ONLINE APPENDIX

Import Competition, Heterogeneous Preferences of Managers, and Productivity

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Data description

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. More information about the data set and researcher access are provided on their website: `http://www.fundacionsepi.es/esee/sp/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.

Figure A.1 shows the distribution of the number of family managers for family-managed firms in 1993. Figure A.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 B.1 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 B.2 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 A.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.

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). 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.

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.

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.

References

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De Loecker, J.: 2013, 'Detecting learning by exporting'. *American Economic Journal: Microeconomics* **5**(3), 1–21.

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A Figures

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

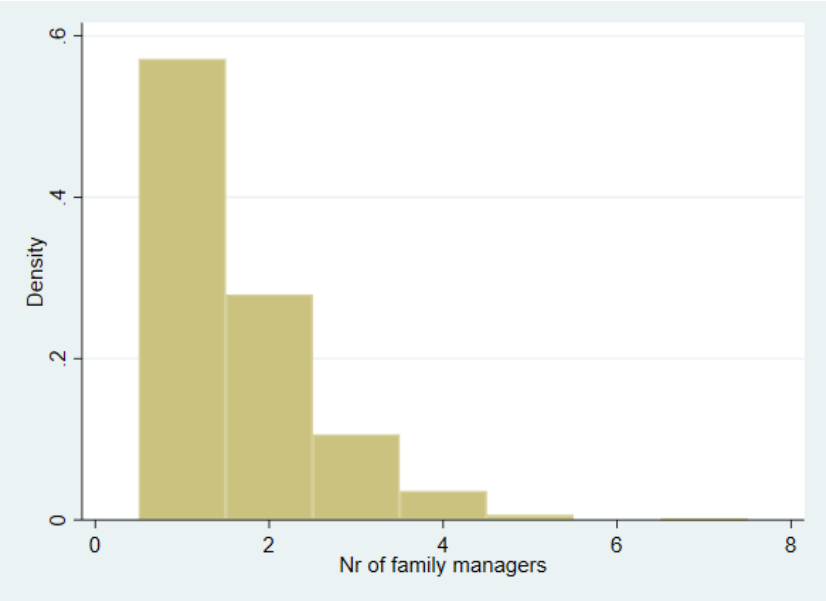


Figure A.2: Distribution of family firms across industries, 1993

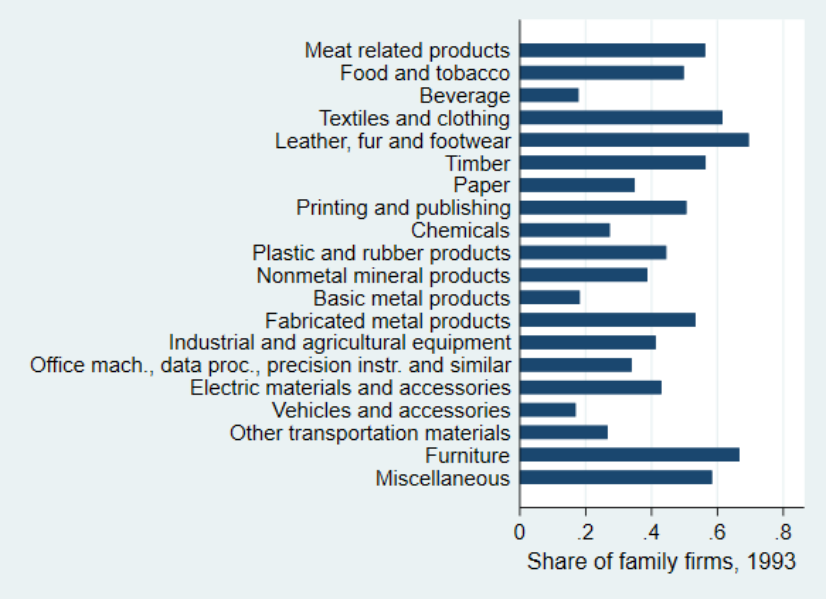


Figure A.3: Number of family members in non-managing positions for firms that have any, 1993

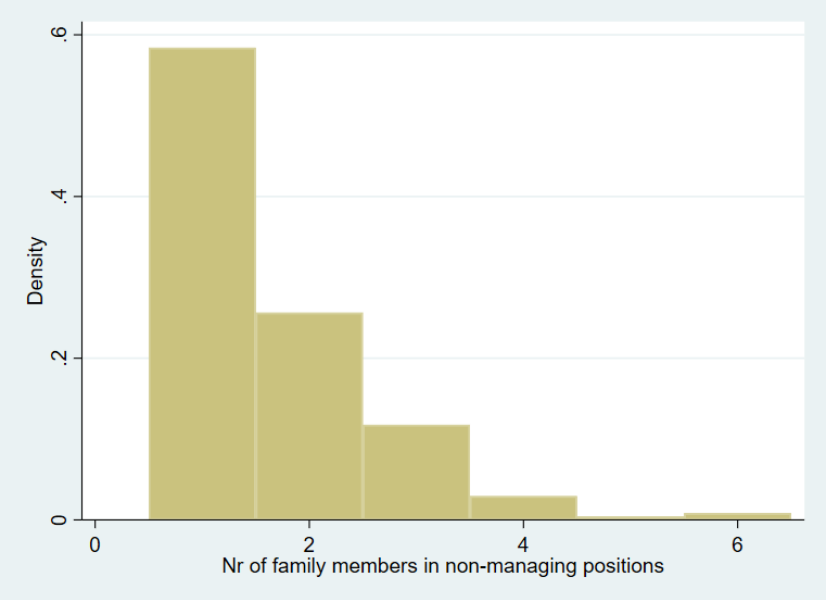
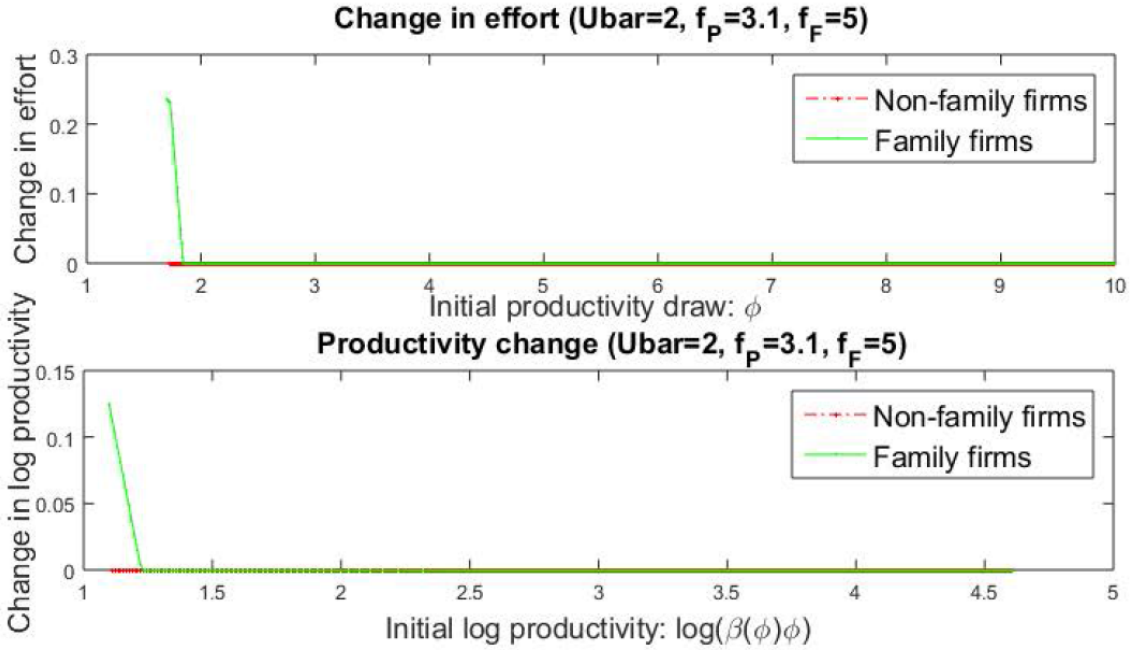


Figure A.4: Effect of increased import competition when the fixed cost differs between family firms and non-family firms

Notes: If P-type firms have a lower fixed operation cost than F-type firms (in the sense that $f_F - \eta > 2(f_P - \eta)$ where f_F and f_P are the fixed cost for F-type firms and P-type firms respectively), then we have an overlap of the productivity draw (and the initial productivity) between P-type firms and F-type firms among the least productive firms like we see in the data. This assumption seems plausible, as non-family firms are shown to have better management practices than family firms (Bloom and Van Reenen, 2007, 2010; Bloom et al., 2012) In particular, non-family firms seem to generate fewer wasted resources and redundancies in the production process compared to family firms, which makes it likely that they have a lower fixed operation cost, f, compared to non-family firms.



B Tables

Table B.1: Relationship between tariff changes and changes in family firm share, industry-level

Dependent variable: Δshare of family firms	(1)	(2)	(3)
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 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 B.2: 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
Industry FE	yes	yes	yes	yes	yes	yes
Year FE	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).

Table B.3: 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 B.4: 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
Year FE	yes	yes	yes	yes
Industry FE	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).

Table B.5: Robustness — propensity score reweighing and nearest neighbor matching

Dependent variable: $\Delta \ln(prod_{it})$	(1)	(3)
Method:	IPSW	NN
ΔIMP_{st}	-35.978	-15.617
	(32.103)	(17.223)
$\Delta IMP_{st} \cdot \ln(prod93_i)$	3.373	1.289
	(3.240)	(1.673)
$\Delta IMP_{st} \cdot FAM93_i$	59.180*	38.819*
	(34.273)	(20.827)
$\Delta IMP_{st} \cdot \ln(prod93_i) \cdot FAM93_i$	-5.461	-3.378
	(3.458)	(2.056)
$FAM93_i$	-0.613*	-0.270
	(0.352)	(0.254)
$\ln(prod93_i) \cdot FAM93_i$	0.062*	0.029
	(0.036)	(0.025)
$\ln(prod93_i)$	-0.119***	-0.086***
	(0.034)	(0.016)
Marginal effects:		
Family versus non-family firms, p 10	9.000***	7.785***
	(3.073)	(2.443)
Family versus non-family firms, p 90	0.209	2.348
	(3.629)	(2.125)
Observations	14,314	12,287
Industry * famfirm FE	yes	yes
Year * famfirm 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). 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. Nearest neighbor matching uses 5 neighbors.

Table B.6: Effect of import competition — number of family managers

	(1)	(2)	(3)	(4)
Dependent variable:	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$
ΔIMP_{st}	-1.574	-1.565		-2.881
	(11.025)	(11.140)		(12.560)
$\Delta IMP_{st} \cdot \ln(labprod93_i)$	0.109	0.109	-0.046	0.245
	(1.039)	(1.050)	(0.111)	(1.183)
$\Delta IMP_{st} \cdot NRFAM93_i$	18.241**	18.325**	17.035**	25.060**
	(8.660)	(8.648)	(6.982)	(11.169)
$\Delta IMP_{st} \cdot \ln(labprod93_i) \cdot NRFAM93_i$	-1.711**	-1.720**	-1.611**	-2.362**
	(0.840)	(0.839)	(0.702)	(1.071)
$NRFAM93_i$	-0.020	-0.017	-0.021	
	(0.110)	(0.113)	(0.110)	
$\ln(labprod93_i) \cdot NRFAM93_i$	0.002	0.002	0.002	
	(0.011)	(0.011)	(0.011)	
$\ln(labprod93_i)$	-0.063***	-0.065***	-0.063***	
	(0.012)	(0.013)	(0.011)	
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
Industry * famfirm FE	yes	yes	yes	yes
Year * famfirm FE	yes	yes	yes	yes
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). $NRFAM93_i$ is 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 one family manager.

Table B.7: Importing and exporting

Dependent variable:	(1) Change importing dummy	(2) $\Delta\ln(imp_{it})$	(3) Change in imported technology dummy	(4) $\Delta\ln(imp\ tech_{it})$	(5) Change exporting dummy	(6) $\Delta\ln(exp_{it})$
ΔIMP_{st}	2.271	-20.795	5.113	135.112	5.293	1.981
	(5.525)	(19.616)	(5.029)	(82.283)	(4.966)	(29.576)
$\Delta IMP_{st} \cdot \ln(labprod93_i)$	-0.240	1.914	-0.536	-12.462*	-0.499	-0.232
	(0.512)	(1.821)	(0.516)	(7.553)	(0.489)	(2.799)
$\Delta IMP_{st} \cdot FAM93_i$	-11.363	-16.439	-9.348	61.534	-11.472	26.141
	(11.476)	(37.025)	(7.133)	(226.982)	(7.521)	(42.556)
$\Delta IMP_{st} \cdot \ln(labprod93_i) \cdot FAM93_i$	1.077	1.829	0.963	-7.184	1.133	-1.899
	(1.138)	(3.476)	(0.744)	(22.443)	(0.725)	(4.019)
$FAM93_i$	0.021	-0.302	0.000	2.289	-0.112**	-0.657**
	(0.056)	(0.247)	(0.038)	(2.443)	(0.048)	(0.271)
$\ln(labprod93_i) \cdot FAM93_i$	-0.000	0.007	-0.001	-0.209	0.006*	0.044*
	(0.005)	(0.024)	(0.004)	(0.240)	(0.004)	(0.026)
$\ln(labprod93_i)$	-0.001	-0.011	-0.001	-0.011	-0.003	-0.021
	(0.002)	(0.012)	(0.003)	(0.050)	(0.003)	(0.018)
Marginal effects:						
Family versus non-family firms, p 10	-1.471	0.365	-0.499	-4.473	-1.058	8.689
	(1.302)	(5.900)	(0.615)	(22.77)	(1.097)	(6.614)
Family versus non-family firms, p 90	0.262	3.308	1.051	-16.04	0.767	5.631
	(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
Family firm	dummy	dummy	dummy	dummy	dummy	dummy
Industry*famfirm FE	yes	yes	yes	yes	yes	yes
Year*famfirm FE	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).

Table B.8: No differential change in employment

	(1) $\Delta\ln(labprod_{it})$	(2) $\Delta\ln(emp)_{it}$	(5) $\Delta\ln(temporary)_{it}$	(6) $\Delta famempl_{it}$
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, p 10	5.426***	0.168	21.81	5.554
	(2.089)	(1.507)	(14.40)	(4.756)
Family versus non-family firms, p 90	1.587	-0.340	7.579	2.822
	(1.593)	(0.843)	(5.617)	(2.923)
Observations	14,341	14,341	2,086	14,341
Industry FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes

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

Table B.9: 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
Year FE	yes	yes	yes	yes
Industry FE	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).