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Exports and financial performances in French cosmetic industry: Long live the 'lipstick effect'!

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Abstract
French cosmetic industry is of great interest given its agglomeration of firms, innovation and economies of scale, as Cosmetic Valley near Paris or PASS (Perfumes, Aroma, Scents, and Savours) in the Alpe-Cote d'Azur province.
In this context, the paper analyses the impact of exports, as a key driver of globalization process, on financial performances of the French cosmetic companies, based on a sample with 704 cosmetic business entities, for the period 2003-2015. The methodology follows static and dynamic panel model estimations.
The main finding shows that the exports have a positive linear impact on their financial performances, both for producers and distributors. We validate the existence of 'lipstick effect', since the rigidity of foreign cosmetics demand makes the exporters' financial performances insensitive to the economic turbulences. Moreover, the producers seem to be more affected by the regulation adjustments, while the investments and debt management are very important elements for distribution companies.

Keywords: Exports, Financial performances, Panel analysis, Effects; French cosmetic industry

JEL-codes: F61, F36, C23

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1. Introduction

During the last decades, the intensification of competition in the foreign markets generates new challenges for exporters, with deep and complex implications both at the macroeconomic and the microeconomic level. At the macroeconomic level, the openness to export has been far away more discussed and encouraged by many policymakers than the imports, exports being seen as a key to wealth creation (Girma, Greenaway & Kneller, 2004). At the microeconomic level, exports are considered an important performance enhancer mainly because the higher level of international competition forces the companies to improve their level of performance continuously.

Different dimensions of company's performance are related to the export activity. The financial one is primordial for stakeholders being translated in the stock prices, dividends, profitability and return rates.

The impact of exports on the company financial performance is propagated through at least three transmission channels: cost channel, risk channel and knowledge channel.
The **cost channel** implies the existence of economies of scale by finding new foreign markets or extending the market share of the existed ones (Campi, Dueñas, Li & Wu, 2018). Exporting more, the companies maximize their returns improving the output per worker. When the companies reach the economies of scale, this higher level of productivity will be accompanied by reduced costs (i.e. based on fixed costs), generating new profits. Such positive financial performances sustain the expansion, the cycle reiterating furthermore.
The **risk channel** refers to the company exposure as a consequence of the exports (Joo & Pak, 2017). On the one hand, by spreading the business risks on multiple markets, the companies compress the costs of failure, improving the financial performance. On the other hand, additional costs reduce the financial performance when the degree of financial risk increases.
The **knowledge channel** is depicted through the free flow of ideas that arises from the foreign market. The companies involved in the export operations gain new knowledge and experience (Bernard & Jensen, 1995; Roberts & Tybout, 1997; Lundvall & Johnson, 1994; Porter, 2011). They attract modern know-how, innovative technologies, updated market practices and more relevant information about competitors. Such advantages reduce the costs and improve the financial performance status.
The exports role as a financial performance enhancer seems to have various intensities for different industries and origin countries.

A very particular industry arises a special interest in this context: the beauty industry. Being almost neglected in the hitherto researches, this industry has several particularities: very strict targeted customers, different elasticity reactions under external shocks, and specific regulations which vary from one country to another. The growth of the world beauty market was connected to the waves of globalization, which began in the nineteenth century. Starting with the mid-nineteenth century, thousands of entrepreneurs primarily based in Western countries crossed border and establish operations in foreign countries carrying with them strong assumptions concerning what it meant to be "beautiful". For instance, both French and British perfume houses as Piver, Guerlain and Rimmel set large export businesses by the middle of nineteen century. A major role was played by the aspirational status of Paris as a capital of fashion and beauty, reflecting well-known France's reputation for refined luxury. The process continued also after 1914 with the development of Hollywood, a very important driver of the unique beauty ideal idea, the first World pageant contests, the extended presence in the worldwide media of Western pop stars, actors, models who Western norm of beauty (Unnikrishnan & Prasad, 2016; Yan & Bissell, 2014). Based in 1951 in Great Britain, it became huge media spectacles televised in many countries and helped set the so-called "Miss Universe standard of beauty" that included among other paler skins and wider eyes.
Even though the World War 1 began to disintegrate the first global economy and to lower market integration, the international consumer culture survives in the case of beauty industry.
France is the largest beauty products world exporter (see Figure 1) and Paris is often considered the world capital of beauty (Jones, 2011). Therefore, choosing France as a representative market to test the relationship between exports and financial performance is not unexpected.

Insert here Figure 1

French cosmetic industry makes a special case regarding the agglomeration of firms, innovation and scale economies because of the very important clusters created in this industry as Cosmetic Valley near Paris or PASS (Perfumes, Aroma, Scents, and Savours) in the Alpe-Cote d'Azur province. Those clusters bring together hundreds of companies (e.g. Hermes, Guerlain, Dior), but also companies from vertical manufacturing sector (e.g. promoters and designers, firms of wrapping and packaging, distributers, universities, training and research centers).

The present paper analyses the impact of exports on financial performances in afore depicted French cosmetic industry. The empirical ground is given by panel estimations, employed with different scenarios, for both producers and consumers, taking into account various determinants. The main sample consider 704 cosmetic business entities, covering the period 2003-2015. The results claim a positive influence of exports on the financial performance, being neutral in respect to crisis, but strongly influenced by the cosmetics regulations.
The contributions of the paper for the literature are threefold. First, to the best of our knowledge, this is one of the first papers that analyses the financial performances of the French cosmetics exporters, considering the rigidity of the world demand during the economic turbulences (i.e. so-called the 'lipstick effect'). Second, the study shapes the financial performances of exporters by discriminating between producers or distributors, based on the differences among them in learning and innovation processes. Third, the paper treats the implications of the exports on the performance taking into account the industry specific regulations. Their effects seems to be more pronounced for manufacturers than distributors.

The paper is organized as follows. Section 2 reviews the literature, Section 3 describes the data and methodology, while Section 4 presents the empirical results. Finally, Section 5 concludes.

2. Literature

Bernard & Jensen (1995) have pioneered the literature based on the analysis between exports and performance at the micro-level, by using a large longitudinal data provided by Census Bureau's Annual Survey of Manufactures (ASM) for US companies. Their main findings suggest that, at a point in time, the exporters seems to be more performant than the non-exporters since they are larger, more productive and more capital intensive. The evidence of the benefit generated by the exports is found especially on short-run in terms of employment and wages.

Starting with Bernard & Jensen's (1995) study, several scholars have tried to bring more light in the correlation between the exports and performance seen either as productivity (in the first studies) or as profitability (in the latest ones). The prevalence of using productivity as a measure of performance in the first studies is caused mainly by the central role played by productivity in the Melitz-type models in the new international trade theory.
Despite that, the stakeholders of firms care about other measures of performance too since productivity is just one of the factors who lead to profitability. In this light, Foster, Haltiwanger & Syverson (2008) demonstrate that the productivity is positively correlated with profitability but the maximization of return and profitability is finally considered as the central goal for the firms. The employees focus on wages, while the stockholders especially care about dividends and profitability.

Only a quite scarce literature connects the exports with profitability. This gap in micro-econometrics of international trades is rather surprising considering that the main goal of the firm is the profit not the productivity maximization.
Analysing the relationship between exports and profitability both positive and negative effects may be noticed.

On the positive side, the knowledge flow coming from international buyers and competitors help exporters to improve their post-entry performance while the more intense competition in the international markets oblige the firms to improve faster their technologies and to be more innovative (Geldres-Weiss, Uribe-Bórquez, Coudounaris & Monreal-Pérez, 2016). Also, the exporters could benefit from important economies of scale (Malmberg, Malmberg & Lundequist, 2000) and risk reduction due to diversification across several international markets (Kim, Hwang & Burgers, 1993). On the negative side, the exports involve dealing with bigger geographical distances (associated with increased transportation costs), psychic and familiarity disparities in terms of culture, regulations, communication infrastructure, and business practices. Despite the potential positive effect on growth, exporting may represent a very risky venture that can generate losses and affect the long-term survival of a firm. In the cases of very high international expansion, the costs of coordination, information processing and the complexity of management process are prone to offset the positive outcomes of the international development, and are likely to result in net costs (Ellis, 2007; Riding, Orser, Spence & Belanger, 2012). In addition, exporting firms tend to pay higher wages generating supplementary costs (Schank, Schnabel & Wagner, 2010).

The previous literature on the relationship between exports and profitability is quite inconclusive and contradictory. Some of the authors found positive causal effects of exporting on profits (e.g. Fryges & Wagner, 2010; Liargovas & Skandalis, 2010; Temouri, Vogel & Wagner, 2013; Vu, Holmes, Lim, & Tran, 2014; Srithanpong, 2014; Esmeray & Esmeray, 2016), while others claim no effects, negative effects or S-shaped effects (e.g. Vogel & Wagner, 2010; Grazzi, 2011; Wagner, 2012; Temouri et al., 2013; Esen, Simdi & Erguzel, 2016).

One of the first contributions regarding the **positive causal effects** of exporting on profits belong to Fryges & Wagner (2010). The analysis targets the German manufacturing firms, over the period 1999-2004, by using a panel approach. The main findings claim positive premiums for exporters that arises from productivity, capital intensity and other mark-ups of prices over costs. The authors also use a continuous approach to prove that, for regular exports ratios (less that 90 percent and more of the total sales abroad), the exports generate an increase of profits because the excess in productivity is not completely absorbed by the sunk costs.
Similar outcomes are reported by Liargovas & Skandalis (2010), based on a sample of 102 Greek industrial firms. They show that export activities along with other factors, such as company size, location, liquidities or net investments, have a strong statistical significance impact on returns. Temouri et al. (2013) support the same relationship, but just for the case of France. Vu et al. (2014) investigate Vietnam through panel quantile regressions. The authors demonstrate that the export participation has a positive effect on profitability of Vietnam companies. This is valid only for the firms with high profit growth at the higher quantiles, while the effect becomes negative for the firms in the opposite category. The exporters profitability premia is also confirmed by Srithanpong (2014) in Thai manufacturing. He compares four groups of firms: two-way traders (both importers and exporters), only exporters, only importers, and firms that do not trade

internationally. The main conclusion is that being an exporter is mostly and strongly correlated with an increase in sales profit and profit rate.

Esmeray & Esmeray (2016) analyse the correlation between exports and profit in both sense, for the largest 500 of Turkish companies, by using a dataset that covers the period 1993-2014. Their findings support the idea of two-way correlation between exports and profit, but the effect of exports on profit being more powerful than vice-versa.

Several studies have found no evidences of a positive relationship between exports and profitability, finding no proofs for any relationship, negative statistic relationships or non-linear ones.

For instance, Wagner (2012) uses the Germany manufacturing firms as Fryges & Wagner (2010), but end up with different results. Based on a unique blended representative data, created through merging the information from surveys performed by Statistical Officers with the administrative data collected by the Tax Authorities, the author highlights the absence of any significant correlations between international trades and profitability. The study includes three categories of participants: exporters, importers and two-way traders. The conclusion shows that the extra productivity generated by exports is "eaten" by the extra cost of selling in foreign markets.

Grazzi (2011) finds similar results by following both non-parametric and regression techniques, for a sample of around 130.000 Italian companies over 1989-2004. The author fails to find evidence of a higher profitability for exporters compared with non-exporters.

Mixed results are claimed by Temouri et al. (2013), who uses identically specified empirical models to analyse the exports' impact on profitability in three countries: France, Germany and United Kingdom. The relation between exports and profitability seems to be different in those countries. The companies which export services are less profitable that non-exporters in Germany, more profitable in France, and similar with the non-exporters in United Kingdom. No positive causal effect of exports on profit has been found.

A negative impact of exports on profitability is revealed by Esen et al. (2016), based on a sample of 107 manufacturing firms listed on Istanbul Stock Exchange, over the period 2009-2014. They stress that the negative impact is driven by the additional production and marketing costs claimed by the entrance and consolidation on foreign markets.

Non-linear interaction between exports and profitability is found by Vogel & Wagner (2010) in a study dedicated to the German firms in business services industry. Contrary to manufacturing German firms, for this sector the results are different and non-linear. At the beginning, it seems that the exports have a linear negative impact on profitability because the productivity premium is overwhelmed by extra-costs associated with exports. After controlling for firm characteristics and unobserved firm characteristics, the relationship between exports and profitability turns in an S- shaped one. Initially, when the firms start to export having only a small part from the total sales represented by exports, their profitability will decline due to the extra costs associated with the export activities. During the time, the profit rises up to the level earned in national market as the share of exports in total sales increases.

Several research questions have not been yet or partially been answered appropriately in the literature.

The **first gap** is the missing of studies that investigate the sensitivity of exporters' financial performances during the crises. In such periods, certain industries have significant particularities in terms of demand elasticity according to the contingent theory (Hofer, 1975; Zeithaml, "Rajan" Varadarajan & Zeithaml, 1988). The cosmetic industry is one of them. Normally, the financial performances during the turbulences should fall but the cosmetics seem to be an exception through its so-called the 'lipstick effect'. The recessions appear to increase womens' spending on

beauty products because the consumers under pressure still want to feel good and to lift their spirit (Hill et al., 2012; Ling, 2012; Murgea, 2012). The effect, coined in 2008 by the head of the cosmetic group Estée Lauder, Leonard Lauder, as the „lipstick effect", seems to be driven by two important determinants: the mood enhancing (Arnold & Reynolds, 2003; Manchanda, 2012) and the mating desires (Buss, 1990; Durante et al., 2011; Hill et al., 2012; Li, Balley, Kenrick & Linsenmeier, 2002; Sabini & Silver, 2005). Although the term is relatively new, the effect seems to be registered long time ago, during the Great recession, cosmetic sales increasing by 25% in that period.

Especially in the women case, shopping is perceived as a relaxing or leisure activity being helpful to overcome the identity problems (Manchanda, 2012). In this way, through hedonic consumption, the consumer just simply tries to feel better (Arnold & Reynolds, 2003).

Therefore, we expect that the impact of exports on financial performances of cosmetic companies to be insensitive to economic turbulences. More precisely, the crisis does not offset the positive effect of exports on performance because the potential decrease in demand determined by the liquidity reduction is compensated by the 'lipstick effect'.

The **second gap** is the missing of studies that discriminate between producers and distributors. The good performances determined by the higher productivity are more prone to occur in the producers' case, since here the learning process and innovation are stronger.

Hence, we suppose that the positive impact of exports on the performance should be less intense for the distributors compared with the producers. Additionally, different kinds of shocks affect in a different manner the manufacturers and distributors (e.g. the introduction of new regulation to protect consumers' health, the decrease of purchasing power, or the shortages in money supply due to the financial turmoil). Therefore, an aggregate view including both categories could lead to fallacious results.

The third gap is the missing of analyses that consider industry specific regulations. Due to its connection with the consumers' health, the cosmetic industry is prone to be affected by different regulations. They can ban the use of raw materials with high level of toxicity, or specific manufacturing tests or methods dangerous for humans or animals (i.e. the case of animal tested products). The effects of these regulations are more pronounced for manufacturers than distributors. The change in the raw materials generates several costs, starting with potential supplementary costs of substitutable raw material to innovation costs (i.e. create new recipes), investment costs (i.e. replace of equipment) and costs associated with the stock of products unsold.

Moreover, there is a time lag when the regulations are enforced. In that period, the distributors could be reluctant to buy anymore the products that contain future banned ingredients, the manufacturers remaining with unsold stocks of products.

Based on this general framework, the paper analyses the influence of exports on financial performances in the French cosmetic industry by fixing aforementioned literature gaps.

3. Data and methodology

3.1. Data

The impact of exports on the financial performances of the active companies from the French cosmetic industry is analysed based on a panel model approach. We consider 704 active companies, which officially provided financial information in due time for the French tax authorities. The span is divided into two samples, covering the period 2003-2015.

The first sample includes companies from the production sector (371 companies), while the second one contains companies from the distribution one (333 companies). The initial database had 1415 French cosmetic firms, for the period 2001-2015. By removing all the companies and years with missing data, we fixed 704 firms, over 2003-2015, as a final dataset. The source of data is Diane interface for France, Orbis platform database of Bureau van Dijk (2017), excepting the climate and regulation dummy variables.

The dependent variable describes the financial performance. For robustness, we consider two such variables: return on assets (ROA) and return on capital employed (ROCE). ROA measures the company's profitability related to its total assets, while ROCE denotes the company's profitability and the efficiency of employed capital. ROA is a good choice to express the financial performance (e.g. Gomes & Ramaswamy, 1999; Hitt, Hoskisson & Kim, 1997; or Lu & Beamish, 2004). ROCE is added as alternative, this rate being related to the capital employed instead of the assets, as in the case of ROA.
The interest variable is the exports (E), as a key driver of globalization process, representing the volume of exports in Euros. We choose to work in level in order to catch the real export magnitude between small and big companies. Not at least, this approach allows to avoid the business cycle trend which could be captured by considering the dependent variable as a share of sale measurements. The exports are widely used in the literature to express the international openness, the trade flows being the main common feature during the two waves of globalization (i.e. before World War I, and from 1960s to present, respectively), as Bairoch & Kozul-Wright (1998), Baldwin & Martin (1999) or Williamson (2002) state. According to the first assumed hypothesis, a positive sign of variable is expected.

A set of control variables is also considered to isolate the effect of the interest one: capital intensity, credit period, debt period, debt structure, firm dynamic size, economic climate and regulation.
Capital intensity (EC) is captured via the level of extraordinary charges, the variable denoting the fixed capital investments. On the one hand, the investments in plants and equipment raise the worker productivity and accelerate the inventory flows, improving the company financial performances, as Han (2009) highlights. Not at least, according to Gaur, Fisher & Raman (2005), this variable can be also considered a good proxy for the inventory status. On the other hand, Hendricks & Singhal (2005) show that the investments can erode the profitability on the short term, as results of high expenditures and lagged effects over time. Hence, we expect the capital intensity has positive or negative influence on financial performances.
Credit (CRP) and debt periods (DP) are two variables which express the payment terms related to the commercial relationships with customers and providers, respectively. The management of those commercial payment terms influences the liquidity, with direct impact on company financial performances.

According to Tang (2014), relaxing the credit period term means many aspects: '(i) the decreases in the operational costs, (ii) the increases of sales, (iii) the emerging of implicate rate on return and (iv) the establishing of stable commercial relationships with buyers' (p. 2). Conversely, a compression of credit time period can gravely affect the payment balance. Credit period can have both positive and negative effect on financial performance.

Debt period seems to have a positive impact on financial performances. Tang (2014) argues that the 'trade credit can be more accessible, especially over the period of a tight monetary policy' (p. 3), reducing the operational costs with a positive impact on financial performances.
Debt structure (DEBT) offers a general framework of the company regarding the debt status, being captured via a synthetic rate as report between total liabilities and total assets. The positive influence of debt structure on financial performance is explained either by tax deductions on interest expenses which raise the returns via the leverage (Modigliani & Miller, 1958) or by higher performance of management forced to change its own incentive structure (Grossman & Hart, 1986). Conversely, a different opinion is sustained by Smith & Warner (1979) or Majumdar & Chhibber (1999). They argue a high level of debt increases the risks and exposes the company to failure, the management not being able to deal with such complex challenges. We expect a positive or negative sign for debt structure variable.
Firm dynamic size (SIZE) represents the annual absolute change of natural logarithm of total assets, catching not only the magnitude of firms in term of assets but also their expanding capacity. The variable is widely used in the literature, representing the company's resources potential (e.g. Mehran, 1995; Rumyantsev & Netessine, 2007; Han, 2009; or Dang & Li, 2015). We choose the absolute change to capture the annual growth of assets and also to avoid any endogeneity issue in respect to ROA. Mehran (1995) finds a negative correlation between financial performances and total assets, explaining that the small companies find easier high growth opportunity. Contrary, Dang & Li (2015), and Rumyantsev & Netessine (2007) claim a positive connection. The large companies exhibit economies of scale in respect to products and negotiations on market, improving the financial performances. Hence, the positive or negative sign is expected for the firm dynamic size.

Economic climate (CLIMATE) is a dummy variable, which discriminates between pre-crisis, and crisis and post-crisis periods, respectively. The variable is introduced to control for economic climate circumstances as our span covers also the last world economic turbulences. The economic climate dummy variable has value 0 for the period 2003-2006 (pre-crisis) and value 1 for years 2007-2015 (crisis and post-crisis). Different from many other industries profoundly affected by financial crises during the time, recessions appear to increase womens' spending on beauty products because the consumers under pressure still want to feel good and to lift their spirit (Hill et al., 2012; Ling, 2012; Murgea, 2012). In this context, it is expected the crisis and post-crisis period to have a positive or negative impact on financial performances.
Regulation (REG) is also a dummy variable, denoting the major European regulation adjustment in the cosmetic industry. According to Regulation (EC) N° 1223/2009, which entered into force in July 2013, the European Union cosmetic producers must follow specific requirements in the preparation of products. The regulation dummy has value 0 for 2003-2012, and value 1 for 2013-2015. A positive sign is expected for the pre-regulation period and a negative one for post-regulation period.
Detailed information about variables are presented in Table A1, in Appendix.

Insert here Table A1

All explanatory variables are treated as elasticity. Therefore, excepting the variables already expressed as percentages, the exports, capital intensity, credit period and debt period are expressed in Euros, finally appearing in natural logarithm form (i.e. Ln_E, Ln_EC, Ln_CRP and Ln_DP, respectively). Firm dynamic size is the result of logarithm difference of total assets expressed in Euros, as variable SIZE. The stationarity property of variables are tested via the

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Levin-Lin-Chu adjusted t*, Im-Pesaran-Shin W-stat, ADF-Fisher Chi-square and PP-Fisher Chi-square tests, with constant only (i.e. we assume the trend inconsistency, as the series have only several years). A matrix of correlations is also performed in order to check the multicollinearity implications.

3.2. Methodology

The impact of the exports on the active companies' financial performances is analysed based on a panel model approach, for production and distribution sectors, respectively. We assume those sectors to have different elasticity reactions in terms of financial performances under the shocks of trade openness. Herein, we suspect the distribution sector to be more sensitive than the production one, the international trade disturbances being firstly absorbed by the distribution channels. In the same time, we also expect a sort of rigidity of distribution sector, according to the so called 'lipstick effect'. The 'lipstick effect' supposes that during the economic crisis, the consumers will be more willing to buy less costly luxury goods. In this case, instead of buying different expensive goods, the woman will focus on expensive lipstick or luxury perfumes.
The producers also have a prompt reaction, but under the regulation changes. Not at least, this split helps us to also deal with the so-called 'industry effects', given by the concentration levels and the entry barriers, as Waldman & Jensen (2006) claim.
The empirical strategy comprises both static and dynamic panel estimations, for each of the two sectors, by using for robustness both ROA and ROCE rates.

(i) The static approach includes classical OLS models, fixed- and random-effects models, and instrumental variable estimators. A preamble with naive OLS models with different polynomial orders of Ln_E is employed in order to check for any non-linearity between exports and financial performances.
The extended classical OLS panel model is as follows:

$$Y_{it} =_{\alpha} + \beta_1 X_{it} + \sum_{k=1}^{n} \beta_k X'_{k,it} + \varepsilon_{it} \quad (1)$$

where Y reveals the dependent variable (ROA, ROCE), a is the intercept, $\beta_{l,k}$ are the slopes of independent variables, X reflects the interest variable (Ln_E), X' is the control variable k by n type (Ln_EC, Ln_CRP, Ln_DP, DEBT, SIZE, CLIMATE and REG), i denotes the company, t is the time, while ε_{it} represents the error term, which varies over both country and time.
The panel may have homogeneity issue. Often, such estimator suffers from unobservable factors that are correlated with the variables included in the regression. In this context, the fixed-effects panel model is a good solution to eliminate the omitted variable bias. Hence, the estimator evidences the disparities between cross-sections and deals with unobservable heterogeneity. It is as follows:

$$Y_{it} = \alpha_i + \beta_1 X_{it} + \sum_{k=1}^{n} \beta_k X'_{k,it} + \varepsilon_{it} \quad (2)$$

On the other hand, Allison & Waterman (2002), and Albulescu & Tamasila (2016) argue that the fixed-effects panel does not control for all stable covariates. As in our case the number of cross-sections is higher than the number of periods (N>T), the random effects panel model can offer more consistent estimation. The random-effects panel model handles the intercepts not as fixed, but as random parameters, and has the following form:

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$$Y_{it} = \alpha + \beta_1 X_{it} + \sum_{k=1}^{n} \beta_k X'_{k,it} + (\nu_i + \varepsilon_{it}) \quad (3)$$

where ν_i denotes a standard random variable with zero mean.
F-test and Hausman test are performed to discriminate between OLS and fixed-effects models, and fixed-effects and random-effects models, respectively.
We also suspect the existence of a reverse causality between the dependent variable (ROA, ROCE) and the interest explanatory one (Ln_E). This endogeneity issue deserves further investigations. Therefore, we follow classical instrumental variable estimator (IV model) in order to deal with endogeneity, by using as instruments the lags of Ln_E. The Sargan-test is employed to verify if the instruments are well identified. The endogeneity status is tested via the Wu-Hausman, and Durbin-Wu-Hausman tests, respectively. Unfortunately, such group of static models is not consistent under heteroskedastic disturbance. The Pagan-Hall test is performed to check the heteroskedasticity status for IV models.
To clarify heteroskedasticity problem, Baum, Schaffer & Stillman (2003) claim that "if heteroskedasticity is present, the GMM estimator is more efficient than the simple IV estimator, whereas if heteroskedasticity is not present, the GMM estimator is no worse asymptotically than the IV estimator" (p.11). As a result, to overcome the heteroskedasticity presence, a dynamic approach is also employed.

(ii) The dynamic approach comprises GMM models. These estimators control the issue of heteroscedasticity and also fix the bias generated by the use of lagged dependent variable.
The advantages of GMM estimators are highlight by Roodman (2009): "1) "small T, large N" panels, meaning few time periods and many individuals; 2) a linear functional relationship; 3) one left-hand-side variable that is dynamic, depending on its own past realizations; 4) independent variables that are not strictly exogenous, meaning they are correlated with the past and possibly current realizations of the error; 5) fixed individual effects; and 6) heteroskedasticity an autocorrelation within individuals but not across them" (p. 86).
The pioneer work belongs to Arellano & Bond (1991), whose propose a dynamic GMM estimator (GMM-dynamic), with this form:

$$\Delta Y_{it} = \varphi \Delta Y_{it} + \beta_1 \Delta X_{it} + \psi \Delta V x'_{it} + \Delta \nu_i + \Delta \varepsilon_{it} \quad (4)$$

where φ is the coefficient of lagged variable Y, while ψ denotes the coefficient of the vector control variables Vx'. The GMM-dynamic fails under instrument specification, as the lagged levels of regressors are poor instruments for the first-differenced ones.
Therefore, an improved version of GMM-dynamic is developed by Blundell & Bond (1998), called GMM-system estimator. This version follows the level of variables, as in equation (3), for constructing a system with two equations: one differenced and one in levels. Sargan test is calculated to check if the instruments are well identified. Additionally, Hansen's J-test is also performed to check the validity of instruments because in the robust GMM estimations, as in our case, the Sargan test is inconsistent.
Not at least, the Arellano-Bond test for autocorrelation is applied to identify the autocorrelation in residuals. Herein, we focus on the AR(2) test in first differences, because it detects the autocorrelation in levels, as Mileva (2007) emphasizes.

4. Results

The findings of panel unit root tests, for each variable, for both production and distribution sectors, are illustrated in Table A2, in Appendix.

Insert here Table A2

Without any exception, all tests clearly show that the null hypothesis of common unit root process can be rejected at all levels of significance. Hence, our estimations are performed based on stationary series, which is required condition in the time-series domain. As all the series are I(0), this approach allows us to also avoid any implications generated by the co-integration assumption. Moreover, for both production and distribution panels, there are no multicollinearity issues between variables. Tables A3 and A4, in Appendix, reveal that the coefficients of correlation not exceed the level of 0.586 in the case of production sector, and 0.636 in the case of distribution one, respectively.

Insert here Tables A2 and 3

The empirical results for the nonlinear polynomial assumption, for both production and distribution, are presented in the Table A5, in Appendix. Our naïve-OLS scenarios performed by considering different polynomial orders (i.e. from 2 to5) clearly lead to the conclusion that the non-linear polynomial assumption can be rejected for both sectors. The ROA's production scenario validates the 'polynomial order trap', as the coefficients are significant for each superior added order (between orders 2 and 4, in our case).The rest of estimations shows no significance of coefficients up to polynomial order 5, inclusively.

Insert here Table A5

(i) The static estimations are presented in Tables A6 and A7, in Appendix.

Insert here Tables A6 and 7

Table A6 shows the case of production sector. Based on F- and Hausman tests, the findings enforce the fixed-effects models are more appropriate than OLS and random-effects models, for both ROA and ROCE scenarios. In order to deal with endogeneity issues, the IV models are finally considered. Herein, the Sargan tests show that the instruments are well identified. The Wu-Hausman and Durbin-Wu-Hausman tests evidence no endogeneity issue.

The results illustrate that two control determinants are not significant in all scenarios: ln_EC and ln_CRP. The rest of control variables are all quasi-significant. Ln_DP, DEBT, CLIMATE and REG are negatively correlated with ROA and ROCE, while only the SIZE has a positive impact on them. The CLIMATE is not significant in the IV models. The increase of commercial debt period is not a good incentive for financial performances, as well as high levels of debt which increases the risks and exposes the company to failure. Fortunately, the dynamic size of company facilitates good financial performance through the economies of scale. Strong rebound of cosmetic producers' financial performances has been generated by the world economic crisis and European regulation adjustment in the cosmetic industry. The most important result shows the

Ln_E has a significant and positive influence on ROA and ROCE, revealing that cosmetic French production companies can improve their financial performance by exporting more.

The estimations for distribution sector are presented in the Table A7. Both the F- and Hausman tests claim for fixed-effects models. As in the case of production sector, the IV models are finally considered in order to fix the endogeneity issues. The Sargan tests validate that the instruments are well identified, while the Wu-Hausman and Durbin-Wu-Hausman tests find no endogeneity issue. Irrespective of model specification, the ln_EC, ln_CRP, CLIMATE and REG are not significant, for both return rates The Ln_DP and DEBT remain significant but with a negative sign in respect to ROA and ROCE. The SIZE is also significant but positively correlated with financial performance rates. The distribution companies react similarly on exports as producers, the openness being an optimal choice to enhance good financial performances. As a particularity, the crisis and European regulation seem not to play a crucial role considering the performances of the distribution companies, validating the rigidity of demand in the cosmetic market.
Unfortunately, excepting the ROA in the distribution case, all IV models suffer from heteroscedasticity, as the Pagan-Hall test claims. Hence, dynamic panel models should be considered to fix the issue.

(ii) The dynamic estimations are illustrated in Table 8, in Appendix.

Insert here Table A8

In all GMM-system models employed with robust standard errors, if we admit the presence of heteroscedasticity, the Sargan and Hansen tests reveal the instruments are well identified. Moreover, the AR(2) tests in first differences state no autocorrelation in residuals.

The GMM-system models for production sector show that the exports remain a good option to improve the ROA and ROCE rates. Herein, the SIZE continues to have a significant and positive impact on financial performances, while the REG is negatively related to them. Only for production ROA scenario, the Ln_EC is significant, with a positive sign. The rest of control variables are not conclusive. Overall, the results show that the cosmetic French producers achive better financial performances if they export more, especially when they obtain economies of scale. Capital intensity seems to erode the profitability on the short term, being destructive for performance. Not at least, the cosmetic regulation adjustments have also a distortive effect on financial vectors, generating a strong elastic reaction.

The case of distribution sector is not so different. The exports are still the best choice to perform better in financial terms, for both ROA and ROCE ratios. The control determinants are not significant in all scenarios. Only in the case of ROA, the Ln_EC and DEBT are significant but negatively connected with ROA. The SIZE is also significant, with a positive sign. The exports play a major role for financial performances for French cosmetic distribution companies, with the support of the economies of scale, under a strict control of investments and debts.

Our results confirm the positive linear impact of the exports on financial performances for both French cosmetic producers and distributors, supporting our assumed hypotheses. Hence, we also reinforced the findings of Grazzi (2011), Fryges & Wagner (2010), Liargovas & Skandalis (2010), and Vu et al. (2014). We are in dissonance with the rest of contributions, which claim no connection between exports and financial performances (Temouri et al., 2013; Vogel & Wagner,

2010; Wagner, 2012), as we used a panel approach with different estimators, by including only the cosmetic French companies over 2003-2015.

5. Conclusions

The word cosmetic market is indissoluble related to the French cosmetic industry. The French cosmetic companies play a crucial role in this market, irrespective if they are producers or distributors. Over the last decades, the international trade openness rapidly extended on the word, the exports in the beauty industry being no exception.

The main results show that the exports represent a good incentive in the French cosmetic industry, both for cosmetic producers and distributors. More openness improves the financial performances of those companies since a linear positive correlation between exports and financial performance vectors has been found. Herein, the companies exploit market imperfections across borders and free-flow of knowledge, reducing the costs. We find that the big cosmetic companies, which reach the economies of scale, perform better. Besides that, the strategy of investment is important for both producers and distributors, while the debt management plays an important role only for the distributors. The cosmetic producers are more sensitive to the regulation changes compared with the distributors, the effect being propagated with time-lag on the distribution channel. The producers firstly receive the regulation shocks as such changes generally refer to the cosmetic substance composition.

The economic crisis did not generate notable disturbances over the cosmetic market, as this market exhibits a sort of rigidity in respect to the purchasing power, validating the 'lipstick effect'. Europe, United States of America, Canada and Asia are the main targeted markets, with great and stable purchasing power potential. The major part of the French cosmetic actors focus on the luxury classes of perfumes, cosmetics, dermo pharmacy or niche products. Usually, under a market shock, the producers stop the production until the distributors finish their existing stocks. Hence, the impact of such an event cannot be quickly visible in sales.
Our finding also claims that the economic crisis and cosmetic regulation adjustments are not conclusive in the cosmetic distribution channel, as this is very heterogeneous: specialised retailers, big shops, perfumeries, tax-free shops, internet online etc.

Important policy implications for French cosmetic industry regarding the financial performances arise. The big producers must pay attention especially to the regulation adjustments, while the small ones should also be preoccupied to reach the economies of scale. The producers should be focus especially on the investment policies. For the distributers, an optimal management of investments and debts is crucial to improving their financial performance vectors.
The main policy implication is related to the international trade openness. Hence, in order to register high financial performances, it is required for the French cosmetic companies to export more. Finally, the partners bank of exporters should reduce the attention for the industry's risk exposure, as the crisis do not significantly affect the financial performances of those companies.

References

Albulescu CT, Tamasila M (2016). Exploring the role of FDI in enhancing the entrepreneurial activity in Europe: a panel data analysis. *International Entrepreneurship and Management Journal*. 12(3): 629-657.

Allison PD, Waterman RP (2002). Fixed-effects negative binomial regression models. *Sociological Methodology*. 32(1): 247-265.

Arellano M, Bond S (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies*. 58(2): 277-297.

Arnold M, Reynolds KE (2003). Hedonic shopping motivations. *Journal of Retailing*. 79(2): 77-95.

Baldwin R, Martin P (1999). Two waves of globalisation: superficial similarities, fundamental differences', *NBER Working Paper* No. 6904.

Bairoch P, Kozul-Wright R (1998). Globalization myths: some historical reflections on integration, industrialization and growth in the world economy. In R. Kozul-Wright and R.

Rowthorn (ed). Transnational corporations and the global economy. Palgrave Macmillan: UK.

Baum CF, Schaffer ME, Stillman S (2003). Instrumental variables and GMM: estimation and testing. *The Stata Journal*. 3(1): 1-31.

Bernard AB, Jensen JB (1995). Exporters, jobs, and wages in US manufacturing: 1976-1987. Brookings papers on economic activity. *Microeconomics*. 1995(1): 67-119.

Blundell R, Bond S (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*. 87(1): 115-143.

Bureau van Dijk (2017). Orbis platform database of Bureau van Dijk, accessed in January 2017.

Buss DM (1990). Unmitigated agency and unmitigated communion, An analysis of the negative components of masculinity and femininity. *Sex Roles*. 22: 555-568.

Campi M, Dueñas M, Li L, Wu H (2018). Diversification, economies of scope, and exports growth of Chinese firms. arXiv:1801.02681v2.

Dang C, Li F (2015). Measuring firm size in empirical corporate finance. *Mimeo*, University of Western Ontario.

Durante KM, Griskevicius V, Hill SE, Perilloux C, Li NP (2011). Ovulation, female competition, and product choice, Hormonal influences on consumer behaviour. *Journal of Consumer Research*. 37, 921-934.

Ellis PD (2007). Paths to foreign markets: does distance to market affect firm internationalisation? *International Business Review*. 16(5): 573-593.

Esen S, Simdi H, Erguzel OS (2016). The effect of international trading activities of firms on their financial structure. *International Business Research*. 9(6): 1-9.

Esmeray A, Esmeray M (2016). The Relationship Between Profit and Export Performance Revisited: Evidence from Turkish Companies. *International Journal of Economics and Financial Issues*. 6(3): 1035-1037.

Foster L, Haltiwanger J, Syverson C (2008). Reallocation, firm turnover, and efficiency: Selection on productivity or profitability? *The American economic review*. 98(1): 394-425.

Fryges H, Wagner J (2010). Exports and profitability: first evidence for German manufacturing firms. *The World Economy*. 33(3): 399-423.

Gaur V, Fisher ML, Raman A (2005). An econometric analysis of inventory performance in retail services. *Management Science*. 51(2): 181-194.

Geldres-Weiss V, Uribe-Bórquez CT, Coudounaris DN, Monreal-Pérez J (2016). Innovation and experiential knowledge in firm exports: Applying the initial U-model. *Journal of Business Research*. 69(11): 5076-5081.

Girma S, Greenaway A, Kneller R (2004). Does exporting increase productivity? A microeconometric analysis of matched firms. *Review of International Economics*. 12(5): 855-866.

Gomes L, Ramaswamy K (1999). An empirical examination of the form of the relationship between multinationality and performance. *Journal of International Business Studies*. 30(1): 173-187.

Grazzi M (2011). Export and firm performance: Evidence on productivity and profitability of Italian companies. *Journal of Industry, Competition and Trade*. 12(4): 413-444.

Grossman SJ, Hart OD (1986). The costs and benefits of ownership: A theory of vertical and lateral integration. *Journal of Political Economy*. 94(4): 691-719.

Han C (2009). The impact of globalization on inventory and financial performance: a firm-level and industry-level analysis. PhD Thesis, University of Maryland Libraries, University of Maryland.

Hendricks KB, Singhal VR (2005). Association between supply chain glitches and operating performance. *Management Science*. 51(5): 695-711.

Hill SE, Rodeheffer CD, Griskevicius V, Durante K, White AE (2012). Boosting beauty in an economic decline, mating, spending, and the lipstick effect. *Journal of personality and social psychology*. 103(2): 275-291.

Hitt M, Hoskisson R, Kim H (1997). International diversification: Effects on innovation and firm performance in product diversified firms. *Academy of Management Journal*. 40(4): 767-798.

Hofer C (1975). Toward a Contingency Theory of Business Strategy. *The Academy of Management Journal*. 18(4): 784-810.

Joo S-H., Pak M-S (2017). Empirical Analysis of How Risk Management by Korea's Exporting Companies Affects Export Performance. *Journal of Korea Trade*. 21(4): 324-348.

Jones G (2011). Globalization and beauty, a historical and firm perspective. *EurAmerica*. 41(4): 885-916.

Kim W, Hwang P, Burgers W (1993). Multinationals' diversification and the risk-return trade-off. *Strategic Management Journal*. 14(4): 275–286.

Li NP, Balley JM, Kenrick DT, Linsenmeier JA (2002). The necessities and luxuries of mate preferences, testing the trade-offs. *Journal of Personality and Social Psychology*. 82(6): 947-955.

Ling Q (2012). Theory and empirical research on cultural consumption in China, Lipstick Effect. *GSTF Business Review (GBR)*. 2(2): 115-119.

Liargovas P, Skandalis K (2010). Factors affecting firm competitiveness: The case of Greek industry. *Global Business & Management Research*. 2(2): 184-197.

Lu J, Beamish P (2004). International diversification and firm performance: the S-curve hypothesis. *Academy of Management Journal*. 47(4): 598-609.

Lundvall BÄ, Johnson B (1994). The learning economy. *Journal of Industry Studies*. 1(2): 23-42.

Majumdar SK, Chhibber P (1999). Capital structure and performance: evidence from a transition economy on an aspect of corporate governance. *Public Choice*. 98(3): 287-305.

Malmberg A, Malmberg B, Lundequist P (2000). Agglomeration and firm performance: economies of scale, localisation, and urbanisation among Swedish export firms. *Environment and Planning A*. 32(2): 305-321.

Manchanda R (2012). A comparative study of compulsive buying behaviour between working and non-working women. *Pragyaan, Journal of Management*. 10(1): 1-9.

Mehran H (1995). Executive compensation structure, ownership, and firm performance. *Journal of Financial Economics*. 38(2): 163-184.

Mileva E (2007). Using Arellano-Bond Dynamic Panel GMM Estimators in Stata, Online Tutorial with Examples using Stata 9.0 (xtabond and xtabond2).

Modigliani F, Miller HM (1958). The Cost of Capital, Corporation Finance and the Theory of Investment. *American Economic Review*. 48(3): 261-297.

Murgea A (2012). Lipstick effect in Romania, propensity to buy cosmetics and stock market evolutions. *Annales Universitatis Apulensis, Series Oeconomica*. 14(2): 512-525.

Porter ME (2011). Competitive advantage of nations: creating and sustaining superior performance. Simon and Schuster: New York.

Roberts MJ, Tybout JR (1997). The decision to export in Colombia: an empirical model of entry with sunk costs. *The American Economic Review*. 87(4): 545-564.

Riding A, Orser BJ, Spence M, Belanger B (2012). Financing new venture exporters. *Small Business Economics*. 38(2): 147-163.

Roodman D (2009). How to do xtabond2: an introduction to difference and system GMM in Stata. *The Stata Journal*. 9(1): 86-136.

Rumyantsev S, Netessine S (2007). What can be learned from classical inventory models? A cross-industry exploratory investigation. *Manufacturing & Service Operations Management*. 9(4): 409-429.

Sabini J, Silver M (2005). Gender and jealousy, stories of infidelity. *Cognition & Emotion*. 19(5): 713-727.

Schank T, Schnabel C, Wagner J (2010). Higher wages in exporting firms: self-selection, export effect, or both? First evidence from linked employer-employee data. *Review of World Economics*. 146(2): 303–322.

Smith CW, Warner JB (1979). On financial contracting: an analysis of bond covenants. *Journal of Financial Economics*. 7(2): 117-161.

Srithanpong T (2014). Exports, imports, and profitability in Thai manufacturing: Evidence from establishment-level analysis. *International Business Research*. 7(12): 77-91.

Tang Y (2014). Trade credit and profitability in small and medium enterprises, 3rd IBA Bachelor Thesis Conference, July 3, Enschede, The Netherlands.

Temouri Y, Vogel A, Wagner J (2013). Self-selection into export markets by business services firms–Evidence from France, Germany and the United Kingdom. *Structural Change and Economic Dynamics*. 25: 146-158.

Unnikrishnan L, Prasad R (2016). The impact of globalization on the perception of beauty among South Indian women. Advances in Computing, Communications and Informatics (ICACCI), 2016 International Conference on IEEE, 1487-1495.

Vogel A, Wagner J (2010). Exports and Profitability – First Evidence for German Business Services Enterprises. *Applied Economics Quarterly*. 56(1): 7-30.

Vu H, Holmes M, Lim S, Tran T (2014). Exports and profitability: a note from quantile regression approach. *Applied Economics Letters*. 21(6): 442-445.

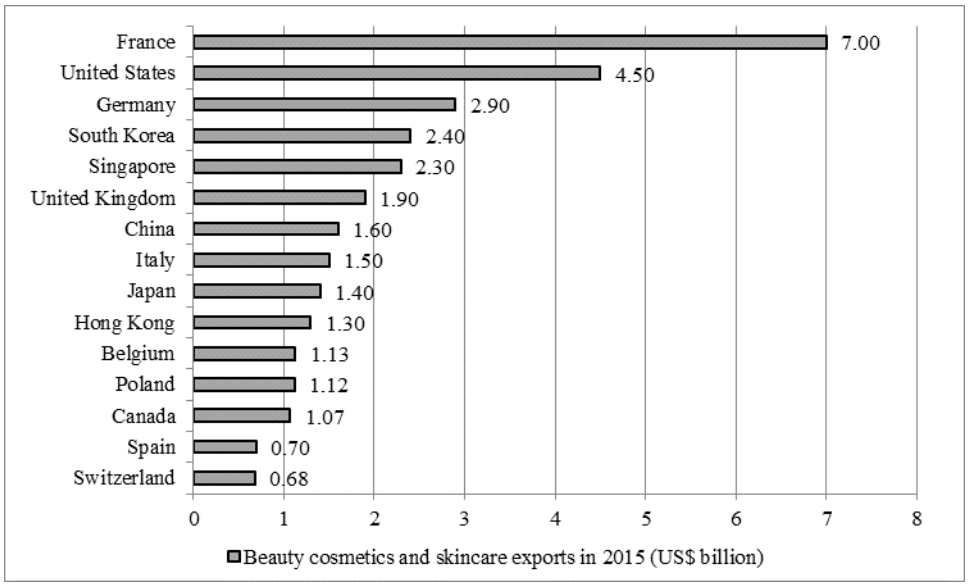
Waldman DE, Jensen EJ (2006). Industrial Organization, 3rd Edition, Pearson Education, Inc.: Boston.

Wagner J (2012). Exports, imports and profitability: First evidence for manufacturing enterprises. *Open Economies Review*. 23(5): 747-765.

Williamson J (2002). Land, labor, and globalization in the third world, 1870-1940. *The Journal of Economic History*. 62(1): 55-85.

Yan Y, Bissell K (2014). The globalization of beauty: how is ideal beauty influenced by globally published fashion and beauty magazines? *Journal of Intercultural Communication Research*. 4(3): 194-214.

Zeithaml VA, Rajan Varadarajan P, Zeithaml CP (1988). The contingency approach: its foundations and relevance to theory building and research in marketing. *European Journal of Marketing*. 22(7): 37-64.



Source: performed based on International Trade Center (2017).

Figure 1 - Beauty cosmetics and skincare exports distribution

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Appendix

Table A1 - Description of variables

Variable	Description	Unit	Expected sign
ROA	Return On Assets - the rate is calculated by dividing the net incomes by total assets.	%	
ROCE	Return On Capital Employed - the rate is the report between the earnings before interest and tax (EBIT) and the capital employed.	%	
E	Exports - the indicator reveals the volume of total exports in absolute value.	Euros	+/-
EC	Capital intensity - the indicator reveals the volume of total extraordinary charges in absolute value.	Euros	+/-
CRP	Credit period - the indicator denotes the number of payment days in the commercial relationships with the customers.	Days	+/-
DP	Debt period - the indicator shows the number of payment days in the commercial relationships with the providers.	Days	+
DEBT	Debt structure - the rate is calculated by dividing the total liabilities by total assets.	%	+/-
SIZE	Firm dynamic size - the annual change in the volume of natural logarithm of total assets	Euros	+/-
CLIMATE	Dummy variable, which takes value 0 for 2003-2006 (pre-crisis period) and value 1 for 2007-2015 (crisis and post-crisis periods).	0/1	- for 0/ + for 1
REG	Dummy variable, which takes value 0 for 2003-2012 (pre-regulation period) and value 1 for 2013-2015 (post-regulation period).	0/1	+ for 0/ - for 1

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Table A2 - Panel unit root tests

Tested variable	Levin-Lin-Chu adjusted t*	Im-Pesaran-Shin W-stat	ADF-Fisher Chi-square	PP-Fisher Chi-square
		Production		
Ln_E	-26.02***	-5.26***	667.7***	986.2***
Ln_EC	-13.39***	-5.84***	694.3***	1299.5***
Ln_CRP	-13.17***	-5.36***	967.2***	1539.1***
Ln_DP	-15.69***	-4.96***	973.7***	1384.3***
DEBT	-94.73***	-10.7***	969.1***	1302.9***
SIZE	-29.95***	-14.9***	1450.4***	2792.4.2***
		Distribution		
Ln_E	-22.01***	-3.98***	644.7***	996.2***
Ln_EC	-22.01***	-8.91***	816.7***	1225.5***
Ln_CRP	-11.33***	-2.50***	748.2***	1355.8***
Ln_DP	-14.14***	-3.80***	821.1***	1239.3***
DEBT	-19.16***	-3.30***	802.8***	991.4***
SIZE	-19.42***	-14.69***	1345.79***	2792.7***

(a) *, **and *** reveals stationarity significance at 10, 5 and 1%, respectively;
(b) For all tests, the null hypothesis assumes there is a common unit root process.

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Table A3 - Matrix of correlations - production sector

Correlation	ROA	ROCE	L_E	L_EC	L_CRP	L_DP	DEBT	SIZE	CLIMATE	REG
ROA	1.000000									
ROCE	0.585874	1.000000								
L_E	0.098397	0.086083	1.000000							
L_EC	0.032718	0.035021	0.474631	1.000000						
L_CRP	-0.172354	-0.078312	0.069496	-0.020329	1.000000					
L_DP	-0.347726	-0.167646	-0.014364	-0.041790	0.550994	1.000000				
DEBT	-0.251846	-0.130559	-0.039596	-0.013675	0.310039	0.544409	1.000000			
SIZE	0.142492	0.150837	0.024706	-0.028816	0.094908	0.073882	0.022576	1.000000		
CLIMATE	-0.049236	-0.064463	0.060986	0.036551	-0.066642	-0.038224	-0.032900	-0.077367	1.000000	
REG	-0.037141	-0.044881	0.062687	0.044485	-0.059302	-0.038276	-0.066972	-0.067471	0.298566	1.000000

Table A4 - Matrix of correlation - distribution sector

Correlation	ROA	ROCE	L_E	L_EC	L_CRP	L_DP	DEBT	SIZE	CLIMATE	REG
ROA	1.000000									
ROCE	0.635263	1.000000								
L_E	0.079418	0.026648	1.000000							
L_EC	0.025335	-0.017767	0.598385	1.000000						
L_CRP	-0.146095	-0.083320	0.163831	0.175735	1.000000					
L_DP	-0.367106	-0.209229	0.008791	0.100136	0.463284	1.000000				
DEBT	-0.290562	-0.156360	-0.056943	0.034772	0.263194	0.593865	1.000000			
SIZE	0.200969	0.143422	-0.011218	-0.027743	0.088600	0.111648	0.033602	1.000000		
CLIMATE	-0.019610	-0.033363	0.053990	0.012643	-0.124989	-0.053977	-0.078571	-0.042880	1.000000	
REG	-0.001682	-0.034649	0.074204	0.041446	-0.059656	-0.032963	-0.096588	-0.024525	0.312915	1.000000

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Table A5 - Empirical results for nonlinear assumption – production and distribution

Dependent variable					
	Production		Distribution		
Independent variables	ROA	ROCE	ROA	ROCE	Expected sign
	Model				
	Naïve-OLS	Naïve-OLS	Naïve-OLS	Naïve-OLS	
	(1)	(2)	(3)	(4)	
Intercept	-8.10**	18.94***	2.77***	12.46***	
	(3.40)	(3.98)	(0.89)	(2.86)	
Ln_E	14.55***	-4.10*	-0.28	-0.75	+/-
	(2.05)	(2.49)	(0.72)	(2.05)	
Ln_E^2	-4.84***	-0.32	0.12	-0.72	+/-
	(0.76)	(0.93)	(0.17)	(0.56)	
Ln_E^3	0.68***	0.32	0.03	0.24**	+/-
	(0.19)	(0.22)	(0.05)	(0.12)	
Ln_E^4	-0.04**	-0.03	-0.007	-0.02	+
	(0.02)	(0.02)	(0.006)	(0.01)	
Ln_E^5	0.001	0.001	0.001	0.001	+/-
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	
R-squared	0.023	0.011	0.013	0.003	
Obs.	4824	4824	4329	4329	
Groups	354	354	333	333	

(a) (…) denotes the standard error;
(b) ***, **, and * show significance at 1, 5 and 10 % level of significance, respectively.

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Table A6 - Empirical results of static panels – production

Dependent variable	ROA				ROCE				
Independent variables	Model								Expected sign
	OLS	FE	RE	IV	OLS	FE	RE	IV	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Intercept	41.3*** (2.47)	32.5*** (4.37)	39.4*** (3.10)	40.4*** (3.24)	90.3*** (10.59)	69.1*** (23.1)	92.4*** (12.21)	75.2*** (12.5)	
Ln_E	0.52*** (0.12)	1.01*** (0.27)	0.45*** *(0.17)*	0.73*** (0.16)	1.87*** (0.50)	-0.74 (1.39)	1.31** (0.60)	2.43*** (0.16)	+/-
Ln_EC	-0.04 (0.11)	0.12 (0.13)	0.07 (0.12)	-0.16 (0.13)	-0.10 (0.48)	0.66 (0.70)	0.21 (0.53)	-0.08 (0.53)	+/-
Ln_CRP	-0.06 (0.50)	1.49** (0.67)	1.80 (0.56)	-4.47 (0.62)	-0.53 (2.12)	-2.14 (3.41)	-0.67 (2.36)	0.06 (2.42)	+/-
Ln_DP	-5.38*** (0.57)	-4.96*** (1.00)	-5.57*** (0.70)	-5.35*** (0.76)	-14.14*** (2.57)	-7.54 (5.66)	-13.4*** (2.95)	-11.9*** (2.98)	+
DEBT	-0.14*** (0.006)	-0.18*** (0.01)	-0.14*** (0.006)	-0.12*** (0.013)	-0.11** (0.05)	-0.36*** (0.11)	-0.14** (0.06)	-0.15** (0.06)	+/-
SIZE	5.55*** (0.83)	4.80*** (0.72)	5.12*** (0.70)	10.85*** (1.60)	29.02*** (3.81)	24.16*** (4.01)	27.07*** (3.73)	33.79*** (6.38)	+/-
CLIMATE	-1.61*** (0.75)	-2.00*** (0.63)	-1.65*** (0.61)	-1.90 (1.28)	-8.26*** (3.14)	-9.98*** (3.24)	-8.63*** (3.03)	-7.22 (4.98)	- for 0/ + for 1
REG	-1.68*** (0.77)	-2.33*** (0.65)	-1.92*** (0.63)	-2.03** (0.83)	-4.95 (3.23)	-7.42** (3.28)	-5.63* (3.10)	-7.72** (3.19)	+ for 0/ - for 1
R-squared	0.358	0.666	0.306	0.352	0.068	0.297	0.055	0.149	
F-test [p-vales]		5.27 (0.00)				1.83 (0.00)			
Hausman test [p-vales]			18.85 (0.01)				15.66 (0.01)		
Number of instruments				2				2	
Sargan test [p-vales]				1.670 [0.196]				0.786 [0.375]	
Wu-Hausman test				0.805 [0.369]				0.105 [0.745]	
Durbin-Wu-Hausman test				0.810 [0.368]				0.105 [0.744]	
Pagan-Hall test				68.52 [0.000]				39.18 [0.000]	
Obs.	4824	4824	4824	4824	4824	4824	4824	4824	
Groups	354	354	354	354	354	354	354	354	

(a) (…) denotes the standard error, while […] is the p-vales;
(b) ***, **, and * show significance at 1, 5 and 10 % level of significance, respectively.

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Table A7 - Empirical results of static panels – distribution

Dependent variable	ROA				ROCE				
Independent variables	Model								Expected sign
	OLS	FE	RE	IV	OLS	FE	RE	IV	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Intercept	47.9*** (2.84)	46.3*** (4.30)	45.7*** (3.32)	42.1*** (3.41)	108.5*** (13.54)	116.3*** (18.05)	116.3*** (14.5)	110.2*** (12.88)	
Ln_E	0.35*** (0.12)	0.72*** (0.24)	0.42*** (0.15)	0.46*** (0.16)	0.75*** (0.24)	-1.34 (1.08)	1.85* (0.48)	0.97* (0.58)	+/-
Ln_EC	0.15 (0.11)	0.19 (0.13)	0.16 (0.11)	0.13 (0.13)	-0.22 (0.28)	-0.02 (0.57)	-0.14 (0.42)	-0.26 (0.47)	+/-
Ln_CRP	1.67*** (0.59)	2.02*** (0.70)	2.28*** (0.61)	0.10 (0.67)	-0.32 (2.67)	-4.03 (3.20)	-2.43 (3.12)	0.17 (2.44)	+/-
Ln_DP	-8.66*** (0.61)	-8.29*** (0.90)	-8.72*** (0.70)	-6.55*** (0.71)	-18.86*** (3.26)	-11.7*** (4.09)	-15.9*** (3.56)	-20.1*** (2.81)	+
DEBT	-0.17*** (0.01)	-0.22*** (0.01)	-0.22*** (0.01)	-0.15*** (0.014)	-0.10* (0.05)	-0.60*** (0.13)	-0.34*** (0.08)	-0.06 (0.06)	+/-
SIZE	14.9*** (1.001)	9.05*** (0.897)	10.9*** (0.85)	22.01*** (1.66)	32.3* (7.50)	09.3*** (5.23)	23.54*** (6.05)	48.43*** (6.27)	+/-
CLIMATE	-0.32 (0.66)	-1.38** (0.55)	-0.85 (0.54)	-0.97 (1.05)	-3.97* (2.10)	-5.69*** (2.10)	-4.80** (1.90)	-6.10 (3.85)	- for 0/ + for 1
REG	-0.60 (0.69)	-1.15** (0.56)	-1.07* (0.55)	-0.32 (0.70)	-4.30** (2.05)	-9.08*** (3.34)	-7.06*** (2.55)	-3.39 (2.59)	+ for 0/ - for 1
R-squared	0.356	0.667	0.311	0.427	0.076	0.477	0.072	0.162	
F-test [p-vales]		6.04 (0.00)				4.88 (0.00)			
Hausman test [p-vales]			90.3 (0.00)				0.00 (1.00)		
Number of instruments				2				2	
Sargan test [p-vales]				0.001 [0.971]				9.963 [0.076]	
Wu-Hausman test				0.019 [0.888]				0.649 [0.420]	
Durbin-Wu-Hausman test				0.019 [0.887]				0.653 [0.418]	
Pagan-Hall test				11.28 [0.256]				30.59 [0.003]	
Obs.	4329	4329	4329	4329	4329	4329	4329	4329	
Groups	333	333	333	333	333	333	333	333	

(a) (…) denotes the standard error, while […] is the p-vales;
(b) ***, **, and * show significance at 1, 5 and 10 % level of significance, respectively.

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Table A8 - Empirical results of dynamic panels – production and distribution

Dependent variable	Production		Distribution		Expected sign
	ROA	ROCE	ROA	ROCE	
Independent variables	Model				
	GMM-SYS	GMM-SYS	GMM-SYS	GMM-SYS	
	(1)	(2)	(3)	(4)	
Intercept	33.1 (24.4)	55.6 (81.9)	23.14 (25.22)	60.1 (106.4)	
Ln_E	1.47*** (0.52)	4.27** (1.80)	1.05** (0.42)	2.42** (1.12)	+/-
Ln_EC	-1.91** (0.97)	-4.80 (3.81)	-1.31* (0.68)	-3.14 (2.05)	+/-
Ln_CRP	1.59 (8.91)	-8.20 (26.4)	6.61 (5.20)	12.65 (14.53)	+/-
Ln_DP	-7.69 (9.09)	1.13 (25.4)	-6.77 (6.79)	-29.48 (27.2)	+
DEBT	-0.01 (0.11)	-0.28 (0.58)	-0.26** (0.12)	0.65 (0.61)	+/-
SIZE	6.69* (3.55)	27.4** (13.7)	7.04* (4.08)	7.26 (10.3)	+/-
CLIMATE	1.39 (1.10)	-7.60 (5.26)	-0.06 (0.88)	1.85 (2.88)	- for 0/ + for 1
REG	-1.90** (0.96)	-11.80*** (3.41)	-0.43 (0.97)	-4.60 (5.05)	+ for 0/ - for 1
Number of instruments	36	36	70	81	
Sargan test [p-vales]	30.08 [0.310]	35.54 [0.126]	73.59 [0.129]	113.58 [0.001]	
Hansen test [p-vales]	18.88 [0.874]	17.99 [0.904]	56.47 [0.640]	52.61 [0.958]	
Arellano-Bond p-vales test for AR(2)	[0.713]	[0.646]	[0.881]	[0.129]	
Obs.	4824	4824	4329	4329	
Groups	354	354	333	333	

(a) (…) denotes the standard error, while […] is the p-vales;
(b) ***, **, and * show significance at 1, 5 and 10 % level of significance, respectively.