

Are EU's Small and Medium-Sized Entities Familiar with Economies of Scale?: Response from the Field

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This paper aims at contributing to the topic which focuses on the achievement of economies of scale by Small and Medium-sized Entities. Firstly, we identified the several cost economies, which, according to most of the well-established literatures, determine the economies of scale. Thereafter, the study overcomes the one-way interpretation of the phenomenon at stake, in favour of a distinction in the economies of scale at level I, that can be easily attained by a firm, through the mere growth in size, and economies of scale at level II, to determine if the growth in size is a necessary, but not a sufficient condition. Finally, the information gathered from the study analyses through specially designed questionnaires from a sample of SME (Small and Medium-sized Entities), located in European countries, in order to ascertain the kind of economies of scale gained (if so) by such companies during their productive processes. The survey showed that a high percentage of the SME in the sample, declared to have gained economies of cost associated with economies of scale at level I; conversely, few companies have realized economies of cost that originated from economies of scale at level II.

Keywords: SME, scale economies, cost economies, size growth.

Field of Research: Business Management

1. Introduction

In order to survive in the long term, a business needs to articulate and coordinate its productive processes in terms of technical and economic efficiencies, that is, it has to maximize the productivity of each productive factor (and that of the whole productive process) as well as to minimize the absolute production costs. To this end, the dimensional growth of a business is often motivated by the search for scale economies (Lambrecht, 2004), which consist of “potential reductions in the average costs associated with higher levels of productivity, which is measured by the quantity of output that can be produced within the time unit” (Pratten, 1991).

Having clearly established the importance of scale economies for modern businesses, researchers and business scholars in previous years have focused their attention primarily, on the economies of scale in large businesses (normally listed on regulated markets), analyzing the economic rationale behind the phenomenon at stake as well as identifying the different typologies of economies of cost which contribute to its origin. Conversely, it has been stated that SME is not suitable for achieving economies of scale in their productive process.

This paper, instead, focuses on contributing to the possible achievement of economies of scale by Small and Medium-sized Entities not-listed on the regulated markets. To this end, we tried to overcome the one-way interpretation of the economies of scale phenomenon,

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Celli

in favor of the distinction in economies of scale at level I, that can be easily attained by a firm, through a mere growth in size, and economies of scale at level II, to determine if the growth in size is a necessary but not a sufficient prerequisite. Furthermore, the study analyses the information collected, through specially designed questionnaires from a sample of SME located in European countries, in order to ascertain which kind of economies of scale are gained (if so) by such companies in their productive processes. Specifically, in our study we intend to ask the following questions:

- 1) Is it possible to define the economies of cost that jointly or separately originate from economies of scale?
- 2) Is it possible to overcome the one-way and the sole interpretation of the phenomenon at stake in favor of the distinction of the phenomenon in two or more categories of economies of scale, each of them being determined by different factors?
- 3) What kind of economies of cost (if any) is actually achieved by Small and Medium-sized Entities located in European countries and not-listed on regulated markets?

This paper is structured as follows. The second section provides a literature review on the topic. In section 3, the economies of scale at level I and II are first of all distinguished by briefly pointing out the characteristics of each of them. Afterwards, we analyzed the different typologies of economies of cost that contribute jointly/separately to validate the two aforementioned typologies of economies of scale. In section 4, we analyzed the information collected through the specially designed questionnaires from a sample (No. 200) of Small and Medium-sized Entities located in European countries and not-listed in regulated markets. The aim of the questionnaires is to verify if such companies obtained economies of scale during their productive process, and (if so) to identify which of the economies of cost analyzed in section 3 of this paper are actually achieved. In section 5, we draw some conclusions on the topic being discussed.

2. Literature Overview

Over the years, the subject, economies of scale in large businesses has been broadly investigated and analyzed by business scholars and has therefore been the subject-matter for several remarkable research studies.

Specifically, many studies have dealt with the economic rationale behind the economies of scale (Silberston, 1972; De Witte & Rui, 2011) as well as with the identification and analysis of the different typologies of economies of cost that contribute jointly/separately to validate the phenomenon under examination (Gold, 1981; Mingzhou, Wu & Murat, 2006). Even more abundant are the studies made by scholars relating to the mechanics, in order to calculate the quantitative effects of economies of scale on the production costs of large businesses (Foreman & Beauvais, 1999; Tsionas & Loizides, 2001; Anderson, Fok, Springer & Webb, 2002; Truett & Truett, 2007).

Conversely, the contribution of the international doctrine to the topic which focuses on the achievement of economies of scale by Small and Medium-sized Entities not-listed on regulated markets, has been limited over the years (Robinson, 1997; Marques & De Witte, 2011; Polo & Scarpa, 2013). Moreover, such researches are not the specific target of the topic being discussed, but rather they feature the adaptation of hypothesis and theories previously elaborated, compared with the economies of scale in large businesses listed on regulated markets. In any case, such studies basically refute the opinion that SME can obtain economies of scale of a productive kind (so as to be different from large

businesses), rather SME can only obtain economies of cost of organizational and distributive kind.

Even more numerically limited are the attempts made to overcome a one-way and sole interpretation of the phenomenon being analyzed in favor of the distinction in economies of scale at level I and economies of scale at level II (Celli, 2013).

3. Typologies of Economies of Scale and Relative Determinants

3.1 Typologies of Economies of Scale

Economies of scale occur when “increasing outputs lead to a less proportional increase in the overall costs (that is, output costs per unit decrease)”, or, “when increasing production costs in constant proportion, result in a more proportional output” (Bellandi, 2007). According to business scholars and researchers (Scherer, 1975; Hamel & Prahalad, 2010), the economies of cost that determines jointly the economies of scale are the following:

- a) Economies of expansion;
- b) Economies from recycling by-products and productive discards;
- c) Economies of massed reserves;
- d) Economies of cooperation;
- e) Economies of big machines;
- f) Monetary economies;
- g) Supply economies;
- h) Economies of organizational learning.

In our opinion, the growth in the size of a business is necessary, but not a sufficient requirement to guarantee the achievement of all the above mentioned economies of cost. Specifically, if a business is able to gain in the long term all the aforementioned economies of cost, then, its physical size will certainly increase over time, but the fact that a business has increased its physical size is not sufficient in itself to guarantee the gain of all the aforementioned economies of cost.

We are therefore convinced that a unique categorization of the economies of scale phenomenon should be overcome in favor of the distinction in:

- Economies of scale at level I, that can simply be obtained through the mere growth in size;
- Economies of scale at level II, to get which the growth in size is a necessary, but not a sufficient condition (Celli, 2013).

In other words, if a business is able to gain in the long term, the economies of cost by determining the economies of scale at level II, then, it would have certainly increased its physical size over time. Conversely, the fact that a business has increased its physical size is not a sufficient reason to guarantee the gain in the economies of cost that determine the economies of scale at level II (while the economies of scale at level I are automatically achieved).

3.2 Determinants of Economies of Scale at Level I

- a) *Economies of expansion*, which is gained by businesses when the utilization of a given factor of production is increased, within a specific period of time, until its maximum technical capacity is reached. The overall cost of the specific factor is allocated based on the maximum quantity of output, with subsequent minimization of the total cost per unit of output (Besanko, Dranove & Shanley, 2009; Chandler, 1994).
- b) *Economies of cooperation*. Given that any industrial productive process consists of a sequence of technical operations in which all factors of production (labor, machines, industrial plants, and so on) work together, the economies of cooperation are obtained when all the aforementioned productive factors, each characterized by different nature and degrees of performance, are used to their maximum productive capacity. In other words, to balance the whole productive process and to ensure the maximum use of each productive factor, it is necessary to gain an outflow of output which would be equal to the lowest common multiple of the maximum productive capacity of each productive component. With such volume of output, all productive factors of the whole manufacturing process are “overfilled” (that is, used at the maximum level technically possible) and so the total cost per unit of output is the minimum possible (Anderson, Fok, Springer and Webb, 2002; Crompton & Lesourd, 2008).
- c) *Economies of big machines*. Each factor of the industrial productive process is characterized by specific technologies and sizes (specifically, surfaces and volumes). Whereas, the technological requirements for a specific productive factor are often stated, the choice of its size is exclusively influenced by economic considerations. The fact that a firm can obtain cost advantages by using productive factors of large sizes in its productive processes which has been derived not only from proportionally low acquisition/manufacturing costs, but also, from lower operating costs (direct and indirect labor, maintenance, and so on) and higher technical productivity in comparison with productive factors of minor size (Mukherjee, 2012).
- d) *Supply economies*, which is derived from a stronger position on the markets of capital factors and held by firms with larger productive sizes as compared to smaller ones. This kind of economies of costs usually focuses on better trading conditions and more convenient prices. Specifically, the supply economies pertain to savings on orders and on shipping costs, due to the greater quantity purchased (the so called "quantity discounts"), as well as better contractual terms and improved grade of customization of the purchased goods.
- e) *Monetary economies*. Not only the costs of the borrowed capital (particularly the interest rate, which is often lower than the one applied in small enterprises) or an easier access to credit grants of comparable amounts are of concern, but also, the burdens connected with negotiations as well as the issuing of financial instruments, that usually increase less proportionally as the monetary value of the operation increases.

3.3 Determinants of Economies of Scale of II Level

- a) *Economies from recycling by-products and productive discards*. Every industrial firm produces by-products and/or waste, in addition to their main products, that are commercially wasted, while recycling such residues, in order to reuse them in the

manufacturing process, or to sell them separately which involves relatively high costs of modifying their technical characteristics. When a business increases its productive capacity (and also its physical size), it becomes enabled to get the aforementioned operations which is economically convenient, since the costs of recycling and reusing can be distributed on a greater number of end products, at the same time, saving the money necessary for their disposal (Tsionas and Loizides, 2001).

- b) *Economies of massed reserves.* A business has to ensure that its normal operational activity when compared with statistically probable events, is not likely to weaken the productive process, this can be checked by creating and maintaining precise amounts of reserves over time, both the physical type (such as spare parts, end products and so on) as well as monetary ones. The costs of any kind of reserves are determined not only by the specific acquisition and maintenance expenses but also, by the opportunity cost, that is, the profit the business could have made, if the money used to create and maintain such reserves had been invested in more profitable, financial or productive activities (Guy, Bennison & Clarke, 2005). As the firm's size increases, such reserves can be used in a more economical way by improving the distribution of the aforementioned statistical risks over a higher number of productive operations, so that the costs associated with the storage and maintenance of monetary and physical inputs which are not used in the productive process, increase less proportionally (Weaver & Deolalikar, 2004).
- c) *Economies of organizational learning.* The cost per unit of a specific output decreases by a fixed percentage, each time the total output doubles. This phenomenon being discussed does not concern labor only, but also, all the productive factors, and is determined by improvements in the quality of the overall productive process, derived from increasing the labor skills at all levels of the organizational chart (such as better training and specialization of the human factor) as well as optimization of the plant layout and sequences of production (Cohen & Sproull, 1996; Jardot, Eichhammer & Fleiter, 2010).

4. Research Methodology and Data Analysis

4.1 Research Methodology

In previous years, researchers and business scholars have focused their attention majorly on the economies of scale in large businesses (normally listed on regulated markets), de facto, denying the possibility that Small and Medium-sized Entities could achieve the economies at stake in their productive processes. As a matter of fact, on the basis of the aforementioned business theories, such companies should be able to gain economies of scale of both organizational and distributive kind.

This paper aims at demonstrating that Small and Medium-sized Entities not-listed on regulated markets can also obtain the same economies of cost normally achieved by large businesses, as the firm's size grows. Moreover, the study aims at identifying which kind of economies of scale (level I or II, on the basis of the distinction elaborated in section 3) are effectively gained by such companies in their productive process.

To this end, about 200 questionnaires have been distributed to a corresponding number of industrial Small and Medium-sized Entities (to the investor relations and/or administrative offices) located in European countries which are not-listed on regulated markets.

Celli

Insurance companies, financial companies as well as credit institutions have not been included in the sample. The geographical allocation accruing to the companies in the sample are as follow: Italy (50 companies), France (50 companies), Germany (50 companies), Spain (50 companies).

Preliminarily, in order to categorize an enterprise as an SME, reference has to be made to two of the three dimensional parameters set out by the European Commission:

- 1) *Net profit* < € 50,000,000;
- 2) *Total invested capital* (total assets) < € 43,000,000.

Such data can be immediately inferred from the balance sheets of the relevant enterprises, without any further developments. The last parameter set out by the European Commission has not been used (*employees* < 250), given the difficulties involved in finding the relevant information.

Afterwards, the SME in the panel is selected, taking into account that during the period 2003-2013, their annual balance sheet totally increased by at least 50%. The increase in such parameter over the specified period of time, which is more than the increase in the net profit, in our opinion, is a very good proof, indicating increase in the enterprise size, which is a necessary prerequisite (and, with respect to economies of scale at level I, which is also sufficient) to obtain the economies of cost analyzed in section 3 above. All balance sheet data used for this survey are from database *Amadeus – Bureau van Dijk*.

The questions outlined in the questionnaire (that cannot be included herein for reasons of space) aim at verifying, according to the management of each business:

- 1) If the business realizes economies of scale in its productive processes;
- 2) Which of the economies of cost analyzed in section 3 above are actually attained by the business.

4.2 Data Collection and Analysis

Out of the 200 questionnaires distributed, 64 (32%) of them have been completed and returned to the author. The data that emerged are as follow:

- 1) In question one, 59 Small and Medium-sized Entities declared that they gained economies of scale in their productive process;
- 2) In question two, from the aforementioned 59 companies:
 - a) N.59 stated that they realized economies of expansion;
 - b) N.11 stated that they realized economies from recycling by-products and productive discards;
 - c) N. 17 stated that they realized economies of massed reserves;
 - d) N. 43 stated that they realized economies of cooperation;
 - e) N. 54 stated that they realized economies of big machines;
 - f) N. 59 stated that they realized supply economies;
 - g) N. 56 stated that they realized monetary economies;
 - h) N.32 stated that they realized economies of organizational learning.

In conclusion, it has been ascertained that:

- A large percentage of the examined companies (92%) declared that they got economies of scale in their productive processes as the firm's size grew. Such data seem to

Celli

contradict the assumptions drawn from previous years by a number of researchers and business scholars regarding the practical impossibility for Small and Medium-sized Entities to achieve economies of scale, which confirms the basic assumption of this paper;

- A high percentage (on average 91%) of the European SME which declared to have achieved economies of scale, have realized economies of cost associated with economies of scale at level I. Such data seem to confirm the assumption elaborated in section 3 of this paper, which indicates that this kind of economies of scale is easily achievable by a firm through a mere increase in size;
- Conversely, a comparatively small percentage (on average 34%) of the aforementioned SME, has realized economies of cost that originated from economies of scale at level II. Such data seem to be consistent with the assumption elaborated in section 3 of this paper, which indicates that the firm's increase in size is a necessary but insufficient prerequisite in getting this kind of economies of scale.

5. Conclusion

The data and information collected from the questionnaires confirmed, in *primis*, the hypothesis that industrial Small and Medium-sized Entities (not-listed on regulated markets) are able to achieve economies of scale as the firm's size grows, likewise the large businesses. Such results seem to contradict the assumptions and theories drawn from previous years by a number of researchers and business scholars, which stated that only large businesses are able to gain the economies of cost.

The aforementioned data also support, in our opinion, the theoretical attempt to overcome a unique categorization of the economies of scale phenomenon in favor of the distinction between economies of scale at level I and economies of scale at level II. The first typology of economies of scale can be easily attained by a business through a mere growth in size (likewise, if a business is able to attain this kind of economies of cost then, it has to, of necessity, increase its size), whereas to get the economies of scale at level II, the increase in size is a necessary but not a sufficient prerequisite.

In other words, if a business is able to gain in the long term the cost economies, by determining the economies of scale at level II, then, it has certainly increased its physical size over time. Conversely, the fact that a business has increased its physical size is not sufficient in itself to guarantee the attainment of economies of cost that determine the economies of scale at level II (while the economies of scale at level I is automatically achieved).

As a matter of fact, a larger percentage (on average 91%) of the 59 Small and Medium-sized Entities that have completed the questionnaire and returned it to the author (and that have increased their size within the period, 2003-2013, thereby, realizing economies of scale) declared to have gained economies of cost associated with economies of scale at level I. Conversely, few companies (on average 34%) have realized economies of cost that originated from economies of scale at level II, confirming that the latter presents the most qualifying advantages, though, more uncertain to attain, associated with the increase in size of a business.

In our opinion, the implications of this analysis may be of interest to the scholars in Small and Medium-sized Entities, both from academic and professional standpoint. Preliminarily, the fact that such companies as well as the large businesses may attain economies of

Celli

scale explain, although only partially, the ability of SME to survive over the years (and, in particular, in periods of serious crisis similar to the one we are presently facing). This contradicts the business theory that prevailed in previous years, of which, large businesses only can satisfy the principle of *going concern* in the long-term, as they are more efficient in economic-technical terms. This is even more true in Countries like Italy, Spain and France, where for each large business (that is, a business which meets the dimensional parameters specified in section 4 above), with more than 20 years of continuous business operation, only SME ranging from 7 to 11 and having a similar “seniority” can be identified (Eurostat, 2012).

Furthermore, the theoretic overcome of a unique interpretation of the economies of scale phenomenon, in favor of the distinction in economies of scale at level I and economies of scale at level II is, in our view, an explanation, in addition to the “classic” ones drawn up in the past years by numerous researchers and business scholars, based on the fact that enterprises having similar sizes and which are active in the same markets, show very distinct survival rates in the long-term. Such information, which is obviously based on further studies and analyses (in particular of economic nature), could be allowed not only to address more efficiently and/or aid policies of domestic and EU’s Small and Medium-sized Entities, but also, the financing and/or investment choices of private entities.

5.1 Limitations and Recommendations

Our study has some limitations, which is similar to other empirical studies carried out on the topic being discussed. Specifically, it has not been possible to verify the correctness and truthfulness of the information reported in the questionnaires, as the balance sheets of the companies used in the sample (collected from database *Amadeus – Bureau van Dijk*), obviously do not report useful data to such extent.

5.2 Further Research

Additional econometric studies will be required to isolate and measure quantitatively the economies of cost achieved (if so) by the businesses in the sample.

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Celli

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