{FAM93_i=1} - \frac{\partial\Delta\ln(labprod_{it})}{\partial\Delta IMP_{st}}\Big|_{FAM93_i=0} = \beta_3 + \beta_4\ln(labprod93_i)$, evaluated at the 10th and 90th percentile of the initial productivity distribution (i.e., across non-family and family firms). Regression coefficients are not reported to save space.

Table E.13: Prediction of family firms for propensity score matching estimators

	(1)
	Family firm dummy
ln($labprod$)	-0.211***
	(0.069)
ln($sales$)	-0.050
	(0.063)
ln($employment$)	-0.346***
	(0.071)
Export dummy	0.059
	(0.078)
Observations	1,775
Pseudo R2	0.1827

Notes: Estimates are based on a probit regression of a dummy variable indicating family-managed firm on the regressors above, using the sample of firms in 1993. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table E.14: Robustness — inverse propensity score reweighing and nearest neighbor matching

Dependent variable: $\Delta\ln(prod_{it})$	(1)	(2)
Method:	IPSW	NN
Marginal effects:		
Family versus non-family firms,	9.000***	7.785***
p 10	(3.073)	(2.443)
Family versus non-family firms,	0.209	2.348
p 90	(3.629)	(2.125)
Observations	14,314	12,287

Notes: * p<0.05, ** p<0.01, *** p<0.001. Standard errors in parentheses are two-way clustered (by industry-year pairs and firms). All regressions include family-firm specific industry and year fixed effects. Family firms are indicated by a dummy variable. IPSW = inverse propensity score reweighing. NN = nearest neighbor matching. Both methods use the following variables to predict family firm status in 1993: log labor productivity, log sales, log employment, and an export dummy, results are shown in Table E.13. Nearest neighbor matching uses 5 neighbors and imposes common support. We estimate regression equation (2) and calculate the marginal differential effects for family versus non-family firms by $\frac{\partial\Delta\ln(labprod_{it})}{\partial\Delta IMP_{st}}\Big|_{FAM93_i=1} - \frac{\partial\Delta\ln(labprod_{it})}{\partial\Delta IMP_{st}}\Big|_{FAM93_i=0} = \beta_3 + \beta_4\ln(labprod93_i)$, evaluated at the 10th and 90th percentile of the initial productivity distribution (i.e., across non-family and family firms). Regression coefficients are not reported to save space.

Table E.15: Controlling for input and export tariffs

	(1)	(2)	(3)	(4)
Dependent variable:	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$
ΔIMP_{st}	-4.137	5.226	-5.920	0.690
	(12.376)	(13.036)	(11.826)	(11.903)
$\Delta IMP_{st} \cdot \ln(labprod93_i)$	0.296	-0.618	0.496	-0.142
	(1.172)	(1.242)	(1.118)	(1.128)
$\Delta IMP_{st} \cdot FAM93_i$	27.338*	35.290*	23.344	21.037
	(15.920)	(19.722)	(15.453)	(15.428)
$\Delta IMP_{st} \cdot \ln(labprod93_i) \cdot FAM93_i$	-2.385	-3.215*	-2.023	-1.813
	(1.551)	(1.931)	(1.496)	(1.505)
$\Delta INTAR_{st}$		43.351**		28.402
		(19.855)		(24.892)
$\Delta INTAR_{st} \cdot \ln(labprod93_i)$		-4.299**		-2.747
		(1.957)		(2.423)
$\Delta INTAR_{st} \cdot FAM93_i$		62.431		-4.812
		(58.434)		(31.079)
$\Delta INTAR_{st} \cdot \ln(labprod93_i) \cdot FAM93_i$		-6.074		0.482
		(5.696)		(3.128)
$\Delta EXPTAR_{st}$			-9.582**	-7.938
			(4.786)	(5.350)
$\Delta EXPTAR_{st} \cdot \ln(labprod93_i)$			1.018**	0.859
			(0.472)	(0.525)
$\Delta EXPTAR_{st} \cdot FAM93_i$			-11.117	-11.011
			(7.564)	(7.435)
$\Delta EXPTAR_{st} \cdot \ln(labprod93_i) \cdot FAM93_i$			1.073	1.060
			(0.754)	(0.741)
$FAM93_i$	-0.121	-0.067	-0.217	-0.215
	(0.234)	(0.235)	(0.155)	(0.172)
$\ln(labprod93_i) \cdot FAM93_i$	0.009	0.004	0.020	0.020
	(0.023)	(0.023)	(0.015)	(0.016)
$\ln(labprod93_i)$	-0.066***	-0.069***	-0.060***	-0.063***
	(0.013)	(0.013)	(0.012)	(0.013)
Marginal effects:				
Family versus non-family firms,	5.426***	5.753**	4.756**	4.379**
p 10	(2.089)	(2.387)	(2.080)	(2.021)
Family versus non-family firms,	1.587	0.578	1.499	1.461
p 90	(1.593)	(1.825)	(1.462)	(1.567)
Observations	14,341	14,341	14,341	14,341

Notes: * p<0.05, ** p<0.01, *** p<0.001. Standard errors in parentheses are two-way clustered (by industry-year pairs and firms). All regressions include family-firm specific industry and year fixed effects. Family firms are indicated by a dummy variable. $INTAR$ denotes a weighted average of import tariffs of the inputs of an industry, where input shares are constructed from the Spanish IO tables. $EXPTAR$ denotes the weighted average of tariffs that other countries impose on imports from the EU. Effects evaluated at 10th (and 90th) percentile refer to the effects of average (annual) import tariff reduction on the change of log productivity for firms that are at the 10th (and 90th) percentile of the overall initial productivity distribution in 1993 (i.e., including both family and non-family firms).

Table E.16: Importing and exporting

	(1)	(2)	(3)	(4)	(5)	(6)
	Change in importing		Change in imported		Change	
Dependent variable:	dummy	$\Delta\ln(imp_{it})$	technology dummy	$\Delta\ln(imp\ tech_{it})$	exporting dummy	$\Delta\ln(exp_{it})$
Marginal effects:						
Family versus non-family firms,	-1.471	0.365	-0.499	-4.473	-1.058	8.689
p 10	(1.302)	(5.900)	(0.615)	(22.77)	(1.097)	(6.614)
Family versus non-family firms,	0.262	3.308	1.051	-16.04	0.767	5.631
p 90	(1.199)	(3.271)	(1.075)	(18.40)	(0.796)	(3.848)
Observations	14,203	8,352	14,283	1,341	14,291	8,566

Notes: * p<0.05, ** p<0.01, *** p<0.001. Standard errors in parentheses are two-way clustered (by industry-year pairs and firms). All regressions include family-firm specific industry and year fixed effects. Family firms are indicated by a dummy variable. We estimate regression equation (2) and calculate the marginal differential effects for family versus non-family firms by $\frac{\partial\Delta\ln(labprod_{it})}{\partial\Delta IMP_{st}}\Big|_{FAM93_i=1} - \frac{\partial\Delta\ln(labprod_{it})}{\partial\Delta IMP_{st}}\Big|_{FAM93_i=0} = \beta_3 + \beta_4\ln(labprod93_i)$, evaluated at the 10th and 90th percentile of the initial productivity distribution (i.e., across non-family and family firms). Regression coefficients are not reported to save space.

Table E.17: No differential change in employment

	(1)	(2)	(5)	(6)
	$\Delta\ln(labprod_{it})$	$\Delta\ln(emp)_{it}$	$\Delta\ln(temporary)_{it}$	$\Delta famempl_{it}$
ΔIMP_{st}	-4.137	-4.342	79.696	-7.438
	(12.376)	(11.370)	(77.306)	(15.103)
$\Delta IMP_{st} \cdot \ln(labprod93_i)$	0.296	0.419	-7.565	0.434
	(1.172)	(1.107)	(7.217)	(1.473)
$\Delta IMP_{st} \cdot FAM93_i$	27.338*	3.069	103.024	21.148
	(15.920)	(12.963)	(85.003)	(34.461)
$\Delta IMP_{st} \cdot \ln(labprod93_i) \cdot FAM93_i$	-2.385	-0.316	-8.839	-1.697
	(1.551)	(1.257)	(7.786)	(3.306)
$FAM93_i$	-0.121	-0.093	0.262	-0.024
	(0.234)	(0.096)	(0.977)	(0.261)
$\ln(labprod93_i) \cdot FAM93_i$	0.009	0.006	-0.009	0.002
	(0.023)	(0.009)	(0.089)	(0.025)
$\ln(labprod93_i)$	-0.066***	0.014**	0.039	-0.010
	(0.013)	(0.007)	(0.043)	(0.010)
Marginal effects:				
Family versus non-family firms,	5.426***	0.168	21.808	5.554
p 10	(2.089)	(1.507)	(14.399)	(4.756)
Family versus non-family firms,	1.587	-0.340	7.579	2.822
p 90	(1.593)	(0.843)	(5.617)	(2.923)
Observations	14,341	14,341	2,086	14,341

Notes: * p<0.05, ** p<0.01, *** p<0.001. Standard errors in parentheses are two-way clustered (by industry-year pairs and firms). All regressions include family-firm specific industry and year fixed effects. Family firms are indicated by a dummy variable. emp denotes the total number of employees. $temporary$ denotes the number of employees employed through a temporary agency (variable PERETT). $famemp$ denotes the total number of family members working in the firm. We estimate regression equation (2) and calculate the marginal differential effects for family versus non-family firms by $\frac{\partial\Delta\ln(labprod_{it})}{\partial\Delta IMP_{st}}\Big|_{FAM93_i=1} - \frac{\partial\Delta\ln(labprod_{it})}{\partial\Delta IMP_{st}}\Big|_{FAM93_i=0} = \beta_3 + \beta_4\ln(labprod93_i)$, evaluated at the 10th and 90th percentile of the initial productivity distribution (i.e., across non-family and family firms).

Table E.18: Robustness check: time horizon

	(1)	(2)	(3)	(4)
Dep var:	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$	$\Delta_2\ln(labprod_{it})$	$\Delta_2\ln(labprod_{it})$
Sample:	Family firms	Non-family firms	Family firms	Non-family firms
ΔIMP_{st}	23.201**	-4.137	29.752**	21.655
	(10.341)	(12.376)	(13.891)	(20.427)
$\Delta IMP_{st} \cdot \ln(labprod93_i)$	-2.088**	0.296	-2.673*	-2.073
	(1.022)	(1.172)	(1.381)	(1.957)
$\ln(labprod93_i)$	-0.057**	-0.066***	-0.107**	-0.118***
	(0.024)	(0.013)	(0.051)	(0.028)
Effects evaluated at:				
10th prod percentile	4.013***	-1.413	5.193***	2.607
	(1.239)	(1.815)	(1.471)	(2.619)
90th prod percentile	0.651	-0.936	0.890	-0.730
	(1.104)	(0.949)	(1.378)	(1.235)
Observations	6,507	7,834	3,117	3,736

Notes: * p<0.05, ** p<0.01, *** p<0.001. Standard errors in parentheses are two-way clustered (by industry-year pairs and firms). All regressions include year and industry fixed effects. Marginal effects are calculated at different percentiles of the initial productivity distribution.

Table E.19: Exits

	(1)	(2)	(3)
Dependent variable: exit dummy			
Sample:	all	non-family	family
ΔIMP_{st}	0.210*	0.234*	0.167
	(0.119)	(0.128)	(0.232)
$\ln(labprod93_i)$	-0.004***	-0.002	-0.007***
	(0.001)	(0.002)	(0.003)
Observations	22,524	12,319	10,176

Notes: * p<0.05, ** p<0.01, *** p<0.001. Standard errors in parentheses are two-way clustered (by industry-year pairs and firms). All regressions include year and industry fixed effects.

Table E.20: Robustness — accounting for missing observations

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	No collaboration, narrow	$\Delta\ln(prod_{it})$, interpolated	$\Delta\ln(prod_{it})$, interp. and extrap.	No collaboration, broad	$\Delta\ln(prod_{it})$, interp. and extrap.	Not located, not observed after
Marginal effects:						
Family versus non-family firms, p 10	0.135	5.431***	5.095**	0.370	4.981**	1.050
	(0.589)	(2.088)	(2.057)	(0.662)	(2.048)	(0.759)
Family versus non-family firms, p 90	-0.239	1.588	1.755	-0.661*	1.701	0.393
	(0.367)	(1.592)	(1.503)	(0.358)	(1.477)	(0.653)
Observations	15,255	14,355	14,570	15,439	14,753	15,531

Notes: * p<0.05, ** p<0.01, *** p<0.001. Standard errors in parentheses are two-way clustered (by industry-year pairs and firms). All regressions include family-firm specific industry and year fixed effects. Family firms are indicated by a dummy variable. We estimate regression equation (2) and calculate the marginal differential effects for family versus non-family firms by $\frac{\partial\Delta\ln(labprod_{it})}{\partial\Delta IMP_{st}}\Big|_{FAM93_i=1} - \frac{\partial\Delta\ln(labprod_{it})}{\partial\Delta IMP_{st}}\Big|_{FAM93_i=0} = \beta_3 + \beta_4\ln(labprod93_i)$, evaluated at the 10th and 90th percentile of the initial productivity distribution (i.e., across non-family and family firms). Regression coefficients are not reported to save space.