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Effectiveness of Health Services in Portuguese Hospitals under Public-Private Partnerships Regimes

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Abstract

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The evaluation of the effectiveness of the medical services in the Portuguese Public-Private Partnership (PPP) hospitals is a very relevant problem in public policy. The study was conducted using a research protocol created by distinguished academics fulfilling a request from World Health Organization. The eight dimensions of this protocol was used as a good guideline to understand and appraise the main features and interactions of the PPP model. The study then proceeded by considering one of these characteristics, the performance and outcome aspect, through a two tier analysis. First a comparison of the outcome indicators between the four PPP hospitals and the Portuguese public hospitals' national system. The second was a productivity analysis of the hospital activity, considering several inputs (medical staff, hospital capacity and population served).

The results from 2012 to 2014 show that PPP hospitals present a pattern of activity and results very similar to the rest of the national service, with a positive trend in performance on all four PPP hospitals. In what regards productivity, however, the levels of PPP hospitals seem to be considerably higher than the national average, in all inputs. This indicates the ability to produce the same with much lower use of resources.

This preliminary study reveals some interesting stylized facts of medical services of PPP hospitals, which deserve further and more detailed consideration.

Contents

List of Abbreviations

ACSS – (Administração Central do Sistema de Saúde) – Health System Central Administration

ARS – (Administração Regional de Saúde) – Regional Health Authority

DGS – (Direcção-Geral de Saúde) – Directorate-General for Health

ERS – (Entidade Reguladora da Saúde) – Regulating Entity of Health

IGAS – (Inspeção-Geral das Actividades em Saúde) – General Inspection of Health Activities

INE – (Instituto Nacional de Estatística) – Statistics Portugal

PPPs – (Parcerias Público Privadas) – Public-Private Partnerships

RNCCI – (Rede Nacional de Cuidados Continuados Integrados) – National Network of Integrated Continuous Care

SNS – (Serviço Nacional de Saúde) – National Health Service

UTAP – (Unidade Técnica de Acompanhamento de Projeto) – Project Monitoring Technical Unit

Preface

I am grateful to Professor Ricardo Reis, for the strong support, patience and guidance.
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1. Introduction

Public-Private Partnerships (PPPs) in the last decades have proliferated around the World accompanied by great controversy[1]. Many articles have been published in the academia world, however there is much still to be studied as PPPs are complex and multifaceted models.

Portugal presents a wide experience in the use of PPPs to govern several sectors. In the health sector, Portugal has proven to be pioneer in the use of PPPs to run hospital's buildings as well as medical services integrated in the SNS. The clinical services of four major SNS hospitals are currently under a PPP contract.

The thesis has as main purpose the operational and value production of the medical services. To guide this purpose, a research protocol was implemented to analyse each partnership in the most important aspects of its framework. This is an approach significantly different from the traditional financial consideration of PPP institutions. The thesis aims to give a tentative answer to the question of whether the PPP hospitals are different from the others, not so much in the cost dimension but in its operation and service. This aim is much more ambitious than other approaches and clashed with the empirical limitations faced. This is the central reason for some rough aspects of the corresponding chapters.

The analysis performed in this study is twofold. First a service analysis of value comparison that show homogeneous figures between PPP hospitals and the national average. A second analysis focused on productivity by comparing outcome indicators with medical staff, hospital capacity and population served. Once again this comparison was made between each PPP hospital and the national average of all public hospitals.

The results obtained revealed a similarity of service levels between the four PPP hospitals and the public hospitals. A conclusion that indicates a synchronization pattern that is present in SNS hospitals through the country. Nonetheless, when productivity was analysed it was discovered a higher pattern in PPPs compared to public hospitals. A finding that seems to suggest a higher effectiveness in PPP hospitals by producing the same services with less resources.

An improvement trend was also shown across most indicators in all PPP hospitals. This beneficial trend could indicate a favourable effect from public and private interaction compared to public hospitals. Another conclusion of this study is a slightly positive distinction of Braga Hospital in productivity levels.

The thesis poses as a preliminary analysis of medical services in Portuguese PPP hospitals. The results obtained implied some positive aspects and trends of the partnerships institutions.

[1] Consider Bult-Spiering and Dewulf (2006), Sarmento and Renneboog (2014) and Torchia et al (2015)

However further studies are necessary for a more profound comprehension of PPP medical services. Some considerations for future analysis highlight the importance of environmental factors as demographic aspects and SNS interaction.

In the next section a brief literature review presents the current status of the PPP research. It also succinctly raises the main questions surrounding this model and describes the Portuguese experience concentrating in the health sector. In section 3 the qualitative analysis of the PPPs is explained. Through the implementation of the research protocol, the 8 aspects proposed are described and evaluated. Section 4 presents both quantitative analysis that were made to service and productivity. Finally the study culminates with section 5 where the main findings and conclusions are explained.

2. Literature Review

The literature relevant for health PPPs is vast and diverse, as there are many aspects to take into account in this complex reality. First, there are some rules for the implementation of the organizational model[2]. As several years of worldwide experience have already been gathered, some results are available[3]. In the case of hospitals, the particularities of the health sector play an important role[4].

Although still recent, the question of the health PPPs also has some evaluations available[5]. It should particularly be mentioned the existence of surveys. The most relevant are the literary reviews in IOB (2013) and Torchia et al (2015), the first of which centers on developing countries. This thesis is not the place for an exhaustive consideration of this very wide literature. Only some general and important conclusions are worth mentioning.

2.1. Origin and justification

All the studies refer the fact that governments worldwide struggle to reach an equilibrium between increasing healthcare costs in an environment of decreasing public budgets. This is the determining constraint behind the model. “Governments facing increased fiscal stringency can no longer sustain open-ended financing of infrastructure. And societies today hold infrastructure to higher environmental standard” (World Bank, 1994, p. 6).

Besides this resource constraint, the PPP structure deals directly with a central puzzle in the health sector. “Both the public and the private sector recognize their individual inabilities to address the emerging public health issues that continue to be tabled on the international and within-country policy agendas" (Nishtar, 2004, p. 7). By combining both approaches PPP are thus particularly adequate for this public service.

These two elements may be considered as the main drives for a process which has been gathering momentum for several years.

[2] Main examples are UNECE (2008), OECD (2012) and EPEC (2014)

[3] Consider as relevant Monteiro (2005), Grimsey and Lewis (2005), OECD (2008), Basílio (2011), OECD (2013), Tang and Shen (2013), Sarmento and Renneboog (2014)

[4] For the Portuguese case it is important to consider, among others, Costa and Lopes (2007), Ministério da Saúde (2010), World Health Organization (2010), Deloitte (2011), Barros (2013) and EPEC (2014).

[5] As relevant examples should be mentioned Reich (2000), the already mentioned Simões (2004), McKee et al (2006), Espigares and Torres (2011), Nikjoo et al (2012) and in Portugal the reports of Tribunal de Contas (2009) and the continual evaluations of UTAP at Ministério das Finanças.

2.2. Implementation of the Model

Public Private Partnerships in health registered a huge boom in the 1990's. This is contemporaneous with the introduction of reform packages in several countries seen as embracing social cohesion (in Barr, 2007 and Torchia et al, 2015). "Recently there has been enthusiasm for using public– private partnerships to improve the delivery of health and welfare services for a wider range of health problems, especially in developing countries" (Barr, 2007, p. 19). The evolution has been so dramatic that some authors consider it politically irreversible. "PPPs in the health care sector therefore seem to be both unavoidable and imperative" (Torchia et al, 2015, p. 239).

It should be mentioned that the model has registered in Portugal an important development which has merited even the qualification of pioneering. The inclusion of hospital services management in the structure of PPP represents a bold innovation which other countries avoided. "Portugal was a pioneer in the introduction of this model, because although the UK already used PPP in the health sector, their model encompasses only the component of the hospital building (construction and operation / maintenance)" (Basílio, 2011, p.97). "The reason why this model is consider as innovator and complex is that in the international experience PPPs only apply to the construction and management of the infrastructure, and not to medical services" (Sarmento and Renneboog, 2014, p.4).

The boom was not merely operational but also intellectual. The health care sector academics have turned their attention to PPP projects. As has already been mentioned, the number of published articles related to the subject has increased substantially in the past decades identifying problems, methods and solutions in PPPs models.

2.3. Mixed evaluation

The unequivocal trend of PPP in health sectors does not translate necessarily into a positive evaluation of the experience by the studies performed. It could even be said there is a lack of evidence to support the PPP enthusiasm.

The problems identified are several. The first is conceptual uncertainty, as there is "no common understanding about what precisely constitutes a public–private partnership" (Barr, 2007, p. 19). Also, the inner complexity of the PPP structure creates, by itself, some obstacles. In particular "considerable skepticism exists about the motives of private firms that engage in partnerships" (Reich, 2000, p. 619).

One facet of PPPs that have brought huge controversy comes from the political point of view. For some left wing militants the PPP model is seen as a masked privatization of important

services. “Confusion about the PPP concept is striking in the political and social discussion on these governance questions. Often, PPP is used as synonym for privatization. (…) The confusion impedes a rational discussion about PPPs since all the disadvantages of privatization are imputed to PPPs.” (Bult-Spiering and Dewulf 2006 p. 3). “In many cases, PPPs are simply neoliberal solutions in disguise, i.e., they amount to the privatization and de-regulation of formerly public services. This seems to be very much the case concerning PPPs in humanitarian aid and the development sector” (Börzel and Risse, 2002, p. 15)

More relevant, the studies do not show a clear picture. The advances in the understanding of PPPs effects have been few. Torchia et al (2015) state that “there is no general agreement on their main benefits. In particular, doubts remain concerning their actual effectiveness, efficiency and convenience in the health care sector” (Torchia et al, 2015, p. 239). The judgement of the studies can be considered disappointing: “the success of public–private partnerships in this context appears to be mixed, and few data are available to evaluate their effectiveness” (Barr, 2007, p. 19).

As was stated in the conclusion of a survey, “despite the increasing attention PPPs are gaining in the health sector worldwide, some questions remain unanswered. Future research should provide more empirical results on the actual effectiveness, efficiency and convenience of PPPs as solutions for public health care system problems.” (Torchia et al, 2015, p. 259).

2.4. The Portuguese Case

Portugal has a mounting experience with PPPs. Since 1994 with the start of two contracts, in road sector and health sector, PPPs have been present in Portugal. Nonetheless, the growing amount of vivid information has done little to stimulate the academia world. “The Portuguese history with PPP had started approximately two decades ago and yet, there is a scarcity of papers on the topic.” (Basílio, 2011, p. 73).

In the last years the number of PPPs have grown and covered 4 main sectors: roads, trains, security and health. In total 32 partnerships are now in force, with the majority of these in the road sector. The rapid rhythm of partnerships in past years highlighted Portugal in the international sphere. In 2008 the Court of Auditors (Tribunal de Contas) stated in one report that “Portugal is currently, the European country with the highest percentage of PPP both in growth domestic product and in state budget” (Tribunal e Contas, 2008, p. 1, translated by the author).

Another particularity of this accelerated rate was the separation from the legal system. The pace imposed by the expanding number of partnerships could not be mimicked by the legislation. In the same report of 2008, the Court of Auditors declared “The procurement model of PPP

advanced in Portugal before the specific legal and budget framework was developed" (Tribunal de Contas, 2008, p. 1, translated by the author).

The health sector has nowadays 8 partnerships divided in 4 hospitals. However seven health institutions were, so far, developed under a PPP contract. The extensive Portuguese PPP experience counts with three already finished partnerships that raise much debate in its evaluation. The first was Hospital Fernando da Fonseca, a partnership on the medical service and hospital management which ended with little or no process evaluation. In their study on the subject in 2008, Adelino et al. observed that the private experience of a public hospital concluded without a global and careful evaluation that identified the advantages and inconveniences of the model, the impact on the health system and the results obtained[6].

The second and third controversial health PPPs were a rehabilitation and medical center in Algarve and a centralized service of telephonic assistance that did not persist for too long due to operational and financial problems.

Nonetheless, many more partnerships were planned to exist with the purpose of developing the SNS. "One of the mechanisms that the government has used to improve NHS capacity and value for money has been through an increased use of private entities to build, maintain and operate health facilities, under the so-called PPPs." (Barros et al., 2011, p. 46).

In Portugal every hospital under PPP model has two contracts with two different private partners. One type of the contracts is made with a construction and building maintenance company. The purpose of this contract is to elaborate on the new facilities and how they will be design, produced and maintained in a time span of 30 years. All the four current hospitals under PPP regimes had a new facility built either with the purpose of transferring from an old hospital or to start a new institution in a place where there were none. The second type of contracts covers the medical services provided by the hospital and its staff. This thesis will focus only in this type of contract of the four existing PPP hospitals.

Of the four hospitals, Cascais Hospital is the most ancient one. The partners of Cascais signed the contract in February 2008, started their functions in the old building in January 2009 and made the transfer to the new facilities in February 2010.

The Braga Hospital had a different timeline with the contract signed in February 2009, managing the hospital in the old building since September 2009 and transferred in May 2011.

[6] "Ficou assim anunciada a conclusão da experiência de gestão privada de um hospital público sem que tenha sido disponibilizada uma avaliação global criteriosa que identificasse as vantagens e os inconvenientes do modelo, o seu impacto no sistema de saúde e os resultados obtidos medidos…" (Adelino et al., 2008,p. 5)

Loures Hospital is the third hospital to change into PPP management. This hospital has the particularity of not having a previous facility. The private partner signed the contract in December 2009 but only started to exert their functions in January 2012 at the new hospital building.

The last one is Vila Franca de Xira, in which the contract was signed on October 2010, then started their activity in June 2011 at the old hospital and transferred in May 2013.

There are visible differences between the four PPP hospitals in Portugal. The main distinction is the size of each hospital. ACSS created a classification of their institutions which organizes each hospital, hospital center or health unit in 6 groups. This categorization has into account the institutions size, medical specialties available and SNS interaction. In this outline, Braga Hospital is considered in a higher group than Loures and Cascais. Vila Franca de Xira is the smalles of the four PPP hospitals.

3. Structured Analysis of Portuguese PPP Hospitals

The purpose of this thesis is to evaluate the effectiveness of health services provided by the Portuguese Hospitals under PPP regime. Thereby, the scope of the thesis is limited to medical services and the partners directly associated. Despite the doubled structure of the PPP contracts of these institutions, the private partners responsible for the construction and maintenance of the buildings are not considered in this analysis.

To guide the evaluation of effectiveness in Portuguese PPP's Hospitals, a research protocol was implemented. Published in 2007, the protocol was presented in the article "Research Protocol to Evaluate the Effectiveness of Public-Private Partnerships as a Means to improve Health and Welfare Systems Worldwide" of Dr. Donald Barr. The main particularity of this protocol was that it was made as response to direct request from the World Health Organization (WHO). To fulfil the request, 9 prominent scholars from around the United States of America convened in a two days meeting to discuss the issue. When the protocol was finished and published the World Health Organization had to turn their attention to more urgent matters and cut the finance for the implementation of this protocol.

This research protocol is divided in eight principal aspects which will be addressed in the following chapter. Due to the similarity between the four Portuguese PPP hospitals' contracts, they are described as a group, highlighting the main characteristics in the following aspects. However, any important distinguishing feature of each partnership is also included in the description.

3.1. The Relationship Between Public and Private Sectors

The first aspect of the research protocol is the clear definition of each partner and the characterization of the market system in which they operate.

For all four PPP hospitals considered, there are two partners involved in the health services. The public partner, the Portuguese Government, is represented by the ARS of the hospital's area of influence. The ARS are regional institution with public rights that integrate Indirect State Administration. There are five ARS (Norte, Centro, Lisboa e Vale do Tejo, Alentejo and Algarve) which are under the health minister tutelage. The private partners are anonymous companies to whom their main shareholder is one of the three most known private health providers in Portugal. These companies are market-based for-profit organizations with wide health management experience.

One of the companies is Lusíadas Saúde, a health provider group founded in 1998. In February 2008, when the PPP contract was signed, Lusíadas Saúde, by then Hospitais Privados de Portugal,

was part of Grupo Caixa Geral de Depósitos, a holding of the public bank Caixa Geral de Depósitos. Lusíadas Saúde changed its name in 2012 when it was acquired by AMIL, a Brazilian health company of the UnitedHealth Group, a worldwide differentiated health provider. Today, Lusíadas Saúde manages nine private health institutions of which five are hospitals including one PPP.

A second company is Luz Saúde, founded in 2000 with the name Espírito Santo Saúde as part of the Espírito Santo Group. By the end of 2009, when it signed the partnership contract, Espírito Santo Saúde, had grown in expertise and renown in the private health sector. At the beginning of 2014, the company entered the Euronext Lisbon Stock Exchange. Few months later, a large majority of the company was bought by Fidelidade, a Portuguese insurance company that had been acquired by a Chinese private-owned conglomerate called Fosun. After the purchase was made, the name changed to Luz Saúde. Nowadays Luz Saúde operates eighteen institutions of which nine are private hospitals and one PPP.

The final private company is José de Mello Saúde. Founded in 1945 as part of Grupo CUF (Companhia União Fabril) which later became Grupo José de Mello. The company has a long history in Portugal, among other achievements, had the first hospital as a PPP of the health sector in Portugal, Hospital Fernando da Fonseca from 1995 until 2008. José de Mello Saúde currently has eighteen health institutions from which seven are hospitals including the two PPP. The two partners involved in each partnership differ for every hospital.

Hospital Dr. José de Almeida in Cascais is the result of a partnership between the public partner ARS Lisboa e Vale do Tejo, I.P. and private partner HPP Saúde – Parceiras Cascais, S.A. which the main shareholder is Lusíadas Saúde, formerly HPP (Hospitais Privados de Portugal).

Hospital Beatriz Ângelo in Loures comes from the partnership of ARS Lisboa e Vale do Tejo, I.P. and SGHL – Sociedade Gestora do Hospital de Loures, S.A. subsidiary of Luz Saúde, formely Espírito Santo Saúde.

Hospital de Braga combines the efforts of ARS Norte, I.P. with Escala Braga – Sociedade Gestora do Estabelecimento, S.A., a company linked to José de Mello Saúde.

Hospital de Vila Franca de Xira operates under the partnership of ARS Lisboa e Vale do Tejo, I.P. and Escala Vila Franca – Sociedade Gestora do Estabelecimento, S.A. which is also linked to José de Mello Saúde.

All three private partners, of the four PPPs, are well established and successful healthcare providers with great experience in hospital management.

The Portuguese health sector is a highly regulated market system that is greatly influenced by the SNS, a nationwide public network of healthcare providers. This network was created in 1979 to exert the universal right of health protection to all citizens described in the national

constitution. Nowadays the SNS has a wide range of hospitals, health centers and health units scattered all over the country. Under the tutelage of the Portuguese Ministry of Health, the network is managed by the ACSS which divides the country in areas of influence of the five ARS. The goals of these institutions are guided by the National Health Plan which is defined every 4 years by the DGS and approved by the Government.

Although the SNS has a national coverage that ranges throughout Portugal, half of the Portuguese hospitals are private institutions. The private sector in health has a growing range of institutions and practices in Portugal. These services are regulated by public organisms, like the DGS that issues the norms. And the IGAS which is responsible for auditing, inspect, supervise and perform disciplinary actions to healthcare providers. Both these institutions are under Direct State Administration and respond to the Ministry of Health and the Government. Another important organism in the Health sector is the ERS, an independent public entity that regulates the health market by investigating complaints from customers or other institutions and issues recommendations or sanctions accordingly.

3.2. Nature of the Partnership between Public and Private Participants

Secondly, the research protocol demands an accurate description of the relation between both parties. In the Portuguese case, the four PPPs were created under an employer-employee relation. The partnership has the model of private sector investment in the public sector service program. To assume the public responsibility of universal coverage in each hospital with the use of public resources and private expertise.

The agreement is formalized under a strict contract detailing expected outcomes and financial arrangements for the ten year duration of the contract and the possible two renewals of 10 years more. In these contracts, the financial incentives are described to attract the private partner into providing the expected services with their management expertise. The expected benefits of the partnerships are based in a symbiotic complementarity reinforcing the service quality. The public side is expected to achieve the established health practice services and resources management with more stable and controlled costs. The private partner has the possibility to explore the business related to the services with state approval and public visibility while achieving a perceived fair value for the services provided. Another possible benefit for the private partner is the prospect of achieving the expected service with improved resources management that allows to reduce the costs and achieve profits.

An important aspect of this relation is the dynamic nature of the expected outcomes. The production levels are not static measures that the hospitals must achieve but established

comparative data to other public hospitals, selected to be the reference group. With this dynamic the hospitals performance levels are adjusted to external causes that would impact the whole sector and would establish a stronger link to public hospitals and the SNS goals.

3.3. Financial Arrangements of the Public-Private Partnership Project

This aspect of the research protocol, intends to clarify the financing model of the enhanced service provision. The financial arrangements of these partnerships are dynamic systems strengthen by an initial forecast formula that is later corrected with the actual figures. This systems allows for concurrent monthly payments of a large percentage and subsequent yearly adjustment to correct the amount. The next image illustrate the financial system through a scheme that shows the financial flow.

Insert image 1 [PPP Hospital financial flow] here

The financial flow moves mostly in the private partner direction but is supported by three financial sources: patients, third-party financiers and public partner.

One of the sources is created by patients that have to pay an amount for the service that was provided to them. If the person attends the hospital under the SNS, she is committed to pay a hospital charge that can vary considering the socioeconomic status of the patient and the service performed. These charges are stipulated by the Ministry of Health and are applied nationwide under the same set of rules for public hospitals and PPP hospitals. Some patients, however, are insured by a third-party financiers allowing them to pay a special price called copayment. This special price is the fruit of a negotiation between the insurance company and the Hospital. Amid this payments by the patient, the hospital also receives another payment directly from the insurance company that fulfills the negotiated cost for the procedure. Other patients can also chose to pay the full price of the service provided and afterwards present it to the insurance company to be partially reimbursed. All these possible payments are mainly made immediately before or after the patient has benefited from the hospital services and they are paid directly to the private partner.

The second financial source, third-party agents, hosts different enterprises that can be divided in two groups, health subsystems or insurance companies and catering & vending companies. The latter group are privately held enterprises that rent the space to develop secondary services not linked to the hospital ongoing functionality. They establish food and beverage points of sale either through a vending machine or a cafeteria. Each hospital has the autonomy to negotiate the supply contract and collect the rent. This money is then divided by the entities of the partnership, 25% to the public partner and 75% to the private partner.

Another third-party financiers group are like health subsystems & insurance companies, which are organizations that co-finance health related costs through an established agreement in the form of a contract among the insured and the insurer. In this agreements, the terms of financing are described in the policies, establishing how the costs are divided between the patient and the company. Most insurance companies establish a direct relation with some health services providers, like hospitals, in order to negotiate better prices for their costumers and create a reliable network of providers. In these cases is the provider responsibility to engage the organizations with the purpose of informing the costs and collecting the insurer share of the payment. In PPP hospitals', is the private partner that manages these relations and collects the money. Once the payments are done, it is separated in four amounts. The first amount is due to the private partner for the effort of managing and collecting the payment. This amount corresponds to 5% of the total payment received. The second amount is computed in order to cover the actual costs of the service provided, which is also made to the private partner. Subtracting these two amounts from the total computes the sum of the third and fourth amount, the remaining value. This value is divided between the private and public partner in the weights of 25% and 75%, respectively.

The last financial source is the main source and one of the entities in the partnership, the public partner. This partner is the main financier of the project empowering the private partner with the operational and management responsibilities of the hospital. Due to the importance of the entity and the proportion of money involved, this source has a more complex financial model. An important characteristic of the financial model is to establish a continuous financial flow from the public partner, which is crucial for the hospital financial equilibrium. The payment amount of this partner is computed using established formulas, as described in the image 2 [PPP Hospital financial formulas] (appendix 2). The Nacional Health Service (SNS) total payment is calculated by achieving the base remuneration of all services performed during the year and then subtracting the payments received from other sources as well as the money due to the public partner. For the base remuneration, the formula covers four different sections. First is the price of the hospital production along the year in all services. Secondly, the established price for the continuous operation of the emergency department is added alongside an adjustment according to the contributions of the prescribed medication. After summing these three values, a discount is made according to the amount of deductions imposed due to performance evaluation.

Hospital production includes the services of patient's hospitalization and surgeries, hospitalization of qualified patients for RNCCI, emergency care services, outpatients care and appointments, day hospital consults and an undefined special cases part for less common services, for example mechanically assisted ventilation. Each of these services is computed using

a specific formula that multiplies the amount performed with the price established, but also accounts for special considerations of each service, as patients quotas, different diagnosis related groups or indexes of complexity (see appendix 2 IMAGE [PPP Hospital financial formulas]). To the overall payment amount of production, availability and medication, a discount related to performance is need to compute the base remuneration value. The deduction amount is described in the contract in the form of an evaluation system aimed at the hospital performance that establish the penalization points and there value. These calculations allows to reach the base remuneration value which covers the hospital's whole production.

To achieve the SNS total payment, some amounts are subtracted to the base remuneration. These amounts are the payments received from other sources, which is the sum of the money inflow to the private partner from patients and Third-party Agents according to the models specified earlier in this chapter. Another amount subtracted, is the money due to the public partner from commercial activities of the hospital, as well as partial profits from third-party financiers' payments for hospital services. All of these values are calculated twice for each year, once before the year starts as a forecast value and after the year ends to obtain the actual value. The forecasted values are used to establish a beforehand amount to finance the hospital operations on a daily basis. The amount equals ninety percent of the forecasted SNS total payment and is distributed in monthly payments to the private partner, transferred by the end of each month. The remaining amount to be paid by the public partner is retained until all figures are confirmed and the actual SNS total payment is determined.

Due to the partnership inherent circumstances the process to determine the forecasts has established timeframes for both parties to contribute with their point of view. The process starts with a negotiation between the private and public partners in the first half of November of the previous year. If a consensus is not achieved in negotiations until the deadline, the public partner will unilaterally calculate the predicted production using the forecasts considerations described in the contract. Among the considerations used to forecast there are quantitative indicators, such as, service required by the hospital's area population in the previous 5 years and results obtained in the past year. However, to achieve a more realistic and comprehensive estimate, some qualitative considerations must be contemplated. These considerations allow an adjustment for Hospital overall capacity, hospital yearly investments possibilities and hospital inherent circumstances due to the possible building transfer problems or related issues.

During the year the private partner is obligated to send two types of reports to the public partner, as described in the contract. Quarterly a report is sent with operational data from services provided to current financial figures and hospital maintenance information. This report allows the public partner to be aware of the hospital performance as the year progresses. The

second mandatory report is biannually and has secondary information, such as patients and professionals' surveys results, accreditation processes and self-monitoring evaluations. After the end of the year the real values need to be determined and confirmed by both parties, this is done on a flexible timeframe.

3.4. Structure, Scope and Functions of Enhanced Health and Welfare Services

Following the guidelines of the research protocol, the next aspect to be analyzed is the characteristics of the enhanced service program. Each partnership project provides medical care and public health through a hospital based facility. The institution is a decentralized extension of the SNS responsible for the health of the stipulated area's population. The partnership involves all activities, resources and personnel need and linked to the hospital in question. In the agreement, the public partner acts as a financial provider and the private partner is the service provider. As described in the contract, decision making and operational processes are of private partner's full responsibility. All health professionals involved in the hospital, as well as administrative personnel are selected, trained, paid and managed by the private partner. This partner also negotiates and manages all relations with suppliers and third-party agents. The supervision and inspection responsibilities falls on the public partner through an agent, the contract manager, and his team. Each partnership has a designated contract manager who confirms the fulfilment of all contract obligations, performs the liaison duties between both partners and writes frequent reports describing the situation to the public partner.

In these contracts the private partners are more susceptible to risk. The prices and limits to activities in all services are mostly established and linked to a reference group of public hospitals with similar characteristics. The service parameters and expected service quality are described in great detail, as well as performance measurements indicators. The contract stipulates penalizations and deductions linked to performance that could contribute only in the public partner favor. The financial model dictates that ninety percent of the expected payment from the public partner should be paid every month of the year to which it relates. However, the remaining ten percent of the total payment is only paid after the figures of the year are calculated and evaluation indicators checked. These characteristics allow for a mitigation of the financial risk for the public partner. Other risks to be considered are operational and procurement risks. These risk are mainly supported by the private partner in their management responsibilities and decisions. As public partner plays the role of financier and supervisor, the burden of achieving the expected outcomes with the imposed obligations fall into the private partner. Also, as explained above, private partner has the responsibility to negotiate the deals

with suppliers, insurance companies and other stakeholders. All these risks are seen as an incentive to private partner involvement as he is able to profit from the conditions achieved. This characteristics of the partnership establishes a scenario where the public partner has a more predicted benefit and the private partner has more variable one.

3.5. Government Policy Enacted to Promote Partnerships Efforts

The public policy aspects of the protocol evaluates the governmental changes needed to implement the partnerships. In the Portuguese healthcare sector, six decree-laws were written to support the conditions of the PPP Hospitals' contracts by adjusting the SNS rules. In 2002, the decree-law no. 185/2002 was written to establish the legal regime of the health partnerships with private management. This decree-law was updated afterwards by the decree-law no. 86/2003 and decree-law no. 141/2006 with small adjustments. By 2010 the decree-law no. 136/2010 applies several changes to the legalization to support the austerity measures. Some changes were the reduction of the administration board of the hospitals and the empowerment of ACSS to materialize and supervise the partnerships process. The latter change is further developed in the decree-law no. 1324/2011, defining the powers and responsibilities given to ACSS. Finally, the last decree-law to influence directly healthcare PPPs, is the decree-law no. 111/2012 where the general norms applied to the creation and supervision of Healthcare PPPs are again reviewed and the UTAP is created. As an independent administrative entity under the Finance Ministry tutelage, UTAP assumes the responsibilities to monitor all PPPs processes in Portugal. Other policies and legislation also have influence in the Portuguese PPP hospitals, either by influencing all hospitals under the SNS or by affecting health care partnerships or public-private partnerships in general. However these policies and legislations do not strongly define the Portuguese Hospitals under a PPP agreement.

3.6. Measuring outcomes of the Public-Private Partnership

For the sixth aspect, the research protocol considers the outcome measurement of the partnership. The figures and data of this aspect are better exposed in section 4.

3.7. Assessing issues of Equity

This is the aspect most fulfilled by the Portuguese PPP Hospitals. Due to the universal coverage of the SNS, there are no distinctions in the treatment of people. This characteristic is distinctly stated in each partnership contract. Under the clause called Access to Health Services (Acesso às Prestações de Saúde) the contract states that the private partner must abide by the principle

of equality, assuring that all SNS beneficiaries have the right to equally access, attain and use of healthcare services. Another point described is the right of equal involvement, where everybody should be assisted according to the clinical priority criteria defined by the health care necessity. However, due to the private partner nature, universal coverage can be compromised if a medical situation emerges that conflicts with potential profits. This is a limitation to hospitals with PPP management model. Private partner use their expertise and are bound to act according to the written contract. But medical advances will be made during the contracts extension and situation can appear where a new procedure, drug or equipment could beneficially impact on the patient care. If such a similar situation would appear in a public hospital, the institution structure would allow it to put the patient welfare first and the moral responsibility to acquire the needed specialist, medication or technology would prevail. On a generic point of view the contract covers most conflicting possibilities, nonetheless not all scenarios can be predicted.

3.8. Identifying Potential Weakness of the Analysis

This final aspect of the protocol calls for an analysis on the problems encountered during the implementation of the protocol. The first and more revealing weakness of this study is related with the lack of updated and unprocessed information about the PPP contracts and the health national service. During this study an extensive search was performed and many institutions were approached with the purpose of collecting sufficient and unbiased data. Unfortunately the process was not completely successful and considerable gaps of the analysis still remain to be studied. Another weakness of this analysis is the reduced time spam of the PPP hospitals associated with a small sample of observable institutions. Although another hospital under a PPP regime was made in Portugal the time lapse and the differences among contracts, outcast that hospital from the group presented here.

3.9. Protocol summary

Overall the Portuguese hospital under PPP regimes satisfy the aspects of the protocol presented in this section. Every hospital has a well-defined public and private partner, likewise the relationship between them is explicitly characterized. There is room for improvement in the understanding of the nature and expected outcomes of each of the partners, especially the private partner's expected benefits. The financial arrangements, structure and scope of the partnerships were sufficiently detailed in the contracts that were signed. A more detailed analysis about the constraints or gaps in the legal framework by professionals in that field would be beneficial for a more profound understanding of environment in which the partnerships

operate. The equity assessment and the weaknesses of the analysis are satisfactorily described and transversal to all PPPs. In the next section the measuring outcomes are described in further detailed.

4. Data Analysis

The Portuguese experience with health PPPs is both rich and very significant. The pioneering statute of the country in this regard has already been mentioned in section 2. There are already detailed and exhaustive studies of this experience. But the literature hardly has isolated the case of health. It can broadly be divided in studies relative to the whole of PPP experience, of which health is but a part[7] and evaluations of the complete health sector[8]. Simões (2004) remains the only academic study of the relevant intersection. Unfortunately the early date of the analysis seriously impairs its relevance. Another important drawback of most of these analyses is that they are generally limited to the financial elements, neglecting performance, services and other results.

This thesis carries a preliminary study of the performance of the four PPP Hospitals. The unfortunate obstacles faced in the process of data collection, justify the sketchy nature of the exercise. Future research will certainly allow further and deeper consideration. The database used is from the monthly monitoring of hospitals performance by the ACSS[9].

The thesis performs two exercises, in a preliminary attempt to capture the specificity of the PPP model inside the health sector. Avoiding the traditional financial and cost consideration, the thesis will be centered on the production of health service. The first section is dedicated to measurement of service not only in dimension but also in quality and type. This is called service analysis. Section two tries a much more sketchy consideration of productivity and efficiency measurement, entitled productivity analysis. All the database is limited to the years of 2012, 2013 and 2014.

4.1. Service analysis

To perform this analysis data about the operational traits of hospitals, data was collected for the 51 institutions from the five ARS, presented in the next table.

Insert table 1 [Hospital Centers, Health Units and Hospitals] here

The next tables will present the average of each indicator for the national average (the average of all the 51 institutions) and the value of each of the four PPP Hospitals (Cascais, Loures, VFXira, Braga).

[7] Basílio (2011), Sarmento and Renneboog (2014) and the reports of Tribunal de Contas and Ministério das Finanças.

[8] Costa and Lopes (2007), Ministério da Saúde (2010), World Health Organization (2010), Deloitte (2011) and Barros (2013)

[9] http://benchmarking.acss.min-saude.pt/monitormensal.aspx

The first table deals with size variables. These pertain to services rendered either in consultations (consultas), hospitalizations (internamentos), emergency care (atendimentos), surgeries (cirurgias) or discharges (saídas de internamento). As indicated in the previous table, some of the institutions considered had more than one hospital, being hospital centers or health units. Consequently all these variables pertaining to each of these composite units were averaged by the correspondent number of hospitals, to give a level per hospital.

Insert table 2 [Service analysis absolute indicators] here

The general picture of the table is one in which only Braga Hospital is significantly larger than the national average. It is significant that, although of average dimension both hospitals Cascais and specially the one in Loures stand out at emergency consultations and, in the case of the last, also in initial consultations. This could signal some qualitative difference.

Next table deals with length of treatment and rehospitalization cases. The first element is evaluated both in the number of days of hospitalization and the percentage of tenure above 30 days. The second aspect is measured by the percentage of rehospitalization after 5, 30 and between 31 and 180 days.

Insert table 3 [Service analysis Hospitalization indicators] here

The PPP group fails to stand out from the global group, with only Cascais Hospital having a smaller number of late rehospitalizations, a treat which became more salient in 2014.

The consideration of surgery activity, presented in the next table, is analysed in three dimensions. The first variable indicates the percentage of schedule surgeries with a waiting time above the guaranteed response time (TMRG - tempo máximo de resposta garantido). The last element is the type of childbirth, considering the percentage of c-sections.

Insert table 4 [Service analysis surgeries indicators] here

The table confirms the similarity between PPP hospitals and all the others, with the exception of Loures Hospital, having a significant smaller percentage of c-sections and extremely delayed surgeries. Again this could point to a qualitative prominence.

The last table analyzes the efficiency and other characteristics of outpatients and emergency consultations. The following elements are considered: the percentage of initial consultations, percentage of initial consultations performed inside the adequate time, percentage of first discharge follow-up consultations, percentage of consultations not performed and percentage of emergency consultations resulting in hospitalization.

Insert table 5 [Service analysis consultations indicators] here

It is interesting to note that 2014 changed the general picture of similarity of PPP with the environment registered in 2013. Loures had a smaller percentage of consultations in adequate

time, indicating now a low quality problem. In Vila Franca de Xira Hospital, the size of no-shows (non-performed consultations) was very significantly higher.

The first consistent observation that is concurrent in all tables shown a similarity between PPP hospital figures and the public hospitals. The second is a slightly positive trend of the hospitals service levels from 2013 to 2014. Another very clear observation in this analysis is the highly significant values of the Braga Hospital in the absolute indicators' table. This increased number of services performed could be explained by the difference in dimension between the Braga and the rest of the hospitals, especially from Vila Franca de Xira which is the smallest of the group. The final observation of the tables highlights the Loures Hospital contrast with the national average in initial consults, total emergency consults, percentage of surgeries with time above guaranteed and percentage of births by c-section.

4.2. Productivity analysis

The other aspect of PPP hospitals this thesis aims to describe is, as said, operational efficiency, which combines the service elements with measurement of input. The main difficulty faced was that the database of monthly monitoring by the ACSS[10] which has been used so far, does not include any indication of doctors, nurses and other resources in each of the hospitals. This data, available at the INE has the problem of being organized by county and district and not by institution.

Fortunately, for each of the four PPP hospitals it is very simple to make a mapping with a particular county, as they are unique in that geographical demarcation[11]. As it was impossible to do a similar exercise for the other 47 institutions, the study is limited to a comparison with the national average. This eliminates the intra-sample standard deviation, thus precluding the statistical tests included in the last section. Availability of the data forces the study to center only in 2012 and 2013.

Lacking statistical significance measurement, the analysis used percentage distance as an evaluation of disparity between each PPP hospital and national average. By this approach, a very intense variability is shown in the next tables.

If in the previous section the general picture was one of similarity in what regards the product and service of the hospitals, when considering productivity, measured by the relationship between services and input, the trend is now on of divergence and disparity.

[10] http://benchmarking.acss.min-saude.pt/monitormensal.aspx

[11] It was considered that Hospital de Braga corresponds to the county of Braga, Hospital de Loures with the county of Loures, Hospital de Cascais with the county of Cascais and Hospital de Vila Franca de Xira to the county of Vila Franca de Xira.

The output variables used are total numbers of consultations, patients discharged, programmed surgeries and emergency consultations.

The inputs considered for each hospital include several elements. The first is staff, distributed through total and its main components, medical doctors, nurses, nursing assistants, therapeutic and diagnostic technicians and administrative staff (others). Physical inputs include hospital beds and operating rooms (these are only considered as relevant for surgery and hospitalization variables).

The analysis also includes the relationship between the service variable and the total population in the region served by the healthcare institution. If the previous measurement try to capture internal efficiency, this aims at another aspect of productivity namely its impact on society. This last variable is measured per thousand persons.

In what regards the production of consultations, the general picture is one of higher efficiency at PPP hospitals as measured by the level per unit of staff. Braga Hospital stands out with in both years. The clear exceptions are, in 2012, the hospitals of Loures and Vila Franca de Xira, with significantly negative diversions. Curiously enough in 2013 Loures joins Braga at the top while Vila Franca de Xira, the most recent of all the PPP hospitals, improves significantly its position.

Insert table 6 [Productivity analysis total consultations] here

It is also relevant to note that the advantage in productivity of PPP hospitals is decisively more marked in auxiliary and administrative personnel.

Consultations are the main activity in hospitals, so the picture in the previous table dominates the environment but other aspects of the service may be more significant. The positive pattern seen in consultations is strongly enhanced when considering emergency situations. Here all PPP hospitals present a high advantage relative to the national average, in many cases more than double.

Insert table 7 [Productivity analysis total emergency consultations] here

In both years Cascais Hospital stands out above all others, with Loures catching up in 2013. The Braga Hospital, which held the undisputed first place in consultations productivity, is now the last in the ranking. Although the advantages is across the board of personnel types, technicians show the highest positive divergence.

The general pattern of the situation regarding surgeries is understandingly very similar to the one in consultations, although in a much more salient way. The divergent motive in 2012, having Braga Hospital strongly above and Loures significantly below national average, is now again corrected in 2013, with all above. The main difference is that the role of less laggard which Vila Franca de Xira had in consultations is now played by Cascais. Again, less specialized tasks (auxiliary, paramedics and administrative) show the highest productivity.

Insert table 8 [Productivity analysis programmed surgeries] here

Physical infrastructures, not considered in previous tables for obvious reasons, are now very relevant. It is very interesting to note that the pattern of personnel is replicated when considering hospital beds and operating rooms.

Patients discharge is a variable which captures in a much more direct way the production of a hospital. Consultations and services represent activity, while discharges measure results.

Insert table 9 [Productivity analysis patients discharged] here

Again there is a similarity of patterns with other tables. In fact this case mimics but in less salient way the picture of general higher productivity of PPPs seen in emergency consultations. Vila Franca de Xira holds the first place in 2012, but Cascais and even more Loures capture that position in 2013. It should be noted that the variation between consecutive years, which is visible in almost all tables is very significant and recommends further and deeper studies.

The indicator for which the advantage is less marked is the only physical one considered relevant, hospital beds. Administrative staff is like in most previous cases the dimension in which productivity is more salient.

Having considered what was named “internal efficiency”, we now turn our attention to a different angle of productivity: the relationship between the output of the hospital service and the size of the population served. This calculation is obviously a very crude way of capturing this element, and can only be considered somewhat relevant if a clear and undisputed picture surfaces.

Insert table 10 [Productivity analysis population] here

It could be said this is the case. When measuring activity, with the previous output variables as percentage of inputs, the results, as said, depicted a clear advantage of PPP Hospitals relative to national average. When relating the same variables with the population served, now the reverse patterns arises, with almost all the hospitals in all the dimensions considered showing clear negative discrepancy. It is not the task of this thesis to present a clear-cut explanation of this result but it surely points to several purposeful meanings.

One consistent observation present in all tables is the clear higher productivity levels of the PPP hospitals. This distinction is imbued with the positive trend that persists as seen in the service analysis.

5. Conclusion

The thesis intends to evaluate the effectiveness of the Portuguese PPP hospitals. With this aim, the study started by comparing the contracts with the aspects raised by Dr. Barr's research protocol. In general the contracts satisfy each of the aspects evaluated. The partnership structure, scope, entities, relationship, financial arrangements and equity impact are fully characterized allowing a good understanding of the situation. Further analysis could be beneficial in the understanding of the government enactment legal framework as well as expected outcomes from each partners' point of view.

The study continued to an evaluation of outcomes as proposed by one of the aspects in the protocol. Due to the information available, the exercise focused on services and productivity analysis between 2012 and 2014.

The service analysis showed much resemblance between the national average and the partnerships in most of the indicators with some quite pertinent exceptions. The productivity examination revealed a distinctive positive difference of PPP hospitals in comparison with national average. A conclusion indicating a higher effectiveness level of the partnerships allowing them to perform equally with a lower number of resources.

Another result shown in service and productivity analysis, was a consistent positive trend in PPP hospitals. A coherent improvement tendency present in most partnerships in all indicators implying a constant effort of PPP management to progress and develop their institutions.

It is necessary, in order to better understand each PPP hospital's results to launch a small discussion about the some surrounding factors around each and every private partner involved. Hospital de Braga demonstrated, globally, better results than the national average and other PPP hospitals. Braga Hospital had the advantage of being a bigger and central hospital in its area, however, the positive results were also observed in clear comparison between hospitals in the same circumstances. This positive results could be explained by the private partner's previous valuable experience with the Amadora-Sintra PPP in 1995 to 2008.

Nonetheless Vila Franca de Xira, a hospital with the same private partner does not show the same results. This observation can be misleading due to external reasons. As the most recent of the four partnerships, Vila Franca de Xira completed in 2013 the transfer from the old building to the new facilities. This time consuming action surely impacted negatively the Hospital's productivity results. At a cruising state, this recent PPP with new facilities is expected to take off in terms of productivity.

Similar positive tendency to improve results can be observed at the Loures Hospital, also a recent PPP started in 2012 as a green field project. The fresh start allowed this hospital to choose

and adjust their medical team to Luz Saúde culture and management style, instead of absorbing established institutions.

Cascais Hospital demonstrated a higher similarity to national values than the other PPPs institutions. This performance should be observed remembering the ties that its private partner, Lusíadas Saúde, had to the public sector. As part of Grupo Caixa Geral de Depósitos by the time the contract was signed, Cascais Hospital had a disadvantage compared to other PPPs in negotiating with the public partner. This disadvantage could had impacted in personnel selection and operational management, explaining the low degree of variability of the hospital performance.

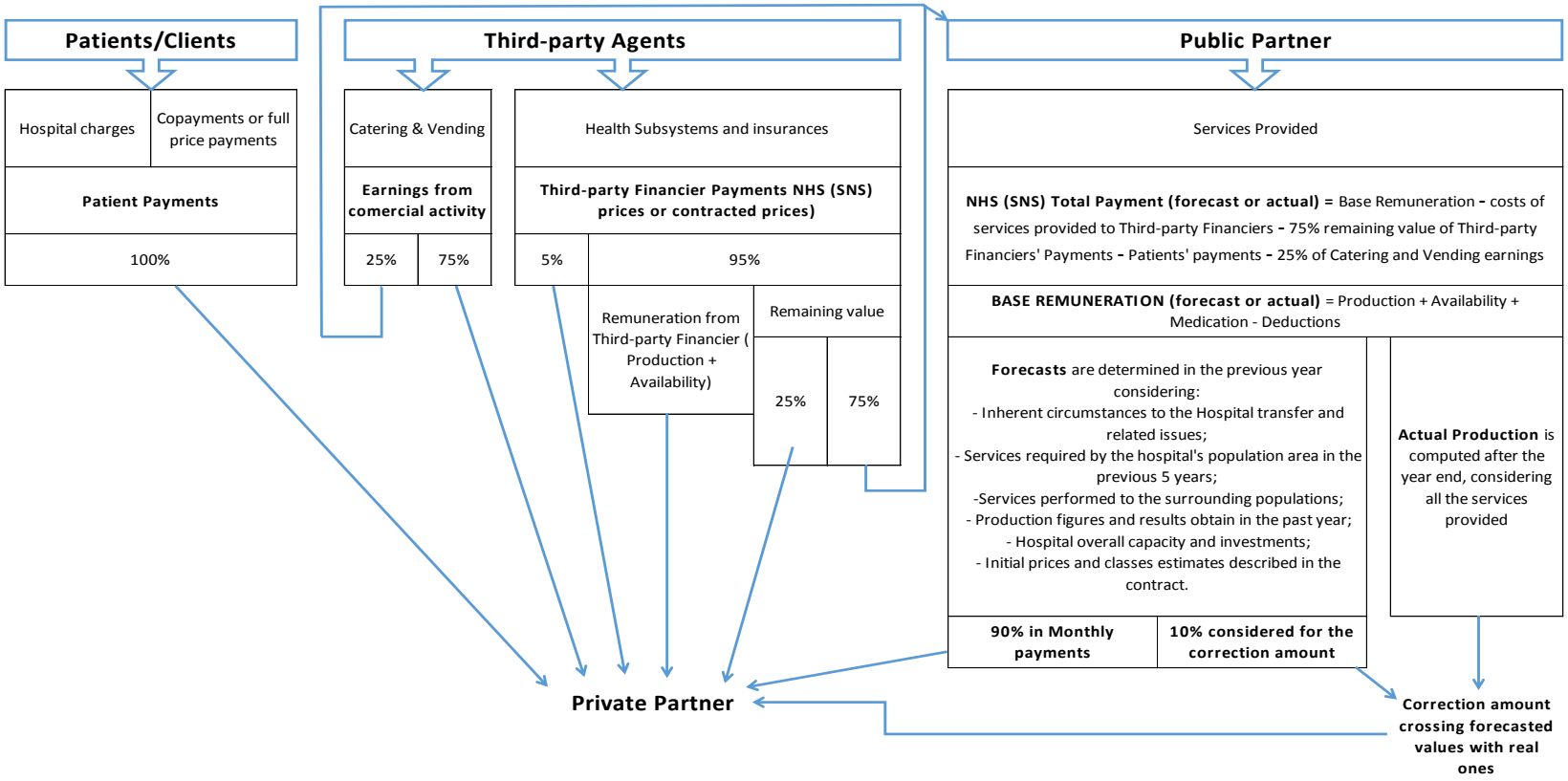
It is important to observe that in both service and productivity analysis all PPPs had significantly better and higher values on emergency consultations. This observation could hint at the importance of demographical factors when analysing the results. The population served by Cascais Hospital exhibit high differences of social classes. This factor combined with the proximity to Lisbon, attracts patients, especially from the lower social classes, to already established Lisbon hospitals. Given that these hospitals have a high level of response, this, impact negatively in Cascais Hospital output numbers.

On the other hand, below average response to patients from hospital surrounding neighbouring areas of the Vila Franca de Xira Hospital end up unknowingly improving this hospital's activity numbers. Unfortunately for this study, these demographical factors are hard to describe and quantify with a high degree of certainty.

Further analysis is undoubtedly necessary for a better understanding and evaluation of the Portuguese PPP hospitals. Future studies that can collect more detailed data from hospitals outputs and characteristics would be beneficial for a detailed analysis with different indicators. A better perception of environmental characteristics like demographical habits and SNS interactions would allow an insightful analysis of each hospital efficiency and effectiveness in great detail. Improving health PPPs knowledge is an important step to be achieved.

6. Appendices

Appendix 1: image 1 [PPP Hospital financial flow]



Source: author

Appendix 2: image 2[PPP Hospital financial formulas]

BASE REMUNERATION (4 aspects) = PRODUCTION + AVAILABILITY + MEDICATION - DEDUCTIONS				
Production (Services provided)	**Variation of production calculation**	**Availability (avalability of Emergency Department)**	**Medication (adjustments according to precribed medication)**	**Deductions (deductions according to performance evaluation/y failures)**
Prod = Hospitalization and surgery (Hosp) + Hospitalization of qualified patients (Hosp QP) + Emergency (Emerg) + Outpatients Appointments (Outpat) + Day Hospital Consults (Day Hosp) + Special Cases (Spec Cases)		**Availability=** ER basis availability * {1 - [number of unavailable sessions / (4 * days of the year)]}	**Medic=** (20% * (contribution reference per capita - expenditure incurred by the state per capita)) * NHS assisted patients	Deductions= sum of deductions value + min (penalization points * point value; 5% base)
Hosp= Remuneration according to Class/Quotas 1 (RC) + Remuneration according to Class/Quotas 2 (RC)		ER basis availability= ER basis availability t-1 * (Consumer Price Index t / Consumer Price Index t-1) + emergency correction differential		maximum of penalization is 666.6 points
RC= full time equivalent patient (Eq Pat) * reference price * min (index of current complexity; average of index of complexity for the past 5 years)	RC= reference price * (sum(Eq Pat of each type of service * index of complexity of each type of service))			
Index of complexity= ((sum of Eq Pat 1 * relative weight 1) + (sum of Eq. Pat 2 * relative weight 2)) / (sum of Eq Pat 1 + sum of Eq Pat 2)	Index of complexity= ((sum Eq Pat of each type of service * relative weight) / (sum Eq Pat of each type of service)			
Equivalent Patients = sum of equivalence factors for each activity				
Hosp QP= min (days of hosp QP * price; renumeration fixed by the Ministry)				
ER= Emergency Care 1 * price 1 + Emergency care 2 * price 2				
Outpat= min [min(first appointment; limit) * price 1 appointments + {max (total appointments - limit first appointment; 0) + 2 appointmnets} * price 2 appointments; renumeration limit]				
Day Hospital= min (sum of sessions * price; renumeration limit)				
Spec Cases= sum (number of activities * price of activities)				
Prices adjusted according to the anual variation (Consumer Price Index/Inhabitant)				
Total price covered by the NHS cannot exceed the total used in the public tabulted prices				

Source: author

Appendix 3: table 1 [Hospital Centers, Health Units and Hospitals]

ARS	HOSPITAL CENTERS, HEALTH UNIT or HOSPITAL	N.
ARS Norte	Centro Hospitalar de São João, EPE	2
	Centro Hospitalar do Alto Ave, EPE	2
	Centro Hospitalar do Médio Ave, EPE	2
	Centro Hospitalar do Porto, EPE	2
	Centro Hospitalar Entre Douro e Vouga, EPE	3
	Centro Hospitalar Póvoa de Varzim/Vila do Conde, EPE	2
	Centro Hospitalar Tâmega e Sousa, EPE	2
	Centro Hospitalar Trás-os-Montes e Alto Douro, EPE	4
	Centro Hospitalar Vila Nova de Gaia/Espinho, EPE	3
	Hospital de Magalhães Lemos, EPE	1
	Hospital Santa Maria Maior, EPE	1
	Instituto Português Oncologia de Porto, EPE	1
	Unidade Local de Saúde de Matosinhos, EPE	1
	Unidade Local de Saúde do Alto Minho, EPE	2
	Unidade Local de Saúde do Nordeste, EPE	3
	Hospital de Braga, PPP	1
	Hospital da Perlada	1
ARS	**HOSPITAL CENTERS, HEALTH UNIT or HOSPITAL**	**N.**
ARS Alentejo	Hospital Espírito Santo de Évora, EPE	1
	Unidade Local de Saúde do Baixo Alentejo, EPE	2
	Unidade Local de Saúde do Litoral Alentejano, EPE	1
	Unidade Local de Saúde do Norte Alentejo, EPE	2
ARS	**HOSPITAL CENTERS, HEALTH UNIT or HOSPITAL**	**N.**
ARS Algarve	Centro Hospitalar do Algarve, EPE	3

ARS	HOSPITAL CENTERS, HEALTH UNIT or HOSPITAL	N.
ARS Centro	Centro Hospitalar Cova da Beira, EPE	2
	Centro Hospitalar de Leiria, EPE	3
	Centro Hospitalar do Baixo Vouga, EPE	3
	Centro Hospitalar e Universitário de Coimbra, EPE	2
	Centro Hospitalar Tondela-Viseu, EPE	2
	Hospital Distrital da Figueira da Foz, EPE	1
	Instituto Português Oncologia de Coimbra, EPE	1
	Unidade Local de Saúde da Guarda, EPE	2
	Unidade Local de Saúde de Castelo Branco, EPE	1
	Centro Medicina de Reabilitação da Região Centro Rovisco Pais	1
	Hospital Arcebispo Joao Crisóstomo	1
	Hospital Dr. Francisco Zagalo	1
	Hospital José Luciano de Castro	1
ARS	**HOSPITAL CENTERS, HEALTH UNIT or HOSPITAL**	**N.**
ARS Lisboa e Vale do Tejo	Centro Hospitalar Barreiro/Montijo, EPE	2
	Centro Hospitalar de Lisboa Central, EPE	5
	Centro Hospitalar de Lisboa Ocidental, EPE	3
	Centro Hospitalar de Setúbal, EPE	2
	Centro Hospitalar Lisboa Norte, EPE	2
	Centro Hospitalar Médio Tejo, EPE	3
	Hospital Distrital de Santarém, EPE	1
	Hospital Fernando da Fonseca, EPE	1
	Hospital Garcia da Orta, EPE	1
	Instituto Português Oncologia de Lisboa, EPE	1
	Hospital de Cascais, PPP	1
	Hospital de Loures, PPP	1
	Hospital de Vila Franca de Xira, PPP	1
	Centro Hospitalar do Oeste	5
	Centro Hospitalar Psiquiátrico de Lisboa	1
	Instituto Gama Pinto	1

Source: author

Appendix 4: table 2 [Service analysis absolute indicators]

		National	Cascais	Loures	VFXira	Braga
Total consultations	2013	131952	133603	240755	111485	382124**
Initial consultations		38334	47325	90217**	44035	123406***
Subsequent consultations		93619	86278	150538	67450	258718**
Total emergency consultation		86354	153197*	185124**	110232	185132**
Patients discharged		10058	12035	19808*	12041	25635**
Programmed surgeries		6819	6375	9417	7099	23329***
Outpatients pr. surgeries		3847	4491	5969	4243	14456***
Hospit. pr. surgeries		3170	1884	3448	2856	8873***
Emergency surgeries		1363	2278	2095	1420	2684
Total consultations	2014	135122	137962	273176	130947	408531***
Initial consultations		38910	49724	90238**	49155	130778***
Subsequent consultations		95995	88238	182938	81792	277753**
Total emergency consultation		86384	159357*	196583**	121573	192022**
Patients discharged		9915	12331	20912*	13177	25855**
Programmed surgeries		6938	6814	11218	8390	24707***
Outpatients pr. surgeries		4030	4993	7373	5563	15246***
Hospit. pr. surgeries		3102	1821	3845	2827	9461***
Emergency surgeries		1319	2331	2092	1136	2723*

* significantly differently at 90%, ** significantly different at 95%, *** significantly different at 99%

Appendix 5: table 3 [Service analysis Hospitalization indicators]

		National	Cascais	Loures	VFXira	Braga
Average hospitalization tenure	2013	10,4	6,9	7,2	7,2	7,8
% Hospit. Above 30 daysd		3,4	1,1	2,9	2,1	3,0
% Rehospit. 5 days		2,3	1,8	2,1	2,9	2,2
% Rehospit. 30 days		8,8	6,9	8,6	8,6	7,8
% Rehospit 31-180 days		10,7	7,7*	10,7	9,6	9,6
Average hospitalization tenure	2014	10,3	6,7	7,3	7,3	7,7
% Hospit. Above 30 daysd		3,4	1,7	3,2	2,3	3,0
% Rehospit. 5 days		2,3	1,6	2,1	1,9	2,1
% Rehospit. 30 days		8,7	6,5	8,4	7,4	7,6
% Rehospit 31-180 days		10,7	6,3**	11,0	9,6	9,6

* significantly differently at 90%, ** significantly different at 95%

Appendix 6: table 4 [Service analysis surgeries indicators]

		National	Cascais	Loures	VFXira	Braga
% surgeries with time above guaranteed	2013	89,6	87,8	72,7**	97,4	87,1
% outpatients surgeries		57,8	70,4	63,4	59,8	62,0
% of births by c-section		31,1	30,0	22,1**	30,1	31,1
% surgeries with time above guaranteed	2014	–	-	-	-	-
% outpatients surgeries		58,8	73,3	65,7	66,3	61,7
% of births by c-section		28,4	27,3	19,6**	24,4	29,3

** significantly different at 95%

Appendix 7: table 5 [Service analysis consultations indicators]

		National	Cascais	Loures	VFXira	Braga
% Initial consultation in total	2013	30,6	35,4	37,5	39,5	32,3
% Initial cons. in adequate time		77,7	68,1	63,6	87,6	64,1
% Consultation after discharge		7,7				11,0
% Non-performed consultations		7,7	12,1		11,2	8,7
% Emergency cons. with hospitalization		8,3	6,1	7,0	8,4	8,9
% Initial consultation in total	2014	30,6	36,0	33,0	37,5	32,0
% Initial cons. in adequate time		78,2	69,6	49,0**	69,3	73,6
% Consultation after discharge		11,1			14,3	14,5
% Non-performed consultations		9,0	11,2		23,6**	8,6
% Emergency cons. with hospitalization		9,5	6,0	6,7	8,3	8,6

** significantly different at 95%

Appendix 8:table 6 [Productivity analysis total consultations]

		Total consultations				
		National	**Cascais**	**Loures**	**VFXira**	**Braga**
Total personnel	**2012**	118	128	88ºº	114	170+
Doctors		623	611	511º	549º	710
Nurses		353	366	284º	345	511+
Nursing assistants		543	495	398ºº	453º	664+
Therap. and Diagn. Tech.		1.689	2.188+	2.522+	1.686	3.024++
Other staff		628	1.029++	336ºº	785+	1.493+++
Total personnel	**2013**	124	145	184+	118	174+
Doctors		636	675	937+	652	732
Nurses		373	420	587++	345	551+
Nursing assistants		525	583	777+	470º	632+
Therap. and Diagn. Tech.		1.779	2.386+	7.296+++	1.770	3.184++
Other staff		744	1.086+	813	758	1.493+++

+ positive difference to national average above 20%; ++ positive difference to national average above 50%; +++ positive difference to national average above 100%; º negative difference to national average above -10%; ºº negative difference to national average above -25%

Appendix 9: table 7 [Productivity analysis total emergency consultations]

		Total emergency consultations				
		National	**Cascais**	**Loures**	**VFXira**	**Braga**
Total personnel	**2012**	62	156+++	98++	130+++	84+
Doctors		329	747+++	568++	628++	351
Nurses		187	447+++	315++	395+++	253+
Nursing assistants		287	606+++	443++	518++	328
Therap. and Diagn. Tech.		892	2.677+++	2.804+++	1.929+++	1.494++
Other staff		332	1.258+++	374	898+++	738+++
Total personnel	**2013**	65	166+++	142+++	117++	84+
Doctors		332	774+++	720+++	645++	355
Nurses		195	482+++	452+++	341++	267+
Nursing assistants		274	669+++	597+++	465++	306
Therap. and Diagn. Tech.		929	2.736+++	5.610+++	1.750++	1.543++
Other staff		389	1.246+++	625++	750++	723++

+ positive difference to national average above 20%; ++ positive difference to national average above 50%; +++ positive difference to national average above 100%

Appendix 10: table 8 [Productivity analysis programmed surgeries]

		Programmed surgeries				
		National	**Cascais**	**Loures**	**VFXira**	**Braga**
Total personnel	**2012**	6	5	4ºº	7	11++
Doctors		30	24º	22ºº	32	45++
Nurses		17	15º	12ºº	20+	32++
Nursing assistants		26	20º	17ºº	27	42++
Therap. and Diagn. Tech.		81	87	107+	99+	190+++
Other staff		30	41+	14ººº	46++	94+++
Hospital beds		23	17º	13ºº	24	36++
Operating rooms		924	799º	368ººº	1.783++	1.330+
Total personnel	**2013**	6	7	8+	8+	11++
Doctors		30	32	38+	42+	45+
Nurses		18	20	24+	22+	34++
Nursing assistants		25	28	32+	30+	39++
Therap. and Diagn. Tech.		84	114+	298+++	113+	194+++
Other staff		3	52+	33	48+	91+++
Hospital beds		24	23	24	29+	38++
Operating rooms		931	1.063	702º	789º	1.372+

+ positive difference to national average above 20%; ++ positive difference to national average above 50%; +++ positive difference to national average above 100%; º negative difference to national average above -10%; ºº negative difference to national average above -25%; ººº negative difference to national average above -50%

Appendix 11: table 9 [Productivity analysis patients discharged]

		Patients discharged				
		National	**Cascais**	**Loures**	**VFXira**	**Braga**
Total personnel	**2012**	9	13+	10	14++	12+
Doctors		47	60+	60+	66+	51
Nurses		26	36+	33+	41++	37+
Nursing assistants		41	49+	47	54+	47
Therap. and Diagn. Tech.		126	215++	295+++	202++	216++
Other staff		47	101+++	39º	94+++	107+++
Hospital beds		36	43	35	49+	41
Total personnel	**2013**	9	13+	15++	13+	12+
Doctors		46	61+	77++	70++	49
Nurses		27	38+	48++	37+	37+
Nursing assistants		38	53+	64++	51+	42
Therap. and Diagn. Tech.		128	215++	600+++	191+	214++
Other staff		54	98++	67+	82++	100++
Hospital beds		37	43	47+	50+	41

+ positive difference to national average above 20%; ++ positive difference to national average above 50%; +++ positive difference to national average above 100%; º negative difference to national average above -10%

Appendix 12: table 10 [Productivity analysis population]

Population (in thousands)					
	Total consultations				
	National	**Cascais**	**Loures**	**VFXira**	**Braga**
2012	1.130	361ººº	426ººº	295ººº	1.238
2013	1.176	399ººº	840ºº	361ººº	1.318
	Patients discharged				
	National	**Cascais**	**Loures**	**VFXira**	**Braga**
2012	84	35ººº	50ºº	35ººº	89
2013	85	36ººº	69ºº	39ººº	88
	Programmed surgeries				
	National	**Cascais**	**Loures**	**VFXira**	**Braga**
2012	54	14ºº	18ººº	17ººº	78+
2013	56	19ºº	34ºº	23ººº	80+
	Total emergency consultation				
	National	**Cascais**	**Loures**	**VFXira**	**Braga**
2012	596	441ºº	473º	338ºº	612
2013	614	458ºº	646	357ºº	639

+ positive difference to national average above 20%; º negative difference to national average above -10%; ºº negative difference to national average above -25%; ººº negative difference to national average above -50%

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