The Impact of an International Competitive Pressure on the French Exports Portfolio

Cyrielle Gaglio*

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Abstract

This paper studies the effect of the origin of an international competitive pressure on the change in the composition of the French exports portfolio. Using harmonized trade data from BACI, we build an argumentation in three steps as specified below. Firstly, we decompose the French exports portfolio between an intensive and an extensive margins over the period 1996-2013. Secondly, we split the international competition between a cost competition from developing countries and a technological competition from developed countries in order to provide a signal about which French markets are most exposed to trade with low- or high-income countries. Thirdly, we define a measure of competitive pressure based on the relative market shares, on the imports penetration (Bernard et al., 2006), and on the exports sophistication (Hausmann et al., 2007a). Two main results show: *(i)* while low- and middle-income countries exert a negative competitive pressure on the French exports portfolio, high-income countries with similar export and productive structures (such as Germany or the United States) do not exert a negative one. *(ii)* Among low- and middle-income countries, we distinguish a negative competitive pressure on the double scale of products and destinations (from China or Equatorial Guinea for instance) and a negative competitive pressure on the single scale of destinations (from Chile or Hungary for instance).

Keywords: Competitive pressure - Exports portfolio - Product-destination level - Trade - France

JEL classifications: F14 - F15 - F62

*Université Côte d'Azur, CNRS, GREDEG, France. cyrielle.gaglio@gredeg.cnrs.fr.

1 Introduction

The joint intensification of world trade flows and international competition induces a reshaping of international trade. In the unprecedented context of current globalization, the emergence of new competitors and their ability to quickly reposition themselves on increasingly sophisticated ranges of products lead to a reshaping of the world market, an intensification of the competitive pressure that each country exerts on its challengers and a growing interdependence of each other. Even though developed countries still occupy a prominent place in the international trade, they are henceforth challenged by the rise of emerging countries.

Since the mid-1990s, emerging countries have opened their economies, have improved their connectedness to world trade networks and have increased their exports much faster than the leading developed countries. The share of emerging countries in the commodities' world trade flows has increased from 26% in 1995 to 44% in 2014, while the share of the most developed countries has decreased by 18% over the same period (WTO, 2015). The spectacular trade performance and the quick integration especially of large emerging countries (such as China, India, South Africa or Brazil) into the global trade network explain the fact that emerging countries tend to catch up the developed ones and to reduce their gaps with respect to the previous leaders. As suggested by its rapid export upgrade from low-technology textiles to high-technology electronics, China appears undoubtedly as the new world challenger (Rodrik, 2006; Schott, 2008; Bloom et al., 2012; Jarreau and Poncet, 2012; Poncet and Starosta de Waldemar, 2013a;b; 2015).

The leading role played by emerging countries induces a reshaping of international trade but implies also an intensification of the competitive pressure that each country exerts on its challengers and a growing interdependence of each other. The emergence of new challengers in world trade flows brings new impetus to international trade. The latter does not reflect the traditional South-North segmentation in which developed countries are specialized in high-tech ranges of products while leaving low-tech ones to the less developed countries. Even though exports from North countries are related to a greater specialization, they are more and more challenged by the presence of emerging countries on the same markets. Furthermore and because the world hierarchy has evolved in favor of these emerging countries, the competitive pressure that each country exerts on each other increased. This can be due to the fact that each country tries to gain from globalization by enhancing its competitive advantages, by developing new ones and by using the market discipline imposed by international competition. Jointly, the interdependence of countries increased; the quick expansion of the fragmentation of production processes is an example. The relocation of

productive activities to emerging countries is due to an access to low wage costs and to an entry into new promising markets. As a result, by sharing a global market, countries are more and more connected to one another and knowledge networks (on which they depend) become even more complex.

Beyond the competition exerted by emerging countries, developed countries should also face an increased competition within them. Although they are important and historical trading partners, they are nevertheless formidable competitors to each other. In the recent years, export performances of developed countries have been questioned and compared with each other. And European countries, which have closely related export and productive structures, are not free from comparisons. According to Berthou and Emlinger (2011), *"German exporters explore more markets (product-destination) as compared to their European partners: France, Italy and United Kingdom explore from 10 to 20% of markets less than Germany"*, (p.1-2)[1]. Furthermore, the deterioration of French and English performances are explained by non price factors (such as products quality, good fit with destination markets, etc.) while the degradation of Italian performances reflect price disadvantages with respect to Germany. On the whole, the ability of European countries to distinguish their products and to increase their exports in existing markets explains their main export divergences.

In this context, the research question is the following one: how does the international competitive pressure induce modifications in the composition of the French exports portfolio? To investigate the role of international competitive pressure, this paper relies on *(i)* the origin and *(ii)* the effect of the competitive pressure on the French exports portfolio. The choice of France is motivated by two main reasons. On the one hand, France is a representative country of the industrialized ones which should face a double challenge in terms of international competitive pressure: the rise of large emerging countries into the world markets and the search of new strategical positioning of others industrialized countries. These latter should adopt new productive strategies to counter the effects of low-wage competitors and to differentiate themselves through highly innovative activities as suggested by Bloom et al. (2012). On the other hand, in the recent years, the French competitiveness has been questioned, especially with respect to the economic performances of Germany. According to Fontagné and Gaulier (2008), the competitive disadvantage of France vis-à-vis to Germany is based on a supply problem and on the implementation of an appropriate economic policy. A growing part of the literature focuses on the link between the intensity of

[1]In the following empirical analysis and according to Berthou and Emlinger (2011), a market is defined through a single pairwise of product-destination. we use interchangeably the terms "observations", "markets" and "single pairwise of product-destination" throughout the article.

the competitive pressure that countries exert relative to each other and the reshaping of world trade flows. Especially, the strong and sudden rise of China (initially based on a low costs and low-tech manufacturing industry) onto global markets fuels the discussions (Lall and Weiss, 2005; Lederman et al., 2007; 2008; Alvarez and Claro, 2009; Freund and Ozden, 2009; Hanson and Robertson, 2009; Bloom et al., 2012; Iacovone et al., 2013; Bloom et al., 2016). Beyond China's example, the international competitive pressure involves a repositioning of each exporter countries in favor of more innovative ranges of products and market segments. As a result, each country, because it is exposed to increasingly strong competition and because it submits these counterparts to a competitive pressure, exports a priori the products to destinations which reflect its competitive advantages (i.e. advantages that can sustain a long-term economic growth). The paper aims to close two gaps in the literature. Firstly, it studies not only low costs competitors but all exporter countries and classifies them in terms of income levels. Secondly, it studies the effect of international competition on a developed country, not on an emerging country such as suggested by the recent literature (Iacovone et al., 2013).

On the empirical side, estimations are based on two sources of data. The main source of data refers to the Base pour l'Analyse du Commerce International (BACI) provided by the Centre d'Études Prospectives et d'Informations Internationales (CEPII). The other source of data refers to the World Bank. The empirical analysis covers the long period from 1996 to 2013. The main result suggests that the origin of international competition does not affect in the same way modifications in the composition of the French exports portfolio. Overall, the study of the evolution of the French exports portfolio composition proves that there are as many different reactions as there are competitive pressures exerted by various competitors. The contribution of this empirical work encompasses at least three aspects. Firstly, countries included in category CC2 (for example, China, Equatorial Guinea or Sri Lanka) exert a negative competitive pressure on the double scale of products and destinations. As a result, these competitors were responsible for the change in the composition of the French exports portfolio along the intensive margin. In particular, they exert a strong competitive threat on the decline in the value of existing exports flows for low- and medium-high tech markets. Secondly, countries included in category TC1 (for example, Saudi Arabia, Chile or the Czech Republic) exert a negative competitive pressure on the single scale of destinations. As a result, these competitors were responsible for the change in the composition of the French exports portfolio both along the intensive and the extensive margins. It also covers the four levels of technological intensity. Thirdly, countries included in category TC3 (for example, Germany, the United States or Japan) do not exert a negative competitive pressure on the difference of the other categories of competitors.

The absence of a negative effect would be compatible with a hypothesis of complementarity in the demand addressed to the TC3 and to France. In other words, we can assume that when certain markets are favorable for TC3, they are also favorable for France.

The remainder of the paper proceeds as follows. Section 2 presents the related literature in terms of exports portfolio and international competitive pressure. Section 3 describes the data and the empirical analysis. Section 4 discusses the results. Section 5 provides some additional robustness checks and extensions. Section 6 offers some concluding remarks.

2 Related Literature

In order to study the effect of the origin of an international competitive pressure on the modifications in the composition of the French exports portfolio, the following section presents the related literature.

2.1 Composition of the French exports portfolio: Between intensive and extensive margins

First, there exist a large debate that rely on export margins. Following Hummels and Klenow (2005), export margins are split between the so-called intensive margin (which reflects a change in the value of export flows) and the so-called extensive margin (which reflects a change in the number of export flows). Although this dichotomy is established, the intensive margin focuses on *value* while the extensive margin focuses on *number* (Felbermayr and Kohler, 2006; Berthou and Fontagné, 2008; Helpman et al., 2008; Besedes and Prusa, 2011; Fontagné et al., 2015), two opinions are still opposed.

On the one hand, a large number of studies have shown that changes along the intensive margin prevail in a country's export growth (Felbermayr and Kohler, 2006; Helpman et al., 2008; Amiti and Freund, 2010; Besedes and Prusa, 2011). On the other hand, other studies have suggested that changes along the extensive margin are predominant (Hummels and Klenow, 2005). These opposite opinions are based on two types of divergence. *(i)* There are divergences in the definition of the extensive margin and more specifically in the definition of the components included within the extensive margin: are entries relative or absolute? Are exits included in the intensive or in the extensive margin? *(ii)* There are divergences in the most relevant level of analysis (i.e. destination level, product level or product-destination level). This leads to the conclusion that although the importance of intensive and extensive margins is recognized as vectors explaining the evolution of

the composition of exports portfolio, they can be defined in many ways (Hummels and Klenow, 2005; Felbermayr and Kohler, 2006). Also, the plethora of possible definitions for each of these two margins justifies the lack of consensus in the economic literature. In particular, there is a lack of consensus on the position of exits in the composition of exports portfolio, which are sometimes assimilated to variations along the intensive margin and sometimes assimilated to variations along the extensive margin.

Because of the previous types of divergence, we make the following two choices. The first choice is related to the export margins. we define the intensive and extensive margins as follows: at the intensive margin are associated existing export flows that have been maintained whose value has increased and those whose value has decreased; at the extensive margin are associated exits of existing export flows and entries of new export flows. This first choice is motivated by a desire to study the change in the composition of French exports by assigning a specific place (in the total basket of exports from France) to each market served. The second choice is related to the level of the analysis. we define each export flow through a single pairwise of product-destination. This second choice is motivated by the fact that recent studies that rely on export performance and, more broadly, on international trade converge towards the need to be at the finest statistical level because exporter countries compete henceforth through geographical and sectoral specializations, which respond to the specific demand addressed by each market. Furthermore, these two choices are in line with Besedes and Prusa (2011).

Following Besedes and Prusa (2011), we study the changes in the composition of the French exports portfolio over the long period. In doing so, we seek to ascertain whether France has strengthened its competitive advantages, created new ones or, on the contrary, whether its competitive advantages have been constrained over time. In other words, if France has abandoned certain market positions and, subsequently, to what types of competitors are these abandonments attributable? Using data from BACI[2], we study the period 1996-2013 and split it into two sub-periods of time. The first one covers the period 1996-1998, the second one covers the period 2011-2013. On the basis of these two sub-periods, we only keep the single pairwise of product-destination present continuously between 1996 and 1998, which defines the portfolio of products exported by France in t_1. we do the same for the single pairwise of product-destination present continuously between 2011 and 2013, which defines the portfolio of products exported by France

[2]See Gaulier and Zignago (2010). Accession date: January 2016. At that time, data are available until 2013. For more informations: http://www.cepii.fr/CEPII/fr/bdd_modele/presentation.asp?id=1.

in t_2[3]. By fixing an interval of three years, we control the ephemeral variations linked to the introduction or the temporary disappearance of a single pairwise of product-destination. As suggested by Besedes and Prusa (2011), comparing two sub-periods of three years, we seek to smooth the variations in the entries and/or exits of certain markets within the French exports portfolio.

After merging the two portfolios, we are left with information on a sample of 248,413 singles pairwise of product-destination. The intensive margin is breaks down as follows: 88,128 singles pairwise of product-destination are associated with existing export flows that have been maintained whose value has increased; 48,818 singles pairwise of product-destination are associated with existing export flows that have been maintained whose value has decreased. The extensive margin is breaks down as follows: 45,688 singles pairwise of product-destination are associated with existing export flows that exit; 65,779 singles pairwise of product-destination are associated with inexistent export flows that entry[4].

2.2 International competition: Between a cost and a technological competition

Second, there exist a large number of studies that rely on the competitive pressure from Chinese exports to Latin American countries (Lall and Weiss, 2005; Alvarez and Claro, 2009; Bloom et al., 2012; Iacovone et al., 2013) or from low-wage countries to US manufacturing plants (Bernard et al., 2006). As a general example, Bloom et al. (2012) show how Chinese manufacturing competition is increasingly capturing low-skill production while simultaneously fostering high-skill innovation in the Western countries (i.e.

[3]We cannot keep the whole period from 1996 to 2013 and preserve only product-destination which are continuously exported over this period for two main reasons. Firstly, if we keep continuous exported product-destination, we lose informations relative to entries of new product-destination and to exits of existing product-destination. Secondly, if we keep continuous exported product-destination and classify them according to the increase or the decrease of their values, we lose almost all observations. This is due to the fact that the value of French exports varies upwards or downwards through each year. In other words, few product-destination follows a gradual increase or decrease. For example, "paper pulp, moulded or pressed articles or paper pulp" (HS6 code: 482370) exported towards Turkey has a value of 255 thousands of US$ in 1996, a value of 126 thousands of US$ in 1997 and a value of 313 thousands of US$ in 1998. At the end of the period, this value evolves like that: 23 thousands of US$ in 2011, 22 thousands of US$ in 2012 and 76 thousands of US$ in 2013. Another specific case illustrates the ephemeral disappearance of a product-destination. For example, "yarn, of flax, multiple (folded) or cabled" (HS6 code: 530620) exported towards Japan has a value of 5 thousands of US$ in 2000, a value of 3 thousands of US$ in 2001 but it disappears from 2002 to 2004 while it reappears in 2005 with a value of 28 thousands of US$.

[4]Because entries are based on an initial statement different from the three others (i.e. an inexistent export flows), they are excluded from the empirical analysis.

the United States, Europe, and Japan). On the basis of this example, we identify two main levels of international competition: *(i)* a *cost* competition from China's low-tech manufacturing superpower to Western countries which forced them to reposition themselves on the world market; *(ii)* a *technological* competition in which industrialized countries, individually subject to the Chinese competitive pressure, must distinguish themselves from each other in order to retain certain competitive market positions. As a result, the intensification of international competition simultaneously involves issues in terms of frontal competition (i.e. a restructuring of the global market for new challengers) and redistributive issues (i.e. a reallocation of productive resources that hits the main holders and leads to losses for some of them).

To the extent that we question the origin of competition to which French exports are exposed, we split international competition between a *cost* competition and a *technological* competition. We refer to a cost competition from developing countries, which represent the new global challengers in terms of international competition. While we refer to a technological competition from developed countries, which represent the pre-established leaders in terms of international competition. Although this split is somewhat sketchy, it allows us to dissociate low-cost exporter countries (which are initially specialized in low-tech productions) to those that are differentiated by increasing the quality or the variety of their exported product ranges (which move more towards high-tech productions).

Because we study the effect of the origin of international competitive pressure on the change in the composition of the French exports portfolio, France represents the reference country from which the other exporter countries are spread following a quartile distribution. Using data from the World Bank[5] and for each year between 1996 and 2013, the value of per-capita GDP for France is used as a reference for the calculations of the various quartiles. Each of them then constitutes a range of international competition. In order to spread each exporter country into a category of competition, we extend the work of Bernard et al. (2006), which measure the penetration of imports from low-wage countries into US manufacturing industries between 1977 and 1997, into two directions. On the one hand, Bernard et al. (2006) suggest that the use of per-capita GDP adjusted for PPPs restricts the number of exporters in the low-wage category and substitutes it by the constant US dollar per-capita GDP[6]. On the other hand, following Bernard et al. (2006), we refine the previous quartile distribution applying an additional restriction to the first quartile. According to them, a country belongs to the category

[5]Accession date: June 2017. For more informations: http://data.worldbank.org/indicator/NY.GDP.PCAP.KD.

[6]Note that, using World Bank data, the number of exporter countries is the same whether we use PPP-adjusted or -unadjusted per-capita GDP.

of low-wage countries if and only if its per-capita GDP is less than 5% of the United States (the reference country in their case). The 5% threshold is motivated by the fact that low-wage countries embody both the world's most abundant labor force and the strongest international competition for exporter countries already established on different countries markets. This threshold, allowing to take into account the specificity of competition exerted by low-wage countries, was used by Lelarge and Nefussi (2010) in the French case for example. Therefore, we replicate this threshold in order to isolate countries with a per-capita GDP below than 5% of that of France. Beyond that, we differentiate *(i)* countries whose per-capita GDP is strictly less than 5% of that of France and *(ii)* countries whose per-capita GDP is initially less than 5% of that of France but not on the whole of the period from 1996 to 2013.

After merging the trade and income databases, the sample covers 156 exporter countries between 1996 and 2013 which are spread into six distinct categories of competitors[7]. The first two ones refer to the 5% threshold and the next four to the different quartiles. Table 1 hereafter provides an overview of the international competition which is split between a cost and a technological competition.

Because the number of countries is not homogeneous from a category of competitors to another, we provide below some descriptive statistics. The exports global value has increased from 4 billion $ in 1996 to 15 billion $ in 2013[8]. More than 820 million $ in 1996 (i.e. 24.20% of total exports) and more than 5 billion $ in 2013 (i.e. 36.97%) originate from exports due to countries included in the cost competition (i.e. CC1, CC2 and CC3). While more than 3 billion $ in 1996 (i.e. 80.51% of total exports) and more than 9 billion $ in 2013 (i.e. 63.03%) come from exports due to countries included in the technological competition (i.e. TC1, TC2 and TC3).

[7]Among the 156 exporter countries, 6 of them have a per-capita GDP that evolves between two quartiles. More precisely, the per-capita GDP of Brunei, Spain, Hong Kong, Macao, New Zealand and Singapore refers either to the 50-75% quartile, or to the higher than 75% quartile. In such a context, we choose to include each country in the quartile in which it is most frequently associated. So, Spain, Hong Kong and Macao are included in the TC2 category while Brunei, New Zealand and Singapore are included in the TC3 category. Furthermore, when we compare the average value of the per-capita GDP of each country between 1996 and 2013 to the average value of each quartile over the same period, we reach the same distribution of these 6 countries.

[8]These figures are relative to the 156 exporter countries included in the sample. Their exports explain in average 91% of the world trade flows registered in BACI from 1996 to 2013.

Table 1: The international competition between a cost and a technological competition

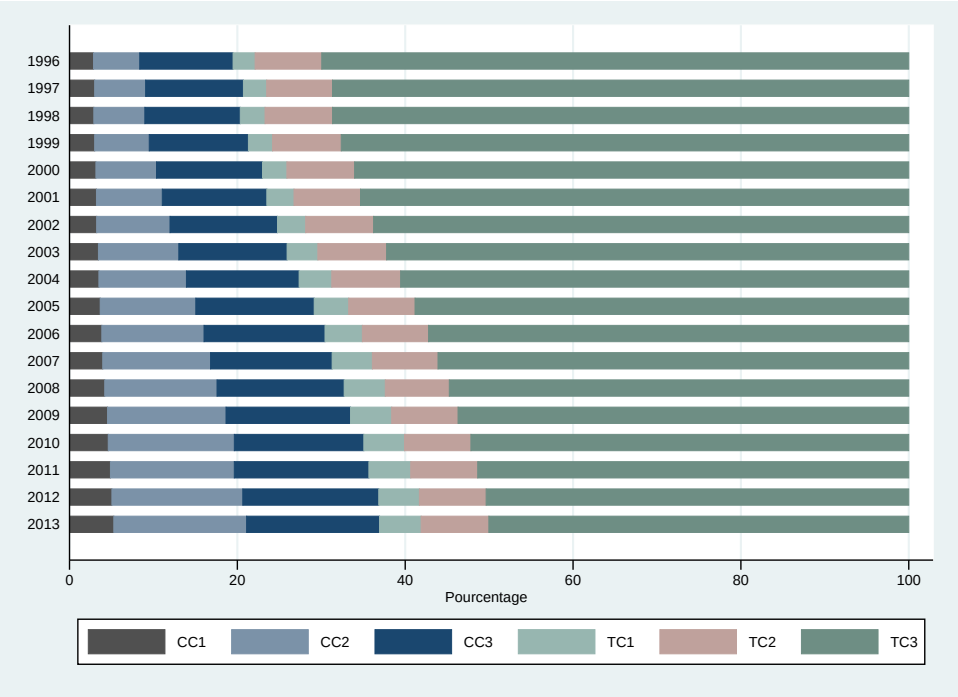
Cost Competition 1 Countries with per-capita GDP continuously less than or equal to 5% of that of France, $N_{CC1} = 53$ countries	Bangladesh, Benin, Bolivia, Burkina Faso, Burundi, Cambodia, Cameroon, Central African Republic, Chad, Comoros, Congo Dem. Rep., Cote d'Ivoire, Djibouti, Egypt Arab Rep., Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Guyana, Honduras, India, Kenya, Kiribati, Liberia, Madagascar, Malawi, Mali, Mauritania, Moldova, Mongolia, Mozambique, Nepal, Nicaragua, Niger, Pakistan, Papua New Guinea, Philippines, Lao PDR, Kyrgyz Republic, Rwanda, Senegal, Sierra Leone, Solomon Islands, Tajikistan, Tanzania, Togo, Uganda, Uzbekistan, Vietnam, Yemen Rep., Zambia, Zimbabwe
Cost Competition 2 Countries with per-capita GDP initially less than 5% of that of France but not over the whole period, $N_{CC2} = 11$ countries	Armenia, Azerbaijan, Bhutan, Bosnia and Herzegovina, Cabo Verde, China, Georgia, Equatorial Guinea, Sri Lanka, Turkmenistan, Ukraine
Cost Competition 3 Countries with per-capita GDP continuously included between 5 and 25% of that of France, $N_{CC3} = 43$ countries	Albania, Belarus, Belize, Brazil, Bulgaria, Colombia, Congo Rep., Costa Rica, Cuba, Dominica, Dominican Republic, El Salvador, Macedonia FYR, Fiji, Grenada, Guatemala, Jamaica, Jordan, Kazakhstan, Lebanon, Malaysia, Marshall Islands, Mauritius, Mexico, Micronesia, Morocco, Panama, Paraguay, Peru, Romania, Russian Federation, St. Vincent and the Grenadines, St. Lucia, Samoa, South Africa, Suriname, Thailand, Tonga, Tunisia, Turkey, Tuvalu, Uruguay, Vanuatu
Technological Competition 1 Countries with per-capita GDP continuously included between 25 and 50% of that of France, $N_{TC1} = 17$ countries	Antigua and Barbuda, Barbados, Chile, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Oman, Palaos, Poland, Slovak Republic, St. Kitts and Nevis, Seychelles, Trinidad and Tobago
Technological Competition 2 Countries with per-capita GDP continuously or mostly included between 50 and 75% of that of France, $N_{TC2} = 11$ countries	Bahamas, Bahrain, Cyprus, Greece, Hong Kong, Israel, Portugal, Korea Rep., Macao SAR, Slovenia, Spain
Technological Competition 3 Countries with per-capita GDP continuously or mostly higher than 75% of that of France, $N_{TC3} = 21$ countries	Australia, Austria, Belgium-Luxembourg, Bermuda, Brunei Darussalam, Canada, Denmark, Finland, Germany, Iceland, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Singapore, Sweden, Switzerland, United Kingdom, United States

Note: OPEC countries, which have specific export and productive structures, are excluded from this sample.

Source: World Bank - Author calculations.

Figure 1 below shows the evolution of the share of each category of competitors in world exports between over the period 1996-2013.

Figure 1: Evolution of the share of each category of competitors in world exports between 1996 and 2013 (in %)



Source: BACI and World Bank - Author's calculations.

Firstly, except countries included in TC3, the market shares of each category of competitors in the world exports has strongly increased from 1996 to 2013[9]. Secondly, the market shares of exports for countries included in TC3 has decreased by almost 20% over the period 1996-2013. Undoubtedly, these countries are challenged by the rise of emerging countries in the world trade. Thirdly, the markets shares of countries included in CC2 (in which appears, amongst others, China) has tripled even though the number of competitors involved in this category is one of the two lower. This is consistent with

[9]The market shares of each category of competitors in the world exports has evolved as follows. For countries included in CC1, this share has increased from 2.87% in 1996 to 5.28% in 2013. For countries included in CC2, this share has increased from 5.50% in 1996 to 15.82% in 2013. For countries included in CC3, this share has increased from 11.12% in 1996 to 15.84% in 2013. For countries included in TC1, this share has increased from 2.62% in 1996 to 4.96% in 2013. For countries included in TC2, this share has decreased from 7.94% in 1996 to 8.07% in 2013. And for countries included in TC3, this share has decreased from 69.94% in 1996 to 50.03% in 2013.

the joint intensification of world trade flows and international competition; especially, with the surge of China as a new global challenger.

These figures induce two general observations. On the one hand, even though countries included in the technological competition are fewer, they still occupy a prominent place in the international trade. On the other hand, exports value from countries included in the cost competition has been multiplied by 6 over the period 1996-2013 whereas exports value from countries included in the technological competition has been only multiplied by 3 over the same period. These two general observations converge towards a reshaping of the world market which is more in favor of the developing countries. These latter increasingly raise their exports, penetrate the world market and shake up the pre-established order associated with developed countries. This context questions the positioning of developed countries, which should henceforth adapt themselves to the presence of these new global challengers. Even though it is not a new phenomena, it fuels recent theoretical and empirical contributions that rely on international trade (Hausmann et al., 2007a; Hidalgo et al., 2007; Hausmann et al., 2011b). However, a new issue arises: the interaction between the emergence of the new world competitors and the ability of industrialized countries to reposition themselves on world markets.

3 Data and empirical analysis

As mentioned previously, the main source of data refers to BACI provided by the CEPII research center. This database contains detailed informations on world trade flows at a high level of product disaggregation. BACI covers bilateral values (in thousands US dollars) and quantities (in tons) of exports at the HS 6-digit product disaggregation, for more than 200 countries and 5,000 products since 1995. Updated every year, these data are available with different revision: we use the 1992 one. The other source of data refers to World Bank. We use income data at the country level (both in terms of per-capita GDP and French growth national product). As already mentioned, the sample covers 248,413 singles pairwise of product-destination and 156 exporter countries[10] from 1996 to 2013.

[10]Because we focus only on individual exporters, we drop territories like West Asia, Neutral Zone, Eastern Europe, etc.

3.1 Measures of competitive pressure

Beyond the traditional relative market shares measure, we choose to examine competition in the domestic market (through the imports penetration measure) and competition in foreign markets (through the exports sophistication measure) because the intensity of competition in each country plays simultaneously on these two markets (Iacovone et al., 2013). The market shares measure is defined at the double scale of products and destinations. The imports penetration measure is defined at the single scale of products. The exports sophistication measure is defined at the single scale of destinations. The choice of these three distinct scales of analysis is motivated by two reasons: on the one hand, competitive pressure may be specific either to the product or to the destination (which are considered separately from one another), or to the product-destination (which are considered together). On the other hand, the most recent work that rely on export performances (Mayer et al., 2014; 2016) suggest that both the characteristics of exporter countries and those of destination markets condition countries productive specializations (i.e. the success of each country on world markets).

Each of these three measures are estimated between t_1 (i.e. from 1996 to 1998) and t_2 (i.e. from 2011 to 2013) through their average annual growth rates[11]. Below, we provide additional clarifications on these three measures.

Firstly, $\Delta ms^{\alpha}_{kj,t_1/t_2}$ represents the growth in the relative market shares held by each category of competitors α for each product-destination pairwise kj served between t_1 and t_2 and is defined as follows:

$$\Delta ms^{\alpha}_{kj,t_1/t_2} = \left[\left(\frac{ms^{\alpha}_{kj,t_2}}{ms^{\alpha}_{kj,t_1}} \right)^{(1/t)} - 1 \right] \times 100 \tag{1}$$

$$For\ example : ms^{CC1}_{kj,2011} = \frac{x^{CC1}_{kj,2011}}{X_{kj,2011}} \tag{2}$$

where $x^{CC1}_{kj,2011}$ represents the exports value associated with the product-destination pairwise kj served by countries included in CC1 in 2011. $X_{kj,2011}$ represents the exports total value associated with the product-destination pairwise kj in 2011. Through this first measure, we study *(i)* the role of each

[11] We estimate an average annual growth rate between t_1 and t_2 on the basis of $t =$ 15 years (which represents the average gap in terms of years between t_1 and t_2). In the following extensions of the empirical analysis, I duplicate these three measures on the short and medium terms, respectively on the basis of t = 5 and t = 10 years.

competitor to efficiently position itself on world markets (i.e. its capacity to export the "correct" variety of products towards the "correct" destination) and *(ii)* the presence of cost advantages held by certain exporter countries (especially those associated with emerging countries).

Secondly, $\Delta ip^{\alpha}_{k,t_1/t_2}$ represents the growth in imports penetration associated with each category of competitors α for each product k exported towards France between t_1 and t_2 and is defined as follows:

$$\Delta ip^{\alpha}_{k,t_1/t_2} = \left[\left(\frac{ip^{\alpha}_{k,t_2}}{ip^{\alpha}_{k,t_1}} \right)^{(1/t)} - 1 \right] \times 100 \tag{3}$$

$$For\ example : ip^{CC1}_{k,2011} = \frac{M^{CC1}_{Fr,k,2011}}{M_{Fr,k,2011} + Y_{Fr,2011} - X_{Fr,k,2011}} \tag{4}$$

where $M^{CC1}_{Fr,k,2011}$ represents the share of each product k exported towards France by countries included in CC1 in 2011. $M_{Fr,k,2011}$ represents French total imports of each product k in 2011. $Y_{Fr,2011}$ is the French growth national product in 2011. $X_{Fr,k,2011}$ represents French total exports of each product k in 2011. Through this second measure, we study *(i)* the role of each trading partner (i.e. its capacity to address efficiently the market conditions of each destination) and *(ii)* the exposure of each country to international competition (because this exposure could restrict the capacity of a country to generate wealth sustainably).

Thirdly, $\Delta es^{\alpha}_{j,t_1/t_2}$ represents the growth in exports sophistication associated with each category of competitors α for each destination j served between t_1 and t_2 and is defined as follows:

$$\Delta es^{\alpha}_{j,t_1/t_2} = \left[\left(\frac{es^{\alpha}_{j,t_2}}{es^{\alpha}_{j,t_1}} \right)^{(1/t)} - 1 \right] \times 100 \tag{5}$$

$$For\ example : es^{CC1}_{j,2011} = \sum_{k} \left(\frac{x^{CC1}_{kj,2011}}{X^{CC1}_{j,2011}} \right) \times PRODY_{k,2011} \tag{6}$$

where $x^{CC1}_{kj,2011}$ represents the exports value associated with the product-destination pairwise kj served by countries included in CC1 in 2011. $X_{j,2011}$

represents the exports total value of countries included in CC1 towards which served the destination j in 2011. $PRODY_{k,2011}$ represents the sophistication index proposed by Hausmann et al. (2007a)[12]. Through this third measure, we study the role of the competitive advantages held by exporter countries and the congruence between export portfolios with destinations targeted.

The table 2 below summarizes briefly the data from which measures of competitive pressure are built and references from which they are retrieved.

Table 2: In a nutshell: Measures of competitive pressure

Measures of competitive pressure	Data	Sources
Relative market shares Competition in foreign markets (measure specific to product-destination pairwises)	BACI	
Imports penetration Competition in the domestic market (measure specific to products)	BACI	Bernard et al. (2006) Alvarez and Claro (2009) Iacovone et al. (2013); Bloom et al. (2016)
Exports sophistication Competition in foreign markets (measure specific to destinations)	World Bank	Hausmann et al. (2007a)

Source: References above mentioned.

3.2 Multinomial logit model

Empirically, we aim to explain the effect of the origin of an international competitive pressure on the modifications in the composition of the French exports portfolio. We estimate a multinomial logit model for each single pairwise of product-destination kj served between t_1 and t_2:

[12] Hausmann et al. (2007a) introduce a new measure $PRODY_k$ as a weighted average of the per-capita GDPs of countries exporting a given product. This index is defined as follows:

$$PRODY_k = \sum_{i=1}^{I} \left[\frac{\left(x_k^i / X^i\right)}{\sum_{i=1}^{I} \left(x_k^i / X^i\right)} \times Y^i \right] \tag{7}$$

$$with: \; X^i = \sum_{k=1}^{K} x_k^i \tag{8}$$

where x_k^i represents the value of product k exported by country i, X^i represents the total value of exports related to country i, and Y^i represents the per-capita GDP associated with country i.

$$Pr(y_{kj,t_1/t_2} = m|X^{\alpha}_{kj,t_1/t_2}) = \frac{exp^{(\beta X^{\alpha}_{kj,t_1/t_2})}}{\sum_{m=1}^{3} exp^{(\beta X^{\alpha}_{kj,t_1/t_2})}} \quad (9)$$

with:

$$X^{\alpha}_{kj,t_1/t_2} = \beta_0 + \sum^{\alpha} \beta^{\alpha}_1 \Delta ms^{\alpha}_{kj,t_1/t_2} + \sum^{\alpha} \beta^{\alpha}_2 \Delta ip^{\alpha}_{k,t_1/t_2} + \sum^{\alpha} \beta^{\alpha}_3 \Delta es^{\alpha}_{j,t_1/t_2} + \epsilon_{kj}$$

where each variable and each parameter are described as follows:

$y_{kj,t_1/t_2}$	:	Multinomial qualitative dependent variable associated with each single pairwise of product-destination kj. We define $Pr(y_{kj,t_1/t_2} = m\|X^{\alpha}_{kj,t_1/t_2})$ as the probability that the product-destination pairwise kj evolves towards one of the three intensive or extensive margins (which are called m) between t_1 (i.e. from 1996 to 1998) and t_2 (i.e. from 2011 to 2013) knowing certain characteristics of the competitive pressure exerted by each category of competitors (which are called $X^{\alpha}_{kj,t_1/t_2}$).
β_0	:	Constant parameter.
$\Delta ms^{\alpha}_{kj,t_1/t_2}$	:	Growth in the relative market shares held by each category of competitors α ($\alpha = CC1, CC2, CC3, TC1, TC2, TC3$) for each product-destination pairwise kj served between t_1 and t_2.
β^{α}_1	:	The coefficient associated with the previous growth in market shares.
$\Delta ip^{\alpha}_{k,t_1/t_2}$	:	Growth in imports penetration associated with each category of competitors α for each product k exported towards France between t_1 and t_2.
β^{α}_2	:	The coefficient associated with the previous growth in import penetration.
$\Delta es^{\alpha}_{j,t_1/t_2}$	:	Growth in exports sophistication associated with each category of competitors α for each destination j served between t_1 and t_2.
β^{α}_3	:	The coefficient associated with the previous growth in exports sophistication.
ϵ_{kj}	:	Error term.

Beyond the simple definition of the previous variables and parameters, some clarifications are needed on: *(i)* the model and the dependent variable, *(ii)* the controls included in the model in terms of technological intensity (which is relative to products) and in terms of destination, *(iii)* the scale of the analysis and the period of time.

(i) Firstly, and insofar as we study a multinomial qualitative dependent variable whose modalities are not ordered relative to each other (but fixed in a random way), we construct a probabilistic model by means of which we estimate the effect of a vector of explanatory variables on the dependent variable y_{kj}. We define the dependent variable $y_{kj,t_1/t_2} = m$ as reflecting the evolution of each single pairwise of product-destination towards one of the intensive or extensive margins. These margins, called m, are defined as follows:

$$\mathrm{m} = \begin{cases} 1 & \textit{if it is an existing export flow that has been maintained and whose value has increased;} \\ 2 & \textit{if it is an existing export flow that has been maintained and whose value has decreased;} \\ 3 & \textit{if it is an existing export flow that exit.} \end{cases}$$

This implies that we observe a sample of N single pairwise of product-destination, which are distributed in m disjoint categories. Each product-destination pairwise is then associated with one of the three intensive or extensive margins such as $m = 1, 2$ or 3. In doing so, we seek to understand the phenomenon of change in the composition of the French exports portfolio as a whole, taking into account the simultaneity of these events. In the case of the multinomial logit models, the sum of the conditional probabilities of occurrence of exclusive events must be equal to the unit, hence: $\sum_{m=1}^{3} Pr(y_{kj,t_1/t_2} = m | X^{\alpha}_{kj,t_1/t_2})$.

(ii) Secondly, we estimate the multinomial logit model under the guise of two controls: the first one refers to products, the second one refers to destinations. The first control is associated with the technological intensity of the sector in which each product is inserted. Using the international classification by sector and by product established by the OECD (Hatzichronoglou, 1997)[13], we join each single pairwise of product-destination to a level of technological intensity: low tech, medium-low tech, medium-high tech, or high tech. The second control is associated with a cluster in terms of destinations. The characteristics of the destinations served differ from one another, for example, the size of the destination market, its potential demand, the

[13]The OECD classification is based on the International Standard Industrial Classification (ISIC), i.e. a United Nations nomenclature. According to the correspondence tables, we merge HS revision 1992 and ISIC revision 3. For more informations: http://wits.worldbank.org/product_concordance.html.

number of countries serving a destination, the distance between an exporter country and a destination, etc. Through this control, we take into account the iteration of the same destination in the exports portfolio.

(iii) Thirdly, we estimate the multinomial logit model for each single pairwise of product-destination over the long period (i.e. between 1996 and 2013 via two sub-periods: from 1996 to 1998 for t_1, from 2011 to 2013 for t_2). These two sub-periods of time control the ephemeral variations associated with the introduction and/or the disappearance of a product-destination pairwise.

The model we estimate for entries is similar to the one we estimate previously. The only difference is that we use a logit model. The following table 3 provides some descriptive statistics for each of the three explanatory variables and for each of the six categories of competitors. We notice that TC3 have an export profile close to France one. The countries included in the TC3 serve 216,031 markets in common with France between 1996-1998 and 2011-2013. These countries are similar to France, they have similar levels of industrial development, high incomes such as Germany, Australia, the United States or Japan. We then observe that the growth of the three explanatory variables is stronger for the countries included in the CC2. Although few in number, these competitors have recorded on average growth of 13.91% for their market shares, 14.39% for their imports penetration, and 2.56% for their exports sophistication. We finally find that the categories of competitors with the highest incomes (i.e. TC2 and TC3) have the lowest growth in each of the three explanatory variables, or even a decline for countries included in TC3. The latter have negative growth rate both for their market shares and their import penetration: trade flows from high-income countries weakened between 1996 and 2013.

4 Estimation results and discussion

4.1 Multinomial logit model

The following tables 4 and 5 provide estimation results for equation 9. For low tech markets, in terms of market shares, we highlight the presence of an inverse effet between the competition exerted by CC1, CC2 and CC3 compared to the competition exerted by TC2 and TC3. As a result, low-cost competitors exert greater competitive pressure on low tech French exports, which is at the root of the decline in the value of exports. French exports are directly threatened by the presence of these countries in these markets. In the face of these competitors, we can assume *(i)* that France is poorly positioned in these markets and/or *(ii)* the advantages in terms of costs held

Table 3: Descriptive statistics for each of the three explicative variables and for each of the six category of competitors

Growth in the relative market shares	**Number of observation by market**	**Mean**	**Standard deviation**	**Minimum**	**Maximum**
$\Delta ms^{CC1}_{kj,t_1/t_2}$	115,331	4.90	14.80	-50.28	121.70
$\Delta ms^{CC2}_{kj,t_1/t_2}$	129,434	13.91	15.25	-49.96	147.29
$\Delta ms^{CC3}_{kj,t_1/t_2}$	162,213	3.59	13.23	-51.37	112.18
$\Delta ms^{TC1}_{kj,t_1/t_2}$	110,513	5.13	15.58	-52.82	112.54
$\Delta ms^{TC2}_{kj,t_1/t_2}$	167,730	0.25	12.26	-55.89	108.56
$\Delta ms^{TC3}_{kj,t_1/t_2}$	216,031	-2.63	5.48	-48.65	89.33
Growth in imports penetration	**Number of observation by product**	**Mean**	**Standard deviation**	**Minimum**	**Maximum**
$\Delta ip^{CC1}_{k,t_1/t_2}$	3,005	5.17	15.83	-45.61	100.12
$\Delta ip^{CC2}_{k,t_1/t_2}$	2,854	14.39	17.17	-44.07	102.62
$\Delta ip^{CC3}_{k,t_1/t_2}$	3,576	4.12	14.86	-48.53	129.84
$\Delta ip^{TC1}_{k,t_1/t_2}$	3,129	8.84	18.74	-42.51	99.17
$\Delta ip^{TC2}_{k,t_1/t_2}$	3,883	0.82	11.37	-49.88	67.21
$\Delta ip^{TC3}_{k,t_1/t_2}$	4,042	-1.97	6.71	-41.42	50.92
Growth in exports sophistication	**Number of observation by destination**	**Mean**	**Standard deviation**	**Minimum**	**Maximum**
$\Delta es^{CC1}_{j,t_1/t_2}$	197	2.54	1.79	-5.04	11.52
$\Delta es^{CC2}_{j,t_1/t_2}$	192	2.56	1.07	-5.48	7.34
$\Delta es^{CC3}_{j,t_1/t_2}$	197	1.73	0.94	-5.70	4.38
$\Delta es^{TC1}_{j,t_1/t_2}$	196	1.59	1.31	-5.91	6.31
$\Delta es^{TC2}_{j,t_1/t_2}$	197	1.69	1.24	-5.78	6.70
$\Delta es^{TC3}_{j,t_1/t_2}$	197	1.45	0.73	-5.86	3.82

Source: BACI and World Bank - Author calculations.

by these competitors weaken French exports. Conversely, the coefficients associated with TC2 and TC3 suggest that the presence of these competitors did not negatively affect French exports. In other words, compared to these competitors, France is well positioned in these markets in that it exports the right variety of products to the right destination by responding efficiently to the potential demand. In terms of imports penetration, we find that competition from CC2 has negatively affected France. The coefficient associated with this category of competitors is in line with the results presented by Bernard et al. (2006) at the level of US manufacturing plants. We notice, however, that: *(i)* the effect associated with imports penetration by these competitors does not explain a possible exit but rather a decrease in the value of the existing export flows. *(ii)* The effect associated with imports penetration is not the same for all cost competitors. The behavior of the countries included in CC1 does not negatively affect the composition of the French exports

Table 4: Estimation results for equation 9 for low- and medium-low tech markets - Multinomial qualitative dependent variable

	LT		**MLT**	
	m=2	**m=3**	**m=2**	**m=3**
$\Delta ms^{CC1}_{kj,t_1/t_2}$	1.003**	0.994***	1.000	0.990***
	(0.00146)	(0.00427)	(0.00126)	(0.00198)
$\Delta ms^{CC2}_{kj,t_1/t_2}$	1.005***	0.977***	1.000	0.972***
	(0.00157)	(0.00157)	(0.00174)	(0.00293)
$\Delta ms^{CC3}_{kj,t_1/t_2}$	1.007***	0.995***	0.997**	0.986***
	(0.00165)	(0.00207)	(0.00154)	(0.00177)
$\Delta ms^{TC1}_{kj,t_1/t_2}$	0.998	0.985***	0.998	0.982***
	(0.00148)	(0.00199)	(0.00158)	(0.00191)
$\Delta ms^{TC2}_{kj,t_1/t_2}$	0.996**	0.996	0.997	0.998
	(0.00181)	(0.00273)	(0.00163)	(0.00202)
$\Delta ms^{TC3}_{kj,t_1/t_2}$	0.977***	0.974***	0.975***	0.958***
	(0.00328)	(0.00528)	(0.00432)	(0.00659)
$\Delta ip^{CC1}_{k,t_1/t_2}$	0.988***	0.981***	0.996***	0.989***
	(0.000995)	(0.00101)	(0.00101)	(0.00113)
$\Delta ip^{CC2}_{k,t_1/t_2}$	1.002*	0.989***	1.002**	0.996***
	(0.00114)	(0.00166)	(0.000910)	(0.00155)
$\Delta ip^{CC3}_{k,t_1/t_2}$	0.999	0.991***	0.993***	0.987***
	(0.00122)	(0.00126)	(0.00120)	(0.00136)
$\Delta ip^{TC1}_{k,t_1/t_2}$	0.993***	0.988***	0.994***	0.988***
	(0.000893)	(0.00112)	(0.000954)	(0.00135)
$\Delta ip^{TC2}_{k,t_1/t_2}$	0.983***	0.990***	0.996**	1.007***
	(0.00193)	(0.00185)	(0.00180)	(0.00253)
$\Delta ip^{TC3}_{k,t_1/t_2}$	0.932***	0.912***	0.969***	0.954***
	(0.00423)	(0.00470)	(0.00275)	(0.00427)
$\Delta es^{CC1}_{j,t_1/t_2}$	0.961	0.910**	0.928**	0.851***
	(0.0291)	(0.0367)	(0.0292)	(0.0435)
$\Delta es^{CC2}_{j,t_1/t_2}$	0,965	0,790**	0.833**	0.659***
	(0.0934)	(0.0883)	(0.0694)	(0.101)
$\Delta es^{CC3}_{j,t_1/t_2}$	1.093	0.875	1.021	0.833
	(0.0722)	(0.0920)	(0.0707)	(0.101)
$\Delta es^{TC1}_{j,t_1/t_2}$	1.059	1.187**	1.233***	1.256**
	(0.0564)	(0.0999)	(0.0685)	(0.116)
$\Delta es^{TC2}_{j,t_1/t_2}$	1.008	0.899	0.988	0.910
	(0.0813)	(0.0765)	(0.0783)	(0.123)
$\Delta es^{TC3}_{j,t_1/t_2}$	0.853	0.940	0.925	1.121
	(0.0914)	(0.177)	(0.135)	(0.234)
Constant parameter	0.637*	2.282*	0.942	3.466**
	(0.158)	(1.113)	(0.246)	(1.676)
Observations	58,206		34,708	
Wald $\hookrightarrow \chi^2(18)$	$Pr > \chi^2 = 0.000$ for all outcome combinaisons			
Small-Hsiao for IIA	19.594$^{\#}$	21.170$^{\#}$	20.612$^{\#}$	15.893$^{\#}$

Note: $m = 1$ is the base outcome. Coefficients are indicated through "relative risk ratios". Robust standard errors are provided in parenthesis. The model is estimated under the guise of a cluster in terms of destinations. Confidence intervals are defined at *** 1%, ** 5% and * 10%. The symbol $^{\#}$ indicates that the hypothesis H_0, relative to "Independence Irrelevant Alternatives" (IIA), is accepted.

Table 5: Estimation results for equation 9 for medium-high and high tech markets - Multinomial qualitative dependent variable

	MHT		**HT**	
	m=2	**m=3**	**m=2**	**m=3**
$\Delta ms^{CC1}_{kj,t_1/t_2}$	0.997***	0.990***	1.002	1.005**
	(0.00121)	(0.00157)	(0.00160)	(0.00212)
$\Delta ms^{CC2}_{kj,t_1/t_2}$	1.003**	0.975***	1.003**	0.971***
	(0.00135)	(0.00229)	(0.00144)	(0.00245)
$\Delta ms^{CC3}_{kj,t_1/t_2}$	1.000	0.991***	0.994***	0.990***
	(0.00143)	(0.00162)	(0.00162)	(0.00193)
$\Delta ms^{TC1}_{kj,t_1/t_2}$	0.997*	0.976***	1.002	0.974***
	(0.00149)	(0.00155)	(0.00168)	(0.00208)
$\Delta ms^{TC2}_{kj,t_1/t_2}$	0.995***	0.991***	0.995***	0.989***
	(0.00123)	(0.00147)	(0.00206)	(0.00206)
$\Delta ms^{TC3}_{kj,t_1/t_2}$	0.970***	0.952***	0.953***	0.949***
	(0.00413)	(0.00677)	(0.00546)	(0.00825)
$\Delta ip^{CC1}_{k,t_1/t_2}$	0.996***	0.985***	0.990***	0.990***
	(0.000676)	(0.00113)	(0.00136)	(0.00141)
$\Delta ip^{CC2}_{k,t_1/t_2}$	0.995***	0.983***	1.003**	0.987***
	(0.000650)	(0.00126)	(0.00114)	(0.00163)
$\Delta ip^{CC3}_{k,t_1/t_2}$	0.994***	0.986***	0.989***	0.997*
	(0.000943)	(0.000938)	(0.00152)	(0.00146)
$\Delta ip^{TC1}_{k,t_1/t_2}$	0.995***	0.987***	0.995***	0.990***
	(0.000733)	(0.00118)	(0.00118)	(0.00137)
$\Delta ip^{TC2}_{k,t_1/t_2}$	0.993***	0.992***	1.002	0.987***
	(0.00116)	(0.00135)	(0.00213)	(0.00218)
$\Delta ip^{TC3}_{k,t_1/t_2}$	0.951***	0.938***	0.941***	0.948***
	(0.00283)	(0.00280)	(0.00438)	(0.00347)
$\Delta es^{CC1}_{j,t_1/t_2}$	0.948**	0.875***	0.964	0.935**
	(0.0256)	(0.0387)	(0.0257)	(0.0307)
$\Delta es^{CC2}_{j,t_1/t_2}$	0.862**	0.709***	0.812***	0.670***
	(0.0651)	(0.0908)	(0.0622)	(0.0642)
$\Delta es^{CC3}_{j,t_1/t_2}$	1.065	0.846	1.074	0.838**
	(0.0680)	(0.0925)	(0.0679)	(0.0634)
$\Delta es^{TC1}_{j,t_1/t_2}$	1.179***	1.193*	1.209***	1.173**
	(0.0640)	(0.107)	(0.0674)	(0.0743)
$\Delta es^{TC2}_{j,t_1/t_2}$	0.927	0.914	1.008	0.986
	(0.0676)	(0.113)	(0.0786)	(0.0806)
$\Delta es^{TC3}_{j,t_1/t_2}$	0.882	0.884	0.896	0.979
	(0.120)	(0.185)	(0.123)	(0.158)
Constant parameter	0.949	4.857***	0.640*	3.008***
	(0.230)	(2.578)	(0.152)	(1.éé5)
Observations	63,092		18,818	
Wald $\hookrightarrow \chi^2(18)$	$Pr > \chi^2 = 0.000$ for all outcome combinaisons			
Small-Hsiao for IIA	35.842	26.677#	23.035#	14.338#

Note: $m = 1$ is the base outcome. Coefficients are indicated through "relative risk ratios". Robust standard errors are provided in parenthesis. The model is estimated under the guise of a cluster in terms of destinations. Confidence intervals are defined at *** 1%, ** 5% and * 10%. The symbol # indicates that the hypothesis H_0, relative to "Independence Irrelevant Alternatives" (IIA), is accepted.

portfolio. In terms of exports sophistication, we notice that competition from TC1 has negatively affected France. For common destinations with France, competition from these countries is at the origin of the exit of the existing export flows: we identify the presence of a negative effect with regard to this category of competitors. We can assume that the adequacy of the export structure of TC1 to the market characteristics of the destinations served weakens French exports.

For medium-low tech markets, in terms of market shares, we do not dissociate any effects from a specific category of competitors on the change in the composition of French exports. On the contrary, most of the coefficients we reach indicate that French specializations in medium-low tech markets are relatively well positioned in comparison with those of its competitors. Faced with these different international competitors, we can, for example, assume that France responds efficiently to the demand addressed by each market it serves. We can also assume that France is not affected by the advantages in terms of costs held by certain categories of competitors or that France has strong competitive advantages, both geographical and/or sectoral, vis-a-vis to these markets. Also, we can postulate that France offers varieties of products that are quite distinct from those of its competitors in markets with medium-low technological intensity. In other words, the presence of these different categories of challengers does not prove to be a brake on France's positioning on these same markets. In terms of imports penetration, we highlight two negative effects: the first one shows that competition from CC2 has weakened the value of existing flows; the second one reveals that competition from TC2 favors the exit of existing flows. In other words, these two effects illustrate varying degrees of competition on the domestic market: while some have weakened French exports, others have caused the abandonment of certain markets. In terms of the exports sophistication, we highlight the presence of a negative effect from the TC1 on French exports. Competition from countries included in this category of competitors not only leads to a decrease in the value of French exports, but also to the exit of certain export flows. In other words, for common destinations, the competition exerted by the TC1 accentuates the probability of exit for France. This result also confirms the previously results for low-tech markets.

For medium-high tech markets, in terms of market shares, we highlight the presence of a negative effect associated with the competition exerted by the CC2 on the decline in the value of French exports. Faced with the emergence of these new challengers on the international markets and in particular in the face of China's rise in world trade, the presence of this negative effect reflects a loss of French competitive advantages for medium-high tech markets. This may be due, for example, to the fact that emerging countries have diversified their productive activities in favor of those with more capital

and knowledge intensity over the period 1996-2013. We assume that these competitors have penetrated world trade flows but also have positioned themselves at different levels along the quality spectrum of exports. In terms of imports penetration, we do not dissociate any effect from a specific category of competitors on the change in the composition of French exports. On the contrary, the coefficients obtained suggest that when competition on the domestic market increases, it has not weakened French exports of these products. In terms of exports sophistication, we find that the competitive pressure exerted by the competitors included in the TC1 category affects once again negatively French exports.

For high tech markets, in terms of market shares, we highlight two types of effects. The first negative effect refers to the competitors included in category CC1: we notice that the increase in their market shares is responsible for the exits of French exports. The second negative effect refers to the competitors included in category CC2: we notice that the increase in their market shares is responsible for the decline in the value of the existing flows of French exports. This second effect corroborates the result for medium-high tech markets. These two effects echo the double hypothesis to which we have previously referred: the new world challengers have rapidly penetrated the world markets and have rapidly positioned themselves in sectors with a higher technological intensity (i.e. at the top of the quality spectrum). In terms of imports penetration, we find that the CC2 exert a strong competitive pressure, which is at the origin of the decline in the value of existing flows. In other words, the competitive pressure exerted by these competitors on the domestic market is stronger than that exerted by other global competitors. The results obtained with respect to imports penetration are in line with the conclusions put forward by Bernard et al. (2006), Alvarez and Claro (2009), Iacovone et al. (2013), Bloom et al. (2016). In terms of exports sophistication, we identify a negative effect from competitors included in the TC1 category, which appear to respond more efficiently to the characteristics of targeted destinations than France. This translates into a decrease in the value of French exports, and even in exits.

4.2 Logit model

The following table 6 presents the results for the logit model. For low tech markets, *(i)* when France serves the same low-tech markets as competitors cost and stays in these markets, it faces a competitive disadvantage vis-a-vis to these competitors. In other words, the CC1, CC2 and CC3 seem to respond more efficiently to the economic conditions of markets with low technological intensity than France. *(ii)* When France is confronted with competition from countries that are close (i.e. TC3), the competitive pressure

Table 6: Marginal effets associated with the logit model - Binary qualitative dependent variable

	LT	**MLT**	**MHT**	**HT**
$\Delta ms^{CC1}_{kj,t_1/t_2}$	-0.00200***	-0.00215***	-0.00264***	-0.00284***
	(0.000411)	(0.000358)	(0.000309)	(0.000351)
$\Delta ms^{CC2}_{kj,t_1/t_2}$	-0.00391***	-0.00352***	-0.00388***	-0.00565***
	(0.000447)	(0.000449)	(0.000373)	(0.000451)
$\Delta ms^{CC3}_{kj,t_1/t_2}$	-0.00169***	-0.00185***	-0.00198***	-0.00172***
	(0.000439)	(0.000404)	(0.000341)	(0.000353)
$\Delta ms^{TC1}_{kj,t_1/t_2}$	-0.00309***	-0.00333***	-0.00356***	-0.00512***
	(0.000456)	(0.000453)	(0.000343)	(0.000451)
$\Delta ms^{TC2}_{kj,t_1/t_2}$	3.02e-05	-0.000474	-0.000845***	-0.000602*
	(0.000408)	(0.000298)	(0.000245)	(0.000323)
$\Delta ms^{TC3}_{kj,t_1/t_2}$	0.00220***	0.00408***	0.00316***	0.00761***
	(0.000791)	(0.00104)	(0.00103)	(0.00133)
$\Delta ip^{CC1}_{k,t_1/t_2}$	0.000688***	-7.94e-05	-5.50e-05	-4.81e-06
	(0.000143)	(0.000212)	(0.000175)	(0.000183)
$\Delta ip^{CC2}_{k,t_1/t_2}$	-0.000143	-0.000148	-7.06e-05	-0.000949***
	(0.000246)	(0.000192)	(0.000174)	(0.000266)
$\Delta ip^{CC3}_{k,t_1/t_2}$	0.000836***	0.000831***	0.000444***	0.000506***
	(0.000134)	(0.000219)	(0.000145)	(0.000195)
$\Delta ip^{TC1}_{k,t_1/t_2}$	0.000279	1.96e-05	-0.000276	-0.000464**
	(0.000175)	(0.000246)	(0.000190)	(0.000211)
$\Delta ip^{TC2}_{k,t_1/t_2}$	0.00222***	0.00127***	0.00145***	0.000297
	(0.000320)	(0.000300)	(0.000180)	(0.000299)
$\Delta ip^{TC3}_{k,t_1/t_2}$	0.00715***	0.00225***	0.00365***	0.00470***
	(0.000566)	(0.000546)	(0.000367)	(0.000547)
$\Delta es^{CC1}_{j,t_1/t_2}$	0.0105	0.0128	0.00479	0.0101
	(0.00993)	(0.00881)	(0.00747)	(0.00741)
$\Delta es^{CC2}_{j,t_1/t_2}$	-0.0207	-0.0315	-0.0419**	-0.0228
	(0.0243)	(0.0235)	(0.0208)	(0.0201)
$\Delta es^{CC3}_{j,t_1/t_2}$	-0.0645**	-0.0490**	-0.0367*	-0.0359*
	(0.0276)	(0.0245)	(0.0218)	(0.0190)
$\Delta es^{TC1}_{j,t_1/t_2}$	-0.0182	-0.0195	-0.00542	-0.00793
	(0.0186)	(0.0164)	(0.0147)	(0.0121)
$\Delta es^{TC2}_{j,t_1/t_2}$	-0.0388	-0.0236	-0.0191	-0.0208
	(0.0270)	(0.0252)	(0.0230)	(0.0191)
$\Delta es^{TC3}_{j,t_1/t_2}$	0.105**	0.109***	0.108***	0.0866***
	(0.0451)	(0.0404)	(0.0340)	(0.0323)
Observations	79,973	46,400	83,323	26,639
Correctly classified	73.05%	74.98%	75.94%	70.19%
lroc	0.6643	0.6469	0.6660	0.6996
Hosmer-Lemeshow $\hookrightarrow \chi^2(8)$	24.87	15.40	21.59	253.38
$Pr > \chi^2$	0.0016	0.0517	0.0057	0.0000

Note: Robust standard errors are provided in parenthesis. The model is estimated under the guise of a cluster in terms of destination. Confidence intervals are defined *** 1% ** 5% and * 10%.

exerted on the French exports portfolio is not negative. On the contrary, France is encouraged to conquer the same markets as its counterparts. In this case, we can assume that the export activities of these countries are complementary to one another. By specializing in products and/or similar destinations, different exporter countries with relatively close productive structures can benefit from mutual gains from trade.

For medium-low tech markets, we find that the results specific to medium-low tech markets corroborate those previously discussed for low tech markets. On the one hand, cost competitors and countries included in the TC1 category exert a negative competitive pressure in terms of relative market shares. On the other hand, the countries included in the TC3 category again encourage entry. This can be explained by a mimicry of France with regard to TC3 by conquering, for instance, new destinations, by niche specializations or by a geographical and/or sectoral proximity of the destinations served.

For medium-high tech markets, the coefficients associated with the import penetration from CC3 and TC2 make competition from these competitors on the domestic market an incentive for entry. These competitors, by exerting a strong competition on the domestic market, encourage new specializations on new products.

For high tech markets, *(i)* in terms of relative market shares, the negative competitive pressure exerted by CC1, CC2, CC3 and TC1 is also confirmed in the case of high tech markets. *(ii)* The absence of negative competitive pressure from TC3 extends also to high tech markets. This suggests that the conquest of a market by one or more exporter countries may be an additional source of specialization for its closest competitors, i.e. for those with similar productive and export structures. *(iii)* In terms of import penetration, the countries included in categories CC2 and TC1 exert a strong competitive pressure.

5 Robustness checks

Despite the fact that we were able to identify several effects specific to three categories of competitors, our sample suffers from missing values. Because countries do not export the same products to the same destinations over the same period, only 49,297 singles pairwise of product-destination are simultaneously exported by the six categories of competitors. The other 187,038 reflect the presence of three distinct scale of the analysis (i.e. the double scale of products and destinations, the single scale of products, the single scale of destinations). This implies that certain categories of

competitors may export a product but not necessarily towards the same destination(s) served by France. Also, certain categories of competitors may serve a destination but not necessarily for the same product(s) exported by France. To address this concern, we estimate the previous multinomial logit model using two restrictions: *(i)* we narrow the model around the hearty sample; *(ii)* we narrow the model around three new categories of competitors.

Firstly, we narrow the model around the hearty sample. In doing so, we seek to confirm our previous results by deleting the presence of potential missing values. To the extent that we questioned the origin of competition to which French exports are exposed, we seek to strengthen the previous effects. The following tables 7 and 8 provide estimation results for the hearty sample.

The table 7 shows the results associated with low and medium-low tech markets. We identify two new sources of competition exerted by CC2 against French exports: *(i)* the increase of imports penetration induces the exit of French existing flows, especially in the case of medium-low tech markets; *(ii)* the increase of exports sophistication induces a decrease of the value of low tech French exports. The first effect is specific to the products, the second effect is specific to the destinations. These two effects strengthen the previous results and suggest that the competitive pressure exerted by countries included in CC2 is based on several dimensions mutually complementary to each other.

The table 8 shows the results associated with medium-high and high tech markets. In this context, we identify three changes related to low cost competitors. Firstly, the increase of the relative market shares for medium-high markets served by CC2 induces a decrease of the value of French exports. Secondly, the increase of the relative market shares for high markets served by CC1 induces a decrease of the value of French exports. Thirdly, the increase of imports penetration for high markets served by CC3 is at the origin of the exit of French export existing flows. Furthermore, the competitive pressure exerted on the domestic market by countries included in TC2 reveals a negative effect on high tech French exports.

Secondly, we narrow the model around three new categories of competitors. In doing so, we seek: *(i)* to reduce the number of missing values in our sample (90% of our sample included henceforth between 0 and 2 missing values); *(ii)* to increase the number of direct competitors. Through this second restriction, we are looking for more simultaneous exports between the different categories of competitors; instead of the previous 49,297 singles pairwise of product-destination, we identify henceforth 136,792 markets (i.e. 58% of the overall sample). By extending the split of the international competition between a

Table 7: Estimation results for equation 9 limited to the hearty sample (for low and medium-low tech markets) - Multinomial qualitative dependent variable

	LT		**MLT**	
	m=2	**m=3**	**m=2**	**m=3**
$\Delta ms^{CC1}_{kj,t_1/t_2}$	1.004	1.001	1.000	0.994*
	(0.00188)	(0.00427)	(0.00179)	(0.00343)
$\Delta ms^{CC2}_{kj,t_1/t_2}$	1.007***	1.004	1.002	0.994
	(0.00236)	(0.00475)	(0.00251)	(0.00579)
$\Delta ms^{CC3}_{kj,t_1/t_2}$	1.009***	0.994	0.995**	0.984***
	(0.00285)	(0.00505)	(0.00255)	(0.00479)
$\Delta ms^{TC1}_{kj,t_1/t_2}$	0.998	0.987***	0.997	0.978***
	(0.00188)	(0.00426)	(0.00217)	(0.00339)
$\Delta ms^{TC2}_{kj,t_1/t_2}$	0.994**	0.985**	0.990***	1.001
	(0.00302)	(0.00622)	(0.00258)	(0.00534)
$\Delta ms^{TC3}_{kj,t_1/t_2}$	0.970***	0.932***	0.970***	0.909***
	(0.00682)	(0.0139)	(0.00884)	(0.0152)
$\Delta ip^{CC1}_{k,t_1/t_2}$	0.986***	0.981***	0.997	0.986***
	(0.00255)	(0.00429)	(0.00212)	(0.00431)
$\Delta ip^{CC2}_{k,t_1/t_2}$	1.003	0.994*	1.009***	1.020***
	(0.00167)	(0.00384)	(0.00208)	(0.00378)
$\Delta ip^{CC3}_{k,t_1/t_2}$	1.001	0.995	0.989***	0.986**
	(0.00287)	(0.00422)	(0.00290)	(0.00562)
$\Delta ip^{TC1}_{k,t_1/t_2}$	0.995***	0.996	0.991***	0.994*
	(0.00135)	(0.00319)	(0.00194)	(0.00368)
$\Delta ip^{TC2}_{k,t_1/t_2}$	0.980***	0.986**	0.996	1.027***
	(0.00437)	(0.00642)	(0.00471)	(0.00868)
$\Delta ip^{TC3}_{k,t_1/t_2}$	0.884***	0.879***	0.950***	0.883***
	(0.00669)	(0.00916)	(0.00786)	(0.0151)
$\Delta es^{CC1}_{j,t_1/t_2}$	0.827***	0.941	0.818***	0.813*
	(0.0412)	(0.0837)	(0.0444)	(0.0878)
$\Delta es^{CC2}_{j,t_1/t_2}$	1.377**	1.153	0.873	0.623
	(0.186)	(0.334)	(0.120)	(0.198)
$\Delta es^{CC3}_{j,t_1/t_2}$	1.103	0.621*	1.123	0.821
	(0.0749)	(0.155)	(0.117)	(0.178)
$\Delta es^{TC1}_{j,t_1/t_2}$	1.224**	1.991***	1.326***	1.417
	(0.116)	(0.504)	(0.107)	(0.301)
$\Delta es^{TC2}_{j,t_1/t_2}$	1.020	0.831	0.880	0.849
	(0.0945)	(0.191)	(0.0919)	(0.179)
$\Delta es^{TC3}_{j,t_1/t_2}$	0.844	0.713	0.894	1.088
	(0.162)	(0.266)	(0.205)	(0.354)
Constant parameter	0.211***	0.120***	0.897	0.460
	(0.0912)	(0.0981)	(0.409)	(0.283)
Observations	16,033		9,410	
Wald $\hookrightarrow \chi^2(18)$	$Pr > \chi^2 = 0.000$ for all outcome combinaisons			
Small-Hsiao pour IIA	27.694#	15.910#	23.641#	11.386#

Note: $m = 1$ is the base outcome. Coefficients are indicated through "relative risk ratios". Robust standard errors are provided in parenthesis. The model is estimated under the guise of a cluster in terms of destinations. Confidence intervals are defined at *** 1%, ** 5% and * 10%. The symbol # indicates that the hypothesis H_0, relative to "Independence Irrelevant Alternatives" (IIA), is accepted.

Table 8: Estimation results for equation 9 limited to the hearty sample (for medium-high and high tech markets) - Multinomial qualitative dependent variable

	MHT		**HT**	
	m=2	**m=3**	**m=2**	**m=3**
$\Delta ms^{CC1}_{kj,t_1/t_2}$	0.994***	0.996	1.005**	1.013***
	(0.00167)	(0.00332)	(0.00207)	(0.00381)
$\Delta ms^{CC2}_{kj,t_1/t_2}$	1.003	0.997	1.006**	0.996
	(0.00228)	(0.00334)	(0.00241)	(0.00531)
$\Delta ms^{CC3}_{kj,t_1/t_2}$	1.001	0.996	0.993**	0.994
	(0.00215)	(0.00445)	(0.00314)	(0.00567)
$\Delta ms^{TC1}_{kj,t_1/t_2}$	0.994***	0.975***	1.003	0.994
	(0.00174)	(0.00444)	(0.00227)	(0.00481)
$\Delta ms^{TC2}_{kj,t_1/t_2}$	0.991***	0.992	0.988***	0.966***
	(0.00205)	(0.00556)	(0.00298)	(0.00742)
$\Delta ms^{TC3}_{kj,t_1/t_2}$	0.942***	0.890***	0.940***	0.862***
	(0.00811)	(0.0126)	(0.00919)	(0.0171)
$\Delta ip^{CC1}_{k,t_1/t_2}$	0.997**	0.995	0.982***	0.975***
	(0.00157)	(0.00396)	(0.00227)	(0.00479)
$\Delta ip^{CC2}_{k,t_1/t_2}$	0.995***	0.996	1.004	1.015***
	(0.00157)	(0.00297)	(0.00254)	(0.00415)
$\Delta ip^{CC3}_{k,t_1/t_2}$	0.992***	0.981***	0.981***	1.023***
	(0.00230)	(0.00499)	(0.00289)	(0.00657)
$\Delta ip^{TC1}_{k,t_1/t_2}$	0.997**	0.988***	0.997	0.993
	(0.00156)	(0.00437)	(0.00206)	(0.00411)
$\Delta ip^{TC2}_{k,t_1/t_2}$	0.992***	0.991	1.013***	0.937***
	(0.00244)	(0.00749)	(0.00372)	(0.00977)
$\Delta ip^{TC3}_{k,t_1/t_2}$	0.914***	0.872***	0.917***	0.990
	(0.00694)	(0.0122)	(0.0104)	(0.0164)
$\Delta es^{CC1}_{j,t_1/t_2}$	0.863***	0.710***	0.877**	0.861*
	(0.0403)	(0.0753)	(0.0451)	(0.0754)
$\Delta es^{CC2}_{j,t_1/t_2}$	0.807*	0.426***	0.717**	0.538**
	(0.102)	(0.107)	(0.106)	(0.137)
$\Delta es^{CC3}_{j,t_1/t_2}$	1.052	0.794	1.049	0.781*
	(0.105)	(0.146)	(0.105)	(0.113)
$\Delta es^{TC1}_{j,t_1/t_2}$	1.325***	1.452*	1.398***	1.563***
	(0.119)	(0.297)	(0.120)	(0.219)
$\Delta es^{TC2}_{j,t_1/t_2}$	0.844	0.792	0.996	0.869
	(0.0932)	(0.143)	(0.124)	(0.164)
$\Delta es^{TC3}_{j,t_1/t_2}$	0.888	1.324	0.965	1.044
	(0.210)	(0.441)	(0.248)	(0.364)
Constant parameter	1.226	1.517	0.702	0.312**
	(0.607)	(0.922)	(0.304)	(0.147)
Observations	14,193		5,281	
Wald $\hookrightarrow \chi^2(18)$	$Pr > \chi^2 = 0.000$ for all outcome combinaisons			
Small-Hsiao pour IIA	16.814#	12.299#	10.150#	24.574#

Note: $m = 1$ is the base outcome. Coefficients are indicated through "relative risk ratios". Robust standard errors are provided in parenthesis. The model is estimated under the guise of a cluster in terms of destinations. Confidence intervals are defined at *** 1%, ** 5% and * 10%. The symbol # indicates that the hypothesis H_0, relative to "Independence Irrelevant Alternatives" (IIA), is accepted.

cost competition from developing countries and a technological competition from developed countries, we gather deux à deux the previous six categories of competitors in order to maintain the criteria in terms of per-capita GDP. So, we define three new categories of competitors as follows:

- CC1 and CC2 represent low income countries (which are called LI for *"Low Income"*);
- CC3 and TC1 represent middle income countries (which are called MI for *"Middle Income"*);
- TC2 and TC3 represent high income countries (which are called HI for *"High Income"*).

The following tables 9 and 10 provide estimation results for the three new categories of competitors. The table 9 shows the results associated with low and medium-low tech markets. In this context, two negative effects strengthen the previous results. *(i)* The competition exerted by low and middle income countries plays a negative effect against French exports in terms of low tech markets. This suggest the presence of a French competitive disadvantage regarding its challengers. However, the French sectoral and geographical specializations seem to be adequate to the characteristics of medium-low tech markets (the presence of the different categories of competitors does not affect negatively the French exports). *(ii)* The competition exerted by middle income countries plays a negative effect on low and medium-low tech French specializations; this negative effect appears along the unique scale of destinations. Despite the fact that coefficients are lowly significative, coefficients associated with these markets are at the origin of a decrease of French exports value. Beyond these two negative effects, we notice that the competition exerted by high income countries does not impact negatively French exports. As mentioned above, the intensification in the performances of competitors with productive structures close to those of France encourages her to conquer new products and/or new destinations. In other words, when the competitors are substantially similar to each other, the evolution of the composition of French exports is conditioned by a mimicry effect, which is based on the export behavior of these competitors.

Table 9: Estimation results for equation 9 limited to three categories of competitors (for low and medium-low tech markets) - Multinomial qualitative dependent variable

	LT		**MLT**	
	m=2	**m=3**	**m=2**	**m=3**
$\Delta ms^{LI}_{kj,t_1/t_2}$	1.007***	0.984***	1.000	0.974***
	(0.00162)	(0.00199)	(0.00165)	(0.00271)
$\Delta ms^{MI}_{kj,t_1/t_2}$	1.004***	0.989***	0.997	0.980***
	(0.00164)	(0.00245)	(0.00176)	(0.00227)
$\Delta ms^{HI}_{kj,t_1/t_2}$	0.979***	0.969***	0.978***	0.953***
	(0.00392)	(0.00570)	(0.00458)	(0.00709)
$\Delta ip^{LI}_{k,t_1/t_2}$	0.993***	0.976***	1.000	0.992***
	(0.00111)	(0.00146)	(0.000896)	(0.00178)
$\Delta ip^{MI}_{k,t_1/t_2}$	0.992***	0.981***	0.990***	0.981***
	(0.00121)	(0.00124)	(0.00133)	(0.00156)
$\Delta ip^{HI}_{k,t_1/t_2}$	0.914***	0.901***	0.964***	0.960***
	(0.00396)	(0.00488)	(0.00289)	(0.00481)
$\Delta es^{LI}_{j,t_1/t_2}$	0.977	0.878	0.932	0.769**
	(0.0468)	(0.0711)	(0.0581)	(0.0992)
$\Delta es^{MI}_{j,t_1/t_2}$	1.123*	0.989	1.147*	0.944*
	(0.0675)	(0.104)	(0.0882)	(0.120)
$\Delta es^{HI}_{j,t_1/t_2}$	0.893	1.039	0.853	1.022
	(0.0822)	(0.145)	(0.0875)	(0.173)
Constant parameter	0.549***	0.927	0.702*	1.545
	(0.0858)	(0.272)	(0.150)	(0.487)
Observations	57,870		34,554	
Wald $\hookrightarrow \chi^2(9)$	$Pr > \chi^2 = 0.000$ for all outcome combinaisons			
Small-Hsiao pour IIA	$9.260^{\#}$	$15.784^{\#}$	$12.483^{\#}$	$6.038^{\#}$

Note: $m = 1$ is the base outcome. Coefficients are indicated through "relative risk ratios". Robust standard errors are provided in parenthesis. The model is estimated under the guise of a cluster in terms of destinations. Confidence intervals are defined at *** 1%, ** 5% and * 10%. The symbol $^{\#}$ indicates that the hypothesis H_0, relative to "Independence Irrelevant Alternatives" (IIA), is accepted.

The table 10 shows the results associated with medium-high and high tech markets. Middle income countries exert a strong competitive pressure along the intensive margin. High income countries exert a competitive pressure along the extensive margin. Whether for medium-high and high tech markets, the distinct role played by these two categories of competitors confirms our previous remarks.

Table 10: Estimation results for equation 9 limited to three categories of competitors (for medium-high and high tech markets) - Multinomial qualitative dependent variable

	MHT		**HT**	
	m=2	**m=3**	**m=2**	**m=3**
$\Delta ms^{LI}_{kj,t_1/t_2}$	1.001	0.974***	1.002	0.977***
	(0.00147)	(0.00193)	(0.00161)	(0.00229)
$\Delta ms^{MI}_{kj,t_1/t_2}$	0.999	0.983***	0.997*	0.981***
	(0.00152)	(0.00189)	(0.00188)	(0.00201)
$\Delta ms^{HI}_{kj,t_1/t_2}$	0.969***	0.941***	0.955***	0.938***
	(0.00476)	(0.00727)	(0.00755)	(0.00926)
$\Delta ip^{LI}_{k,t_1/t_2}$	0.994***	0.977***	0.999	0.978***
	(0.000705)	(0.00132)	(0.00126)	(0.00164)
$\Delta ip^{MI}_{k,t_1/t_2}$	0.990***	0.977***	0.987***	0.987***
	(0.000949)	(0.00113)	(0.00140)	(0.00157)
$\Delta ip^{HI}_{k,t_1/t_2}$	0.945***	0.928***	0.940***	0.946***
	(0.00334)	(0.00299)	(0.00407)	(0.00354)
$\Delta es^{LI}_{j,t_1/t_2}$	0.946	0.807**	0.962	0.865
	(0.0469)	(0.0693)	(0.0496)	(0.0801)
$\Delta es^{MI}_{j,t_1/t_2}$	1.159**	0.932	1.189**	0.927
	(0.0773)	(0.0976)	(0.0901)	(0.0751)
$\Delta es^{HI}_{j,t_1/t_2}$	0.819**	0.900	0.848*	0.956
	(0.0783)	(0.136)	(0.0796)	(0.127)
Constant parameter	0.673**	1.922**	0.471***	1.265
	(0.135)	(0.509)	(0.0893)	(0.333)
Observations	62,735		18,722	
Wald $\hookrightarrow \chi^2(9)$	$Pr > \chi^2 = 0.000$ for all outcome combinaisons			
Small-Hsiao pour IIA	$13.260^{\#}$	$7.907^{\#}$	$13.555^{\#}$	$6.470^{\#}$

Note: $m = 1$ is the base outcome. Coefficients are indicated through "relative risk ratios". Robust standard errors are provided in parenthesis. The model is estimated under the guise of a cluster in terms of destinations. Confidence intervals are defined at *** 1%, ** 5% and * 10%. The symbol $^{\#}$ indicates that the hypothesis H_0, relative to "Independence Irrelevant Alternatives" (IIA), is accepted.

6 Conclusion

In this paper, we study the effect of the origin of an international competitive pressure on the change in the composition of the French exports portfolio. To this aim, we combine three measures in termes of relative market shares, imports penetration and exports sophistication. We test the impact of international competition on French exports using harmonized trade data that covers information on world trade flows at a high level of product disaggregation over the period 1996-2013.

Our findings confirm that the origin of international competition does not affect in the same way the changes in the French exports portfolio

composition. Overall, this study proves that there are as many different reactions as there are competitive pressures exerted by various competitors. The contribution of this empirical work encompasses at least three aspects. Firstly, countries included in category CC2 (for example, China, Equatorial Guinea or Sri Lanka) exert a negative competitive pressure on the double scale of products and destinations. As a result, these competitors were responsible for the change in the composition of the French exports portfolio along the intensive margin. In particular, they exert a strong competitive threat on the decline in the value of existing exports flows for low- and medium-high tech markets. Secondly, countries included in category TC1 (for example, Saudi Arabia, Chile or the Czech Republic) exert a negative competitive pressure on the single scale of destinations. As a result, these competitors were responsible for the change in the composition of the French exports portfolio both along the intensive and the extensive margins. It also covers the four levels of technological intensity. Thirdly, countries included in category TC3 (for example, Germany, the United States or Japan) do not exert a negative competitive pressure on the difference of the other categories of competitors. The absence of a negative effect would be compatible with a hypothesis of complementarity in the demand addressed to the TC3 and to France. In other words, we can assume that when certain markets are favorable for TC3, they are also favorable for France.

Even though we have identified specific effects for certain categories of competitors, we see some limitations related to our current analysis. *(i)* The choice of the explanatory variables is relatively restrictive and reports only a single dimension of the competitive pressure that each country exert on its counterparts. *(ii)* Besides the two controls in terms of technological intensity and cluster, we do not include any other control variable in our empirical analysis. *(iii)* The scale of the analysis is relatively large and is associated with exporter countries. Based on the previous results and the current limitations, we see further research avenues through which our current analysis could be extended. For instance, we can extend the methodology to identify the strategies of productive resources reallocation adopted by French industries and/or firms in a context of a growing international competition.

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