Local Projections in business history: the case of Inditex

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Abstract

This article has two objectives. On the one hand, it attempts to delve into the sources of competitive advantage of Inditex, the world's largest clothing retailer, by considering the evolution of the company's strategies over the last two decades and relying on an econometric technique, Local Projections, to complement the qualitative analyses. On the other hand, the article presents and explains this quantitative technique, which can help to solve some of the problems that arise when attempting to apply quantitative methods in business history, such as small sample sizes, causality analysis or endogeneity.

Keywords: local projections, quantitative methods, business history, fast fashion.

JEL Codes: M16, M31, N80, N84.

Introduction

The competitive strategy of firms has been the subject of much academic reflection since at least the middle of the 20th century (Ghemawat 2002). Among the various contributions on the subject, the work of Michael Porter from the 1980s onwards has been particularly influential. Porter points out the existence of three types of competitive strategies: a) cost leadership strategy, which allows competing with lower prices; b) product differentiation, offering a product or service that is recognized as unique, which allows competing with higher prices, and c) focus strategy, specializing in a certain market segment. In his opinion, companies have to opt for either price competitiveness or product differentiation to obtain the best performance, since the combination of both generic strategies causes companies to be stuck-in-the-mid-

dle and obtain poor results (Porter 1980, 1985). However, for other authors, the two strategies are not radically opposed nor are they always mutually exclusive (Hill 1988). In fact, empirical research has shown that firms adopt a wide variety of competitive strategies that combine elements of the three types of strategies differentiated by Porter and that this combination can be effective and provide advantage over rival firms (Pertusa-Ortega et al. 2009, Salavou 2015).

In the fashion sector, luxury companies have clearly chosen to base their competitive advantage on product differentiation. Other companies, such as Ireland's Primark and China's Shein, seem to have opted very strongly for price competition. However, there are many companies that show a combination of strategies, seeking to reduce costs and attract consumers with low prices, but also offering a differentiated product, adjusted to fashion trends, and using specialized brands in different market segments. These combined strategies are widespread among fast fashion companies, as this business model is characterized by the rapid production and distribution of a wide variety of low-priced garments, which are constantly renewed and adjust to the fashion trends that triumph in the market. The world's leading apparel retailer, Inditex, is a good example of the successful use of a combination of generic strategies. On the one hand, Inditex has offshored most of its production to reduce costs and be able to compete with low prices. On the other hand, it maintains its own production structure and orders a higher proportion of garments in nearby countries – with higher costs than in more distant ones – than its main competitors, in order to have shorter lead times and offer products that are more in line with the latest fashion trends. It also has many brands dedicated to different market segments by gender, age and purchasing power.

Studies on Inditex show this plurality of strategies but tend to highlight the company's extraordinary capacity to adjust to demand and thus offer a differentiated product as its truly decisive competitive advantage. Nevertheless, many of these studies analyse only the behaviour of the company at a given moment in time, without considering the evolution of its strategies over time. They are also mostly qualitative analyses exclusively. This article provides a new approach to the study of Inditex's competitiveness, introducing into the analysis the company's behaviour over two decades and the use of an econometric technique, Local Projections, to complement the qualitative analyses. Our objective is twofold: on the one hand, to delve deeper into the variables that explain the competitiveness and success of Inditex, to determine which of these variables have had a greater influence over the last two decades; on the other hand, to present a new quantitative technique that can be very useful in business history studies, as it allows us to observe the influence of some variables on others with relatively small data samples.

Several authors have pointed out the need for business history to improve its quantitative methods so that it can dialogue with the other disciplines that are part of the social sciences, since scholars accustomed to formal and quantitative approaches do not consider business history studies as quality research due to their lack of quantitative methodology (Hidy 1970, Jones et al. 2012, De Jong et al. 2015). In our opinion, the research object largely conditions the research methodology, but the combination of quantitative and qualitative methods, whenever possible, allows to deepen the analyses and enrich the results. The use of quantitative methods should be understood as a way of contributing to the solidity of business history research and allowing it to dialogue and compare with the rest of the social sciences, but it should not limit the multidisciplinary nature and richness of the discipline. This article is a proposal of this mixed methodology and uses the case of Inditex to show the possibilities that the application of the Local Projections technique has for research in business history. The aim is that the case study, a hallmark of business history, can be supported by a methodology that allows contrasting hypotheses, obtaining verifiable and comparable results.

Following this introduction, the article examines the evolution of Inditex as a fast fashion company. The Local Projections method is then presented. The next section explains the variables used to analyse the sources of Inditex's competitive advantage and shows and discusses the results of the analysis. Finally, some brief conclusions are offered.

1. The development of Inditex

Since the end of the twentieth century, the so-called fast fashion industry has become the most dynamic fashion sector. It has been the one that has most promoted the consumption of clothing and has generated the largest companies. This business model appeared in the mid-1980s, although some of its main characteristics had already been present in companies in the sector for several decades. Fast fashion was the response of some companies to the sharp increase in price competition in the mass consumer clothing market due to offshoring and the dominance of large retailers (Barnes and Lea-Greenwood 2006). Instead of continuing with the traditional strategy of producing large quantities of basic garments, little influenced by fashion trends, at the lowest possible price and for only two seasons (spring/summer and autumn/winter), these companies created their own brands, increased the variety of products and shortened production and distribution cycles to accelerate their response to changes in demand, adapt to fashion trends and go beyond the framework of two seasons per year, offering more frequent product renewal. This evolution seems to have occurred simultaneously in some

UK retailers, such as Look or George (Gupta and Gentry 2018), and in companies in other countries, such as the Swedish Hennes & Mauritz (H&M), the Spanish Inditex, and the American Forever 21.

H&M was the fast fashion company that was initially the most successful internationally. The company's origins date back to 1947, when Erling Persson opened a small women's clothing shop in his hometown of Västeras, imitating the American retail model. He called it "Hennes", which is Swedish for "Hers". The good results of the business led him to set up shops all over the country and from 1964 also in Norway, to sell women's, men's and children's clothing, manufactured in Sweden and other European countries. In 1968, the company acquired the Mauritz Widforss shop and renamed itself Hennes & Mauritz. In 1974, it was listed on the stock exchange (Giertz-Materson 2018). During the 1980s and 1990s, the company entered a dozen European countries, specializing in low-priced fashion products, but its real international expansion began in the early 21st century, with products manufactured mainly in Asia (H&M 2005, p. 4). The 12 countries where it was present in 1999 became 21 in 2005, 38 in 2010 and 73 in 2019, before the sector was affected by the Covid-19 pandemic. The number of shops increased in the same years from 613 to 1,193, 2,206 and 5,076. The number of employees, which was close to 18,000 in 1999 grew to almost 60,000 in 2010 and more than 126,000 in 2019, and sales, measured in 2015 euros, increased from less than 5 billion in 1999 to almost 14 billion in 2010 and more than 20 billion in 2019, according to annual reports published by the company. In 2009, H&M became the clothing retailer with the highest turnover in the world, beating the American GAP, which had led the large-scale retail sector in previous decades and continued with a more traditional business model. However, Sweden's leadership in the fast fashion market was short-lived, as a few years later H&M was overtaken in sales by Spain's Inditex.

Spanish companies, which until the 1990s had barely had a presence in the international clothing market, began to play a leading role from then on, adopting the fast fashion business model. This business model did not require the support of a prestigious country brand and made it possible to compete both with poorly designed and very low-priced products and with high-quality and fashionable products (Miranda 2020). The most important of these Spanish fast fashion companies is undoubtedly Industria de Diseño Textil SA (Inditex), which, since 2012, has been the world leader in fashion retail. In 2019, Inditex had more than 176,000 employees, it had 7,469 shops in almost a hundred countries, sold online in more than 200, had an annual turnover of more than 28,000 million euros and its stock market value was above 100,000 million euros (Inditex 2020).

Inditex was the first Spanish company to adopt the fast fashion business model and is one of the companies that has contributed the most to its devel-

opment, becoming a benchmark for the sector as a whole on an international scale. The origin of the company dates back to the early 1960s, when Amancio Ortega and his brother Antonio established a small family clothing workshop in the Galician city of A Coruña, in north-western Spain. In those years, the Spanish population's consumption, starting from very low levels, began to increase rapidly, driven by the country's economic growth and the improvement in per capita income, in a domestic market highly protected by tariff and non-tariff barriers. According to data from the Instituto Nacional de Estadística (National Institute of Statistics), Spanish clothing production grew at an average annual rate of over 10% between 1962 and 1974. Confecciones GOA, the Ortega brothers' small company, was able to enter the market with minimal start-up capital because the Spanish garment industry was very technologically backward and most companies were small, labour-intensive, with low productivity and little specialization (Sojo 2012). Amancio Ortega, who would become the main driver and owner of the company, had little formal education – he had left school at the age of 14 – but knew the industry from his work as an employee in the clothing retail trade. His beginnings in manufacturing were based on cheap, low-quality garments. Initially, the star product was a dressing gown, but the success of the business led him to diversify production with other types of garments and to the creation of new companies – Samlor, Noite, Fíos, etc. Although he had partners who provided capital for the new initiatives, he gradually took full control of the companies (Blanco & Salgado 2004).

Ortega also entered the retail sector in the early 1970s, initially with little success. In 1971, he opened a shop in the city of A Coruña called Sprint, specializing in modern design garments, but of low quality, which he had to close after a year. However, in 1975 he opened a new shop in the same city, under the name of Zara, which was to be a success and the first link in a rapidly growing chain that would first spread to the rest of Galicia and, from the early 1980s, to the whole of Spain. In this first phase of the commercial expansion some of the bases that would define the company's later strategy were already adopted. On the one hand, a very careful choice of the location of the shops, looking for central and busy places, and the use of large and eye-catching shop windows. On the other hand, just-in-time production and the non-accumulation of stocks, as well as the vertical integration of garment design, production and marketing in the same company (Alonso 2000, p. 157-182).

In 1985, Inditex was created as the parent company of Amancio Ortega's group of companies, which consisted of seven clothing companies and 41 shops in Spain. The group's growth was supported from then on by the incorporation of qualified management staff, partly from the teaching staff of the School of Business Studies in A Coruña, and the increase in production ca-

pacity by contracting independent workshops and cooperatives in Galicia and the north of Portugal to sew the garments. Robotization was also used in some stages of the production process, such as the cutting of the fabrics (Alonso 2000, p. 162-163). In the year 2000, 80% of Inditex's garments were still produced in Europe and 50% were made in the group's industrial facilities, despite the fact that the company had progressively resorted to more distant suppliers, with lower costs, and that the proportion of its own production in its total supply had been declining (Inditex 2001). The use of Asian suppliers intensified from the beginning of the twenty-first century, and in 2019, 56% of the suppliers and more than 80% of the workers employed in the factories that produced for Inditex were located in distant Asian countries, mainly in China, Bangladesh and India (Inditex 2020). However, this dependence on the Far East remains low compared to major competitors, as more than 80% of the factories producing for H&M or GAP are located in Asia (Gestal 2023).

The increase in company sales was spectacular. Until the 1990s, it was based on the Spanish market and on what was then the only chain in the group, Zara. In real terms, the company's turnover grew at an average annual rate of over 30% between 1985 and 1990. In the early 1990s, this growth slowed down in a domestic market strongly affected by the economic crisis, but during the second half of the 1990s sales growth picked up again thanks to the creation of new specialised store chains in different market segments and by penetration in a rapidly growing number of countries. In 1991, Inditex created the Pull&Bear chain and acquired 65% of the shares of Massimo Dutti, a chain of shops created in Barcelona in 1985, of which Inditex would buy the totality of the shares in 1995; both brands initially dedicated to fashion for young men, but which would later extend their activity to women's clothing. In 1993, Kiddy's Class, a children's fashion chain, was created. In 1998, Bershka was launched, a very casual youth line, and the following year 90% of Stradivarius was acquired; Stradivarius was a similar rival chain, created in Barcelona in 1994, of which Inditex would acquire all the capital in 2005. Lefties was also created in 1999, as a low-cost version of Zara. In 2001, the lingerie chain Oysho started its activities and in 2003, the homewares chain Zara Home. Also in 2003, the Often brand was launched, aimed at male customers between 20 and 45 years old, but it was not successful and disappeared in 2006. The last chain created by Inditex, Uterqüe, specialising in accessories and quality, medium-high priced clothing, which had started its activities in 2008, would also end up disappearing in 2022. In addition, Tempe, a subsidiary company for the production of footwear for the group's chains, 50% owned by Inditex, was founded in 1989. However, despite this diversification of Inditex brands and chains, Zara, the generalist brand of women's, men's and children's clothing, with its homewares section, has continued to

be the group's main chain, accounting for almost two thirds of the group's total sales area in 2021 and contributing more than 70% of sales and almost 69% of profits (Inditex 2022)

Inditex began to enter the international market in the late 1980s, with the establishment of shops in Portugal in 1988, the United States in 1989 and France in 1990. However, its true international expansion would begin in the 1990s. The number of countries with Inditex chain shops rose from 4 in 1990 to 39 in 2001, and reached 96 in 2017, while the number of countries in which the company was selling online rose from 20 in 2011 to 202 in 2018 (Miranda and Roldan 2021, p. 163-166). The proportion of sales outside Spain rose from 25% of total turnover in 1994 to 54% in 2001, and exceeded 85% in 2021 (Inditex 1999, 2002, 2022). European countries are the company's main market. These countries, excluding Spain, accounted for more than 30% of the company's sales in 2001, and their sales exceeded the value of sales in Spain from 2006 onwards; in 2021 they accounted for more than 48% of sales (almost 63% including Spain), while Asian countries accounted for nearly 20% and the Americas just over 17%. In this last year, Spain continued to be the country with the most Inditex shops, with 1,267, followed in Western Europe by Italy, with 341, and Portugal, with 302; Russia was the country with the largest number of shops, with 515, in Eastern Europe; Mexico in America, with 382, and China in Asia, with 323 (Inditex 2022).

Since the founding of Inditex, the economist José María Castellano Ríos was Amancio Ortega's trusted man at the head of the group of companies, holding the positions of CEO and vice-chairman. Castellano managed Inditex's rapid international expansion and led its IPO in 2001. However, in 2005, due to disagreements between Ortega and Castellano, the latter left the company and was replaced by Pablo Isla, who had until then chaired the tobacco multinational Altadis, and to whom Amancio Ortega ceded the chairmanship of Inditex in 2011, although he continued to retain his majority shareholding position. Marta Ortega, the founder's daughter, replaced Pablo Isla as Chairman of Inditex in April 2022, although delegating executive responsibilities to a new CEO, Óscar García Maceiras (Galindo 2022, De Barrón 2021).

After more than two decades of rapid growth, the Inditex group's sales barely increased in 2008 and from then onwards its growth became slower and more irregular, in an environment of strong international competition, accentuated by the development of electronic commerce. The pre-tax profit margin (EBIT) also trended downwards after peaking at 19.5% in 2012, due to increased competition in the sector and higher costs caused by the higher proportion of online sales. Nevertheless, Inditex has continued to lead the world's clothing sales and its performance has been better than that of the other big fast fashion companies.

2. Quantitative methods in business history: impulse response functions by Local Projections

According to De Jong et al. (2015), business history has progressed methodologically in the last decades, but the use of quantitative theories and methods remains limited. These authors highlight that the use of statistics grew from 30% of articles in 1970 to 60% in 2012. Despite this increase, only 11% of the articles included analytical statistical methods such as regressions or correlations. Thus, the use of sophisticated quantitative techniques remains low. In fact, an earlier study (Eloranta et al. 2008) that examined the quantitative content of articles published in *Business History Review* and *Business History* for the period 1990–2000 highlighted that 43% and 34%, respectively, of the articles did not employ quantitative methods, while articles using "sophisticated quantitative techniques" accounted for 5.6% and 7.3%, respectively. In 2010, the same authors also showed how, during the 1990s, the level of quantification seemed to have no significant impact in *Business History Review* and even a negative impact in *Business History* (Eloranta et al. 2010). The trajectory followed by the discipline since then does not seem to have changed much, despite repeated calls to increase the use of rigorous empirical methods and the critical testing of hypotheses (Friedman and Jones 2011, Jones et al. 2012, Raff 2013, De Jong et al. 2015).

We advocate complementing the traditional approach to business history, based on the qualitative analysis of company documentation, with quantitative methods, also for the study of specific cases. However, it should be kept in mind that not all quantitative methods can be widely applied in business history, due to the characteristics of the discipline and its object of study. One of the characteristics that reduces the range of techniques that can be used is the usually limited availability of data. Therefore, this article aims to contribute to a greater incorporation of quantitative techniques in business history by proposing a methodology, Local Projections (Jordà 2005), that has been used for small samples more than other methods and that is simpler to apply.

Macroeconomists use impulse response functions to make causal inferences, estimate multipliers and study the dynamics of the main macroeconomic aggregates in stochastic models (Brugnolini 2018). Impulse responses functions can be calculated by previously estimating a Vector Autoregressive Model (VAR) or directly estimating them by Local Projections following Jordà (2005). VARs and Local Projections are often used to study the relationships between variables and to make inferences about the historical evolution of a system (usually an economy). A VAR is a system of equations in which the variables are endogenous (Lutkepohl et al. 2006, Luthkepöhl 2010). VARs and Local Projections (as they aim to do a similar analysis) are often used to study economies as a system in order to analyse the impact that monetary,

fiscal and other policies have on a particular economy. The approach of this paper is to equate the firm to an economy and to equate the strategies used by the firm to increase sales to economic policies.

Impulse response functions measure the system's reaction to a shock (increase) in a variable. For example, in business history, they could show how the system variables react in response to a shock (increase) in the number of markets of a specific company. Impulse responses are symmetrical, so, impulse response estimation also shows what would happen after a negative shock in the number of markets (one can imagine a loss in the number of markets).

Jordà (2005) presents an alternative – and easier to calculate – method for estimating impulse response functions based on Local Projections, which does not require a VAR to be specified or estimated. This method is very useful because, when the data are not well approximated by a VAR or the model is not correctly specified, the estimation of the impulse response functions may be biased or incorrect. In such situations, Local Projections seems a more appropriate technique than VAR. Therefore, the problems related to the estimation of impulse response functions through a VAR can be overcome by Local Projections. Considering that business history is not exactly like macroeconomics and that we are not testing theoretical models, it seems better to use Local Projections rather than VAR in business history and specifically in our case study.

Jordà (2005) shows how impulse responses, estimated by Local Projections, can be calculated by a sequence of projections of the endogenous variables shifted in time towards their lags. These projections are local to each forecast horizon and therefore more robust. Local Projections are a natural and preferable alternative to VARs when the objective is to estimate impulse responses, since Local Projections are more robust to model misspecification than the impulse responses of VARs, because the former are estimated directly while VARs use an iterated procedure. Moreover, Local Projections does not require defining a set of endogenous variables (Bazot et al. 2022).

There is much theoretical debate about which method (VAR or Local Projections) is superior. According to Jordà (2005):

> Impulse responses are almost universally estimated from the Wold decomposition of a lineal multivariate Markov model such as a VAR. However, this two-step procedure consisting of first estimating the model and then inverting its estimates to find the impulse responses is justified only if the model coincides with the DGP (Data Generating Process). Moreover, deriving correct impulse responses from cointegrated VARs can be extremely complicated (see Bruce E. Hansen 2003).

Brugnolini (2018) compares the performance of the impulse response function estimator of the vector autoregressive model (VAR) with the local projection (LP) methodology of Jordà (2005). Using a Monte Carlo experiment, he shows how with a well-specified DGP, the impulse response function estimator computed through a VAR is the best choice. However, he also underlines that for small samples, and therefore when the lag length of the model is misspecified, impulse responses estimated by Local Projections are a good alternative. Stolbov and Shchepeleva (2020) explain that Local Projections appear more flexible than VAR models, as this technique is more robust to misspecification and/or small sample sizes. Local Projections are simpler to estimate and have been used for small samples (Barnichon and Brownlees 2016), which is useful for quantitative analysis in business history and specifically for our case study. Ramey (2016) highlights that when using Local Projections, short-term analysis should be prioritised because the responses will be worse at distant horizons. This is not a problem for this study, nor should it be for other business history research because the horizon we are working with is not distant.[1] Finally, according to Jordà et al. (2020), when the horizon is longer than the number of lags, VAR responses are biased, and Local Projection responses are not. Considering this, Local Projection responses are better for our case of study.

Local projections have several advantages. First, they can be estimated by simple least squares using univariate equation methods. Second, they can provide good individual and joint inference. While inference of impulse responses from VARs is difficult, since impulse response coefficients are high-dimensional non-linear functions of the estimated parameters, Local Projection methods directly estimate impulse response coefficients, thus providing better inference (Jordà 2005). The VAR impulse responses simulate the effect of a shock, while the Local Projections estimate the effect of a shock. Third, the estimates are robust to misspecification errors in the data generation process. Local projections are more resistant than VARs to specification errors, which makes them more useful for business history studies. Finally, Montiel and Plagborg-Moller (2021) find that Local Projections are a robust way of estimating even when the data may show the presence of a unit root. Local Projection inference is simpler than previously thought and more robust than standard autoregressive inference, whose validity is known to depend heavily on data persistence and horizon length.

The general equation for Local Projections, developed in Jordà (2005), is the following:

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1.   In this article's Appendix, readers can find the results for other time horizons. Long horizons are used in macroeconomics.

$$y_{t+s} = \alpha^s + B_1^{s+1} y_{t-1} + \cdots + B_p^{s+1} y_{t-1} + u_{t+s}^s \quad (1)$$

where y_{t+s} is a n X 1 random vector, α^s is a n X 1 vector of constants, B_i^{s+1} are the matrices of coefficients for each lag i and horizon s + 1 and u_{t+s}^s is the error vector.

To identify structural shocks and then, estimate impulse responses, different methods can be used. The most used is a recursive causal ordering method called Cholesky. This is a common approach to identify the shocks of a VAR model.[2] Macroeconomists rely on impulse response functions (IRFs) to perform causal inference (Li et al. 2022). The Cholesky method ranks the variables from the most exogenous to the less exogenous (or from less endogenous to most endogenous). Subsequently, we need to theoretically and historically determine the behaviour of the variables. In a business history study, it may be difficult to really know the correct order of variables. In that case, a different method can be used to identify structural disturbances: generalised impulse response analysis (Koop et al. 1996, Pesaran and Shin 1998). The generalised impulse estimates are not orthogonalized and do not depend on the order of the variables under study, so they may be more suitable for calculating impulse responses in business history. Accordingly, in the results section, we show impulse responses using generalised impulse response analysis. In addition, the results obtained using a Cholesky decomposition considering a different ordering of the variables can be found in the Appendix section.

The impulse response functions are usually presented in graphs showing the reaction of the variables to a shock in one of them and an error band to represent the degree of uncertainty. Another advantage of Local Projections regarding error bands is that in the impulse response functions calculated by Local Projections, confidence intervals remain valid even if the data show unit roots (Montiel and Plagborg-Moller 2021). Jordà (2009) proposes two more types of error bands to improve the ability to examine the individual significance of the coefficients. This not only allows us to observe the response of a variable but also to test its significance. This is the process followed in the case study proposed in this paper.

De Jong et al. (2015) states that one of the problems of econometrics in economic history is that correlation is not causality. Our work provides a methodology that has been used as an approach to the concept of causality by studying, through impulse responses by Local Projections, how one variable reacts to a shock of another variable. For example, how the sales volume reacts to a shock in the number of markets. Moreover, De Jong et al. (2015)

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2. Cholesky decomposition is usually used to forecast error variance-covariance matrix and estimate impulse response functions with respect to the orthogonalized shocks.

highlight the endogeneity problems that arise when applying quantitative methods. Impulse responses by local projection consider endogeneity among the variables. Therefore, the methodology presented in this paper is not only adapted to small samples such as those typically found in business history, but also addresses endogeneity and estimates how a variable reacts to a shock in a variable of interest.

3.   The competitive advantage of Inditex

By conducting an analysis of the impulse responses through Local Projections, we aim to quantitatively verify the influence of some of the variables that studies on this company have highlighted as the main factors responsible for its commercial success and, therefore, drivers of its sales growth: the expansion of the commercial network (measured through the size of its surface area), the expansion of its international markets (measured through the number of countries with company shops), the capacity to adjust to demand (measured through the stock rotation index), price competitiveness (measured through the average price of the products), and the capacity to offer garments adjusted to the latest fashion trends (measured inversely through the average distance, in kilometres, travelled by Inditex garments from the place of manufacture to Spain). These factors have been used in the literature to explain the competitiveness of Inditex and, in general, of fast fashion companies, but even Inditex itself highlights in its corporate information the importance for its business model of some of these variables, such as the extensive commercial network, local production and the capacity to adapt to demand. All these variables and the value of sales are transformed into logarithms; a descriptive statistical table of them is presented in Table 1. We have followed the evolution of these five variables over 20 years, from 2000 to 2019, through indicators built from the information provided by Inditex in its annual reports. In the case of "retail area" and "number of markets", we have directly used the figures provided by the company. The variables "stock turnover rate", "average price" and "average distance from the place of manufacture" have been calculated as ratios of other parameters, which we will explain below. Since the company's reports are public and subject to the control of auditing agencies, we consider their data to be sufficiently reliable. Our aim is to clarify through a quantitative analysis which strategies have been more decisive for the commercial success of Inditex and, therefore, to verify whether product differentiation strategies have indeed been more influential than strategies linked to cost reduction, as qualitative analyses claim.

One of the variables of the company's performance that we have taken into account is the total surface area of the points of sale. The literature on

Inditex indicates that, at least until the second decade of the twenty-first century, when the rise of electronic commerce began to change the situation, the strategy to expand sales of this company was strongly based on the establishment of new points of sale, located in the best commercial areas of the cities. These studies present stores not only as Inditex's main sales channel, suited to the tastes of consumers in each area, but also as a key means of promoting its products through its elegant shop windows. In addition, it has been found that the stores constitute a fundamental source of information on fashion trends among consumers, both through the detailed sales data that they transmit daily to Inditex's central offices and thanks to the qualitative reports on the opinion of customers sent by store managers (Alonso 2000, p. 176-177; Suul and Turconi 2008, p. 8; Tokatli 2008, p. 28; Taplin 2014, p. 255-256; Divita and Yoo 2017, p. 25). As shown in Figure 1, the number of stores grew at a good pace until the 2008 crisis, slowing down from then on and even more so after 2012, when Inditex adopted the strategy of establishing larger stores, which could also be integrated into the online sales system, instead of more small stores. In order to take into account both the number of stores and the establishment of larger stores, we have taken as a variable the total area occupied by the stores. We have called this variable *surface*.

The literature has also underlined Inditex's growth strategy through rapidly expanding the number of international markets in which it is present. In fact, in 2019 Inditex had stores in 23 more countries than its main competi-

FIGURE 1 ▪ *Number of shops and total commercial surface area of Inditex, 2000-2010*
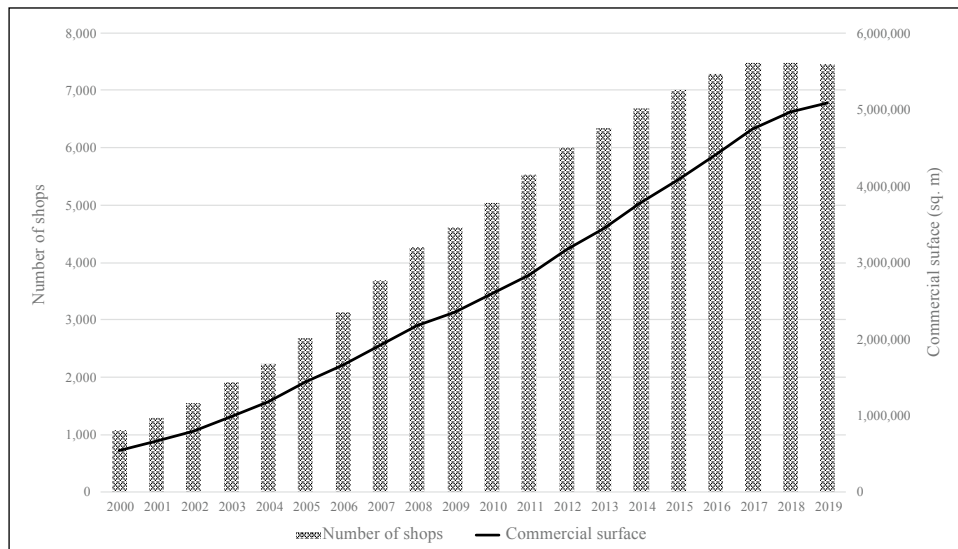
Source: Inditex Annual Reports, 2000-2019.

tor, H&M, and in 73 more than the world's third largest fast fashion brand, Uniqlo. According to Alonso (2000, p. 170), this strategy has allowed Inditex to have more diversified markets and, therefore, have a greater capacity to re-sist recessions and drops in consumption. To check the effect of the extension of international markets, we have included the variable of the number of countries in which the company has points of sale. This variable, which grew very rapidly in the second half of the 1990s, maintained a high rate of increase until 2004, rising more slowly thereafter, practically stopping between 2013 and 2015, returning to moderate growth in 2016-2017 and stopping again from 2018 (Figure 2). We have called this variable *markets*.

FIGURE 2 ▪ *Number of Inditex markets, 2000-2019*
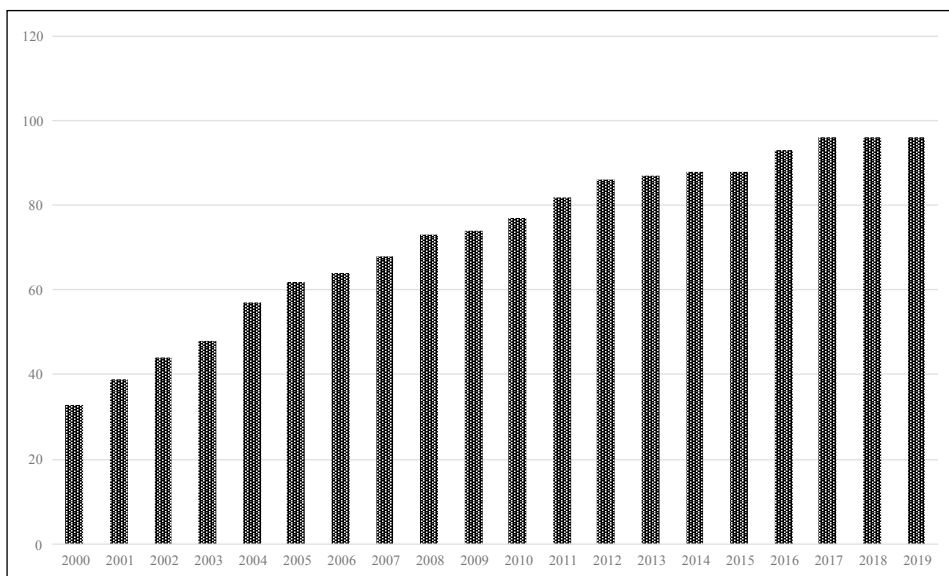
Source: Inditex Annual Reports, 2000-2019.

The competitive advantage that has been most highlighted in the litera-ture on Inditex is probably the company's ability to adapt to market demand, which gives it greater stock turnover and, therefore, lower storage costs, a higher percentage of garments sold at full price and fewer unsold products. In 2019, for example, the value of unsold stock at the end of the year in rela-tion to total turnover was half that of H&M at Inditex (Inditex 2020, H&M 2020). This ability to adjust to consumer tastes seems to be due to the knowl-edge of the market that the company obtains through stores and other infor-mation channels. But it is also possible thanks to the speed of its production and distribution system, which allows it to find out about fashion trends be-

fore creating the garments and also continuously probe the market with new garments, with short production series that encourage customers to visit stores regularly and create a sense of scarcity that encourages them to buy instead of waiting for the sales season or to find a similar product at a better price (Crofton and Dopico 2007, p. 42-43; Tokatli 2008, p. 31; Wei and Zhou 2013, p. 261-270; Taplin 2014, p. 255; Divita and Yoo 2017, p. 25). To observe the effect of this ability to adapt to demand on the evolution of sales, we have included the stock turnover rate (measured as the ratio of the cost of the merchandise to the value of the average stock in each year) among the variables analysed. Figure 3 shows that the trend of this indicator has been downward, although after the 2008 crisis and, with more intensity, in 2019 the company increased the speed of its stock turnover. We have called this variable *rotation*.

FIGURE 3 ▪ *Stock turnover rate at Inditex, 2000-2019*
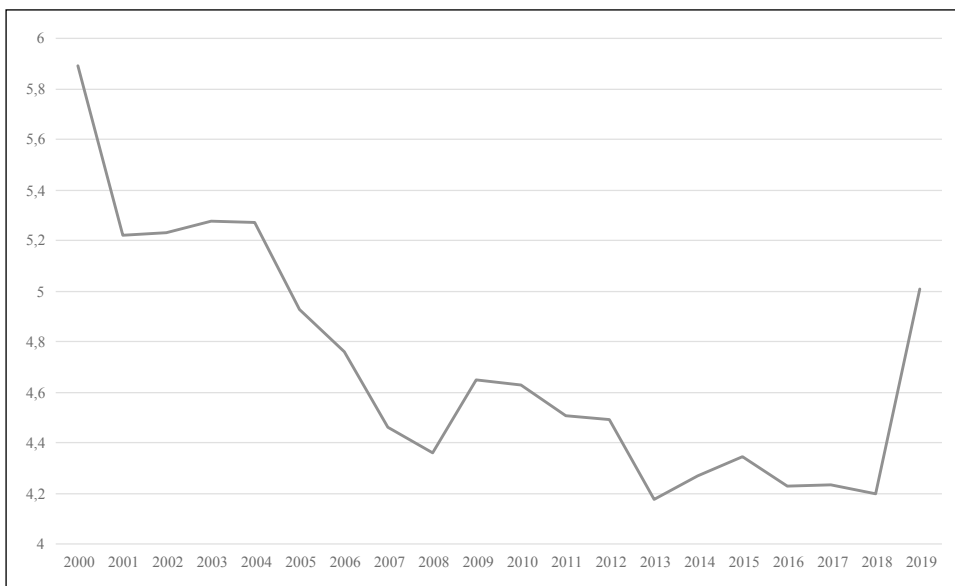
Source: Inditex Annual Reports, 2000-2019.

Inditex, like the rest of the fast fashion companies, combines low prices with the incorporation of fashion in its garments in its competitive strategy (Shephard and Pookulangara 2017, p. 10; Divita and Yoo 2017, p. 25). However, applying both strategies together is complicated, since garments with a higher fashion content are usually more expensive to produce, mainly because, in order to reach the market earlier, when this trend is still booming, they cannot be ordered from suppliers far away, who have the lowest costs. Studies on Inditex have found that this company has made a greater commit-

ment to responding to fashion trends than its main competitors and, according to some authors, this has resulted in its prices being slightly higher. Therefore, although the company has kept most of its brands in the affordable clothing segment, its competitiveness would not have been based on low prices (Taplin 2014, p. 260). Other studies, however, indicate that Inditex has tended to set prices 15% lower than those of its competitors (Alonso 2011, p. 341), which would imply a strategy of competition via price. To see the degree of influence of prices on sales, we have included in the econometric analysis the variable of the average price per garment, dividing the total turnover by the number of garments placed on the market. The evolution of this indicator, in 2010 euros, clearly followed a decreasing trend until 2009, beginning a rapid rebound from that year until 2012 and gradually decreasing again after 2013 (Figure 4). The aim is to observe whether the decrease in average prices, which we can identify with a higher proportion of basic products and, therefore, with a lower presence of fashionable products, was a determining factor in the increase in sales or if, on the contrary, the increase in average prices, which, in a very competitive market had to be due to an increase in quality and/or fashion, had a positive impact on sales. We have called this variable *price*.

According to Caro and Martínez-de-Albéniz (2015, p. 241), in the 1990s, 80% of Zara's garments were items with a high fashion content. Although two decades later this figure had dropped to 60%, it was still double the pro-

FIGURE 4 ▪ *Average sales price of Inditex products, 2000-2019 (2010 euros)*
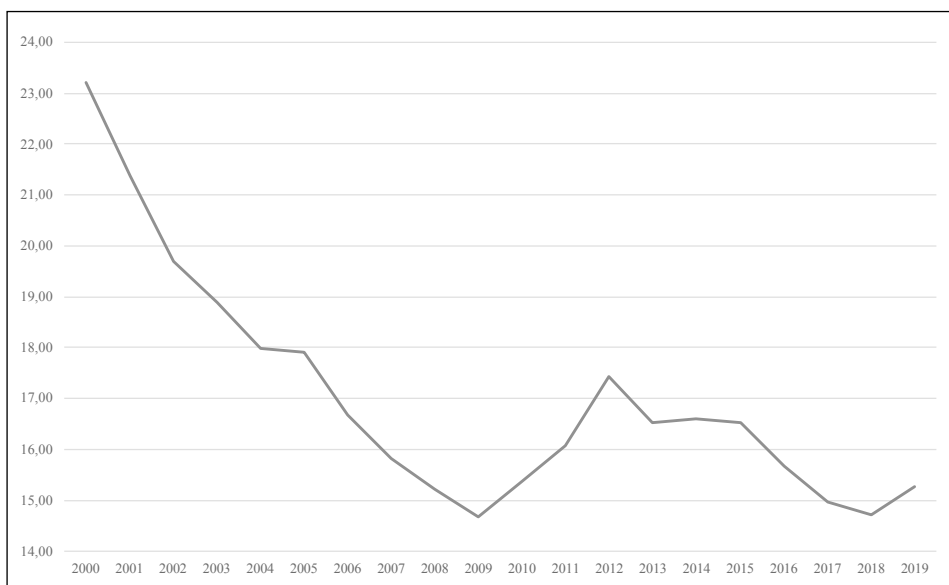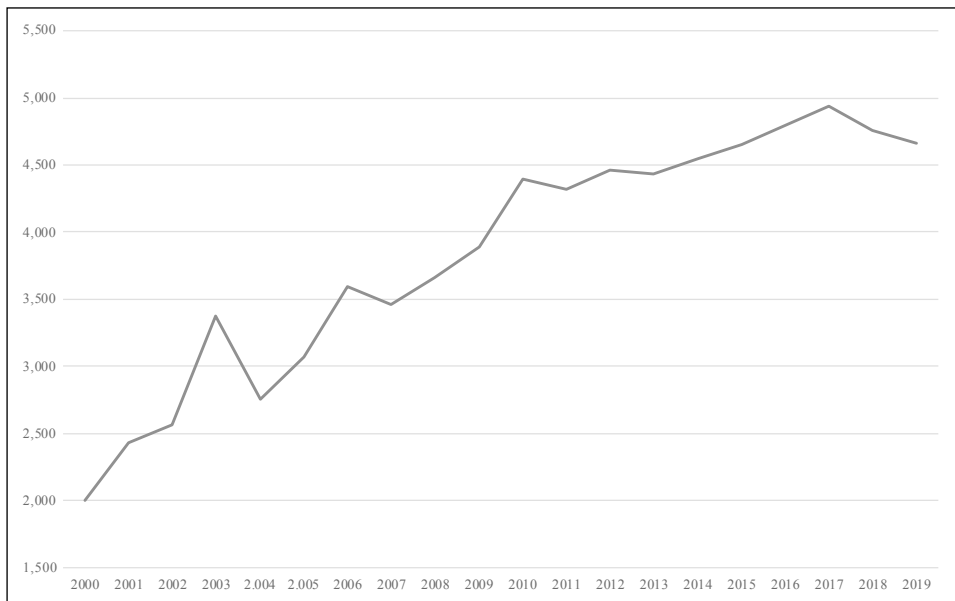

Source: Inditex Annual Reports, 2000-2019.

portion of its main competing brands. To achieve this high proportion of fashion garments, until the beginning of the twenty-first century, Inditex commissioned the production of many garments in nearby places, mainly in Spain and Portugal, and in North Africa. The company also had an important own production structure, mainly for the initial and final phases of the manufacturing process (Alonso 2000, pp. 172-173, and 2011, p 342; Barnes and Lea-Greenwood 2006, p. 9; Tokatli 2008, p. 21; MacCarthy and Jayarathne 2009, p. 19; Cachon and Swinney 2011, p. 2; Divita and Yoo 2017, p. 24). However, in the last two decades, Inditex has reduced its own manufacturing structure in relative terms and has significantly increased the proportion of garments manufactured in Asia, although without reaching the percentages of dependence on Asian production of its main competitors (Miranda and Roldán 2021, p. 171). To measure the effect on sales of where the production is located, we have calculated approximately the average distance, in kilometres, travelled by Inditex garments from the place of manufacture to Spain. For this we have considered the data s upplied by the company on the countries where its suppliers are located and the distance between the capitals of these countries and the capital of Spain. This indicator, reflected in Figure 5, shows an increase in the importance of suppliers located in distant countries,

FIGURE 5 ▪ *Average distance travelled by Inditex products from the country of manufacture to Spain (km), 2000-2019*

Source: Inditex Annual Reports, 2000-2019.

with lower costs, until 2017 and a slow decrease thereafter. We have call this variable *distance*.

TABLE 1 ▪ *Descriptive statistics of the variables analysed*[3]

	lsurface	lrotation	lprice	lmarkets	ldistance	lsales
Mean	14.59	1.54	2.83	4.24	8.22	9.30
Median	14.72	1.52	2.80	4.32	8.32	9.38
Maximum	15.44	1.77	3.14	4.56	8.50	10.13
Minimum	13.20	1.44	2.69	3.50	7.60	8.07
Std. dev.	0.70	0.10	0.13	0.32	0.26	0.63
Skewness	−0.55	0.68	1.08	−0.95	−0.90	−0.45
Kurtosis	2.13	2.52	3.44	2.82	2.74	2.10
Jarque-Bera	1.64	1.72	4.04	3.06	2.77	1.34
Probability	0.44	0.42	0.13	0.22	0.25	0.51

In order to analyse the sources of competitive advantage of the company using Local Projections, we start by establishing that the evolution of Inditex's sales depends on the number of markets, the sales area, the average price of the products, the stock turnover rate and the distance to suppliers. All the variables are transformed into logarithms.

According to the information criterion of Akaike and Schwartz, the impulse response functions are estimated using the local projection method with one lag. One lag is common when working with annual data, as is the case in this study. For each strategy, the impulse response is estimated using the Local Projection method for a five-period horizon to observe the evolution of sales in the face of different increases in the variables of interest.[4] A five-period horizon allows to study the initial impact, as well as to check for changes over time and finally to analyse whether the cumulative impact on sales is significant or not. We have taken a period of five years considering that a small sample does not allow us to take more years without losing robustness. Our impulse responses by Local Projections measure how a variable reacted, in our case *sales*, after a shock of one standard deviation in the variables of interest (in our case, *surface*, *markets*, *distance*, *rotation* or *price*).

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3.   Jarque-Bera test normal distribution. The null hypothesis is normal distribution and the alternative not normal distribution. The probability over 5% means that we do not reject the null hypothesis.

4.   Given the size of the sample and the case of Inditex, and in order to make the results as robust as possible, the Appendix section shows the results for smaller time horizons of 2, 3 and 4 periods.

Therefore, we present the following figures by explaining that a shock (an increase) in one of the variables of interest generated an increase/decrease in Inditex sales. Standard deviations are preferred because they offer the responses in the correct order of magnitude. Serial correlation that leads to wider marginal bands can appear in impulse response coefficients, so, it is better to select conditional error bands because they prevent serial correlation. Then, we used conditional error bands. Conditional error bands are consistent with the joint null of significance and make more sense in terms of the significance of individual responses (Jordà 2009). To understand the hypothesis and probabilities associated with them, we should note that joint refers to the null hypothesis that all the response coefficients are jointly zero and cumulative denotes the null hypothesis that the accumulated impulse response after five years is zero. The grey lines are the error bands.

Impulse response results are often presented as groups of graphs. The approach is to consider the analysis of graphs as a proxy for causality (Demiralp and Hoover 2003). However, for the sake of clarity, Table 2 shows Local Projections responses in a different way.

FIGURE 6 ▪ *Local responses of sales to an increase in the variables of interest*
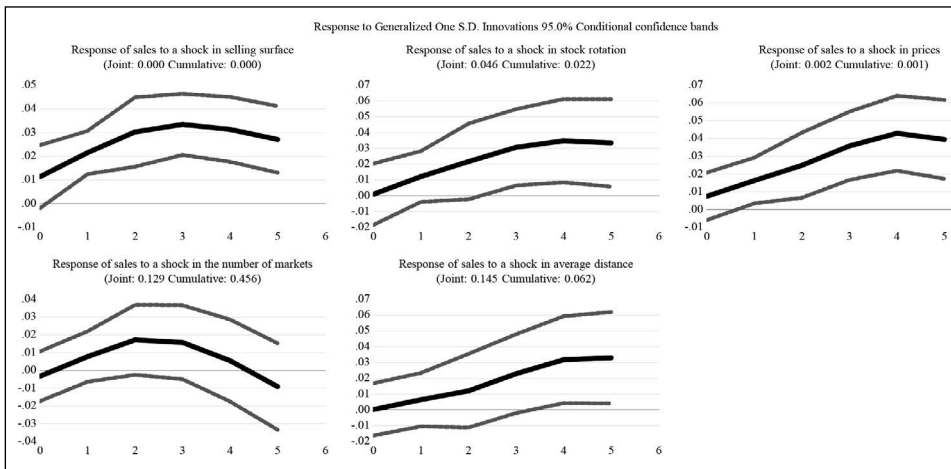
Source: Own elaboration using Eviews.

Figure 6 shows the responses to the impulse by Local Projections, i.e., how Inditex's sales reacted in the five years after the shock in the variable of interest occurred. In this way, we can understand the effect of the different decisions taken by the company. When probability is under 5% (0.05) then the result is significant. So, when rotation stock rose, sales significantly increased. Sales also grew as retail floor space and prices increased. A shock in the num-

TABLE 2 ▪ *Local responses of sales to an increase in the variables of interest*

	Response to a shock						Probability	
	t0	t1	t2	t3	t4	t5	Joint	Cumulative
Response of sales to an increase in selling surface	0.011	0.022	0.030	0.033	0.031	0.027	0.000	0.000
Response of sales to an increase in number of markets	−0.003	0.008	0.017	0.016	0.005	−0.009	0.129	0.456
Response of sales to an increase in price	0.007	0.016	0.025	0.036	0.043	0.039	0.002	0.001
Response of sales to an increase in average distance	0.000	0.006	0.012	0.023	0.032	0.033	0.145	0.062
Response of sales to an increase in stock rotation	0.001	0.012	0.022	0.031	0.035	0.033	0.046	0.022

ber of markets generated an increase in sales, but the result is not significant for a time period of five years (nor for shorter periods, see Appendix), while an increase in the average distance to suppliers produced a positive and significant cumulative effect on sales.

Most of the studies on Inditex cited in section 2 of the article highlight that Inditex's competitive advantage has been based fundamentally on its ability to produce and distribute fashion clothing in shorter lead times than its competitors, better adjusting to demand, in terms of style and quantity, at any given time (Ferdows, Lewis and Machuca 2004; Crofton and Dopico 2007; Toklati 2008; Wei and Zhou 2013; Tapli 2014; Divita and Yoo 2017). Although the company has kept most of its brands in the affordable clothing segment, its competitiveness would not have been based on low prices. On the contrary, its better knowledge of demand and the ability to produce and replenish merchandise quickly would have allowed Inditex to sell a higher percentage of its production at full price, without discounts, than its main competitors.

To test this proposition, the Local Projections analysis should show a positive relationship between sales and stock turnover rate, and a negative relationship of sales with average product prices and with the distance to the countries of origin of the garments, since the greater the proximity of production, the greater the ability to incorporate fashion into garments, to adjust them to demand and to reduce the time between product design and commercial distribution. This would confirm the importance of speed of response to demand and the fashion content of the product. However, the results of

the analysis are not fully in line with this hypothesis, but show a hybrid strategy, where product differentiation is accompanied by measures to achieve cost-competitiveness.

On the one hand, the results of the analysis show a positive relationship of the stock turnover rate and the increase in the average price of garments with sales growth, which seems to confirm the interpretation that attributes the key to the company's success more to its ability to adjust to demand and offer an attractive and different product than to its competitiveness via price. The positive impact on sales of an increase in the turnover rate reflects the competitiveness provided by the speed of production and distribution cycles, which makes it possible to offer a product suited to consumer tastes. The fact that price increases in the model do not lead to a decrease in sales, but rather the opposite, underlines the importance of product differentiation, since in a sector where there is strong competition between companies, consumers would not be willing to pay a higher price for a similar product. The analysis also confirms the importance in the company's competitive strategy of expanding the retail network, as there is a clear positive effect on sales as the retail area increases. However, penetration in more countries does not appear in this analysis with a significant impact, although its probability is close to 0.10 and it does appear with a positive sign in some the alternative estimations we have made in the Appendix section. Perhaps the sample has not enough years to capture the significance of increasing the number of markets.

However, contrary to what might be expected for a fashion-based strategy, the increase in the average distance from garment production sites had a positive effect on sales. In fact, the percentage of garments manufactured by distant suppliers grew rapidly until 2017. Therefore, Inditex needed to expand its relationship with Asian suppliers to remain price competitive. This necessarily had to reduce the company's ability to adapt to demand and was reflected in the trend of decreasing stock turnover rate until 2018. This greater dependence on Asian products was also due to the increase in the proportion of basic garments and the decrease in products with a high fashion content within Inditex's supply, although the Spanish company continued to have a much higher percentage of fashion garments than its main competitors (Caro and Martínez-de-Albéniz 2015).

Therefore, what the analysis of Local Projections shows is that, at least in the last two decades, Inditex has followed a hybrid competitive strategy, in which the measures to differentiate the product through design and marketing have been fundamental, but have been accompanied by measures to reduce costs, which have also been very influential. If Inditex is compared with other large fast fashion companies, such as the Swedish H&M, there is clearly a greater attention to fashion and less competition on price on the part of the Spanish company. But Inditex's strategy has evolved over the

years. The decreasing trend in this company's average prices (Figure 4), turn-over rate (Figure 3) and the proportion of products manufactured in near-by locations (Figure 5) shows that the strategy of competing with low costs has become increasingly important.

4. Conclusion

This paper presents a method of quantitative analysis, impulse response by Local Projections, that can be useful for business history, and contribute to the quantitative business history literature. This method solves some of the problems presented in the literature on quantitative business history, such as working with small samples, the analysis of causality or endogeneity problems. It can be used, as shown, to test and study a company and to compare different companies allowing a better understanding of a sector. It can be a useful tool to complement qualitative approaches and provide more robustness to the research, allowing hypotheses to be tested and offering results that facilitate comparison between different cases.

The case of Inditex, the world's largest clothing retail company, has been used to show the possibilities of Local Projections in research on the history of companies. We have tried to quantitatively contrast the effect of several factors that the literature on this case considers to be principally responsible for the commercial success of the company. The results confirm that Inditex's competitiveness has been fundamentally supported by the company's strategy of capturing information on fashion trends and consumer tastes in order to adapt its products to demand and offer consumers a varied and continuously renewed supply. The results also show the importance of other measures to differentiate the offer of the Inditex chains, such as getting closer to customers through the expansion of the commercial network. This measure has also contributed to making possible the good adaptation of Inditex's products to demand, as the network of shops is a key tool for the company to know the preferences of consumers.

Nevertheless, like all fast fashion companies, Inditex competes mainly in market segments where the consumer is looking for low prices and, therefore, its competitive strategy has to pay great attention to cost reduction. This is the reason why the proportion of products ordered from nearby suppliers has tended to decrease in the last two decades and, consequently, the average distance from where the products arrive has increased.

Our quantitative analysis shows that this strategy has also contributed to the increase in sales. Although Inditex resorts much less than its main competitors to production in distant countries, with lower costs, in order to have a greater proportion of garments that follow the latest trends, the company's evo-

lution over the last two decades has accentuated cost-cutting measures. Many studies on Inditex ignore this part of its competitive strategy because they carry out a static analysis, focused on the distinctive features of the company from its beginnings, without taking into account the subsequent evolution.

In summary, the use of Local Projections in a case study has allowed us to confirm some interpretations established in the literature, but it has also revealed the need to refine others and enrich them with new research.

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Author contribution statement

The two authors have jointly produced the entire article, but Alba Roldán should appear first because she is the one who proposed the research topic and devised the structure of the study.

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Appendix. Robustness check

Following Kilian and Kim (2011) and Jordà (2005), we have checked our results by estimating impulse responses by Local Projections using Cholesky structural form. From the most exogenous variable to the less exogenous, the order should be the average distance, then, the number of markets, the stock rotation, the selling surface and the average price for explaining Inditex sales (Graph 1). The average price should have a direct impact on sales. The selling surface is another important variable for explaining the success of Inditex (see section 2). After that, it seems that both the number of markets and the stock rotation are less endogenous than the other two and perhaps the least endogenous is the average distance. We also check the results by estimating impulse responses by local projections in a different order, considering the stock rotation as more exogenous than the number of markets. The second estimation order from most to least exogenous is the average distance, then, the stock rotation, the number of markets, the selling surface and the average price (Graph 2).

GRAPH 1 ▪ *Results using Cholesky*
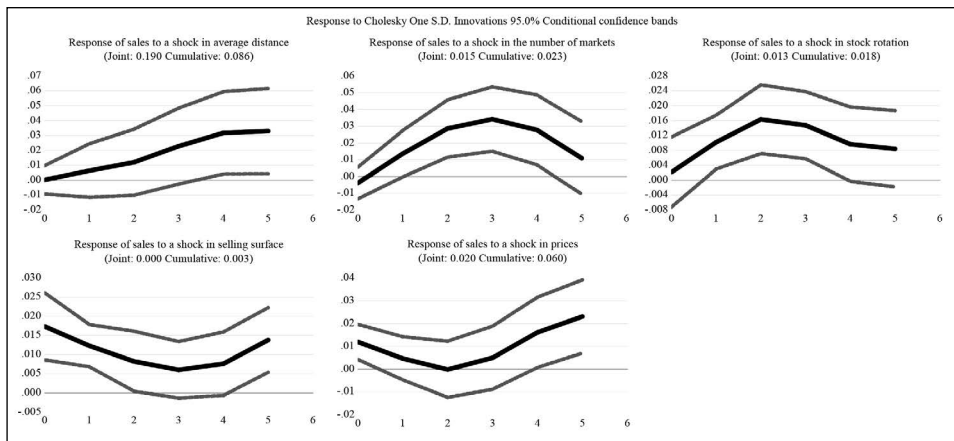
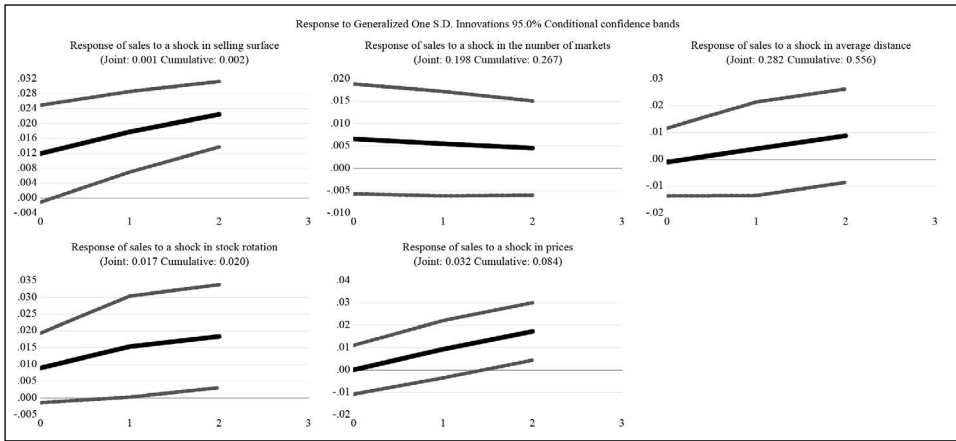
Source: Own estimation using Eviews.

GRAPH 2 ▪ *Results using Cholesky different order*

As can be seen in graphs 1 and 2 of this Appendix, the variables that were most significant and that led to an increase in sales (stock rotation, selling surface and prices) continue to maintain their positive and significant effect on Inditex's sales. As for the average distance, it also maintains its result, having a positive and significant cumulative effect on Inditex's sales. In both graphs, using Cholesky instead of Generalised Impulses to calculate the impulse response functions by means of Local Projections, we observe that an increase in the number of markets would lead to a significant increase in Inditex's sales (with Generalised Impulses this variable was positive but not significant). Therefore, the role played by the increase in the number of markets cannot be categorically affirmed.

The following graphs (3, 4 and 5) show the impulse response functions by Local Projections for our main model (lsurface, ldistance, lmarkets, lrotation and lprices) at different time horizons (2 years, 3 years and 4 years, respectively). It can be seen how for a 4-year horizon the results remain practically unchanged in terms of their sign and significance, while for the 2- and 3-year horizons, the average distance variable loses its cumulative effect over time (as it is a shorter time horizon) and ceases to be significant in explaining an increase in Inditex's sales.
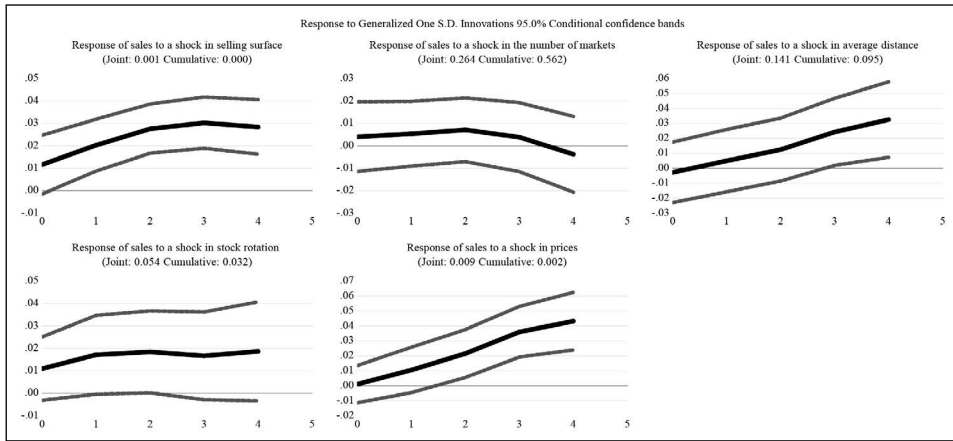
GRAPH 3 ▪ *Results for a horizon of 2 years*

Source: Own elaboration using Eviews.

GRAPH 4 ▪ *Results for a horizon of 3 years*
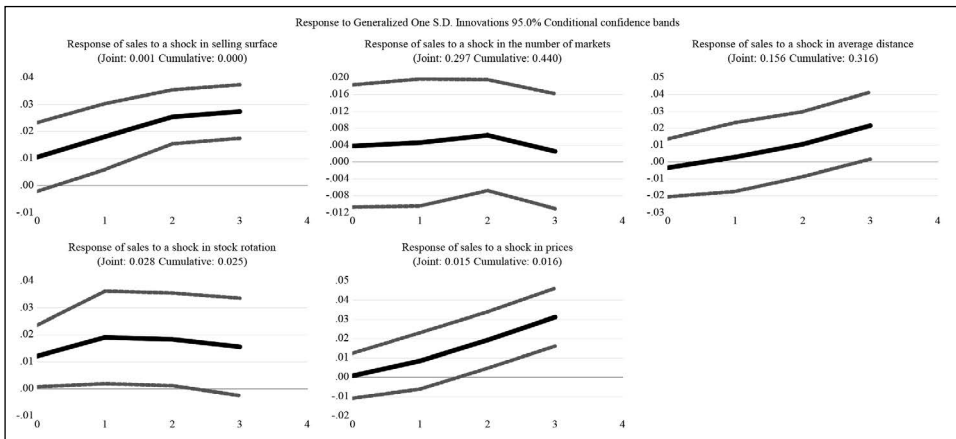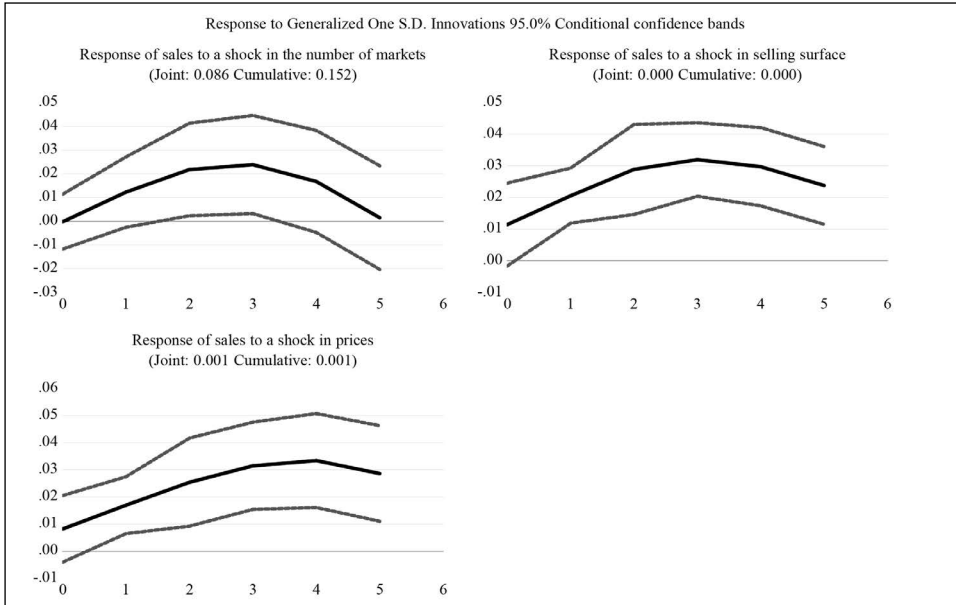

Source: Own elaboration using Eviews.

GRAPH 5 ▪ *Results for a horizon of 4 years*

Source: Own elaboration using Eviews.

Another way to test the results on a short sample is to test them using fewer variables in order to have a larger number of degrees of freedom and, in principle, to obtain more robust results. For this reason, impulse response functions are calculated by Local Projections by creating two groups with the variables of interest. The creation of two groups of variables may involve theoretical issues of why the variables go in one group or the other and this should be supported by the theory of business strategies. The creation of two groups also leads to statistical problems as fewer variables may be used to capture the effect of a variable that has been eliminated. This is why it is preferred that the central analysis contains the five variables of interest to explain sales.
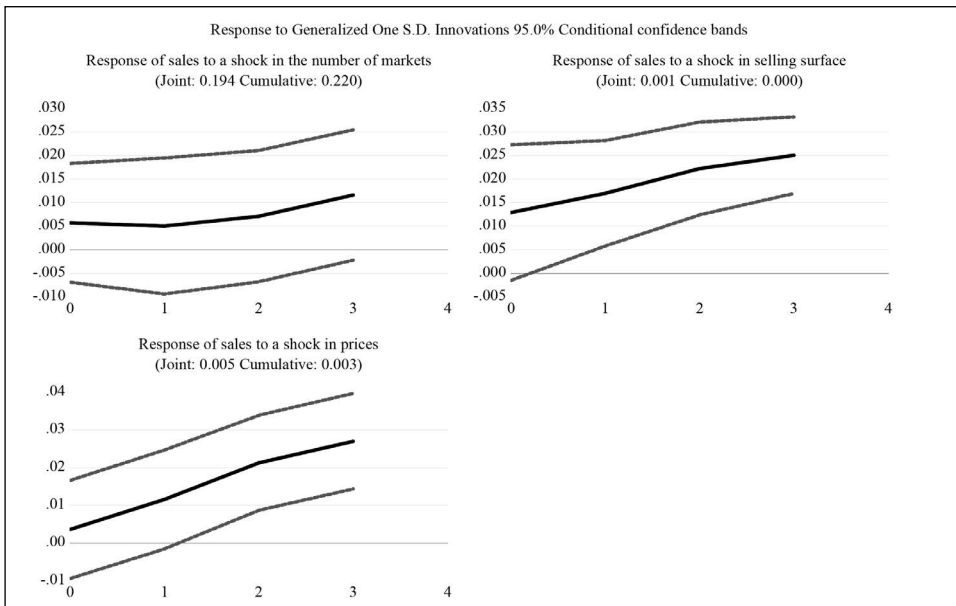
The two groups would be as follows. On the one hand, average distance, stock rotation and prices (for their impact on Inditex sales) and, on the other hand, selling surface, number of markets and prices. This exercise is done for a 5-year horizon as in the main estimation of the paper and, also, for a smaller and, in principle, more robust 3-year horizon. The price variable is repeated in both groups given its importance in explaining the sales of this (and any) firm. The results are shown in graphs 6 and 7 for the first group of variables and 8 and 9 for the second group.

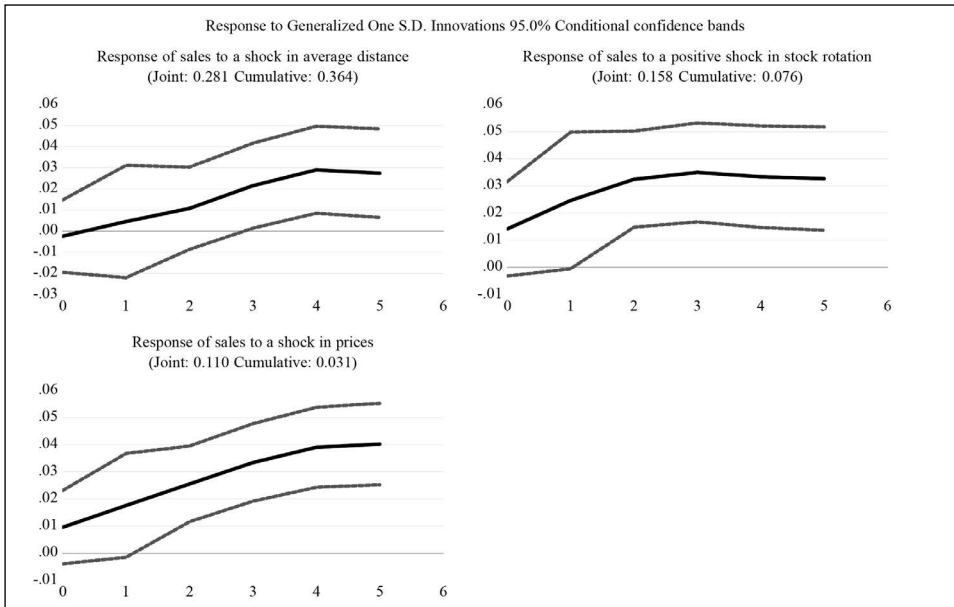**GRAPH 6** ▪ *Results for selling surface, number of markets and prices, horizon of 3 years*

GRAPH 7 ▪ *Results for selling surface, number of markets and prices, horizon of 3 years*
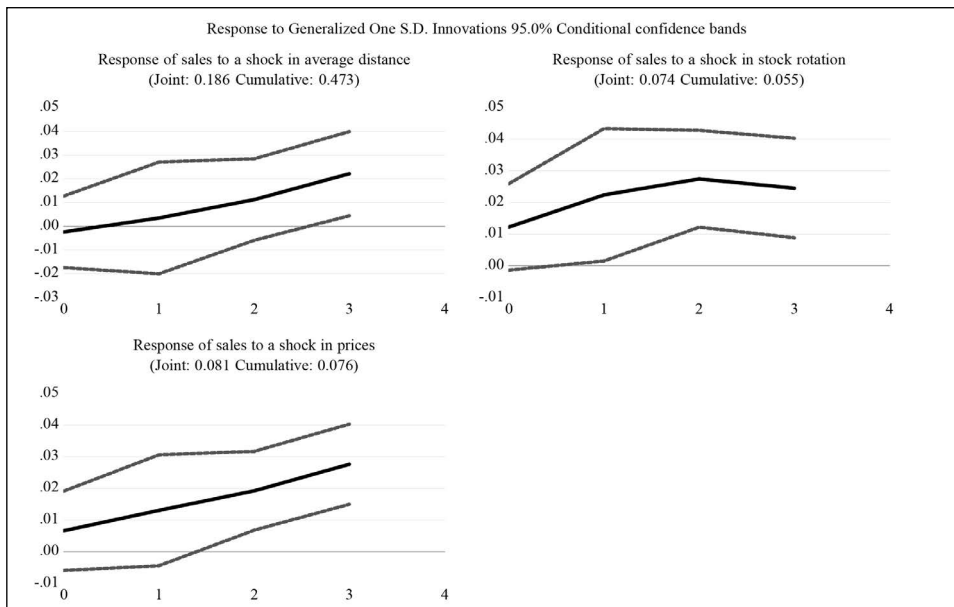
GRAPH 8 ▪ *Results for average distance, stock rotation and prices, horizon of 5 years*

Source: Own elaboration using Eviews.

GRAPH 9 ▪ *Results for average distance, stock rotation and prices, horizon of 3 years*

Source: Own elaboration using Eviews.

These graphs show that for a 5-year horizon the results are the same for the most significant variables (prices, stock rotation and selling surface), while the number of markets would have a positive and significant effect on Inditex's sales, dividing the analysis into two groups. For a 3-year horizon, the results are exactly the same as for the central model of this work.

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Local Projections en història empresarial: el cas d'Inditex

RESUM

Aquest article té dos objectius. D'una banda, tracta d'aprofundir en les fonts de l'avantatge competitiu d'Inditex, l'empresa més gran de venda minorista de roba del món, considerant l'evolució de les estratègies de l'empresa en les dues últimes dècades i secundant-se en una tècnica econòmetrica, *local projections*, per complementar les anàlisis qualitatives. D'altra banda, l'article presenta i explica aquesta tècnica quantitativa, que pot ajudar a resoldre alguns dels problemes que sorgeixen en intentar aplicar mètodes quantitatius en la història empresarial, com la petita grandària de les mostres, l'anàlisi de causalitat o l'endogeneïtat.

PARAULES CLAU: *local projections*, mètodes quantitatius, història empresarial, moda veloç

CODIS JEL: M16, M31, N80, N84

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Local Projections en historia empresarial: el caso de Inditex

RESUMEN

Este artículo tiene dos objetivos. Por un lado, trata de profundizar en las fuentes de la ventaja competitiva de Inditex, la mayor empresa de venta minorista de ropa del mundo, considerando la evolución de las estrategias de la empresa en las dos últimas décadas y apoyándose en una técnica econométrica, *local projections*, para complementar los análisis cualitativos. Por otra parte, el artículo presenta y explica esta técnica cuantitativa, que puede ayudar a resolver algunos de los problemas que surgen al intentar aplicar métodos cuantitativos en la historia empresarial, como el pequeño tamaño de las muestras, el análisis de causalidad o la endogeneidad.

PALABRAS CLAVE: *local projections*, métodos cuantitativos, historia empresarial, moda veloz.

CÓDIGOS JEL: M16, M31, N80, N84