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IMPORT COMPETITION, HETEROGENEOUS PREFERENCES OF MANAGERS, AND PRODUCTIVITY

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ABSTRACT

Empirical evidence on the relationship between import competition and firm productivity is mixed. We explore a new dimension of firm heterogeneity by focusing on different types of managers. Using Spanish firm-level data, we show that import competition leads to productivity increases for family-managed firms that are initially unproductive. Productivity changes are driven by family management as opposed to family ownership or non-managing family members. This evidence is consistent with a model in which family managers care more about the survival of their firm than professional managers, which triggers additional effort when the firm is faced with an increased bankruptcy risk. We show evidence consistent with this mechanism.

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An Online Appendix is available at
https://drive.google.com/file/d/1ikBalYIpLw5A20BHrlhi0wt6guJ6FSe0/view

1 Introduction

The recent surge in China's exports has triggered the re-examination of an old and important economic question: Does (import) competition spur innovation and thus productivity growth, or does it discourage it? The answer to this question remains far from being settled, with recent empirical papers finding mixed evidence ranging from overwhelmingly positive effects in developing economies to negative effects in Northern America. What drives these differences across regions is unresolved; proposed explanations include different levels of competitiveness, different market frictions, or differences in managerial preferences (or "slack").[1] In this paper we explore this last hypothesis by providing empirical evidence that managerial preferences can generate heterogeneous effects of import competition on productivity across firms.

Our focus on managers is motivated by two stylized facts: First, emerging markets are characterized by a large share of family firms.[2] Second, family managers have been found to have very distinct preferences. For example, family managers care about building a legacy and/or creating and sustaining the firm for their descendants, resulting in a long-run perspective that covers generations. They take a strong pride in their firm and enjoy the pleasure of being one's own boss. Family managers also have the ability to use firm resources for personal purposes or provide jobs for relatives. They like the ability to have flexible work hours, leading them to enjoy more leisure or a more quiet life.[3] Summarizing this literature, we find that family managers enjoy a specific utility from being a part of the family firm, which professional managers do not enjoy. Moreover, family managers lose this specific utility if the firm ceases to exist. This specific utility function may lead to an aversion to the family firm going bankrupt, thereby affecting innovation decisions.

We use use Spanish firm-level data between 1993 and 2007 to investigate how increased import competition affected the labor productivity of family-managed firms and non-family-managed firms. The Spanish context and data present an ideal scenario for the purposes of this study. First, there were large increases in import competition, e.g., driven by increased European integration and the unprecedented increase in Chinese exports that many other economies have also faced.[4] Second, Spain's import tariffs are determined at the EU level and therefore arguably exogenous to Spanish firms. We will exploit this feature in the empirical

[1] Shu and Steinwender (2019) provide a survey of this large literature. Examples for positive effects in emerging markets include: Pavcnik, 2002; Amiti and Konings, 2007; Muendler, 2004; Schor, 2004; Fernandes, 2007; Gorodnichenko et al., 2010; Bombardini et al., 2017; Brandt et al., 2017. Examples for negative effects in Northern America include: Xu and Gong, 2017; Kueng et al., 2017; Autor et al., 2017.

[2] Family Firm Institute, Global Data Points, McKinsey & Company, 2014.

[3] See, e.g., Demsetz and Lehn (1985); Bertrand and Mullainathan (2003); Bandiera et al. (2014a); Hurst and Pugsley (2011); Bertrand and Schoar (2006); Belenzon et al. (2014); Bandiera et al. (2014b)

[4] E.g., US (Autor et al., 2013; Hombert and Matray, 2017), Canada (Kueng et al., 2017), UK (Bloom et al., 2016), South Korea (Ahn et al., 2018), Vietnam (Dang, 2017), Peru (Medina, 2018).

specification and study the effects of tariff reductions on the productivity of Spanish firms. Third, Spain has a large number of family firms: 40% of the observations in our sample are family-managed firms. In general, family businesses account for a larger share of economic activities in Spain than in the rest of Europe.[5] Fourth, the Spanish data set is unusually rich in that it allows us to differentiate between family management and family ownership, or between managing and non-managing family members. This distinction is important for verifying the mechanism underlying our results. In addition to this information, the Spanish data also provide firm-specific input and output price changes, which allow us to purge labor productivity changes from changes in markups.

Our main empirical specification studies how changes in tariffs set by the EU affect the labor productivity of Spanish firms, distinguishing between family- and professionally-managed firms. We also allow the effects to differ by the initial productivity of firms (even differently for family- and non-family-managed firms) so as not to confound the effects of family management with the effects of initial productivity that has been previously shown by the literature.[6] In essence, we are comparing the productivity response of firms with and without family managers, holding their initial productivity constant. Besides this, we include firm fixed effects, industry-specific trends, and year fixed effects in the regressions in order to address other potentially confounding factors. While we focus on labor productivity as our main outcome because of its transparency, the results are robust to using a TFP measure in the spirit of the De Loecker (2007, 2013) modification to Olley and Pakes (1996).

Our empirical analysis uncovers a specific, robust pattern of heterogeneous responses. After a reduction in import tariffs, the family firms in the left tail of the initial productivity distribution (i.e., initially unproductive firms) increase productivity, while we do not observe significant changes in the productivity of initially productive family firms or professionally-managed firms.

In our robustness checks we rule out two types of alternative explanations. First, we check whether family management, rather than other characteristics of family-managed firms, drive our results by implementing a variety of checks. For example, we conduct horse-race regressions between family management and alternative firm-level characteristics such as

[5]Overall, in Spain 85% of companies are categorized as being family-owned, accounting for 70% of Spain's GDP (see http://www.campdenfb.com/article/infographic-spanish-family-businesses). In contrast, in Europe family businesses make up about 60% of all companies and 50% of GDP (see http://www.europeanfamilybusinesses.eu/ and https://ec.europa.eu/growth/smes/promoting-entrepreneurship/we-work-for/family-business_en). In another study on publicly traded companies (Faccio and Lang, 2002), the share of family firms in Spain is 56%, less than in Germany or France (both 65%), but more than in the UK (24%), Ireland (25%), or Scandinavian countries (39% to 49%).

[6]Studies focusing on heterogeneous effects of import competition have often found positive effects to be present in large or productive firms, while effects for small or less productive firms have been found to be smaller, or even negative. For some examples, see Muendler, 2004; Schor, 2004; Fernandes, 2007; Gorodnichenko et al., 2010; Iacovone, 2012; Iacovone et al., 2011; Fernandes and Paunov, 2009; Autor et al., 2017; Bombardini et al., 2017; Xu and Gong, 2017; Ahn et al., 2018.

firm size, R&D intensity, or capital intensity. We implement propensity score matching techniques to compare family and non-family firms that are more alike. We show that our results are not driven by family ownership or by a switch towards professional managers. As a placebo exercise, we check whether family members in non-managing positions generate similar results. While we are admittedly not able to exploit exogenous variation in family management, excluding a large number of alternative explanations makes it unlikely that characteristics other than family management are generating our results.

Second, we check whether the productivity response is driven by import competition rather than other potentially correlated shocks such as improved access to imported inputs or foreign markets. However, controlling for changes of tariffs on inputs or the changes in foreign tariffs faced by Spanish exporters does not affect our results. Furthermore, the affected firms do not show significant changes in the volume of imported technologies or exports.

Why is the productivity response to import competition concentrated among family-managed firms that are initially unproductive? We provide a stylized model that can rationalize our findings. In the model, all managers care about the profits of the firm, but family managers derive an additional, constant utility from being a part of the family firm. Importantly, they lose this additional utility if the firm goes bankrupt. This additional utility captures the variety of private benefits to the family manager mentioned above. The profits of the firm depend positively on productivity. Each firm receives an initial productivity draw but managers can increase the productivity by exerting effort, which entails private costs. Managers choose their effort in order to maximize utility. If the initial productivity of the firm is far from the exit cutoff, professional and family managers choose the same level of effort, which increases in the initial productivity. However, if the initial productivity of a firm is low, family managers exert effort in order to avoid bankruptcy by making the firm break even, while professional managers let the firm go bankrupt.

When an import competition shock hits the economy, potential profits of all firms fall. This increases the bankruptcy risk for unproductive firms. Since family managers care more about the existence of their firms, they exert an extra effort to avoid bankruptcy. If the bankruptcy risk does not change, i.e., for firms with high initial productivity, there is no change in productivity.

The model can rationalize our key empirical findings about how productivity responds to import competition. Furthermore, in contrast to alternative explanations that we are aware of, the model matches additional empirical patterns. First, we show that the productivity increases in the data are driven by increases in efficiency improvements rather than innovation, which is in line with the motive of managers to increase cash flow on the short run in order to ensure survival. Second, the empirical findings are particularly strong for older firms and firms with more family members, i.e., for multi-generational, inherited businesses, which are also the firms for which the mechanism is more likely to be relevant. Third, the model is consistent with the cross-sectional differences in the productivity distribution of family firms compared to non-family firms. For example, the model predicts that the average productivity of family-managed firms is lower than that of professionally managed firms. We obtain this prediction not by assumption; instead, it is generated by the additional incentive for family managers to keep their firms alive. Finally, our model is consistent with the observed exit rates of family and non-family firms that are generated by import competition.

Our paper is related to three strands of literature. First, our paper contributes to the literature on how trade liberalization affects firm productivity and innovation.[7] Trade liberalization tends to affect firms in different ways. While papers focusing on the effect of access to export markets (e.g., Bustos, 2011; Lileeva and Trefler, 2010; Mayer et al., 2016; Coelli et al., 2018) or access to intermediate inputs (e.g., Fieler and Harrison, 2018; Brandt et al., 2017; Amiti and Konings, 2007) tend to find positive effects on innovation and productivity, studies focusing on the effect of import competition have found more divided results (e.g., Bloom et al. (2016); Autor et al. (2017); Pavcnik (2002); Amiti and Konings (2007)). Effects have also been found to be heterogeneous by firm size or initial productivity. Positive effects are typically present in large or productive firms, while effects for small or less productive firms have been found to be smaller or even negative. In this paper we focus on a novel dimension of heterogeneity, family management, that may affect productivity responses to trade liberalization. Given that most developing countries host a large number of family firms, and that the effects of import competition on productivity for these countries have been found to be different than for developed economies like North America, studying this dimension of heterogeneity seems to be particularly important.

Second, we contribute to the literature on family firms.[8] Family firms are an important economic phenomenon. They are widespread, even in developed countries. For example, 15% of the American Fortune Global 500 firms are family firms. In Europe, 40% of large, listed companies are controlled by families.[9] In developing countries, family firms are even more dominant: Out of large (>$1 billion) firms, 85% are family run in South-East Asia, 75% in Latin America, 67% in India, and around 65% in the Middle East.[10] Furthermore, family businesses are expected to remain an important feature of the global economy for the

[7]For a review of this literature, see Shu and Steinwender (2019). Besides within-firm productivity improvements, the literature also emphasizes that trade liberalization may increase aggregate productivity by reallocating resources towards the most efficient firms (e.g., Pavcnik, 2002). A related literature examines how foreign direct investment affects the productivity of firms (e.g., Guadalupe et al., 2012).

[8]E.g., Shleifer and Vishny (1986); Morck et al. (1988); Shleifer and Vishny (1997); Morck et al. (2000); Anderson and Reeb (2003); Pérez-González (2006); Bennedsen et al. (2007); Bertrand et al. (2008); Mullins and Schoar (2016); Villalonga and Amit (2006); Gomez-Mejia et al. (2007).

[9]See http://www.economist.com/news/leaders/21629376-there-are-important-lessons-be-learnt-surprising-resilience-family-firms-relative.

[10]See http://www.economist.com/news/business/21629385-companies-controlled-founding-families-remain-surprisingly-important-and-look-set-stay.

foreseeable future.[11] Given their ubiquity, it is therefore important to understand the decision making process of family managers better. Most papers in this literature document that family firms, and especially family-managed firms, perform worse than non-family firms.[12] Economists have long been worried about the implications of their lower performance on welfare and aggregate growth. As an example, inherited family firms have been found to be one cause for slow economic growth in Canada – the "Canadian disease" (Morck et al., 2000). We contribute to this literature by highlighting how economic forces, specifically increased competition, can incentivize unproductive family firms to become better.

Third, we contribute to theoretical models on the effect of competition on productivity. The literature provides a range of models with different mechanisms and predictions. For example, models in the Schumpeterian spirit argue that (import) competition may reduce profits and the benefits of innovation, thereby reducing innovation (e.g., Schumpeter, 1934). A different class of models focuses on the idea that innovation may help firms escape the reduced profits that competition brings with it; therefore increased competition may in fact lead to increased innovation (e.g., Arrow, 1962; Aghion et al., 2005). Our model is most closely related to a third class of models that focus on managers with different preferences. In this literature, managers do not maximize profits because they consider private benefits as well (e.g., Hart, 1983; Hermalin, 1992; Schmidt, 1997; Raith, 2003). We contribute to this literature by focusing on the preferences of family managers, which generate a motive to increase effort in order to avoid bankruptcy.

The rest of the paper is organized as follows. Section 2 describes the data, Section 3 describes our empirical strategy, and Section 4 shows our empirical results. Section 5 rationalizes these findings using a model with heterogeneous preferences of managers and Section 6 provides additional empirical evidence in support of the model. Section 7 concludes.

2 Data description

We use 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.[13] The survey is designed to cover

[11]See http://www.economist.com/news/special-report/21648171-far-declining-family-firms-will-remain-important-feature-global-capitalism.

[12]E.g., Pérez-González (2006); Bennedsen et al. (2007); Bloom and Van Reenen (2007); Bandiera et al. (2011, 2014b); Mullins and Schoar (2016); Lemos et al. (2016); Bertrand and Schoar (2006); Morck et al. (2000); Villalonga and Amit (2006). This has also been documented for Spanish family firms (Gallo and Estape, 1992) and is consistent with our data. There are, however, papers in this literature arguing that family ownership is associated with better firm performance (e.g., Anderson and Reeb, 2003). For example, because family ownership facilitates monitoring inside the firm (Demsetz and Lehn, 1985; Burkart et al., 2003) or reduces short-termism (Stein, 1988, 1989; James, 1999).

[13]For more information, see `http://www.fundacionsepi.es/esee/sp/spresentacion.asp`

a representative sample of Spanish manufacturing firms and includes around 1,800 firms per year. The survey started in 1990: In this year, participation of firms with more than 200 employees was required, while firms with more than 10 but fewer than 200 employees were sampled via a stratified sampling approach based on detailed size and industry categories. After that, SEPI made a great effort to replace non-responding and exiting firms with firms from the same size and industry category to ensure the continuing representativeness of the sample. Since the data on capital is incomplete before 1993 (e.g., information on intangible capital and depreciation is not available) and the financial crisis in 2007 might have brought about confounding shocks, we focus on the years between 1993 and 2007, covering a total of around 4,000 observed firms.

The advantage of the Spanish data set is that it provides very rich information on several dimensions that are important for our empirical analysis.[14]

Family firms. We distinguish between family-managed and professionally-managed firms because the survey includes a variable that gives the number of "owners and working relatives who hold managing positions."[15] We classify firms as family-managed firms (or family firms, in short) if this number is bigger than or equal to one in the first year of our sample, 1993. We use the first year of the sample for this definition in order to avoid a potentially endogenous definition of management type that responds to changes in competition.[16]

Family firms are prevalent in Spain: Table 1 shows that 41% of our observations are family firms. 58% of family firms in our sample have just one family manager, and none of the firms have more than seven family managers (see online appendix for a histogram). Consistent with the literature, family firms are on average smaller (both in terms of sales and employment), have lower productivity, and spend less on R&D. The share of family firms ranges from 17% to 69% across different industries.[17] Family management is relatively persistent: 74% of family-managed firms in 1993 are still family-managed in 2007. This finding is consistent with earlier work on Spanish family firms using different data (Gallo and Pont, 1989).

Our main regressions use information on family members in managing positions. The data set also includes information about the number of family members in non-managing positions, which we use in a placebo test to differentiate family management from other aspects of family businesses. Furthermore we use a variable indicating whether the firm is controlled by a family group as an indicator for family ownership and thereby distinguish between family-owned and family-managed, and family-owned but professionally-managed firms. This variable, however, is available for one year at the end of our sample, which is why

[14]Note that additional details regarding the construction of our variables can be found in the online appendix.

[15] Note that an owner is not necessarily a majority owner (this is not clearly specified in the survey) and a founder is not necessarily an owner.

[16]In a robustness check we look at whether changes in management explain the productivity response.

[17]See figure in the online appendix. In the online appendix we also show tariff changes are uncorrelated with changes in the share of family firms across industries or with the number of family managers within a firm.

we use it only in robustness checks.

Productivity. We use labor productivity as our main measure of productivity as it is transparent and can be directly observed in the data. Since we do not want to interpret changes in output or input prices as changes in productivity, we exploit the fact that the Spanish firm-level survey provides firm-specific deflators for inputs and outputs.[18] Firms are asked by what percentage the sales price of its products and the purchasing price of its intermediate inputs and services have changed compared to the previous year. The price changes are supposed to be calculated as a weighted average across various final products and markets (for output prices) and a weighted average across various intermediate inputs, energy consumption, and purchased services (for input prices). We use these price changes to deflate output and intermediate inputs at the firm level (instead of using industry-wide deflators). Overall, our measure of labor productivity is therefore given as deflated sales minus deflated intermediate inputs divided by employment.[19]

Labor productivity does not exclude the contribution of capital to total output from the productivity measure; and productivity changes might be driven by changes in the capital stock. In robustness checks, we use the Olley and Pakes (1996)-type proxy estimator approach augmented with a De Loecker (2007; 2013)-type correction that allows for the management type and import tariffs to directly affect the evolution of firm TFP to estimate firm-level total factor productivity (TFP). In addition, we allow family firms to have different technologies from non-family firms by including a dummy variable for family firms in the production function (additional details are provided in the online appendix).

Tariff data. This paper exploits variations in industry-specific import tariffs over time. We use tariffs that the EU imposes on imports from the rest of the world ("import tariffs") to construct our main regressor. We use MFN tariffs from TRAINS (provided by UNCTAD) accessed via the WITS software provided by the World Bank.[20] We use the weighted average of the import tariff in each product category (ISIC Rev. 3; 244 product categories) and aggregate them to the NACECLIO industries that the Spanish data uses (20 NACECLIO categories[21]) by using trade shares in 1993 (to avoid endogeneity of the weights). Our results

[18] Ornaghi (2006) first demonstrated the usefulness of this feature in the Spanish firm-level data. The importance of distinguishing between productivity and price changes has been noted in e.g., De Loecker (2011) and Beveren (2012).

[19] Notice that this 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.

[20] `http://wits.worldbank.org/wits/`

[21] 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.

are robust to using trade shares from the previous year to calculate the industry-level tariffs. For robustness checks we calculate average tariffs that other countries impose on exports from the EU ("export tariffs") as an indicator for export opportunities with the same methodology; and import tariffs on the inputs ("input tariffs") of an industry based on Spanish input-output tables to control for changed access to imported inputs.

The resulting import tariffs are shown in Figure 1. Tariffs fell over time, especially during the 1990s. Important trade liberalization episodes that occurred during the sample period include several EU enlargement episodes (e.g., also studied by Berger and Nitsch, 2008; Bergin and Lin, 2012; Brouwer et al., 2008) and China's accession to the WTO in 2001 (also studied in Bloom et al., 2016; Autor et al., 2013). A large heterogeneity of tariffs across industries is also visible. Beverages, food/tobacco, meat related products, and textiles all started with the highest tariffs. While tariffs dropped for food and drink related industries, tariffs on textiles fell very little. Tariffs for leather/fur/footwear and vehicles also changed little and remain on the higher end.

3 Empirical strategy

We start by estimating the effects of import competition separately for the set of family-managed and professionally-managed firms. We then combine the separate regressions into a pooled regression, which has three advantages: First, it allows us to test whether coefficients are significantly different across family and non-family firms. Second, it allows us to check whether our results are robust to adding industry-times-year fixed effects. Third, it allows us to more efficiently conduct a variety of other robustness checks.

Separate regressions. We regress log productivity changes $\Delta\ln(labprod_{it})$ on changes in import competition ΔIMP_{st} separately for family and non-family firms. We allow for a potential heterogeneous effect depending on the firm's log productivity in our base year 1993, $\ln(labprod93_i)$, in line with literature on heterogeneous firms and trade inspired by Melitz (2003),

$$\begin{aligned}\Delta\ln(labprod_{it}) \quad = \quad & \beta_1\Delta IMP_{st} + \beta_2\left(\Delta IMP_{st}\cdot\ln(labprod93_i)\right) \\ & +\beta_3\cdot\ln(labprod93_i) + \text{yearFE} + \text{industryFE} + \eta_{it} \qquad (3.1)\end{aligned}$$

where i denotes firm, s denotes industry, and t denotes year.

A few things should be noted: We add the interaction of import competition with initial productivity because we are interested in heterogeneous effects for firms that are initially unproductive versus those that are initially productive. Notice, however, that the magnitude of coefficient β_1 does not directly reveal the effect of import competition on productivity for initially unproductive family firms as there are no firms with zero initial productivity. Similarly, the coefficient β_2 tells us how the effect changes as initial productivity increases but it does not tell us what sign the effects have for initially very productive firms. For this reason we calculate the marginal effects of import competition for firms at the 10th percentile (i.e., initially unproductive) and firms at the 90th percentile (i.e., initially productive) of the initial productivity distribution and we focus our interpretation of the results on these marginal effects. For robustness, we also estimate the interaction effect non-linearly with respect to different percentiles but it turns out that a linear approximation works quite well.

For easier interpretation we use the *negative* of the industry- and year-specific EU import tariff, denoted as IMP_{st}, as our exogenous variation in import competition. This means when IMP_{st} increases, import competition increases due to a reduction in import tariffs. In general, it is not always clear whether tariff changes can be interpreted as exogenous to firms and industries as large companies often try to influence policy makers in order to obtain favorable tariffs. However, in the Spanish case tariffs are negotiated at the European level and it is less likely that Spanish firms are able to influence European decision making. Furthermore, many tariff changes are part of a larger political process (e.g., the EU enlargement or China's WTO accession) and therefore likely out of the control of specific Spanish firms.

Our specification allows for year fixed effects to absorb macroeconomic shocks. Since the model is in first differences, any time-invariant firm or industry characteristics are absorbed as firm fixed effects in levels drop out in the first differences specification. We follow Autor et al. (2017) and make the empirical specification more demanding by adding industry-level fixed effects to the estimation equation in first differences, allowing for industry specific time trends. Historically, import tariffs have fallen while productivity has increased at the industry level. These correlated trends should not be interpreted as causal evidence of a productivity response to increased import competition.

Finally, all standard errors are two-way clustered at the firm level (to allow for autocorrelation within a firm over time) and industry-year level (to allow for correlation across firms in the same industry).

Pooled regressions. Our main specification is a pooled regression of family and non-family firms with triple interaction terms that allow for differential effects of import competition depending on a firm's management type (family vs. non-family) and initial productivity. The resulting, fully saturated regression equation is:

$$
\begin{aligned}
\Delta\ln(labprod_{it}) \quad = \quad & \beta_1 \cdot \Delta IMP_{st} + \beta_2 \cdot \Delta IMP_{st} \cdot \ln(labprod93_i) \\
& + \beta_3 \cdot \Delta IMP_{st} \cdot FAM93_i + \beta_4 \cdot \Delta IMP_{st} \cdot \ln(labprod93_i) \cdot FAM93_i \\
& + \beta_5 \cdot FAM93_i + \beta_6 \cdot \ln(labprod93_i) \cdot FAM93_i + \beta_7 \cdot \ln(labprod93_i) \\
& + \text{yearFE} \cdot FAM93_i + \text{industryFE} \cdot FAM93_i + \eta_{it} \qquad (3.2)
\end{aligned}
$$

We allow for family-firm-specific year and industry fixed effects. This ensures that all coefficients in this regression are identical to the coefficients obtained from the separate regressions for family and non-family firms. For example, coefficients β_1 and β_2 estimate the effects of import competition for non-family firms, allowing for a differential effect by initial productivity. Importantly, the advantage of the pooled regression is that it allows us to test whether the estimated effect on family firms is significantly different from that of non-family firms, which is estimated by coefficients β_3 and β_4 (again allowing for a differential effect by initial productivity). Since we are interested in the effect on the initially least (p10) and most (p90) productive firms, we compute marginal effects as discussed above. In addition, we are able to compute marginal *differential* effects this time. By focusing on these marginal differential effects we are implicitly implementing two difference-in-differences specifications (family versus non-family firms; before and after an import competition shock): one for initially unproductive and one for initially productive firms, which we will report separately. As this is the most stringent specification, we are going to focus our interpretation on these effects.

Additional benefits of the pooled regression are that we are able to add industry-times-year fixed effects; and that we are able to show a large number of robustness checks in a simple and space-saving way.

4 Empirical results

Separate regressions. We start by dividing the sample into family-managed and professionally-managed firms and estimate the effect on these two samples separately in Table 2. Columns (1) and (5) already reveal that heterogeneity across these different types of firms is important: Import competition has a positive and significant effect on the labor productivity of family firms but a negative and insignificant effect on non-family firms.[22] Note that this difference is not driven by differences in initial productivity as we control for this.

In columns (2) and (6) we allow for additional heterogeneity with respect to initial produc-

[22] The average effect of import competition on labor productivity across all firms is positive, but insignificant (see the online appendix). The magnitude is similar to findings in the literature, e.g., Fernandes (2007); Schor (2004); Amiti and Konings (2007).

tivity. The coefficient on import competition is large and significant for family firms and the effect decreases as the initial productivity of firms increases. Interpreting the raw coefficients is not meaningful, however, as there are no firms in the sample with an initial log productivity of zero. We therefore evaluate the estimated effects for firms at the 10th and 90th percentile of the initial productivity distribution, which are reported in the rows below the coefficients. We can see that import competition has a large and positive effect on the productivity of initially unproductive firms, but this effect fades out and there is an insignificant effect for initially productive firms. When we implement the same exercise using the sample of non-family firms, we see negative effects for both the initially least productive firms and the initially most productive firms. However, all effects are insignificant.

In columns (3) and (7) we add region fixed effects to the regression and in columns (4) and (8) we allow for firm-specific time trends but the results change very little. Overall, there is a very robust, positive productivity response to import competition for initially unproductive family firms.[23]

The magnitude of this effect is sizable. In our preferred specification in column (2) of Table 2, a one percentage point reduction in the import tariff leads to a 4% increase in labor productivity for the family firms with low initial productivity (10th percentile). Over the sample period, the import tariff fell by 0.34 percentage points per year on average, so the resulting average annual productivity increase is about 1.4% for the initially least productive family firms. A large annual import tariff reduction (95th percentile), however, would be associated with a 4.7% labor productivity increase for the initially least productive family firms.

Non-parametric regressions. Regression equation (3.1) imposes a linear relationship between the initial productivity and productivity changes after an import competition shock hits. The estimation might disguise a non-linear or non-monotonic relationship in the data. In order to check this, we also implement non-parametric versions of regression equation (3.1) for both types of firms:

$$\begin{aligned}\Delta\ln(labprod_{it}) \quad &= \quad \beta_1 \Delta IMP_{st} + \sum_p \beta_{2p} Perc93_{pi} + \sum_p \beta_{3p} \left(Perc93_{pi} \cdot \Delta IMP_{st}\right) \\ &\quad +\text{yearFE} + \text{industryFE} + \eta_{it}, \end{aligned} \tag{4.1}$$

where $Perc93_{pi}$ are dummy variables for firm i's position in different percentiles p of the initial productivity distribution. We experiment with different percentiles, using halves, terciles, quartiles, and quintiles.

[23] We also checked whether there are additional effects to lagged changes in import tariffs but we were not able to find significant effects (see table in online appendix). The immediate response is consistent with the motive to fight against bankruptcy in order to survive another day, which we present in the theoretical part of the paper.

Figure 2 shows the effects graphically for the case of quintiles. Family firms that are in the bottom two percentiles of the initial productivity distribution respond positively to import competition but the response is smaller and insignificant for more productive firms. The pattern across percentiles suggests that the linear interaction is indeed a good approximation. In contrast, non-family firms respond negatively to import competition but the effect is mostly insignificant. This pattern is largely consistent across different splits of percentiles of the data. In columns (1) and (5) of Table 3, we estimate the effect differently for the lower and upper half of firms in the initial productivity distribution and we repeat the estimates for terciles, quartiles, and quintiles in columns (2) to (4) and (6) to (8).

Pooled regressions. In Table 4 we move to the pooled estimation given in regression equation (3.2) that estimates the effects jointly for family and non-family firms. Column (1) implements the pooled version of the separate regressions in columns (2) and (6) of Table 2. The coefficients on ΔIMP_{st} and $\Delta IMP_{st} \cdot \ln(labprod93_i)$ estimate the impact on non-family firms, whereas the coefficients on those terms interacted with the family firm dummy $FAM93_i$ estimate the effect on family firms *relative to non-family firms,* i.e., the difference between the two firm types. Using these estimates we can compute marginal effects for non-family and family firms at various points of the initial productivity distribution. Table 4 reports marginal effects at the 10th and 90th percentile of the initial productivity distribution and in Figure 3 we report the results for the entire initial productivity distribution of family and non-family firms. The effect on family firms decreases with firms' initial productivity but it is positive and significant even for the median-sized family firms, which indicates that our estimated effect is not just relevant for a handful of unproductive family firms.

More importantly from an identification point of view, however, the pooled regression allows us to test whether the estimated effect is statistically different between family firms and non-family firms. We implement this test in the last rows of Table 4 and see that the effect on the initially least productive family firms is indeed statistically larger than the effect on the initially least productive professionally managed firms. In order to save space and to simplify the exposition, we are going to focus on these two marginal differential effects in following tables.

The remaining columns in Table 4 add a number of different fixed effects to check the robustness of the results. In column (2), we add regional fixed effects (separately for family and non-family firms) to allow for confounding geographic trends. In column (3) we allow for industry*year fixed effects to absorb any industry-year specific heterogeneity that might be correlated with import competition. Taking this step leaves us unable to identify the main effect of import competition but it is reassuring to see that all the interaction terms remain almost unchanged. Turning to the marginal effects, while we cannot estimate the main effects on family or non-family firms in this specification, we can identify the differential effect of interest which is still significant. In column (4) we even control for firm fixed effects, which implies allowing for firm-specific trends in productivity (as the estimating equation is in first differences). In short, our results are robust to including these various fixed effects.

The number of family managers. So far we have compared firms with any family managers with firms that have no family managers. Since our data includes the number of family managers, we can refine our specification and interact the effects with the number of managers. As a table in the online appendix shows, the results are unchanged: Firms with one family manager increase productivity significantly relative to firms with professional managers.

Alternative productivity measures. While labor productivity is a transparent measure, it has one disadvantage: Increases may be driven by capital accumulation. In order to investigate whether this is responsible for our main finding, we implement a structural TFP estimation for robustness. We follow the recent literature by combining the Olley and Pakes (1996)-type proxy estimator approach augmented with a De Loecker (2007; 2013)-type correction that allows for family firms to have different technologies from non-family firms; and the management type and import tariffs to directly affect the evolution of TFP (additional details are provided in the online appendix). Column (1) in Table 5 uses this TFP measure in our pooled specification, adding industry*year fixed effects in column (2). Again the effect of import competition is positive for family firms that are initially unproductive and significantly different from those initially unproductive professionally managed firms, suggesting that our previous results are driven by increases in productivity rather than capital stock.

In columns (3) and (4) of Table 5 we divide deflated value added by the number of hours worked instead of employment and in columns (5) and (6) by the total wage bill. Our findings are robust to these alternative productivity measures.

In the following sections we implement robustness checks in order to rule out two types of alternative explanations. First, we check whether family management rather than other characteristics of family-managed firms drive our results. Second, we check whether the productivity response is driven by increased import competition or by other potentially correlated shocks such as improved access to imported inputs or foreign markets.

4.1 Robustness checks: family management

Given that we know family and non-family firms differ across observable and unobservable characteristics, we want to understand whether our estimated effects are driven by family management rather than other, correlated (observed or unobserved) firm characteristics. Since we are not able to use an instrumental variable approach (e.g., as in Bennedsen et al. 2007) that would make it possible for us to compare two identical firms that differ only by management type, we implement several different tests.

Observable firm characteristics. In Table 6 we perform a horse race between family management and other observable characteristics such as size, R&D intensity, and capital intensity, allowing for productivity changes to depend on initial productivity just as in our baseline specification.[24] Column (1) repeats our baseline specification and in column (2) we add an interaction term between import competition and the initial sales of the firm. This specification allows the effects to differ across firms with different initial sizes and helps us distinguish between the effects of family firms versus the effects of firm size. Interestingly, the estimates on family firms are not affected by this inclusion and the coefficients on sales are not significant, suggesting that family management rather than size matters. In column (3) we conduct the same exercise using initial employment as an alternative size measure with the same results. In column (4) we perform the same exercise with initial R&D intensity and in column (5) we allow the effect to vary by initial capital intensity. Neither inclusion has an impact on the effects of family management. In fact, the differential marginal effects for family firms at the lowest percentile are remarkably similar in magnitude. This is robust to adding all alternative characteristics together in column (6).

As an alternative method, we use propensity score matching (PSM) techniques (inverse propensity score re-weighting and nearest neighbor matching) using firm's initial TFP, sales, employment, and exporting status in another set of robustness checks. As a result of the matching, family firms and non-family firms are distributed more equally across initial TFP in our regressions. Our empirical results are robust to using either method (tables provided in the online appendix).

Non-managing family members. Next, we explore more intangible characteristics of family-managed firms. Since we also observe the number of family members in *non*-managing positions, we can check whether those employees affect productivity in a way similar to that of managing family members. If this is the case, we are likely measuring the effects of some other more general characteristics of firms that are associated with families rather than the specific effect of family management. We perform a similar horse race in column (2) of Table 7 to the one in column (2) of Table 6. However, we test whether our effects are driven by family members in managing versus non-managing positions this time and implement this by adding an interaction term with a dummy variable for whether the firm has family members in non-managing positions.[25] The estimated effects confirm that management is the driving force behind productivity increases as we do not find significant effects for firms with family members in non-managing positions. In columns (3) and (4) we replace the family firm dummy variables with the number of family members in managing and non-managing

[24] Note that we do not need to test against differences in productivity as our baseline estimates already control for initial productivity.

[25] Note that, while having family managers in managing and non-managing positions is positively correlated, the correlation between the dummy variables is only 0.37 as we have firms in the sample that have family members in managing but not non-managing positions and vice versa.

positions to exploit the full variation that we have in the data.[26] Our findings are unchanged: Again, productivity increases are driven specifically by family management.

Family ownership. Family-managed firms are owned by families and family ownership has been shown to affect the governance of firms in various ways (e.g., Suáre and Santana-Martín 2004; Kim and Lu 2011), generating different incentives for undertaking innovation (e.g., differential tax incentives, different types of assets, different political connections, or different time horizon of running the business). In column (1) of Table 8, we test whether family management rather than family ownership is driving our results by restricting the sample to family-owned firms. Unfortunately the information on family ownership is only available at the very end of our sample, in 2006. We therefore need to assume that family ownership is unchanged over time and use the value in 2006 to identify family owned firms. When we restrict the sample to family owned firms, the marginal effects compare family owned and family-managed firms to *family owned but professionally managed* firms. The marginal effects in column (2) reveal that import competition increases the productivity of family-managed, family owned firms by more than those of professionally managed, but family owned firms, confirming our hypotheses that family management rather than other aspects of family firms are driving our results. Given that the ownership variable is available only at the end of the period, this is admittedly a rough test. However, it is the best we can do using the data in hand and nevertheless reassuring that our results hold.

Switch towards professional managers. As a final step we want to make sure that productivity improvements are not only driven by firms that replace their family managers by professional managers. Column (3) of Table 8 checks whether the observed productivity improvements are driven by firms that replaced their family managers by professional managers. In order to do this, we exclude firms that are initially family-managed but switch to professional management at some point in the sample. It is reassuring to see that the results are not driven by those switchers. If anything, our findings seem to become stronger in magnitude. In a similar spirit, we check directly whether family management changes as a response to import competition in column (4) by using the change in the time-varying family firm dummy variable as a dependent variable. While the marginal differential effects reveal a small positive effect for initially unproductive firms, the effect is insignificantly different from zero.[27] Overall, switches between family and non-family management cannot be used to rationalize our empirical findings.

[26] The number of family members in non-managing positions ranges between 1 and 6. See the online appendix for a histogram and more details.

[27] The interpretation of the magnitude of the effects is as follows: An increase in import competition triggered by a 1pp tariff reduction leads to an increased likelihood of a firm changing management type by 1.7pp for the initially unproductive firms.

4.2 Robustness check: import competition

While a reduction in tariffs increases import competition, this is not the only trade-related channel through which domestic firms are affected (Shu and Steinwender, 2019). First, reduced tariffs also have positive effects on domestic firms as they can import intermediate inputs more cheaply. Second, trade negotiations are often bilateral, resulting in two economies reducing the tariffs on each other, possibly for the same products. This results in another positive effect on firms as they obtain better access to the foreign market by exporting. In what follows, we test whether our regressions are indeed capturing the effect of increased import competition as opposed to better access to imported inputs or export markets.

Imported inputs. Access to inputs has been shown to increase productivity (e.g., Amiti and Konings, 2007; Topalova and Khandelwal, 2011). The productivity increase may be driven by lower prices or higher quality of imported inputs, or different inputs may allow for a more efficient arrangement of the production process. The first channel, increased productivity via lower input prices, is unlikely to show up in our estimates as our productivity changes are already purged of changes in input prices (see discussion in the data section). Furthermore, for these effects to show up in our estimates, they must be larger for initially unproductive firms — the limited empirical evidence on these heterogeneous effects however suggests the opposite (Iacovone, 2012). Nonetheless we can directly control for access to foreign inputs by including the change in input tariffs $INTAR_{st}$ (and its interaction terms with the initial productivity and initial status of family management) to our regression. Column (2) of Table 9 conducts this exercise. The coefficients on input tariffs confirm that the effect of better access to intermediate inputs is positive for initially unproductive rather than productive firms but it is not statistically different between family and non-family firms. More importantly, it barely changes the effect of import competition: The effect is still positive for unproductive family relative to non-family firms.[28]

Export opportunities. The literature has also shown that better access to export markets leads to productivity increases (e.g., Lileeva and Trefler, 2010; Bustos, 2011; Mayer et al., 2016; Munch and Schaur, 2018; Iacovone, 2012). However, whether more or less productive firms are affected is less clear. Existing papers suggest that the positive effect is the largest at the lower (Lileeva and Trefler, 2010; Munch and Schaur, 2018), the middle (Bustos, 2011) or the upper end of the productivity distribution (Iacovone, 2012). In addition, there is no evidence that this affects family firms differentially from non-family firms. In order to directly test this explanation, we control for the full interactions with "export tariffs," i.e., tariffs other countries impose on exports originating from the EU, $EXPTAR_{st}$. In column (3) of Table 9 we

[28] In the online appendix we show additional evidence that better access to imported inputs does confound our estimates: We check whether import competition leads unproductive family firms to start importing, increase their imports, start importing technology, or increase their imports of technology. We do not find significant effects of any.

see that the effect of better access to export markets is positive for initially productive rather than unproductive firms and larger for family than non-family firms. But this effect is not statistically different between family and non-family firms. Importantly, this exercise does not eliminate the differential effect of import competition on family relative to non-family firms.[29]

5 Model

In this section we present a model that rationalizes our main empirical findings: After a reduction in import tariffs, family-managed firms at the lower end of the productivity distribution respond by increasing productivity. In our model we suggest that this is due to the specific preferences of family managers. Specifically, they care about the survival of the family firm by itself and do not want to let the firm go bankrupt. We model this by giving family managers additional utility when the family firm exists, which they lose when the family firm goes bankrupt.[30]

There is ample evidence in favor of this type of preferences in the literature on family firms. Family managers have been shown to obtain a wide range of personal benefits from running the firm (e.g., Hurst and Pugsley, 2011; Bandiera et al., 2014a; Belenzon et al., 2014; Gomez-Mejia et al., 2007; Besley and Ghatak, 2005; Prendergast, 2008; Bertrand et al., 2008; Mullins and Schoar, 2016; Bertrand and Mullainathan, 2003). For example, there is emotional attachment to the firm; the family firm also might allow for an increased social status or even allow for personal identification. People have been shown to have a preference for eponymy and empire building. Family managers may like to pass the firm on to the next generation. But they may also just enjoy being their own boss, having flexible work hours, using the firm resources for private purposes, or having the opportunity to use the firm to address family issues (e.g., finding a prestigious job for a low-ability offspring).

We start with a static partial equilibrium model with heterogeneous firms and endogenous productivity, i.e., the firm's managers have the possibility to exert effort and increase the productivity of the firm. The key novel element of the model in this paper is that we allow managers to have heterogeneous preferences with respect to non-monetary private benefits of running the firm. This generates differential productivity responses to a change in the competitiveness of the market. Our model is general and just distinguishes between two types of managers: We assume that compared to P-type (i.e., professional) managers, F-type

[29]In the online appendix we show additional evidence that better access to export markets does not confound our estimates: We check whether import competition leads unproductive family firms to start exporting or increase their exports but we do not find significant effects of either.

[30]Note that the driving feature of our model revolves around the characteristics of the manager of the firm rather than the owner or a non-managing employee of the firm. Therefore, we abstract from theoretical explanations that are based on the latter (e.g. tax incentives, political connections, asset mixes, or investment horizons that differ for family owned vs non family owned firms).

(i.e, family) managers derive (more) non-monetary private benefits from running the firm which they only receive when the firm exists.

5.1 Setup

Firm profits. We assume that each firm draws a random initial productivity ϕ upon entry. The initial productivity draw is fixed throughout the model and its cumulative density function (CDF) is assumed to be $G(\phi)$. Firm profits are positively related to the exogenous productivity draw. Managers can exert effort β which increases ex post firm productivity endogenously.

We model the firm's profits π in the following stylized way:

$$\pi = (\eta + \phi\beta) - f.$$

The first term, η, is an exogenous market environment parameter that leads to decreased profits when import competition increases. We label the second term *realized productivity,* $\phi\beta$, of the firm which is a positive function of the initial productivity draw and managerial effort. We assume that there is a complementarity between exerting effort and the initial productivity draw, meaning that the marginal return to exerting effort increases with the initial draw. We label these two terms together variable or operating profits, $\eta + \phi\beta$.

Finally, the third term in the profit function is a fixed cost of production f which the firm incurs in order to produce. If the variable profits are not enough to cover the fixed cost, the firm exits — the model therefore allows for endogenous exits. Furthermore, the manager can also let the firm exit and obtain zero utility without exerting any effort (i.e., the manager's outside option yields zero utility). However, if total profits (i.e., variable profits minus the fixed cost) are negative *after* the effort is exerted, the firm is forced to exit even if the manager would like to continue operating the firm, as our model is a static model. In this case, the manager obtains zero monetary income but still has to bear the disutility of exerting effort. In short, exit is not chosen by the owner or the manager once the manager has exerted effort.[31]

Utility functions. The manager derives utility from both firm profits and non-monetary private benefits, which exist only when the firm exists. As we have argued above, we assume that F-type managers derive more of these private benefits than P-type managers. For simplicity, in what follows we assume that only F-type managers derive the non-monetary private benefits. However, the empirical predictions of the model are unchanged even if we allow for a private benefit of P-type managers, as long as it is small enough (and smaller than that of F-type managers).[32] The utility of the manager also includes a private, convex cost of

[31]We implicitly assume that the firm cannot borrow and the manager cannot use his or her own wealth to cover the firm's losses in order to prevent the firm from exiting. This is true in our model, as it is static. In addition, this seems like a reasonable assumption as firms that go bankrupt probably face severe financial constraints and managers of those firms are likely also facing personal financial constraints.

[32]For a more details on this, see our discussion after Proposition 3.

exerting effort, which is assumed to be the same for both type of managers.

Overall, the utility of F-type managers is given by:

$$U_F = \begin{cases} (\eta + \phi\beta) - f - \frac{1}{2}\beta^2 + \bar{U} & \text{if firm exists;} \\ 0 & \text{if firm exits,} \end{cases} \tag{5.1}$$

where $\frac{1}{2}\beta^2$ is the effort cost and $\bar{U}$ represents the non-monetary private benefits.

The utility function of P-type managers differs from that of F-type managers only by the lack of the non-monetary private benefits:

$$U_P = \begin{cases} (\eta + \phi\beta) - f - \frac{1}{2}\beta^2 & \text{if firm exists;} \\ 0 & \text{if firm exits.} \end{cases} \tag{5.2}$$

5.2 Effort choice and realized productivity

In this subsection we derive the optimal effort choice of both managers. The following proposition summarizes our result.

Proposition 1 (Optimal effort choice)**.** *Assume $f \geqslant \eta$ and $\bar{U} > \frac{f-\eta}{2}$,*[33] *then:*

1. *The optimal effort choice for a P-type manager is given by:*

$$\beta_P(\phi) \quad = \quad \phi \quad \text{if } \phi \geqslant \sqrt{2(f-\eta)} \equiv \bar{\phi}_P$$

P-type managers with productivity draws below $\bar{\phi}_P$ exit the market.

2. *The effort function of the P-type manager is increasing in ϕ.*

3. *The optimal effort choice for a F-type manager is given by:*

$$\beta_F(\phi) \quad = \quad \begin{cases} \phi & \text{if } \phi \geqslant \sqrt{(f-\eta)} \\ \frac{f-\eta}{\phi} & \text{if } \phi \in \left[\frac{f-\eta}{\sqrt{2\bar{U}}} \equiv \bar{\phi}_F, \sqrt{f-\eta}\right) \end{cases}$$

F-type managers with productivity draws below $\bar{\phi}_F$ exit the market.

4. *The effort function of the F-type manager is initially decreasing in ϕ and later increasing in ϕ (i.e., the relationship is "U-shaped").*

[33] The first assumption is a technical assumption, which is needed to generate endogenous exits. Otherwise, managers with any productivity draw can make their firms survive and obtain positive payoffs by choosing zero effort. The second assumption states that the private benefits are big enough such that even when the firm's final profits are zero (under the effort level that ignores the private benefits), F-type managers still have incentives to keep their firms alive by exerting more effort. Without the second assumption, the model would not generate a positive productivity response from initially unproductive family firms under tougher import competition, which is the purpose of the model.

Proof. In appendix. □

Figure 4 illustrates the optimal effort as a function of initial productivity draw for P-type managers and for F-type managers. If productivity is high, i.e., above $\bar{\phi}_P$, both F-type and P-type managers behave in the same way. For both type of managers, effort increasing in the initial productivity draw, because the two are complements. However, when initial productivity is below $\bar{\phi}_P$, P-type managers let the firm exit, while F-type managers prefer to keep the firm alive in order to reap the private benefits. This creates an incentive for F-type manager to work harder and this incentive is larger the lower the initial productivity. If the initial productivity is too low, i.e., below even $\bar{\phi}_F$, ensuring firm survival requires too much effort and the F-type manager prefers to exit. Overall, the exit cutoff is lower for F-type managers than for P-type managers.

The kink in the effort function of F-type managers in Figure 4 also illustrates that there are two different ways in which the F-type manager is incentivized to exert effort. Below the kink, when the effort function is decreasing, the F-type manager exerts effort in order to make their firms break even and stay in the market. For further exposition, we label managers with initial productivity in this region the *constrained managers.* Above the kink, when the effort function is increasing, she exerts effort in order to increase the marginal profitability of the firm. We label these managers the *unconstrained managers.*

In addition to the predictions for effort choices, the model also has the following implications for productivity:

Proposition 2 (Realized productivity)**.** *Assume $f \geqslant \eta$ and $\bar{U} > \frac{f-\eta}{2}$, then:*

1. *Realized productivity of firms with P-type managers, $\beta_P(\phi)\phi$, increases in ϕ when $\phi \geqslant \bar{\phi}_P$.*
2. *Realized productivity of firms with F-type managers, $\beta_F(\phi)\phi$, is constant for $\phi \in \left[\bar{\phi}_F, \sqrt{f-\eta}\right)$ and increasing in ϕ for $\phi \geqslant \sqrt{f-\eta}$.*
3. *Average realized productivity of firms with P-type managers is higher than that of firms with F-type managers.*
4. *Assume that the initial productivity draw follows the same Pareto distribution for both F-type firms and P-type firms. Then, the distribution of realized productivity of P-type firms first order stochastically dominates that of F-type firms.*

Proof. See appendix. □

Figure 5 illustrates how realized log productivity, which is a combination of the initial productivity draw and the optimally chosen effort, varies with the initial productivity draw for P-type managers and for F-type managers. Realized productivity weakly increases in the initial productivity for both type of managers but more importantly, as the exit cutoff for professional firms is larger, average observed productivity for P-type firms is higher than that of F-type firms.

5.3 Impact of import competition on productivity

In this subsection we analyze how stiffer import competition affects the realized productivity of F-type firms and P-type firms differentially. Specifically, we conduct a comparative statics exercise of a decrease in η (i.e., an increase in import competition) on managerial effort and firm productivity. We use subscripts *"before"* and *"after"* to denote variables before and after a reduction in import tariffs. The following propositions state formally how tougher import competition affects F-type firms and P-type firms differently:

Proposition 3 (Productivity change for F-type firms and P-type firms)**.** *Assume $f \geqslant \eta$ and $\bar{U} > \frac{f-\eta}{2}$. Suppose the market environment parameter decreases from η_1 to η_2, i.e., import competition increases. Then:*

1. *The realized productivity of each surviving P-type firm is not affected.*
2. *For surviving F-type firms, the initially least productive surviving firms increase their realized productivity, whereas the initially most productive surviving firms do not change their realized productivity.*
3. *For the initially most productive surviving firms, the induced productivity change of F-type and P-type firms is the same. For the initially least productive surviving firms, the productivity change for F-type firms is larger than that of P-type firms.*

Proof. See appendix. □

Figure 6 illustrates the change in the managerial effort and firm productivity graphically in response to an increase in import competition. The least productive surviving F-type firms increase productivity as stiffer import competition incentivizes their managers to exert more effort to ensure the survival of their firms (i.e., by just earning non-negative profits). On the contrary, the most productive surviving F-type firms and all P-type firms do not change their productivity, as their managers' efforts do not depend on the market environment parameter. This is the main proposition of our simple, stylized model that can rationalize our empirical findings.

It is worth noting that the empirical predictions of the above proposition do not depend on the assumption that P-type managers receive no private benefits by running the firms. In fact, as long as the private benefits P-type managers receive are smaller than $\frac{f-\eta}{2}$ (i.e., $\bar{U} \leqslant \frac{f-\eta}{2}$, which is opposite the assumption made for the private benefits of F-type managers), the effort choice is still ϕ for all P-type managers, which does not respond to a change in the market environment parameter η. As a result, their effort and their firms' productivity do not change after import competition increases. In short, our results hold as long as the private benefits of F-type managers are above — and the benefits of P-type managers are below — a certain threshold.

Proposition 4 (Exits)**.** *Assume $f \geqslant \eta$ and $\bar{U} > \frac{f-\eta}{2}$. Suppose the market environment parameter decreases from η_1 to η_2, i.e., import competition increases. Then:*

1. *The exit cutoff on realized log productivity increases for both F-type firms and P-type firms. As a result, the least productive firms of either type exit.*

2. *For firms with the same realized initial productivity, P-type firms are more likely to exit than F-type firms.*

Proof. See appendix. □

6 Additional empirical evidence

The objective of the model was to provide a rationale for explaining our main results in the data: Initially unproductive family firms increase their productivity in response to an import competition shock, while we see no significant changes for initially productive family firms or non-family firms (Table 4). Proposition 3 qualitatively predicts this pattern.[34] However, ours may not be the only model that can rationalize the empirical findings. We therefore explore in this section how likely it is that the mechanism proposed in the model is the correct one, and whether additional predictions of the model are consistent with the data.

Innovation. We start by investigating what kind of activities managers undertake in response to import competition. In column (2) of Table 10 we check whether firms that respond to import competition also start to perform R&D activities, using the change in the R&D dummy variable as a dependent variable. However, we cannot find significant marginal effects. In column (3) we use the change in the R&D expenses that a firm reports as a dependent variable.[35] Family firms at both ends of the productivity distribution report increased spending relative to non-family firms, but the estimated effects are not significant. In column (4) we check whether the firm reports a change in the number of patents. We estimate positive effects for initially unproductive family firms relative to non-family firms, but the effects are again insignificant.[36]

[34] Note that strictly speaking, the model predicts a sharp non-linear effect of import competition on the productivity of family firms, whereas our data suggests a more linear effect. Measurement error in productivity or uncertainty with respect to how effort translates into productivity could smooth the strict prediction of the model.

[35] Note that we can only do this for firms that report positive R&D expenses, which explains why the sample size drops significantly.

[36] We also checked whether product or process innovation changed, but did not find significant effects.

Overall, we do not see a differential increase in innovation related activities in response to import competition. This is consistent with the mechanism in the model. R&D and patenting are innovation activities that span a longer time horizon, and are therefore not suitable to increase cash flow to ensure survival. Furthermore, firms that are faced with increased bankruptcy risk due to tougher import competition probably do not have the resources in order to invest into R&D.

Efficiency. In Table 11 we conduct another exercise to shed light on what is going on inside the firm by regressing the different components of labor productivity separately on import competition and the respective interaction terms. Comparing columns (2), deflated value added, with column (5), employment, we see that increases in value added rather than reductions in employment drive the productivity increase.[37] Decomposing value added into sales in column (3) and material in column (4) makes clear that initially unproductive family firms increase their labor productivity by reducing their material inputs (rather than increasing their sales).

This is again evidence in support of the mechanism in the model, as it suggests that firms are trying to use their materials more efficiently in order to increase their short-term cash flow and their survival probability. Managers may be able to improve material efficiency in a variety of ways: They may source the buying inputs at lower prices, they may run down the material inventories, or they may use the same material inputs more efficiently in production. Either interpretation is consistent with the mechanism in the model, in which managers are trying to ensure survival into the next period. But we can dig a little bit deeper. First, we know that the decrease in material usage is not driven by using cheaper materials, as we already deflated material expenditure by change in material prices.[38] Second, if the effects were driven by a run-down in inventory, they would have to be restocked in the next period. As a result, we would see an equivalent productivity decrease in the following period. However, when we run our regressions on changes over two years, we still find significant positive effects of import competition on the productivity of initially unproductive family firms (results in online appendix). The most likely explanation for our findings is therefore that managers are using the same material inputs more efficiently in the production process to generate more output.

Overall, these results are consistent with managers putting more effort towards increasing efficiency (by reducing material usage) rather than innovation (by increasing R&D or patenting). The former can help to increase efficiency, improve cash flows and therefore avoid immediate bankruptcy, whereas the latter improves long-run success, but is more risky if the

[37] This is maybe not surprising as the Spanish labor market has been characterized as very rigid. In the online appendix we also check whether the workers supplied by a temporary agency or total employment of family members changed, but we did not find significant effects.

[38] We also checked whether import competition affected input prices, but there are no significant effects.

firm does not survive. This is consistent with the mechanism in the model, which is triggered by the motive to keep the firm alive another day.

Multi-generational family firms. The model assumes that family managers care more than professional managers about the survival of the firm, in line with findings in the literature on family firms. In Table 12 we test this assumption more directly by checking whether our results are stronger for those family managers who we suspect to be especially motivated to keep the family firm alive in the long run: firms that have more family managers and older family firms. We think that these firms correspond closest to a multi-generational family firm with a long history. In columns (2) and (3) we split the sample of family firms into those that have one family manager versus those that have more than one family manager. The effect for initially unproductive firms is larger for the latter. In columns (4) and (5) we split the firms by age using a 30 year cutoff, which is likely long enough to span more than one generation. Again, the effect for unproductive firms is larger for older firms, even though it is not statistically significant. While these results are imprecise and therefore not strong enough to be a strict test of the model, we interpret them as suggestive of our proposed mechanism.

Cross-sectional productivity differences. The model has additional predictions that we can check in the data. First, while we are interested in explaining productivity changes, the model yields predictions concerning differences in the productivity distribution of family versus non-family firms in the cross section. Most noticeable, Proposition 2 explains that family firms are, on average, less productive than non-family firms. This is a frequent finding of the literature and also supported in our data, as Table 1 shows. The literature usually rationalizes this finding using assumptions of worse abilities or lower willingness to work of family managers (e.g., Bertrand and Schoar, 2006; Bandiera et al., 2014a; Bloom et al., 2012). In our model, however, family managers have the same initial abilities as non-family managers on average, since the distribution of the productivity draws is the same for both types of firms. Also, they exert either the same level of effort or even more: They keep putting in effort for initially unproductive firms that professional managers would have let go bankrupt. Yet, precisely because of the desire to keep unproductive family firms alive, the model results in lower (average) realized productivity for family firms.

Proposition 2 also predicts that the distribution of realized productivity of non-family firms first order stochastically dominates that of non-family firms. Figure 7 plots the empirical CDF of the log labor productivity for both types of firms. The figure shows that this prediction indeed holds in the data.

Exits. Another prediction from the model is Proposition 4, which predicts that import competition leads to exits of non-productive firms of either type. In Table 13 we see that import competition indeed leads to exits.[39] Overall, a fall in import tariffs by 1pp increases

[39] Exiting firms include closed firms, firms in liquidation, and firms that are taken over by other firms.

the average probability of exit by 0.2pp. Column (4) confirms that this increase is especially pronounced for initially unproductive firms. In columns (2) and (5) we see that the increase in exit probability is significant for non-family firms, more specifically the unproductive ones, while the effect on family firms is insignificant, though of similar magnitude.

7 Conclusion

In this paper, we use rich, firm-level data from Spain and changes in EU-imposed import tariffs between 1993 and 2007 to study how stiffer import competition affects productivity of firms depending on their manager type. We find that family-managed firms with initially low productivity show significant productivity increases after a reduction of import tariffs. This is in contrast to initially very productive family firms as well as non-family firms, whose productivity is not affected by import competition. This finding is driven by family management rather than family ownership or other characteristics of family firms. In addition, these productivity increases seem to be driven by a more efficient use of input materials rather than innovation activities like R&D or patenting. This shows that family managers that face increased bankruptcy risk try to improve their cash flow position in order to ensure survival into the next period.

We propose a model featuring heterogeneity in managers' preferences in order to rationalize the empirical findings. Motivated by the literature, we assume that family managers receive additional private benefits when their firm exists. When import competition increases, the bankruptcy risk of the initially unproductive firms increases. Family managers increase effort which makes the firm more productive and ensures survival, while professional managers let the firm exit. Consistent with this notion of the preferences of family managers, our findings are empirically stronger for multigenerational family firms.

Our results shed light on the behavior of family firms, which contribute to a large share of economic activities in many countries throughout the world. Economists have long been worried about the implications of unsatisfactory performance of family firms on welfare and aggregate productivity. At the same time, the surge of China's exports in recent decades has increased the bankruptcy risk of these vulnerable firms. Our findings suggest that the attachment of family managers to their firms creates a stronger motive to "fight" against bankruptcy when the import shock hits. This mechanism may help to reconcile the mixed evidence in existing empirical studies, which have found positive effects for emerging economies that typically host a large number of family managers.

Also, this positive effect of import competition is in contrast to the literature that has pictured family managers as less able or less productive. However, all is not well: The increased efforts are targeted towards improving short-term efficiency (to ensure survival) rather than long-term productivity based on innovation or research and development. Future research should focus on embedding these findings into a general equilibrium trade model that can help us understand how the difference in managers' preferences affects gains in aggregate productivity and welfare after trade liberalization.

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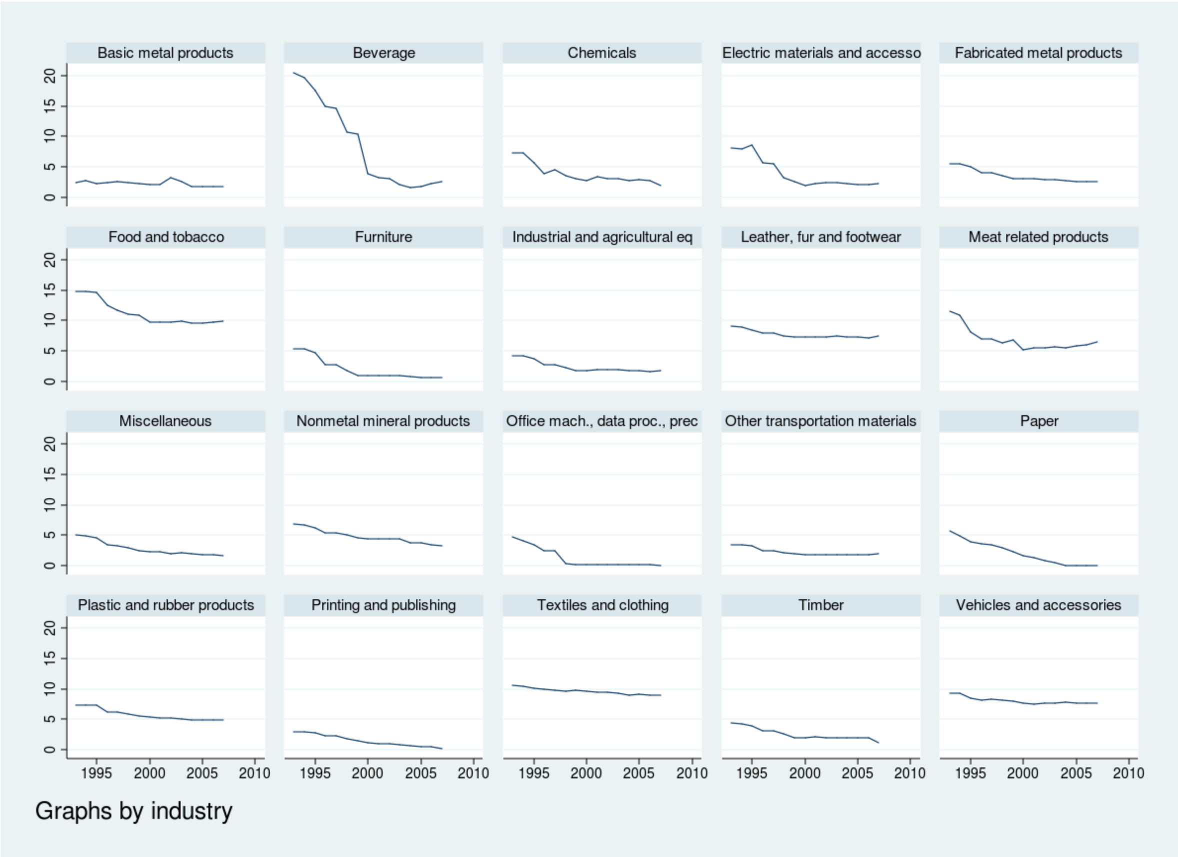
Appendix

A Figures

Figure 1: EU import tariffs over time



Source: TRAINS database (provided by UNCTAD), accessed by World Integrated Trade Solution (WITS), `wits.worldbank.org`

Figure 2: Effect of import competition on labor productivity: Non-parametric estimation

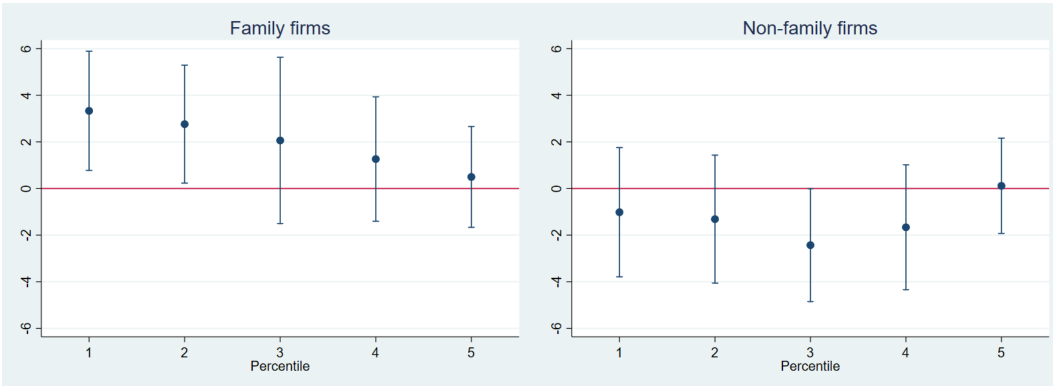


Figure 3: Effect of import competition

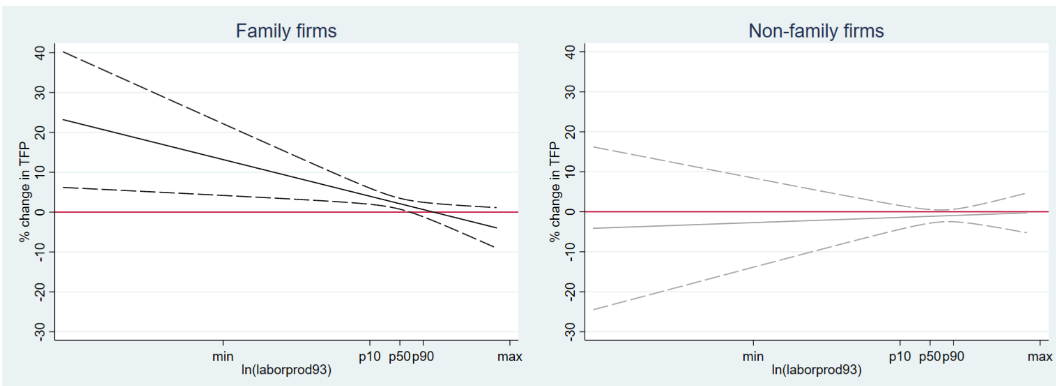


Figure 4: Effort choices of F-type and P-type firms

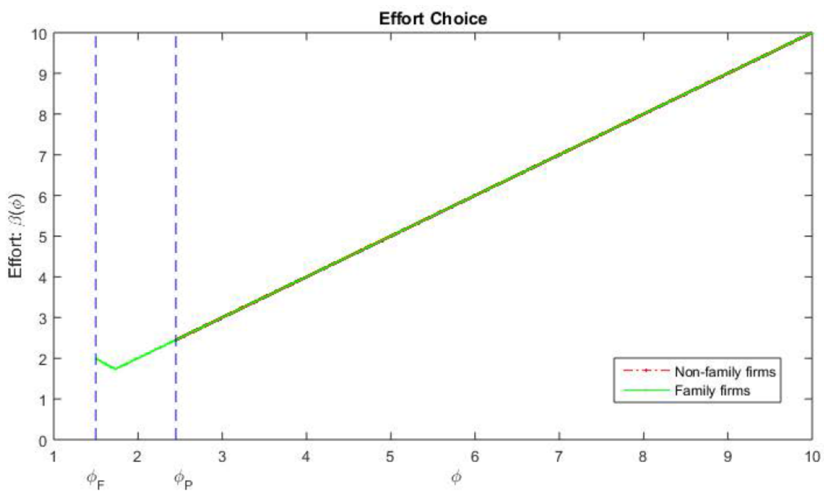


Figure 5: Realized log productivity across firms

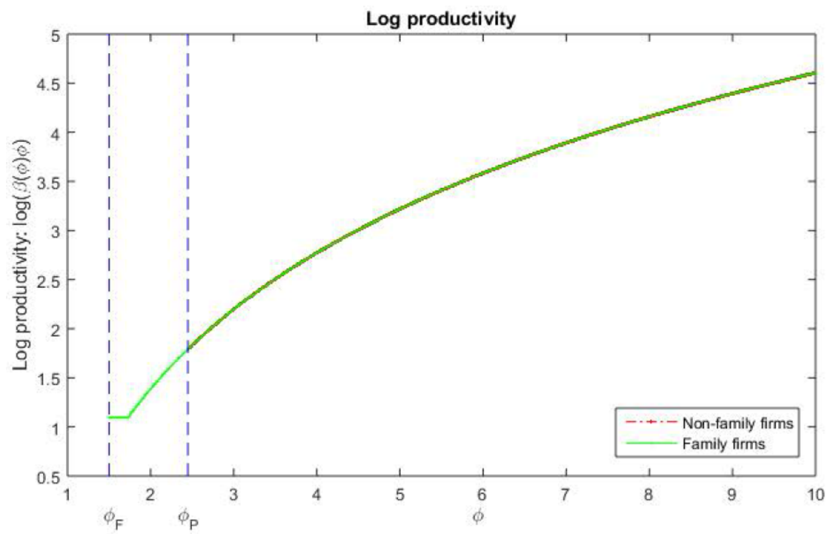


Figure 6: Effect of increased import competition on managerial effort and realized productivity

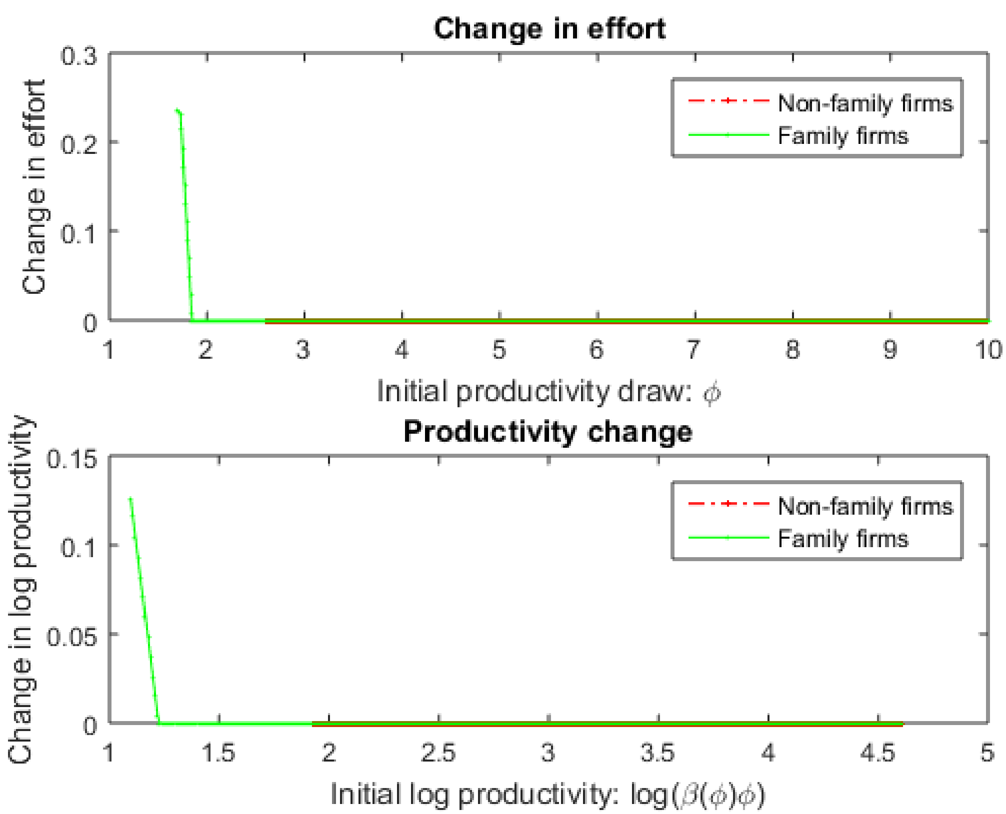
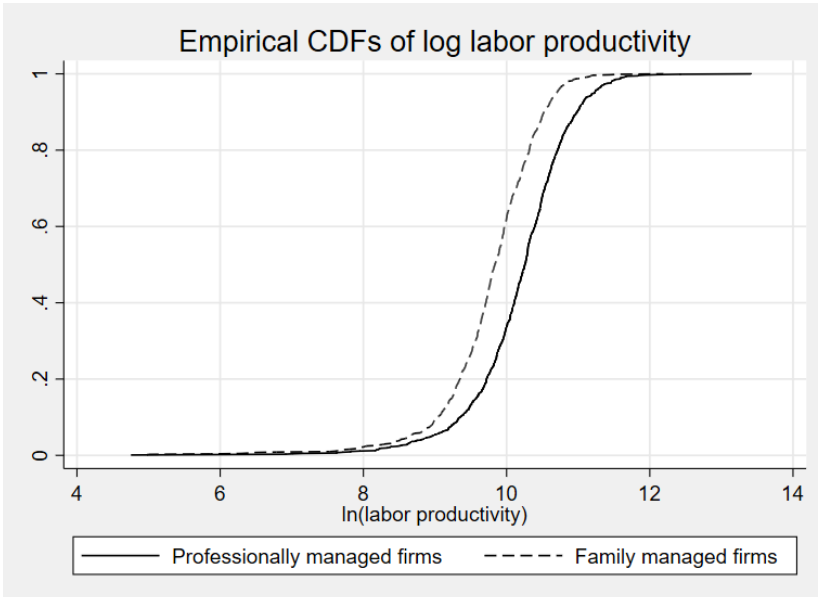


Figure 7: Empirical CDF of log labor productivity



B Tables

Table 1: Descriptive statistics of Spanish manufacturing firms, family versus non-family firms

	Family firms	Non-family firms	Difference
N (firm-year observations)	6,894	9,812	
	(41%)	(59%)	
Sales, million EUR	9.50	84.14	74.64***
	(0.36)	(2.83)	
Employment	71.94	399.18	327.24***
	(1.95)	(9.32)	
ln(labor productivity)	11.19	11.65	0.46***
	(0.01)	(0.01)	
R&D intensity	0.51	0.89	0.38***
	(0.02)	(0.03)	
Capital intensity	26.45	64.13	37.68***
	(0.56)	(1.78)	

Notes: * p<0.05, ** p<0.01, *** p<0.001. R&D intensity is equal to R&D expenditure (in EUR)/sales (in EUR)*100. Capital intensity is capital (in thousand EUR)/employment.

Table 2: Effect of import competition on labor productivity — separate regressions

Dep var: $\Delta\ln(labprod_{it})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Family firms				Non-family firms			
ΔIMP_{st}	2.078**	23.201**	23.347**	29.540**	-1.062	-4.137	-4.199	-3.341
	(0.838)	(10.341)	(10.593)	(13.181)	(0.912)	(12.376)	(12.500)	(13.540)
$\Delta IMP_{st} \cdot \ln(labprod93_i)$		-2.088**	-2.102**	-2.668**		0.296	0.301	0.239
		(1.022)	(1.022)	(1.285)		(1.172)	(1.183)	(1.278)
$\ln(labprod93_i)$	-0.063***	-0.057**	-0.058**		-0.065***	-0.066***	-0.068***	
	(0.023)	(0.024)	(0.026)		(0.011)	(0.013)	(0.014)	
Effects evaluated at:								
10th prod percentile	n/a	4.013***	4.033***	5.024***	n/a	-1.413	-1.429	-1.144
		(1.239)	(1.262)	(1.615)		(1.815)	(1.832)	(2.015)
90th prod percentile	n/a	0.651	0.649	0.729	n/a	-0.936	-0.944	-0.760
		(1.104)	(1.108)	(1.145)		(0.949)	(0.945)	(1.025)
Observations	6,507	6,507	6,507	6,434	7,834	7,834	7,834	7,759
Year FE	yes	yes	yes	yes	yes	yes	yes	yes
Industry FE	yes	yes	yes		yes	yes	yes	
Region FE			yes				yes	
Firm FE				yes				yes
Number of firmid				662				822

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 3: 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
Nr of percentiles	2	3	4	5	2	3	4	5
Percentile FE	yes	yes	yes	yes	yes	yes	yes	yes
Industry FE	yes	yes	yes	yes	yes	yes	yes	yes
Year 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).

Table 4: Effect of import competition — pooled regression

Dependent variable:	(1) $\Delta\ln(labprod_{it})$	(2) $\Delta\ln(labprod_{it})$	(3) $\Delta\ln(labprod_{it})$	(4) $\Delta\ln(labprod_{it})$
ΔIMP_{st}	-4.137	-4.199		-3.693
	(12.376)	(12.500)		(13.779)
$\Delta IMP_{st} \cdot \ln(labprod93_i)$	0.296	0.301	-0.102	0.260
	(1.172)	(1.183)	(0.120)	(1.300)
$\Delta IMP_{st} \cdot FAM93_i$	27.338*	27.546*	23.453**	31.302*
	(15.920)	(16.095)	(11.736)	(18.834)
$\Delta IMP_{st} \cdot \ln(labprod93_i) \cdot FAM93_i$	-2.385	-2.404	-2.032*	-2.735
	(1.551)	(1.567)	(1.197)	(1.821)
$FAM93_i$	-0.121	-0.088	-0.253	
	(0.234)	(0.248)	(0.229)	
$\ln(labprod93_i) \cdot FAM93_i$	0.009	0.010	0.009	
	(0.023)	(0.024)	(0.023)	
$\ln(labprod93_i)$	-0.066***	-0.068***	-0.065***	
	(0.013)	(0.014)	(0.011)	
Marginal effects:				
Non-family firms, p10	-1.413	-1.429		-1.307
	(1.815)	(1.832)		(2.058)
Non-family firms, p90	-0.936	-0.944		-0.890
	(0.949)	(0.945)		(1.037)
Family firms, p10	4.013***	4.033***		4.866***
	(1.239)	(1.262)		(1.728)
Family firms, p90	0.651	0.649		0.881
	(1.104)	(1.108)		(1.236)
Family versus non-family firms,	5.426***	5.462***	4.785***	6.173**
p 10	(2.089)	(2.110)	(1.350)	(2.532)
Family versus non-family firms,	1.587	1.593	1.515	1.771
p 90	(1.593)	(1.590)	(1.704)	(1.739)
Observations	14,341	14,341	14,341	14,195
Family firm	dummy	dummy	dummy	dummy
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). There are 17 regions in our data (corresponding to autonomous regions in Spain).

Table 5: 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
ΔIMP_{st}	-9.179		-3.495		-2.599**	
	(8.195)		(3.652)		(1.138)	
$\Delta IMP_{st} \cdot \ln(prod93_i)$	0.770	-0.140	0.768	-0.445	1.526	0.952
	(0.749)	(0.147)	(1.227)	(0.469)	(1.558)	(1.543)
$\Delta IMP_{st} \cdot FAM93_i$	27.287**	15.068	7.873*	4.374	5.152***	3.775***
	(11.618)	(9.196)	(4.581)	(3.568)	(1.458)	(1.302)
$\Delta IMP_{st} \cdot \ln(prod93_i) \cdot FAM93_i$	-2.423**	-1.259	-1.754	-0.635	-3.078*	-2.892
	(1.121)	(0.929)	(1.599)	(1.389)	(1.805)	(1.939)
$FAM93_i$	-0.121	-0.123	-0.049	-0.122*	-0.031	-0.122***
	(0.198)	(0.195)	(0.078)	(0.070)	(0.051)	(0.047)
$\ln(prod93_i) \cdot FAM93_i$	0.006	0.001	0.006	0.002	-0.004	-0.005
	(0.021)	(0.021)	(0.026)	(0.026)	(0.029)	(0.030)
$\ln(prod93_i)$	-0.048***	-0.045***	-0.064***	-0.060***	-0.093***	-0.091***
	(0.010)	(0.010)	(0.014)	(0.012)	(0.018)	(0.018)
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 * famfirm FE	yes	yes	yes	yes	yes	yes
Year * famfirm FE	yes	yes	yes	yes	yes	yes
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). 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 wagebill. All TFP measures are logged.

Table 6: Horse race between family management and other observable firm characteristics

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$
ΔIMP_{st}	-4.137	56.867	4.264	-5.124	-8.686	174.169
	(12.376)	(60.819)	(28.345)	(12.390)	(11.269)	(123.188)
$\Delta IMP_{st} \cdot \ln(labprod93_i)$	0.296	-6.735	-0.842	0.362	0.728	-18.877
	(1.172)	(5.897)	(2.804)	(1.172)	(1.070)	(11.663)
$\Delta IMP_{st} \cdot FAM93_i$	27.338*	26.841*	28.084**	28.894*	32.846**	40.192***
	(15.920)	(14.673)	(13.835)	(15.980)	(15.866)	(14.768)
$\Delta IMP_{st} \cdot \ln(labprod93_i) \cdot FAM93_i$	-2.385	-2.275	-2.399*	-2.533	-2.922*	-3.595**
	(1.551)	(1.421)	(1.360)	(1.555)	(1.553)	(1.458)
$\Delta IMP_{st} \cdot \ln(sales93_i)$		-3.203				-15.789
		(3.651)				(12.514)
$\Delta IMP_{st} \cdot \ln(labprod93_i) \cdot \ln(sales93_i)$		0.377				1.668
		(0.346)				(1.183)
$\Delta IMP_{st} \cdot \ln(empl93_i)$			-0.666			15.534
			(6.194)			(16.214)
$\Delta IMP_{st} \cdot \ln(labprod93_i) \cdot \ln(empl93_i)$			0.129			-1.591
			(0.600)			(1.566)
$\Delta IMP_{st} \cdot \ln(R\&Dint93_i)$				0.474		1.225
				(1.977)		(1.718)
$\Delta IMP_{st} \cdot \ln(labprod93_i) \cdot \ln(R\&Dint93_i)$				-0.020		-0.098
				(0.194)		(0.169)
$\Delta IMP_{st} \cdot \ln(capint93_i)$					0.000	0.000
					(0.000)	(0.000)
$\Delta IMP_{st} \cdot \ln(labprod93_i) \cdot \ln(capint93_i)$					-0.000	-0.000
					(0.000)	(0.000)
$FAM93_i$	-0.121	-0.138	-0.129	-0.132	-0.119	-0.151
	(0.234)	(0.230)	(0.234)	(0.233)	(0.238)	(0.234)
$\ln(labprod93_i) \cdot FAM93_i$	0.009	0.011	0.010	0.010	0.009	0.013
	(0.023)	(0.023)	(0.023)	(0.023)	(0.024)	(0.024)
$\ln(labprod93_i)$	-0.066***	-0.066***	-0.066***	-0.067***	-0.067***	-0.066***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Marginal effects:						
Family versus non-family firms,	5.426***	5.940***	6.046***	5.619***	5.999***	7.165***
p 10	(2.089)	(1.993)	(1.749)	(2.093)	(2.017)	(1.787)
Family versus non-family firms,	1.587	2.278	2.185	1.541	1.296	1.378
p 90	(1.593)	(1.425)	(1.495)	(1.555)	(1.612)	(1.575)
Observations	14,341	14,341	14,341	14,185	13,665	13,516
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). *sales*93 is total firm sales in 1993. *empl*93 is total employment in 1993. of *R&Dint*93 is R&D intensity (R&D expenditure/sales) in 1993. *capint*93 is capital intensity (capital/employment) in 1993.

Table 7: Managing versus non-managing family members

Dependent variable: $\Delta\ln(labprod_{it})$	(1)	(2)	(3)	(4)
Family members	dummy	dummy	number	number
ΔIMP_{st}	-4.137	-3.143	-1.574	-0.416
	(12.376)	(12.413)	(11.025)	(11.109)
$\Delta IMP_{st} \cdot \ln(labprod93_i)$	0.296	0.200	0.109	-0.004
	(1.172)	(1.174)	(1.039)	(1.045)
$\Delta IMP_{st} \cdot FAMMGR93_i$	27.338*	30.768*	18.241**	19.429**
	(15.920)	(16.750)	(8.660)	(9.033)
$\Delta IMP_{st} \cdot \ln(labprod93_i) \cdot FAMMGR93_i$	-2.385	-2.706*	-1.711**	-1.828**
	(1.551)	(1.632)	(0.840)	(0.878)
$\Delta IMP_{st} \cdot FAMNOMGR93_i$		-0.116		-12.909
		(0.235)		(11.186)
$\Delta IMP_{st} \cdot \ln(labprod93_i) \cdot FAMNOMGR93_i$		0.009		1.298
		(0.024)		(1.077)
$FAMMGR93_i$	-0.121	-0.066***	-0.020	-0.020
	(0.234)	(0.013)	(0.110)	(0.110)
$\ln(labprod93_i) \cdot FAMMGR93_i$	0.009	-24.103	0.002	0.002
	(0.023)	(23.459)	(0.011)	(0.011)
$\ln(labprod93_i)$	-0.066***	2.336	-0.063***	-0.063***
	(0.013)	(2.253)	(0.012)	(0.012)
Marginal effects:				
Family versus non-family firms,	5.426***	5.904***	4.068**	4.241**
p 10	(2.089)	(2.150)	(1.824)	(1.859)
Family versus non-family firms,	1.587	1.548	-0.375	-0.507
p 90	(1.593)	(1.603)	(1.274)	(1.310)
Observations	14,341	14,341	14,341	14,341
Industry*famfirm FE	yes	yes	yes	yes
Year*famfirm 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). $FAMMGR93_i$ in columns (1) and (2) is a dummy variable if the firm has family managers, and in column (3) and (4) it is the number of family managers. $FAMNOMGR93_i$ in columns (1) and (2) is a dummy variable if the firm has family members in non-managing positions, and in column (3) and (4) it is the number of family members in non-managing positions. The marginal effects for family firms are computed for family firms with the average number of family managers (1.6).

Table 8: Family ownership, management changes

	(1)	(2)	(3)	(4)
Dependent variable:				Change in
	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$	$\Delta\ln(labprod_{it})$	family mgmt
Sample:	all	family owned	non-switchers	all
ΔIMP_{st}	-4.137	0.695	-4.137	1.432
	(12.376)	(21.891)	(12.376)	(6.900)
$\Delta IMP_{st} \cdot \ln(labprod93_i)$	0.296	-0.402	88.053**	-0.229
	(1.172)	(1.968)	(36.305)	(0.673)
$\Delta IMP_{st} \cdot FAM93_i$	27.338*	62.892	0.009	7.418
	(15.920)	(45.583)	(0.271)	(15.032)
$\Delta IMP_{st} \cdot \ln(labprod93_i) \cdot FAM93_i$	-2.385	-5.590	0.296	-0.625
	(1.551)	(4.353)	(1.172)	(1.433)
Marginal effects:				
Family versus non-family firms,	5.426***	10.40*	10.78***	1.677
p 10	(2.089)	(5.473)	(4.027)	(2.116)
Family versus non-family firms,	1.587	3.076	-3.703	0.671
p 90	(1.593)	(3.155)	(4.677)	(1.172)
Observations	14,341	3,086	8,885	14,341
Industry * famfirm FE	yes	yes	yes	yes
Year * famfirm 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). Regressors $FAM93_i$, $\ln(labprod93_i) \cdot FAM93_i$ and $\ln(labprod93_i)$ are partialled out in some specifications and therefore coefficients not shown. Sample "family owned" restricts the sample to firms that are family owned in 2006 (earlier information about family ownership is unfortunately not available in the data). Sample "non-switchers" drops family firms that change to professional management at some point in the sample.

Table 9: 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
Family firm	dummy	dummy	dummy	dummy
Industry * famfirm FE	yes	yes	yes	yes
Year * famfirm FE	yes	yes	yes	yes

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

Table 10: Mechanism: R&D and innovation related outcomes

Dependent variable:	(1) $\Delta\ln(labprod_{it})$	(2) Change R&D dummy	(3) $\Delta\ln(R\&D\ exp_{it})$	(4) Change in # patents
ΔIMP_{st}	-4.137	1.038	15.951	59.700*
	(12.376)	(5.990)	(46.690)	(33.531)
$\Delta IMP_{st} \cdot \ln(labprod93_i)$	0.296	-0.098	-1.416	-5.756*
	(1.172)	(0.585)	(4.393)	(3.227)
$\Delta IMP_{st} \cdot FAM93_i$	27.338*	-3.341	-7.295	147.511
	(15.920)	(7.158)	(59.575)	(108.576)
$\Delta IMP_{st} \cdot \ln(labprod93_i) \cdot FAM93_i$	-2.385	0.279	1.133	-14.731
	(1.551)	(0.709)	(5.573)	(10.954)
$FAM93_i$	-0.121	-0.028	-0.252	-0.293
	(0.234)	(0.036)	(0.486)	(0.717)
$\ln(labprod93_i) \cdot FAM93_i$	0.009	-0.000	0.007	0.019
	(0.023)	(0.003)	(0.044)	(0.064)
$\ln(labprod93_i)$	-0.066***	0.000	-0.024	0.076***
	(0.013)	(0.003)	(0.029)	(0.022)
Marginal effects:				
Family versus non-family firms,	5.426***	-0.782	3.118	12.16
p 10	(2.089)	(1.038)	(8.946)	(8.883)
Family versus non-family firms,	1.587	-0.333	4.942	-11.56
p 90	(1.593)	(1.019)	(3.485)	(10.63)
Observations	14,341	14,169	4,769	14,283
Family firm	dummy	dummy	dummy	dummy
Industry * famfirm FE	yes	yes	yes	yes
Year * famfirm 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 11: Decomposition of effect

Dependent variable:	(1) $\Delta\ln(labprod_{it})$	(2) $\Delta\ln(valueadded_{it})$	(3) $\Delta\ln(sales_{it})$	(4) $\Delta\ln(material_{it})$	(5) $\Delta\ln(empl_{it})$
ΔIMP_{st}	-4.137	-8.479	-0.563	0.162	-4.342
	(12.376)	(8.850)	(5.917)	(7.363)	(11.370)
$\Delta IMP_{st} \cdot \ln(labprod93_i)$	0.296	0.716	0.125	0.113	0.419
	(1.172)	(0.852)	(0.586)	(0.725)	(1.107)
$\Delta IMP_{st} \cdot FAM93_i$	27.338*	30.408**	-4.750	-14.651	3.069
	(15.920)	(14.019)	(8.446)	(11.942)	(12.963)
$\Delta IMP_{st} \cdot \ln(labprod93_i) \cdot FAM93_i$	-2.385	-2.701*	0.444	1.268	-0.316
	(1.551)	(1.379)	(0.838)	(1.152)	(1.257)
$FAM93_i$	-0.121	-0.214	-0.119	-0.154	-0.093
	(0.234)	(0.245)	(0.090)	(0.103)	(0.096)
$\ln(labprod93_i) \cdot FAM93_i$	0.009	0.016	0.006	0.006	0.006
	(0.023)	(0.025)	(0.009)	(0.010)	(0.009)
$\ln(labprod93_i)$	-0.066***	-0.052***	-0.006	0.011	0.014**
	(0.013)	(0.012)	(0.005)	(0.007)	(0.007)
Marginal effects:					
Family versus non-family firms,	5.426***	5.594***	-0.675	-3.001*	0.168
p 10	(2.089)	(1.843)	(1.074)	(1.592)	(1.507)
Family versus non-family firms,	1.587	1.246	0.0390	-0.961	-0.340
p 90	(1.593)	(1.622)	(1.031)	(1.023)	(0.843)
Observations	14,341	14,341	14,341	14,340	14,341
Family firm	dummy	dummy	dummy	dummy	dummy
Industry * famfirm FE	yes	yes	yes	yes	yes
Year * famfirm FE	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 12: Heterogeneous effect by number of family managers

Dep var: $\Delta \ln(labprod_{it})$	(1)	(2)	(3)	(4)	(5)
		Family firms			
		By # of family managers		By age (years)	
	Non-family firms	1	>1	<=30	>30
ΔIMP_{st}	-4.137	25.212*	24.701	30.448**	23.952
	(12.376)	(14.365)	(23.212)	(14.550)	(22.142)
$\Delta IMP_{st} \cdot \ln(labprod93_i)$	0.296	-2.309*	-2.190	-2.864*	-2.041
	(1.172)	(1.394)	(2.295)	(1.473)	(2.007)
$\ln(labprod93_i)$	-0.066***	-0.061***	-0.059**	-0.064**	-0.025
	(0.013)	(0.022)	(0.030)	(0.028)	(0.026)
Effects evaluated at:					
10th prod percentile	-1.413	3.999**	4.583*	4.136***	5.201
	(1.815)	(1.851)	(2.459)	(1.509)	(3.814)
90th prod percentile	-0.936	0.282	1.058	-0.474	1.916*
	(0.949)	(1.278)	(2.058)	(1.823)	(1.098)
Observations	7,834	3,580	2,927	5,207	1,300
Year FE	yes	yes	yes	yes	yes
Industry FE	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 13: Exits

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable: exit dummy						
Sample:	all	non-family	family	all	non-family	family
ΔIMP_{st}	0.210*	0.234*	0.167	3.022*	1.708	4.341
	(0.119)	(0.128)	(0.232)	(1.621)	(1.468)	(3.828)
$\Delta IMP_{st} \cdot \ln(labprod93_i)$				-0.273*	-0.141	-0.414
				(0.155)	(0.139)	(0.382)
$\ln(labprod93_i)$	-0.004***	-0.002	-0.007***	-0.003**	-0.002	-0.007**
	(0.001)	(0.002)	(0.003)	(0.001)	(0.002)	(0.003)
Effects evaluated at:						
10th prod percentile				0.517**	0.409*	0.533
				(0.230)	(0.227)	(0.390)
90th prod percentile				0.0770	0.181	-0.135
				(0.141)	(0.135)	(0.387)
Observations	22,524	12,319	10,176	22,524	12,319	10,176
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).

C Proofs

C.1 Proof of Proposition 1

Proof. Consider the following:

1. Solving the P-type manager's objective function in equation (5.2) yields $\beta_P(\phi) = \phi$. Plugging this into the utility function, the manager gets a payoff of $U_P(\phi) = \eta + \frac{1}{2}\phi^2 - f$ as a function of the initial productivity draw. The manager will let the firm exit (before exerting the effort) when she expects to receive a non-positive utility from running the firm; we can solve for the non-exit cutoff of the firm by setting $U_P(\bar{\phi}_P) = 0$. Solving for this means the firm exists iff $\phi \geqslant \bar{\phi}_P \equiv \sqrt{2(f-\eta)}$. Because effort costs are strictly positive for positive effort, the firm's profit is strictly positive whenever the firm exists, while the P-type manager's payoff is only non-negative (i.e., zero at the cutoff).

2. The optimal profit function is $\beta_P(\phi) = \phi$ and therefore increasing in ϕ.

3. Solving the F-type manager's objective function in equation (5.1) also yields $\beta_F(\phi) = \phi$. The manager will exert this as long as both his utility and firm profits are positive. Under the assumption $\bar{U} > \frac{f-\eta}{2}$, the profit function cuts the payoff function from below and we only need to check for non-negative profits in order to understand when this behavior is optimal. This means solving for $\pi(\phi) = \eta + \phi^2 - f = 0$ yields that this is the optimal effort as long as $\phi \geqslant \sqrt{(f-\eta)}$. If $\phi < \sqrt{(f-\eta)}$, however, the manager can avoid losing the private benefit $\bar{U}$ by exerting a bit more effort and keeping the company alive. Making sure the firm's profits are non-negative, i.e., solving for β in $\pi(\beta) = \eta + \phi\beta - f = 0$ yields the effort function $\beta_F(\phi) = \frac{f-\eta}{\phi}$. Plugging the effort into the utility function, the payoff is $U_F(\phi) = \bar{U} - \frac{1}{2}\left(\frac{f-\eta}{\phi}\right)^2$. Under the assumption $\bar{U} > \frac{f-\eta}{2}$, this is strictly positive at $\phi = \sqrt{(f-\eta)}$ so the manager gains by choosing this effort level. However, if the initial productivity of the firm is too low, such that the payoff function even under this utility is zero, the firm exits. The non-exit cutoff can therefore be obtained from setting $U_F(\bar{\phi}_F) = 0$ which yields $\bar{\phi}_F = \frac{f-\eta}{\sqrt{2\bar{U}}}$. The firm exits if the productivity draw is below $\bar{\phi}_F$.

4. Notice that $\beta_F(\phi) = \frac{f-\eta}{\phi}$ is decreasing in ϕ, while $\beta_F(\phi) = \phi$ is increasing in ϕ.

□

C.2 Proof of Proposition 2

Proof. Consider the following:

1. As effort $\beta_P(\phi) = \phi$ increases in ϕ, the realized productivity of P-type firms, $\beta_P(\phi)\phi$, also increases in ϕ.

2. The same pattern holds for F-type firms, when $\phi \geqslant \sqrt{f-\eta}$. Realized productivity $\beta_F(\phi)\phi = f - \eta$ for $\phi \in \left[\bar{\phi}_F, \sqrt{f-\eta}\right)$, i.e., constant.

3. P-type firms have higher average realized productivity than F-type firms as P-type firms have a higher exit cutoff than F-type firms and realized productivity weakly increases in the initial productivity ϕ for both types of firms.

4. Note that for any value of realized productivity above $2(f-\eta)$ the corresponding value of the initial productivity draw is the same for P-type firms and F-type firms. Also note that only F-type firms have realized productivity below $(f-\eta)$. Since the initial productivity draw follows the same Pareto distribution for both F-type firms and P-type firms, the distribution of realized productivity of P-type firms first order stochastically dominates that of F-type firms.

□

C.3 Proof of Proposition 3

Proof. Consider:

1. Notice that both exit cutoffs (i.e., $\bar{\phi}_P$ and $\bar{\phi}_F$) are increasing functions of η and therefore both exit cutoffs increase after import competition intensifies. However, both effort $\beta_P(\phi) = \phi$ and realized productivity $\phi\beta_P(\phi)$ of surviving P-type firms are independent of η, and therefore do not change after import competition increases.

2. For the same argument, effort and realized productivity of surviving F-type firms are independent of η as long as productivity is high enough after the shock, i.e., $\phi \geqslant \sqrt{f-\eta_2}$. However, effort below the kink $\sqrt{f-\eta_2}$ is an increasing function of η. For F-type firms with $\phi \in \left[\frac{f-\eta_2}{\sqrt{2\bar{U}}}, \sqrt{f-\eta_2}\right)$, the manager's effort after the import shock is $\beta(\phi,\eta_2) = \frac{f-\eta_2}{\phi}$, while it was

$$\beta_F(\phi,\eta_1) \quad = \quad \begin{cases} \phi & \text{if} \quad \phi \in \left[\sqrt{f-\eta_1}, \sqrt{f-\eta_2}\right) \\ \frac{f-\eta_1}{\phi} & if \quad \phi \in \left[\frac{f-\eta_2}{\sqrt{2\bar{U}}}, \sqrt{f-\eta_1}\right) \end{cases}$$

before import competition increased. As $\eta_1 < \eta_2$, effort increases for $\phi \in \left[\frac{f-\eta_2}{\sqrt{2\bar{U}}}, \sqrt{f-\eta_2}\right)$. Realized productivity is a positive function of effort for surviving firms, so realized productivity increases for these firms.

3. As only the realized productivity for initially unproductive surviving F-type firm increases, i.e., $\phi < \sqrt{f - \eta_2}$, and the realized productivity of all other firms are unchanged, the proposition follows directly.[40]

□

C.4 Proof of Proposition 4

Proof. Consider the following:

1. The exit cutoff on the realized log productivity is $\bar{\phi}_P \beta_P(\bar{\phi}_P) = 2(f - \eta)$ and $\bar{\phi}_F \beta_F(\bar{\phi}_F) = f - \eta$ for P-type firms and F-type firms, respectively. As both cutoffs are decreasing functions of η, both cutoffs increase when import competition increases. Furthermore, the exit probability (either zero or one) decreases in the initially realized productivity, as firms exit if and only if their realized productivity is below the exit cutoff.

2. Note that the exit cutoff on realized productivity is always higher for P type than for F type firms. Therefore, P type firms are more likely to exit than F type firms when import competition increases, if both of them have the same initial realized productivity.

□

[40] Notice that, strictly speaking, we should not observe P-type firms that are as unproductive as those F-type firms that are increasing their productivity in the data. However, the real world is probably more complex than our stylized model: Either measurement error in productivity, a random component to realized productivity after exerting effort, or smaller fixed cost for F-type firms can generate the overlap in initial productivity among family and non-family firms that we see in the data while preserving the predictions of the model. For an example of how differential fixed costs effect predictions, see the figure and notes in the online appendix.