Schumpeter and the Blue Ocean Strategy[*]

Jan ter Wengel[**]
Gilma Beatriz Ferreira-Villegas[***]
Gérman Pérez-Hernández[****]
Luis Miguel Suárez-Cruz[*****]

Abstract

The purpose of this paper is to integrate and quantify the Blue Ocean Strategy for the business activities proposed by the Kim and Mauborge model and by Schumpeter´s competitive strategy. It analyzes the importance of innovation and scale economy in Colombia, based on information from 8.000 companies over a period of 12 years. This study also emphasizes the importance of new product performance, new technologies, innovation, invention, scale economy and production cycles in companies, based on our empirical exercise and international trade and economy recent literature. The possibility of improving the performance of companies with strategies for new products and processes is vital for industry policies seeking new ways to help businesses foster innovation. This paper analyzes how the Blue Ocean Strategy is particularly useful as a guide to help entrepreneurs achieve dynamic innovation. The empirical exercise documented is a sector analysis approach for company growth, considering contribution decomposition obtained by of the development of new products, markets, processes, raw materials used and reorganization through take-overs and fusions.

Key words author: Innovation, Invention, Business Management, Industrial Economy.

Key word plus: Industry Policy, Enterprise Strategies, Economies of Scale.

JEL Classification: D24, L23, L60.

Schumpeter y la Estrategia del Océano Azul

Resumen

El presente artículo integra y cuantifica la Estrategia del Océano Azul para las actividades de negocios propuestas a través del modelo de Kim y Mauborge y la visión de la estrategia competitiva de Schumpeter. Se analiza la importancia de la innovación y las economías de escala en Colombia con una base de 8.000 empresas durante un período de 12 años. En igual sentido enfatiza la importancia para el desempeño de las empresas de nuevos productos, nuevas tecnologías, la innovación, la invención, las economías de escala y el ciclo de producto con base en literatura reciente en el campo del comercio internacional y la economía. La posibilidad de mejorar el desempeño de las empresas con estrategias de nuevos productos y procesos es vital para la política industrial que está buscando nuevas maneras de ayudar a las empresas para fomentar la innovación. Analiza cómo la Estrategia del Océano Azul es particularmente útil como una guía para ayudar a los empresarios a conseguir una dinámica de innovación. El ejercicio empírico es una aproximación a un análisis sectorial del crecimiento de las empresas por la descomposición de las contribuciones obtenidas por la generación de nuevos productos, mercados, procesos, insumos y la reorganización del establecimiento a través de tomas de posesión y fusiones.

Palabras clave autor: innovación, invención, gestión empresarial, economía industrial.

Palabras clave descriptor: política industrial, estrategias empresariales, economías de escala.

Clasificación JEL: D24, L23, L60.

Schumpeter et la Stratégie Océan Bleu

Résumé

Le présent article intègre et quantifie la Stratégie de l'Océan Bleu pour les activités d'affaires proposées à travers le modèle de Kim et Mauborge et la vision de la stratégie compétitive de Schumpeter. Il analyse l'importance de l'innovation et des économies d'échelle en Colombie sur la base de 8.000 entreprises durant une période de 12 ans. Dans le même sens, il souligne l'importance dans l'activité des entreprises de nouveaux produits, de nouvelles technologies, de l'innovation, de l'invention, des économies d'échelle et du cycle de produit, sur la base de la littérature récente dans le domaine du commerce international et de l'économie. La possibilité d'améliorer l'activité des entreprises avec des stratégies de nouveaux produits et processus est vitale pour la politique industrielle qui cherche de nouvelles manières d'aider les entreprises pour favoriser l'innovation. Il analyse comment la Stratégie de l'Océan Bleu est particulière-ment utile comme guide pour aider les chefs d'entreprise à parvenir à une dynamique d'innovation. L'exercice empirique est une approche de l'analyse sectorielle de la croissance des entreprises par la décomposition des contributions obtenues grâce à la génération de nouveaux produits, marchés, processus, facteurs de production et par la réorganisation de l'établissement à travers des prises de possession et des fusions.

Mots clés auteur: innovation, invention, gestion d'entrepise, économie industrielle.

Mots clés descripteur: politique industrielle, stratégies des entreprises, économies d'échelle.

Classification JEL: D24, L23, L60.

Summary: Introduction. 1. The Blue Ocean Strategy and the Schumpeter Models. 2. Empirical Verification. Conclusions. Bibliography.

INTRODUCTION

Kim and Mauborgne in the Blue Ocean Strategy (2005) present a very different strategy for business than the competition strategy put forward by Porter (1990). The question is: How relevant is the new market strategy? Are there enough opportunities to find new markets? Economics has also been confronted by the same question: How relevant is the competition model with respect to the innovation and economies of scale models proposed by Schumpeter and recently formalized by Baumol (2010)[1]. The purpose of this article is to integrate and quantify the Blue Ocean Strategy model with the models proposed by Schumpeter. Thus, we aim to examine the relevance of innovation and economies of scale in Colombia on the basis of the Annual Manufacturing Survey (AMS) produced by Departamento Administrativo Nacional de Estadística de Colombia (DANE) covering some 8.000 firms over a period of 12 years.

Thus, our article complements the studies of Kim and Mauborgne and Schumpeter. Schumpeter based his analysis on the examination of thousands of firms in five industries – textiles, railroads, steel, electricity and automobiles – in three countries – Germany, the United Kingdom and the United States – over a period stretching from 1750 to 1930. The study by Kim and Mauborgne (2005) was also based on a panel of 150 innovations in 30 industries over a period of 130 years. We develop a correspondence table between Blue Ocean and Schumpeter theories.

The relevance of our article is derived from the increasing attention given to new products, new technologies, innovation and invention in the current business and economics literature (Arthur, 2009; Broda & Weinstein, 2010). The article also applies to the literature on the product cycle as it applies both to business (Frenken, Silverberg & Valente, 2009) and to international trade (Vernon, 1966). Finally, we also draw attention to the usefulness of the new trade theory (Melitz, 2003) to the explanation of innovation and economies of scale. This interest in new products and processes has even led toward a renewed interest in industrial policy (The Economist, 2010). As countries look for new ways to help firms foster innovation, the Blue Ocean Strategy is particularly useful in that it provides concrete recommendations for business.

While the Blue Ocean Strategy focuses on new products only, Schumpeter (1912) concentrated on the dynamics of the economy and produced a more detailed list of the

---

1   The incorporation of innovation and economies of scale in a micro-economic framework continues to challenge and elude eonomists. It is a subject that has been continually brought up by: Young (1928), Kornai (1971), Kaldor (1972), Aghion and Howitt (1992), Buchanan and Yoon (1994), W. Brian Arthur (1994) and many others.

elements that propel the economy forward, namely: new products, processes, markets (e.g. exports), sources of supply, forms of organization. In 1939 Schumpeter described the growth process in terms of: innovation and the reaping of economies of scale.

We aim to test for the importance of the items proposed by both Kim and Mauborgne (2005), on the one hand, and Schumpeter, on the other on the basis of the AMS DANE[2]. In terms of the Blue Ocean Strategy, innovation and the first and third propellers proposed by Schumpeter in 1912 would create new market space, Blue Oceans, and enterprises could expand without too much attention to competition. The economy would enjoy an increase in the supply and variety of goods. On the other hand, with new processes, sources of inputs, and forms of organization, firms would reap economies of scale and gain an advantage in the Red Oceans characterized by head to head competition. The aggregate economy would benefit from greater volumes of production and lower prices.

The organization of this article is the following. In the first section we present a short review of the main recommendations of the Blue Ocean Strategy and examine the Schumpeter 1912 and 1939 proposals; we present a correspondence table between the various models and review some micro-economic formulations that formalize these models. In the second section we empirically examine the relevance of: the Blue/Red Ocean hypothesis; the innovation/economies of scale formulation; and we suggest ways of looking at the data to distinguish between new product, new process, new market, new input and new form of organization. The last section concludes with a number of recommendations for further research.

1. THE BLUE OCEAN STRATEGY AND THE SCHUMPETER MODELS

In this section we set out the Blue Ocean Strategy and the Schumpeter models. We first describe them, then present a correspondence table, and, finally, describe some suggestions to formalize these models.

The objective of The Blue Ocean Strategy is to develop a number of guidelines for the creation of new markets. In order to do this, Kim and Mauborgne (2005) start by dividing the business universe into two oceans: Blue and Red Oceans. The red oceans are the markets for existing products. The market space is known and the industry or sector boundaries are clearly defined and generally accepted. In the red oceans firms compete head on and one company's market gain represents another's market loss. Also, with a clear market delimitation the possibilities for growth and increased profits are largely restricted.

---

2   The database has been described in Wengel et al. (2006).

The blue oceans on the other hand represent a new, yet unknown, market space. This area is occupied by firms with new products where there is no competition. Kim and Mauborgne (2005) illustrate the creation of new market space with an example: that of Cirque du Soleil. Starting in a market space with limited perspectives, Cirque du Soleil invented a new product, a circus presentation with many of the characteristics of a theater performance: one stage with a clear theme, a refined ambience and artistic music and dance.

Kim and Mauborgne indicate that the process of innovation involved in the creation of the Cirque du Soleil is also the process that led to the development of automobiles, music recording, aviation, petrochemicals, health care and business consulting in the past 100 years. In the more recent past we find cell phones, biotechnology, express delivery services and snowboards.

We believe there is a coincidence of ideas when Schumpeter (1939) states: "Railroads have not emerged because any consumers took the initiative … Nor did consumers display any such initiative to have electric lamps or rayon stockings, or to travel by motorcar or airplane, or to listen to radios, or to chew gum" (p. 73). The conclusion is that the supply of new goods results from the efforts made by entrepreneurs.

Kim and Mauborgne point out that history shows us that we have sub estimated the capacity of entrepreneurs to create new products and industries and recreate existing ones. Like Schumpeter they point out to the unprecedented increase in welfare we have experienced since 1750.

Having demonstrated the importance of new markets, Kim and Mauborgne develop a set of guidelines to help businessmen develop new markets. Abstracting from the tools they propose – the strategic canvas and four action framework – Kim and Mauborgne (2005) suggest six principles which they illustrate with examples:

1. *Look across alternative industries*. That is, look at the technologies being utilized in other sectors to establish their possible use in the industry at hand. That is, in the terms of the view of about evolution in technology of W. Arthur Brian (2009).

2. *Look across strategic groups within industries*. What are the leading industries in the sector doing?

3. *Look across the chain of buyers*. The market characteristics are may not be clearly defined by the direct customer but by the needs of customers further down the pipeline. Responding to the needs of these further removed customers may define a new market.

4. *Look across complementary product and service offerings*. The product being sold may be consumed in conjunction with other products or services and considering them together may offer new market opportunities.

5. *Look across functional or emotional appeal to buyers*. Consumers decide on products on the basis of both functional and emotional reasons and therefore a firm should be aware of the combination of these factors and adjust them to advantage.

6. *Look across time*. What are the perspectives of the product and other products over time? How will they be affected by technological developments? What new market opportunities will be created by the dynamics of the business environment?

In a The Theory of Economic Development (1912)[3], Schumpeter ascribes the growth of the economy to: new products, processes, markets, sources of supply, forms of organization.

In 1939, Schumpeter described the working of the capitalist economy on the basis of the entry and exit of businesses and the reaping the advantages of economies of scale. He demonstrated the use of the concept of creative destruction by conducting a virtual panel analysis of five industries – textiles, railroads, steel, automobiles and electric power – in three countries: the United Kingdom, Germany and the United States, for the period covering 1750 to 1930.

The microeconomic models developed by Schumpeter, especially the 1939 one, differ from the classical supply and demand model in that they stress the role of the entrepreneur, innovation, creative destruction and economies of scale. Although Schumpeter never hid his admiration for Walras, he stated that: "We hold, that this model covers less ground than is commonly supposed and that the whole economic process cannot be adequately described by it..." (p. 98). Therefore Schumpeter sets out to explain the capitalist engine from a different perspective, emphasizing innovation and economies of scale.

We propose that an elementary version of the Schumpeter (1939, Ch. III) decision process might be described as follows. In Figure N° 1 we sketch two of the many possible alternatives open to the firm[4]. Thus, the firm could invest little and face large marginal costs as depicted by path A or the firm could chose a higher investment and lower marginal costs as shown by path B. The optimal path would obviously depend

---

3   The English translation of *The Theory of Economic Development* is dated 1936. We refer to it as 1912 because that was the date That the German book *Theorie der wirtschaftlichen Entwicklung* was first published.

4   The inspiration for this model and the groundwork for a mathematical specification can be found in Aghion and Howitt (1992, 2007) with an endogenous growth model and Melitz (2005) with a monopolistic competition model and with chapter 5 in Spulber's *"The Theory of the Firm"*. Arthur also describes a demand system that is driven by the number of people that have already chosen the product.

on demand. However, this demand is to a large extent also determined by the firm. It is not only obvious in the case of Microsoft or Apple, but also in the case of the corner store. A question facing the entrepreneur when he is making the investment decision is: Can the firm obtain an acceptation of its product that leads to D_H or does it stall at D_L.

Figure N° 1

The Decisión of the Firm
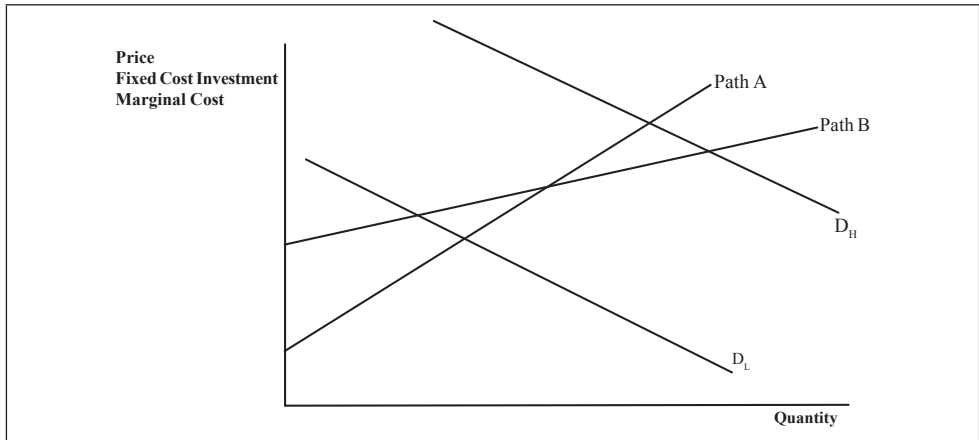
Source: Inspired by Minsky (1954) Figure 3.1. (p.72) and Figure 5.7. (p.115).

Demand uncertainty and the influence a firm has on its own demand leave a wide range of choices open to firms, it is only natural to expect firms to make very different choices with respect to size. The dispersion with respect to size could be magnified if the firms could opt for more sophisticated technology and the D_H schedule were to shift to the right by the possibility of exporting.

The following implications derived from the Schumpeter model[5]:

1. The productivity of firms increases with the size of the firms.

2. The harnessing of economies of scale leads to the concentration of production, value added and employment in the largest firms.

3. The process of creation and destruction occur mostly within the same sectors. In narrowly defined sectors we find new and growing enterprises as well as shrinking and closing firms.

The models described by Kim and Mauborgne (2005) and Schumpeter (1912-1939) may be summarized in the following correspondence Table N° 1:

---

5   These implications have been established in a previous research Wengel et al. (2006).

TABLE N° 1

The Kim/Mauborgne and Schumpeter Correspondence Table

Kim and Mauborgne 2005	Schumpeter 1912	Schumpeter 1939
Blue Oceans	New Product	Innovation
	New Process	
Red Ocean	New Market	Economies of Scale
	New Source of Input	
	New Form of Organization	

Source: Own elaboration.

As discussed by Kim and Mauborgne (2005) and made very explicit by Schumpeter (1912-1939), blue oceans do not last forever. Schumpeter (1939) makes this point as follows:

> Most new firms are founded with an idea and for a definite purpose. The life goes out of them when that idea or purpose has been fulfilled or has become obsolete or even if, without having become obsolete, it has ceased to be new. That is the fundamental reason why firms do not exist forever. Many of them are, of course, failures from the start. Like human beings, firms are constantly born that cannot live. Others may meet what is akin, in the case of men, to death from accidental illness. Still others die a "natural" death, as men die of old age. And the "natural" cause, in the case of firms, is precisely their inability to keep up the pace in innovating which they themselves had been instrumental in setting in the time of their vigor. No firm which is merely run on established lines, however conscientious the management of its routine business may be, remains in capitalist society a source of profit, and the day comes for each when it ceases to pay interest and even depreciation. (pp. 94-95)

The spirit of the Schumpeter (1939) quote can be captured in a micro-economic model that is already familiar to most economists. As suggested by Baumol (2010)[6], a model that can be applied to describe the transformation of a market from blue to red is that of the firm that can discriminate between users on the basis of user characteristics (students, senior citizens) or user location.

However, rather than using characteristics or location, the Baumol model of innovation uses time. The innovating firm at time t_0 faces demand curve "A". In the Kim and Mauborgne spirit, it faces no competition. However, other firms will imitate the successful innovator and in the next period the firm will face demand curve "B" and even later "C" (Figure N° 2).

---

6   See Baumol (2010) Chapter 3 for a mathematical exposition. Baumol, William J. (2010). *The Microtheory of Innovative Entrepreneurship*, (Princeton: Princeton University Press, 2010).

<center>Figure N° 2</center>

The Shifting (Rotating) Demand Curve for New Products
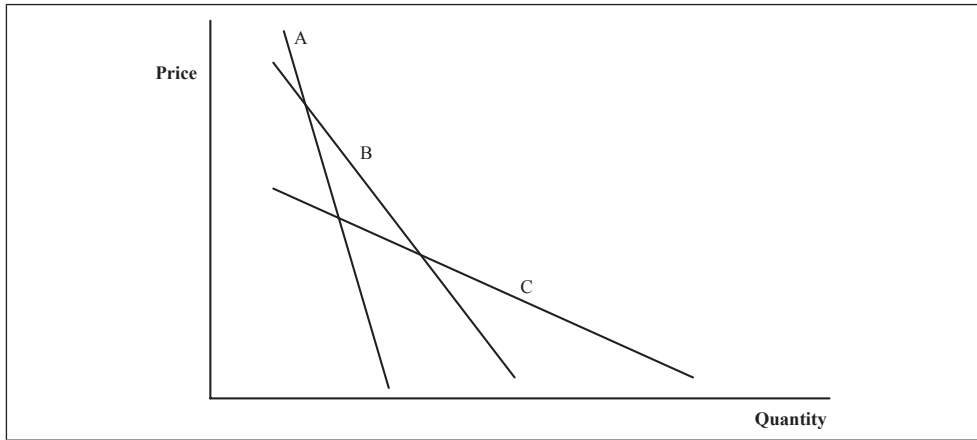
Source: Baumol (2010).

Shifting might also describe the motion of the firm´s demand curve. But the important element is the rotation, the increase in competition as the sector or the innovation grows in age. In the empirical literature this effect shows up in the concentration of sales or production in the diverse sectors as discussed by Bartelsman et al. (2008).

Baumol also suggests a model for a neglected characteristic of the market system: the pressure to innovate. Baumol describes it as:

> This incredibly effective – indeed, ingenious – arrangement is not invented, designed, or imposed consciously by any person or group. Instead, it is yet another fortuitous product of the market mechanism. Unlike the institutional arrangements that underlie the Industrial Revolution´s initial expansion of productive entrepreneurial activities, which I ascribe largely to historical accident, the Red Queen[7] game of the innovation process is automatically introduced by oligopolistic competition and, therefore, is yet another contribution of the market mechanism itself. (2010, p. 58)

The mechanism described by Baumol is reproduced in Figure N° 3 "Stability of Research and Development Expenditure in Red Queen Game".

The Red Queen Game view presents a model that works essentially like a kinked-demand-curve model[8]. It explains why firms keep up their Research and Develop-

---

[7]   Baumol calls the innovation game between firms the "Red Queen" game. The name is derived from L. Carroll (1902), *Through the Looking Glass*: "Now, here, you see, it takes all the running you can do, to keep in the same place. If you want to get somewhere else, you must run twice as fast as that!" (Baumol, p. 57).

[8]   In the kinked-demand-curve model the firm sets its Price at the industry level because it does not expect other firms to follow it if it raises prices but it expects other firms to follow if it lowers prices.

ment (R&D) expenditures. In a market in which innovation is the principal form of competition the firm will chose the research and development expenditure level established by the industry as shown in the Figure above N° 3. The stability of the R&D expenditures of a firm is given by its expectations with regard to the behavior of competing firms. If the firm reduces its R&D expenditures, other firms will not follow and the profits will be negative as shown on the profit curve Z-U.

On the other hand, also in Figure N° 3, if the firm raises R&D expenditures and the other firms follow, then the firm will not continue along its earlier total revenue path and go from B to D but will face the horizontal revenue path B-C. The profit curve dips as shown by the curve Z-V.

Figure N° 3

Stability of Research and Development Expenditure in Red Queen Game
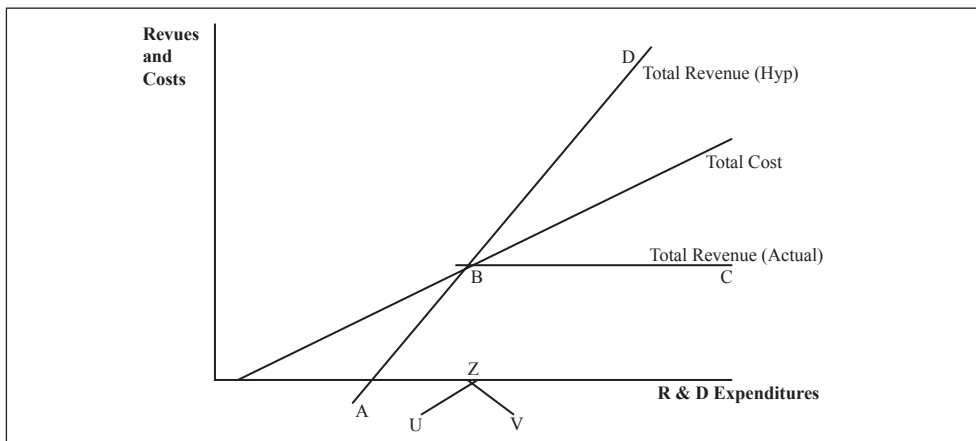
Source: Baumol (2010).

This equilibrium will prevail until a firm hits upon a particularly promising invention that justifies a jump in its R&D expenditures from the previous sticky level. Probably a firm that looks to increasing its market share rather than its productivity through the greater expenditure on R&D. If this were the case, we could employ the Helpman (2006) description of the Melitz (2003) model to show that a higher investment would lead to greater profits at all productivity levels because of the jump in demand.

In Figure N° 4 we show the conglomerate of profit points for firms with and Industry Average Investment (IAI) and diverse levels of productivity along the curve IAI-S. Firms with a productivity greater than "A" stay in the market. Those that do not achieve this level of productivity are forced to exit. The new firm (or firms) with

a Market Expanding Investment enjoy an advantage and only require a productivity level "B" in order to survive. Thus, they survive and start making profits at the lower level of productivity "B".

Figure N° 4

The Melitz-Helpman Model with Market Enhancing Investment
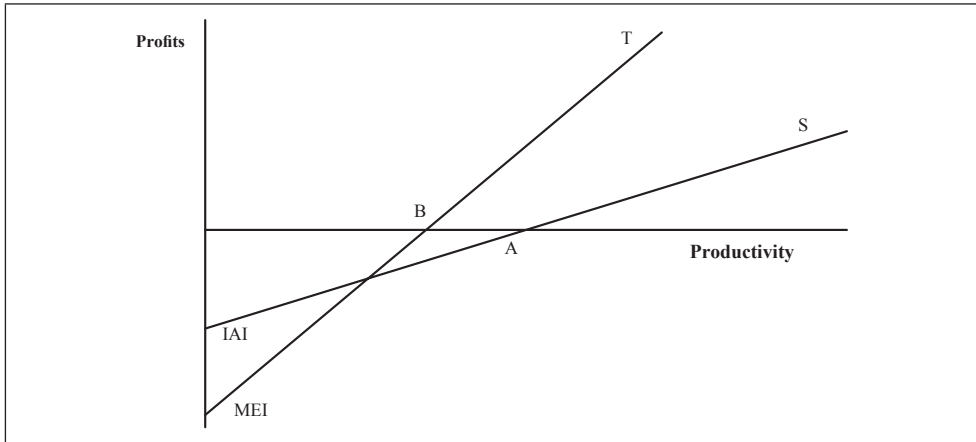
Source: Baumol (2010).

Figure N° 4 is obviously a complement to Figure N° 1 depicting the firm decision process as described by Schumpeter.

The impact of the decision by a firm to move to a greater, market enhancing level of investment is that it will pull the whole industry with it. In terms of Figure N° 3, the equilibrium level of R&D expenditure moves to the right of point Z. Thus firms engaged in competition based on innovation are forced to keep up with one another in terms of their investments. Once at a new level, location to the right of Z, firms will no longer be able to reduce their R&D investment below the new industry level for fear of losing to their competitors. This pattern implies that from time to time firms will be forced to increase their R&D expenditures. Once these expenditures have been increased, firms will no longer be able to retract to the former, lower level of investment. Consequently, R&D expenditures are subject to a ratchet effect that may explain the enormous increase in economic output described by both Schumpeter (1912-1939) and Kim and Mauborgne (2005).

The models sketched in Figures N° 1 to N° 4 suggest that there may be additional ways to examine the market economy. It is obvious that these suggestions do not have

the rigor of the general equilibrium models which constitute the greatest achievement by economists. In this section we merely wanted to point out the modeling possibilities before presenting the empirical relevance of the Kim and Mauborgne (2005) and Schumpeter models (1912-1939) in the next section.

2. EMPIRICAL VERIFICATION

In the last section we sketched a number of models that might be amenable to further formalization. The purpose of this section is to examine whether such an effort might be warranted in view of the empirical evidence. Therefore, the objective here is to see if we can say something about blue and red oceans; innovation and economies of scale, and new products, new processes, new markets, new inputs and new forms of organization.

From the very start we have to make it clear that we are not proposing a strict verification of any of the models sketched in the last section. At best, we provide some evidence, based on the AMS DANE, of the relevance of the Blue and Red Ocean dichotomy; the explanation of progress in terms of innovation and economies of scale; and the way forward in the assessment of the importance of new products, processes, markets, inputs and forms of organization.

2.1. THE BLUE/RED OCEAN CLASSIFICATION

Burke, van Stel and Thurik (2008) specified a model to test the relevance of the blue ocean versus the competitive strategy based on the number of firms in the retail industry in the Netherlands between 1982 and 2000. We do not follow their approach because of the wide dispersion of firm sizes in the Colombian manufacturing industry. In order to examine the relevance of Blue and Red Oceans we recur to the most elementary of the empirical tools: the picture.

For simplicity we posit that new products and new markets lead to blue oceans. That is, if valued at constant prices, if the industrial production of the sector were stationary, the production of the rapidly rising establishment would lead to an increase in the industrial production of the sector. Such a situation might be depicted in Figure N° 5. Once identified in this way, the next task would be to decompose the increase in production by the firm into that generated by a new product or that derived from a new market (export).

Figure N° 5

Graphical Description of a Blue Ocean
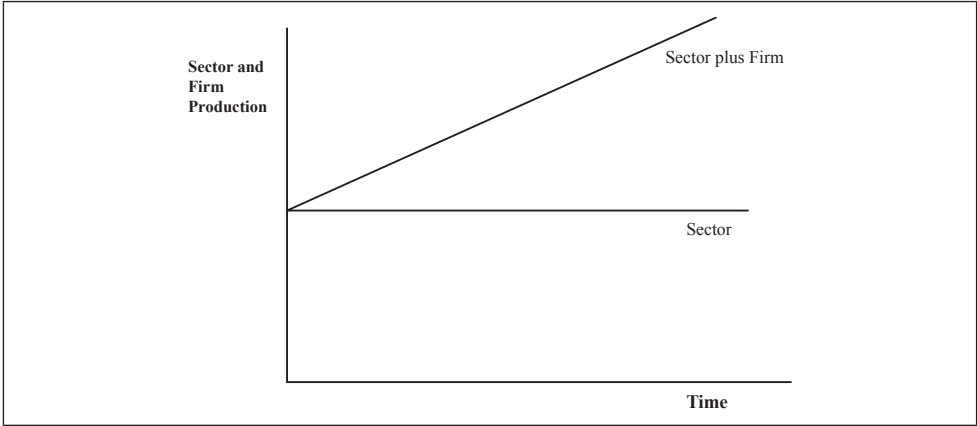
Source: Own elaboration.

In contrast to Figure N° 5, a firm with a new process or a new input would gain market share at the expense of other firms in what might be termed a Red Ocean. Such an ocean would be depicted as in Figure N° 6 where the value of production of the sector stays constant and the firm increases its market share at the expense of other firms.

Although Figures N° 5 and N° 6 present the two extremes of Blue and Red Oceans, in practice we might expect to find a mixture of both. This mixture leads to a problem: we cannot design a single measure that will tell us how much the firm is blue or red in comparison to the sector.

Figure N° 6

Graphical Description of a Red Ocean
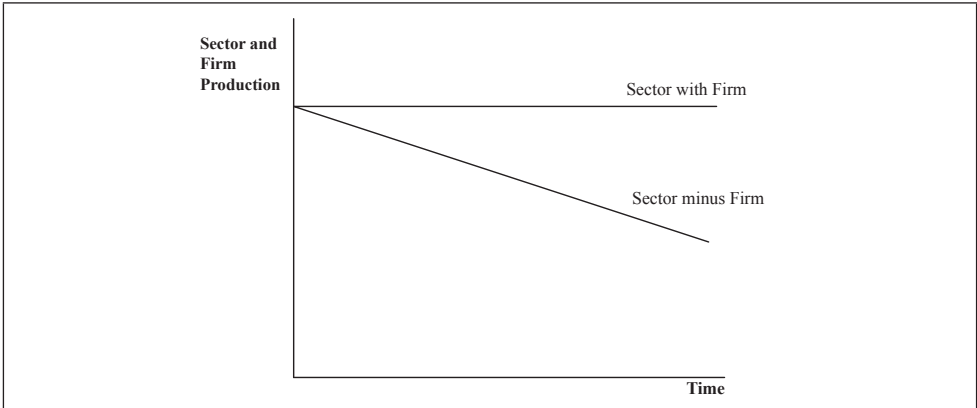
Source: Own elaboration.

This difficulty in designing a measure of the firm´s blueness or redness forces us to take a different approach. Thus, we start by looking at the share of the principal firms in the sector industrial production. This view will provide a rough guide to whether it is relevant to look for blue and red oceans. Thus, in this article we will limit our attention to the search of firms that have substantially increased their market share.

We have proposed to check whether we can ascribe a Blue/Red index to these firms by looking at: the actual increments in production recorded by the firms and the number of firms in the sectors.

On the basis of these observations about market share, actual production, and number of firms, we will try to rank firms according to their blueness or redness.

We do not attempt this ranking in this article because such an exercise presents a number of difficulties as will be shown below. For one, a number of the more salient establishments in Colombia belong to the same holding firms. The recorded increase in the share of one establishment and the decline of another do not necessarily point to a Red Ocean but to the reshuffling of production by a firm among the establishments that it owns. Another difficulty is the difference in the size distribution of firms in the different sectors. Finally, we have that new establishments may be born as independent firms but also as diversification strategies of large, continuing firms.

We clarify these issues in our analysis of a number of sectors. Nevertheless, the general conclusion is that it is warranted to look at Blue and Red Oceans: in all sectors of the economy we find establishments that substantially increase their participation.

The difficulties with the classification of these firms in blue and red oceans is explained in the subsequent analysis.

Starting with the first component of the Manufacturing Sector covered by DANE we find in Figure N° 7 the production, processing and preserving of meat and meat products of subsector 1511[9]. We calculate the share of the most important firms in relation to sector industrial production.

The first thing to note about Figure N° 7 is that the numbers of the establishments do not have any substantial meaning. The numbers assigned to establishments are random numbers to hide the identity of the establishments under the confidentiality rules established by DANE. Nonetheless, these random numbers are assigned only once to an establishment so that the nature of the panel is not disturbed.

---

9   We sequentially analyze the first few sectors of the manufacturing industry in order to dispel any notion that our results may be due to a selective choice of sectors. The complete set of sector figures may be obtained from the authors on request.

The examination of Figure N° 7 reveals that a new enterprise, establishment number 11124 enters the market and rapidly claims a 10% stake in the sector. At the same time establishment 4612 collapses and the production of 7781 is reduced from 16% to 9%. Given these statistics the first thing to inquire is whether these establishments might belong to the same firm. Thus, we have to rule out the possibility that 11124, 4612, and 7781 belong to the same firm and that all we are recording is the movement of production from one establishment to another.

FIGURE N° 7

Sector 1511
Production, Processing and Preserving of Meat and Meat Products
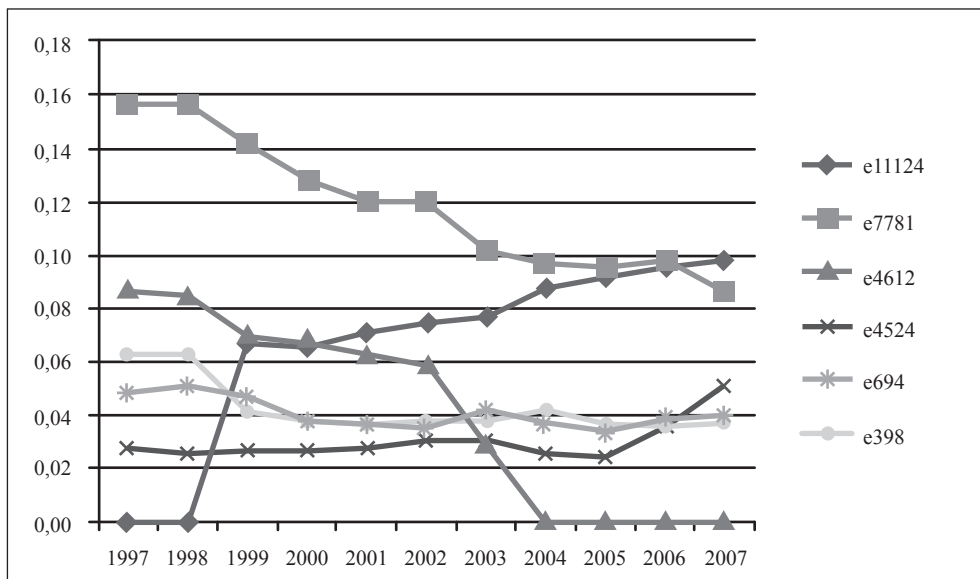
Source: Own elaborationon the basis of the AMS DANE.

Thus we produce a table of the firms, the establishments and their share of sectoral production over the period.

Table N° 2 establishes that there is no ownership relationship between 11124, 4612 and 7781. Although 11124 belongs to a multi-establishment firm, 560223, the companion establishment, 11147, is not very large. Again it has to be noted that the firm numbers have no real meaning: they are just random numbers assigned to firms.

<div align="center">

TABLE N° 2

The Firm and Establishment Data

</div>

Firm	Estab.	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
560223	11124			0,06	0,07	0,07	0,07	0,08	0,09	0,09	0,10	0,10
560223	11147							0,00	0,00	0,00	0,00	0,01
6870	4612	0,09	0,08	0,07	0,07	0,06	0,06	0,03				
11881	7781	0,16	0,16	0,15	0,13	0,12	0,12	0,10	0,10	0,09	0,10	0,09

Source: Calculations by the authors on the basis of the AMS DANE.

On the basis of Figure N° 5 we might venture a call as to whether we are dealing with a Blue or Red Ocean: red. However, our evaluation also has to take into account what is happening in the broader sector. In Table N° 2 we present the real production values for the firms and the sector as well as the number of firms in the sector.

Table N° 3 indicates that the number of establishments in the sector has increased. So has the industrial production in the sector. On the basis of this analysis we might say that establishment 11124 navigates in a blue ocean.

<div align="center">

TABLE N° 3

Sector 1511.
Industrial Production of the Establishment and the Sector
(thousands of million)[10] and the Number of Establishments

</div>

CONC.	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Estab. 11124	0	0	115	130	147	163	186	225	242	282	320
Sector	1584	1597	1692	1946	2056	2186	2411	2549	2644	2971	3248
N° Firms	134	133	134	135	131	137	145	146	155	157	155

Source: Calculations by the authors on the basis of the AMS DANE.

Establishment 11124 has no exports. Therefore if we label it blue, we would also be implying that the firm derives its advantage from a new process. Thus, for the further analysis proposed for a subsequent paper we might give establishment 11124 a high ranking on a blue/red index scale and would also record that it probably has a new product.

The next sector for analysis is sector 1521[11], processing and preserving of fruit and vegetables. Figure N° 8 shows extreme variations at the establishment level. Establishment 994 which had nearly 40% of the sector market disappears. Establishments 8461, 12946 and 13021 increase their share.

---

10   Constant 2003 pesos.

11   Sector 1521 corresponds to sector 1513 in the United Nations ISIC revision 3.

Figure N° 8

Sector 1521
Processing and Preserving of Fruit and Vegetables
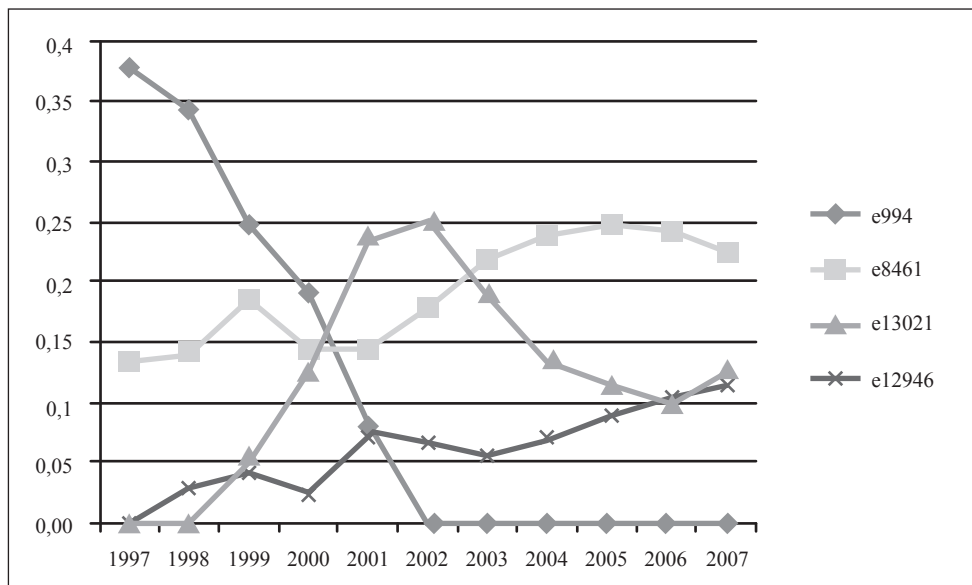
Source: Own elaboration on the basis of the AMS DANE.

However, a closer look at these establishments indicates that 12946 and 13021 belong to the same firm, 11948 as shown in Table N° 4. The table shows that a decrease in the share of 13021 is related to the increase in the share of 12946.

Table N° 4

The firm and Establishment Data for Sector 1521
Processing and Preserving of Fruit and Vegetables

Firm	Estab.	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
11948	12946		0,03	0,04	0,04	0,10	0,09	0,09	0,12	0,15	0,18	0,18
11948	13021			0,06	0,17	0,31	0,36	0,32	0,23	0,19	0,17	0,19
5598	994	0,39	0,35	0,25	0,25	0,11						
14087	8461	0,14	0,14	0,19	0,22	0,23	0,22	0,23	0,30	0,32	0,34	0,35

Source: Calculations by the authors on the basis of the AMS DANE.

Looking further into the relationships between firms and establishments we find that firm 11948 has another seven establishments (in addition to the two listed in Table N° 4) in sector 1594, production of non-alcoholic beverages and mineral waters.

Table N° 5 shows us how firm 11948 diversified from non-alcoholic beverages into the manufacture of food and vegetable foods. The table also indicates that the diversification was not minor. In 2007 the real industrial production of establishments 12946 and 13021 accounted for 23% of the production of the firm.

Table N° 5

The Establishments of Firm 11948. Industrial Production (thousands of million)

Firm	Estab.	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
11948	7864	38	38	23	27	84	44	50	48	44	52	58
11948	7858	22	20	14	7	0	0	0	0	0	0	0
11948	7862	20	25	10	11	19	23	27	25	25	43	45
11948	7861	28	33	21	20	34	32	33	42	43	45	45
11948	7863	75	73	48	42	76	73	75	91	89	94	95
11948	7860	38	64	62	55	91	79	70	88	90	83	94
11948	7859	70	83	67	57	87	90	93	166	280	289	307
11948	12946	0	23	29	17	52	41	34	43	65	81	92
11948	13021	0	0	38	81	166	159	117	85	81	78	100

Source: Calculations by the authors on the basis of the AMS DANE.

With respect to the sector we have the data presented in Table N° 6, in 2007 the real industrial production of establishments 12946 and 13021 accounted for 23% of the production of the firm.

Table N° 6

Sector 1521
Industrial Production of the Establishment and the Sector (thousands of million)[12] and the Number of Establishments

Firm	Estab.	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
11948	12946	0	23	29	17	52	41	34	43	65	81	92
11948	13021	0	0	38	81	166	159	117	85	81	78	100
14087	8461	107	115	127	94	103	113	136	148	175	191	183
Total Sector		802	822	688	644	704	637	616	625	715	788	821
N° Establis.		89	87	85	83	83	77	77	75	76	75	74

Source: Calculations by the authors on the basis of the AMS DANE.

---

12   Constant 2003 pesos.

Table N° 6 indicates that the number of firms in the sector has been reduced from 89 to 74 while the sector production has remained constant. While the sector production remained constant, firm 11948 through its two establishments, 12946 and 13021, took over 23% of the market. At the same time firm 14087 (establishment 8461) took another similar share of the market. These developments coincide closely to our depiction of a perfect Red Ocean. In order to establish whether this red ocean is caused by new technology or better and cheaper inputs we would have to delve into the value chains of the enterprises. This is possible and is suggested for an ensuing article.

The next sector to analyze is 1522[13], manufacture of vegetable and animal oils and fats. As shown in Figure N° 9, this sector does not appear to show clear winners and losers. However, upon closer inspection we note that enterprise 7693 that started in 1997 with a market share of 7%, which it increased to 9% in 1998, starts losing its share of the market and no longer exists by 2006.

Establishments 5473 and 2109 that had nearly 16% and 9% of the market, respectively, end up with 9% and 3%. On the winning side we have establishments 20 and 761 that increased their market participation from 4 and 1%, respectively, to 5,5 and 3,8%. A new establishment in 2002, 8665 goes from cero in 2001 to nearly 4% in 2007.

The first thing to check is that the reshuffle among establishments is not the reallocation of production within the same firms (the table is not shown). We find that all of the firms presented in Figure N° 9 have different parent firms. The inquiry nevertheless shows that establishment 5473 belongs to firm 8335 that has another establishment in the same sector, 11258. Establishment 11258 presents an stable market share of about 3%.

Firm 8335 also has two smaller establishments in sector 2424: manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations. Another establishment that has a multi-establishment parent firm is 2109.

The parent firm is 3265 and has three enterprises: 2109, 5018 and 7912. The last is the largest of the group and is devoted to sector 1549[14], other food products. By 2007 both 2109 and 5018 are listed in sector 2424, manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations. In our analysis of the data we follow enterprises so that moves between sectors do not lead to the sudden appearance or disappearance of enterprises.

---

13   Sector 1522 corresponds to sector 1514 in the United Nations (UN) International Standard Industrial Classification (ISIC) revision 3.

14   1549 in the in the United Nations (UN) International Standard Industrial Classification (ISIC) revisión 3.

Figure N° 9

Sector 1522
Manufacture of Vegetable and Animal Oils and Fats
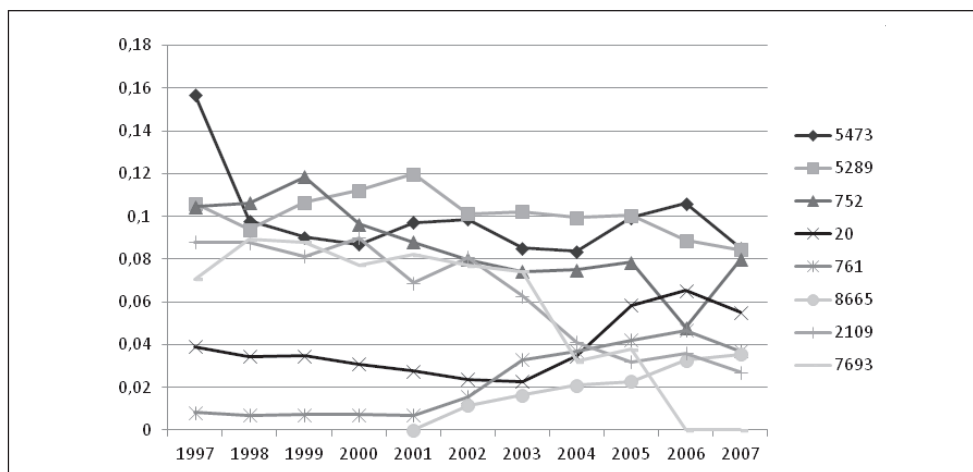
Source: Own elaboration on the basis of the AMS DANE.

Although establishment 20 only doubled its production in the ten years to 2007, establishment 761 grew by 530% and establishment 8665 was born and rapidly grew to capture 3.5% of the sector market, as shown in Table N° 7. These establishments do not seem to be operating in a red ocean as the aggregate real industrial production of the sector expands and there is no significant contraction in the number of firms. We might, subjectively, say that we are viewing a modest blue sector.

Table N° 7

Sector 1522
Industrial Production of the Establishment and the Sector
(thousands of million)[15] and the Number of Establishments

Firm	Estab.	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
22	20	63	60	67	70	54	49	54	84	130	139	123
1126	761	13	12	14	16	14	33	78	89	94	99	82
14304	8665						24	39	50	51	70	79
Total Sector		1621	1718	1884	2005	1881	1979	2262	2347	2228	2124	2230
No Establis.		59	54	55	53	52	54	54	55	55	52	54

Source: Calculations by the authors on the basis of the AMS.

---

15   Constant 2003 pesos.

Next we look at Figure N° 10 the information about manufacture of dairy products[16]. This Figure shows us a pattern that is for a great part the same as the previous figures. In fact, it is representative of the more than one hundred sectors covered by the AMS DANE.

Figure N° 10

Manufacture of Dairy Products
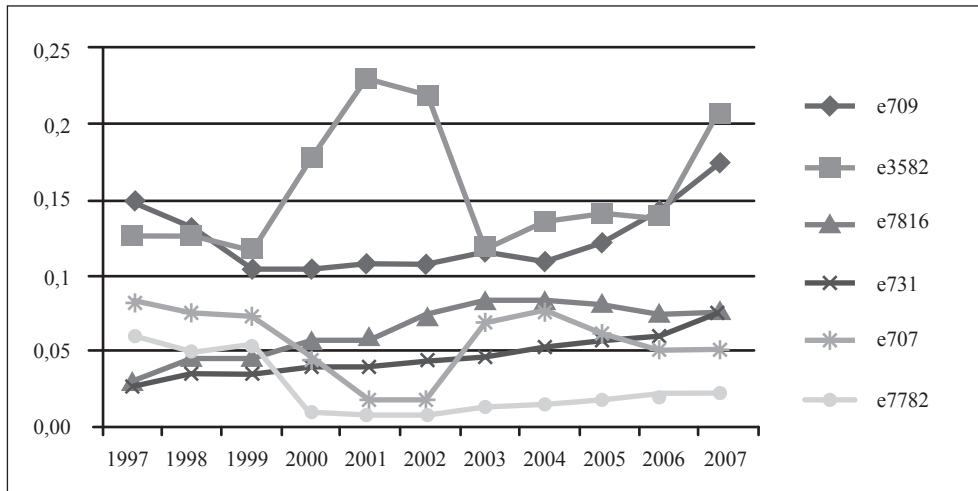
Source: Own elaboration on the basis of the AMS DANE.

With respect to any of these sectors, where Figure N° 10 is an example, we ask whether these establishments may belong to parent firms that:

1. May be shifting production among its dependent establishments.

2. May be very large and where the sum of the production of the establishments may represent a substantial fraction of the sector.

3. May be very large firms that are diversifying into other sectors.

Having carried out this analysis, we proceed to the examination of the performance of the enterprises in relation to the sectors. Are they leading the growth of the sectors? Or, are they merely taking a larger share of the sector sales? These analyses have to be carried out with a close watch to the sector shifting by some enterprises. Thus, enterprises may be classified as belonging to one sector at the beginning of the period

---

16   1539 in the in the United Nations (UN) International Standard Industrial Classification (ISIC) revision 3.

and to another at the end. These sector where the company is classified can make a big difference in the valuation of nature (Red/ Blue) of the company.

Nonetheless, the previous analysis supports the idea that the distinction of firms and sectors into red and blue oceans may provide a useful assessment of the dynamics of the manufacturing sector.

2.2. Innovation and Economies of Scale

Abstracting from the growth in resource inputs, Schumpeter (1939) ascribes growth to innovation and economies of scale. The purpose of this section is to explore the importance of innovation and economies of scale in the increase in Total Factor Productivity (TFP). We use the increase in TFP because this measure already takes into account the growth of factor inputs.

To measure TFP we use the data from the AMS conducted by DANE[17] from 1995 to 2007 for real value added and employment. This may sound crude but given the dynamics at the firm level[18] there is little sense in aiming for greater accuracy. If we chose a lower level of depreciation, say 5%, then the contribution of innovation increases with respect to that of economies of scale because the capital of continuing firms is given a higher value than if the rate of depreciation is higher. A higher level of depreciation increases the importance of economies of scale. We also skip the possible refinement of deflating firm production by the firms product prices for two reasons. The first relates to the process of innovation itself. A firm with a new or better quality product will charge a higher price. The deflation to physical productivity would hide this effect. The second reason refers to the empirical task of calculating firm deflators. Most firms produce several products that are often very different and go for completely different prices. The calculation of firm prices generates large numbers of outliers (that have to be removed) and is fraught with danger because it depends on the specific weighting of the goods taken into account. The investment series was deflated with the capital formation indices calculated by DANE.

Therefore our measure of productivity is the TFP calculated as the residual between the value added by the firm and the contributions made by capital and labor. Following Aghion and Howitt (2007), as a rough approximation we take the share of capital to be 0,3. Then our measure of TFP is equal to labor productivity divided by the ratio of capital to labor with an exponent equal to 0,3. Although this residual has been

---

17   The capital series was constructed starting in 1995 using across the board 5, 10, 15 and 20% depreciation rates.

18   Given very different firms in the various sectors with respect to size, productivity, exports and imports, specificity of the machinery and the survival probabilities, it is virtually impossible to assign depreciation rates. The depreciation rate for a firm that survives and grows may be very small while that for a firm with very specific machinery that fails will be near to 100%.

criticized as a "measure of our ignorance"[19] the important thing is that it may help us get an idea of the importance of innovation with respect to economies of scale.

In order to determine the contributions of innovations and economies of scale at the economy-wide level we propose to use the Foster, Haltiwanger and Krizan (2001) decomposition described in more detail below. The rationale for using this decomposition is the generally held view that innovations are typically the product of new or starting enterprises. We again quote Baumol:

> In seeking to explain the unprecedented and miraculous growth performance of free-market economies, this chapter focuses on the difference in, but complementary relationship between, the characteristic innovative contributions of large and small entrepreneurial firms, emphasizing that these two groups have tended to specialize in different components of society´s innovation process. The major breakthroughs have tended to come from small, new enterprises, while the invaluable incremental contributions that multiply the capacity and speed and increase the reliability and user-friendliness have been the domain of larger firms. (2010, p. 27)

The very same point is argued by Govindarajan and Trimble (2010). They explain that small, new enterprises can easily carry out innovation because they are not yet structured and organized. They state that large enterprises are organized to deliver performance. Therefore, "organizations are not designed for innovation. Quite the contrary, they are designed for ongoing operations" (p. 10).

Thus, we basically argue that the new firms conduct structural innovation while large, ongoing concerns carry out incremental innovations and reap economies of scale. We are aware that this is a heroic assumption. Of course it may also be argued that the process of innovation in a developing economy is very different from that in the developed economies to which Baumol (2010) and Govindarajan and Trimble (2010) refer. Notwithstanding this objection it still remains an interesting question to discern the contribution of new entrants with respect to continuing firms.

The contribution of continuing firms and the addition due to entry and exit to economic productivity are measured following a decomposition formula suggested by Foster, Haltiwanger and Krizan (2001). Thus we have:

$$\Delta TFP_{it} = s_{Ct-1}\Delta TFP_{Ct} + TFP_{Ct-1} - TFP_{it-1}\Delta s_{Ct} + \Delta TFP_{Ct}\Delta s_{Ct} + s_{Nt}(TFP_{Nt} - TFP_{it-1}) - s_{St-1}(TFP_{St-1} - TFP_{it-1})$$

Where:

TFP_{it} : Stands for total factor productivity of industry i.

---

19   Hulten provides a detailed analysis of this measure.

S_{Ct-1} : Relative weight of continuing firms in period t-1.

TFP_{Ct} : It is the total factor productivity of the firms that continue in the period t.

S_{Nt} : It is the participation of the new firms in the period t.

TFP_{Nt} : It is the total factor productivity of the new firms in the period t.

S_{st-1} : It is the participation of the firms that go out in the period t-1.

TFP_{st-1} : It is the total factor productivity of the firms that go out in the period t-1.

The Foster, Haltiwanger and Krizan (2001) equation establishes a decomposition of the TFP in five terms. The first one corresponds to the increase of the productivity of the firms that continue, using as weights the participation in the labor force in the initial period. The second one corresponds to the increase in productivity attributable to the changes in the shares of enterprises. The third corresponds to a residual fraction for continuing firms that is the result of the product of the change in productivity and the change in weights. The fourth term of the decomposition presented in the equation evaluates the contribution of new firms. The fifth term presents the contribution of the firms that exit.

The results of the decomposition are presented in Table N° 8. Because it might be argued that the results over the 1997-2007 period might be biased because of the 1999 recession or that a period of 10 years might be too long, we also decompose the increase in productivity over the 2002-2007 period.

The first thing to note about Table N° 8 is that the sum of the terms does not always equal exactly 100 because of some rounding errors. Secondly, we have that a greater rate of capital depreciation leads to a greater change in TFP as might be expected. Thirdly, the contribution of continuing firms increases as we increase the rate of depreciation as was anticipated earlier in this section. Finally, the percentage change in TFP is greater for the 1997-2007 than the 2002-2007 period.

Table N° 8

Decomposition of the Increase in Total Factor Productivity in the periods 1997-2007 and 2002-2008 (End points Analysis).

Period	Capital Depreciation Rate	Percent Change Productivity	1St Term	2Nd Term	3Rd Term	4Th Term	5Th Term
97-07	5%	30,25	77,0	1,0	4,6	-0,6	18,6
97-07	10%	41,69	79,5	0,8	4,7	1,0	13,4
97-07	15%	52,57	81,1	0,6	4,8	1,9	10,6
97-07	20%	62,43	82,3	0,5	4,8	2,5	8,9

Continues

Period	Capital Depreciation Rate	Percent Change Productivity	1St Term	2Nd Term	3Rd Term	4Th Term	5Th Term
02-07	5%	22,69	94,0	+0,0	+0,0	-9,0	14,6
02-07	10%	27,24	95,1	+0,0	+0,0	-8,2	12,1
02-07	15%	30,88	96,2	+0,0	+0,0	-7,8	10,6
02-07	20%	33,39	97,4	+0,0	+0,0	-7,6	9,7

Source: Calculations by the authors on the basis of the AMS DANE.

With respect to the decomposition we note that the sum of the terms for the contributions of within and between continuing firms (terms 1 to 3) always account for more than 80 percent of the growth of productivity at the economy-wide level. For the period 1997-2007 the within plant productivity growth is somewhat lower than for the 2002-2007 period. The lower within plant contribution in the 1997-2007 period is compensated by a more effective reshuffling of production from lower to higher productivity plants in relation to the 2002-2007 period.

The contribution of new firms to productivity is negligible at best in the 1997-2007 period and actually negative in the 2002-2007 period. In contrast, the exit of low productivity firms turns out to be substantial in both periods, although larger in the 1997-2007 period. Thus, the exit of firms turns out to be more important for productivity growth than the entry and growth of new firms. Although this result would seem to contradict the Blue/Red ocean analysis of the last section it must be remembered that the present analysis refers to the whole economy. It is very possible that if the analysis were conducted at the sector level we would find many sectors in which new firms would add a lot more to productivity. Also, in the last section we concentrated on the firms that demonstrated above average performance. We may surmise that this excellence is not replicated in the rest of the economy. Thus, overall, we might conclude that we have an economy with few exceptional new firms.

The low contribution of new firms to productivity does not, however, mean that they are not important. The new firms created during the period 1997-2007 provide 19,4% of the employment in 2007. In a similar way, the new firms in 2002-2007 provide 10,5 percent of the employment in 2007.

2.3. The 1912 Schumpeter Ladder

Section 2.1. indicates that there are fast-growing firms in most sectors of the economy. Some of them grow because they have found new markets (new products or exports), others grow because they out-compete the other firms in the sector with better technology or lower priced inputs. Section 2.2., however, reveals that this dynamic behavior of a select number of enterprises cannot be assessed on the basis of the

contribution of new firms to the productivity of the economy. Whether this behavior shows up at the sector level is a question that will be answered in a subsequent article.

The decomposition of the growth of Blue Ocean firms into the two components –expansion due to new products and the increment derived from the access to export markets– will also be left for a next article. However, we may anticipate that the way forward here is to examine the industrial production of the blue ocean establishments in great detail. On the basis of specific data on the products, volumes, prices and exports a decomposition formula can be devised.

The decomposition of the Red Oceans to the shares attributable to new technologies and new (cheaper) inputs is also left for a following paper. Again, this decomposition will be formulate on the basis of detailed information on products, volumes, prices and the volumes and prices of inputs.

In this section we want to assess the importance of re-organization which is defined as the take-over of establishments by firms or the fusion of establishments into multi-establishment firms. We start our analysis by looking at all firms in the manufacturing sector and establishing how many establishments they have. The data are reported in the second and third columns of Table N° 9. The table shows that the number of firms declined between 1997 and 2007 from 8275 to 7042. During the same period the number of multi-establishment firms also decline but in a smaller proportion. Therefore the proportion of multi-establishment firms increased from 245 to 271 percent.

Columns 4 and 5 of Table N° 9 show the number of establishments that are held by single-establishment firms and multi-establishment firm. These decreased from 8721 to 7443 in the 10-year period under consideration. The number of establishments belonging to multi-establishment firms also declined from 649 to 592. However, as a proportion of the total number of establishments the multi-establishment category increased from 7,44% to 7,95%.

The above measures of an increase in concentration obviously need to be refined. The improvements that can be suggested are not only in terms of the number of establishments but also in terms of employment or value added. However, for a first pass, it must be concluded that there appears to be a slight tendency toward greater concentration.

Table N° 9

The Number of Single and Multi-establishment Firms

Number of Estab. per Firm	N° Firms		Total Estab.	
	1997	2007	1997	2007
Total N° firms/estab.	8275	7042	8721	7443
1	8072	6851	8072	6851
2	127	120	254	240
3	29	27	87	81
4	16	16	64	64
5	10	5	50	25
6	5	6	30	36
7	5	4	35	28
8	1	6	8	48
9	2	3	18	27
10	3	2	30	20
11	0	1	0	11
12	2	1	24	12
14	1		14	0
16	1		16	0
19	1		19	0
More than 1 estab.	203	191	649	592
Multi/all %	2,45	2,71	7,44	7,95

Source: Calculations by the authors on the basis of the AMS DANE.

The slight tendency toward concentration evidenced by the manufacturing sector as a whole, is however very evident in some sectors, Table N° 10. Thus, for example, in sectors 2694 and 2695 related to gravel and cement, we find a sharp movement toward more concentration. The number of firms is reduced from 172 to 99 and that of the number of establishments from 214 to 143. The proportion of multi-establishment firms increases from 8,1 to 9,1. The share of establishments belonging to multi-establishment firms increases from 26,2% to 37,1%.

Table N° 10

Example of Concentration per Sectors-Gravel and Cement

Number of Estab. per Firm	N° Firms		N° Estab.	
	1997	2007	1997	2007
Total N° firms/ estab	172	99	214	143
1	158	90	158	90
2	6	2	12	4
3	3	1	9	3
5	2	1	10	5

Number of Estab. per Firm	N° Firms		N° Estab.	
	1997	2007	1997	2007
Total N° firms/ estab	172	99	214	143
7	1	1	7	7
8	1	3	8	24
10	1	1	10	10
More than 1 estab	14	9	56	53
Multi/all %	8,1	9,1	26,2	37,1

Source: Calculations by the authors on the basis of the AMS DANE

What we find in the cement sector is not, however, the rule for the whole economy. Nevertheless, in the analysis of blue and red ocean firms, this is a possibility that should not be excluded.

Conclusions

Explaining the cornucopia of new goods produced since 1750 and the abundance in which they are produced requires an approach that is not well covered by the general equilibrium model developed by Walras. While the Walrasian model must continue to be the centerpiece of economics, we concur with Schumpeter (1939). "The reasonable thing for us to do, therefore, seems to be to confine the traditional analysis to the ground on which we find it useful, and to adopt other assumptions (…) for a class of facts that lies beyond that ground"[20].

In the process of breaking new ground we are confronted by the questions of who generates innovations and who reaps economies of scale. The answer provided by Schumpeter is: the entrepreneur. Unfortunately the entrepreneur has received scant attention in the economics literature with the notable exception of the work by Baumol (2010). He not only suggests several intuitively attractive models but also explains that entrepreneurship is not an intractable quality that some countries have and others do not. According to Baumol the emergence of an entrepreneurial class depends on institutions. Countries with institutions that promote rent-seeking will have a dearth of entrepreneurs. The opposite will be true in societies that reward entrepreneurship and respect property rights.

Kim and Mauborgne (2005) in the Blue Ocean Strategy set out a number of guidelines to help entrepreneurs spur innovation. In their description of the steps to foster the development of new products and processes, they simplify the economic realm to blue and red oceans. These simple concepts constitute the bootstrap to engage in the empirical analysis of firms that grow through the creation of new market space and the firms that expand at the expense of their competitors. This empirical analysis,

---

20   Business cycles. Schumpeter (1939).

presented in section 2.1., indicates that we have a vast unexplored realm that must be carefully examined. We stress the conscientious nature of the research that is required because firms exhibit an extremely idiosyncratic behavior with respect to products and prices, and the sectors they define themselves to belong to.

The visually clear ups and downs of particular enterprises do not seem to register at the aggregate level. This is shown in section 2.2. the recommendation is to extend the analysis to the sector level.

In section 2.3. we posit that if the painstaking examination of the Blue/Red ocean firms is concluded, then a decomposition of their growth into the contributions of new products, new markets, new processes and new inputs can be completed. However, the section also highlights another area of attention: the reorganization of establishments through take-overs and fusions. In the aggregate of the economy this may not be particularly important but it certainly cannot be assumed away in some sectors.

In the end we conclude the article with great humility: our article does not connect the dots between theory and evidence in an unobjectionable way. Maybe in a subsequent paper we will be in a position to better explain the mechanism through which the market system produced the cornucopia we register since 1750.

BIBLIOGRAPHY

Aghion, P., Fally, T. & Scarpetta, S. (2007). Credit constraints as a barrier to the entry and post-entry growth of firms. *Economic Polic*y, 733-779.

Aghion, P. & Howitt, P. (1992). A model of growth through creative destruction. *Econometrica*, 60 (2), 323-351.

Aghion, P. & Howitt, P. (2007). Capital, Innovation and Growth Accounting. *Oxford Review of Economic Policy, 23* (1), 79-93.

Arthur, W. B. (1994). *Increasing returns and path dependence in the economy*. Ann Arbor: The University of Michigan Press.

Arthur, W. B. (2009). *The nature of technology: What it is and how it evolves*. New York: Free Press.

Bartelsman, E., Haltiwanger, J. & Scarpetta, S. (2004). *Microeconomic evidence of creative destruction in industrial and developing countries* (IZA Discussion Papers No. 1374). Bonn: Institute for the Study of Labor.

Bartelsman, E., Haltiwanger, J. & Scarpetta, S. (2008). *Cross country differences in productivity: The role of allocative efficiency.* Manuscript. University of Maryland.

Baumol, William J. (2010). *The microtheory of innovative entrepreneurship*. Princeton: Princeton University Press.

Bernard, A. B., Eathon, J., Jensen, J. B. & Kortum, S. (2003). Plants and productivity in international trade. *The American Economic Review, 93* (4), 1268-1290.

Bernard, A. B., Jensen, J. B., Redding, S. J. & Schott, P. K. (2007). *Firms in international trade* (NBER Working Papers No. 13054). Cambridge, MA: The National Bureau of Economic Research.

Broda, C. & Weinstein, D. E. (2010). Product creation and destruction: Evidence and price implications. *American Economic Review, 100,* 691-723.

Buchaman, J. M. & Yoon, Y. J. (1994). *The return of increasing returns*. Michigan: Michigan University Press.

Burke, A., van Stel, A. & Thurik, R. (2008). *Blue Ocean versus Competitive Strategy: Theory and evidence* (the Netherlands EIM Report). Zoetermeer, Netherlands: Erasmus Institute of Management.

Davis, S. J., Haltiwanger, J. & Schuh, S. (1997). *Job creation and destruction.* Cambridge, MA: The MIT Press.

Diamond, A. M. (2007). *The neglect of creative destruction in micro-principles texts*. *History of Economic Ideas*. Nebraska: University of Nebraska at Omaha.

Dunne, T., Roberts, M. & Samuelson, L. (1998). Patterns of firm entry and exit in US manufacturing industries. *Rand Journal of Economics, 19* (4), 495-515.

Eslava, M., Haltiwanger, J. C., Kugler, A. D. & Kugler, M. (2009). *Trade reforms and market selection: Evidence from manufacturing plants in Colombia* (Working Papers No. 14935). Cambridge, MA: National Bureau of Economic Researh.

Foster, L., Haltiwanger, J. C. & Krizan, C. J. (2001). Aggregate productivity growth: Lessons from microeconomic evidence. In E. Dean, M. Harper & C. Hulten (Eds.), *New Developments in Productivity Analysis* (pp. 303-372). Chicago: University of Chicago Press.

Frenken, K., Silverberg, G. & Valente, M. (2008). *A percolation model of the product life-cycle* (Working Paper Series No. 2008-073). Maastricht: United Nations University/ Maastricht Economic Research Institute on Innovation and Technology.

Govindarajan, V. & Trimble, C. (2010). *The other side of innovation: Solving the execution challenge*. Boston: Harvard Business Review Press.

Helpman, E. (2006). Trade, FDI, and the Organization of Firms. *Journal of Economic Literature, 44,* 589-630.

Hulten, C. R. (2001). Total Factor Productivity: A Short Biography. In E. Dean, M. Harper & C. Hulten (Eds.), *New Developments in Productivity Analysis* (pp. 1-54). Chicago: University of Chicago Press.

Kaldor, N. (1972). The irrelevance of equilibrium economics. *Economic Journal, 82,* 1237-1255.

Kornai, J. (1971). *Anti-equilibrium: on equilibrium systems theory and the tasks of research*. Amsterdam: North-Holland Publishing Company.

Kim, W. C. & Mauborgne, R. (2005). *Blue Ocean Strategy.* Boston: Harvard Business School Press.

List, A. J. & Zhou, H. (2007). *Internal increasing returns to sale and economic growth* (NBER Working Papers No. 12999). Cambridge, MA: The National Bureau of Economic Research.

Melitz, M. J. (2003). The impact of trade on intra-industry and aggregate industry productivity. *Econometrica*, *71* (6), 1695-1725.

Minsky, H. P. (1954/2004). *Induced investment and business cycles.* In D. B. Papadimitriou (Ed.). Cheltenham: Edward Elgar.

Picking winners, saving losers. Industrial policy is back in fashion. Have governments learned from past failures? (2010, Aug. 5th). *The Economist*.

Porter, M. (1990). *The competitive advantage of nations*. New York: The Free Press.

Schumpeter, J. A. (1939). *Business cycles: A theoretical, historical and statistical analysis of the capitalist process.* New York/Toronto/London: McGraw-Hill Book Company.

Schumpeter, J. A. (1942/1992). *Capitalism, socialism and democracy.* London: Routledge. (Original 1942)

Schumpeter, J. A. (2005). *Business cycles: A theoretical, historical and statistical analysis of the capitalist process.* Mansfield Centre, CT: Martino Publishing. (Original 1939)

Schumpeter, J. A. (2006). *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle.* New Brunswick, NJ: Transaction Publishers. (Original in German, 1912; English, 1934)

Spulber, D. F. (2009). *The theory of the firm: Microeconomics with endogenous entrepreneurs, firms, markets, and organizations.* Cambridge: Cambridge University Press.

Vernon, R. (1966). International investment and international trade in the product cycle. *Quarterly Journal of Economics,* 80 (2), 190-207.

Wagner, J. (2007). Exports and productivity: A survey of the evidence from firm-level data. *The World Economy, 30* (1), 60-82.

Wengel, J. T. (2006). Creación y destrucción del empleo en la industria colombiana. *Revista de la Información Básica, 1* (2). Disponible en http://www.dane.gov.co/revista_ib/html_r2/articulo4_r2.htm

Wengel, J. T., Suárez, L. M., Martínez, J. F., Pérez, G., García, F. & Ferreira, B. (2006). *Dinámica y productividad de la industria colombiana: empleo, exportaciones y la pequeña empresa* (Documentos de Economía 2006-2). Bogotá: Universidad Javeriana.

Wengel, J. T., Ferreira, G. B., Salgado, L. & Suárez, L. M. (2009). La importancia de la microeconomía schumpeteriana: un análisis de panel para Colombia. *Revista de la Maestría en Derecho Económico, 5,* 37-65.

Yeaple, S. R. (2005). A simple model of firm heterogeneity, international trade and wages. *Journal of International Economics, 65* (1), 1-20.