At the roots of China's striking performance in textile exports: a panel data comparison with its main Asian competitors

Donatella Baiardi*

Carlucccio Bianchi†

June 15, 2018

Abstract

This paper aims to analyze the determinants of China's striking performance in textile exports in the time period 2001-2016. To this purpose, we integrate the analysis by Lall and Albaladejo (World Development, 2004) based only on China and its main Asian competitors' market share dynamics, with estimating an extended version of a traditional export function, derived from the imperfect substitute model, including a proxy of non-price competitiveness. The key long-run elasticities for each Asian exporter are thus computed and discussed in a panel-data framework, and the different export performances are examined also considering the interaction between the estimated parameters and their interaction with the growth rates of relative prices, world income and product quality. Lastly, our approach decomposes the textile export growth differences between China and its rivals into the three main channels of trade competition, i.e. prices, quantities and quality. Our findings shows that China crowds out most of its rivals with a competitive strategy based on a mix of low and decreasing relative prices and non-price policies aiming at stimulating exported volumes. However, some weaknesses in the Chinese trade prospects emerge when quality improvement is considered.

Keywords: Textile exports, Outperformance, Displacement, Competitiveness, Cross-country comparisons, Panel data analysis.

JEL classification: C23, F14, F63, L67.

*Dipartimento di Scienze Economiche ed Aziendali, University of Parma, Parma, Italy. Email: donatella.baiardi@unipr.it. Donatella Baiardi is the corresponding author.

†Dipartimento di Giurisprudenza e Scienze Politiche, Economiche e Sociali, University of Eastern Piedmont, Alessandria, Italy. Email: carluccio.bianchi@uniupo.it

1 Introduction

According to the well-known Heckscher-Ohlin theory, countries tend to specialize in the production, and consequently export, of the goods employing as inputs the factors of production that are relatively more abundant. As the process of economic development proceeds, then, countries are expected to increasingly specialize in capital-intensive and abandon labor-intensive products. This implies, in general, that developed economies should shift their output and export composition toward more high-tech products, while developing countries should tend to concentrate on traditional sectors. In this context, international competition would be felt most strongly by countries with similar factor endowments, and viceversa in the opposite case.

In the most recent decades, first the implementation and gradual abolition of the Agreement on Textiles and Clothing (ATC) and then China's accession to the World Trade Organization (WTO), implying the dismantling of tariff and non-tariff barriers to exports, triggered profound changes in the dynamics and composition of world trade,[1] with large effects on the international division of labor and the organization of production processes. China became the first world exporter at the end of the first decade of the new century, overtaking the leading positions of Germany and the USA.[2]

The literature on the consequences of this extraordinary Chinese export performance on world trade has flourished and a survey of its main findings would require an entire specific paper (see, for example, Goldstein et al., 2006 and Winters and Yusuf, 2006). If we limit our attention to the empirical studies investigating the repercussions of China's export success on its neighboring Asian economies, which are the most exposed to the Chinese competitive threat because of their geographical proximity,[3] Lall and Albaladejo (2004) find that Chinese Taipei, Hong Kong, Korea and Singapore suffered the greatest market share losses, with Japan also appearing as a vulnerable exporter. Similar conclusions are obtained by Greenaway et al. (2008), who find that China crowded out many high-income Asian exporters, while Eichengreen et al. (2007) and, more recently, Kong and Kneller (2016) observe that the growth of Chinese exports had a positive effect on high-income and middle-income Asian economies (Japan, Singapore and South Korea, and Malaysia and the Philippines, respectively), with negative effects confined only to low-income Asian countries (Bangladesh, Cambodia, Pakistan and Sri Lanka).

Furthermore, when specific industries are considered, Pham et al. (2017) find that, with respect to high-tech products, China displaced its developing competitors (India, Malaysia, Singapore, Thailand and Vietnam), with stronger effects especially in the period prior to the global financial crisis of 2008. Moreover, in the case of textiles and clothing,

[1]The ATC is a 10-year transitional trade agreement allowing for selective application of tariffs and quotas, that replaced the more restrictive Multi-Fibre Agreement signed in 1995.

[2]China's market share in total world merchandise exports increased from 4.30 per cent in 2001 to 13.09 per cent in 2016.

[3]A recent survey on this issue is provided by Amman et al. (2009).

Amman et al. (2009) find that higher-income Asian economies fared better than their lower-income counterparts in the time period 1990-2005.

In line with the Heckscher-Ohlin theory, the extraordinary rise of China's market share in world trade has been accompanied by a notable change in its export structure, shifting away from traditional to more sophisticated goods (Hue and Hua, 2002; Athukorala, 2009; Caporale et al., 2015; Pham et al., 2017). Indeed, China has also become one of the top high-tech exporters since 2013.[4] However, and contrary to the implications of the Heckscher-Ohlin model, China has also become the top world exporter in a very traditional sector like textiles, since its world market share more than tripled in the period 2001-2016, passing from 10.66 to 36.22 per cent.[5,6] A similar performance, even though at a reduced rate, involved the clothing sector, where China's market share practically doubled in the same period (see Baiardi et al., 2015). In the light of these figures, the textile sector may be considered as a very interesting case study in order to understand the reasons at the roots of China's striking success and its future prospects with respect to its competitors. In fact, despite the low incidence of textile exports in total merchandise trade (1.8 per cent in 2016), this sector is still an important source of output and employment in many countries, with positive effects in terms of growth performance and balance of payment equilibrium. In particular, this industry is fundamental for the Pakistani economy, where textile exports reach the astonishing figure of 37.58 per cent of total merchandise sales abroad.

The empirical analysis developed in this paper is original in many aspects. The country sample includes China and its main Asian competitors in the textile industry, selected according to their export performance in 2016, and the time period investigated is the most recent one 2001-2016, in order to capture the effects China's extraordinary success after its accession to the WTO. The methodology proposed is an extension of the analysis, implemented by Lall and Albaladejo (2004), who consider, however, only the dynamics of relative export market shares during the 1990s and uses data in values, thus overlooking the behavior of quantities, absolute and relative prices and their interdependence with traded volumes. Actually, a change in the relative price of an exported good can have either a positive or a negative effect on the market share in value, depending on the price elasticity of its export function. In fact, if the export function is price-elastic, a variation

[4]Despite this extraordinary performance, the value added embodied in China's high-tech products remains modest as documented by Athukorala (2009), Kuroiwa (2014), Xing (2014) and Pham et al. (2017). These also state that the claim that the sophistication of China's export basket is rapidly approaching that of most advanced industrial countries is ultimately weak. In fact, Athukorala (2009), by separating China's high-tech export data into final goods and its components in the years 1992-2005, finds that China is becoming only a final assembler of East Asia–centred production networks. Therefore, China's concentration on final goods assembly reveals a persistent relative comparative advantage in labor-intensive products.

[5]In particular, China textile exports were 105USD billion in 2016, a value that is nearly seven times that of India, the second largest exporter with 16USD billion.

[6]Germany was the leader exporter in this industry until 1999, when it was overtaken by China.

in relative prices triggers a more than proportional change in exported quantities, with a consequent opposite repercussion on the dynamics of market shares in values. As a consequence, a correct and thorough analysis of China's export performance should consider the joint behavior of relative prices and quantities, together with their interdependence as formalized by an estimated export demand function.

Thus, after an introductory analysis on market share behaviour, we proceed with a panel-data estimation of an extended version of the traditional export function derived from the imperfect substitute model, which, following the most recent indications of the 'new trade theory', also includes a proxy for non-price competitiveness. The estimated long-run elasticities for China and its main Asian competitors are commented within a more general framework that also considers their interaction with the growth rates of relative prices, world income and quality changes. Lastly, for the first time in the empirical literature, our approach decomposes the growth difference between China and its rivals' textile exports into three main channels through which trade competition can occur, i.e. prices, quantities and quality. In particular, price competitiveness traditionally refers to the comparative level of relative prices, while non-price competitiveness depends upon factors related to export composition and promotion, market destination, trade barriers, but also the quality level of exported products (Krugman, 1989; Schott 2004; Hallak, 2006, Bernard et al., 2006; Fu et al, 2012).

The rest of the paper proceeds as follows. Section 2 outlines the criteria chosen for the selection of China's competitors in world textile trade and briefly describes the main stylized facts related to this trade. Section 3 presents the empirical framework adopted and outlines the three channels through which export competition can occur and the condition for testing China's export performance *vis á vis* its competitors. Section 4 describes the data used in the subsequent analysis together with their relevant statistics. Section 5 discusses the empirical results obtained and their main implications for interpreting the observed events. Section 6 complements the previous results with an additional investigation of the similarity between China's textile exports and those of its competitors. Finally, Section 7 briefly concludes.

2 A general overview of the textile industry developments

2.1 Selection of China's competitors in world textile trade

China's textile export competitors investigated in this empirical analysis are selected among the top world traders, whose market share is greater than 1 per cent in 2016, the last year for which data are currently available.

Table 1 about here

As shown in Table 1, the leader is China, with an export value of 104,663 million USD and a corresponding market share of 36.22 per cent, followed by India, Germany and the USA, with a market share of 5.61, 4.63 and 4.47 per cent respectively. Indonesia, United Kingdom and Thailand are the bottom countries, with a market share of 1.42, 1.26 and 1.17 per cent, respectively. If we concentrate our attention on the Asian exporters, the selected China's competitors, in alphabetical order, are therefore Chinese Taipei, Hong Kong, India, Indonesia, Japan, Korea, Pakistan, Thailand, Turkey, and Vietnam. These countries, together with China, can be grouped into two distinct clusters according to their stage of economic development. In particular, we distinguish between developing (China, India, Pakistan, Thailand, Turkey and Vietnam) and developed economies (Chinese Paipei, Hong Kong, Japan, Korea and Taiwan). Asian developing countries record a total export value of 153,228 million USD and a market share of 53.02 per cent, while Asian developed economies have a less relevant position, with a total export value of 33,331 million USD and a market share of 11.53 per cent. Globally, all Asian countries, with an export value of 186,559 million USD and a market share of 64.56 per cent, play a central role in textile exports.

2.2 The textile industry: some stylized facts

According to growth theory, as economic development proceeds, countries tend to shift their productive activities from agriculture to industry, and then from industry to services. This implies a change in the composition of output, passing from labor-intensive to capital-intensive products. The same production shift also affects exports. Since the textile sector is a labor-intensive industry, this shift is expected to be empirically observed mostly in advanced countries.

Figures 1 and 2 about here

Figures 1 and 2 show that, when considering the top exporters reported in Table 1, the production shift predicted by theory generally holds both for advanced Western countries and for developed Asian economies, whose total sectoral market shares decrease on average by 2.27 and 2.41 percentage points, respectively, in the period 1990-2016. In a rather interesting way, however, the US market share shows a hump-shaped dynamics, with a 2.58 increase in the sub-period 1990-2001, followed by a similar decrease (2.17) in the subsequent sub-period.

Moreover, Figure 2 shows that China's textile market share records a tremendous increase (30.41 per cent) in the time span under consideration. The majority of other developing Asian countries in the sample show a similar rising trend, even though at lower rates (3.85, 2.61 and 2.10 per cent for India, Turkey and Vietnam, respectively), with Indonesia, Pakistan and Thailand as the only exceptions, since they show a generally oscillating market share.

China's spectacular increase in the textile export market share is mostly pronounced in the period after its accession to the WTO, with an overall rise of 25.25 percentage points. In the same period all developed countries, both Western and Asian, continue their decreasing trend. With regards to developing Asian countries, instead, only India, Vietnam and Turkey increase their market share, while Indonesia, Pakistan and Thailand show a slightly decreasing or rather stationary dynamics.

The case of China is very interesting from different points of view. First, the outstanding growth of market share recorded by this country suggests that Chinese exports are not only eroding the market share of its regional neighbors, but are also detrimental to Western exporters (see, Lall and Albaladejo, 2004 and Roland-Holst and Weiss, 2005). Secondly, this outcome is obviously linked to the fact that the General Agreement on Tariffs and Trade (GATT) Uruguay Round came into effect in 1995, bringing the textile and clothing sectors under the jurisdiction of the World Trade Organization (WTO), which China joined in 2001. Moreover, the Agreement on Textile and Clothing (ATC) established a gradual dismantling process of the quotas that existed under the Multi Fibre Arrangement (MFA), which ended in 2005.[7]

As expected from trade theory, China's economic development process has produced a notable shift in its export composition away from conventional labor-intensive goods to more sophisticated product lines, well documented in the recent literature (see, among others, Athukorala, 2009; Yue and Hua, 2002; Caporale et al., 2015; Pham et al., 2017), finally becoming the world's leading exporter in high-tech products since 2013. On these premises, therefore, China's extraordinary performance in the textile sector highlighted by Figure 2 may appear quite surprising, so that a closer look at these changes in the international trade composition appears to be necessary.

A preliminary analysis can be performed by means of the Balassa index, a very popular indicator in international economics for measuring the relative comparative advantage (RCA) of a given country in a specific industry or type of goods.[8] This index has been computed both for the textile sector and for high-tech industries, where these latter industries are identified following Pham et al. (2017).[9] It is interesting to note that, according to this indicator, China exhibits the highest comparative advantage in textiles as well as in electronics-telecommunications, since the specific Balassa indices are equal to 2.77 and 2.58-2.74 respectively in 2016. In all other high-tech sectors, this indicator is

[7]The last twenty years have been also turning points for Turkey and Indonesia. Turkey, in particular, after the shift from an import substituting to an export-led growth strategy in the Eighties, strengthened its association with the European Union in the next decade, obtaining a 'preferential supplier status'. Similarly, export-oriented policies have been implemented in Indonesia starting from the mid-Eighties.

[8]The Balassa index is the ratio between any country's share of exported goods in total exports and the corresponding world share. An exporter has a comparative advantage in a particular industry (good) if its RCA index is greater than unity.

[9]These high-tech industries are: chemistry, computer-office machinery, electrical and non-electrical machinery, electronics-telecommunications, pharmacy and scientific instruments.

widely lower, especially in the case of scientific instruments (1.08), chemistry (0.51) and pharmacy (0.19). It is also interesting to note that the dynamics of the Balassa index in the textile sector is slightly decreasing in the overall period 1990-2016, but increasing after 2001 (from 2.48 to 2.77), while, in the case of clothing, which is a quite similar industry, a continuously decreasing trend is observed, with an acceleration after 2001, since the specific RCA falls from 4.62 in 1990 to 4.16 in 2001 and then to 2.64 in 2016.

Furthermore, with regard to the textile sector, the average RCA index in the period 1990-2016 is greater than 1 for all Asian exporters, with Japan as the only exception.[10] If we concentrate on the post-2001 period, after China's accession to the WTO, it is worth mentioning that, in a really very significant way, the only two economies where the RCA index slightly increases over time are China and Pakistan.The latter country has a very high specialization in textile exports, since its share on total exports is 37.58 per cent in 2016, with an RCA index equal to 20.64. Also Turkey and India have RCA values higher than China (4.20 and 3.37 in 2016), even though their decrease in the time period 2001-2016 is noteworthy, and particularly pronounced for India (2 pecentage points). The RCA decrease is also high for Korea and Hong Kong, with percentage reductions close to that of India.

The dynamics of the RCA index also enables to compare the evolution of any country's market share of textile exports (s^v_{Tj}) with that of the overall share of total exports in merchandise trade (s^v_j). In fact, given the definition of the index, some algebraic manipulations yield the following Identity (1),[11]

$$s^v_{Tj} = RCA_{Tj} s^v_j \tag{1}$$

where Condition (1) shows that the market share of textile exports may be decomposed into the product of the Balassa sectoral index (RCA_{Tj}) and of the total merchandise market share of exporter j. Thus, if we focus on the case of China during the most recent time period 2001-2016, Condition (1) shows that the spectacular increase in the Chinese market share of textile exports (at a rate of 8.5 yearly percentage points) may be attributed mostly to the increase in China's general competitiveness, leading to a similar increase in the country's overall export share (7.7 yearly percentage points), but also to an increase in the relative comparative advantage (0.8 yearly percentage points). Thus, despite the fact that, according to international trade theory, China's development process has implied a reduction in the ratio of exports to total merchandise exports (from 6.32 in 2001 to 4.99 per cent in 2016), the increase in the textile RCA has enabled the country to increase its sectoral market share (from 10.66 to 36.21 percentage points) at a rate faster than that of total export share (from 4.30 to 13.09 per cent).[12] These outcomes therefore

[10]The Japanese RCA textile index is equal to 0.60 both in the overall time period under consideration and in the post-2001 subperiod, with a further reduction to a value of 0.55 in 2016.

[11]For details, see Appendix A.

[12]Of course the increase in China's textile RCA index implies that the country's reduction in the share of textile exports, with respect to total exports, in the period under consideration, has been less that

suggest that an investigation of the forces behind China's striking performance in textile exports is necessary.

3 The testing framework

3.1 China's competitive strategies: a preliminary analysis based on market share dynamics

Traditionally, the empirical literature uses the terms '*crowding out*' or '*displacement*' to indicate the consequences of China's extraordinary export growth at the expense of its competitors' performance. To the best of our knowledge, a relevant contribution on this topic is the paper by Lall and Albaladejo (2004), which constitutes one of the first studies about the potential '*export threat*' played by China on international markets.[13]

More precisely, according to Lall and Albaladejo (2004), given the dynamics of China's exports relatively to those of its competitors, and the resulting impact on market shares, five combinations of possible outcomes may be identified, which are labeled as follows:

1. '*partial threat*', when both China and its competitors exhibit a positive world market share dynamics, but China's exports grow *faster* than those of its competitors;
2. '*no threat*', when both China and its competitors exhibit a positive world market share dynamics, but China's exports grow *slower* than those of its competitors;
3. '*direct threat*', when China gains market shares and its competitors lose;
4. '*China under threat*', when China loses market shares and its competitors gain;
5. '*Mutual withdrawal*', when both China and its competitors lose market shares.

Their analysis considers all types of exported goods, classified according to their technological content in the period 1990-2000, and is mainly concerned with studying China's competitive threat to its East Asian neighbors, benchmarking performance by technology and market. Therefore, as shown in the previous sections, their analysis does not take into consideration the most interesting recent period, characterized by an extraordinary growth of Chinese exports in general, and of textile goods in particular. In fact, the Chinese market share in manufactured exports has increased by 2.1 percentage points in the 1990's against 8.8 points in the following period 2001-2016; in the textile industry this

that of the whole world.

[13]Other popular contributions on this issue, investigated according to different methodologies, are those by Eichengreen et al. (2007), Greenaway et al. (2008), Athukorala (2009), and, more recently, Pham et al., 2017.

trend has been even more pronounced, since China's market share increase has passed from 3.9 to 25.6 points.

Furthermore, Lall and Albaladejo (2004), in evaluating the potential for China's competitive threat, consider only the dynamics of relative export market shares using data in value, thus overlooking the behavior of quantities and that of absolute and relative prices. Actually, market shares in values are equal to the product of market shares in quantities and relative prices. In fact, at the aggregate level, for any country j and any year t,[14] we have that

$$s_j^v = \frac{p_j x_j}{p_w x_w} = \frac{p_j}{p_w} \cdot \frac{x_j}{x_w} = rp_j \cdot s_j^q \tag{2}$$

where x_j and x_w are the volumes exported by country j and all world exporters, respectively, p_j and p_w their absolute prices, rp_j the consequent relative prices of country j and s_j^q its market share in quantity. It follows that if the relative price increases, the market share in value will show a more favorable dynamics than that in quantity, because the rising relative price improves it. However, at the same time, the market share in quantity depends on relative prices, because exports in turn depend among other variables on relative prices too, so that, on the one hand, given Identity (2), a relative price increase directly improves s_j^v, but on the other hand, the indirect negative effect on exported quantities reduces both s_j^q and s_j^v.

In particular, a change in the relative price of an exported good can have either a positive or a negative effect on the market share in value, depending on the price elasticity of its export function. In fact, if the export function is price-elastic, a variation in relative prices triggers a more than proportional change in exported quantities, with a consequent opposite repercussion on the dynamics of market shares measured in values. As a consequence, a correct and thorough analysis of China's export performance should consider the joint behavior of relative prices and quantities, together with their interdependence as formalized by an estimated export demand function.

Therefore, the comparison between China's performance and that of its competitors could be examined in the following way. Consider textile exports in volumes for China (x_c) and those of any trade competitors (x_z): the difference in their export dynamics is given by $\dot{x_c} - \dot{x_z}$, which may be either positive or negative. By adding and subtracting from this difference the growth rate of world exports ($\dot{x_w}$), $\dot{x_c} - \dot{x_z}$ can be rewritten as $\dot{s}_c^q - \dot{s}_z^q$, where $\dot{s}_c^q = (\dot{x_c} - \dot{x_w})$ and $\dot{s}_z^q = (\dot{x_z} - \dot{x_w})$ are the growth rates of the textile export world share in volumes for China and any of its rivals z, respectively.

Furthermore, given that $\dot{s}_c^q > 0$ is always verified since it is equal to 9.53 percentage points in the period under consideration (see the following Table 2 and also Section 2), three distinct outcomes can occur:

1. if $\dot{s}_z^q > 0$ and $\dot{s}_c^q > \dot{s}_z^q$, the difference $\dot{s}_c^q - \dot{s}_z^q$ is positive. In this case, China *outperforms* its competitor z;

[14] For the sake of simplicity, we omit the subscript t.

2. if $\dot{s}^q_z > 0$ and $\dot{s}^q_c < \dot{s}^q_z$, the difference $\dot{s}^q_c - \dot{s}^q_z$ is negative. In this case, China *underperforms* its competitor z;

3. if $\dot{s}^q_z < 0$, the difference $\dot{s}^q_c - \dot{s}^q_z$ is positive. In this case, China not only outperforms, but also *displaces* its competitor z.

As a consequence, there is outperformance when China's textile exports grow faster than its competitors', while there is displacement if there is outperformance and, at the same time, competitors' export shares decrease in time. The case of underperformance, instead, describes a situation where both countries exhibit a positive export performance but China's exports grow slower.[15]

Table 2 about here

Table 2 reports the average annual growth rate of each exporter's textile market shares (in quantity) in the time period 2001-2016 (first column), together with the differences between China and its Asian competitors (second column), and the consequent relative performance according to the three-point classification proposed above (third column). Beside China, the textile market share dynamics $\dot{s}^q_z$ is positive only for India and Turkey, while it is negative for all the remaining developing countries (Indonesia, Pakistan, Thailand), as well as for all developed Asian economies. Since China's exports grow faster than any of its competitors, there is never underperformance, but *outperformance* with respect to India and Turkey and *displacement* at the expense of all the other exporters.[16] The highest displacement is towards Hong Kong (23.91 growth difference points), but it is also substantial with respect both to the other developed and developing economies. Note that, as underlined by Lall and Albaladejo (2004), even when displacement occurs, this does not necessary imply a positive gain for China. In fact, '*Chinese exports may be undertaken by firms relocating from the neighbor losing market share: its enterprises extend their competitive advantage and benefit the home country by promoting exports of intermediates and related design and marketing activities and remitting dividends*' (Lall and Albaladejo, 2004, p.1443).

Summarizing previous discussion, in order to investigate the causes of China's successful export performance with respect to its competitors, it is not enough to focus on the evolution of market shares in values as in Lall and Alabadejo (2004), but it is necessary to analyze the joint dynamics of prices and quantities, and their interaction, especially in a period of great changes both in production costs and in the institutional environment

[15]It is worth noticing the strict parallelism existing between these three cases and the *Partial Threat*, *No Threat* and *Direct Threat* outcomes identified by Lall and Albaladejo (2004) and recalled at the beginning of the present section. In our analysis, however, market shares and trade performances are defined and analyzed in terms of volumes and not of values.

[16]Note also that these two export outcomes correspond to case Partial Threat and Direct Threat circumstances identified by Lall and Albaladejo (2004).

concerning tariffs and quotas. This requires studying the main features of the textile export function of each country, together with the evolution of the variables affecting it.

3.2 Export function specification

Modelling export dynamics is a debated issue in the literature, since different key aspects should be taken into account, such as the characteristics of the considered goods (i.e. if they are homogeneous or differentiated products), their end-use, the level of disaggregation of available data, and so on.[17] In the traditional framework, export flows are determined by two key factors: price competitiveness and foreign demand.[18]

However, empirical evidence seems to indicate that these two variables alone cannot entirely explain export performance, since an additional non-price competitiveness factor, related to the quality content of products, should be explicitly considered (Murata et al, 2000; Pain et al., 2005). In fact, according to the 'New Trade Theory', product differentiation in an open economy is the most important source of trade between countries with similar economies and consequently the inclusion of this new variable in the export equation should '*contribute to better gauge export demand and ameliorate the estimations of price elasticities*' (Algieri, 2014), and at the same time reduce the potential bias in estimating the income elasticity of export demand, which reflects a failure to account for changing product quality (Krugman, 1989).[19] Moreover, this additional variable explicitly introduces supply-side factors in trade models, which are particularly relevant especially in the light of the well-known '45-degree rule' (Krugman, 1989; Caporale and Chui, 1999).[20] Our empirical analysis is thus based on this extended version of the traditional export

[17]When goods are imperfect substitutes, products are generally geographically differentiated, and domestic and foreign goods may differ by some real or perceived characteristics due to differences in the place of production (Armington, 1969; Goldstein and Khan, 1985; Crozet and Erkel-Rousse, 2004). Moreover, many papers in the literature find that the 'law of one price' does not hold either across or within countries for differentiable goods, which may be diverse from each other in terms of variety or quality, and consequently in terms of price.

[18]Existing studies are generally based on exports at the aggregate level (see Goldstein and Khan, 1985; Riedl, 1989; Athukorala and Riedel, 1991; Panagariya et al., 2001; European Central Bank, 2005; Bussiere et al., 2013 and Algieri 2011, 2014), while only few attempts are performed at the industry level (see, Cosar, 2002; Baiardi et al., 2015a,b).

[19]In the empirical literature, only recently the role of non-price competitiveness factors in the export function is formalized. Algieri (2011) introduces in the traditional equation an unobserved component in the form of a time-varying trend, in order to capture stochastic unobserved patterns, which appear to be relevant in the estimation of export performance, as also underlined by the European Central Bank (2005) and the OECD (2000, 2005). Athanasoglou and Bardaka (2010) find that this component is crucial for the export performance of manufactured goods in Greece. Furthermore, Algieri (2014) provides a microfoundation of the extended specification of the export function in the case of imperfect substitute goods, and she applies it to investigate the export dynamics of the GIIPS countries at the aggregate level.

[20]Krugman (1989) uses the term '45-degree rule' to indicate the observed regularity between the estimated elasticities of foreign activity in export equations and the rate of growth of domestic output.

function, and therefore, the following export equation for each country is considered:

$$x = \omega + \alpha rp + \beta y^{*} + \gamma q + \epsilon \tag{3}$$

where the variable x is the natural logarithm of yearly exported volumes, while rp and y^{*} are the natural logarithms of annual relative export prices and of foreign demand, respectively. The variable q is the natural logarithm of the non-price competitiveness factor, which mirrors quality, variety and technological content of exported goods. The coefficient α is the export price elasticity for the textile industry, and is expected to be negative. The coefficients β is the income elasticity, while γ is the non-price competitiveness component elasticity; they are both expected to be positive. The parameter ω is the intercept, and ϵ is the error term.

If Equation (3) is differentiated with respect to time, the following condition is obtained:

$$\dot{x} = \alpha \dot{rp} + \beta \dot{y^{*}} + \gamma \dot{q} \tag{4}$$

where, thanks to the log properties, $\dot{x}$, $\dot{rp}$ and $\dot{q}$ are the approximated rates of change of exports, relative prices and quality for each exporter, while $\dot{y^{*}}$ is the approximated growth rate of world GDP, which is country-invariant. According to Equation (4), the growth rate of textile exports in each country depends thus on three components, which capture the effects of relative prices, world income and quality changes on export dynamics. Hence, the corresponding three terms on the right-hand side of Equation (4) may be labeled as the price effect, the income effect and the quality effect. More precisely, the price effect depends on the interaction between the price elasticity and the growth rate of relative prices; the income effect depends on the interaction between the income elasticity and the growth rate of world income, while the quality effect depends on the interaction between the quality elasticity and the growth rate of the non-price competitiveness proxy.

Given these premises, the following subsection provides clear indications about the main channels through which China outperforms or displaces its competitors. This is particular important not only in order to understand which are the competitive strategies chosen by the textile exporters, but also to devise appropriate recommendations in terms of industrial and trade policy measures.

3.3 China's export competition: the main channels

Starting from Equation (4), the difference in total export performance between China and any of its rivals $\dot{x_c} - \dot{x_z}$ depends on three factors as follows:

$$\dot{x_c} - \dot{x_z} = (\alpha_c \dot{rp_c} - \alpha_z \dot{rp_z}) + (\beta_c - \beta_z)\,\dot{y_j^{*}} + (\gamma_c \dot{q_c} - \gamma_z \dot{q_z}) \tag{5}$$

The right-hand side of Equation (5) indicates that there are three main channels through which export competition can occur, i.e. prices, quantities and quality. More precisely, if the difference $\dot{x_c} - \dot{x_z}$ is positive, and the following condition holds

$$\alpha_c \dot{rp_c} - \alpha_z \dot{rp_z} > 0 \tag{6}$$

then price competitiveness is one strategy implemented by China in order to outperform or displace its competitors in international markets. As Equation (6) shows, both price elasticities, obtained by estimating Equation (3), and the growth rates of relative prices matter when a competition based on prices is pursued. Moreover, if the two exporters exhibit the same (or close) price elasticities, but the relative price dynamics is different, then the country with higher price dynamics will loose market shares the more the higher the absolute value of the price elasticity is.

The second term on the right-hand side of Equation (5) captures the difference in income effects between exporters, and China's better performance is verified if the following condition holds

$$(\beta_c - \beta_z)\, \dot{y^*} > 0 \tag{7}$$

In this case, China successfully competes in terms of exported volumes and its underlying motivations. Condition (7) depends on the difference in the income elasticities recorded by each exporter multiplied by the growth rate of world income, which is the same for all countries.

Finally, the quality effect difference is captured by the last term in the right-hand side of Equation (5), and is verified if the following condition holds

$$\gamma_c \dot{q_c} - \gamma_z \dot{q_z} > 0 \tag{8}$$

In this case, China outperforms or displaces its rival z by means of a competition based on product quality. Similarly to the price effect difference, Condition (8) depends both on quality elasticities, obtained by estimating Equation (3) for each exporter, and the growth rates of quality levels.

These three effects may be either opposite or complementary and they provide useful information about the different industrial strategies pursued by China and the other top exporters in international trade. With regard to price competition, on the one hand, advanced economies can choose to delocalize their production activities in emerging countries, where labor is cheaper, which allows them to continue to compete in world markets by re-exporting the goods produced abroad at lower prices. On the other hand, because of their competitive advantage in terms of labor costs, developing countries can choose to center their trade policies on price differentials.

Since however international trade competition is based not only on relative prices but also on other non-price factors, such as export composition and promotion, geographical market destination, trade arrangement, technological content and efficiency improvement (Fagerberg, 2000; Fu and Gong, 2011), Conditions (7) and (8) capture all these other relevant aspects. More specifically, Condition (7) is connected to mismatches between demand and supply at the national level and to world consumers' desire for diversity, while Condition (8) focuses on the importance of improving the variety, quality and technological content of exported goods (Krugman, 1989; Schott 2004 and Hallak, 2006, Bernard et al., 2006; Fu et al, 2012).

Summing up, our approach allows to identify the roots of China's outperformance, *vis-á-vis* its competitors, in exporting textile goods, produced by an industry still characterized by a low technological and a high labor content and that should have been progressively abandoned by such a rapidly industrializing country.

4 Data

4.1 Data description

The export data used in our econometric estimations are at the 4-digit disaggregated level, according to the Standard International Trade Classification (Rev. 3). The data source is the UN Comtrade database. Chinese Taipei and Vietnam have been however excluded from the final analysis because, with regard to the former country, specific export data are not provided by the UN Comtrade database and other alternative compatible data have not been found, while, in the case of Vietnam, export quantities are missing for 23 out of 59 goods.[21] The final sample spans over the period 2001-2016, because in most of the selected countries either export volume data are incomplete and of poor quality in the years before 2000,[22,23] or because, as highlighted in the previous section, we are fundamentally interested in the post-2001 outcomes.

The available database is thus organized to form nine distinct panel datasets, one for each selected Asian country. Every balanced panel for each exporter is characterized by 59 cross-sections (the selected goods) spanning over the period 2001-2016, with the exception of Indonesia and Pakistan, where, because of missing data, the total number of cross-sections is 55 and and 54, respectively.

The relative price series rp for every good i at time t, with $i = 1, ..., 59$ and $t = 2001, ..., 2016$, is computed as the ratio between the export unit value of each good in any selected country j, with $j = 1, ..., 9$, and the average export unit value of all top exporters

[21] The complete list of the selected goods is reported in Table A1 in the Appendix. Data have been carefully checked and corrected for evident errors, especially concerning the position of the decimal point in quantity time series.

[22] This is the case of China for the following list of goods: 6522-6529, 6532, 6533, 6544, 6576, 6584; in the case of Pakistan the involved goods are 6511, 6519, 6522, 6523, 6525, 6531-6535, 6538-6544, 6572, 6578, 6585, 6594; in the case of Thailand, this problem refers to the goods from 6521 to 6541; and goods 6531 and 6532 for Turkey.

[23] For similar reasons, goods 6535, 6545, 6546 and 6572 have been dropped for Indonesia and goods 6529, 6536, 6546, 6576, 6591 have been lastly excluded in the case of Pakistan.

considered in Table (1) for which data are available.[24] Foreign demand y^* is proxied with the chained-volume index of world GDP (in constant 2010 USD). In particular, this variable is retrieved from the International Monetary Fund database (World Economic Outlook Database, April 2018 Edition) and, because of its nature, is invariant for each cross-section.

Measuring product quality has always been an ambitious task from an empirical point of view. In general, the most popular variables used for this purpose are the real capital stock and R&D expenditure. Data on the real capital stock are available only at the aggregate level, and consequently they are inconsistent with our analysis performed at a sectoral level. Data on R&D expenditure are instead available at the industrial level and are provided by the OECD STAN and ANBERT databases, but country coverage of these two datasets is very limited with reference to Asian economies.[25] An alternative useful database on export quality is that proposed by Henn et al., (2013). Even if this dataset covers 178 countries over the period 1962-2010 and considers goods at different levels of disaggregation, when we focus our attention on the selected exporters, 4-digit quality data are available only for China, India and Korea, while 3-digit quality data are available only for China, Korea and Hong Kong, and 2-digit quality data are available only for China.[26] As a consequence, given the limited data coverage with regard to Asian countries, the available series cannot be used to proxy non-price competitiveness factors.

Therefore, the proxy for product quality (q) used in our empirical analysis is EXPY, a quantitative index originally proposed by Hausman et al. (2007), which is quite popular in the empirical literature as the indicator of the 'sophistication level of exports' (see, among others, Lall et al., 2005; Xu, 2010). This variable is a weighted average of the per-capita GDPs of textile exporters for each product, where the weights reflect the revealed comparative advantage of each exporter in each product. Therefore, it is considered as a general measure of the productivity level associated with a country's specialization pattern. Note that our EXPY variable is computed at a disaggregated level only with regard to the textile sector and not to all the traded goods of a country as in the seminal paper by Hausman et al. (2007). For details see Appendix B.

Finally, all variables are transformed into natural logarithms.

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[24]Many papers in the literature find that the 'law of one price' does not hold either across or within countries for differentiable goods, which may be diverse from each other in terms of variety or quality, and consequently in terms of price. In line with this assumption, in this paper prices are approximated by average unit values, which are particularly useful for capturing the evolution of comparative advantage, export sophistication, reputation and quality (Aiginger, 1997, Fontagné et al., 2008; Schott, 2004, 2008; Fu et al., 2012).

[25]More precisely, with regard to R&D expenditures, complete time series for textile industry are only available for Japan, Korea and Turkey. In the case of China, data start from 2000, but with missing records in the period 2001-2007.

[26]Moreover, in the case of 4-digit quality data, the typology of disaggregation is not consistent with that adopted in this paper.

4.2 Variable analysis

Before estimating Equation (3), a preliminary analysis of the variables of interest is performed. The order of integration of these series is investigated by means of the panel unit root test proposed by Pesaran (2007), whose null hypothesis is that all series contain a unit root, while the alternative is that some time series do not have a unit root.[27]

This test is applied to the following variables: export volumes, relative prices and the non-price competitiveness indicator, given that world GDP is a time series invariant across cross-sections. For this reason, the stationarity of this latter variable is assessed by means of the widely used Augmented Dickey-Fuller (ADF) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) time series unit root tests (Said and Dickey, 1984 and Kwiatkowski et al., 1992, respectively).

Tables 3 and 4 about here

The results of the unit root tests performed are reported in Tables 3 and 4. They all clearly indicate the non-stationarity of the variables of interest, since the null hypothesis is only rejected when the variables are transformed into their first differences (Δx, Δrp, Δy^* and Δq respectively).

Given the non-stationarity of the variables of interest, a panel cointegration test is implemented in order to verify the existence of a long-run relationship between them. This test is composed of two different groups of statistics; the first group consists of four tests (panel v, panel ρ, panel PP and panel ADF-statistics), which pool the residuals along the within-dimension of the panel (panel tests). The second group is composed of three other tests (group ρ, panel PP and panel ADF-statistics), which pool the residuals along the between-dimension of the panel (group tests). The cointegration results are shown in Table 5, where the Pedroni cointegration test is performed with the inclusion of the intercept in the testing equation.

Table 5 about here

It is common practice in the empirical literature to reject the null hypothesis of no-cointegration if at least four out of seven of these statistics are significant (see, among others, Bottazzi and Peri, 2005, 2007 and Bottasso et al., 2013). As shown in Table 5, following this 'rule of thumb', our results confirm the presence of cointegration. As a consequence, we can conclude that a long-run relationship between export volumes, relative prices, world income and quality exists, since the Pedroni test rejects the hypothesis of no cointegration for all countries. Given these premises, Equation (3) is estimated by applying the the panel mean group (PMG) estimator proposed by Pesaran and Smith

[27]This panel unit root test relaxes the hypothesis of cross-sectional independence and takes into account any possible correlation among cross-sections. These features are particularly important with regard to the nature of our datasets, where cross-sections consist of similar goods belonging to the same industry.

(1995), which is particularly appropriate in the case of non-stationary panels with 'small-T', where 'small' typically means about 15 time-series observations (as exactly in our case).

5 Export competition in the textile sector

In this section, export competition in the textile sector is analyzed through different steps. We first proceed with estimating Equation (3),[28] in order to obtain the long-run elasticities (the parameters α, β and γ respectively) for each country in our sample. Then, according to the framework highlighted in Section 3, we analyze the main channels through which China competes in the textile international trade and test and measure their relevance.

5.1 Long-run elasticities and export performance decomposition for each textile top exporter

The starting point in analyzing export competition in the textile sector is the estimation of each country's export function expressed by Equation (3). Table 6 reports the key long-run elasticities (the parameters α, β and γ respectively).

Table 6 about here

The coefficient α captures the price-competitiveness factor, and is negative statistically significant, as expected, for all exporters. China is the only country in our sample with a price elasticity greater than one in absolute value (1.27). Pakistan and Hong Kong are also characterized by high price elasticities, with estimated absolute values equal to 0.86 and 0.78, respectively. In all other Asian exporters, absolute price elasticities range from 0.67 to 0.45. The lowest values are observed for Korea (0.45), Turkey (0.46) and Japan (0.48).

With regard to the income elasticity, this parameter exhibits the highest value again for China (2.16) in line with its extraordinary success in international markets as highlighted by its awesome export growth rate. High values of this coefficient are also observed for India (1.09), and, even if with a lower value, for Turkey (0.67), in line with the historical world income elasticity for the same period (0.70). For all other developing Asian exporters (Indonesia, Pakistan and Thailand), the income elasticity is not statistically different from zero, while, with regard to the developed Asian economies, it is negative

[28] More precisely, in a panel data context, the estimated equation for each Asian country is

$$x_{it} = \omega_i + \alpha_i rp_{it} + \beta_i y_t^* + \gamma_i q_{it} + \epsilon_{it}$$

where the subscript i refers to 59 textile goods.

and highly statistically significant, in line with their negative performance in terms of export growth rate and market shares (see Section 2 and the following subsection).

Lastly, the non-price competitiveness factor, proxied in this paper with the EXPY variable, is always positive and highly significant as expected. This result is in line with the main findings of the empirical literature on new trade and growth (see Helpman and Krugman, 1989; Krugman, 1989).[29] In particular, the highest quality elasticities are observed in Pakistan, Turkey and Hong Kong, with estimated coefficients equal to 1.04, 0.95 and 0.87, respectively.

Moreover, in line with Algieri (2014), this parameter is always higher than the price-competitiveness elasticity with the only exception of China and Indonesia. Consider for example the case of Turkey, the exporter who exhibits one of the lowest absolute price elasticities (0.46) in the sample together with one of the highest non-price competitiveness elasticities (0.95). These values imply that a 1 per cent increase in relative export prices prompts a reduction in export volumes by 0.46 percentage points, while a 1 per cent fall in non-price competitiveness triggers a more than double (0.95 percentage points) export volume reduction.

Finally, when Equation (3) is differentiated with respect to time, Equation (4) is obtained.

Table 7 about here

Equation (4) decomposes the dynamics of textile exports into the price effect, the income effect and the quality effect, which depend on the interaction between the price, income and quality elasticities reported in Table 6, and the growth rates of relative prices, world income and quality changes reported in Table 7.

As far as the price effect is concerned, it is worth noticing that in the period under consideration, relative prices fall in China, Indonesia and Turkey (and also Japan among developed Asian economies), so that the price effect on export dynamics is positive for these countries.[30] The effect is particularly relevant for China because of its high price elasticity mentioned above, which implies an incidence on total export performance of about 13 per cent. It is however Indonesia the country where the price effect is particularly relevant, mainly because of the high fall in relative prices, with an effect of about 73 per cent on total textile export growth. With regard to Turkey, the price effect is not very pronounced, despite the high relative price reduction, because of the country's low price elasticity. Among developed Asian exporters, the price effect is positive only for Japan,

[29]Athanasoglou and Bardaka (2010) find that this variable has a strong direct positive effect on export performance as well as an indirect effect by reducing export prices and and increasing price competitiveness (see also Algieri, 2014).

[30]It worthwhile to note that relative prices fall not because absolute prices (actually average unit values (AUVs) decrease, but because their increase in this country in the time under consideration is lower than the world's AUV increase. With regard to China, for instance, absolute prices rise at an annual growth rate of 6.50 per cent in the period under consideration, while world's prices rise by 28.91 per cent.

even if at a very reduced rate both because of its low reduction in relative prices and its low price elasticity. In Hong Kong, instead, the negative price effect on export performance is very high (about 56 per cent of the total textile export reduction) because of the very high relative price increase combined with the relatively high price elasticity. Lastly, in Korea the price effect is practically nil, as a consequence of the almost stationary value of relative price dynamics.

It is worth recalling that, as highlighted in Subsection 3.1, the dynamics of the market share in value depends both on relative price behavior and export volume performance. In our sample, the countries having a positive relative price growth in the period under consideration are Hong Kong, with a very high annual increase (8.62 per cent), Pakistan (1.52 per cent) and also India, Thailand and Korea, but with very modest changes (less than 0.10 per cent). On the other hand, China, Indonesia, Turkey and Japan show an opposite dynamics, with relative prices falling on average in the overall period (-1.27, -0.83, -0.74 and -0.30 per cent, respectively), so that for these countries the accounting dynamics of market shares in value is less favorable than that of shares in quantities. In any case, however, if the overall changes in market shares in values and quantities are compared, it can be observed that the signs of variation do not change, which implies that the quantity performance effect *dominates* the possible opposite effect of relative price dynamics, also because of the feedback effect of relative prices on quantities exported. These observations highlight the importance of concentrating on the export performance in terms of quantities and of studying the value of the key parameters of the export function.

Furthermore, since for China at the same time relative prices fall in the period under consideration and the price elasticity is greater than one, exported quantities increase *ceteris paribus* more than proportionally, so that the effects on the market share in value is positive despite, from a statistically point of view, relative prices and exports go in an opposite direction, so that the accounting dynamics of market shares is less favorable than that of shares in quantities. For all the other countries, whose price elasticity is less than one, the effect on exported volumes of relative price changes is less than proportional; therefore if relative prices increase, market shares in value show a more favorable dynamics than that of quantities, even if the statistical record incorporates the negative effect of prices and quantities. The opposite holds true when relative prices fall, in the presence of a price elasticity less than one.

Passing to examine the income effect, their registered values are an obvious consequence of the considered countries' income elasticities, since the growth rate of world income is the same for all. Therefore, China is characterized by the highest income effect (8.34 per cent, which accounts for 67 per cent of its total export performance), followed by India (4.21 per cent, which accounts however for 80 per cent of its total export growth) and Turkey (2.59 per cent, corresponding to 43 per cent of its total export increase). With reference to developed Asian exporters, the income effect is always negative.[31] In details, Hong Kong records the most pronounced negative experience (-7.64 per cent, with an incidence of 63 per cent on its total export performance), followed by Korea and Japan. In these two countries, however, the incidence on export dynamics is noticeable (200 per cent and 269 per cent, respectively) because of the positive and compensating influence of the quality effect.

When we move to consider the quality effect, which is always positive for all countries, the highest values are registered for Turkey (2.42 per cent), Thailand (2.02 per cent) and China (1.93 per cent) among developing countries, and Hong Kong (2.04 per cent) among developed economies. These outcomes are substantially in line with the considered countries' growth rates of quality since the quality elasticities are rather similar. Thailand, Indonesia and Pakistan are three interesting cases. With regard to Thailand, the quality effect accounts for 94 per cent of the country's total export performance, so that quality improvement is the main driver of textile export growth. Indonesia also records a very high quality improvement (at rate of 2.21 per cent), but a very low quality elasticity (0.58), so that the quality effect is limited (1.28, almost the double of total export growth). Despite the highest quality elasticity (1.04), Pakistan exhibits an opposite experience with the lowest quality of the sample (0.58) due to the very modest quality upgrading (0.56).

This suggests that in more and more integrated trade markets, characterized by intra-industry resource reallocation and inter-industry structural change, quality improvement and product differentiation play a very important role in export competition (Fagerberg, 2000; Fu et al., 2012; Algieri, 2014), so that structural policies aimed at encouraging innovation and technological progress should be adopted. Recent trends in the textile industry indicate that many efforts are made in this direction, mainly stimulating the churning of production in favor of the so-called 'technical' textile goods, i.e. a cluster of textile products for non-aesthetic purposes distinguished from all other similar goods because of their high level of technological sophistication and the continuous flow of new and innovative applications.

5.2 How has China outperformed or displaced its Asian competitors?

The findings reported in Tables 6 and 7 can be used to analyze which are the main channels through which China outperforms or displaces its main Asian competitors (see Table 2). In particular, Table 8 shows the results of Conditions (6), (7) and (8), which decompose the difference between China and its rivals' textile exports into the three main channels through which trade competition can occur, i.e. prices, quantities and quality. These channels may have opposite or complementary effects, and they provide useful

[31]This is a consequence of the countries' change in international division of labor, away from low-tech and high-labor content goods towards more sophisticated products.

information about the different industrial strategies pursued by China and the other top exporters in world markets.

Table 8 about here

With regard to the price effect difference, Condition (6) is always positive and statistically significant, with particularly high values in the case of Hong Kong and Pakistan (8.42 and 2.92 percentage points, respectively). As discussed in details in the previous Subsection 5.1, the causes of this result are to be ascribed both to the highest price elasticity observed in China and to the different dynamics of relative prices, which decrease in China while increase in the other two countries. In all other cases, the price effect difference is also very relevant, which implies that China successfully competed in international markets by means of a low-price competitive strategy, despite the efforts of the other exporters to be more careful about price setting and cost controlling, especially after China's accession to the WTO (Bernard et al., 2006; Fu et al., 2012).

With regard to the income effect difference, Condition (7) is also always positive and statistically significant. Obviously, this result is closely connected to the Chinese extraordinary performance in textile exports already stressed in the previous sections, and it is interesting to note that this channel explains most of the total export difference shown in the last column of Table 8. In particular, the income gap is very wide with regard to the countries whose income elasticity is negative, or not statistically different from zero (see Table 6). Note also that India and Turkey are the two exporters that better contrast China in terms of export volume competition (4.13 and 5.75 per cent, respectively); indeed, as shown in Table 2, these two countries are the only ones for which, in the period under consideration, there is a Chinese outperformance but not displacement.

On one hand, this result is line with the conclusions of the trade literature based on gravity equation models, where however the displacement effect is identified by looking only at the sign and significance of the key explanatory variable 'volume of exports by China to the importer j' in a particular time period. In this context, if China and any its competitor's exports are substitutes, then China is expected to displace its rival j. Our model is more general since the income effect is only one of the main channels through which export competition takes place. On the other hand, the income effect difference can be connected to the so-called 'flying geese' evidence, according to which China's growth triggers output, investment and export opportunities for all other Asian economies (Ahearne et al., 2006). In this case, China's export performance is not necessarily at the expense of its competitors, but is instead the precondition for their economic growth too.

Lastly, with regard to Condition (8), China successfully competes in terms of quality improvement of the exported goods when its performance is compared with that of India, Indonesia and mainly Pakistan among its developing Asia competitors, and with Japan when advanced Asian countries are considered. However, this competitive channel is not very strong with the exception of Pakistan, where as we have already noticed in the previous subsection, the quality improvement is very weak. In all other cases, Condition (8) is either not statistically different from zero (Thailand, Hong Kong and Korea) or negative as for Turkey, which is the only country for with the quality improvement strategy is the most successful against China's competitive challenge.

To sum up, our results clearly show that China crowds out most of its rivals with a competitive strategy based on a mix of low-price policies and non-price factors aiming at increasing exported volumes. However, some weaknesses in the Chinese performance emerge when competitiveness is examined in terms of quality improvement, since most of the advanced Asian economies, together with Thailand and Turkey, are characterized by an active process of quality upgrading. As a consequence, in order to ensure its long-lasting dominance in international markets, many efforts in this direction should be pursued, as recently emphasized by the 'Made in China 2025 Program', in which quality is recognized to be the core of the manufacturing leadership for the future. Furthermore, and more in general, this effort is in line with the conclusion by Rodrik (2006), who demonstrates that what really matters for a country's economic growth in the long run is not *how much* it exports, but *what* it exports.

5.3 Price and quality effect difference decomposition

In this subsection, the differences in export performance according to the possible alternative competitive strategies, analyzed in the previous subsection, with particular reference to the price and quality effects can be further decomposed in order to more deeply investigate the determinants of China's success. No decomposition is necessary with regard to the income effect, because world GDP growth is the same for all countries in the sample, so that differences in their income performances are only due to differences in income elasticities, as shown in Table 6.

With regard to the price effect differences, Condition (6), by means of simple algebraic manipulations,[32] can be decomposed into the sum of two terms as follows:

$$(r\dot{p}_c - r\dot{p}_z)\,\alpha_z + (\alpha_c - \alpha_z)\,r\dot{p}_c > 0 \tag{9}$$

or, analogously,

$$(r\dot{p}_c - r\dot{p}_z)\,\alpha_c + (\alpha_c - \alpha_z)\,r\dot{p}_z > 0 \tag{10}$$

The first and second term in Conditions (9) and (10) can be defined, respectively, as the relative-price and the price-elasticity components of the overall price effect difference. Note that the two determinants in Inequalities (9) and (10) are analogous, even if algebraically different, because of their diverse weights, so that it appears useful to compute also the average values of the two components in the period under consideration. The results of the just illustrated decompositions are shown in Table 9.

[32]Condition (9) is obtained by adding and subtracting the term $\alpha_z r\dot{p}_c$, while Condition (10) is obtained by adding and subtracting the term $\alpha_c r\dot{p}_z$.

Table 9 about here

These computations highlight the different role and importance of the two factors in determining the recorded price effect difference. The relative-price component is always positive since China's relative prices fall while those of its rivals either fall at a lower rate or increase in the period under consideration (see Table 7). The price-elasticity component is always positive in Condition (9), since China's price elasticity is the highest (in absolute terms) in the sample and its relative prices decrease, while it may be either positive or negative in Condition (10) according to whether the relative prices of China's competitors fall or rise, respectively. Therefore, the average price-elasticity component may be positive as in the case of India, Indonesia, Thailand, Turkey, Japan and Korea or negative as in the case of Pakistan and Hong Kong.

The relative-price component generally dominates the price-elasticity component in determining the overall price effect difference except for Turkey and Indonesia, where the impacts of the two components are reversed, because in these two countries relative prices decrease at a consistent rate (see again Table 7) and the price elasticities are the lowest in the sample in absolute terms (see Table 6). With regard to Japan, the average relative-price component is only slightly higher than the equivalent price-elasticity component, because also in this country relative prices fall, even though at a reduced rate, and the price elasticity of the export function is low.

In a way analogous to what has been done for the price effect differences, Condition (8) can be decomposed into two determinants, which can be defined, respectively, as the relative-quality and quality-elasticity components, as shown by the following two conditions:

$$(\dot{q}_c - \dot{q}_z)\,\gamma_z + (\gamma_c - \gamma_z)\,\dot{q}_c > 0 \tag{11}$$

and

$$(\dot{q}_c - \dot{q}_z)\,\gamma_c + (\gamma_c - \gamma_z)\,\dot{q}_z > 0 \tag{12}$$

As before, the relative-quality and quality-elasticity components correspond to the first and second terms of Conditions (11) and (12).[33] The results of this decomposition are reported in the following Table 10, together with the average values of the two factors in the period under consideration.

Table 10 about here

Some interesting results emerge. In particular, when the overall quality effect difference is positive and relevant (see Table 8),[34] its two determinants may behave in a different

[33] Condition (11) is obtained by adding and subtracting the term $\gamma_c \dot{q}_z$ to the right-hand side of Condition (8). Similarly, Condition (12) is obtained by adding and subtracting the term $\gamma_z \dot{q}_c$ to the right-hand side of Condition (8).

[34] This is the case of India, Indonesia, Pakistan among developing Asian countries and Japan among developed Asian countries.

way. Specifically, in the case of Pakistan (mostly) and India, the relative-quality component dominates, also because the quality-elasticity component is negative. In the case of Indonesia, instead, the quality-elasticity component explains most of China's differential advantage in quality, mainly because Indonesia's quality elasticity is the lowest in the sample. Lastly, in the case of Japan, the two components have almost the same weight. With regard to Turkey, the only country where the quality effect difference is negative and statistically significant (see again Table 7), both these two components are negative, with a slight prevalence of the quality-elasticity term. The reason of this result is due to the fact that Turkey records the highest quality improvement in the sample (cfr. Table 7) and its quality elasticity is very high (cfr. Table 6). In the remaining cases, while for Thailand and Hong Kong both components are negative, Korea shows a positive quality-elasticity determinant. In all these last cases, however, the computed figures are close to zero.

6 Competitiveness challenges: an additional investigation on export similarity

According to the results discussed in the previous subsections, China outperforms or displaces all its Asian competitors in textile exports. Only Turkey, India and, to some extend, Thailand record high or satisfactory export growth rates. China's competitive threat has been mainly driven by price and quantity competition, and this threat is potentially higher the more similar the export structure of the involved countries is. Hence, it seems interesting to conclude our empirical analysis with a further investigation on the issue of the export structure, in order to shed some light on the typology of China's exported textile goods *vis á vis* its competitors.

The most commonly indicator used in this context is the export similarity index (ESI), computed in this case with regard to the textile sector only (ESI^T), which captures the extent to which China's textile exports and those of its rivals overlap by means of the following formula (Pham et al., 2017):

$$ESI^T_{c,z} = \sum_{i=1}^{N} Min(s^q_{T,c,i}, s^q_{T,z,i}) \tag{13}$$

where $s^q_{T,c,i}$ and $s^q_{T,z,i}$ are the shares in quantity of China and country z exports of any textile good i, respectively, over total textile exports. The ESI^T index varies from 0 to 1, and a higher value of this indicator corresponds to a more overlapping pattern between China and its competitors' exports, i.e. when China's textile export structure is more similar to that of its rivals. On the contrary, low ESI^T values suggest that China's products are rather complementary to those of its rival, so that traded goods are different in terms of structure. Table 11 reports the ESI^T index computations for our sample of exporters in the years 2001, 2008 and 2016.

Table 11 about here

The picture that generally emerges is that China's export structure is not very dissimilar to that from its competitors, since almost all ESI^T values are around 0.5.[35] This implies that China's success in international markets is not due to some peculiar features of its exported goods, but rather to the competitive strategies previously analyzed. The most interesting case is however that of Pakistan, which has the lowest ESI^T index in the sample. Despite this divergence with China, which points to a complementarity between the two countries' exports, there has been a displacement due to the Pakistani relative prices increase, its low product quality level (the lowest in the sample according to the EXPY index) and also its modest quality improvement over time. With regard to the developed Asian competitors, their ESI^T indexes show more similarity with China, particularly in the case of Japan.

It is also interesting to note that the global financial crisis of 2008 seems to have acted differently on the textile export structure of developing and developed Asian competitors. While the ESI^T index of the first group of countries has definitely reduced over time, the opposite has happened on average for the second cluster. Emerging countries, and mainly India, have differentiated the composition of their textile exports in the attempt to fight the Chinese threat. Among developed rivals, instead, while Hong Kong has somehow tried to offset its ever-decreasing textile market share by changing the composition of traded goods, Korea's export structure has become more similar to that of China, which contributes to explain its weak performance.

7 Conclusions

During the last decades, China has experienced a remarkable change in its overall export composition, shifting from labor-intensive to capital-intensive products. Despite this evidence, and contrary to the predictions of the Heckscher-Ohlin theory, textile exports have been characterized by an unexpected extraordinary growth, especially after China's accession to WTO in 2001.

The approach proposed in this paper to analyze the factors at the roots of China's striking performance is an extension of the analysis performed by Lall and Albaladejo (2004), who consider all types of exported goods and use data in value. These data, however, are relevant only with regard to the balance of payments, and overlook the behavior of export quantities, which are instead relevant in determining GDP dynamics. Moreover, the analysis of market shares in value disregards the difference between absolute and relative prices and their influence on exported volumes. As a consequence, a correct and thorough analysis of China's export performance should consider the joint behavior

[35]Since the ESI^T index is computed at a sectoral level, there is a general bias toward similarity with regard to the ESI indexes referred to the overall economy.

of relative prices and quantities, together with their interdependence as captured by an estimated export demand function.

Therefore, in this paper, trade competition in the textile sector is analyzed through different steps. First we perform a preliminary analysis based of the market share dynamics of China and its main Asian competitors, selected among the top world traders in 2016. Then, we proceed with estimating an extended version of a traditional export function in a panel-data context, derived from the imperfect substitute model, including however a non-price competitiveness factor. The key long-run elasticities for each Asian exporter in the time period 2001-2016 are thus computed and discussed, and the different export performances are examined also considering the interaction between the estimated parameters and the growth rates of relative prices, world income and quality. Lastly, for the first time in the empirical literature, our approach decomposes the textile export growth difference between China and its rivals into the three main channels of trade competition, i.e. prices, quantities and quality. These channels may have opposite or complementary effects on trade performance, and they provide useful information about the different industrial strategies adopted by the considered textile top exporters in world markets.

Since China's exports grow faster than all its rivals, we find that there is an outperformance with respect to India and Turkey, while there is a displacement with regard to all other considered Asian competitors. Moreover, our results clearly show that China crowds out most of its rivals with a competitive strategy based on a mix of low and decreasing price policies and non-price factors aiming at stimulating exported volumes. However, some weaknesses in the Chinese trade prospects emerge because, on the one hand, this country has the highest absolute price elasticity in the sample, so that its exports are strongly dependent upon a favorable relative price behavior, and on the other only weak quality improvements are realized, unlike most of its rivals, including Thailand and Turkey. Moreover, since China' s export composition is not very different for that of its competitors, as shown by the sectoral values of the export similarity indexes, price and quality competition strategies are fundamental for guaranteeing a persistent success in textile exports. Given however the fact that China is becoming a wage-growing country, quality improvement will be the most important policy to pursue in the future, as highlighted by agences like the WTO or UNCTAD.

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8 Appendix A

The world market share of any country's (j) textile exports expressed in value terms (s^v_{Tj}) in any year is defined as the ratio between the value of textile exports and that of the world (X_{Tj} and X_{Tw}, respectively) as follows:

$$s^v_{Tj} = \frac{X_{Tj}}{X_{Tw}} \tag{14}$$

The Balassa RCA index is then defined as

$$RCA_{Tj} = \frac{\frac{X_{Tj}}{X_j}}{\frac{X_{Tw}}{X_w}} \tag{15}$$

By rearranging the terms in definition (15), we can also write

$$RCA_{Tj} = \frac{X_{Tj}}{X_{TW}} \cdot \frac{X_w}{X_j} = \frac{s_{Tj}}{s_j} \tag{16}$$

Hence, the market share of any country's j textile exports in value may be written as

$$s^v_{Tj} = RCA_{Tj} \cdot s^v_j \tag{17}$$

9 Appendix B

The variable used to proxy the textile product quality is a sectoral EXPY, which, in line with Hausmann et al. (2007), is computed as follows:

$$EXPY_{ijt} = \frac{PRODY_{it} \cdot s_{ijt}}{\sum_{i=1}^{N} s_{ijt}} \tag{18}$$

where

$$PRODY_{it} = \frac{\sum_{j=1}^{M} s_{ijt} \cdot y_{jt}}{\sum_{j=1}^{M} s_{ijt}} \tag{19}$$

and

$$s_{ijt} = \frac{x_{ijt}}{x_{jt}} \tag{20}$$

is the share of good i on total exports in country j, with $i = 1, ..., N$, $j = 1, ..., M$ and $t = 1, ..., T$. Therefore, the variable EXPY is, for every product i in country j , a fraction of the overall PRODY index, which is the same for every good and country, where the reduction coefficient is equal to the ratio between the share of exports of every textile product on total exports and the sum of all these shares. Differently from the literature, where the EXPY index is computed at the aggregate level, in our case it is calculated for every product of the textile sector only (which explains the presence of the sum of textile shares in the denominator of Definition 18).

Tables

Table 1: Top textile exporters in 2016

	Export values	**Market share (%)**
China	104,663	36.22
India	16,210	5.61
Germany	13,376	4.63
USA	12,904	4.47
Italy	11,707	4.05
Turkey	10,913	3.78
Korea	10,039	3.47
Chinese Taipei	8,973	3.11
Hong Kong	7,901	2.73
Pakistan	7,680	2.66
Japan	6,419	2.22
Viet Nam	6,276	2.17
Belgium	5,398	1.87
Netherlands	4,801	1.66
France	4,678	1.62
Spain	4,127	1.43
Indonesia	4,105	1.42
United Kingdom	3,647	1.26
Thailand	3,382	1.17
Developing Asian countries	153,228	53.02
Developed Asian countries	33,331	11.53
Total Asian Countries	186,559	64.56
World	288,976	85.54

Notes: The table reports the textile exporters whose export share is greater than 1 per cent in 2016; Export values are million USD; Authors elaboration on WTO data.

Table 2: Textile market shares and China's competitive export outcomes towards its Asian competitors in the time period 2001-2016

	Textile market shares	**Textile market shares' difference between China and its Asian competitors**	**China's competitive export outcome**
China	9.53	-	-
Developing Asian competitors			
India	2.49	7.04	*Outperformance*
Indonesia	-2.78	12.32	*Displacement*
Pakistan	-2.23	11.76	*Displacement*
Thailand	-0.45	9.98	*Displacement*
Turkey	3.23	6.30	*Outperformance*
Developed Asian competitors			
Hong Kong	-14.38	23.91	*Displacement*
Japan	-3.76	13.29	*Displacement*
Korea	-4.79	14.32	*Displacement*

Notes: Our elaboration on Comtrade data. The data reported in the table refer to market share measured in kilograms (yearly growth rate). The export outcomes do not change if we compute the same statistics by considering data in values (US dollars).

Table 3: Panel unit root test

	Exports (x) *Levels*	Exports (Δx) *First differences*	Relative prices (rp) *Levels*	Relative prices (Δrp) *First differences*	Non-price competitive factor (q) *Levels*	Non-price competitive factor (Δq) *First differences*
China	-0.08 (0.47)	-2.20 (0.00)	1.19 (0.88)	-7.39 (0.00)	1.24 (0.89)	-6.49 (0.00)
Developing Asian competitors						
India	1.95 (0.97)	-8.25 (0.00)	0.96 (0.83)	-2.98 (0.00)	0.01 (0.50)	-4.27 (0.00)
Indonesia	0.28 (0.61)	-6.78 (0.00)	0.49* (0.69)	-9.63 (0.00)	1.69 (0.95)	-8.27 (0.00)
Pakistan	0.74 (0.77)	-8.25 (0.00)	-0.20* (0.42)	-10.46 (0.00)	-0.99 (0.16)	-8.06 (0.00)
Thailand	1.21 (0.89)	-7.05 (0.00)	1.89 (0.97)	-3.86 (0.00)	0.67 (0.75)	-1.73 (0.04)
Turkey	3.26 (0.99)	-8.28 (0.00)	0.30 (0.62)	-8.14 (0.00)	4.05 (0.99)	-5.64 (0.00)
Developed Asian competitors						
Honk Kong	0.95 (0.83)	-10.44 (0.00)	0.57 (0.72)	-3.91 (0.00)	4.06 (0.99)	-2.92 (0.00)
Japan	0.57 (0.72)	-6.97 (0.00)	-1.04 (0.15)	-2.17 (0.02)	2.21 (0.98)	-1.64 (0.05)
Korea	-0.89 (0.18)	-5.45 (0.00)	-0.65 (0.26)	-2.79 (0.00)	0.62 (0.73)	-7.30 (0.00)

Notes: Standardised Z-tbar are reported for the Pesaran (2007) unit roots test. p-values are shown in parentheses. Pesaran (2007) tests is calculated by including the intercept in the test equation. Maximum selected lag length is 2. A * indicates a lag length equal to 3. The null hypothesis for all tests is 'Panels contain unit roots'. Authors' elaboration on Comtrade data.

Table 4: Unit root tests for the variable y^*

ADF		KPSS	
Foreign demand (y^*) *Levels*	Foreign demand (Δy^*) *First differences*	Foreign demand (y^*) *Levels*	Foreign demand (Δy^*) *First differences*
-1.18	-3.13	0.52	0.22
(0.65)	(0.04)	[0.46]	[0.46]

Notes: T-statistic and LM-statistic are reported for the Augmented Dickey-Fuller test (ADF) and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) unit roots tests. p-values and asymptotic critical values are in parentheses and brackets respectively. An asymptotic critical value of 0.46 corresponds to the 5 per cent significance level. ADF and KPSS unit root tests are calculated including the intercept in the test equation. The null hypothesis is 'y^* (or Δy^*) has a unit root' for the ADF test and 'y^* (or Δy^*) is stationary' for the KPSS test.

Table 5: Pedroni Panel Cointegration Test

	Panel $v-$Statistic	Panel ρ-Statistic	Panel PP-Statistic	Panel ADF-Statistic	Group ρ-Statistic	Group PP-Statistic	Group ADF-Statistic
China	0.11 (0.46)	1.39 (0.92)	-4.47 (0.00)	-6.61 (0.00)	5.38 (0.99)	-3.98 (0.00)	-7.10 (0.00)
Developing Asian competitors							
India	-1.03 (0.85)	2.79 (0.99)	-2.45 (0.01)	-4.17 (0.00)	6.26 (0.99)	-2.41 (0.00)	-3.20 (0.00)
Indonesia	-2.02 (0.98)	-0.63 (0.26)	-8.22 (0.00)	-9.55 (0.00)	3.66 (0.99)	-9.35 (0.00)	-9.36 (0.00)
Pakistan	-1.07 (0.86)	2.37 (0.99)	-2.69 (0.00)	-4.94 (0.00)	5.19 (0.99)	-4.79 (0.00)	-5.72 (0.00)
Thailand	-2.32 (0.98)	2.90 (0.99)	-2.53 (0.00)	-6.69 (0.00)	6.13 (0.99)	-5.79 (0.00)	-9.30 (0.00)
Turkey	-1.60 (0.94)	2.27 (0.98)	-4.17 (0.00)	-8.29 (0.00)	5.11 (0.99)	-6.64 (0.00)	-9.21 (0.00)
Developed Asian competitors							
Hong Kong	-1.18 (0.88)	0.68 (0.75)	-7.97 (0.00)	-10.29 (0.00)	4.45 (0.99)	-9.06 (0.00)	-9.71 (0.00)
Japan	0.78 (0.22)	1.93 (0.97)	-5.46 (0.00)	-7.27 (0.00)	4.90 (0.99)	-9.26 (0.00)	-10.54 (0.00)
Korea	-1.08 (0.86)	2.74 (0.99)	-3.36 (0.00)	-6.02 (0.00)	5.90 (0.99)	-3.98 (0.00)	-5.37 (0.00)

Notes: The panel statistics are the within-dimension statistics, while the group statistics are the between-dimension statistics. The null hypothesis is no cointegration; p-values in parentheses; user-specified lag length is equal to 1. Trend and intercept options: ‘no deterministic trend’ for all countries.

Table 6: Estimation results of Equation (3) in the period 2001-2016

	Developing Asian competitors						*Developed Asian competitors*		
	China	India	Indonesia	Pakistan	Thailand	Turkey	Hong Kong	Japan	Korea
Relative prices (α)	-1.27***	-0.68***	-0.59***	-0.86***	-0.67***	-0.46***	-0.78***	-0.48***	-0.45***
	(0.12)	(0.07)	(0.13)	(0.04)	(0.05)	(0.05)	(0.04)	(0.04)	(0.06)
Foreign demand (β)	2.16***	1.09***	-0.20	0.19	0.16	0.67***	-1.97***	-0.82***	-1.19***
	(0.12)	(0.13)	(0.88)	(0.22)	(0.16)	(0.11)	(0.15)	(0.11)	(0.12)
Non-price competitive factor (γ)	0.84***	0.85***	0.58***	1.04***	0.86***	0.95***	0.87***	0.79***	0.80***
	(0.07)	(0.05)	(0.24)	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)
Constant	10.15***	-0.07	13.26	8.69***	9.09***	3.84***	33.63***	20.55***	25.35***
	(1.43)	(1.85)	(9.19)	(2.42)	(1.13)	(1.26)	(1.63)	(1.25)	(1.31)
Observations	944	944	816	864	944	944	944	944	944
Number of goods	59	59	51	54	59	59	59	59	59

Notes: PMG estimation results for the time period 2001-2016. A *(**)[***] indicates significance at the 10(5)[1] per cent level. Standard errors are reported in parenthesis. In the case of Indonesia, time dummies for the years 2001-2009 are included in the estimation. In the case of Pakistan, time dummies for the years 2008 and 2012-2016 are included in the estimation.

Table 7: Textile export performance, price effect, income effect and quality effect for each considered exporters

	Textile export rate of growth	Relative prices rate of growth	World income rate of growth	EXPY rate of growth	Price effect	Income effect	Quality effect	Residuals
China	12.48	-1.27	3.86	2.30	1.61*** (0.15)	8.34*** (0.46)	1.93*** (0.16)	0.61
Developing Asian competitors								
India	5.25	0.08	3.86	1.81	-0.05*** (0.00)	4.21*** (0.52)	1.54*** (0.08)	-0.44
Indonesia	0.67	-0.83	3.86	2.21	0.49*** (0.11)	-0.77 (3.41)	1.28** (0.54)	-0.33
Pakistan	0.40	1.52	3.86	0.56	-1.31*** (0.06)	0.73 (0.85)	0.58*** (0.02)	0.40
Thailand	2.16	0.07	3.86	2.35	-0.04*** (0.00)	0.62 (0.39)	2.02*** (0.08)	-0.43
Turkey	6.00	-0.74	3.86	2.55	0.34*** (0.03)	2.59*** (0.44)	2.42*** (0.09)	0.66
Developed Asian competitors								
Hong Kong	-12.08	8.62	3.86	2.35	-6.78*** (0.41)	-7.64*** (0.59)	2.06*** (0.13)	-0.28
Japan	-1.18	-0.30	3.86	2.12	0.14*** (0.01)	-3.18*** (0.44)	1.67*** (0.10)	0.17
Korea	-2.29	0.07	3.86	2.32	-0.03*** (0.00)	-4.59*** (0.47)	1.86*** (0.08)	0.47

Notes: The first three columns report the yearly rates of growth of textile exports, world income and EXPY, respectively. Price effect, volume effect and quality effect are derived by means of the estimates reported in Table 6 and the rates of growth reported in the first three columns of this table. The last column of this table reports the difference between the observed textile export performance (first column) and the one obtained with the sum of price, income and quality effects. A *(**)[***] indicates significance at the 10(5)[1] per cent level. Standard errors are reported in parenthesis.

Table 8: Difference *via á vis* China in price effect, volume effect, quality effect and total export performance in the textile industry: results and estimated conditions

	Price effect difference	Income effect difference	Quality effect difference	Total export difference
China versus its developing Asian competitors				
India	1.66*** (0.15)	4.13*** (0.46)	0.39** (0.16)	6.19*** (0.57)
Indonesia	1.12*** (0.15)	9.11*** (0.46)	0.65*** (0.16)	10.88*** (0.57)
Pakistan	2.92*** (0.15)	7.60*** (0.46)	1.36*** (0.16)	11.88*** (0.57)
Thailand	1.66*** (0.15)	8.03*** (0.46)	-0.08 (0.16)	9.61*** (0.57)
Turkey	1.27*** (0.15)	5.75*** (0.46)	-0.48*** (0.16)	6.54*** (0.57)
China versus its developed Asian competitors				
Hong Kong	8.42*** (0.15)	15.56*** (0.46)	-0.10 (0.16)	23.87*** (0.57)
Japan	1.47*** (0.15)	11.54*** (0.46)	0.26* (0.16)	13.28*** (0.57)
Korea	1.64*** (0.15)	12.08*** (0.46)	0.08 (0.16)	13.81*** (0.57)

Notes: Total export performance difference, price effect, volume effect and quality effect are obtained by testing Conditions (6), (7) and (8) starting from the estimates reported in Tables 6 and (7). Standard errors in parenthesis. A *(**)[***] indicates significance at the 10(5)[1] per cent level.

Table 9: Price effect difference decomposition

	Relative-price component	Price-elasticity component
China versus its developing Asian competitors		
India		
Condition (9)	0.90	0.76
Condition (10)	1.71	-0.05
Average values	1.31	0.36
Indonesia		
Condition (9)	0.26	0.86
Condition (10)	0.56	0.56
Average values	0.41	0.71
Pakistan		
Condition (9)	2.39	0.52
Condition (10)	3.54	-0.62
Average values	2.92	-0.05
Thailand		
Condition (9)	0.90	0.76
Condition (10)	1.70	-0.04
Average values	1.30	0.36
Turkey		
Condition (9)	0.24	1.03
Condition (10)	0.67	0.60
Average values	0.46	0.81
China versus its developed Asian competitors		
Hong Kong		
Condition (9)	7.81	0.61
Condition (10)	12.56	-4.14
Average values	10.19	-1.76
Japan		
Condition (9)	0.47	1.00
Condition (10)	1.23	0.24
Average values	0.85	0.62
Korea		
Condition (9)	0.60	1.04
Condition (10)	1.70	-0.06
Average values	1.15	0.49

Notes: Relative-price and price-elasticity components correspond to the first and second terms of Conditions (9) and (10), respectively. The Table also reports their average values. Note that the sum (by row) of the values reported in the tables corresponds to price effect difference shown by Condition (6).

Table 10: Quality effect difference decomposition

	Relative-quality component	Quality-elasticity component
China versus its developing Asian competitors		
India		
Condition (11)	0.41	-0.02
Condition (12)	0.40	-0.02
Average values	0.41	-0.02
Indonesia		
Condition (11)	0.04	0.60
Condition (12)	0.06	0.58
Average values	0.05	0.59
Pakistan		
Condition (11)	1.81	-0.46
Condition (12)	1.46	-0.11
Average values	1.63	-0.29
Thailand		
Condition (11)	-0.04	-0.05
Condition (12)	-0.04	-0.05
Average values	-0.04	-0.05
Turkey		
Condition (11)	-0.24	-0.25
Condition (12)	-0.21	-0.28
Average values	-0.22	-0.27
China versus its developed Asian competitors		
Hong Kong		
Condition (11)	-0.04	-0.07
Condition (12)	-0.04	-0.07
Average values	-0.04	-0.07
Japan		
Condition (11)	0.14	0.12
Condition (12)	0.15	0.11
Average values	0.15	0.11
Korea		
Condition (11)	-0.02	0.09
Condition (12)	-0.02	0.09
Average values	-0.02	0.09

Notes: Relative-quality and quality-elasticity components correspond to the first and second terms of Conditions (11) and (12), respectively. The Table also reports their average values. Note that the sum (by row) of the values reported in the tables corresponds to quality effect difference shown by Condition (8).

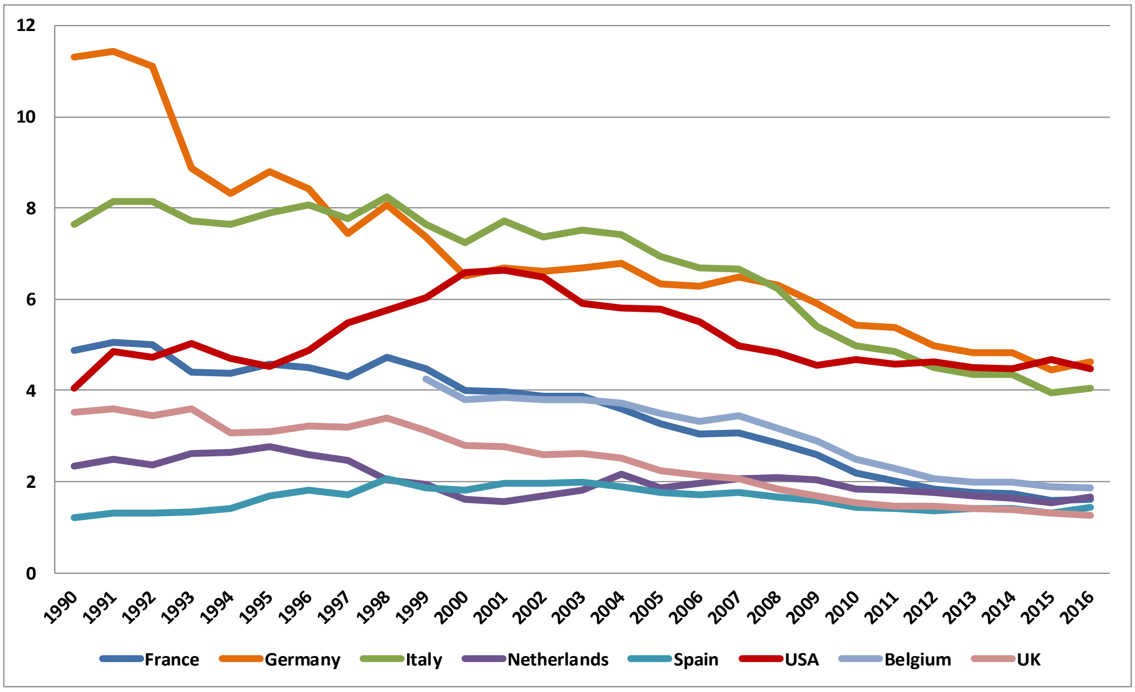
Table 11: The export similarity index in the years 2001, 2008 and 2016

	2001	2008	2016
China versus its developing Asian competitors			
India	0.52	0.56	0.45
Indonesia	0.45	0.45	0.42
Pakistan	0.37	0.29	0.28
Thailand	0.55	0.60	0.58
Turkey	0.58	0.60	0.58
Average Developing Asian competitors	0.50	0.50	0.46
China versus its developed Asian competitors			
Kong Kong	0.50	0.47	0.44
Japan	0.42	0.56	0.56
Korea	0.44	40.49	0.55
Average Developed Asian competitors	0.45	0.50	0.52
Average Asian competitors	0.48	0.50	0.48

Notes: Our elaboration on Comtrade data.

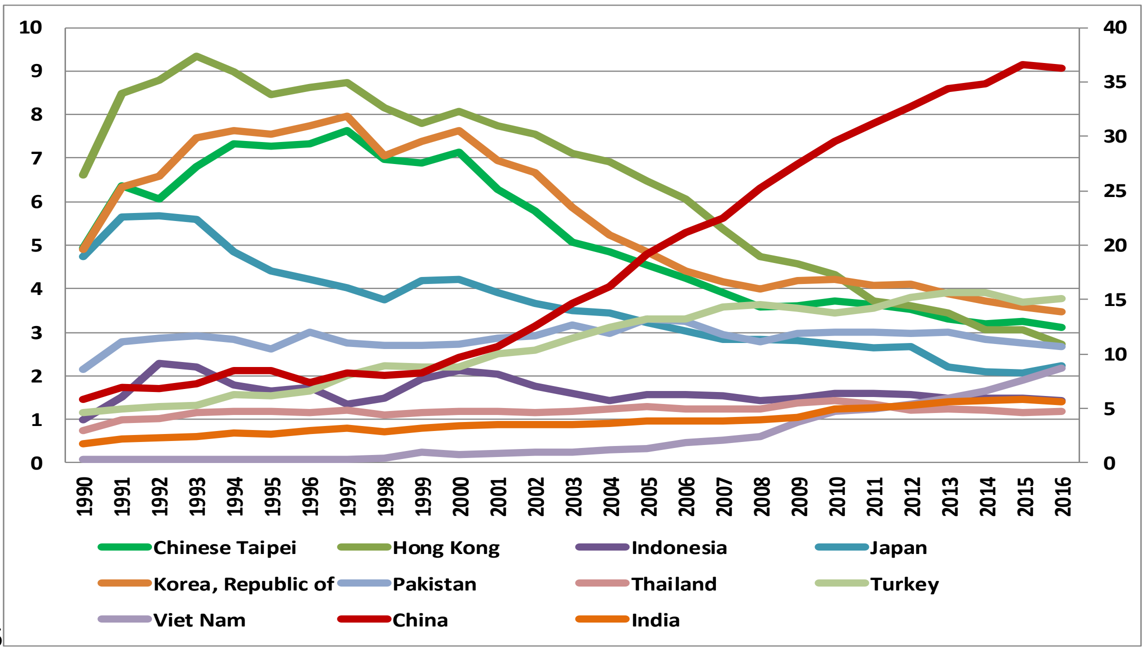
FIGURES

Figure 1: Shares of world textile exports in advanced Western countries: 1990-2016



Notes: Our elaboration on WTO data.

Figure 2: Shares of world textile exports in Asian countries: 1990-2016



Notes: Our elaboration on WTO data. All countries' values are measured on the left vertical axis with the exception of China's data, measured on the right axis