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**Performance in distribution systems:
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organizational choices?**

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Performance in distribution systems:

What is the influence of the upstream firm's organizational choices?

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ABSTRACT

This paper studies the performance of distribution networks as the result of a range of organizational choices made by the upstream firm. The analytical part of the paper surveys the vast literature devoted to franchising and to dual distribution. From this framework, several testable propositions are derived, linking the networks performance to the organizational choices. Three complementary criteria of performance are taken into account: the internationalization rate, the expansion rate, the market share. The paper provides evidence that these criteria are empirically related. Thus, a system of simultaneous equations is defined, free of endogeneity relating to the explanatory variables. The estimations on recent French data by means of the three-least squares method provide robust results, and show that the type of distribution network, the number of company-owned units in the network, the type of sector, and the choice to manage several networks simultaneously affect the performance in distribution systems.

Keywords:

Franchising. Organizational choices. Endogeneity. Simultaneous Equations

JEL codes: C31; L14.

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1. Introduction

Organizational forms in distribution systems are the subject of a vast empirical literature on franchise data, and constitute an ongoing issue, as demonstrated by several recent publications (Kosova et al. 2012; Cliquet and Pénard, 2012; Kashyap and Sivadas, 2012; Pénard et al. 2011; Barthélémy, 2011). In line with studies focusing on the influence of the organizational choices on the performance at the network level (initially, over the last ten years: Sorenson and Sorensen, 2000; Shane, 2001; Azoulay and Shane 2001), this paper provides several new empirical results leading to managerial and conceptual implications.

A survey of the recent literature reveals that there is no unique criterion regarding the performance of distribution networks. As showed by Table 1, the empirical dedicated studies over the period 2007-2012 can be classified in three main categories: one category dealing with the financial performances, the other one with the non-financial performances, and a third category of empirical works combining financial and non financial performance criteria.

In the first field relating to the financial performances, Barthélemy (2008) focuses on the impact of the network resources and the governance structure on the financial performance of the chain. This author uses as performance criteria a combination of return on sales (ROS) and return on assets (ROA). Perdreau et al. (2010) study the financial performances (ROA) resulting from plural forms in franchising chains. Taking into account the mean turnover for each network, Chaudey and Fadairo (2010) highlight the positive influence of more constraining contracts for the retailers. Madanoglu et al. (2011) analyze whether franchising units achieve a better financial performance than non-franchising ones.

In the second field, Vasquez (2007) evaluates the impact of the annual growth in retail outlets on the networks performance outcomes. Kidwell et al. (2007) study the influence of

the free riding behaviors on the franchisees performances, and highlight prejudicial effects. Gillis and Combs (2009) provide evidence that the agency theory offers an interesting explanation for firms' franchising decisions and performances. Jeon et al. (2010) measure the franchise success by the number of operating outlets, while Mellewigt et al. (2011) draw attention to the relationship between the performance of franchise systems and the satisfaction of the franchisees and the employee-managers.

A few studies combine both types of criteria. This is the case with Dada and Watson (2011), Grünhagen et al. (2012), Kosova et al. (2012). Dada and Watson (2011) analyze the impact of the franchisor's perception on the entrepreneurial strategy orientations and the performance outcomes. More recently, Grünhagen et al. (2012) focus on the opposing forces relating to standardization and innovation system, and on their result regarding the performance of franchise chains. Kosova et al. (2012) highlight the differences in outcomes between franchised and corporate hotels from data concerning a large multi-chain hotel company. The performance outcomes are measured in terms of prices, occupancy rate and revenues per room.

Table 1
Recent empirical studies dealing with performance in distribution networks (2007-2012)

Year	Author (s)	Dependent Variable	Estimation Method	Analytical Framework
2012	Grünhagen Dada Wollan Watson	Financial and non financial performance	Moderated regression	Managerial orientation
2012	Kosova Lafontaine Perrigot	Financial and non financial performance	Panel data OLS Quantile regression	Agency and other theories of industrial organization
2011	Madanoglu Lee Castrogiovanni	Financial performance	Panel Data	Agency theory Resource scarcity theory
2011	Mellewigt Ehrmann Decker	Non financial (satisfaction)	OLS	Agency theory
2011	Dada Watson	Financial and non financial performance	OLS	Managerial orientation

2010	Jeon Dant Baker	Non financial (number of operating Units)	OLS	Managerial orientation
2010	Chaudey. Fadaïro	Financial (mean turnover)	2 steps Heckman method	Agency theory
2010	Perdreau Le Nadant Clicquet	Financial performance (ROA)	Panel Data	Agency theory Resource scarcity theory
2009	Gillis Combs	Non financial (propensity to franchise)	OLS	Agency theory
2008	Barthélemy	Financial performance (ROA, ROS)	OLS Tobit	Agency theory Resource scarcity theory
2007	Vazquez	Non financial (percentage of franchised outlets)	OLS	Agency theory Resource scarcity theory
2007	Kidwell Nygaard Silkaset	Non financial (perceived performance)	Structural model	Agency theory

Our study takes place in the second field of this empirical literature, and values networks performance with non-financial variables. The originality of our approach is to use three different and complementary criteria as indicators of the same latent variable, namely the distribution networks performance. More precisely, in this paper, the performance of distribution networks is measured with: the market share, the expansion rate, and the internationalization rate.

The paper demonstrates the empirical relationships between these performance criteria. In addition, while instrumental variables are not available due to the cross-sectional data, a specific methodology is developed here to deal with the endogeneity problems, inherent to the issue of the paper.

Indeed, as mentioned by Kosova et al. (2012), Yvrande-Billon and Saussier (2004), studying performance as the result of strategic choices raises a problem of endogeneity. Many

factors may influence both the performance and the organizational choices. For this reason, managerial decisions are usually endogenous to their expected performance outcomes.

In this paper, the econometrical model takes the form of a system of simultaneous equations, free of endogeneity regarding the explanatory variables. The model is estimated on recent and good quality primary data, provided by the French National Institute of Statistics and Economic Studies (INSEE). The diversity of organizational forms in the French system provides a good opportunity to study the impact of the organizational choices on networks performance. Five types of distribution networks are distinguished in our sample, regarding a wide range of retail and services sectors. The estimation results highlight the influence of the organizational choices on networks performances.

The article is organized as follows. Section 2 presents the research model. The literature dealing with franchising and plural forms networks constitutes the analytical background. Section 3 describes the data and the study variables. Evidence for the relationships between the three performance indicators is given in section 4. Section 5 contains the estimations regarding the determinants of networks performance. Finally, section 6 offers a general discussion.

2. The research model

The literature dedicated to the organizational forms in distribution networks highlights the interest of franchising and of plural forms networks. Plural forms organization refers to the simultaneous presence of both franchised and company-owned outlets in the same network. The brand-name value plays also an important role in distribution networks where the downstream units share a same brand-name and a same concept defined and promoted by the upstream firm.

Three testable propositions linking networks performance to organizational choices derive from this analytical framework, presented in greater detail in the following.

2.1. Franchising and performance in distribution networks

Several analytical contexts justify franchising as a retail strategy. The resource scarcity view, initially developed by Oxenfeldt and Kelly (1969), Caves and Murphy (1976), Lafontaine and Kaufmann (1994), focuses on the resource constraints of the upstream firm. Franchisees are seen as financial and human capital providers that enable quick growth of the network. Hence, the exploitation of a brand name through independent retailers instead of company-owned units is analyzed as an efficient governance strategy of the upstream firm, the goal being a rapid expansion of the network.

The agency theory offers another and complementary explanation for franchising, based on the seminal contributions of Mathewson and Winter (1984; 1985), Tirole (1988). These authors analyze the moral hazard within the relationship between producers and retailers: the producer cannot observe the sales effort of the retailer, while the retailer's actions affect the profit of the upstream firm. In this analytical context, the moral hazard is related to a range of externalities regarding the relationships in a distribution network. Providing the first formalized analysis of franchising in the agency framework, Mathewson and Winter (1985) highlight the importance of the vertical externality as the main explanation for franchising. Their agency model demonstrates that every action of the downstream firm affecting the level of the final demand impacts the producer's profit. Organizing a profit-sharing between two independent firms, the franchise contract provides a better incentive structure compared to company-owned retail units. Therefore, due to the vertical externality and the moral hazard on the downstream side, franchising networks have better incentive properties than vertically integrated networks.

This analytical context underlying the interest of franchising to resolve resource scarcity and agency issues is the framework of recent empirical works on US data (Combs et al., 2004; Castrogiovanni et al., 2006; Michael and Combs, 2008), or on European data (Barthélemy,

2008; Dahlstrom et al., 2009; Arrunada et al. 2009). Moreover, Barthélemy (2008) provides evidence that financial performance actually depends on the governance structure of distribution networks; Arrunada et al. (2009) show that franchised units perform better than company-owned units in terms of productivity, labor costs, and profitability.

Based on this background literature, we formulate the following hypothesis:

H₁. Franchise contracts provide higher resources and incentives; therefore franchising networks generate a higher performance.

2.2. Plural forms and performance in distribution networks

The literature dealing with the organizational design of franchised chains emphasizes the interest of plural forms networks which include a proportion of company-owned outlets. While the coexistence of franchised and company-owned units in the same network has long been considered as a transitory phenomenon, it is now clearly established that the proportion of company-owned outlets remains relatively stable in mature franchised chains (Lafontaine and Shaw, 2005). Such empirical evidence suggests that dual distribution, mixing vertically integrated and independent retail units as franchised ones, is strategically employed by the upstream firm.

In a recent theoretical work, Pénard et al. (2011) demonstrate that, in a context of asymmetric information and moral hazards, plural forms is an efficient and stable organizational choice. The agency framework has previously been used by Bai and Tao (2000) to study dual distribution. Adapting the Holmstrom and Milgrom (1991)'s multitasks model, Bai and Tao (2000) draw attention to the complementarities between company-owned units and independent retailers coexisting in the same network. With dual distribution, each type of downstream unit is devoted to a specific task; owned units being more involved in the promotion of the common brand while franchised units would be more involved in sales efforts.

Most of the empirical works on plural forms in franchising are developed in line with Bradach (1998)'s model (Ehrmann et al., 2004; Dant et al., 2008; Cliquet and Pénard, 2012). In this seminal work, Bradach (1998) argues that franchise systems use plural forms because the existence of each type of outlet (franchised *versus* company-owned) in the same network positively impacts the management of the other side of the business. The author highlights four challenges for a franchisor to successfully manage distribution networks. They show that for each of them dual distribution is more efficient than the other organizational forms. Bradach (1998)'s analysis has recently been empirically tested on French data by Cliquet and Pénard (2012) who provide an empirical support to the conceptual model justifying the interest of plural forms organizations. Cliquet and Pénard (2012) show that the four designated challenges, namely network expansion, concept uniformity, local responsiveness, and network adaptation, actually drive the statutory choices in franchised networks.

From this previous literature, we derive the following hypothesis:

H₂. A plural forms organization within franchising networks enables to manage the diversity of goals; therefore the presence of company-owned units in franchising networks generates a higher performance.

2.3. Brand-name value and performance in distribution networks

In addition with the agency literature regarding the downstream moral hazard in producers-retailers relationships, several theoretical (Lal, 1990; Bhattacharyya and Lafontaine 1995) and empirical works (Lafontaine, 1992; Agrawal and Lal, 1995; Scott, 1995; Vazquez, 2005) dealing with franchising and distribution networks show that the moral hazard is two-sided, and draw attention to the important role of the upstream firm.

Branded-networks, as business-format franchising, are indeed based on the location of an intangible asset, namely the upstream firm's brand and concept. It is even possible to say that supplying and promoting the brand is the main task devoted to the upstream unit. The

promotional efforts increase the brand-name value, in other words the reputation of the network. In doing so, they positively affect the sales of the network.

The advantage of using a brand-name compared with wholly-independent retailing finds evidence in Williams (1999)'s empirical results, based on US data, which suggest that franchisees' profits would be lower if the studied downstream units would not be part of a franchised network.

The importance of the brand-name is illustrated by the history of franchising networks, which, as pointed out by Mathewson and Winter (1985), have developed from the 50s, along with the development of national brands. This importance is emphasized by Windsperger (2004) who studies the influence of brand-name assets on the allocation of decision rights in the Austrian franchise systems, and by Kidwell et al. (2007), dealing with the free-riding relating to the brand-name reputation on Norwegian franchising data.

As mentioned by Lafontaine and Shaw (2005), all brands are not equal, and their value depends on a long term effort of the upstream firm. This idea is consistent with Barthélemy (2008)'s empirical work on French data which highlights the influence of the brand-name on the financial performance of franchised chains.

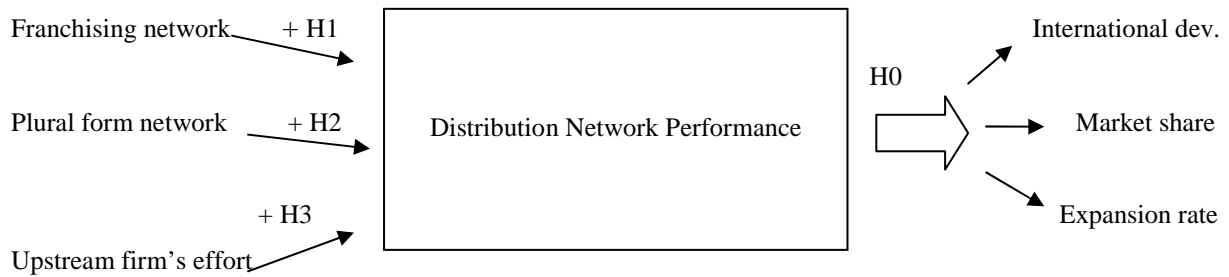
From this analytical context, we formulate the following hypothesis:

H₃. The upstream firm's effort determines the brand-name value; therefore a higher effort from the upstream firm generates a higher network performance.

2.4. Overview of the research model

Figure 1 illustrates the overview of our proposed model, composed of three complementary hypotheses concerning the determinants of networks performance (H_1 - H_3), and a background hypothesis (H_0), seeing the market share, the international development, and the expansion rate of distribution networks as three indicators of the same latent variable, namely the networks performance.

Fig. 1 Overview of the model



3. The data

In this study we use recent primary data provided by the INSEE regarding the French distribution networks over seven units. The networks, and more precisely the upstream firms or structures, were surveyed by means of a paper questionnaire sent by post. Several surveys were conducted between 2006 and 2008.

As a result of the matching and of the work of retopolation, our cross-sectional dataset refers to the year 2007. It is exhaustive and covers all of the subsectors within the retail and services sectors. The sample consists of 1202 networks.

3.1. *Dependant variables*

The three indicators of networks performance are defined as follows.

The *market share* is the proportion of the network turnover in the total sector turnover:

$$MS = \frac{\textit{Turnover of the network}}{\textit{Turnover of the sector}}$$

The study takes into account 21 sectors, as presented in Table 2:

Table 2

A wide range of retail and services sectors

Sectors	% in sample
Accommodation	2.1
Food and beverage service activities	6.4
Travel agencies	7.8
Other services activities	1.6
Real estate agencies	2.9
Renting (motor vehicles, personal goods)	1.9
Information technology and computer service activities	0.6
Maintenance and repair of motor vehicles, sale of parts and accessories	2.1
Large-scale food retailing stores	2.3
Personal service activities	6.5
Personal and household goods (except clothes and shoes)	7.9
Cultural and recreation goods stores	4.6
Home equipment stores	7.4
Do-it-yourself stores and flower stores	5.5
Department and general stores	1.3
Small-scale food retailing stores and frozen products stores	1.4
Delicatessen, bakery	1.8
Retail sale of food, beverages and tobacco in specialized stores	4.1
Other sundry specialized retail sale	6.6
Clothes stores	17.9
Shoe stores	7.3

Data from INSEE surveys (year 2007)

As mentioned in Table 2, the two main sectors in terms of the number of networks are “clothes stores” and “personal and household goods”.

The *international development* of the network is measured, for each network, as the ratio between the number of outlets abroad and the total number of the network outlets:

$$ID = \frac{\text{Number of outlets abroad}}{\text{Total number of the network outlets}}$$

Finally, the performance is measured with the *expansion rate* of the networks as a third indicator. Using cross-sectional variables, it is not possible to take into account the evolutions over time. However, for each network, we construct an index of the expansion rate with the total number of outlets in the network divided by the age of the network:

$$ER = \frac{\text{Total number of the network outlets}}{\text{Age of the network}}$$

3.2. Independent variables

Related to hypothesis 1, the *network type* is introduced in the study as an explanatory variable. Five organizational forms are distinguished in the sample. Each of them relates to distribution networks with a common brand for the outlets. These different types of distribution networks are: *predominantly integrated networks*, mainly composed of company owned units, *business-format franchising networks*, retailer or service provider *cooperatives* where the upstream unit in charge of the promotion of the common brand belongs to the downstream units, and networks organized with *brand license* contracts, close to business-format franchising but less constraining for the downstream units. Usually, franchised networks enclose a part of company owned units. In our sample, two types of franchising networks are taken into account according to the proportion of the network turnover achieved by franchised *versus* owned units: *predominantly franchised* and *franchised mixed networks*.

Table 3 presents these different kinds of networks. Each network is allocated a type according to the proportion of the network turnover achieved by the different categories of outlets in the network. The algorithm tests successively the condition in the second column of Table 3, and stops as soon as a condition is true:

Table 3
Five types of networks

Network type	Proportion of the sample turnover	Condition
Predominantly integrated	69%	More than 50 % of the network turnover is achieved by company-owned units
Predominantly franchised	7%	More than 50 % of the network turnover is achieved by franchised units
Franchised mixed	8%	Between 20 % and 50 % of the network turnover is achieved by franchised units
Cooperative	14%	More than 50 % of the network-turnover is achieved by outlets member of a cooperative
Brand license	3%	More than 50 % of the network-turnover is achieved by outlets with a brand-license contract

From hypothesis 1, we expect that franchised networks provide higher performances than the other forms.

In line with hypothesis 2, the presence of *company-owned units* in the network is taken into account as an explanatory variable for networks performance. This variable is measured as the number of company-owned units divided by the total number of outlets in the network:

$$O = \frac{\text{Number of company owned units}}{\text{Total number of outlets}}$$

This ratio is commonly used in the empirical literature on franchise data as an indicator of the extent to which a firm franchises its outlets (Castrogiovanni *et al.* 2006). However, most of the time, it is studied as a dependent variable, which is not the case here. Deriving from hypothesis 2, the expectation concerning this variable is that the presence of company-owned units within networks of independent retailers, *ie* dual distribution, favors the performance.

The third core explanatory variable is related to hypothesis 3. The *upstream firm's effort* in the vertical relationship is taken into account with an index resulting from the compilation of six qualitative variables (see Table 4). Each of these qualitative variables represents a specific form of involvement by the upstream firm. In some networks the upstream firm defines itself the layout of the downstream outlets and is in charge of the advertizing campaigns. The upstream imposes teams training and the different services that the outlet offers to the customers. Finally, the upstream firm may choose an information strategy concerning the sales tracking or the diffusion of the retailers' performances within the network.

Each qualitative variable is coded from 0-2 (0 = no, 1 = yes partially, 2 = yes totally; the maximum value is 12). The higher the value of this variable, the higher the level of involvement is of the upstream firm in the vertical relationship.

A greater performance is expected from a greater upstream effort.

Table 4

Construction of the proxy variable upstream effort

Aggregation of the six following qualitative variables :
Layout of the retail outlet
Teams training
Advertizing and promotion
Definition of the services to customers
Sales tracking
Diffusion of information concerning the network performance
Minimum : 0 maximum : 12

3.3. Control variables

The dummy variable *Retail/Services* enables to control for the influence on the networks performance of operating in retail *versus* services sectors. Such a variable was previously introduced by Dant *et al.* (2008). This distinction between the *retail* and *services* sectors is in line with Perrigot (2006)'s empirical results which underline significant differences between retailing and services in the French franchising sector. As the data relate to a developed country, it is relevant to predict that services sectors are more dynamic and generate more performance than the retail activities.

Finally, the dummy variable *other network* takes into account the operating by the upstream firm of another branded network. The strategic choice to operate simultaneously several networks may affect the performance. The impact may be positive, due to a higher experience, or negative, if focusing on one specific distribution network appears to be more efficient.

3.4. Summary statistics

Summary statistics for all the study variables are provided in Table 5.

Table 5

Summary statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
<i>Dependant variables</i>					
Market share	1202	0.0191348	0.051123	0.0000104	0.6809489
Expansion rate	1202	21.06948	159.2495	0 .05	4849.33
Internationalization rate	1202	0. 1303478	0.2628227	0	0.9967006

<i>Independent variables</i>					
Network type					
Predominantly integrated	1202	0.4825291	0.4999027	0	1
Predominantly franchised	1202	0.2171381	0.412469	0	1
Franchised mixed	1202	0.0740433	0.2619503	0	1
Cooperatives	1202	0.0873544	0.2824712	0	1
Brand license	1202	0.046589	0.2108446	0	1
Company-owned units	1202	0.5939847	0.4471412	0	1
Upstream effort	1202	0.5174709	0.4999027	0	1
<i>Control variables</i>					
Retail/Services	1202	0.7129784	0.4525601	0	1
Other network	1202	0.7287854	0.4447717	0	1

4. Evidence for the relationship between the three indicators

4.1. Method

The econometric model deriving from the analytical framework can be written as follows:

$$Performance^*_i = \beta_0 + \sum_{NT=1}^5 \beta_1 Network\ type_i + \beta_2 Company\ owned\ units_i + \beta_3 Upstream\ effort_i + \beta_4 Retail/Services_i + \beta_5 Other\ network_i + u_i$$

$$i = network$$

$$i = \{1 \dots 1202\}$$

Where *Performance** is a latent variable with three indicators¹: the internationalization rate of the network, the network market share, and the expansion rate of the network.

We propose a specific methodology to highlight the empirical relationship between the three indicators, in other words the endogeneity relating to the three dependant variables.

In the econometric literature, in order to deal with endogeneity, it is suggested to use the Hausman test and to compare the estimation results of an OLS and of a two-stage least squares model. However, good instrumental variables are not available here due to the cross sectional and mainly qualitative data. For this reason, we use the procedure proposed by Gujarati (2004). The two steps process consists first to get the residue v_i from the regression

¹ Indicators are observed variables that measure a latent variable.

of Y_1 with the exogenous variables (in the reduced form)², then to regress Y_2 as a function of Y_1 and v_i . If the coefficient of v_i is significant it is then not possible to reject the hypothesis of simultaneity. Gujarati (2004) presents this method within a two equations system. We extend the process here to the case of a three equations system. More precisely, we test for the potential simultaneity regarding the internationalization rate, the expansion rate and the market share in the following reduced form system:

$$\begin{cases} Y_1 = \beta_0 + \beta_1 X_i + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + \beta_5 X_{5i} + u_i \\ Y_2 = \alpha_0 + \alpha_1 X_i + \alpha_2 X_{2i} + \alpha_3 X_{3i} + \alpha_4 X_{4i} + \alpha_5 X_{5i} + v_i \\ Y_3 = \pi_0 + \pi_1 X_i + \pi_2 X_{2i} + \pi_3 X_{3i} + \pi_4 X_{4i} + \pi_5 X_{5i} + w_i \end{cases}$$

where,

$Y_1 =$ *Internationalization rate*

$Y_2 =$ *Expansion rate*

$Y_3 =$ *Market share*

$X_1 =$ *Network type*

$X_2 =$ *Company owned units*

$X_3 =$ *Upstream effort*

$X_4 =$ *Retail/Services*

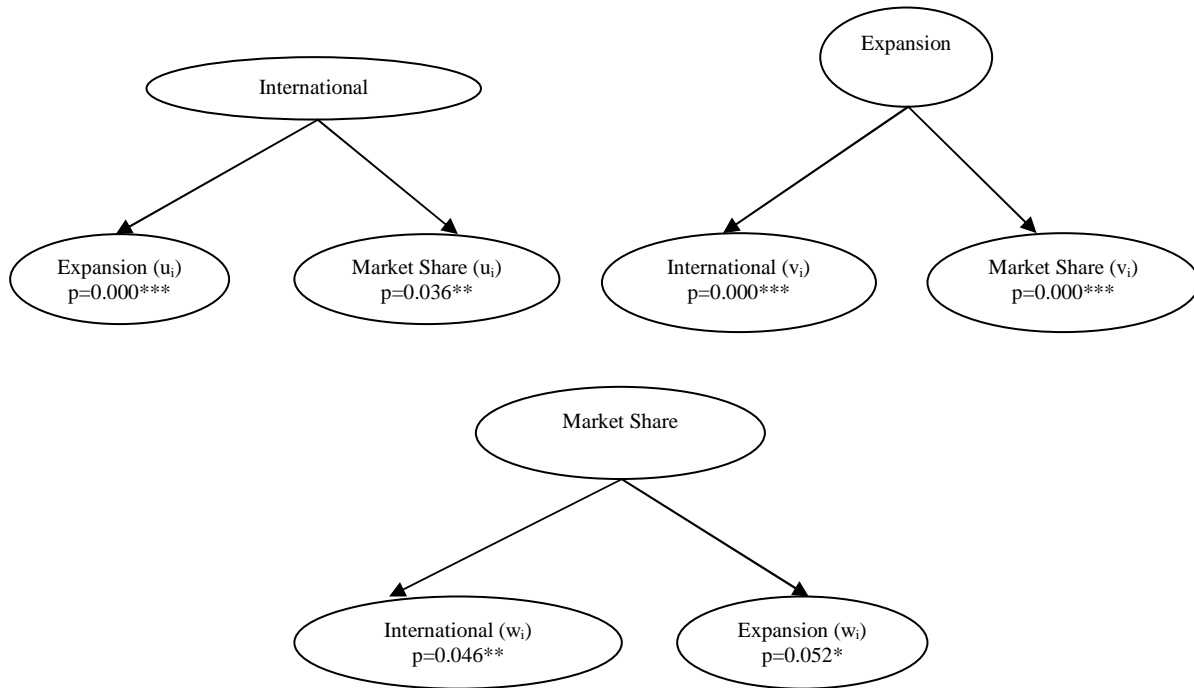
$X_5 =$ *Other network*

4.2. Results

The results of the procedure highlight the endogeneity between the three dependant variables, as summarized in Figure # 2. As shown by this Figure, the results are robust to changes concerning the order of the testing procedure: each residue remains significant.

² The reduced form is as follows: $\begin{cases} Y_1 = \alpha_0 + \alpha_1 X_i + v_i \\ Y_2 = \pi_0 + \pi_1 X_i + w_i \end{cases}$

Fig. 2 Endogeneity between the three indicators



5. Empirical determinants of networks performance

5.1. Method

Taking into account the empirical relationship between the three dependant variables of the study, we rewrite the econometric model as a system of simultaneous equations.

In order to warrant that all the variables of the system are exogenous, we test for each equation all the explanatory variables using the procedure previously defined (4.1). For each equation of the system, if all the explanatory variables are included, some of them become endogenous depending on the equation. Therefore we test all the possible forms of the system in order to ensure that the explanatory variables included are exogenous³. The resulting empirical model free of endogeneity problem regarding the explanatory variables can be written as follows:

³ All the estimation results are available upon request.

$$\left\{ \begin{array}{l} \text{International}_i = \beta_0 + \sum_{NT=1}^5 \beta_1 \text{Network type} + \beta_2 \text{Upstream effort}_i + \beta_3 \text{Retail/Services}_i + \beta_4 \text{Other network}_i + u_i \\ \text{Market Share}_i = \pi_0 + \pi_1 \text{Company owned units}_i + \pi_2 \text{Retail/Services}_i + \pi_3 \text{Other network} + w_i \\ \text{Expansion}_i = \alpha_0 + \sum_{NT=1}^5 \alpha_1 \text{Network type}_i + \alpha_2 \text{Retail/Services}_i + v_i \end{array} \right.$$

$i = \text{network}$

$i = \{1 \dots 1202\}$

The organizational form: "franchised mixed" serves here as the reference.

This system satisfies the order conditions. The first equation is exactly identified; the second and third equations are over identified (see Appendix). In this case, the two-stage least squares or the three-stage least squares methods can be used.

We test for the potential multicollinearity and hetorecedasticity in each equation, like Ackert and Athanassakos (2003). The tests reveal a problem of hetorecedasticity⁴. In practice, if there is no hetorecedasticity problem between the errors of each equation, the two-stage least squares and the three-stage least squares methods provide the same estimators. This is not the case here. For this reason, the three-stage least squares estimates should be preferred.

5.2. Results

The estimation results are reported in Table 6.

Table 6
Estimation results - simultaneous equations for networks performance

Variable	Two-stage least squares	Three-stage least squares
<i>Internationalization rate</i>		
Other network	.0198395 (0.017031)	.0180542 (0.0163912)
Retail/Services	-.0585595*** (0.019653)	-.0619913*** (0.0208524)
Upstream effort	-.0342793 (0.0289239)	-.0297871 (0.0188955)
Retailer cooperatives	-.0543015** (0.0376679)	-.0584758** (0.0287711)
Brand License	-.0515261 (0.03060721)	-.0502604 (0.037445)

⁴ The Brush-Pagan test is performed

Predominantly franchised	.0717417** (0.0180458)	.0690512** (0.03051505)
Predominantly integrated	.0005524 (0.0211833)	.0015839 (0.017932)
Constant	.1769447*** (0.0210878)	.1783752*** (0.0207427)

Expansion rate

Retail/Services	-32.95786*** (10.43239)	-33.19872*** (10.40524)
Retailer cooperatives	-15.48824 (17.60851)	-18.3978 (17.53543)
Brand License	2.422808 (22.70735)	2.509925 (22.61323)
Predominantly franchised	6.409633 (18.67029)	4.985144 (18.59324)
Integrated	-22.56448** (10.7958)	-21.58793** (10.75214)
Constant	56.22124*** (10.17937)	56.27733*** (10.14907)

Market Share

Other network	-.0056336* (0.0030349)	-.0057003* (0.0030847)
Retail/Services	-.0109318*** (0.0030349)	-.0109367*** (0.0030298)
Company-owned units	.0001552*** (0.0000115)	.0001549*** (0.0000114)
Constant	.0244456*** (0.003598)	.0245128*** (0.003589)

R2 <i>International</i>	0.0364	0.0363
R2 <i>Expansion</i>	0.0174	0.0174
R2 <i>Market Share</i>	0.1436	0.1436
F*,Chi ^{2f} <i>International</i>	6.44 (0.0000)	45.03 (0.0000)
F*,Chi ^{2f} <i>Expansion</i>	4.24 (0.0008)	20.85 (0.0009)
F*,Chi ^{2f} <i>Market Share</i>	66.96 (0.0000)	201.76 (0.0000)

Note: *Significant at the 10% level, ** at the 5% level, *** at the 1% level. Standard errors are in brackets.

The good global significance of the system is highlighted by the p-values for each equation. Note that the small R squared obtained do not question the quality of the estimates, due to the cross-sectional data, and to the purpose of the three-stage least squares, which is to get accurate estimates of the coefficients. This is why a negative or a small R squared is not a problem with this estimation method, the focus being on the parameters.

The estimates relating to the internationalization rate reveal that, as predicted, the organizational form of the network has a significant influence on the performance. The sign concerning the variable “predominantly franchised” highlights the positive influence of such a type of organization for the international expansion of the network. In addition, the results suggest that cooperatives, *versus* “franchised mixed” networks which serve as the reference in the estimations, have a negative impact on the first performance indicator. These results are consistent with H_1 . The negative sign concerning the control variable sector suggests that services involve a higher performance than retail activities. The hypothesis H_3 finds no empirical support here. The variable “Upstream effort” has no significant influence. This unpredicted result may be due to the construction of the proxie variable.

Complementary results are provided by the estimates relating to the expansion rate. Here again, the organizational form impacts the performance, and the comment is similar than the preceding one concerning cooperatives: the integrated form has a negative influence on the expansion rate, contrary to the reference form “franchised mixed”. H_1 which relates franchising and networks performance finds here again an empirical support. The results concerning the expansion rate highlight once again the significant influence of the sector and the positive impact of the services *versus* the retail activities.

This is also the case within the third group of estimates dealing with the market share. Thus, whatever the performance criterion taken into account, the influence of the sector is significant and the results indicate that services *versus* retail activities favor networks

performance. This result could be explained by the fact that retailing networks represents 77% of our sample: distribution networks would be well established in this sector, and would be expanding in the services. In this case our results would illustrate an ongoing dynamics. The equation for the market share includes the variable “Company-owned units”, confronting then H_2 to data. The estimation results are consistent with the hypothesis, suggesting that company-owned units have a significant and positive influence. Considering the p-value 10%, the control variable “Other network” has a significant and negative impact on the performance. This result means that a higher performance in terms of market share results from the focus of the upstream firm on one specific network.

6. Results and Discussion

6.1 Findings

The performance of distribution networks can be measured through different approaches. In this empirical paper we take into account three criteria: the internationalization rate of the network, the market share and the expansion rate.

Empirical evidence is provided concerning the simultaneity of these three criteria, which are studied in the paper as three indicators of the same latent variable; that is the performance of the distribution networks.

The analytical part of the paper surveys the vast literature devoted to franchising and to dual distribution. From this framework, several testable propositions are derived, linking the networks performance to the five following organizational choices: the type of distribution network, regarding five alternative forms in the French system; the level of company-owned units in the network; the involvement of the upstream unit in the vertical relationship; the type of sector, considering the distinction between services and retail activities; and the choice to manage several networks simultaneously.

The estimation of a system of simultaneous equations, free of endogeneity regarding the explanatory variables, by means of the three-stage least squares method provides robust results.

Except for the involvement of the upstream unit, the estimates highlight the significant impact of the organizational choices on the performance at the network level.

6.2. Practical implications

This paper offers an understanding of the influence of several organizational choices on the performance of distribution networks, providing practitioners with a better basis for making decisions about the organizational forms in distribution.

Compared to cooperatives and company-owned networks, franchising appears to be the appropriate form when the goal is the extension of the network, in terms of international expansion and expansion rate relating to the age of the network. In addition, the paper highlights the positive influence on the market share of the presence of company-owned units within branded-networks of independent retailers or service providers, that is dual distribution. The choice of the sector, regarding the distinction between retailing and services impacts also the performance. Our empirical results suggest that services *versus* retail activities favor networks performance. Finally, evidence is provided that, in terms of market share, it is better to focus on a unique distribution network instead of managing several networks simultaneously.

6.3. Conceptual implications and further research

This study contributes to the ongoing literature regarding the influence of the organizational forms on the performance (Mazzeo, 2004; Yvrande-Billon and Saussier, 2004; Ciliberto, 2006; Forbes and Lederman, 2007; Lafontaine et al. 2012). In addition, the paper provides an interesting processing of endogeneity, inherent to this issue, in the case of cross sectional data.

Several limitations which open the way to further research have to be mentioned.

First, the empirical investigation is limited by the characteristics of the data, mostly composed of categorical variables. In addition, our analysis focuses on a single year. This approach could be complemented by estimations on panel data in order to highlight fixed effects and evolutions.

Second, the study distinguishes only two general sectors; retail *versus* services. The good results regarding this variable call for a more detailed sector-based analysis.

Finally, it would be interesting to take into account financial performance criteria in order to see if the results obtained here concerning the influence of the organizational choices can be generalized to other performance criteria.

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Appendix – Identification and order conditions

Before the estimation of the model it is necessary to check for the identification and order conditions in the system. Concerning the order conditions, the criterion is as follows:

$$\begin{cases} K - k = m - 1 & \text{exactly identified} \\ K - k > m - 1 & \text{over identified} \\ K - k < m - 1 & \text{under identified} \end{cases}$$

Equation	K	k	K-k	Relationship	m-1	Identification
International	5	4	1	=	1	Exactly identified
Expansion	5	2	3	<	1	Over identified
Market Share	5	3	2	<	1	Over identified

M: endogenous variables in the model

m: endogenous variables in an equation

K: number of predetermined variables in the model

k: number of predetermined variables in an equation