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Innovation Capability Configuration in Complex Product Systems: The Brazilian Shipbuilding and Offshore Industry

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Abstract

This paper aims to analyze how capabilities are developed and arranged to generate economic positive results in two complex product systems (CoPS) firms. In this context, this paper is a case study based on interviews with the Shipbuilding and Offshore Industry in Brazil covering the overall characteristics of the firm's capabilities. Results show that, out of the four innovation capabilities, there is a difference in the predominance and importance of them in each firm. The essence of this difference seems to be in the technological content of each firm which will require diverse capabilities' configuration. The results from these two CoPS firms, corroborate with the finding of previous studies that the success of any firm relies on the predominance of at least one of the four capabilities. As this study is conducted in Brazilian Shipbuilding and Offshore firms, this implies that the generalizability of this study's findings is limited to firms in Brazil and cannot be applied to other markets without a further validation. This empirical research has extended our understanding about the relation between innovation capabilities and CoPs. Also, the obtained findings offer the Brazilian executives and managers strategic insights in relation to need to develop innovation capacities even in complex productive structures. The academic value of this research is the analysis of CoPS through the perspective of innovation capabilities. Besides that, the analysis of a re-emergent industrial sector in a developing country context.

Keywords: Capabilities, Complex Product Systems, Technology, Business

Introduction

Industrial activity is often triggered or backed by governmental efforts and incentives to tackle contextual windows of opportunity to generate economic growth. This is often the case in Complex Product Systems (CoPS) (Davies and Brady, 1998). Scholars define CoPS as technological systems high in complexity and value (Miller *et al.*, 1995; Hobday, 1998; Dedhayir *et al.*, 2014). However, successful and lasting economic outcomes will depend on how firms develop their capabilities and become autonomous from any governmental dependency

(Bergek *et al.*, 2008; Hardstone, 2004; Hobday *et al.*, 2005). This is only achieved if firms can find the right configuration of internal capabilities to tackle technology and business issues.

In order to achieve a long-term economic performance, firms must constantly orchestrate, develop and adapt their capabilities (Jacobides and Winter, 2005; Madhok, 1996; Loasby, 1998; Foss and Foss, 2004). Based on this, empirical evidence shows that innovation capabilities create different benefits for enterprises (Maldonado-Guzmán *et al.*, 2018). Thus, considering the innovation capabilities, the innovation capability-based model to the firm developed by Zawislak, Tello-Gamara, Alves, Barbieux & Reichert (2012, 2013), technology and business are two vectors that respectively correspond to four essential capabilities: *development, operations, management and transaction capability*.

Different research's has been conducted to analyze the influence of these four capabilities in individual industrial firms (Reichert *et al.*, 2015; Alves *et al.,* 2017; Zawislak, *et al.*, 2018), the differences in the way capabilities are configured can be specially highlighted in CoPS where different firms combine diverse knowledge bases complementarities in order to produce the final outcome (Hobday, 1998; Davies and Hobday, 2005, Magnusson *et al.*, 2005; Gholz, James and Speller, 2018).

The purpose of this paper is to analyze how these capabilities have been configured to allow the development of the industry in two firms belonging to the shipbuilding and offshore industry in Brazil. As in a CoPS, the industry is largely based on single or multi-projects. Companies engage in transient inter-firm arrangements that often require them to find new capability combinations to deal with new specifications or contextual situation of available suppliers. While some level of stability may provide during the process due to contractual safeguards, the continuity of the arrangement depends heavily on technical-economic performance of all participants and, consequently on key capabilities they are able to develop.

This paper is organized as follows. First, we discuss the literature on Capabilities and present the framework we'll rely on, distinguishing two major vectors: technology and business. Second, we present the research procedures of this study, followed by the discussion and conclusion.

Addressing technology and business through firm's capabilities

Innovation has been recognized as the greatest source of economic development. In this sense, to understand the phenomenon and help to improve companies' new knowledge proposition to the market, the literature has dealt with the topic using the innovation capability lens to explain the enterprises that innovate (Lall, 1992; Bell and Pavitt, 1995; Chandler, 1992). Based on that, Primo and DuBois (2012, p.48) claim that "as economic activity shifts away from developed economies towards emerging markets, the ability of firms in these markets to stand on their own as global competitors is of paramount importance".

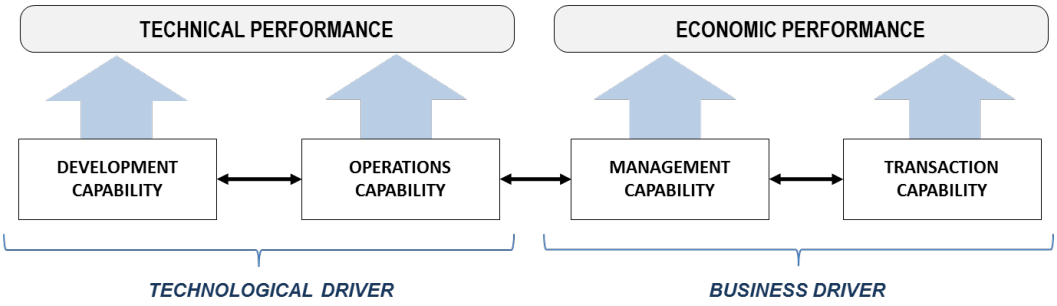
The concept of capabilities was first presented by Richardson (1972) defining them as the 'knowledge, experience and skills' of the firm. To Dosi, Nelson and Winter (2000) capabilities express the firm's "know-how" about doing certain things which means "to have a generally reliable capacity to bring that thing about as a result of intended action" (p.2). Routines are the capabilities' "building-blocks" (Grant, 1991; Chandler, 1992; Collis, 1994; Dosi, Nelson and Winter, 2000; Peng *et al.*, 2007; Alves *et al.*, 2011). Moreover, since capabilities carry the intrinsic nature of each firm based on knowledge, they explain why firms are different (Nelson, 1991).

Not only knowledge possessed by firms is different, but it is constantly subjected to a change through a cumulative process of learning. Sustainable competitive advantage is regarded to be the result of how firm's ability to deal with this process through dynamic capabilities (Teece *et*

al., 1997; Eisenhardt and Martin, 2000). Even though different concepts are found in literature, we understand that in order to create and sustain competitive advantage over time, firms must constantly develop and create new and dynamic capabilities. These dynamic capabilities, as a matter that involves knowledge and practice resources, it is directly related to generate innovations as outcomes.

However, while much discussion has been realized on the role played by capabilities and dynamic capabilities, it is often the hard to define what the important capabilities are (Alves *et al.*, 2011). Zawislak *et al.* (2012) propose a framework of innovation capabilities that are define four capabilities that can be found in any firm: technology development capability, operations capability, management capability and transaction capability. These capabilities are dived into a technological and a business driver.

Figure 1. Analytical framework



(Adapted from Zawislak *et al., 2013)*

These technological and business drivers both mix two important functions of the firm, that of an agent of change and entrepreneurial activity and, at the same time, of an agent of coordination of internal resources that has to fulfill external gap in the market in an efficient manner.

The Technological Driver

Development and *Operations Capabilities* correspond to the technological driver of the firm. Zawislak et al. (2012) defined *development capabilities* as the "The ability that any firm has to interpret the current state of the art, absorb and eventually transform a given technology to create or change its operations capacity and any other capability aiming at reaching higher levels of technical-economic efficiency" (p17).

Operations capability is the "ability to perform the given productive capacity through the collection of daily routines that are embedded in knowledge, skills and technical systems at a given time" (Zawislak *et al.* 2012, p.17). For Wu *et al.* (2010), operational capabilities are firm-specific sets of skills, processes, and routines, developed within the operations management system, that are regularly used in solving its problems through configuring its operational resources.

These two capabilities combined involve what Lall (1992) described as the way firms absorb, process, create, change and generate feasible technical applications and the knowledge-based products and services. Or what Bell and Pavitt (1995) defined as the resources needed to generate and manage technological change.

The technological driver represents the Schumpeterian function of creating an operation, changing the efficiency patterns of an industry. However, while these capabilities are important, they are only valuable if they can generate positive economic outcomes, that is,

business. Therefore, development and operations capabilities are insufficient in explaining positive performance. They must be complemented by *management and transaction capabilities.*

The Business Driver

Moreover, the *management capability* is related to the development of a wide range of skills to deal with unpredictable circumstances. According to Whitley (1989) management capability not only reduces the costs imposed by uncertainty, but also is dynamic and evolutionary. It concerns the maintenance of the different areas of the firm and requires the constant improvement of resource's coordination and use, thus mixing continuity and innovation strategically.

The *transaction capability* is defined as the combination of activities that the firm uses in order to minimize transaction costs (Zawislak and Gamarra, 2013), thus, complementing the technological capability. Furthermore, for Gamarra (2013), transactional capability is defined as a repertoire of skills, processes, experiences, knowledge and routines that the firm uses to minimize their transaction costs.

The business driver combines the functions proposed by Coase (1937) and Penrose (1959), on the one hand, the make or buy decision arises from the comparison of the costs of organizing certain transactions internally within the boundaries of the firm in relation to carrying the same transactions in the market. On the other, it highlights the ability of management to efficiently allocate internal resources efficiently and expand the boundaries of the firm.

These two major drivers outline that, in order to exist and perpetuate itself overtime must, the firm must be capable of combining these four capabilities in order to complete the full cycle of bringing any technical solution (goods and services) to fill an economic transaction in the most efficient manner.

Complex product systems

Complex Products Systems (CoPS) are sometimes considered cases of exemption for some theories where mass production behavior and a regular technological trajectory can be expected (Peltoniemi, 2011). CoPS are high-value capital-goods produced by request, not a mass production, which requires a high degree of specialization and are usually produced by projects. Due to the high level of investment such, projects are sometimes backed by government intervention (Hobday, 1998), through subsidies, market protection or and incentives.

For "complex" it is understood the breadth of knowledge and skills required to reflect other critical product dimensions (Hobday, 1998). The concept of Complex Product Systems is related to levels of uncertainty and risk (Hofer and Halman, 2004). According to Hansen and Rush (1998), the high investment in engineering and technology for the generation products with large numbers of components adapted is the risk which the firm runs by developing project with large specifications. Thus, examples of CoPS include aerospace industry, military systems, offshore oil platforms and others.

Different than in mass markets where the technology of production reflects specific market behavior, in such systems industrial arrangement are usually fragmented among many firms which are specialized in the production of parts or modules that will be integrated in the final product to be delivered to one or few clients. Firms rely on different sets of skill and technology as well as contractual arrangements and consequently must find different capabilities configuration to deal with the stage of production they are responsible for. In this sense,

analyzing this type of industry can allow reflections on how the different set of skills and technology influences the capability configuration of each firm in the arrangement.

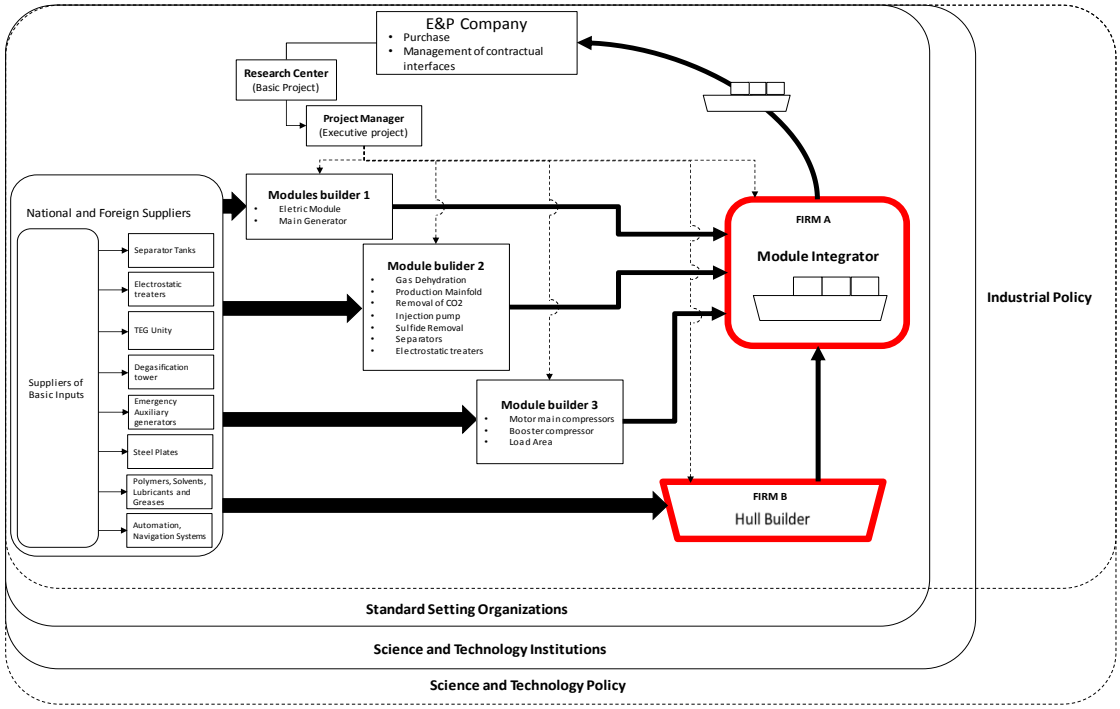
Research design and method

The aim of this research is to analyze the influence played by the two major vectors of capabilities, technology and business in an emerging industry. In order to accomplish this aim, we conducted an exploratory study where evidences of two empirical analyses were collected. We collected data from two companies of the Shipbuilding and Offshore Industry in Brazil. The two companies represent two major processes in the shipbuilding supply chain. Firm A is responsible for the final module's integration, whereas Firm B is responsible for building the platform hull.

According to the National Union of Construction and Repair Offshore Marine Industry (SINAVAL), South Korea and China are the leading world oil producers with 67%. All other countries together represent 15% of the total production amount, including United States (military ships), Singapore (offshore platforms), India and Brazil.

The Brazilian Offshore Industry started in the 50's going through times of growth and crisis. From the beginning of the current decade, because of the large growth exploration and offshore oil production in the country, the Shipbuilding industry of Brazil began a recovery process. There are 47 shipyards in Brazil all over the country, concentrating most in the southeast, specifically in the state of Rio de Janeiro. Furthermore, there are 11 new shipyards in construction. The Brazilian Offshore Industry is a typical case of an industry ruled by government policies. This is because the national government, through us, is the only national company interested in this industry.

Figure 2. Example of technological Interfaces involved in one Platform Construction Project



Companies interviewed

Two of the main shipyards are located in the southernmost part of the country and operate the shipyards under a public concession. The industry has been operating in the region 8 year from now. Rio Grande's Offshore Pole (as it is called) has already built two platforms so far and there are two more scheduled for conclusion by the end of the year.

The two empirical analyses were taken at the two main firms operating in Rio Grande's Offshore Pole. We present here the most important data related to each of these firms in order to characterize them and to promote a better understanding about the findings of this research.

The first firm contacted was Firm A. The firm was founded in 2005 by the merge of three other firms (each one acting in a different industry), one from building industry, the second from heavy engineering, and the third which operated in the oil and gas industry. The first operation Firm A performed was the construction of *Floating, Production, Storage and Offloading* (FPSO) platform required by public auction by the major oil and gas explorer and producer in the country (E&P company). Nowadays, Firm A is also participating in the assembly a semi-submersible platform and has recently delivered the second FPSO. The responsibility of this firm in the platform development projects are related to the engineering, buying main components, building and assembling the platform, as well as testing them. They have around 3,000 employees.

The other firm studied in this paper was Firm B which was created in 2010 and hired by the E&P company through public auction for building eight bottom hulls for offshore platforms extraction in deep waters. The main components produced by Firm B are hulls, modules and drillships. Figure 2 shows a general example of the distribution of activities of this CoPS industry and the supply chain position of the two companies analyzed.

Data collection and analysis

The data collection was performed as threefold. First, we collected information from secondary sources (public information, internet, firm's websites and open documents, annual reports, and so on). As a second stage we performed in-depth interviews with the head office manager of Firm A and the production engineer of Firm B. In Appendix A we present the research protocol undertaken on both interviews. The interviews occurred in 2012 and 2013 in the city of Rio Grande, Rio Grande do Sul (RS), south of Brazil at the headquarters of the firms.

Results

According to the literature review on capability theories and specially regarding the analytical framework proposed (Zawislak, *et al.*, 2012), we'll further explore the collected data. We will firstly analyze each firm as separate in its specificities and then we discuss their relationship and common understandings.

FIRM A – Module Integrator

The main activities developed by Firm A concerns assembling the modules that compose the offshore platforms. There is a difference between regular shipyards and the work Firm A does, especially because it doesn't produce the platform's hull. Although the other analyzed firm is a shipyard that produces the platform's hull and assembling activity, these two firms are also competitors, concerning the assembling process. Any shipyard can essentially be eligible for making the assembly process. And this is because that E&P company usually opens two public auctions, one to produce the roofs and the other for the assembling activity.

When the interview was taken, Firm A was working on two simultaneous projects of offshore platforms. These projects may take around 2 to 3 years to be completed. The average cost of a platform produced in Brazil is around 1.5 billion dollars. In order to deliver an offshore platform project, Firm A must develop and organize different capabilities.

The first capability is related to technological development. In relation to this capability, it is a requirement of the public auction from Oil E&P Firm, that 65% of the material used to produce the platforms must be made in national territory. As the coordinator of construction and assembling said: "In a general sense, the work Firm A does is analogous as a Lego play, you have to assemble all the pieces to form the set of pieces that an offshore platform is". So, their main problems do not come from the technological basis but are in finding national suppliers that have the required specialization.

The technological development is not new, that is, Firm A follows strict requirements and specifications for building and assembling offshore platforms used worldwide. The interviewee says that their innovation is just geographical since it is being produced in Brazil now, especially in the south region. Thus, the suppliers are also getting specialized to enter in this industry. But concerning the product - the platform itself - it has no innovation.

However, there are two technological innovations highlighted by the interviewee, that are a special kind of a moving ceiling to protect workers from wind and rain during their activities and an electronic equipment to measure workers' real ability to weld. This equipment was created due to a need of the firm to test and know what the real abilities of their workers were. They explained that ever since the firm started to operate in the region, there were lots of people willing to work with them, but they did not have the real ability to operate and weld. This equipment is now being licensed by Firm A. As we can see, these two main technological innovations are not directly related to the final product or to high-technology development, but mainly operations capabilities concerning to the basic need for both infra-structure and training to guarantee production and economic efficiency.

The second required capability concerns operations. This is the area that Firm A defines as its obligation, that is, to make it work. They organized their production process by projects, and inside each project they have to assure total quality. The deadlines must be respected and the general rules of international offshore industries, like safety and security are strictly followed as well. However, what stands out from this analysis is that, all these operational issues from quality to deadlines requires an intense attention from management in order to ensure that specifications are met.

Management capability, it therefore the most important capability of firm A. There are several aspects to be highlighted related to management capabilities. First, since the firm is organized mainly by projects thus each project is independent and has its team, areas and self-business units. Firm A has only two general director and manager that respond for all the projects. Other important information is related to the constitution of the firm, that only when it was approved by the public bid, that it formally established its formal and physical structure. That is to say that it was all planned and specified only for this complex special product: offshore platforms.

As the coordinator of construction and assembling says: "The main competitive advantage is the engagement and commitment that we do our job with in order to produce the exact product that was asked for". For that reason, they count with a special kind of co-participation, that is, there is a technical team representing the E&P Company in all the stages of production organized by Firm A. They are in constant exchange, collaborating and co-participating during the whole production process.

One of the major problems and struggles that concern Firm A success is related to individual competencies development. There is a lack of specialization and skills in the different job positions according to what the offshore industry requires. Thus, the major challenge is in developing and forming specialized qualified labor force, especially at a technic level. Nowadays, among 81% of Firm A's workers are from the south of Brazil.

As this is an only customer firm and it is hired before the start of the projects by public auction, the main concern of transactional capabilities was with suppliers: selection, contracts, costs, specificities, and so on. At this regard, the interviewee said that they use to buy from national industries the raw material and material with less complex transformation, and from abroad the complex materials and technology related. The second major challenge of this firm is related to the search and relationship to be developed with potential suppliers. It is difficult to find quality and specialized suppliers nationally, so the interviewee said that they have to develop close relationship with potential and already operating suppliers. This relationship demands that Firm A get involved with suppliers from instructions on specifications to direct training and close supervision. The transactional challenge, as the same case of the human resources, takes time, because it demands the mobilization of people, learning, abilities and, the most important, it requires the development of new capabilities.

FIRM B – Hull Builder

The main activity developed by Firm B is to produces the platform's hull, unlike firm A, which assemble the modules that compose the offshore platforms. Firm B was created by and engineering company to compete in the Brazilian E&P Company's bids for construction of ship hulls for oil extraction. When the interview was taken, Firm B was working with the construction of seven ship hulls. This service is carried out by reproduction, that is, for instance, all the ship hulls must follow the same technical design. The main competitive advantage of the company according to the interviewee is the manpower (technical resources, thus called individual competencies).

The employees' knowledge comes mostly from the remaining companies of the 80's (first development of the Brazilian Shipbuilding industry). The coordinator of maintenance engineer said: "the company sought for new employees in the old industries back from the 80s". But as this decision was not enough to meet the needs of the firm, they developed training centers to overcome the training needs of the employees.

The domestic shipbuilding offers direct competitors in the firm level, however, this is not seen as a threat, since management considers its resources able to compete in this market. Moreover, the demand for this type of activity is large, which distributes the service offering. The company believes that there is no innovation in activities; as follows a pattern established by the contracting company.

In order to building platforms, firm B must develop and organize different capabilities. Development capability, although it does not produce any breakthrough, it leads the firm to be up to date with state of the art in the sector. Automation has been one of the main efforts of the firm in its operations and it represents a change in on the firm's technological base. As an example of automation, Firm B has weld inspection with ultrasound and robotic painting. Other important advance was related to the use 3D software for design and plans the architecture of the vessels to be produced. In this case, managers will have access to all materials use in the construction of the platform through a 3D model that shows each component individually.

Technological development and qualification are at the highest priorities to this firm. It has capitalized in university-industry relations by investing the and technological center within the

universities technological park for developing new solutions as well as preparing human resources to work in the sector.

The second capability is operation. Firm B has a tonnage of steel processing capacity of 11 thousand per month. This is the area that Firm A defines as its greater differentials. According to director of engineering the operations capability is the main company's ability, because they are in constant upgrade. They control their production process by tracking chips, where it is possible to locate all equipment and materials for the construction of platforms within the yard of the firm. Although, CoPS industries never obtain scale as in mass manufacturing industries, by winning the governmental-bid for producing eight equal hulls, the firm can have economies of repetition. This will allow improvement in routines and techniques which will eventually lead to efficiency.

The third capability is management. Firm B has a matrix organizational structure. Thirty percent of the company was bought by a Japanese firm in order to add and improve technical knowledge and technology to operations. Firm B has five thousand employees at various levels. Most of the staff is professional level (like welders and electricians), and part of them have higher education degree completed (such as engineers, managers and accountants).

Transactional capability was considered the least influential capacity in the Firm B. In the construction of platforms, FIRM B has only one customer, the E&P company. On the supplier side, the firm does not have much autonomy for searching for alternatives. Contractual clauses for the company are tied to registered suppliers and local industry. One of the major problems is the dependence of suppliers, but this is a condition prescribed in the bidding.

Discussion

Despite being in the same industry and part of the same value chain, they are two different companies with different capabilities arrangement. The basis of the difference in capabilities lies in the technological content domain by each company. If we see a product as the result of technology of a firm (Baecker, 2006), in a complex value chain such as the Shipbuilding and offshore industry, the ultimate expression of technological content that we have in any company is how much each contributes to the final product.

The final product for Firm A, is final platform. However, firm A does not build it from scratch. The basic project usually is delivered to Firm A who has only to follow the steps described in the manual in a “Lego-like” type of assembly. While the company has some operational capabilities to build some modules, the main activity for the company is to integrate the final models on the platform. Since time and quality are the main drivers for the company, its managerial capabilities are key in order to ensure the optimal allocation of resources. The company works by projects and so it needs to be able to hire technical and human resources effectively and contractual arrangements with suppliers and labor are extremely relevant. This justifies that the company does not have a team of engineers engaging full-time in developing technology of its own. The technological stage of Firm A is to ensure that the full integration of modules work properly. Therefore, it only needs to know what the resources are, where to find them and where to place them. No wonder it is a company run by administrators because they deal with complex project management. From the EPC acronym (Engineering, Procurement and Construction), the letter P seems to be its flagship. Any technical development happens with focus in problem solving to improve operations.

In the case of Firm B, final products include platforms, drill ships and tankers. The company has managed to dominate other steps of the construction process. The activities that are carried out in the companies’ dry dock go beyond "just fit" parts. It dominates the technology for steel

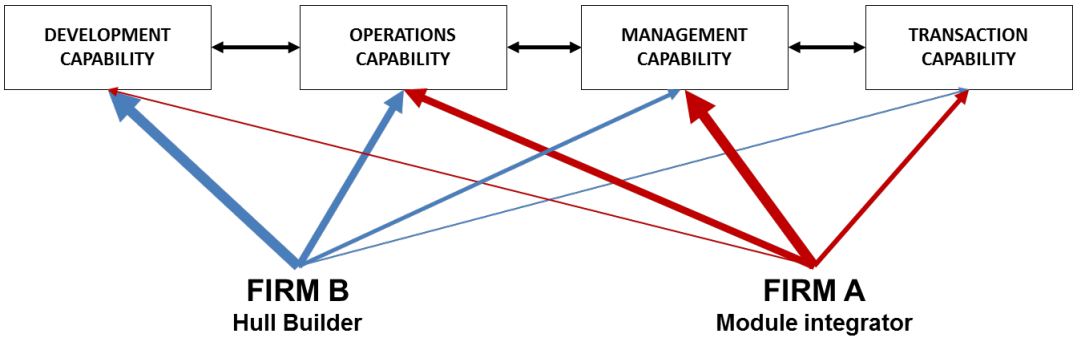
processing, cutting and welding which turns out to be important for Firm B to invest in technology to improve techniques and materials. In addition to knowing what the necessary resources are and managing production deadlines, it must also improve technology. This explains the investments in partnerships with the local universities in order to conduct research and develop technology. Because of the high level of investment, and higher complexity, the firm B needs to ensure also a higher level of stability and long-term plans with labor also being hired for longer term. In this sense, because of its complexity and investment, firm B is less likely to be dissolved. Moreover, because its technological content is more specific than Firm A, and Firm A is relatively less complex, Firm B, has the potential of building an entire vessel from scratch.

While Firm A, can enjoy short term business opportunities because of its ability to quickly pull the necessary resources, the lack of specificity of Firm A, is also a potential weakness in the long run. As the more technological intense Firm B broadens its technological boundaries it might become economically advantageous to vertically integrate similar activities of Firm A and compete for same markets. What seems to be a key advantage for Firm A is its flexibility, nonetheless, in this case, flexibility brings also high volatility.

In order to endure, it seems that firms should plan a shift from a business-driven approach to a more technological-driven one. By analyzing the cases, it seems reasonable to affirm that firm B, due to investments made in technology and its concerned with improving capabilities and technology beyond the operational level, will lead to further reaching business opportunities. Firm B shows clearly the concerned of management with expanding its knowledge boundaries.

The innovation capability configuration shows the arrows where the firm is stronger at the wider the arrows (Figure 3). Firm A clearly focus its attention in operations and dealing with several suppliers. In order to integrate these needs it must have a stronger management capability. Because the activities of Firm A are less specific, Firm A has more flexibility to enter or exit the arrangement. Conversely, Firm B has invested in more specific technology and it masters more stages of the productive activity and could eventually build the whole vessel by itself if it incorporates the activities of Firm A once they are less specific and volatile.

Figure 3. Capabilities predominance in each interviewed firm



Because Firm B has invested more intensively in technology, it is expected that this firm will have more chances to continue, opening new windows of opportunity that will not be available to Firm A. In this sense, Firm A is more of a temporary arrangement that to exploit a business opportunity, whether Firm B, is probably looking for the future.

We could attempt to draw a proposition that, those who invest in technology increase the life-time of the firm. However, this is not a risk-free decision. It involves the knowledge on technological and market. The Brazilian Shipbuilding and Offshore industry is being backed by the government and the State-owned Oil E&P firm who claim a 20 year perspective of oil exploration. Much uncertainty remains to what will happen to the industry after this single-client market is over. Firms willing to compete in international markets will have to catch-up with world-class technology and start develop new solutions and this is a tough challenge which might request other types of governmental intervention and incentives.

Conclusion

The purpose of this research was to analyze the influences of the capabilities of the firm to address technology and business issues. This was done in the context of the Shipbuilding and Offshore industry in Brazil. We aimed at contributing to a literature gap that relates the development of capabilities in a Complex Products and Systems emerging industry.

As in a CoPS (Miller *et al.*, 1995; Hobday, 1998; Dedhayir *et al.*, 2014), the Shipbuilding and Offshore industry in Brazil is largely based on single or multi-projects. In other words, this industry is interpreted as a complex of industrial activities that are linked over a long period to planning and for the assembly of a final product of high added value.

Originally based in Zawislak *et al.* (2012) analytical framework, two empirical analyses were performed to find how these firms organized their capabilities, because they are part of an emerging industry in Brazil. The empirical contributions of this research are not only to set the analyze the major vector and configuration status, but also to present a picture of this emerging industry which faces many challenges in order to turn to a future and become capable of focusing on technological development.

Considering both firms, the final product for Firm A, is final platform. In the case of Firm B, final products include platforms, drill ships and tankers. Based on that, the firm A has the capacity of management and the capacity of operation like predominant innovation capacities. However, firm B has the capacity for development and the ability to operate as predominant.

In general, both companies have a focus on production activity, which evidences the need to control productivity indices and low production costs. However, while firm A seeks management as an alternative to control these actions, firm B has the capacity to develop the mechanism to create alternative solutions.

Finally, we highlight the limits of this study. It was held at a single moment through interviews. Besides the lack of generalizability capacity, it would be best to analyze this process in different periods of time to see the shifts or changes in capability configurations. Future research is highly encouraged, especially on CoPS industry by mapping the differences in capability configuration across all firms belonging to the arrangement.

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[1] State-owned mixed economy company - Brazilian Energy, Oil and Gas Industry

[2] Portion located underground beneath a salt layer below the seafloor

Appendix a

Protocol questions:

1. A brief history of the firm:
2. Where the firm's knowledge came from?
3. How many employees?
4. How does the firm develop the knowledge and techniques to do what it does?
5. Does the firm have competitors? National or international level:
6. How is the knowledge of the firm in relation to these potential competitors?
7. How could you describe the commercial activities of the firm?
8. How is the relationship of the firm with customers and suppliers? Selling and buying?
9. What are the main requirements the firm does to its suppliers?
10. What are your main activities and projects now?
11. How does prices and coasts are defined in public auctions?
12. How long it takes to conclude a project?
13. How does the knowledge transfer process work with the firms involved in the process?
14. How could you describe the managerial activities of the firm?
15. How could you describe the financial and budget management activities of the firm?
16. How could you describe the past 6 years' changes the firm passed through?
17. How could you describe the organizational structure of the firm?
18. Could you give an innovation example?
19. How could you describe the main competitive advantage of the firm?
20. Could you describe how you understand the firm according to the 4 capabilities framework?

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A Theoretical Study on the Application of the "Vertical Tax Equity"

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Abstract

This paper focuses on discussing the principle of "Vertical Tax Equity", theoretically and mathematically, by comparing between three rules: absolute sacrifice, proportional sacrifice, and marginal sacrifice. Vertical tax equity is based essentially on two principles: "Ability to pay" and "The amount of sacrifice" or "Loss of welfare" for every taxpayer. The study showed and illustrated how to make a comparison between the three rules above which may contribute to the design of the optimal tax system, and how governments may determine the "fair share" for taxpayers` contributions in its spending. Graphs and mathematical equations were used to illustrate how to find the optimal tax rate based on the loss of the welfare of taxpayers.

Keywords: Vertical Tax Equity, absolute sacrifice, proportional sacrifice, marginal sacrifice

1. Introduction

Several authors argued that the classical criteria of equals treated equally imply no rank reversal criterion (Feldstein, 1976; Plotnick, 1981; King, 1983). Atkinson (1970), Blackorby and Donaldson (1976), Sen (1973), Kondor (1975), Rosen (1978), Fields and Fei (1978), and King (1983) have pointed out that index measures of the income distribution should be consistent with a social welfare function. Some of these authors have provided indicators to determine how income is distributed, such as Gini coefficient and Atkinson's index. Later, a number of authors linked the subject of public finance and taxation to income distribution. However, they discussed how to achieve tax Equity in their literatures. Although it is difficult to access tax Equity, it is a basic criterion for tax structure design. Most people agree that the tax system should be fair in the sense that anyone who pays a tax must be involved in a "fair share" for government spending. Nevertheless, there is no agreement on the definition of this "fair share". In addition, there are two approaches that can be taken into consideration about tax equity:

a) An approach based on the so-called "benefit principle", based on Adam (Smith, A., 1776), where each taxpayer contributes in line with the benefits received from public services.

According to this approach, the appropriate tax formula depends on the patterns of preference and, more specifically, on the elasticity of both income and price. If the income elasticity is high, the appropriate tax rates will rise with the income, but if the price elasticity is high, the rise will be lower. The relationship can be defined as follows:

$$Ey = (\frac{\Delta Q}{Q})/(\frac{\Delta Y}{Y})\text{--------(1)}$$

$$Ep = (\frac{\Delta Q}{Q})/(\frac{\Delta P}{P})\text{--------(2)}$$

Where E_y: The elasticity of income, E_P: The elasticity of price, Y: Income, P: Price.

By dividing equation (1) with (2):

$$\frac{Ey}{Ep} = (\frac{\Delta P}{P})/(\frac{\Delta Y}{Y})\text{-------(3)}$$

The right side of equation (3) expresses the elasticity of the tax rate of income, which:

- Ey/Ep=1, The tax rate will be constant.
- Ey/Ep> 1, The tax rate will be progressive.
- Ey/Ep< 1, The tax rate will be regressive.

Therefore, the required structure for tax rate will be proportional, progressive, or regressive, which depend on whether income elasticity of demand for public goods equals, exceeds, or falls short of price elasticity.

The second approach is based on the principle of "ability to pay." Under this approach, each taxpayer contributes proportionately to its ability to pay. This approach is not easy to apply or even interpret. A clear mechanism must be found to measure the "capacity to pay" before applying this principle; thus, people of equal income pay the same amount of tax (horizontal equity), while those with higher incomes pay a higher tax (vertical equity) (Wise & Berger, 2010) (TJNA, 2011).

Nevertheless, the difficulty here is how to develop a quantitative measure of ability to pay. This paper focuses on the second approach to the form of taxation, specifically the so-called "vertical Equity".

2. Research Problem

The study will examine how to achieve vertical tax equity theoretically. It will also seek to clarify the options available for selecting the appropriate tax system by linking tax equity to loss of income for taxpayers. Several studies such as (Holeckova, 2013) have shown that the tax system that seeks to raise revenue in ways that avoid distortion effects is considered neutral tax system. Furthermore, (Mostar& Evan, 1995) argue that the taxpayer's awareness of the absence of tax equity negatively impacts on his decision to disclose his income.

3. Importance of the Research

The importance of the study lies on the importance of designing an appropriate tax system that achieves equity among taxpayers. A distortion of the tax system will negatively affect the

economies of countries (Škreb, 1999). Also, there are some aspects that must be considered when designing a tax system, for example, (Güneş & Polat, 2016) focus on the relationship between democracy and economic development over the concept of taxation. Furthermore, (Obeid & Awad, 2018) shows that the 2008 global financial crisis highlighted the importance of maintaining financial stability. The discussion of monetary and fiscal policies is no longer separated from policies related to policies targeting to control systemic risk.

4. Research Objectives

The aim of this study is to provide a simplified theoretical framework on how to achieve vertical tax equity mathematically, and how to link the determination of the tax rate to the loss of welfare for taxpayers.

5. Methodology

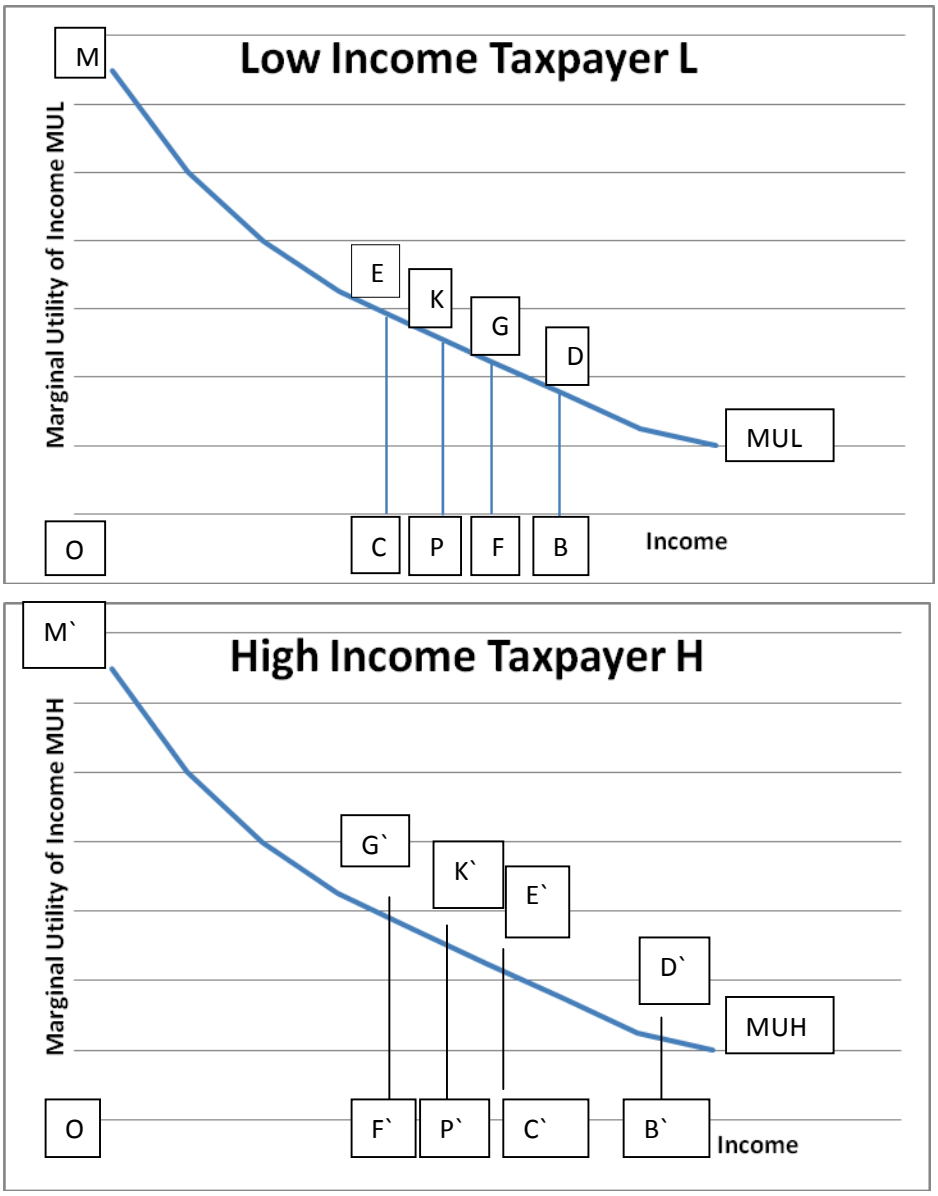
In this study, graphs and mathematical equations will be used to illustrate how to find the optimal tax rate based on the loss of welfare of taxpayers.

6. The concept of Vertical Equity

The issue of vertical equity in taxation is linked to the so-called "Equal Sacrifice Rules" where taxpayers are treated equally if the tax includes equal loss of welfare, and loss of welfare is linked to loss of income. People with different income must pay different amounts of taxes, but the problem here is how to determine these amounts and how to interpret the concept of "equality" and whether equal loss requires progressive tax or not.

Therefore, the answer to the above questions depends on the form of the income benefit table and the base of the equal loss. Mill (1921) argued that taxpayers are said to be treated equally if their tax payments involve an equal sacrifice or loss of welfare. Here, equality can be interpreted to mean: absolute sacrifice, proportional sacrifice, or marginal sacrifice. These concepts can be interpreted in the following graph. The first graph illustrates the low income for the taxpayer (L), while the second graph illustrates the high income of the taxpayer (H). MU_L & MU_H is the marginal utility of the income tables. The income before tax of L is OB, while OB` is the income before tax for H. In addition, the total utilities received by L & M are OBDM & OB`D`M` respectively. So the question is: how can taxes be calculated under the three rules mentioned above?

Figure 1. Measure of Equal Sacrifice

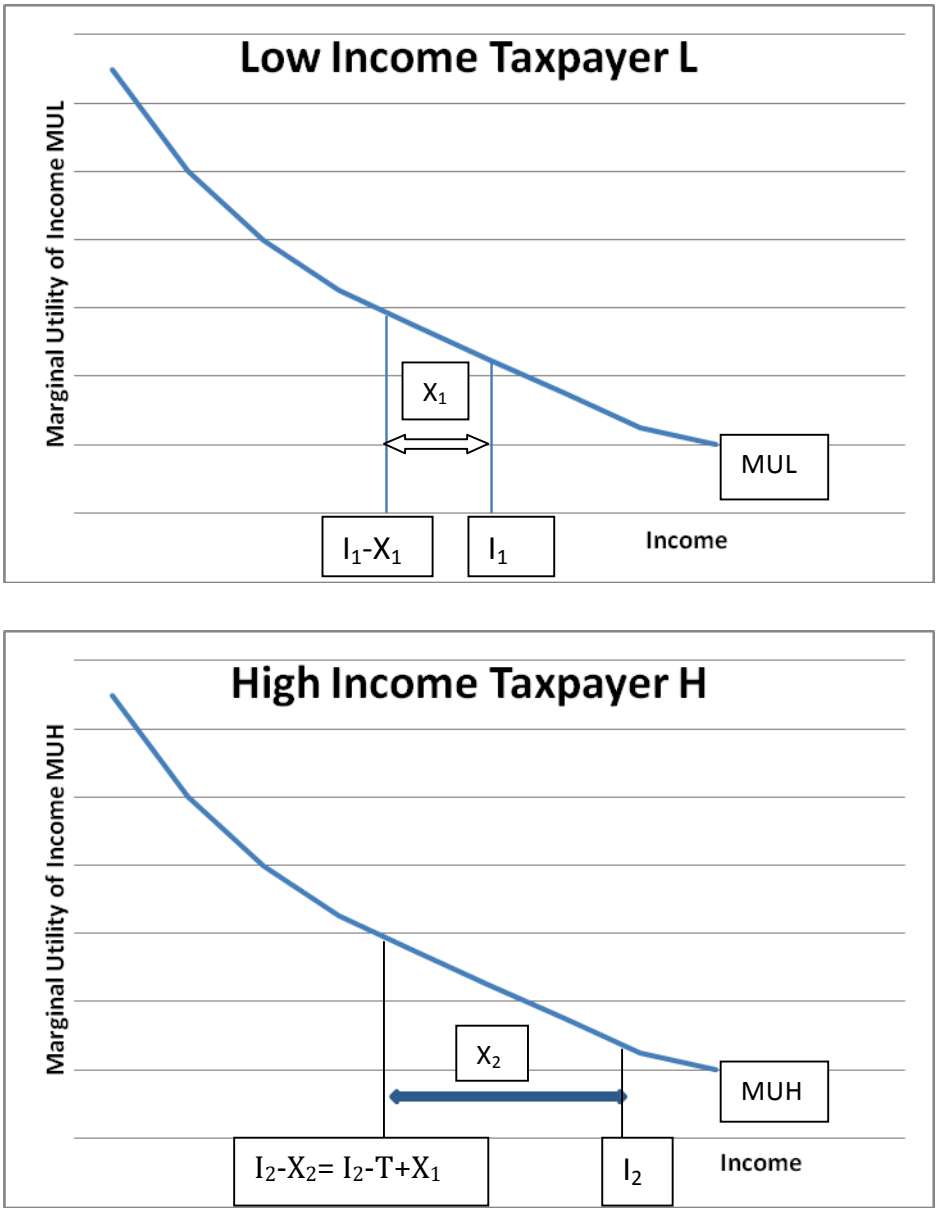


6.1. Absolute Sacrifice

Under the absolute sacrifice rule, L is the owner of the OB income pays CB, whereas H is the owner of the OB' income pays C'B'. Thus, the required tax returns are CB + C'B '= T, the loss of welfare for L is equal to CBDE while H is equal to C'B'D'E ', and T is also distributed so that CBDE = C'B'D'E'.

If the marginal utilities for both taxpayers L&H are constant and equal, the MU will be parallel to the x-axis; the absolute sacrifice will lead to the achievement of a regressive tax rate for all incomes.

Figure 2. Measure of Equal Sacrifice



Suppose X_1: Tax from taxpayer L with income I_1, X_2 : Tax from taxpayer H with income I_2, and the required revenue from taxes is T.

$X_1 + X_2 = T \rightarrow X_2 = T - X_1$.

The income after tax for the taxpayer with income $I_1 \rightarrow I_1 - X_1$

And the income after tax for the taxpayer with income $I_2 \rightarrow I_2 - X_2$, but $X_2 = T - X_1$

Thus, we can rewrite the income after tax for the taxpayer as H $\rightarrow I_2 - T + X_1$

So, we can find the values of X_1 and X_2 using Integration:

$$\int_{I1-X1}^{I1} MUL.\,dI_1 = \int_{I2-T+X1}^{I2} MUH.\,dI_2$$

Special Case: If $MUL = MUH$=C (Which C denotes to a constant number), then (Note: MU Curve will be parallel to X-axis):

$\int_{I1-X1}^{I1} C.dI_1 = \int_{I2-T+X1}^{I2} C.dI_2$ ➔ C(I1-I1+X1)=C(I2- I2+T-X1)

X1=T-X1 ➔ X1=T/2---(4)

Now X2=T-X1 ➔ X2=T-(T/2) ➔ X2=T/2 ----(5)

Thus, the income after tax for the taxpayer with income I1is (I1- $\frac{T}{2}$)

Similarly, the income after tax for the taxpayer with income I2 is (I2- $\frac{T}{2}$)

If we assume that I1=500$, I2=1000$ and T=100$, then the required tax from the taxpayer with income I1 will be $\frac{\frac{T}{2}}{500}$ = 10% of his income as a tax.

Similarly, the required tax from the taxpayer with income I2 will be $\frac{\frac{T}{2}}{1000}$ = 5% of his income as a tax.

6.2. Proportional Sacrifice

If the tax burden is distributed proportionately to the loss, from Figure 1, the taxpayer L will pay PB and the taxpayer H will pay P'B ', i.e. T = PB + P'B', the tax divided between the two taxpayers. Therefore, the loss of welfare to be lost for L (or PBDK / OBDM) are the same as in H (or P'B'D'K '/ O'B'D'M'). Under this rule, it is clear that the constant MU table will lead to the achievement of proportional taxation.

To find the values of X1 and X2, we can use Integration again (Figure 2):

$$\frac{\int_{I1-X1}^{I1} MUL.dI1}{\int_{0}^{I1} MUL.dI1} = \frac{\int_{I2-T+X1}^{I2} MUH.dI2}{\int_{0}^{I2} MUH.dI2}$$

If $MUL = MUH$=C (C: constant number), then:

$$\frac{\int_{I1-X1}^{I1} C.dx1}{\int_{0}^{I1} C.dx1} = \frac{\int_{I2-T+X1}^{I2} C.dx2}{\int_{0}^{I2} C.dx2} \rightarrow \frac{C(I1-I1+X1)}{I1} = \frac{C(I2-I2+T-X1)}{I2}$$

$$\frac{X1}{I1} = \frac{T-X1}{I2} \rightarrow X1 = \frac{I1T}{I1+I2}\text{---(5)}$$

Now X2=T-X1 ➔ X2=T-$\frac{I1T}{I1+I2}$ ➔ X2= $\frac{I2T}{I1+I2}$----(6)

Thus, the income after tax for the taxpayer with income I1is (I1-$\frac{I2T}{I1+I2}$).

Similarly, the income after tax for the taxpayer with income I2 is

(I2-$\frac{I2T}{I1+I2}$).

If we assume that I1=500$, I2=1000$ and T=100$, then the required tax rate from the taxpayer with income I1 will be: $\frac{\frac{500(100)}{1500}}{500}$=6.7%.

Similarly, the required tax rate from the taxpayer with income I_2 will be

$\frac{\frac{1000\,(100)}{1500}}{1000}$=6.7%.

6.3. Marginal Sacrifice

Under the marginal sacrifice rule, L pays FB and H pays F'B, 'ie T = FB + F'B', and the marginal loss of income will be FG = F'G '. At the same time, the total loss of welfare for both taxpayers is given as FBDG + F'B' D'G '. The after-tax income is equivalent to OF = O'F'.

To explain this rule suppose that the incomes of taxpayers L & H is 740$ and 800$ respectively, if the required tax returns is 50$, then the full tax will be deducted from taxpayer H only. This is because 800-50>740$. However, if the required tax returns is 80$, then taxpayer H will pay 60$+$\frac{20\$}{2}$=70$, and taxpayer L will pay $\frac{20\$}{2} = 10\$$. Therefore, we can simply observe that the tax rate applied in accordance with this rule is a progressive tax. This is because the tax rate for H is given as=$\frac{70\$}{800\$}$=8.75% and for L=$\frac{10\$}{740\$}$=1.35%.

According to this rule, we can derive the tax function for taxpayer H. Thus, it can be formulated as shown below:

$T_H = \begin{cases} T & , I_2 - T \geq I_1 \\ T_1 + \frac{T2}{2}, & I_2 - T < I_1 \end{cases}$ where I_2 is the income for taxpayer H, I2 is the income for taxpayer L, and $T=T_1+T_2$.

Also the tax function for taxpayer L can be formulated as follows:

$T_L = \begin{cases} 0 & , I_2 - T \geq I_1 \\ \frac{T2}{2} & , I_2 - T < I_1 \end{cases}$

7. Conclusion

In conclusion, this paper provides a discussion of horizontal and vertical equity concepts mathematically. The paper gives examples to explain how to design tax rates. By comparing the results in each example, we saw that for both taxpayers H and L under the three rules above, the results of taxpayer L under the marginal sacrifice rule is the best rule for him. This was followed by the proportional sacrifice rule and then the absolute sacrifice rule, and it is clear that the taxpayer H pays more than L regardless of the selected rule.

Under the vertical equity or "Equal Sacrifice Rules", this paper showed that taxpayers are treated equally if the loss of welfare is linked to loss of income. As a result, these rules may contribute to the design of the optimal tax system.

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Does Corporate Social Responsibility Improve Profitability of Banking Firms?

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Abstract

This research paper examines the relationship among CSR, size, income variability, expected growth and its effect on ROA, ROE and EPS of banking firms. Panel data of the variables have been collected from the official websites & financial reports of the selected banks for the year 2005-2017. CSR, growth and size of firm have positive & significant effect on ROE and income variability have negative effect on ROE & ROA. All variables have positive effect on EPS but income variability have negative effect on EPS. It is recommended that business organizations should formulate financial policies for dominating their financial position not only for the sake of profitability & strategic objective but also giving improvement to environment, society and all stakeholders by investing in CSR practices.

Keywords: Corporate Social Responsibility (CSR), Earning per share (EPS), Return on Assets (ROA), Return on Equity (ROE), Profitability

1. INTRODUCTION

Corporate social responsibility (CSR) is a dynamic and modest strategy for business organizations. (Chandler &Werther, 2013). Executives may expand competitiveness by adopting CSR strategies, based on the strengths of their corporations. (Nagurney & Li, 2014). CSR has become a progressively significant part for companies' tasks (Deng, Kang, &Low, 2013). Some corporations enhance their investment in corporate social responsibility while some

firm's only show large part of their capital to present CSR activities in their annual reports. (Flammer, 2013). The last decades have observed melodramatic variations in the associations between the public, private sector and civil society. Nowadays a new idea termed as corporate social responsibility (CSR) has introduced and the primary objective of this activity is usually adopted by business in order to satisfy the needs of stakeholders engaged in cycle of business operations. (Ajala, 2005). In this modern age of business every firm and corporation examine their goodwill on the basis of social, economic, and ordinary principles. There are many debates, conflicts and contradictory views among the scholars and researchers on CSR that it helps the firms in many areas and also improve the productivity and profitability. However according to some there exists negative correlation in corporate social responsibility and firm's profit.

In the year 1950 the concept of corporate social responsibility was introduced as corporate responsibility and Howard Bowen was the first author who published a book in 1953 on corporate social responsibility. CSR is the most important and strategic part for every business organizations and corporations, that how they improve and enhance productivity of the corporations through the CSR's activities. (Srivastava, 2012).The policies employed by business concerns to conduct their business activities in such a way that is decent, civilized and beneficial to community in terms of development is known as Corporate social responsibility, (Ismail, 2009). Corporate Social Responsibility generally pronounces obligations of the firm in order to protect and improve social welfare in present as well as in the future, by creating sustainable welfares for stakeholders (Lin et al., 2009). In this modern era the strategy of CSR is an integral part of business for many organizations for addressing the environmental and social impact of company activities (Luo and Bhattacharya, 2006; Lin et al., 2009; Dabas, 2011; Beret, 2011). Although most of the corporations or firms adopt CSR policies while some of consider environment and society to be the smaller domain with the economy. (Berete, 2011). Studies show that the more the companies are socially responsible the larger the companies are profitable. (Moore, 2001).

An essay written by Milton Friedman in 1970s in New York Times about the importance of CSR in private firms for the creation of value of shareholders in the corporations. This idea was not only used but widely appreciated all over the world and also proved to be correct.. (Harjoto, 2011). Revenue is the primary object for all kind of business organizations because it is the basic component for the survival, development and long life of a business firm. All kind of business organizations and corporations have been confronted, not only by the major progressions that happened at the end of the twentieth century, such as privatization, deregulation and globalization, but also by expectations of the society from the firms regarding contributions to public welfare and social involvement. Slowly, large corporations have started to adopt the strategy of CSR processes, such as public commitments to comply with standards, fostering stakeholder involvement community investments & conforming, systematic public reporting on environmental and social performance. Corporate Social Responsibility strategy has grown beyond, both practically and theoretically, money donations, the area of philanthropy and charity actions. CSR has become a dynamic approach to embrace the interests of stakeholders, a way to retain the modest advantage and to settle profit objectives with long-term policies. The natural value was that CSR has become an object of political actions, public debates and research study, but also a substance of supremacy in most regional and global organizations of most of the countries. Return on equity and Return on Assets are accounting ratios & most famous measurement which are usually used by researcher that how effectively and efficiently management use the assets and equities of corporations for enhancing turnover and corporations sales to maximize productivity level. (Raza et al., 2012). The ability of a

business or corporation to earn positive profit is termed as profitability or productivity. In this modern age of business most of the organizations paying attention on CSR because the business operate in the society and society demand some social responsibilities i.e contribution in the welfare of the society from the corporations or business organizations. The CSR is not an old topic for some countries because in Pakistan all kind of business organizations use it in the present world competition. (Islam, 2009).

The main objective of this research paper is to calculate proxy variables for commercial banks of Pakistan and effect of CSR on the profitability of commercial banks in Pakistan.

2. REVIEW OF LITERATURE

The literature regarding CSR is rich with hundreds of research studies, exploring the relationship among business, financial performance, profitability and social activities of the corporations y (e.g. Griffin and Mahon, 1997; Waddock and Graves, 1997; Jackson and Parsa, 2009; Kempf and Osthoff, 2007). But according to quantitative research studies it is concluded that there are unsettled proofs of the relationship between profitability and CSR. Published Literature is available on the topic of CSR and its relation with profitability of corporations ; effect of corporate social responsibility on profitability of banking firm, corporations and businesses of various countries of the world .Important published literature on the topic of CSR and profitability of business organizations is summarized as under:

Aupperle et al. (1985) state in their study that there is negative relation among profitability, productivity, financial performance of corporation or business organization and CSR activities. Further this research study states that by investing on CSR activities the cost of the those firms increase that are not socially responsive and also it is a financial burden and weak the position of business. The researchers Pava and Krausz (1996) conducted research study by examining about twenty one research studies on CSR and Profitability between the year 1972s and 1992s. The results of twelve studies showed positive relation 8 showed no relation and 1 study showed inverse relationship among CSR and financial performance.

Waddock and Graves (1997) measure the profitability of corporate financial performance by using three measures which are ROA, ROE, and ROS and other numerous procedures for measuring profitability of corporations for the business stakeholders. Business organization with good financial position can invest in long term project by investing or building education institute for the welfare of the society while firm having weak financial position will adopt traditional CSR activities. Carroll (1999) conducted research study on the topic of CSR wherein he concluded that the term CSR is social responsibility of the firm. Many people have defined CSR according to their own research and concepts but the most citied and accurate definition is given by Carroll (1979) ''the social responsibility of firms involves the ethical, economic, legal and discretionary hopes that society has of organizations at the any given point in time'. He further states that firm carried these responsibilities for the sake of both the firm at large and the society. So, firms are indebted to take the interest of the society into consideration when taking its verdict because at last the society is greatly pretentious by those verdicts. Different economists and researchers worked on this topic and give their views which are different from each other. Conflict over CSR exists among different researcher and scholars from the year 1950s.

A researcher of UK, Moore (2001) conducted research study on the topic of CSR, profitability and productivity, by investigating the association among these components. The results of his study showed negative relation among the productivity, profitability and CSR activities of supermarket industry in UK. However according to another researchers, Mc Williams and Siegel (2001) states in their study that there is no significant relation among corporate

performance and CSR activities. According to the research study results of " (Wild et al, 2005) the good performance of the business totally depends on its maximum return on assets. It reflects the stable position of the company and attract investors. The ability of the company to meet its liabilities of short term period is usually calculated through liquidity ratio. However performance of the managers that how efficiently they use or manage assets measured through asset management ratio. (Brigham and Houston, 2001) while the ability of firms to manage its long period obligations measured through Debt Management Ratio**.**

According to Van de Ven and Graafland (2006) stated in his study that CSR has positive effect on the profitability of the corporations. According to the study of Peloza and Papania (2008) the profitability aspect of different organizations belong to dissimilar industry may different in CSR effect and it also depends that how much level of significance allotted to each main stakeholders for the industry. Inoue and Lee (2011) conducted study in order to know that how different extents of CSR activities could affect financial performance of firms within 4 similar tourism industries. The results of their study showed that financial impact different across these four same tourism industries. According to Godfrey et al. (2009) that if management of corporation adopt both CSR and profitability strategy then CSR and financial performance will be perfect.

Raza et al. Used the quantitative data for analysis from the year 1972 to 2012. In this study they select Stock market return, Return on equity (ROE), Return on asset (ROA), Earning per share (EPS) and Return on sale for their analysis. Result of their study showed that these accounting ratios are very perfect for ascertaining the profitability of the firms and almost all researchers rely on these accounting ratios i.e. EPS, ROA, ROE and ROS for their analysis. According to a study conducted by Rahmawati (2014) on Indonesian stock market for ascertaining the association among CSR and investment activities and its effect on firms maximizing profit activities. In this study he analyzed 27 organizations data for the year 2006-2008 and concluded that there is direct association of CSR with financial performance, competitive edge and market share of corporations. Shruti (2014) conducted research for the purpose to know the association among the CSR, investment and profitability of the firms. Author conducted this research on UK's three industries by taking data from 2008-12 of ROA and ROE for calculating financial performance and profitability of these industries i.e. Petroleum, Gas and extraction industry. In this study the author concluded that CSR, Investment, Financial performance have significant effect.

According to a study conducted by Abdullah (2014) on stock exchange of Pakistan for the purpose to know about the effect of investment in CSR and its relation with profitability of the firm. In this study the author took the data of 20 companies out of which half were practicing investment in CSR and the remaining were not engaged in the said activities. After analyzing the data the results of the study showed that those firms which were engaged in the practicing of investment in social welfare of the workers or stakeholders and CSR were financially strong and earned maximum profit as compared to the firm which were not engaged in such practices.

3. RESEARCH METHODOLOGY

This section of our paper discuss about the Dependent, independent and control variables, population, sample, sampling technique, data collection, different tests, statistical software and model of the study.

Population, size, Data and sampling technique.

The study population consists the following ten banks operating in Pakistan. Standard chartered Bank, Bank of Punjab, Askari Bank, MCB bank, United Bank, Bank Alfalah, Habib

Bank, Allied Bank, Faysal Bank and Bank Al-Habib. Data is collected from the annual reports available on the official website of these banks as well State Bank of Pakistan. In this research study we have used data of 13 years from 2005-2017, in this research study we have used non probability sampling technique.

Variables for the Study

We have used three kinds of variables in our research paper.

Independent variables

Dependent variables

Control variables.

Independent Variable

In this research paper Corporate Social Responsibility is taken as Independent variable because it is not dependent on any other variable in this research study. .

MEASURING CORPORATE SOCIAL RESPONSIBILITY (CSR)

Basically there are two proxies which are mostly adopted by researcher for the measurement of Corporate Social Responsibility i.e donations and money spent on for the welfare of the firm's workers. Coffey & Fryxell and 1991, Lin, et al., 2009. In many research study it has analyzed that most of the organizations consumer their millions amount on the charitable activities which indicates that donation is used as a proxy for the measurement of CSR. Compensation to workers in the firms is also used as proxy for CSR. (Muller & Kolk, 2008). In most of the research work the researchers have used these proxies for measuring CSR. We will also use these as proxy for CSR in our research study. (Cox et al, 2004 Scholtens, 2008, and Muller & Kolk, 2008) CSR = Donation + Worker's welfare funds / Earning before tax.

Dependent Variables

In our this research study we have taken Earing per share (EPS), Return on Asset (ROA) and Return on Equity (ROE) as our dependent variables which are accounting ratio, usually used by researchers and chartered accountants for calculation of profitability of the firms.

Control Variables

In this research study we have taken income Variability, Size of Firm and Expected Growth rate our control variables.

Size of Commercial Banks

Large type of business organization and firm usually can safe their organization from losses due to their policies and according to the static trade off hypothesis an organization would be more diversified if the size of such organization is large and it will be in a position to protect itself against loss in some cases. Numerous techniques are adopted by the researcher for the calculation of firm size one of the most important procedure is total number of employees and total assets and natural log of the firm's total assets.

$$Size = Log\ total\ assets$$

Expected Growth

The growth of the firms can be calculated as growth is equal to current year total assets divided by previous year total assets multiply with one hundred. Growth is very important component

for all type of organization because the firm size depends on its annual growth. The famous formula for calculating growth is as follows.

$$\text{Growth} = \frac{\text{total assets of current year}}{\text{total assets of previous year}} \text{ x } 100$$

Income Variability

It effect the profitability of firm and used for measuring risk as bankruptcy increase. It can be calculated as under. (Erica et al., 2011)

$$\text{Income variability} = \frac{\text{STDEV of EBIT}}{\text{Total Assets}}$$

Model for the Study

In our this research study profitability is dependent variable for which ROA, ROE and EPS have used as proxy dependent variables, CSR is independent variable while Growth, Size and income variability has used as control variable in this research study . The below model is developed for this study.

$ROA_{it} = \propto + \beta 0 CSR_{it} + \beta 1 \text{ firm size}_{it} + \beta 2 \text{ expected growth}_{it} + \beta 3 \text{firm income variability}_{it} + \varepsilon$

$ROE_{it} = \propto + \beta 0 CSR_{it} + \beta 1 \text{ firm Size}_{it} + \beta 2 \text{ expected growth}_{it} + \beta 3 \text{ firm income variability}_{it} + \varepsilon$

$EPS_{it} = \propto + \beta 0 CSR_{it} + \beta 1 \text{ firm Size}_{it} + \beta 2 \text{ expected growth}_{it} + \beta 3 \text{firm income variability}_{it} + \varepsilon$

4. RESULTS AND DISCUSSION

In this section of our research paper we have analyzed the data regarding dependent, independent and control variables through statistical software. The results of descriptive statistics, chow test, Hausman test and Breusch Pagan LM are interpreted below in details:-

4.1. Descriptive Statistics

Variables	Observations	Mean	Std Deviation	Minimum	Maximum
ROE	130	25.26	6.54	17.34	23.8
ROA	130	3.95	2.66	.5	5.84
EPSRS	130	9.83	4.45	3.05	22.07
SIZE	130	11.09	4.66	19	29
Expected Growth	130	121.27	27.11	1.654	140.20
Income	130	.0333	0.005	0.221	0.433
CSR	130	2.26	8.77	4.97	127.34

According to the results of descriptive statistics there are 130 observations for every variable. The mean value for ROE is 25.26, standard deviation value 6.54, minimum value 17.343 & maximum value 21.6. The mean value of ROA is 3.95, SD 2.66, minimum value 0.5 and

maximum value 5.84. Mean value for EPS is 9.83, SD 4.45, minimum value 3.05 and maximum value 22.07. Size of firm's mean value 11.09, SD 4.66, minimum value 19 & maximum value 29. Expected growth of firm has a mean value of 121.27, SD 27.11, minimum value 1.654 and maximum value 140.20. Income variability mean value is 0.333, SD 0.005, minimum value 0.221 and maximum value of 0.433 and CSR mean value 2.26,SD 8.77, minimum value 4.97 and maximum value 127.34.

4.2 Model for ROA

Test	Null hypothesis	Alternate Hypothesis	P value
Chow	Pooled OLS is better than FEM	FE Model is better than Pooled OLS	0.5527
BP	Pooled OLS is better than RE Model	RE Model is better than Pooled OLS	0.4267
Hausman	REM is better than FEM	FE Model is better than RE Model	0.2857

Model Selection for ROA

Chow Test for ROA

The main objective of this test to select best model between FEM and pooled OLS. The P value is .5527 which states that pooled OLS is better than FEM.

Breusch Pagan Lm Test for ROA

This test is used for selection between random effect model and pooled regression and random effect model. The p value is 0.4267 which is greater than 0.05. Therefore pooled OLS is better model.

Haussmann Test for ROA

The Haussmann test is used to select an appropriate model between random and fixed effect model. The p value is 0.2857 which is greater than 0.05 which states that random effect model is better for this study.

4.3. Model for ROE

Test	Null Hypothesis	Alternate Hypothesis	P value
Chow	PooledOLS is better than FEModel	FEModel is better than PooledOLS	0.0371
BP	PooledOLS is better than REModel	REModel is better than PooledOLS	0.0268
Hausman	REModel is better than FEModel	FEModel is better than REModel	0.4532

Model for ROE

Chow Test for ROE

The main objective of this test is to decide whether to select OLS or FEM. The P value is 0.0371 which is less than 0.05 so fixed effect model is better for this study.

Breusch and Pagan LM Test for ROE

This test is used for selection between OLS and random effect model. The P value is 0.0268 which is less than 0.05 so random effect model is appropriate model than pooled regression model for this study.

Haussmann Test for ROE

This test is usually use to select between Fixed effect model or Random Effect Model. The P value is 0.4532 which is greater than 0.05 so random effect model is better than FEM for this study.

4.4. Model for EPS

Test	Null hypothesis	Alternate Hypothesis	P value
Chow	Pooled OLS is better than Fixed EM	Fixed EM is better than Pooled OLS	0.0376
BP	Pooled OLS is better than REM	REM is better than Pooled OLS	0.0384
Hausmann	Random EM is better than Fixed EM	Fixed EM is better than Random EM	0.8740

Model for EPS

Chow test for EPS

Chow test for EPS shows the P value 0.0376 which is less than 0.05 so Fixed Effect Model is better than Pooled OLS..

Breusch Pagan LM Test for EPS

This test is used to select between random effect model and pooled regression. The P value is 0.0384 which is less than 0.05 so REM is better than pooled regression model.

Hausman Test for EPS

This test is used to select between FEM and REM. The P value is 0.8740 which is greater than 0.05 so random effect model is better than FEM for this study.

4.5. Table for Multi Co-Linearity

Variables	VIF
Size	1.75
CSR	1.92
Income	1.36
Expected Growth	1.34
Mean VIF	1.64

The value of all the explanatory variables VIF is less than 10 which states that there is no multi co-linearity problem in the data of this research study because variance inflation factor (VIF) is very important tool for decision.

4.6. Table for Random Effect Results for ROE

Variables	**Coefficients**	**Standard Error**	**T value**	**P value**
Size	0.91	0.41	2.24	0.0457
Expected Growth	0.82	0.12	7.06	0.000
Income Variability	-0.61	0.34	-1.82	0.052
CSR	0.91	0.21	4.4	0.021
Constant	16.23	17.12	0.92	0.333

The table of Random Effect Model for ROE shows that size, expected growth and CSR of firm have positive relation with ROE and the other variables have negative relations with ROE. The coefficient in the table indicates that one unit change in size will change ROE by 0.91 units positively and the coefficient of one unit increase in expected growth will increase ROE by 0.82 units. However income variability have negative relation with ROE. The results of our study are in line with the results of Basu, (2008) and also a similar results have s been drawn by Harmony J. Palmer (2012). From the above results it is concluded that CSR, growth and size of firm have significant effect on ROE.

4.7. Table for Pooled OLS Model for ROA

Variables	Coefficients	Standard Error	T value	P value
Size	0.302	0.12	2.05	0.050
Expected Growth	0.19	0.76	0.303	0.692
Income Variability	-3.64	2.55	-1.5	0.128
CSR	0.44	0.16	2.2	0.046
Constant	-5.63	3.33	-1.38	0.251

The results of pooled OLS for ROA shows that CSR, size and growth of firm have positive relation with ROA while income variability have negative effect on ROA. CSR and Size of firm have significant effect on ROA while other variables have insignificant effect on ROA. The results of this study are same with the results of Basu, (2008).

4.8. Table Random Effect Model for EPS

Variables	Coefficients	Standard Error	T value	P value
Size	0.72	0.32	2.76	0.052
Expected Growth	0.92	0.34	3.34	0.022
Income Variability	-0.67	0.40	-1.5	0.636
CSR	0.50	0.14	3.5	0.034
Constant	0.72	0.69	1.66	0.346

According to random effect model for EPS all variables have positive effect on EPS but expected income variability of firm have negative effect on EPS. Furthermore according to this table results CSR, growth and size have significant effect on EPS at 5 %. The result of this study is in line with the previous results of basu, (2008) & Harmony J. Palmer (2012).

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This research paper investigated about the association among CSR, Size of firm, income variability, expected growth earning and Performance of the selected commercial banking firms. ROA, ROE and EPS are used as proxies of the performance of firms in this study. ROA, ROE and EPS are used as dependent while CSR as independent variable while Size of firm, income variability and expected growth earnings are used as control variables in this study. Data from 2005-2017 was collected from the websites of the selected firms and state bank CSR, growth and size of firm have positive & significant effect on ROE and income variability have negative effect on ROE and ROA. All variables have positive effect on Earing Per Share but expected income variability of firms have negative effect on EPS.

The Policy makers of the business organizations should implement CSR strategy both for the sake of organization as well as for the welfare of the society. The firm should also increase its

level of productivity and profitability through CSR strategies so that the all kind of stakeholder may be protected from social as well as financial loss.

This study also suggest that firms mainly working on large scale or corporations should pay attention & should maintain proper head in their budget for the CSR so that the strategies of the said may be implement easily.

It is recommended that business organizations should formulate financial policies for dominating their financial position not only for the sake of profitability & strategic objective but also giving improvement to environment, society and all stakeholders by investing in CSR practices.

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The Effect of Capacity Utilization on Economic Growth in Industrial Enterprises

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Abstract

International economic and political developments, rapid changes in the field of technology in recent years, the increase in population and number of employees, and the mobilization of capital have significantly affected the development of developing countries. Influence leads to a fall in production in the real sector and also causes crises in the financial sector. Another reason for production losses is the drop in capacity utilization rates. Capacity utilization is an important factor when it is aimed to increase the speed of development and to create more added value of existing capital. For this reason, it has become important to examine the hypothesis that it is possible to increase the national income more fully by fully using the available capacity in the industry and to present analytical solutions. The idea that fixed asset investments are used at full capacity is invalid. It is frequently encountered in both developed and developing countries that the investments made in manufacturing industry are not operated at full capacity. The idle capacity created by domestic economic crises, decisions and anticipations and structural causes is a decline in the rate of development for developing countries. Because the idle capacity is resource waste.

Keywords: Capacity Utilization, Production, Manufacturing

1. Capacity Definitions and Factors

When it comes to producing goods and services, the quality and quantity of the production tools becomes important. Production decisions are made according to emerging needs and targets are determined based on this. Here, too, the assumptions about targets and the assumptions of goods or services that produce the effects on the means of production are also directed. For this reason, it is important that the production factors are used correctly and efficiently.

Describes the capacity of production at a certain time interval. That is, they express how they will use the production factors in their own hands. The ability of factors in a sense. Directing existing assets and generating value from them is a factor.

In other words, it is possible to define the value of realization as target, level, characteristic, quantity-quality, phase, level, efficient use of resources and efficiency are among the capacity definitions to be sustained by their measurementand regulation (Otoo-Agaptova-Behrens, 2009, 2).

The measurement of production in the enterprises and the evaluation of the measure and the measurement of the potential of the sectors in the macro economy are made with the same explanations. an expression of the amount or value of the products produced, for example, a ratio in production. In fact, the capacity definition should not only be operated or downloaded to a production unit. It is also possible to accept as a relationship level (Brinkerhoff-Morgan, 2010: 4) the assumptions of acceptance that allow a set purpose to be realized and that the common acceptance towards which it takes place influences others.

We can include various definitions of capacity as follows.

- Theoretical capacity: The amount of production targeted at the maximum production rate by using all the means of the production vehicles in a given period.
- Technical Capacity: The amount of product that can be obtained by continuous work without any business organization.
- Maximum capacity: Technically and theoretically, they are used to each other. The only difference between maximum capacity and technical capacity is that there is no business organization at maximum capacity. It is difficult to obtain such capacitance due to definition and application (Gülerman, 1976, 109). Because, over time, their ability to produce means of production is reduced. Managers may not find the production factors at the moment of need. However, in the application of the defined capacity, only once is encountered. It does not repeat repeatedly.
- Economic Optimum Capacity: Defines the "Optimum capacity" of the production level where a unit product cost is minimized, and the production time at which profit and productivity are maximized is minimized. When inclusion of the profitability target is included, "Economic-Optimum Capacity" is determined. The production amount that the unit product cost is minimized is expressed as "Technical Optimum capacity".
- Normal Capacity: It is also used as the general expression of economic and optimum capacity definitions. Economic and technical optimum capacity and production policies including production costs, pricing, stocks, profit-loss development are determined. It is impossible to give a definite quantity because the normal capacity and the production level that can be achieved in the long term are expressed and carry subjective decisions.
- Actual capacity: The production level obtained from the production vehicles in a certain period. Actual capacity is based on current means of production, factors, and work organization. The situation of the current staff leads to the demand limits, the financial resources are scarce and inadequate, and the prices of these levels are reduced according to the changes in technology.
- Sector Capacity: The amount of production obtained by grouping the same goods and services produced by different production vehicles in a given period. Macroeconomic level communities are represented by the product capacities of all enterprises that produce a product range that can be counted to satisfy a certain need (Müftüoğlu, 1978,197).

The description of the sector capacity and sometimes the economic and technical optimum capacity definition are also included. In addition, the actual capacity, expressed as the actual capacity, is related to the determination of the sector capacity.

- Unit capacity: It is the quantity of unit production means and factors according to production purpose. Unit capacity is included in other capacity definitions. The ability to produce the smallest parane bearing production capability describes unit capacity. This is also called "Basic Production Capacity".

Companies evaluate their capacity in terms of their aims and objectives, in line with their mission and vision, and try to produce a production amount using current production of human resources and production factors. Capacity sets out the amount of output as a measure of ability for businesses.

Here, the factors that determine the capacitance are needed. The factors that determine the capacity are labor and capital. Labor and capital refers to unit production.

a.) Labor Factor: It both forms the basis of the production process and is considered a function of the business organization. With this feature, it is possible to accept labor as both a worker and a business organizer. Labor is a sign of time and talent in the production process.

The production time indicator is the amount of time employees spend using production to achieve production. This does not include the time when the worker does not work as a rest, strike or accident.

The unit of work produced by the worker at the time of the unit is the ability indicator. It is not possible to determine precisely because the production ability is variable and subjective. Because social and psychological factors are influential in your ability to work. For this reason, it is used as estimated values.

It is more accurate to take the average of the unit production ability that the workers performed in the unit production time in the previous periods as definite value in determining the production ability. It is more accurate to use any unit production ability instead of unit average value. Labor in labor organiza- tion provides coordination of capital with production time of production ability. Relates and directs production factors with each other. In other words, productivity and profit is the main actor.

b.) Capital Factor: Capital as a function of production is also a factor in determining capital as fixed and variable capital. Increasing production, restructuring, conservation and use of production factors in a certain period in order to increase production of goods and services and increase consumption opportunities especially in future periods is a factor determining the capacity determinant (Sakızlı, 1981,21).

Fixed capital is represented by machinery-equipment, buildings and land, which are renewal and renovation investments, completion investments and new investments.

Although machinery and equipment investments involve the use of work machines and force machines, the capacity builds more on business machines. A factor of time capital used for the production of a unit of machinery equipment in enterprises. Technology and automation should be described to describe the production capability of the machine equipment.

Raw materials and auxiliary materials required for production and financial resources are capacity determinants as capital. Such determinants relate to production capability and production time in the period when the capital is produced. The size and structure of the

industry or of the industry sometimes makes organizational structure based on time (İnan, 1985,194) essential.

Fixed capital participates as a means of production capability at the time of production. Its use is also continuous. However, material and financial resources are consumed during the production period and become final products. Although it is possible to specify the capacity of the work organization outside of labor and capital as the defining factor, it is better to think together with the labor factor. The work organization is carried out by the employees who are the organizers of the production purposes and tools.

The principles and principles set out in the work of selecting and operating the production factors, preparing and managing the work system are provided by the work organization.

2. Capacity Measurement Criteria

In the macroeconomic economy, the measurement of the capacity in the real economy, especially in the industrial sector, is to compare the change in production quantity and development over periods.

In these measurement enterprises, both production quantity is measured and production is compared with production in other enterprises.

Capacity measurements; Based on the difference between the amount of product produced and the amount of planned product, resource waste, use rate of production factors and added value loss are determined. Accordingly, new production capability is planned. the distribution of resources is rearranged and resource and time loss are prevented.

The most common criterion used in capacity measurements is the quantity of products. The difficulty of measuring with the amount of product is that it is more than one product produced at the same place. This difficulty is solved by aggregating the determinations of a single product type in a business by putting it into a sectoral classification in the general economy.

The products produced in one or more enterprises are brought together according to certain qualities and conditions and homogeneous grades are obtained. The product expressed as aggregated is either quantity or value. Capacity is either the quantity or value of the product. Quantity is expressed in terms of quantity, length, weight, area, volume, and the value is the sales amount TL. or US dollars, such as Euro.

The use of machine-equipment is also a capacity measurement criterion. Volume, volume, area are quantity determinants in capacity measurements, especially according to fixed capital investments. Depreciation (wear and tear shares) is a value determiner. The production time is explained as a time determiner.

The use of labor is also a criterion used in capacity measurements. The number of workers (employees) in the labor factor is the quantity measure. The cost of labor, ie the sum of wages, is a measure of value. Time measurement is the production time. As a measurement criterion in the industrial sector, the use of machine-equipment and product quantity and value generally has a more positive effect. Value added or output is the measure used throughout the economy as the production value.

Capacity input capacity calculated based on output capacity, labor and variable capital utilization is calculated as fixed capital capacity according to fixed capital usage (Demirgil, 1965, 5). According to the production value we have taken as output capacity, the various products of the enterprises are used homogenized in the capacity measurements.

F_t = Work time of the base productive unit.

X_t = X unit production time of output.

Y_t = Unit output time of Y output.

c (X) = The output capacity of X

c (Y) = Y Output capacity.

$F_t = X_t*c(X) + Y_t*c(Y)$ If two products are produced during operation, they will show the work time of the basic productive unit.

$c(X) = F_t / X_t$ veya $c(Y) = F_t / Y_t$ Production of only X or Y goods in the basic productive unit

From here,

$c(X) = (F_t / X_t) - (Y_t / X_t)$, $c(Y) = (F_t / Y_t) - (X_t / Y_t)$ A single product capacity will be determined according to the production time and capacities of different goods or services.

It will be possible to maximize profits and minimize costs by producing different commodity-products and revealing the equations to be used in capacity determination according to the measurements of manufactured products.

The time and place of the capacity measurement is as important as the measurement criteria and the account. Business-based capacity measurement is carried out both in the main units-units where production takes place, and in the other units associated with production.

Outside the main Unit, the production capacity measured at each current unit is determined. The capacities found in product type are proportioned to each other and the determinations in the stage of final product output are determined as capacity.

3. Analysis of The Relationship Between Capacity Utilization and Macroeconomics in Enterprises

Within the general economic structure, capital, natural resources and labor usage and the ratio in this usage are very important. In underdeveloped economies, capital stoke does not occur easily.

The realization of capital accumulation necessitates efficient use because it requires social sacrifice. Furthermore, the calculation and interpretation of the capacity utilization rates is an important indicator for the industry (Akpan-Essien, 2011,16).

If capital and labor are not used efficiently, significant losses occur in the economy. When the difference between the amount of production in which the capacity utilization is realized in the sector and the production that can be realized is determined, this difference comes out as a waste of resources as "lost production" and / or "lost added value".

Resource waste can lead to crises in the short and medium term. Because of this, it is desirable that the capacity utilization is complete. Crises caused by the use of incomplete capacity come to the optimum sector capacity in the long run where costs are minimized and profit is brought to the maximum level. The severity of crises diminishes in these periods and crises begin to fade. To arrive at full capacity, the optimum capacity must first be reached.

The optimum capacity at which the production costs are minimized and the profit maximized are related to both costs and production patterns. The production-cost relationship in the business is considered to be the same in the sectors as well. The fiscal function depends on the supply function of inputs used in production. The production function determines the relationship between inputs used for production and production.

The assumption that the input prices used by the operator can be constant over the production time defines the relation between production and cost as "constant yield according to scale".

For production of a certain quantity (P), it is necessary to take it from the input (E) to the input (E), (F). Let us use DF1 instead of a unit (E) entry to perform the production of (P). Let's use E2, F2 to generate the same amount (P) again. Here too, production of (P) is achieved by using DF2 for production of (P).

If E1> E2, then DF1 <DF2 becomes (Avralıoğlu, 1978:9) and this is called "Increasing Marginal Reputation Relative Principle".

It is sometimes possible to increase the production amount by increasing the other by keeping a constant E and F. Production occurs at a level where input marginal efficiencies and input prices can be matched, which may become a level where profit is the highest.

If the ratio between the increases in input prices is constant and all inputs are increased in the same place (eg a b), then if the production increases by b, then there is a non-fluctuating efficiency situation in the business scale.

It is possible for an operator with such a function to double the use of input and double the amount of production. The important thing here is that the costs will increase twice as much as the entries increase twice. that is, the production and cost functions of the business are linear. If the increase in the production of the operator is less than the increase in b (b1 < b) then the operator will have a reduced yield at the production scale. In this case, the enterprise should increase the input quantities by more than twice in order to double the production quantity. Briefly, in this case the amount of production increases less than the amount of input. The cost function becomes an increasing function.

It is possible to mention the increased yield on the operating scale if the b increase in the input quantity of the operator increases the production more ($b^{11} > b$). Business can use less input to increase production twice as much. In this case, the cost function increases in less order. Although the unit costs are expressed as the savings resulting from the growth of the capacity (Süzer, 1981, 35), the savings from the scale are not the same in every business and sector.

The productivity of capital and labor determines the amount of production. When there is a change in the mode of production, the production capacity also changes. The change in capacity is a function of changing natural resources, capital and production techniques (Kazgan, 1974, 110). Increase in investment leads to an increase in income, which leads to idle capacity.

If the increase in income and the increase in investments are not correct, it will be inevitable for the idle capacity to emerge. So where should the investments be so that the increase in output and the increase in income are equal.

The power of production must be calculated correctly. In case there is no unemployment and inflation in the economy, production capacity will be important in determination of capacity increase and decrease rates.

i = annual investment rate, s = productivity achieved per unit with additional investment, i = annual capacity of investment i is lower than the total capacity of new investments. Because s shows capacity.

Because new investments will reduce the production of existing investments.

σs = actual capacity output

P = Production, t = Time, I = Investment

s = (DP / Dt) / I s = DP / Dt.

σs will actually increase production, which will show us the rate at which the economy can grow. Although s is taken as social efficiency of investments, it refers to the increase of production obtained per investment in a certain period.

The difference between s and s indicates that the investment is made incorrectly at some point. Technological development and labor are more invested than growth.

The investment made at one time must be greater than the savings at t-1 to close the gap between increased capacity and income. If it is not big, the idle capacity will emerge. Labor and capital remain idle. The extent to which the idle capacity will affect new investments depends on the structural characteristics of the economy.

In developing countries, it is possible to increase the amount of output with efficient use of existing capacity because capital is not enough (Kalın, 1998, 171). The efficiency of capacity utilization also has a positive effect on capital stocks.

4. Effects of Factors on Growth with Capacity Utilization

Factors affecting capacity utilization can be classified in 6 groups. These are raw material inadequacy, problems with workers, financing problems, energy shortage, lack of tariffs. In particular, there is a shortage of domestic and imported raw materials in the manufacturing industry.

For example, if not enough polyvinyl chloride and polyethylene are produced in the chemical industry, it causes raw materials in rubber and plastics industry to be inadequate.

Inadequate production of one industry is the inadequacy of raw materials and materials for another sector. For example, leather processed in the leather processing industry is used as raw material in shoes and textile industry.

In an industry, foreign exchange bottlenecks are attracted, and imported raw material troubles are inevitably caused by exchange rate differences. Businesses also need to supply existing spare parts and use technological developments to continue their production.

Import inadequacy also appears to be an important factor in capacity utilization. For example, in 1978, 41.3 per cent of the factors affecting raw capacity in production capacity were in manufacturing industry. 22.5 percent of this was from imported goods and 18.8 percent was from domestic goods. In 1981, the impact of domestic goods on idle capacity was 20.8 percent and the impact of imported goods on 15 percent.

Affected by insufficient input of imported goods in investment goods producing sectors, it was 25 percent in 1978 and 18 percent in domestic inputs. The training, personality and technical skills of the employees of the industrial companies differ in quality.

The private sector is entering after retirement from the public sector, both educated and uneducated. The private sector of experienced and qualified workers in the public sector and the public sector operations are greatly affected. But this effect is not the same in the private sector after gradual transitions. the private sector has to educate its own employees to train. As such, the time lost for training and study affects capacity utilization. In addition, applications such as strikes and lockouts are also impressive factors in capacity utilization.

For example, the impact of the problems related to the employees in the investment goods manufacturing industries was 12 percent. In 1981, this rate dropped to 4 percent. The continuation of production requires the discovery of financial issues.

This is necessary for both the public and private sectors. The difficulty of finding a loan for an enterprise is due to the high cost of lending and the bureaucratic issues in its possession.

In addition to the cost of loans, producers can not be turned into money quickly, thus reducing the production of enterprises. This increases product costs and affects capacity utilization.

In 1978, the capital of the companies producing investment goods was affected by the financing due to financing, and it was around 16 percent in the sectors producing consumer goods. In 1981, the investment incentives of the sectors that produce investment goods is 11 percent.

Although the restriction that energy can come into play has affected the idle capacity by about five percent in the 1980s, the measurements are not certain because there is no interruption today. Businesses should be able to sell their products in domestic and foreign markets.

Capacity also changes as the demand for products in the market changes.

Businesses often make the wrong feasibility of keeping demand high to find a loan, which can change the capacity utilization of businesses if the mistakes are not enough to demand the product on the market. For example, in 1978, 28 percent idle capacity was created with inadequate demand in sectors producing investment goods. This ratio has increased to 29.3 percent in 1981.

In addition to the inadequacies of transportation services, the non-optimal decisions of the managers (Cloud, 2004: 1) are among the factors affecting the formation of the capacities. The factors that influence capacity utilization should be tested to determine what capacity and what size of capacity they are using.

5. Conclusions

Since capacity utilization is related to efficient use of resources, it is expected that interest policy will be effective in the period when capital supply and demand is sensitive. It is especially useful to use a cheap business loan. the banking sector should provide support with long term loans.

The second shift should be encouraged in the industry. Particularly exporting sectors should be supported. New incentives should be used. It is inevitable that the incentives given by the economies in which the unemployment is continuous and structured go to the employers. But it will be seen later that the increase in production provided by shifts will also increase employment.

It should be directed towards working with full or full capacity with tax policies. for example, the production tax from 2nd and 3rd shifts should be taken less frequently. In this case, the tax on production will decrease somewhat, but the total tax revenue will go parallel to the increased production.

Inadequate demand and raw materials can be reduced by the inadequate capacity of the administrators. In this sense, public and private enterprises should closely follow the decisions of the managers according to their own production.

The aim is to increase the capacity utilization of the total industry while creating monetary-credit policies and selecting technology. This will be important for production and income growth. It is essential to create a technology policy. High production (high capacity utilization) should be kept in the foreground rather than avoiding capital intensive technologies and capital imports.

Capital-intensive technology investments in foreign currency must be exercised at maximum production level in absolute terms. By doing this, total factor productivity will be increased and new arguments will be provided for inflation targeting.

Assessment of the calculation of idle capacitance is very important for macro planning. If there is idle capacity, it will be necessary to enlarge the Capital / Reasonable Rates. Because the targeted growth will not be realized with the desired capital investment realized.

The capacity gap will not allow this. As long as the current capacity is idle, the capital / revenue ratio will need to be increased to achieve the targeted output. The full utilization of the existing capacity will also reduce the capital / product rates to be used in plans and programs.

In other words, the target output level can be achieved by increasing capacity utilization against less capital investment.

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