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**FINANCIAL SUSTAINABILITY OF TURKISH HEALTH
CARE SYSTEM**

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İZMİR - 2019

APPROVAL PAGE



DECLARATION

I hereby declare that this doctoral thesis titled as “Financial Sustainability of the Turkish Health Care System” has been written by myself in accordance with the academic rules and ethical conduct. I also declare that all materials benefited in this thesis consist of the mentioned resources in the reference list. I verify all these with my honour.

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ABSTRACT
Doctoral Thesis
Doctor of Philosophy (PhD)
Financial Sustainability of Turkish Health Care System
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Sustainability in health care systems, and how to attain financial sustainability through reform are among the main topics discussed by policy makers today. The aim of this study is to determine the experts' viewpoints about financial sustainability of the health care system in Turkey, and to determine the financial sustainability status of system and the public university hospitals, also to suggest the policies required to create a sustainable health care system. This study brings together viewpoints of experts, and recent financial data of health care system and public university hospitals. Both qualitative and quantitative research methods are employed in this study. The qualitative data, which are obtained through semi-structured interviews, evaluated through content analysis. The quantitative data are obtained from publicly available data sources and Revolving Fund Financial Management System. For statistical analysis, revenue and expenditure of health care system are compared. Ratio analysis and Grey Relational Analysis are used in assessing financial sustainability of public university hospitals. The content analysis results indicates that an important proportion of experts think that Turkey health system faced with unsustainability problem. The results for the comparison of health spending with basic macro-economic variables reveal that increase in health expenditure has been greater than economic growth since the 1980s; but financial sustainability has become possible because of the increasing gross national product and following health

reforms implemented after 2003. The ratio analysis results indicate that public university hospitals cannot meet the criteria for financial sustainability and , but can meet cost of services, and cannot meet operating expenses. Finally, the Grey Relational Analysis results reveal significant variability in hospital performance in terms of financial sustainability within each year.

Keywords: Turkey, Health Care System, Financial Sustainability of Health Care System, Public University Hospitals, Content Analysis, Health Expenditure, Ratio Analysis, Grey Relational Analysis.



ÖZET
Doktora tezi
Türk Sağlık Sisteminin Finansal Sürdürülebilirliği
Nehir BALCI

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Sağlık sistemlerinde sürdürülebilirlik ve reform çalışmalarıyla finansal sürdürülebilirliğin nasıl sağlanabileceği, günümüzde politika yapımcılar tarafından tartışılan başlıca konular arasında yer almaktadır. Bu çalışmanın amacı, Türkiye'deki sağlık sisteminin finansal sürdürülebilirliği konusunda uzmanların görüşlerini belirlemek, sistemin ve kamu üniversite hastanelerinin finansal sürdürülebilirlik durumunu ortaya koymak ayrıca sürdürülebilir bir sağlık sistemini oluşturmak için politika önerilerde bulunmaktır. Bu çalışma, uzmanların görüşlerini, Türk sağlık sisteminin ve kamu üniversite hastanelerinin güncel finansal verilerini bir araya getirmektedir. Çalışmada hem nitel hem nicel araştırma yöntemleri kullanılmıştır. Nitel veriler, yarı yapılandırılmış görüşme tekniği ile elde edilmiş, içerik analizi ile değerlendirilmiştir. Ayrıca; amaçlı örnekleme yöntemi kullanılmıştır. Nicel veriler, kamu açık veri kaynakları ve Döner Sermaye Mali Yönetim Sisteminden elde edilmiştir. İstatiksel analiz için sağlık sisteminin gelir ve giderleri karşılaştırılmıştır. Kamu üniversite hastanelerinin finansal sürdürülebilirliği değerlendirilirken oran analizi Gri İlişkisel Analiz yöntemi kullanılmıştır. İçerik analizi sonuçları; uzmanların önemli bir oranının, Türkiye sağlık sisteminin sürdürülemezlik sorunu ile karşı karşıya olduğunu düşündüğünü göstermektedir. Sağlık harcamalarının temel makroekonomik değişkenlerle karşılaştırılması sonucu elde edilen bulgular, 1980'lerden günümüze gelen dönemde sağlık harcamalarının ekonomik büyümeden daha fazla arttığını ortaya koymaktadır, fakat 2003 sonrasında sağlıkta uygulanan reformlar ve artan gayri safi milli hasıla nedeniyle, finansal

sürdürülebilirliğin mümkün hale geldiği tespit edilmiştir. Oran analizi sonuçları, kamu üniversitesi hastanelerinin finansal sürdürülebilirlik kriterlerini karşılayamadığını, hizmet maliyetlerini karşılayabildiklerini, ancak işletme giderlerini karşılayamadıklarını göstermektedir. Son olarak, Gri İlişkisel Analizi sonuçları hastanelerin finansal sürdürülebilirlik performansında yıllar içerisinde önemli değişkenlikler olduğunu ortaya koymuştur.

Anahtar Kelimeler: Türkiye, Sağlık Sistemi, Sağlık Sisteminin Finansal Sürdürülebilirliği, Kamu Üniversite Hastaneleri, İçerik Analizi, Sağlık Harcamaları, Oran Analizi, Gri İlişkisel Analiz.



FINANCIAL SUSTAINABILITY OF TURKISH HEALTH CARE SYSTEM

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ABBREVIATIONS

CHI	Community of Involvement Health
CHS	Community Health Systems
RFMS	Revolving Fund Financial Management System (Turkish abbreviation is DMIS)
GERF	Government Employees' Retirement Fund (Turkish abbreviation is ES)
EU	European Commission
FYDP	Five-Year Development Plan
GDBFC	General Directorate of Budget and Fiscal Control (Turkish abbreviation is BÜMKO)
GDP	Gross National Product
GHE	Government Health Expenditure
GR	Government Revenue
GTR	Government Tax Revenue
GTS	Government Total Spending
GTS-I	Government Total Spending Excluding Interest Payments
HTP	Health Transformation Program
IAP	Immediate Action Program
ICHOM	International Consortium for Health Outcomes Measurement
MED	Medical Enforcement Declaration (Turkish abbreviation is SUT)
MoD	Ministry of Defense
MoF	Ministry of Finance
MoH	Ministry of Health
NCUs	National Currency Units
OECD	Organization for Economic Co-operation and Development
POHEM	The Population Health Model
PUnH	Public University Hospitals
HSSWU	Health and Social Service Workers' Union (Turkish abbreviation is SAĞLIK-SEN)

SPRF	Self-Employed People’s Retirement Fund (Turkish abbreviation is BAĞKUR)
SSI	Social Security Institution
SSK	Social Insurance Institution (Turkish abbreviation is SII)
TGNA	Turkey Grand National Assembly
THE	Total Health Expenditure
TUIK	Turkish Statistical Institute
TUSEB	Directorate of Health Institutes of Turkey
UHI	Universal Health Insurance
UN	United Nations
USAID	United States of America Agency for International Development
VAT	Value Added-Tax
WB	World Bank
WBCSD	The World Business Council for Sustainable Development
WCED	World Commission on Environment and Development
WHO	World Health Organization

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INTRODUCTION

Sustainability requires that current financial and consumption patterns should not decrease the opportunities for future generations by consuming or diminishing resources. It recognizes that the Earth's – and correspondingly, our communities' – natural capital is restricted, and that the economy is drained by pollution and waste, which underlies the force behind sustainability. Sustainability requires a balance between environment, community, and finance. An imbalance in intergenerational equity is caused by giving emphasis to any one of these factors over the others, and this imbalanced emphasis weakens the capability to sustain current business practices in the long run (GFOA, 2014).

Sustainability is a valuable field of quality in health care, which extends the liability of health services across current and future patients. This longer-term view emphasizes that our health care system affects each community's health, and ultimately that of the population and our environment. Hence, a sustainable approach entails the expansion of the definition of value in health care to evaluate health outcomes against environmental and social effects, along with economic costs (Mortimer et al., 2018).

Sustainability in health care systems is one of the most debated topics in the 21st century due to increasing demand for health care services, stimulated by a population that has become less healthy, grows, and gets older, with a large number of co-morbidities, high expectations about the quality of clinical outcomes, and experience of using health care services, and the economic costs of health care. Especially because of the financial pressure that the National Health Care System encounters at present, it is essential to consider how health care provision can be actually provided. Moreover, the financial situation that the National Health Care System faces is likely to be the catalyst needed to speed conversion to the provision of more holistic health care (CHS, 2013).

Financial sustainability in health systems has two aspects, namely sustainability of health expenditure and continuity of health care institutions. In order for health care expenditure to be sustainable, public funding and expenditure must increase in parallel or expenditure must grow less quickly than growth in resources. That is, the fundamental element of the sustainability of health care institutions is to

ensure balance of revenue and expenses. Since increasing health care expenditure in Gross National Product (GDP) threatens financial sustainability during financial recessions or downturns, it tends to threaten expenditure in other financial areas. On the other hand, the fact that health care expenditure increase more quickly than financial growth when economy grows may cause other areas to shrink (Yenimahalleli Yaşar, 2017).

By 2040, about \$25 trillion will be spent on health care every year globally, which represents a huge 150% increase since 2014 that will affect every region of the world. Per capita health spending in certain regions, such as South-East and South Asia, will go up by an average of 5% to 7% every year between now and 2040 (Akpawau and Seidman, 2018).

This high expenditure can impose a significant burden on individuals, payers, and governments who try to cover health care costs. Turkey, for example, has faced an increase of more than 300% in the average annual cost of its health care system in less than 20 years. During this period, it is critical to discuss the sustainability of public university hospitals (PUnH), which play a critical role among health care providers, to establish the sustainability of the health care system, and to share experts' opinions and evaluations in order to produce important data in establishing health policies. Hence, the aim of the thesis is to determine experts' views about the financial sustainability of Turkey's health care system, make evaluations in the light of these views, determine the financial sustainability status of PUnH via quantitative analysis, and suggest some policies required to ensure a sustainable health care system in Turkey.

To address these aims, the first section of the thesis briefly describes health care systems while the second section considers sustainability, sustainability in health care systems, and financial sustainability in health care systems. The third section offers a literature review about financial sustainability in the health care system. The fourth section describes the Turkish health care system in general and discusses its financial sustainability. The fifth section sets out the findings regarding the experts' evaluations about the financial sustainability of the Turkish health care system, the results obtained by comparing fundamental macroeconomic variables of health expenditure, and the sustainability problem facing the Turkish health care system and

its PUnH. The study's findings are then discussed before the last section offers some conclusions and suggestions.



CHAPTER ONE

THE HEALTH CARE SYSTEM

The main purpose of human life is to maintain good health. This is an individual aim as well as a social one. The first basic question coming to mind is “*What is health?*”. The most common definition of health in the literature is offered by the World Health Organization (WHO), which defines it as “*having full physical, mental and social well-being and not only the absence of disease or infirmity*” (WHO, 2006). This definition is a comprehensive one that addresses the multi-dimensional structure of health care and health.

In all countries, health is a social phenomenon and it is the governments’ responsibility to establish health care systems and manage health care services. The structure called the health care system is formed due to this characteristic of health.

Different definitions are available of what a health care system is, just like the many definitions offered for health itself. This chapter focuses on the scope, aims, and functions of the health care system.

1.1. DEFINITION OF THE HEALTH CARE SYSTEM

A system refers to the whole of interacting parts having common features that are brought together in order to fulfill a given goal. Since the health industry comprises multiple interrelated sub-sectors with the same goals, it may be considered as such a “system”. In the center of the health care system lies the society because the health care system exists to protect and promote the society’s level of health.

Health, health care system, health care services, and the health sector are universally used terms; however, they are defined in different ways by analysts and policy-makers. Basically, differences in names indicate varying understandings of the limits and the scope of health care systems. They may refer to systems that restrict the terms to health care only (hospitals, physicians, nurses, etc.) or to a much more comprehensive concept, including all activities, resources, and/or institutions that improve health. A sick person can be treated in a straightforward way (health care). However, it may be more complicated since health outcomes depend on actions that

do not directly target individuals who are already sick as well and they include the other determinants of health) (Figueras et al., 2012).

Although there are several definitions of what a health care system is, some definitions that include the key elements of a health care system and draw the limits can be summarized as follows.

Duplessis et al. (1989) described a health care system as

“organizations which offer health services (public health care service providers, private hospitals, all type of health care centers and health professional officers) and other networks, sectors, institutions, ministries and organizations that have a direct effect on the final objective of the entire system – health. In this context, such facilities as the food industry, housing, transportation, social services, and education, are also significant” (Duplessis et al. 1989 quoted in Durán, et al., 2012).

Most basically, the health care system consists of users, payers, providers, and regulators, as well as the relations among them. *“Provision of services, regulation, financing, and resource allocation are the four main functions addressed by the relations”* (McPake et al., 2002, Mills and Ranson 2001 quoted in Nolte et al., 2005: 12).

According to Roemer (1991), a highly cited author in the field of health care system studies, a health care system is the combination of resources, organization, financing, and management, which serve for the provision of health services to the population.

Finally, WHO (2007) defined the health care system as follows:

A health care system consists of all organizations, people and actions whose primary intent is to promote, restore or maintain health. This includes efforts to influence determinants of health as well as more direct health-improving activities. A health care system is therefore more than the pyramid of publicly-owned facilities that deliver personal health services. It includes, for example, a mother caring for a sick child at home; private providers; behavior change programmes; vector-control campaigns; health insurance organizations; occupational health and safety legislation. It includes inter-sectoral action by health staff, for example encouraging the ministry of education to promote female education, a well-known determinant of better health (WHO, 2007: 12).

Today, other organizations, such as the European Union (EU) and World Bank (WB) use this definition. Thus, the health care system is defined as a system that covers

any activity directly aiming at improving, promoting, or protecting health (Murray and Frenk, 2000).

The concept of health care systems addresses all the organizational issues, such as delivery of health care services, financing, scope of the service, training of labor in health, health legislation, and making health policies.

Roberts et al. (2003) define the elements included within the scope of the health sector and health care system as follows:

- *“All the bodies providing health care-public or private, Western or traditional, licensed or unlicensed, including doctors, nurses, hospitals, clinics, pharmacies, village health works, and traditional healers.*
- *The money flows that finance such care-official or unofficial, through intermediaries or directly out of patients’ pockets.*
- *The financial intermediaries, planners and regulators who control, fund and influence those providing care-including ministries of health, finance and planning, social and private institutions, and regulatory bodies.*
- *The activities of organizations offering preventive services like immunization, family planning, infectious-disease control, and education on nutrition, smoking, and substance abuse which may be public or private, local, national or international”* (Roberts et al., 2003: 7).

A health care system can be considered as consisting of integrated heterogeneous systems that can be operated independently in a network of a shared purpose (Mutingi and Mbohwa, 2014). Wickramasinghe et al. (2007) see health care as the whole of large-scale, independent systems. Health care systems have complex structures since their components are autonomous. They are also self-organizing, show emergent behavior, and change over time as a result of their adaptations to their environment. Therefore, system behavior, either desirable or undesirable could appear over time as a result of the various interactions of autonomous health care subsystems. Being a system of systems, the elements of health care are in an intricate interaction with one another (Baxter, 2010; Runciman, 2017). It involves a variety of stakeholders, such as health care providers, pharmacies, funding organizations, stakeholders, insurance companies, and the government.

1.2. CLASSIFYING HEALTH CARE SYSTEMS

Generally, only one dimension of health financing is highlighted by the classifications made traditionally in different countries (Thomson et al., 2009a). Three fundamental health care models can be categorized according to the source of funding, such as the Beveridge Model (labeled “Beveridge” in Western Europe and “Semashko” in former Soviet Bloc countries), the Bismarck Model and the Private Insurance Model (Lameire et al., 1999).

1.2.1. Beveridge Model

The Beveridge Model, named after William Beveridge, the designer of Britain’s National Health Service, is also called the National Health Care System. In this system, the government finances health care with taxes like other public organizations. Providing “universal coverage” is the most remarkable feature of the Beveridge Model, which means it offers broad and free health care for every citizen, regardless of their profession, age, gender, or means (Nolte et al., 2005: 12; WHO 2000: 12).

In principal, this system is financed by the public through tax payments (Nolte et al., 2005: 12). Sources are allocated by budgets in traditional ways and it is sometimes based on the constant ratios between citizens and health professionals or facilities (WHO 2000: 13).

1.2.2. Bismarck Model

The Bismarck Model, which is also called the Social Insurance Model, takes its name from the Prussian Chancellor Otto von Bismarck, the builder of the welfare state when the German States united in the 19th century. In this model, there is an insurance system that calls the insurers “sickness funds” and uses payroll deductions from employers and employees to finance health care. Palier (2005) states that Social Insurance Systems of this type support the patient’s choice and usually ensure comfortable, good-quality care. On the other hand, he also claims that expenditure on health care services are usually high and that it sometimes causes inequality in access

to health care because only certain people entitled with a scheme are covered by this insurance (Palier 2005 quoted in in Demirci, 2012).

1.2.3. Private Insurance Model

The primary basis of this model is private insurance in which the government assumes very little role. It is generally used to define the American health care system, which is generally considered as a heterogeneous system bringing together three types of health protection with different payment systems: i. Medicaid and the State Children's Health Insurance Program, which offers free health care for the very poor (varying by states); ii. Medicare, which provides health insurance for the very old; iii. Private insurance for the middle-income classes and the well-off (financed by the conductor or the citizens themselves) (Demirci, 2012; Nolte et al., 2005: 12).

1.3. GOALS OF THE HEALTH CARE SYSTEM

Health care systems have very different performance outcomes, so countries differ from each other in reaching their main goals in health despite having similar levels of health expenditure, education, and income.

Part of this difference is caused by differences in health care system performance. Variance in the content, design, and management of health care systems bring about differences in some outcomes, such as responsiveness, fairness, or health, which are socially valued. Responsiveness, fairness, and health in financial contribution are the three main goals of a health system (Murray and Frenk, 2000: 719).

1.3.1. Main Goals

The main goals of a health care system as stated by WHO Report (2000) are *“improving health and health equity in financially fair and responsible ways, as well as benefitting from available recourses most efficiently”*.

1.3.1.1. Health

The primary aim of the health care system is to improve the health of the population. Health care systems would be useless if they did not work to improve health.

1.3.1.2. Responsiveness

The second central goal is to improve the responsiveness of the health care system to the population's expectations. Two primary components of responsiveness are: (a) respect for person's confidentiality, dignity, and independence of individuals and families to make their own decisions about their health); and (b) client orientation (immediate attention, access to social support networks during care, quality of fundamental conveniences, and choosing the provider) (Murray and Frey, 2000). Responsiveness does not include the health improvement expectations of the public, which are reflected in the first goal.

1.3.1.3. Fairness in financing

Two fundamental challenges are to be addressed by the health care system to be fair. Firstly, individuals should not be bankrupted or pay a great deal of their income to meet their health care needs. That is, fairness in financial contribution necessitates a significant level of financial risk pooling. Secondly, the poor should pay less than the rich for their health care needs since poor households have lower incomes, most of which is spent on fundamental requirements like shelter or food. The inequality in disposable income between rich and poor must be reflected in their contributions to the health system.

1.3.2. Instrumental Goals

Besides these three main goals, discussions on the performance of health care systems have focused on other goals like innovation, access to care, community involvement, or sustainability as well. Today, these secondary aims have been one of the leading topics of discussion.

1.3.2.1. Access to Care

Being a complex concept, access needs to be evaluated in a minimum of four aspects. If there are available services of sufficient supply, there is the possibility to obtain health care, which means the population may '*have access*' to services. In addition, financial, organizational, social, or cultural barriers that restrict the utilization of services also affect the degree of access the population has. Therefore, considering utilization, access does not only depend on adequacy of supply but also on the affordability, physical accessibility and acceptability of services. In order for the population to be able to access satisfactory health outcomes, services must be relevant and effective. Different groups in a society have different perspectives, health needs, and material and cultural settings; therefore, the availability of services and limitations to access must be considered accordingly. It is possible to measure equity of access by availability, utilization, or outcomes of services (Gulliford et al., 2002).

1.3.2.2. Community Involvement

It is commonly considered that individuals' participation in the development of health care services can be ensured through community of involvement health (CIH). This is not a totally novel concept since society-specific health practices, traditional methods of community support, and positive community action to deal with health problems and needs are ways of participation and programs aiming at disease control. On the other hand, CIH does not only aim to give support to health development programs that are led externally but it is also a deliberate strategy that works for delivering better health care for the majority of the population. It is also entirely different from traditional approaches to health development (Kahssay and Oakley, 1999).

1.3.2.3. Sustainability

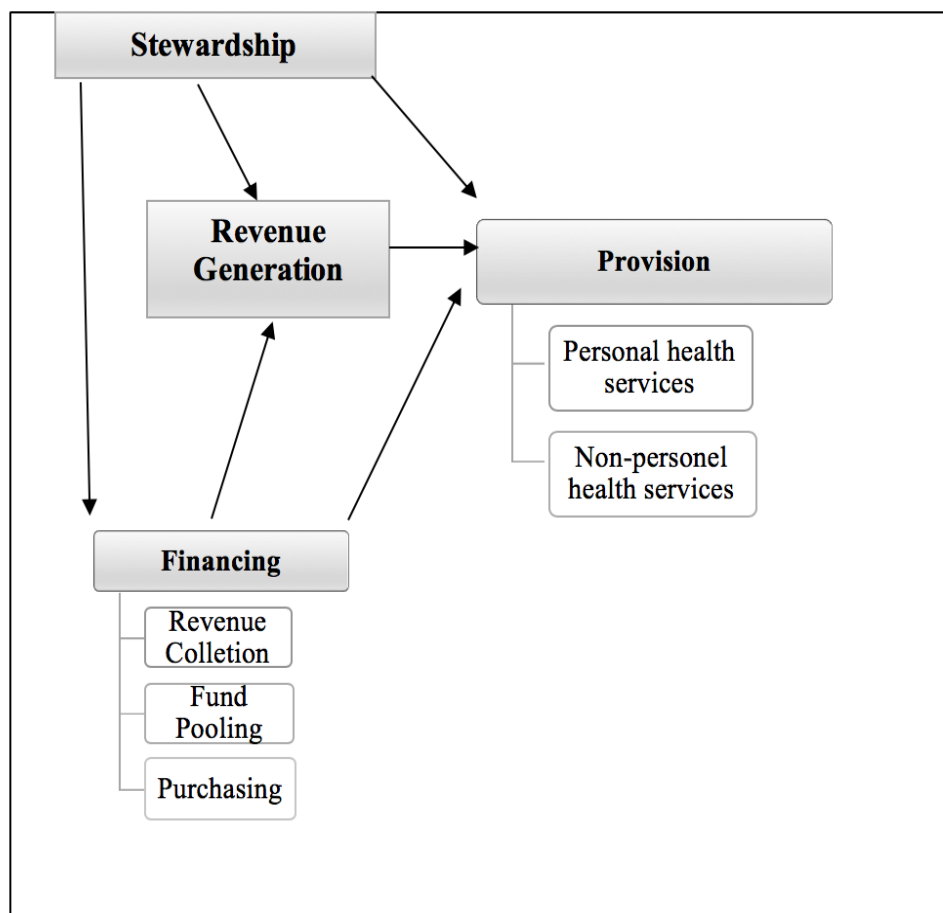
Although the concept of sustainability is rather popular, and the sustainability of health care systems is frequently referred to, it is still poorly defined and misused by many people. According to Knowles et al. (1997), sustainability is the system's

ability to carry on its usual activities successfully in the future, without any external support. A detailed definition of sustainability will be provided in the following sections.

1.4. FUNCTIONS OF THE HEALTH CARE SYSTEM

The functions of the system are defined in order to achieve the abovementioned primary and instrumental goals of the health care system. WHO (2000) also identified four functions of health care systems: *stewardship*, *financing*, *resource generation* (human, physical, and knowledge), and *provision* (organization and management of service delivery). Figure 1 shows that there are four main functions to be performed by organizations in all health care systems.

Figure 1: Functions of Health Care Systems



Source: WHO, 2000; Kutzin, 2001.

Each health care system deals with the fundamental problems of designing, applying, assessing and reforming the organizations and institutions that help promote these functions (Murray and Frenk, 2000). With the aim of overcoming the problems of the health care system reform, activities have gained impetus worldwide, particularly since the 2000s.

1.4.1. Stewardship

Stewardship includes three key aspects, namely setting, implementing, and monitoring the rules for the health care system. It aims to provide all actors in the system with equal conditions (especially patients, providers, and purchasers), and to specify strategic directions for the entire health care system. Stewardship may be divided into six sub-functions in order to handle these aspects: overall system design, performance evolution, priority setting, regulation, intersectoral advocacy, and consumer protection (Londono and Frenk, 1997).

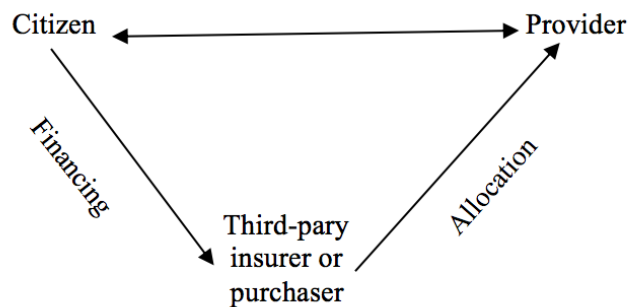
Since it has an enormous importance for the system's performance, some elements of good health stewardship should be mentioned here. No matter what their main purpose is, these elements apply to all interventions with an important effect on health. They can be listed as steering (leading and providing vision, rather than managing all operations), governing (ensuring clear rules and good use of resources), and ensuring accountability (for both performance outcomes and fair/reasonable processes). A successful steward must be a good follower of values, goals, and evidence in order to inspire structural microsystems (public/private hospitals, primary health care centers, etc.) to respond to personal and societal needs with suitable individual and population services. A steward should also regulate the relationships between stakeholders (e.g. the health insurance market). In terms of accountability and transparency, the steward is expected to lead and set priorities for sectors beyond the health care system to improve their effects on health. The steward must have the intelligence to aim at action seeking to understand (i) all the factors affecting health (i.e. the determinants), (ii) the factors arising from outside the system that can be amended, and (iii) the mandatory or concerning activities (Figueras et al., 2012). In short, stewardship refers to specifying the needs and requirements of the population correctly and planning, organizing, directing, inspecting, and coordinating the

resources of the health care system in accordance with these requirements and demands.

1.4.2. Financing

Health financing is a broad term referring to the activation and use of financial resources in the health sector (Lee and Goodman, 2002). It is possible to consider the delivery and financing of health care as a transfer of resources in which health care resources are supplied to patients by the providers and financial resources are provided by patients or third parties to the providers (Figure 2) (Mossialos and Dixon, 2002).

Figure 2: The Health Care Triangle



Source: Mossialos and Dixon, 2002: 2.

According to WHO (2010a) health financing is the “*function of a health system concerned with the mobilization, accumulation and allocation of money to cover the health needs of the people, individually and collectively, in the health system ... the purpose of health financing is to make funding available, as well as to set the right financial incentives to providers, to ensure that all individuals have access to effective public health and personal health care*”.

There are various ways to define the goals of health care system financing, but it is generally accepted that it involves the search for adequate funds for health, as well as allowing people to use the services they need without the experiencing serious financial difficulty (generally named financial catastrophe or impoverishment) (WHO, 2010a).

In summary, health care system financing can be defined as the process of collecting revenues from both primary and secondary sources, accumulating them in fund pools and allocating them to providers. Health care system financing can be divided into three sub-functions for analysis: purchasing, revenue collection, and fund pooling.

Revenue collection is mobilizing the money from primary (firms/ households) and secondary sources (donor agencies/governments). This can be done through eight basic mechanisms: voluntary insurance rated by income, voluntary insurance rated by risk, out-of-pocket payments, compulsory insurance, earmarked taxes, general taxes, and transfers from donor agencies (Kirigia et al., 2012).

Fund pooling refers to accumulating revenues for the common good of participants. Basically, pooling means that financial resources in the pool are not tied to one specific contributor, which translates into contributors' sharing financial risk. Pooling is different from revenue collection, since in such revenue collection methods like medical savings accounts, financial risks are not shared by contributors (Ozanne, 1996).

Purchasing is the process of allocating revenues in fund pools to individual or institutional providers to distribute interventions. Purchasing can be as simple as budgeting exercises in greatly integrated public systems in which revenue is collected through government general taxation and allocated to programs and facilities for staff and other costs. It can also be as complicated as strategies where specific units of inputs, outputs, or outcomes are purchased (Murray and Frenk, 1999).

In modern judicial systems, the primary right and freedom of an individual is the right to life. An inseparable part of the right to life is to lead a healthy life. Therefore, governments should secure individuals' rights to life by considering the latest developments in medicine and mobilizing necessary health opportunities. This results from the social state's responsibility for doing or having done whatever is needed for individuals to lead a healthy life (Yenimahalleli Yaşar, 2007: 1-2).

As mentioned above, health is one of the fundamental human rights. At the center of this issue lies a human being whose value can under no circumstances be measured. In addition, countries' resources are not sufficient to meet the costs of the

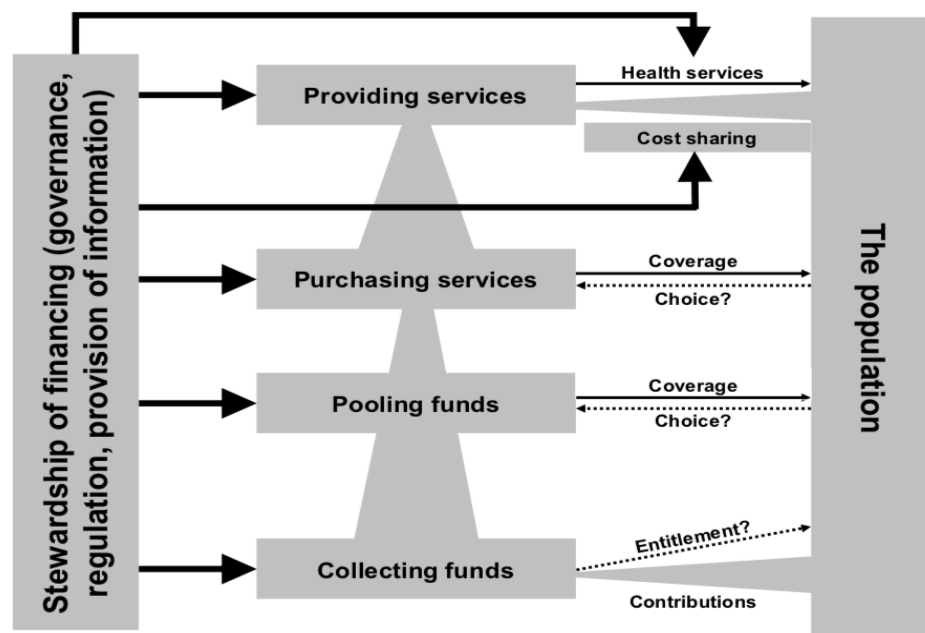
entire health system and the services offered by the health sector are not free goods that can be provided to citizens at “no cost” (Mazgit, 1998).

Financing, which has a significant effect on the performance of a health care system, determines the amount of money that can be kept in hand and used, the parties undertaking the financial burden, the people managing funds, the way risks are pooled and whether the costs of health care services are controllable or not (Özer et al., 2015: 8). Each country has to decide on the resources to use and the degree that they are used.

Health financing primarily aims to create adequate and sustainable resources to make health care services financially accessible for all individuals. Another purpose of it is to use these resources efficiently, observe fairness while providing everyone with financial protection, and to prevent resource generation methods from impoverishing households (WHO, 2000: 95; WHO, 2004: 18; WHO-WB, 2004: 11-12).

Health financing has three main functions: income collection, fund pooling, and making payments to service providers (Kutzin, 2001: 174; Murray and Frenk, 2000: 724; WHO, 2000: 95-96). Figure 3 shows these functions’ relationships with each other and the society while Figure 4 presents the policies associated with these functions.

Figure 3: Health Financing Functions' Relationships with Each Other and the Society



Source: Kutzin, 2001: 174.

Figure 4: Financing Functions and Related Policy Issues

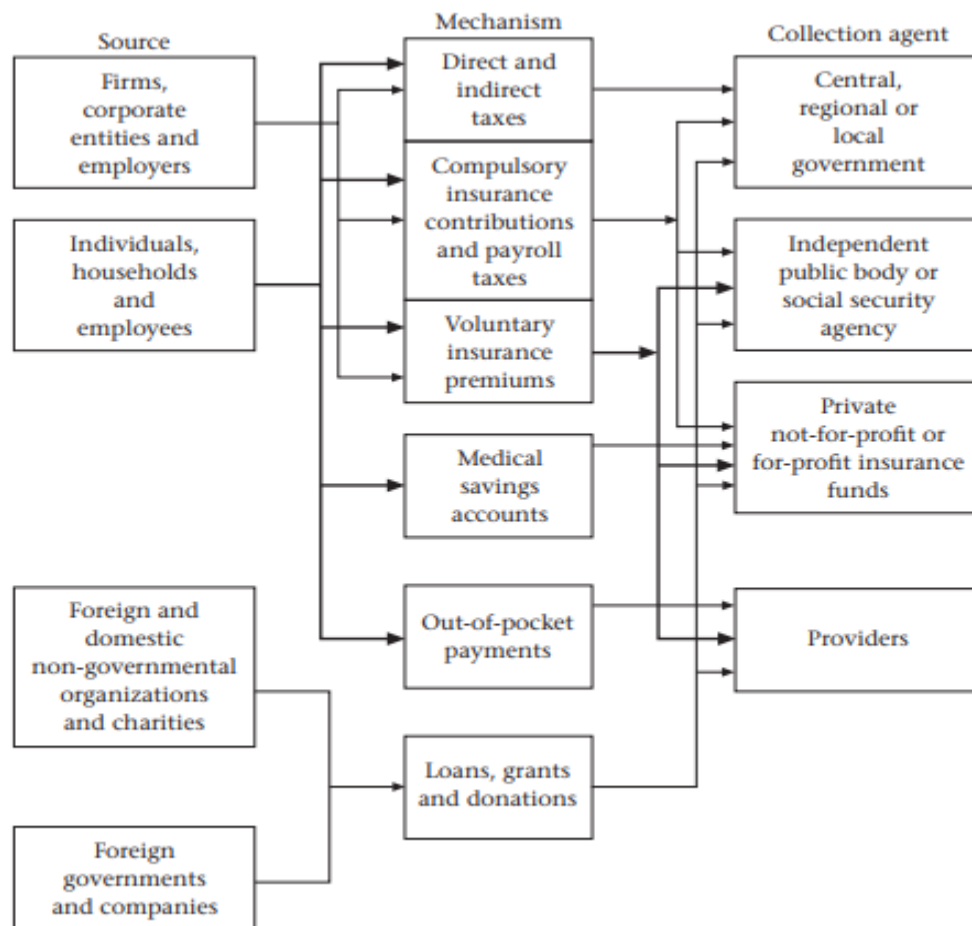
Financing function	Related policy issue
Collection of funds	* How <i>much</i> money to collect and <i>from whom</i>? * Who <i>and what</i> to cover?
Pooling of funds	* How to pool resources? * How to allocate resources to purchasers?
Purchasing of services	* From <i>whom</i> to buy and how to buy * At <i>what</i> price to buy and <i>how</i> to pay?

Source: Dixon et al., 2004: 53.

The funds to be used for financing health care services, that is the financial resources, can be obtained in different ways depending on the financing institution being a public or private organization. For example, if the health care system is financed by the public through the central budget then health care services are financed with the taxes paid by the society. If this financing is made by voluntary health insurance, the resource is the premiums paid by individuals. However, if, like in

Turkey, there is a compulsory social security organization with a public nature, deductions from the wages of employees and/or the employers constitute the resource of the financing institution. Figure 5 shows financing sources, ways of raising funds, variety among fund-raising institutions, and the relationships among them.

Figure 5: Examples of Founding Sources' Contribution Mechanisms and Collection Agents



Source: Mossialos and Dixon, 2002: 5.

There are a variety of methods or mechanisms in the financing of health and countries often use a mix of these mechanisms. Some of the predominant methods are common taxes, social insurance, private insurance, medical saving accounts, out-of-pocket payments, loans, grants, and donations. Financing mechanisms/methods in health care services may vary by country and there are discussions over which of these mechanisms/methods can maintain financial sustainability and far-reaching access

better. However, using a mix of these methods seems to be the best option (Mossialos and Dixon, 2002; Yalçın and Yıldırım, 2001).

One main elements of health financing concerns the methods used in making payments to the service providers in purchasing services. All institutions mobilizing funds for the health sector (social and health insurance plans, governments, or society health financing programs) must specify the institutions and individuals that will be paid. These decisions create strong incentives affecting all institutions and individuals within the system of health care services (Roberts et al., 2004).

Making payments addresses the mechanisms used to purchase services from public and private health system providers (Schieber, 2005), and it is the process of making payments from the collected funds to service providers for specified or non-specified health interventions (WHO, 2000). The purchasing function determines whether available resources are turned into effective health care services or not (McIntyre, 2012).

The ways of making payments to service providers can be classified into three categories: 1) forward-looking pay or budget paid to service providers; 2) retroactive pay or budget paid to service providers; and 3) payment to service providers that is associated with inputs used (salaries or medication costs etc.) or outcomes obtained (services) (Langenbrunner et al., 2009). Forward-looking payments include salary payment, payment per person, and global budget payments. Retroactive payments, on the other hand, consist of payments made after the use of health services that are usually made per service, per case, or group payments as in diagnosis-related groups (Carrin and James 2004).

1.4.3. Provision

This function is the combination of inputs into a production process. This process occurs in a certain organizational setting and results in the delivery of a number of interventions.

Personal health services: Strategically, provision of personal health care services is designed so that it can deal with the provider organizations' relationships with their environment. A group of these relationships is concerned with vertical integration among functions.

Non-personal health services: Theoretically, problems concerning non-personal health care services are the same as those mentioned for personal services. However, in a majority of countries, the public sector, mainly the Ministry of Health (MoH), assumes a leading role in delivering non-personal health care services.

1.4.4. Resource Generation

Health care systems include both the institutions financing or providing services and those producing inputs to the services, especially physical resources, human resources, like facilities and equipment, and knowledge (Roemer, 1991). These organizations also include educational institutions, such as universities, research centers, and organizations that produce certain technologies like pharmaceutical products and devices.

There may be different issues of strategic design, structural arrangements, and implementation management, depending on the group of organizations in resource generation. For instance, a critical question in training institutions, like university medical faculties and nursing schools, is about their primary organizational situation, as to whether they are affiliated to the ministry of health or the ministry of education. The connection between supply and demand for health care professionals can be determined by the organizational ownership. As for research organizations, autonomy is a significant question in setting priorities. As for the pharmaceutical and other technological industries, industrial structure-based issues, like the degree of concentration and competition, may possibly affect the performance of health care system (Murray and Frenk, 2000).

To sum up, since the health sector is a very comprehensive field with the technical aspect of the services it includes and their economic, political/ideological, social, and cultural aspects as well, it has some specific features.

CHAPTER TWO

FINANCIAL SUSTAINABILITY OF HEALTH CARE SYSTEMS

In general terms, sustainability depends on a variety of parameters and one of the most popular study fields of sustainability worldwide is health care systems. Determining and evaluating the factors that affect the sustainability of health care systems has been focused more in the last ten years. This problem brings about questions such as the following: “What is sustainability?” “What is the financial sustainability of health systems?”. This section focuses on sustainability, sustainability in health care systems, and financial sustainability in health care systems.

2.1. SUSTAINABILITY

When the process which shaped the current meaning of the concept of sustainability is examined, it is remarkable that societies have become aware of the rapidly advancing technology developing as of the second half of the 20th century and the environmental factors occurring as a result of its industrial reflections as well as the decline in renewable resources. Emerging in the 1970s at a societal level, this awareness came into prominence in national and international areas as well in the 1980s (Düzer, 2018). Environmental issues emerging in the industrialized areas of the world caused the environmental movement of the 1970s to turn into a more holistic and comprehensive one. In this respect, together with the 1972 United Nations (UN) Conference on the Human Environment, organized in Stockholm, Sweden, growing environmental awareness on a society level began to have its effects internationally. The Declaration on Human Environment adopted at the conference set out the basic elements of the notion of sustainability: “*principles remarking the carrying capacity of the environment, observing equity in use of resources among generations, establishing the connection between environment and economic and social development and highlighting the connectedness of development and environment*” (Bozdoğan, 2005: 1015).

It is not easy to define sustainability because of its changing nature. It is also one of the greatest “indispensable, contested and ubiquitous concepts of our time”

(Tavanti, 2010 quoted in Young and Dhanda, 2012) like some other concepts, such as democracy and globalization.

The word sustainability originates from the Latin word ‘sustinere’ which means ‘tenere’, to hold; support (Tarasova, 2009: 60). When considering sustainability, the primary concepts are “*maintain*”, “*support*”, or “*endure*”, but sustainability is a deeper concept, which includes social, environmental, and economic aspects as well. (Jan and Marimuthu, 2015: 109).

In ecology, for example, sustainability refers to “*how biological systems vary and become productive in time*” (Tavanti, 2010 quoted in Young and Dhanda, 2012). In terms of human beings, sustainability is “*the potential for the maintenance of well-being in the long run, which relies on the maintenance of the natural world and resources*” (Bromley, 2008). As for mechanical systems and structures, sustainability is the conservation of necessary resources and maximizing reliability through decreasing waste (Mathaisel and College, 2014).

The main feature of the concept of sustainability, which is used in a variety of fields, is that it concerns the future of human beings and includes the protection of resources in the field it is used in (Tıraş, 2012).

Sustainability refers to stability and confidence in the future of the organization to assume long-term planning and risks (Bowman, 2011; Zietlow, 2012). In its broadest sense, an organization or system is accepted as sustainable if it has the ability to survive for a long time in order to achieve its mission (Klaous, 2010 quoted in Abuor, 2012).

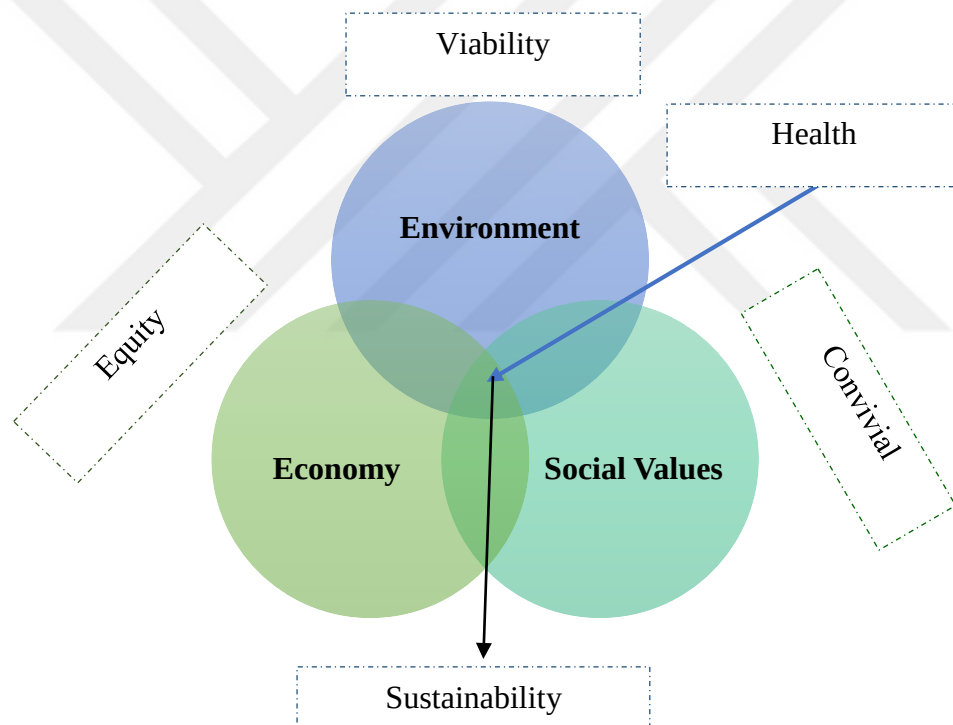
Sustainability in a system is a target which is moving and changes rapidly (Crisp, 2017). The most widely known definition of sustainability was made in the area of sustainable development by the World Commission on Environment and Development (WCED), also known as the Brundtland Report, which defines it as “*The system that is able to meet the needs of today without threatening future generations’ ability to meet their own needs*” (WCED, 1987: 3). This interpretation makes this abstract concept of sustainability easier to understand. It is necessary to understand that environmental sustainability, financial sustainability, resilient people, and communities and social justice are closely related through synergy. The future must

be taken as seriously as today since considering the future environment could be beneficial in terms of today's health care (Penchon, 2013).

The Brundtland Report, which can be accepted as a turning point in terms of sustainability as a concept, represents the transformation of the process initiated with environmental awareness into an internationally accepted understanding that development should be sustainable and a more livable world must be left to future generations (Düzer, 2018).

A model of the relationship between the social, economic, health, and environmental aspects of sustainable social development is presented in Figure 6.

Figure 6: A Conceptual Model of Sustainable Development



Source: Price and Dube, 1997: 35

Sustainable development has three pillars namely the economic, social, and environmental dimensions, and health is both a result and a prerequisite for all three of them (UN, 2012).

It is argued that it is only possible to reach sustainability through the simultaneous protection of the environment, preservation of economic growth and development, and promotion of equity (Portney, 2015).

In a system which is *economically sustainable*, goods and services must be produced continuously, government and external debt must be kept within workable limits, and imbalances in any sector damaging production in agriculture and industry must be avoided. An *environmentally sustainable system* must be based on resource stability and prevent destruction of renewable resources and environmental sink functions as well as reducing the use of non-renewable resources to make investment in sufficient substitutes. This also involves atmospheric stability, preserving biodiversity and other ecosystem functions, which are not usually considered as economic resources. In a *socially sustainable system*, equity must be achieved in distribution, and social services like gender equity, education and health, and participation and political accountability must be provided sufficiently (Harris, 2000).

In summary, there are many factors, both internal and external, affecting sustainability, such as financial viability, performance, financial adaptability, financial capacity, and external environment. (Klaus 2010 quoted in Abuor, 2012).

The definition and measurement of sustainability is of extreme importance as sustainability helps us determine whether a problem exists in reality and its possible solutions (Di Matteo, 2010).

Health is a fundamental human right and contributes to the economic development, which makes it a highly significant element for sustainable human development. In addition, health helps greatly to measure the progress of nations in achieving sustainable development in a summative way (Basys et al., 2005). It provides effective employment, reduces spending on treatment of disease, and contributes to social adherence, all of which, in turn, promote national development. The advantages of this development can go through generations as good health is promoted at all ages. Health can be improved among all social groups with investments made in primary health care so that inequalities in and across countries can be overcome. Enhancement of financial and human resources, good use of technology, empowering the community, and successful governance may provide for the improvement of performance in health systems. With the opportunity to provide

extensive employment, especially for women and young individuals, as health workers, health care services can be improved, and the economy strengthened (Sustainable Development Solutions Network, 2014). The primary element of sustainable development is health. Today, it has become one of the most critical duties of governments to establish a sustainable health care system.

2.2. SUSTAINABILITY IN HEALTH CARE SYSTEMS

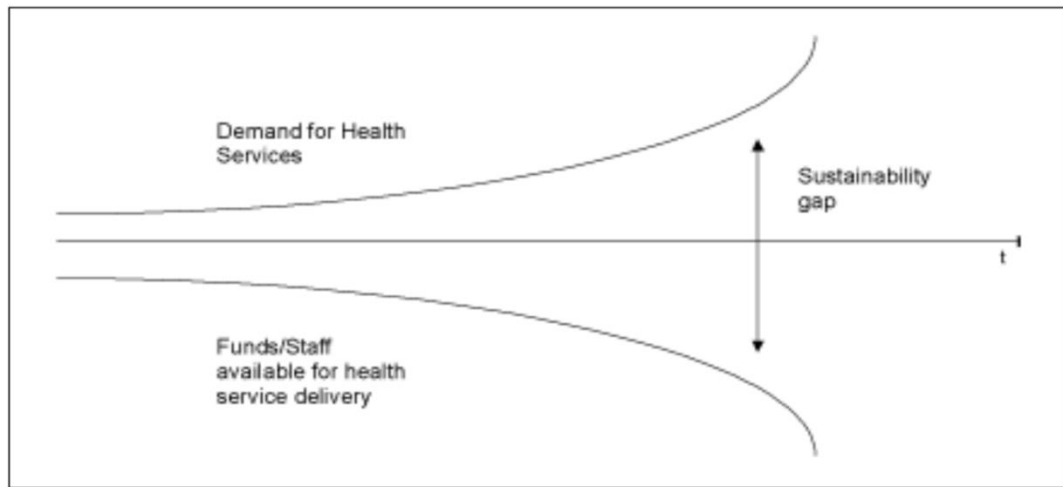
The Royal College of Physicians coined the term “sustainability” in reference to the capacity of a health service system to distribute health care in the long term by considering future generations. Financial problems are mostly considered to be the fundamental threat to health care service sustainability, along with increasing demand and a large financial deficit (Mortimer et al., 2018)

In a health care system, sustainability means more than solely providing sufficient financial resources. A sustainable health care system is generally expected to meet the health and health care needs of citizens, promote health, observe and respond appropriately to changes in cultural, social, and economic realities, and consider the needs of future generations in order not to put them at risk while meeting present needs (Prada, 2012).

Being a dynamic component, sustainability helps systems resist and cope with changing circumstances (Sibthorpe et al., 2005). The changing circumstances affecting sustainability in health care systems, which have become a priority issue of policy for countries and governments, include the increased costs of health due to consumer expectations, demographic changes, advances in technology, limitations of public resources, and increased health expenditure in gross domestic product (GDP) (Thomson et al., 2009b).

A sustainability gap emerges when the demand for health care services rises but human and other resources available for the delivery of health care services decrease (Figure 7). In the last two decades, the sustainability gap has obviously increased. To survive in the long term, health care systems must have enough resources to meet their goals and adapt to the changing environment (Coiera and Hovenga, 2007).

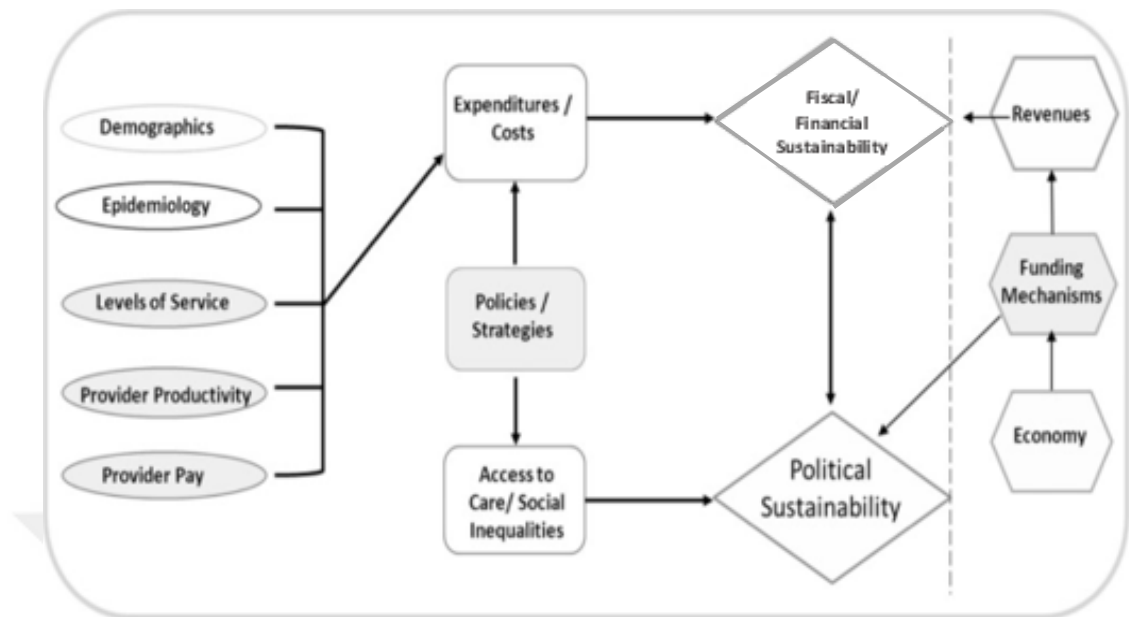
Figure 7: Sustainability Gap



Source: Coiera and Hovenga, 2007.

An alternative approach was suggested by Birch et al. (2015) in order to connect provider numbers to needs for health care in the population receiving the service. In this model, changing conditions of demography, productivity, and epidemiology are integrated into workforce planning and service, controlling for supply-driven ‘pressures’ on expenditure. This perspective suggests that population needs are responded to by health care requirements in response to supply and service use (Figure 8).

Figure 8: Health Care Sustainability Framework



Source: Adopted from Birch et al., 2015: 112.

In the Health Care System Sustainability Framework presented in Figure 8, financial sustainability is influenced by revenues to support the health care system (column 4) and levels of expenditure (column 2). In times of economic difficulty, supporting increased expenditure by increasing revenues is not fully possible (column 4), and expenditure restraint becomes the primary instrument for financial sustainability. The determinants of expenditure are described in column 1. Column 2 shows how these determinants are influenced by strategies and policies to manage public health care expenditure increase. Health care policy does not completely affect demography and epidemiology in the short term and the shaded expenditure reasons, provider pay, provider productivity, and levels of service, are taken as policy directions for expenditure control in the face of changes in health age distribution and population size. It is likely that access to publicly-funded health care and social imbalances in health are influenced by these policies as well (column 2). When access to care is reduced, political sustainability is threatened (column 3) since the number of people demanding health care from the private sector increases.

In the Health Care Sustainability Framework suggested by Brich et al. (2015), health care expenditure is separated into planning components. This framework is

different from other models of health care expenditure planning in that it includes the health needs of the society as a determinant of health care requirements, as well as offering an explanatory tool for understanding the reasons for rising expenditure.

From a broader perspective, social, epidemiological, financial, economic and fiscal sustainability determine the sustainability of a health care system, social sustainability assumes the role of fulfilling the principles values held by the nation (Olgiati and Danovi, 2012). Epidemiological sustainability defines the system's capacity to supply the global health demands of the population in terms of rising life expectancy at birth (Koplan, 2009). Economic sustainability is the growth in public health financing as a percentage of GDP. As long as the social cost of health financing remains equal to or below the value produced by that financing, health financing can be sustainable. If other valued areas of economic activity are threatened by health financing, it may be considered economically unsustainable. Economic sustainability is closely related with social sustainability. According to Olgiati and Danovi (2012), any public policy intervention aiming at the absolute reduction of public health resources economically and socially is sustainable if these resources are those which are wasted; that is, financed and spent but not used efficiently and/or effectively for valuable care service provision (Porter 2009). For this reason, economic sustainability can be seen as a bridge connecting Financial and Social and Epidemiological Sustainability together since it generates socially sustainable savings in financial resources by enhancing the value of the health services delivered (Olgiati and Danovi, 2012).

As presented above, the conceptual framework of sustainability in health care systems is rather broad. In addition, while no agreed-upon definition of sustainability in health care systems has yet been provided, some definitions included in the literature are presented below.

The issue of providing fair quality health care is referred to as “sustainability” by many. What we mean by sustainability is having mechanisms to ensure that all residents have continued access to immediate, technologically advanced, adequate, and humane health care that can meet all their needs (Guyatt et al., 2002).

Sustainability in health care terms can be defined as the ability to maintain public health care of high quality and adequately allocated, while public sector health

care sustainability refers to “*the adequacy of resources to ensure timely access to quality services which respond to citizens’ changing health needs in the long term*” (Di Matteo and Di Matteo, 2012: 2).

According to another definition, sustainability in health care systems refers to the effective operation of a given health care system with minimum external input in time. In other words, sustainability is the capacity of a health care system to function in an effective way with the lowest input in the long term (La Fond, 1995).

Sustainability in health care systems is also defined as the maintenance of quality and service at an affordable cost (Thomson et al., 2009a). Sustainability in health care systems is defined as ensuring that adequate resources are available in the long term to reach quality services for the emerging health needs (Romanow, 2002). Sustainability is the ability to ensure that the coverage of services can continuously control a health problem (Claquin, 1989 quoted in Zemke, 2013: 35).

A sustainable health care system is a proper balance designed between cultural, social, and economic environments in order to meet health and health care needs from protecting individuals’ and population’s health, to preventing diseases till the end of life, and supporting health. This definition expresses the necessity for a multi-stakeholder system with a long-term capacity to allocate and mobilize resources in meeting the health care needs of the population and contributing to the protection of a productive population. Sustainability of health care services is also affected by government policies because political decisions are made in the context of budgets, priorities, and the fiscal limitations determining allocation. Naturally, this involves thinking how much people (individually or together) are willing to pay for the sustainability of health care services. Moreover, political decisions and social choices are always inclined to change according to developments in cultural, social, environmental, and economic conditions (Prada et al., 2014).

A sustainable health care system 1) provides a care service that results in minimum possible mortality and morbidity for patients, 2) delivers services to the entire population as much as possible, 3) the keeps total cost of care in balance with other costs required for the given population as a percentage of GDP, and 4) ensures that service provision is seen as a satisfactory and attractive occupation (Miller, 2013).

Prada (2012), on the other hand, defines a sustainable health care system as 1) designed to meet the health and health care needs of the population and individuals (covering all aspects from improving health and preventing diseases until recovery and end-of-life care), 2) yielding optimal health and health care outcomes, 3) reacting and adapting to cultural, social, and economic conditions and demands, 4) not risking the ability of future generations at the expense of meeting individuals' own health and health care needs.

Most broadly, sustainability concerns ensuring that the evolving needs of citizens are met by the health care system through high-quality, comprehensive, and efficient care services, both today and in the future. This comprehensive definition includes such objectives of sustainability as maintaining health benefits, providing health programs required, institutionalizing the programs in organizational systems, and ensuring the community's capacity (Moat, 2016).

Johnson (2009) claims that the "*principles and practices of sustainability are adopted more slowly by health organizations others in the business sector*" (Johnson, 2009: 397).

Especially over the last decade, health care systems in general, whether tax or social insurance-based or market-based, have been dealing with the issue of sustainability (Lega et al., 2013).

Health care systems have to deal with many difficulties concerning sustainability, which include rising demand for health care services, higher employee turnover rates, insufficient health care personnel, increasing health care costs, excessive patient expectations, finite resources, and the global economic crises (Faezipour and Ferreira, 2013; Faezipour and Ferreira, 2011; Mutingi and Mbohwa, 2012). For the health care system in Japan, three common difficulties have been listed by Shibuya et al. (2011): responsiveness to patients, political governance, and economic sustainability.

According to Thomson et al. (2009b), the value produced by health care must exceed its opportunity cost for health systems to be economically sustainable. On the other hand, fiscal sustainability can be achieved through government's ability and willingness to meet the financing obligations of the health care system (Odame et al., 2013).

The sustainability of the health and care system relies on both internal and external factors, as well as public and political acceptability and support (Crisp, 2017). A recent commission on the Portuguese health care system specified seven factors that should be dealt with to achieve sustainability (Calouste Gulbenkian Foundation, 2014).

Table 1: Seven Factors Affecting the Sustainability of a Health Care System

Internal factors
<i>* Efficiency and effectiveness of health and care provision</i>
<i>* Availability of well-trained health and care workers</i>
<i>* Costs and economic benefits</i>
External factors
<i>* Health and resilience of the population</i>
<i>* Contribution of careers and informal networks of care</i>
<i>* Integration of policy and practice with other sectors and building healthy and health creating communities</i>
Overall
<i>* Public and political acceptability and support</i>

Source: Calouste Gulbenkian Foundation, 2014.

Internal Factors: The achievement of efficiency and effectiveness in healthcare service provision is a financial issue, and its economic and financial results are important because disease management ways are improved and health and disease prevention is promoted. Personnel, on the other hand, are one of the most fragile elements of health care systems. The international incompetence of health care personnel constitutes a threat for the health care system. In order to meet evolving needs, the roles of health care workers must be developed, segregation among occupations must be eliminated, and technology must be used better. In addition, the financing power of the health care system depends on the country's resources, while the degree of efficiency and fruitfulness of the health care system is a political decision (Crisp, 2017).

External Factors: Since protecting public health and preventing morbidity until the few year years before death greatly influence quality of life, demand for health care services and expenditure are extremely important in terms of sustainability. The contribution of careers, and voluntary and community organizations to the health care system is significant for sustainability because any decrease in the contribution of the informal system increases pressure on the formal system. Furthermore, employers, educators, designers, planners, and others are also influential in determining health status, and they are also responsible for the protection and promotion of health. For example, some employers implement health programs for their staff, and when there is no national policy, new programs are developed by organizations in the fields of arts, agriculture, and design and by individual schools. All these are critical factors in terms of achieving sustainability (Crisp, 2017).

Overall: All health care systems depend on public and political acceptability. Although a system is perfectly designed, achieving sustainability is not possible without the commitment of its health care workers and the support of the public.

The World Business Council for Sustainable Development (WBCSD) claims that *“it is agreed by almost everyone that the way we manage health today is unsustainable as the cost is higher than we can afford, and delivery is lower than expected”* (Coiera and Hovenga, 2007). It is not easy to ensure the long-term sustainability of the health system because of the demand for and supply of the health care, the governance of the system, and difficulties in addressing long-term policy issues (Moat, 2016).

The issue of sustainability in health care systems has a very broad scope. However, the first thing considered in respect to sustainability in health care systems is whether the recourses are financially adequate for today and the future; that is, financial sustainability.

2.3. FINANCIAL SUSTAINABILITY IN HEALTH CARE SYSTEMS

The concept of financial sustainability in health care systems, which is frequently addressed in the media, political, and academic circles, is a controversial one that can be interpreted differently. However, discussions rarely deal with the meaning of financial sustainability in a health care system, how a system can attain

financial sustainability, or what the political outcomes of the problem of sustainability are (Thomson et al., 2009b).

Financial sustainability in health care systems can be dealt with from two aspects. First, it is the ability of a country to supply the resources required for the expenditure made on health care; that is, it refers to the continuity of financing of health expenditure. The second one is the financial sustainability of businesses. (Atasever, 2011). In the present study, sustainability in health care systems is discussed both in terms of financing of health expenditure and financial sustainability of health care organizations.

An organization's net income (the surplus of revenues over expenses); liquidity (available cash to pay bills) and solvency (the relationship between assets and debt or liabilities) can mark its financial sustainability (USAID, 2001). Thus, financial sustainability can be considered as the aspect focusing on financial planning and control to enable the organization to survive in the future. Sustainability refers to a system's capacity to maintain its ordinary activities successfully in the future. The two notions of financial and institutional sustainability are the most frequently used ones in the context of sustainability. Financial sustainability is the capacity of the health system to be able to continue its activities with a sufficient level of funding (e.g. replacement of donor funds from other sources when foreign assistance is drawn back) (USAID, 2001). Institutional sustainability addresses the system's capacity of uniting and managing essential nonfinancial resources in order to continue its ordinary activities well in the future through appropriate financing (Islam, 2007).

Financial sustainability, which we can define as maintaining a balance of income and expenses, is highly important for health care businesses, just like others (Atasever, 2011).

In order to maintain financial sustainability, health companies should be able to provide services efficiently to guarantee service quality and user satisfaction, and to enable the organization to continue generating results (Marques Clemente et al., 2018). In order for a health service to be sustainable, the organization operating the service must be able to mobilize and allocate adequate and suitable resources in the long term (Olsen, 1998).

Despite being long debated, sustainability in health care has increased in importance as a result of changes in the market leading organizations to assess their

long-term viability. In order to attain financial sustainability, strategic decisions and capital investments must be made by an organization so that it can have adequate resources to meet the community's health care needs for a certain time period, no matter what the patient's ability to pay is (Becker's Healthcare, 2017).

A health system is supposed to be strong in order to sustain health outcomes. It is not generally possible to achieve sustainability by changing things at the local level alone. For instance, training may be given to health providers at the local level; however, health gains would still be limited unless these providers are maintained or managed or there are adequate medicines and supplies available. In terms of health programs, it is possible to address sustainability on different levels as institutional, program, society, and public health status outcomes (Islam, 2007).

A self-sufficient government that can cover all the needs of the health care system and programs is also referred to as financially sustainable (World Bank, 1997). In such a system, priorities must be set in government budget constraints, additional resources must be mobilized, and money must be valued better with the present resources in the sector.

Financial sustainability also indicates both the government's ability to finance health care services and the guarantee of donor agencies in the long run (La Fond, 1995). For financial sustainability, the health care system must be capable of replacing donor funds that are withdrawn with funds from other, usually domestic, sources (Knowles et al., 1997). In addition, sustainability involves the ability to respond to changing conditions, or to finance a sufficient quality of health care despite the pressure of cost increases, effects of population on disease burdens, new technologies, and consumer preferences (Thomson, 2009b).

Financial sustainability is accepted as the capacity of a health care system to work effectively with the lowest financial input over time (Belek, 2009). Financial sustainability in health care systems can be considered as harmonizing limitless needs with limited fiscal resources (Eurostat, 2005). What lies within sustainability is a balance among the services, citizens' health needs, and the resources to be allocated for the system. Achieving such a balance is the decision of parties governing the health care system, including individuals, governments, communities, health authorities, health care providers, and hospital administrators, through which the future sustainability of the system can be determined (Romanow, 2002). Financial sustainability

is the ability of a country to finance its health care system with the available fiscal resources in the medium and long term. Playing a critical role in maintaining continuity of service provision and healthcare in the long term, financial sustainability means meeting health expenses with the revenues gained using a financing mechanism of the specified weight (Yıldırım, 2012).

According to Wang (2015), there are three ways to attain financial sustainability. First, health care system revenues must exceed the expenditure in order for the system to function; second, in need of more fiscal expenditure, the government should help the health care system; third, health care demand can be met through a basic health care system for all citizens.

Likewise, Ruggeri (2002) states that financial sustainability has three aspects. First, the economy is able to sustain current and future health care expenditure. Second, the overall fiscal system must be able to resist the pressures caused by increasing health expenditure. The third concern concerns the capability of governments to perform their duty to provide health care.

Financial sustainability in health care systems refers to the economic ability to cope with that level of spending (Ruggeri, 2006). The financial sustainability of health care systems is dependent on future economic growth, mobilization of domestic resources, external support, and obtaining more value for money through targeting the poor and improving public spending efficiency (Schieber, 2005).

While ensuring long term sustainability, modern health care systems must also be accessible and effective. To this end, these health care systems need to be sustainable in financial terms.

While governments discuss health care system sustainability in terms of costs and financial impact, it usually has more to do with who pays than how much is paid. Some researchers have concluded that health care systems are not sustainable because of their high costs, the huge share they take from the government budget, or the pressure they cause on taxes. Discussing the problems concerning the system, others have focused on the ineffectiveness and management of outcomes. They have discussed rearranging of the system and argued that more is needed than adequate fiscal resources to meet needs. Still others have claimed that the sole problem concerning the system in recent years is the lack of financial resources, arguing that

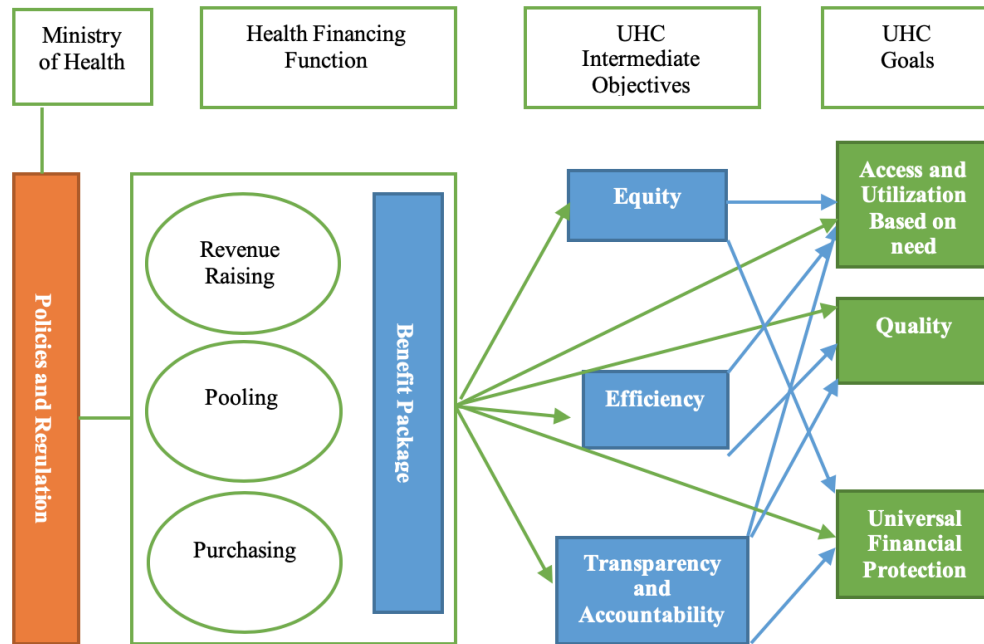
everything will get better by increasing and rearranging financial resources (Romanow, 2002).

The financial sustainability of a health system is mainly based on health spending. Financially sustainable public health spending can be defined as meeting the health needs of both current and future population with the present taxes and expenditure settings (Di Matteo, 2010).

Generally, financial sustainability concerns the ability to generate adequate resources that can enable the continuous provision of healthcare despite increasing costs and balancing spending and income (fiscal sustainability), determining the appropriateness and affordability of the share of resources allocated to health, and specifying the threat caused by health expenditure on a country's macro-economic competitiveness in a globalized economy. Despite being all true, these areas of concern are underpinned by a number of assumptions. Therefore, before dealing with the question how much their society should be spending on health systems, policymakers should consider these aspects (Figueras et al., 2008).

As mentioned before, discussions about the sustainability of health care system are mainly focused on financing. (Birch et al., 2015; Moat, 2016). The main goal of health care financing policy is to provide sufficient funding and offer the correct mechanisms and incentives in order for all groups or individuals in the society to be able to access quality health care. To this end, the three inter-related functions of a health financing system – revenue collection, financial and risk pooling, and purchasing of health care services – must be met, as well as providing health care services based on the need for care, quality, opportunity, and dignity, no matter the individual's ability to pay. In Figure 9, the financial sustainability of health care system is explained within the scope of health financing (McIntyre and Kutzin, 2016; Kutzin, 2001).

Figure 9: Framework for Sustainable Health Care Financing



Source: Adopted from Kutzin 2001; MyLntyre and Kutzin 2016.

The concept of financial sustainability in health care systems can be defined as the ability of the system to collect adequate resources to fulfill what is expected from it and to discharge the responsibility to preserve and improve the health status with the resources collected. If a health care system fails to meet its expenditure through various income sources, and can only fulfill these responsibilities with treasury or fiscal support, then the continuity of this support will form the basis (Ministry of Development, 2014b).

A health care system can be sustainable only when it is operated by an organization that has the ability to employ and allocate adequate and appropriate resources in the long term. Moreover, sustainability represents the ability to react to changing conditions or to finance increasing pressure elements such as cost increases, effects of population on disease burdens, new technologies, and consumer preferences (Brenzel and Young, 2011).

As mentioned above, financial sustainability in health care systems has numerous dimensions. In order to gain a clear understanding of the concept of financial

sustainability in health care systems, it is necessary to identify the factors affecting this concept.

2.4. FACTORS AFFECTING FINANCIAL SUSTAINABILITY IN HEALTH CARE SYSTEMS

The first thing that is considered when discussing financial sustainability in health care systems is the increase in health care costs and expenditure. Recently, there has been a higher increase in spending on publicly funded health systems than total economic growth. From 1970 to the early 1980s, average government spending as a percentage of GDP rose by 50 per cent among Organization for Economic Co-operation and Development (OECD) members. The challenging financial climate and the call for broadening universal coverage for health care have generated concerns about the financial sustainability of universal health care systems (Birch et al., 2015), even in countries where health expenditure has been successfully contained (Angelis et al., 2017).

Factors affecting financial sustainability in health care systems are also those affecting health care expenditure. From this point of view, they are examined here under five headings: demographic factors, labor market factors, macro-economic factors, health care system factors, and expectations and values.

2.4.1. Demographic Factors

2.4.1.1. Demographic Changes

The world population had an average age of 60 from the 1950s to 2000s and a population growth rate of approximately 6%-10%. Approaching 2050 from the 2000s, the population growth rate has increased to 22% while the life expectancy of individuals aged 50 and over, particularly in Western Europe, has reached 90 years. Increased life expectancy also means an increased elderly population. Within the world population, the population aged 80 and over has the most rapidly increasing growth rate, and is expected to increase by over 3% until 2020 (Harper, 2010). On the other hand, the ratio of the young or economically active population (working-age

population) to the retired segment is gradually decreasing. In other words, the old-age support ratio is on a decline (Angelis et al., 2017; Harper, 2010). Moreover, as a result of the increase in the population aged 65 and over, the average OECD dependency ratio is expected to approximately double by the year 2040. Thus, the elderly will be contributing less to the healthcare system while utilizing more care services. In short, an aging population will have a significant future impact on both health expenditure and public revenues (World Economic Forum, 2012).

Another key factor for healthcare systems is the fertility rate because it affects both the size and age structure of the population (Thomson et al., 2010). Demographic changes indicate that birth rates are falling while life expectancy is increasing. This decline in the fertility rate, together with the increase in life expectancy at birth, brings about an ageing of the population. This in turn means more chronic diseases and long-term care, which increases healthcare costs (World Economic Forum, 2012).

2.4.1.2. Age-Related Health

The complicated structure of health care services causes difficulty in identifying the main cost factors considered to be related to the ageing of population and technological advances. There is various evidence, particularly concerning the role of ageing (Angelis et al., 2017). Some studies and future projections show that an ageing population contributes less to the increased cost of health care services than technological advances (Thomson et al., 2009b).

On the other hand, the extra years of life obtained through extended life expectancy may be spent in good or ill health depending on improvements in morbidity and mortality. If mortality increases less than morbidity, years gained through an extended life expectancy are spent in ill health (Olshansky et al., 1991). As individuals and societies live longer, the disease burden and prevalence increase, causing the costs of health care services to rise (World Economic Forum, 2012). In contrast, if mortality rates grow faster than morbidity rates, the morbidity rate may decline or the two trends may balance each other out (Angelis et al., 2017). Recent studies on ageing and health costs at a patient level show a strong correlation between proximity to death and spending than for age in general (e.g. Dixon et al., 2004). However, there has been no decline in health expenditure, even in countries in which the compression of morbidity

theory is applicable. While the cost of end-of-life treatment has levelled out, the costs further before death have gone up (Payne et al., 2007).

2.4.1.3. Life-style Changes

While the growth in the prevalence of diseases associated with *life style* is significant, they seem to weaken the sustainability of health care systems. In other words, life-style related diseases increase the disease burden. For example, such health problems as type 2 diabetes, coronary heart disease, and paralysis from varying risk factors like smoking, poor nutrition, lack of physical activity, and heavy alcohol consumption, increase the disease burden. As a result of the increase in the prevalence of life style-related diseases, health expenditure has risen significantly. For instance, the cost of health care for an obese person is two times that of a person of normal weight (World Economic Forum, 2012).

2.4.2. Labor Market Factors

Whether financed by public spending or out-of-pocket payments, health care systems are influenced by the condition of the labor market. Revenues to be generated by the labor market for the health care system, the size of the labor market, and participation ratios in labor depend on employment and unemployment rates. Increased unemployment reduces revenue as well as affecting the demand for health care services and increasing health expenditure. The labor market factors that could possibly affect the financial structure of a health care system include changes at the level of self-employment, the size of the underground economy, retirement age, and changes in the labor force due to aging and migration (Thomson et al., 2010).

2.4.3. Macro-economic Factors

Financial sustainability in health care systems is assessed on both resource and expenditure bases. Changes in macro-economic factors affect both the health care system resources and expenditure. There is a close relationship between national health expenditure and income, as it is estimated that health spending increases more or less proportionately with economic growth (Schieber and Maeda, 1997). For instance, if GDP falls while health spending does not, less money will be available to spend on other things. This may well affect health care demands, considering the negative effects of reduced spending in other areas on health status (Thomson et al., 2010).

Generally, the amount of goods and services in an economy is related to the demand of the population while the amount of healthcare services provided and consumed is not directly connected to the demand of the population or their health status. This issue was first dealt with in the scope of national health systems. It was determined that high-income countries have more health expenditure than low income countries in general (Abel-Smith, 1967; Gerdtham et al., 1992). In addition, considering that individual health expenditure does not have so much price flexibility (Manning et al., 1987), some health care services have been classified as “individual needs and national luxuries”. In addition, it has brought about the realization that national income is more important than service provision systems (Newhouse, 1977). In short, since it is an explanatory factor for health care expenditure growth, attention should be paid to the interpretation of income (Angelis et al., 2017).

2.4.4. Health Care System Factors

2.4.4.1. Inadequacy of Resources

The affordability of a health care system is determined by the resources of the country, the effectiveness and efficiency of the system, and political choices. While health expenditure varies by country (Crisp, 2017), they generally increase in parallel with the economic growth of a country (OECD, 2013).

According to Özer et al. (2015), as a general economic rule, resources are limited while needs are endless. There are also alternative costs for the resources allocated to

health care. Before the crisis, serious fiscal pressure was experienced by a number of governments because housing market bubbles burst, financial-sector companies were bailed out by the public, borrowing costs went up while resources went down because of high unemployment, and household incomes and consumption both fell (Thomson et al., 2014). The present context of the financial crisis is especially related to the issue of resource constraints about the inability or reluctance of the government to create resources that can meet its obligations in terms of health system (Thomson et al., 2009b).

When spending for the needs of their societies, governments have to consider the limits of their budgets. For the fiscal sustainability of the public sector, expenditure and revenue must be balanced, which is also true for health financing systems. However, for health financing policies, fiscal sustainability is essential not an objective. Health financing systems must be evaluated according to how much they can achieve policy objectives compared to what they can possibly achieve, as well as maintaining fiscal balance. Therefore, efficiency and fiscal sustainability are significantly distinct from each other. It is understandable that most countries experiencing insistent deficits in the health sector are worried about this problem. However, while trying to eliminate deficits, they should not ignore the underlying inefficiencies which mainly cause the problem to occur. In some countries, it is possible for public hospitals to transfer their deficits to the government, which causes a lack of accountability and allows resources to be managed inefficiently since deficits are the manifestation of the problem. In order to protect people from making additional payments, some countries experiencing this problem plan to limit the package (i.e. increasing patient cost-sharing obligations) and to make complementary voluntary health insurance more comprehensive. Although these efforts could solve the problem of deficits for a certain period of time, as long as they neglect the causes of the problem, deficits will return and the reforms will damage equity and financial protection since poorer and sicker people have more difficulty in accessing voluntary health insurance (Kutzin, 2008).

Political decisions on the methods and amount of investment in health and the allocation of resources determine a health system's financial sustainability (Thomson et al., 2010). In short, as a result of increasing health care costs and resource

limitations, it has become difficult for policy makers to ensure that the health system continues to meet its objectives in the long term. If financial sustainability is equated with fiscal balance and seen as a policy objective, this could result in wrong policy choices and put pressure on the public budget to remain, affecting other objectives of the system negatively as well (Thomson et al., 2009b).

2.4.4.2. Public Pension Reform Pressure

The rapid aging of the world population, extended life expectancy, and the expectation that it will extend further have caused reform movements in the public health expenditure allocated for the elderly population and their pensions. Pension expenditure, which is one of the important expense items of health systems, are mainly based on the structure of the population and utility level per capita. As a result, policies for controlling health expenditure depend on the contributions made by individuals to the pension system throughout their lives (in other words actuarial fairness) and proposing ‘notional defined contribution’ schemes. In many OECD countries, the main issue is that the old-age support ratio has fallen, which leads to less possibility of transfers between the economically inactive and active population. The primary asset in pay-as-you-go schemes is human (working) capital, and if this funding source declines, there is either a decrease in benefits per capita or a shift to funded pensions on the basis of real, accumulated capital (Angelis et al., 2017; Meier and Werding, 2010).

2.4.4.3. Health Professionals’ Income Levels, Provider Efficiency, Unit Prices, and Technological Advances

In high-income countries, advancements in medical technology, rises in unit prices of care compared to other goods and services, increases in demand for and utilization of care, provider efficiency, and a number of other factors have proven to be significantly more effective in determining health care expenditure than age (Cremer et al., 2007).

One of the factors affecting expenditure in health care systems is doctors’ income. Staffing constitutes both the greatest cost and the greatest vulnerability of the

health care system (Crips, 2017). Since health care service provision is labor-intensive, the salaries of doctors and other healthcare personnel can significantly affect health expenditure (Angelis et al., 2017; Di Matteo, 2014).

As long as new technologies can provide efficiency gains or health improvements that possibly decrease the need for further and more costly care, they may reduce costs. With new technologies, utilization can be increased by leading to higher costs, the scope of treatments may be extended, treatment can be accessed by more individuals, and current technologies can be replaced with cheaper ones (Cutler and McClellan, 2001), or the use of existing technologies may be extended (Thomson, 2010).

In addition, developments in technology have expanded the variety of treatable conditions, both by curing diseases and extending life and by lessening the distress of symptoms, while such technologies as imaging technologies have increased the extent of diagnostics considerably (Oxley and MacFarlan, 1994).

More recent procedures, like kidney dialysis or organ transplants, are quite expensive, and predicted health care costs are rising with the dissemination of such technologies added to universal coverage (Weisbrod, 1991). Nevertheless, it is still debatable how much effect technology has on total expenditure together with other demand and supply side aspects (Angelis et al., 2017).

Since changes in technology and the intensity of service use are closely correlated, policy-makers have to consider how new technologies are included in the health care system and ensure they are adopted by providers carefully. Another issue to be taken into consideration by policy-makers is the patterns of health service use as they need to ensure that care is used by patients and supplied by providers in the most cost-effective, coordinated way to avoid wasteful and harmful duplication (Thomson et al., 2010). Moreover, policy makers should pay attention to ensuring that providers avoid prescribing unnecessary or ineffective treatments (Thomson et al., 2010) as it is known that the majority of health care costs come from supply factors (including the price of supply) (Anderson et al., 2003) not demand factors.

New treatments and technologies offer health care options to patients and usually improve clinical outcomes, but they may well increase unit costs. This is partly due to the fact that innovators focus mainly on obtaining more outcomes rather than

the quality, price, and cost-effectiveness of new treatments (World Economic Forum, 2012).

Finally, policy-makers should focus on issues such as prevention of ill health and control of chronic conditions. Better results are supposed to be obtained in resource investment in interventions to promote healthy ageing through connecting allocation and population health needs. Thus, quality of life can be improved, future health costs can be reduced, and health sector revenue can be raised (Rechel et al., 2009). All these factors highlight the crucial role of health financing policy in contributing to financial sustainability.

2.4.5. Expectations and Values

WHO states that it is one of the main goals of health care systems is to improve the society's expectations, which are not directly related to health (WHO, 2000) The increased public expectations of health care services, health technologies improving every day, and the elderly population are frequently mentioned as the driving forces for the increase in health expenditure (Busse et al., 2011a). However, how present resources of health are influenced by the expectations of the society has not yet been measured. Considering the complicated structure of health care systems and the possible complexity of human nature, this is an acceptable outcome (Busse et al., 2011a; 2011b). The most general assumption in this regard is that individuals expect to access high-quality health care services easily, and on time. This raises the question whether individuals are willing to pay more to public or private institutions in order to access such services (Thomson et al., 2010).

When considered carefully, the dynamics and outcomes of the process are more complex than they seem while increased expectations of quality and access to healthcare tend to push health expenditure upwards. In this regard, society's perceptions of the quality of health care service is important while understanding the concept of value for money is another critical factor. For example, if the society understands the goals behind strategic resource allocation and the concepts of equity and efficiency, they can support governments in such issues as restricting non-value extra expenditure for other interest groups, such as providers, private insurers, the pharmaceutical industry, or medical device manufacturers in the health care system,

and promoting the private sector through limitations to public health benefit packages. In short, policy makers should see the increased public expectations of quality and access in health care as an opportunity to improve the performance of the health care system, and they must inform the society about investing in public resources in health, avoiding wastage, and enhancing current resources (Thomson et al., 2010). Thus, they can take positive steps towards achieving financial sustainability in health care systems.

Today, in order to achieve long-term financial sustainability of national health care systems, decision makers have to be able to maintain a balance among such challenges as the higher population of the elderly than those in working age, higher healthcare demands of a more aware public, expensive technological innovations, and increasing pressures on other social care budgets (Angelis et al., 2017).

2.5. ASSESSMENT FOR THE MEASUREMENT OF FINANCIAL SUSTAINABILITY IN HEALTH CARE SYSTEMS

There are no agreed criteria to measure and evaluate financial sustainability in health care systems. The indicators for the financial sustainability of a health care system can be divided into two main groups. These are measurements based on health expenditure and revenues/resources, and measurements based on the opinions of stakeholders (Özer et al., 2015).

2.5.1. Assessments Based on Health Care Expenditure and Resources

When evaluating financial sustainability in a health system, the main indicators used must be related to health expenditure and resources (Özer et al., 2015).

According to Knowles et al. (1997), the concept of sustainability is the ability of the system's resources to meet its costs. Most of the health care system reforms and all attempts towards the performance of health systems so far have concentrated on financial sustainability. Table 2 lists the indicators of financial sustainability.

Table 2: Indicators of Financial Sustainability

Indicators of Financial Sustainability
• <i>Percentage of total health system financed by tax revenue</i> • <i>Percentage of government health system financed by tax revenue</i> • <i>Government health expenditure as percentage of total government budget</i> • <i>Government health expenditure as percentage of GDP</i> • <i>Percentage of total health spending financed by donors</i> • <i>Percentage of government health spending financed by donors</i> • <i>Percentage of government recurrent health spending financed by donors</i> • <i>Percentage of government health expenditure directed to primary care</i> • <i>Percentage of government health expenditure directed to preventive care</i> • <i>Percentage of government health expenditure directed to maternal and child health services</i>

Source: Knowles et al., 1997: 38

Mehdi (1999) groups the financial sustainability indicators of a health program under resource mobilization and efficient allocation, and use of resources (Table 3). A country's own resources must be funded to attain sustainability.

Table 3: Financial Sustainability Indicators

Resource Mobilization
1. <i>Government health expenditure as a percentage of GDP</i> 2. <i>Percentage of total health expenditure financed by donors</i> 3. <i>Total per capita expenditure on health</i> 4. <i>Sources of financing for health and their relative shares of total expenditure</i> 5. <i>Percentage of total health expenditure recovered through various mechanisms of cost sharing</i> 6. <i>Percentage of cost sharing revenues retained at the point of service</i> 7. <i>Percentage of facility budget programmed at facility level</i>
Efficient Allocation and Use of Resources
1. <i>Percentage of government health budget allocated to primary care</i> 2. <i>Percentage of government health expenditure directed to primary care</i> 3. <i>Personnel expenditure as a percentage of total recurrent health expenditure</i>

Source: Mehdi, 1999: 9-14

Mehdi (1999) states that these ratios depend on countries' development levels. For example, in many developed countries, the government health expenditure/GDP ratio is 10% approximately while it is around 4% in underdeveloped countries. Previous trends must be examined and checked for any increases in order to evaluate sustainability.

In the Basys et al. (2005) study titled "Development of a Methodology for Collection and Analysis of Data on Efficiency and Effectiveness in Health Care Provision", the indicators presented in Table 4 are recommended for measuring health care systems.

Table 4: Proposed Indicators of Sustainability

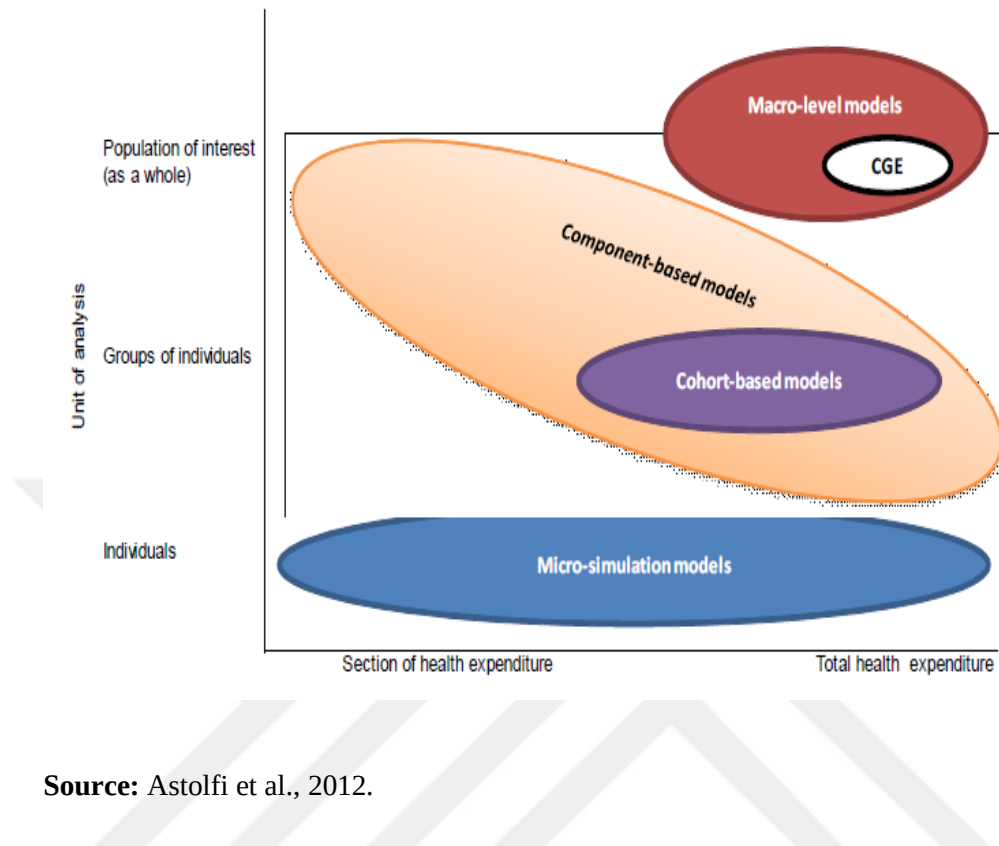
Sub-dimension of Sustainability	Indicator
Scale of health expenditure	Total health expenditure/ Gross Domestic Product (Provincial/regional health expenditure)/(provincial/regional health care revenues) (for devolved health systems)
Scale of publicly financed health expenditure	Public health expenditure/ Gross Domestic Product
Fiscal sustainability	Total health expenditure/ total government expenditure Evolution of revenue/expenditure ratios Expenditure by age group or activity in relation to ability to pay
Productivity and efficiency*	Value added of Health Provider: Health employment Unit costs of selected outputs Effectiveness indicators, with related health expenditure

*Productivity and efficiency are considered here as factors of financial sustainability

Source: Basys et al., 2005: 33.

When measuring the financial sustainability of health care systems, it is possible to evaluate both retrospectively and prospectively. In prospective evaluations, health expenditure are forecast through various scenario analyses. Recently, an OECD paper studied the models employed to estimate health care expenditure (Figure 10) (Astolfi, 2012).

Figure 10: Families of Health Expenditure Forecasting Models



Source: Astolfi et al., 2012.

In **micro-simulation models**, the desired clinical approaches are applied to demographically modified populations (Birch et al., 2015). For instance, the potential, health care utilization, future health, and health expenditure outcomes of common chronic diseases are projected by The Population Health Model (POHEM), a dynamic microsimulation model designed by Statistics Canada (Astolfi et al., 2012).

Component-based models (including disability trends) consider the changes in demand as the reason for expenditure growth (Birch et al., 2015). In this class, expenditure is analyzed by financing agents, providers, goods and services consumed, and groups of individuals, or by a combination of these groups with various forecasting models. For expenditure grouped by financing agents, such as private insurance or out-of-pocket payments and public expenditure, the three models have different layers. In each layer, a different technique can be employed to envisage a sub-component of health expenditure (Astolfi, et al., 2012).

In macro-level models, GDP is used as an indicator of aggregate demand to estimate aggregate health care expenditure (Birch et al., 2015). For example, an

econometric approach was introduced by Getzen and Poullier (1992) to forecast aggregate health expenditure as a function of past GDP growth and inflation rates. Later, comparisons were made between the precision of forecasts and the results obtained from three classic extrapolation methods (moving average, ARIMA methods, and exponential smoothing).

Studies carried out by Di Matteo can be given as other examples of macro-level models. In order to specify factors concerning growth in health care expenditure in Canada for 1965-2008 Di Matteo (2010) used regression analysis as well as the estimated equation for future projections. The data set consisted of provincial population, provincial government health expenditure and revenue, GDP, population aged 65 years and over, government expenditure, implicit price index, and provincial federal cash transfer revenue. This study was extended in 2012 and a conceptual framework was established for fiscal sustainability. In extended study, indicators to measure financial sustainability were divided into general macro indicators of health expenditure and specific comparison expenditure-resource base indicators of sustainability (Table 5-6) (Di Matteo and Di Matteo, 2012).

Table 5: General Macro Indicators of Health Care Expenditure

<i>Measure</i>	<i>Notation</i>
<i>Government health expenditure-to-total government expenditure ratio</i>	<i>m1</i>
<i>Government health expenditure-to-GDP ratio</i>	<i>m2</i>

Table 6: Specific Comparison Expenditure-Resource Base Indicators of Sustainability

HEALTH EXPENDITURE GROWTH RATES (h)	RESOURCE BASE INDICATORS (r)	GOVERNMENT EXPENDITURE INDICATORS (g)
h Percentage growth of real per government health expenditure	r1 Percentage growth of real per capita GDP	g1 Percentage growth of total real per capita government expenditure
	r2 Percentage growth of real per capita total government revenues	g2* Percentage growth of real per capita government program expenditure
	r 3 Percentage growth of real per capita federal cash transfers	g3 Percentage growth of real per capita government program expenditure net of health

* Total government expenditure minus debt service costs

Source: Di Matteo and Di Matteo, 2012.

Di Matteo and Di Matteo (2012) used macro indicators to determine whether public health expenditure have a very large share in general public expenditure and whether public health expenditure takes a large share of economic resources (GDP share). They found that an increasing trend shows increased health expenditure load while it could not be accepted as proof for sustainability without a resource base.

Considering these indicators, the potential situations of sustainability are given in Table 7. If $h > r$, a potential sustainability problem exists since spending growth exceeds the growth in resources (though not necessarily in the case of r_3). If $h > g$, there is a potential sustainability problem based on whether g rises more rapidly than the resource base. For example, if $h \leq r_2$ and $g_3 \leq r_2$, then the system is exactly fiscally sustainable. Actually, it would be running a large overall surplus. If $h > r_2$ and $g_3 > r_2$ there is a sustainability problem and deficits and debt would be increasing. If $h > r_2$ and $g_3 < r_2$, the present situation could be sustainable, although the ratio h/g_1 may increase, which eventually may cause health care could to take up the whole government budget. As g_1 grows (because it includes h), g_1 could also exceed r_2 , which would cause public sector deficits and debt to go up. Table 7 summarizes the unsustainable situations depending on government revenue as the resource measure (Di Matteo and Di Matteo, 2012).

Table 7: Sustainability Problem

$h > r$: government health expenditure growth rate above resource base indicator growth rate	Unsustainable in the long-term in the absence of policy changes
$h > g$: government health expenditure growth rate above government expenditure growth rate	Potentially sustainable if $h < -r_2$ and $g_3 < -r_2$
	Potentially unsustainable if $h > r_2$ and $g_3 > r_2$
	Sustainable in short term e.g. $h > r_2$ and $g_3 < r_2$ or $h > r_1$ and $g_3 < r_1$ although at risk in the long run

Source: Di Matteo and Di Matteo, 2012.

Financial sustainability in health care systems has a very broad scope. In the study carried out to evaluate the financial sustainability of Estonia's health care system, Thompson et al. (2010) listed the following revenue sources and expenses of the health system that could possibly affect financial sustainability:

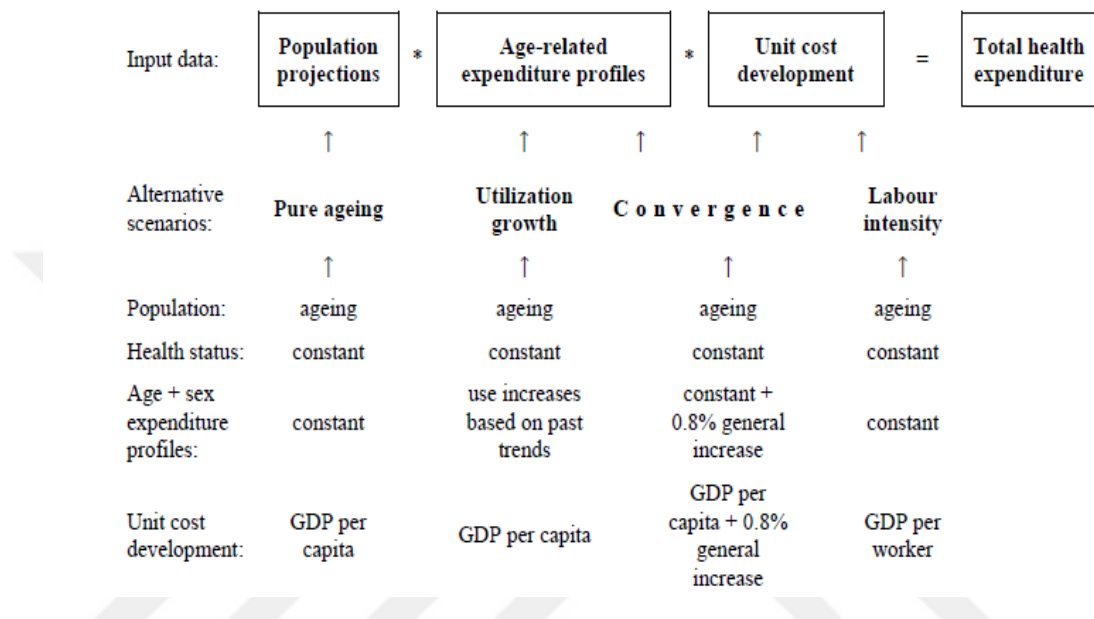
Table 8 Factors Affecting Future Revenue and Expenditure of Estonia's Health Care System

Demographic Factors
• Total population • Total fertility rate • Life expectancy (male) • Life expectancy (female) • Old-age dependency ratio (%) • Dependency ratio (%) • Population Age Structure (% 0-14, % 15-64, % 65+)
Labor Market Factors
• Labor force (thousands) • Labor force growth (%) • Labor force participation rate (%) • Employed (thousands) • Employment rate, 15–74 (%) • Employment growth (%) • Unemployment rate (%)
Macro-economic Factors
• GDP • GDP per capita • Nominal GDP growth (%) • Real GDP growth (%) • GDP per capita growth (%) • Inflation (GDP deflator) (%) • Nominal wage growth (%) • Real wage growth (%) • Labor productivity growth (%) • Inflation (CPI) (%) • Average gross wage

Source: Thomson et al., 2010: 69-73.

Based on future projections of these factors, future resources and health expenditure were determined in order to forecast the financial sustainability of the system. Figure 11 shows their health expenditure projection methodology.

Figure 11: Health Expenditure Projection Methodology



Source: Thomson et al., 2010: 76.

The study carried out by Olgiati and Danovi (2012) examined the financial sustainability of a health care system which provides universal coverage heading into the Eurozone financial crisis. It aimed to see if it the many emergency financial stability and public economic interventions could be synthesized into a single and straightforward index and to evaluate the size and direction of these interventions to increase or decrease the sustainability of publicly funded health care and universal coverage. The model introduced by this study broadly puts forth that the social, financial, epidemiological, fiscal and economic sustainability determined the sustainability of a health care system. In order for a health care system to be socially sustainable, the nation's shared values should be fulfilled. The epidemiological sustainability is a health care system's ability to meet health demands to increase life expectancy at birth (Koplan, 2009). The present study associates economic sustainability very closely with social sustainability. That is, any public policy

intervention intended to decrease public health resources absolutely is sustainable in both social and economic aspects as long as they reduce the resources that are actually wasted, those that are financed and expended although not used efficiently/effectively for a valuable care provision (Porter, 2009). For this reason, economic sustainability is considered to connect financial and social and epidemiological sustainability to one another. It improves the value of the health care service delivered and as a result savings in financial resources become socially sustainable. The focus of this model is the effects of *exogenous* variation, but not those of *endogenous* variation, on the sustainability of public health universal coverage with special attention to the effects brought about by increasing interest rates on sovereign debt.

$$\text{Financial Sustainability } (\sigma) = \begin{cases} \ll -1; \text{ reduction of public health financing - social and epidemiological sustainability at risk if economic sustainability does not increase;} \\ \sigma = -1; \text{ stabilization of public health spending;} \\ -1 < \sigma < 0; \text{ range of intervention financially sustainable;} \\ = 0; \text{ stabilization of public health spending propensity growth;} \\ > 0; \text{ lower limit of financial unsustainability;} \\ \gg 0; \text{ financial and fiscal sustainability at risk.} \end{cases}$$

In this model, dynamic relationships between the financial variables are analyzed into a synthetic coefficient.

In summary, sustainability is directly associated with a country's relative growth levels of resources and health expenditure. Growth in health expenditure may be economically sustainable as long as the value generated through health care services can exceed the opportunity value of the health care service. In other words, value outstripping cost can be accepted as a measure of economic sustainability. However, when the opportunity cost of health expenditure is too high, health spending begins to be unsustainable economically. In this case, the growth of health expenditure in GDP will threaten other areas of economic activity. It would also cause problems concerning economic sustainability. In a second but not very frequent case, health expenditure within the economic growth cycle may grow at a faster rate than economic growth without leading to any shrinking in other areas of economic activity. In this case, health

expenditure and other activities like going to the cinema would increase as well (Thomson et al., 2008).

If the average growth of health expenditure is higher than the average growth of resources (GDP), and this is gradually increasing, it means there is a problem or risk of sustainability. If health expenditure grows faster than that in other components of the economy, a larger share of the GDP is consumed for this reason. This raises the concern that expenditure cannot be made for other goods and services that provide a welfare increase (Thomson et al., 2008).

2.5.2. Assessments Based on Stakeholders View

When evaluating financial sustainability of health care system, another assessment method is use of stakeholder view. Academia, government, payers, providers, and health-related industry can be example of stakeholders. When the literature is examined, it is seen that in many studies the assessments of financial sustainability in the health care system is considered on the basis of stakeholder view (Prada et al., 2014; Thomson et al., 2010; Tordrup et al., 2013; Wang, 2010). Data obtained from stakeholders of health care can be useful in developing a sustainability framework, which can also specify principles and key elements that are necessary for the maintenance of sustainability in health and health care. For better value for money, stakeholders should be provided with required knowledge and tools for innovation and to collaborate with other sectors. To this end, new processes and instruments must be designed and culture, attitudes, and behaviours should be changed, which is quite difficult but worth for the outcome. A framework like this needs to empower the connections health and health care goals, evidence-based health care, and innovative services and products. In addition, the significance and the duty of all stakeholders in the health enterprise should be clarified to attain the goals targeted.

CHAPTER THREE

LITERATURE

3.1. PREVIOUS STUDIES ABOUT FINANCIAL SUSTAINABILITY OF HEALTH CARE SYTEM

During the last two decades, sustainable health care systems have been continuously discussed in the developing world. The focus of the discussion is mostly on the reform of the public sector, universal health coverage, and health expenditure.

Treichel (2001) seeks into the financial sustainability of Albenin Pension in his study. In this study, one of the topics investigated is how much should be paid optimally by the citizens for pension fund and the other topic is whether pay-as-you-go system is better. Another topic is if a parametric reform is needed in second-line and third-line health care services. Scenario analysis method was employed in the study and future projections of GDP and health expenditures were compared. As a conclusion of the study, pension fund was found to be unsustainable. It is suggested to make the fund sustainable to raise the age of retirement and increase the manpower, and reduce the contribution margins and uplift the contribution ceiling. Similarly, it is found that pension fund which is valid in the countryside is also unsustainable. However, it is stated that reform studies should be performed in order to improve the financial performance.

Presbyterian hospitals in Cameroon and the Democratic Republic of Congo were analysed in Sthrsley's (2004) study. Through regression and step-down, Sthrsley (2004) makes analysis to discover which indicators affect the financial sustainability of these hospitals most. Keeping salaries low compared to local income and drug availability had the largest effect on sustainability. Other significant variables were average salary, occupancy of beds, the ratio of medical staff to non-medical staff, surgeries each doctor perform per week, and the profit margin on drugs. In the study, optimal levels of the factors which have impact on sustainability are not found, and also it was discovered that hospitalization duration and services that require a large number of staff damage sustainability and such services that require less number of staff as radiology and laboratory services have positive effect.

Kagubare (2005) made analysis in his study using multivariate regression, structured questionnaires methods in order to determine the effect of community-based health insurance on health service usage and financial sustainability in Rwanda. It was detected that community-based public insurance cannot meet the company costs with the revenues collected from the members and it is unsustainable. In addition, as a result of regression analysis, a 1%-increase in insurance shares caused a 2%-decrease in hospital visits.

Lee (2007) searched in his study sustainability of Canada health care system through scenario analysis by taking variables such as inflation, technology and aging population which affect health expenditures into consideration. As a results of the study, it is found that two factors that threaten sustainability most are inflation and cost of death since one-third to one-half of health expenditures of an average person are made in later periods of her/his life. Moreover, developing technologies and pharmaceutical medication, expansion of health care services due to nursing at home and long-term care are among other factors that impact sustainability. Another remarkable result is that aging population is found to be a factor that increases costs to be controlled with an acceptable level of growth and its effect is less than the other factors.

Gruen et al. (2008) systematically reviewed both empirical studies and conceptual frameworks about sustainability of health-programme. Based on this review, it is suggested that health-programme sustainability is the fundamental indicator of a composite web of mutual relations between resources, stakeholders, health concerns, and actions in parallel with an ecosystem. In the review, prescriptive definitions of sustainability (i) upkeep of health benefits (ii) persistence of health programme, (iii) continuity of health programme, (iv) capacity of community were defined. Analogous to normative definitions, conceptual frameworks have investigated to describe factors that affect sustainability. These factors are composed of aspects of programme design (e.g. objective, duration, financial and delivery arrangements, governance, relevant training, and engagement of local stakeholders), properties of organizations, and contextual factors, like local health policy and characteristics related to society, culture and environment (e.g. participation of community, nature and solidity of the socioeconomic and political environment,

appropriate laws, and market forces, and). It is likely that these factors will have interaction with evaluative frameworks that must have many aspects and programme, institution, and dependency on context.

Di Matteo and Di Matteo (2009) stated that health expenditures that increased more swiftly than growth speed of public revenues in the economy of Canada between 1975 and 2007 threatened the financial sustainability of the cities. For that reason, projections of health expenditure and revenues of Alberta City were conducted and various scenarios were formed. As a result of the study, it was foreseen that health expenditure would reach at 87% of the revenues of the city in 2030 if these scenarios were realized.

Thomson et al. (2009b) discussed, in their study, the concept of financial sustainability and usage of sustainability in practice, which is a political decision. Limitations of adopting financial sustainability is shown as a 'policy goal' in this policy summary; however, it is argued that it should be perceived as a 'policy constraint', and this notion should be translated into three key questions related to policy. The first of these questions is "how much money should be spent on health?", the second is "at what level coverage should be provided in health care system?" and the third is "how can resources of the health system be increased?". Thomson et al. (2009b) stated that the nature of financial sustainability problem in health care stems from the imbalance between expenditures and revenues. It is important to understand reasons and challenges of this imbalance. Causes of this imbalance and related challenges can be classified into two main titles. These are 1) increase in health expenditures due to the factors affecting the demand and supply of health care services and 2) inadequacy/limitations of the resources.

Thomson et al. (2010) sought in their study how the health care system in Estonia reacted against challenge of financial sustainability. Initially, literature was reviewed in the report and then stakeholders' views were received in 2 following workshops. With reference to literature review and stakeholders' views, scenario analysis was performed for financial sustainability of health care system considering the factors affecting health expenditures. It was specified in the study that sustainability in health care system can be achieved by increasing public revenues, decreasing out-of-pocket payments and enhancing financial protection, boosting the

performance of health care system through improvements in purchasing and resource allocation, and maintaining a powerful governance in health care system.

Wang (2010) sought financial sustainability of National Health Insurance (NHI) initiated in Taiwan in 1995 and which had 80% citizens' satisfaction. The study elaborated on increasing financial sustainability problems, achievements of NHI up to now, reform suggestions made since 1998 and factors causing financial crisis and political obstacles that hinder the support for NHI reform. Negotiations with key stakeholders were performed in the study and implications were made based on them. In addition, comparison of revenues and expenditure in the existing system was performed. It was detected as a result of the study that the most important reason of unsustainability is the fact that revenues do not cover the expenditure. Institutional reasons of this imbalance problem are as follows: existing premium system is not arranged in accordance with the existing national income and household income, the scope of expansive health insurance damage sustainability due to cost restrictions, the existing premium system cause conflict between local governments and centralized administrations in allocation of state funds and resources are wasted because of excessive service delivery. Moreover, it was stated in the study that individual reason of imbalance between revenues and expenditures was patients', doctors' and pharmaceutical industry's behaviors abuse the system.

Rovere and Skinner (2011) examines in their study if the public costs in association with Canada's health care system are financially sustainable. An empirical trend analysis is used in this report in order to gauge future financial sustainability of the public costs in relation with the health care system of Canada in the long run. The average yearly growth rates for total health expenditure of provincial government and total existing revenue of provincial government from all sources over the most recent decade constitute the trend. The initial result of the study is the fact that sustainability cannot be ensured through high tax levels or increasing taxes, for this situation hinders public resources from increasing in the long run. The second result is the fact that restriction of health expenditure damage sustainability due to decreasing the use of necessary medical products and services. Canada's health care system is found to be unsustainable in its existing form and transition to a supplementary user-based system is suggested.

Di Matteo, and Di Matteo (2012) investigated Canadian Health Care System Sustainability in their study. Various expenditure scenarios are formed in this paper by the help of regression determinants and growth extrapolation approaches, for Canada in toto, each of the ten provinces and the territories for the years starting from 2010 to 2035. Public health care spending has mostly been found unsustainable in Canada. The followings are the latent policy solutions that will make public health care spending more sustainable: controlling and restructuring expenditure, increasing additional tax revenues, establishing a federal health tax to create revenues for a national health endowment fund, and providing a greater private role in health care spending.

Moreover, a demographic approach and actuarial techniques are used in order to seize in a direct manner the rise in health care costs in association with the aging of the population in Levert's (2014) study, which is different than the studies attempting to estimate and examine the future costs of the Canadian health care system through a macroeconomic approach. To summarize, according to the indications of the research, Canada must essentially restrict health care cost rises or enhance GDP growth or increase fees (in other words taxes) or considerably decrease or cut other government services or put some of these into practice combinedly so that it can preserve the sustainability of its health care system.

The financial sustainability of a health care system that ensures universal coverage directing into the Eurozone financial crisis will be focused in Olgiati, and Danovi's (2012) study. The possibility of synthesizing such multitude of emergency public economic and financial stability interventions into a single and plain quantitative index is assessed in framework of the research in addition to assessment of their magnitude and direction towards raising or diminishing sustainability of universal coverage and openly funded health care. They have suggested a quantitative synthetic sustainability index σ on basis of plain partial and exact differential equations in accordance with our analysis of the Italian Stability and Economic Reform Program 2011-2014, which unites EUROSTAT and OECD health and economic data and guidelines. They have tested the statistical and strength significance of trends and data from EUROSTAT and OECD through simple correlation coefficients. In accordance with the sustainability index σ , it is emphasized that should the growth of the GDP between 2011 and 2014 be insufficient, which is already the case in the first semester

of 2012, all the premises which state the Italian Economic and Stability Reform Program 2011-2014 rests will be invalid, and Universal Coverage will be unsustainable.

Abuor (2012) states that the core provider of health care services in Kenya is the government and Faith Based Hospitals are an essential element of our society. The objectives of his study are to identify the impact of health insurance, patient revenue, donor funding and enterprising activities on financial sustainability in Hospitals of Faith Based. It was also researched in the study how is the relationship between control environment practices, financial reporting and financial sustainability among these hospitals. Data was collected through a semi-structured questionnaire and intended respondents were the individuals who were responsible for governance, management and implementation of core health programs in these hospitals. According to the results, it is found that alternative sources of revenues should be provided in order to raise their funds, to ensure financial sustainability and to persist in supplying affordable and quality health care to everybody. Hospitals that own effective financial management systems have a tendency to be more sustainable since they are more liable to the donors and management and they can take corrective measures to handle any financial challenges they may confront.

Challenges regarding financial sustainability of health care system are mostly associated with the increase in health cost and expenditure. The problem of health financing gap which many countries are likely to face in near future was handled in World Economic Forum (2012). The approach of “pathway to sustainability” framework was developed in order to assure financial sustainability of health care systems. The results of the report have proved that developing health care sector not only enhances life quality but also contributes to financial growth. In World Economic Forum (2013), fundamental dynamics and determinants of the increasing health expenditures were put forward by forming a simple conceptual model of demand and supply. In this sense, it is possible to examine the causes of increase in health expenditures in two dimensions: supply and demand. It was stated in World Economic Forum (2013), the rise in health expenditure especially stems from aging population, the increase of diseases due to life styles, increased public expectations and lack of value-conscience among health care consumers.

Tordrup et al. (2013) carried out a research titled as “Policy Options in Ensuring Financial Sustainability of Health Care Services in the Future: Results of Stakeholders’ Views” and sought the topic of sustainability of health care systems based on stakeholders’ views. Representatives from the 28 EU member states in addition to Russian Federation, Switzerland, Iceland, Australia, Canada, Norway, and New Zealand took part in the research as respondents. Increased tax on cigarettes and alcohol, performed in order to ensure financial sustainability, received positive response from all stakeholders and it became the most preferred policy option. The respondents stated counter-views mostly on allocating sources from especially social protection and education and they also exclaimed that this is a policy which will impact general economic growth adversely together with raising consumption tax (VAT) and corporate tax. Furthermore, the most-preferred options in this study were to encourage healthy lifestyle rather than increasing additional income, to improve protective health care services and decrease expenditures by hindering detrimental consumption. In Tordrup et al.’s (2013) study, especially such topics as evaluation of health technologies and private insurance for new technologies caused controversy among stakeholder groups most. Stakeholders in industry/consultation group (i.e. rise of private insurance, enhancement of rivalry) supported the approaches based on market.

Pencheon (2013) evaluated in his study the point England reached in the last 5 years, in which it has been trying to develop a sustainable health care system. For Pencheon (2013), while all health care systems attempt to increase the quality and safety in health care services within the framework financial and environmental boundaries, they face incremental challenges due to advance in technology, increased health care service demand and costs. Three main problems that health policy makers should focus on in order to ensure sustainability are summarized in the following: (i) both the needs of a population which is continuously changing (socially, culturally, and demographically) and people’s assets and eagerness to unite and take more control of their health and wellbeing by taking appropriate support must be well-understood, (ii) Science and technology grow rapidly, which has significant implications for how a health and care system can enhance outcomes and efficiency (iii) public services must act within both financial boundaries and environmental as well as under an rising level of scrutiny and regulation. Health and care systems are large employers,

exemplars of how large organizations and large pro-curers are supposed to act for our common future, so it is both an opportunity and responsibility of them to show a commitment to taking our future health seriously.

Prada et al. (2014) report is provides a definition of sustainability and a sustainability framework. The development of this definition and the framework was based on extensive literature review interviews with representatives of health care stakeholders such as governments, health care organizations, life sciences industries, profit and not-for-profit insurance organizations, and citizens' advocacy organizations. Sustainability requires flexibility and creativity to adapt to changes in demands as well as in economic and social environments. Sustainability also requires assessment mechanisms for the system to operate in harmony and adapt to new realities. Prada et al. (2014) suggests four guiding principles for the sustainability of health systems. These four principles were proposed to manage the principles, strategies and policies contributing to the sustainability of the health system and to support political decisions and decision making. These principles include accountability, the value of money, fair and timely access and suitability. The increase in health care services costs is a serious threat for the system's sustainability; however, sustainability is complex and requires much more than financial restriction and an all-purpose systematic approach.

In their study, Thomson et al. (2014) examined how European health care systems responded to the 2008-09 crisis, how the crisis affected population health and health care systems and the expected effects of a similar shock on health systems in the future. They provided a map and analysis of the policy responses around Europe between 2008 and 2013. In the scope of the study, questionnaires were conducted with the key informants in 45 countries as well as detailed case analyses to see how health systems in Portugal, Estonia, Ireland, Lithuania, Latvia and Greece responded to the crisis. The study found that the crisis did not affect all countries in Europe equally, public health expenditure declined in many countries between 2007 and 2012, sustainability of health systems was disturbed by economic shocks, the crisis had greater influence on countries with weak governance and poor health system performance and that it caused positive reforms in health systems of many countries.

Wang (2015) claims that China requires more health care since it has the world's largest population. The practices in Shenmu, one of the top 100 counties in

China, reveal that National Free Health Care (NFHC) system has actively contributed to meeting the population's health care needs. It also helped people with the difficulties in managing the medical charge and seeing doctors. However, it seems that NFHC system requires serious financial support. Whether the NFHC system is suitable for the national conditions in China is a significant topic of discussion and reflection. The paper decomposes methodology and actuarial modelling and establishes the model for both NFHC financial burden and population age structure forecasting model. As a result, it was found that the financial burden of NFHC system in Shenmu would increase from 256.64 million Yuan to 656.04 million Yuan in 2013–2020, with a growth rate of 12.45%. The financial burden has a percentage of less than 2% in government's annual revenue in 2013–2020, and NFHC system has financial sustainability in Shenmu. Considering the fortunate outcomes obtained in other countries and the results estimated in Shenmu, the NFHC system can be extended to the whole of China for realistic possibility and financial sustainability.

Birch et al. (2015) introduced a different view of financial sustainability which focuses on the unsuccess of health care management and planning to reflect populations' health care needs and to bring management and planning functions together for labour force, services and health care expenditure. Just like governments may fail to assign health care optimally and the outcomes for system sustainability; market failure is another threat for health care. They current a Health Care Sustainability Framework depends on dividing the health care expenditure into different planning components. This framework is different from other approaches in that it considers population health needs as an origin of health care requirements and enables a diagnostic instrument to comprehend the sources of rise in expenditure while making plans.

Nawata and Kawabuchi (2015) state that recently medical expenditure in Japan have gone up significantly and are estimated to keep increasing. Actually it is still not clear if the Japanese health system could be sustained. In this study, the medical expenditure for educational hospitalization of type 2 diabetes patients were analyzed. The data were collected from 6173 patients in 36 hospitals between the years July 2008 to March 2012. The medical expenditures were examined in two different ways; premier, the length of hospital stay was evaluated using The Box-Cox transformation

model and next, the daily expenditure per patient was studied with the ordinary least squares method. Nawata and Kawabuchi (2015) reported that medical expenditure for educational hospitalization of patients with diabetes largely depended on the average lengths of stay. As a result, they claim that it is necessary to shorten average lengths of stay in order to control medical expenditure. This is possible through the introduction of a critical path, as well as developing and standardizing educational programs, particularly in hospitals where average lengths of stay are longer.

In its report titled *Fiscal Sustainability of Health Systems: Bridging Health and Finance Perspectives* (2015), OECD introduced a detailed outline for financing of health care institutions in OECD countries. A detailed map of governance structures and budgeting practices and is offered concerning health across OECD countries. It is governments' responsibility to (i) specify and observe the sustainability of their health care systems, (ii) evaluate institutional factors and political, and (iii) apply instruments and policy levers to make health care spending more sustainable. In the examples of the United Kingdom, France and the Netherlands, it was seen that reform practices may not reach success very shortly and need buy-in from key stakeholders both in and outside the health care system.

In the study carried out by Moat (2016), factors challenging the sustainability of the health care system in Ontario and solutions were offered to overcome these factors. These challenges concern the demand for and supply of health care, the way the system is governed and political factors restricting the efforts to attain financial sustainability, which are the issues faced by the Ontario health system in marking long-standing policy problems. In order to overcome these difficulties, a 3-step solution was offered. In the first step, solutions were sought for the problems caused by the demand for health service. Solution offers for this stage include (i) decreasing habits that may affect citizens' health adversely, (ii) increasing citizens' health literacy, (iii) implementing policies that can guide citizens to make more healthy choices and (iv) including patients and families more into care. In the second step, it aims to ensure value for money considering challenges concerning health care supply. Some promising solution offers for this stage include (i) increasing the use of evidence based techniques by decision makers, managers and clinicians, (ii) implementing fiscal promotions to improve care quality and the goals of the health care system (iii)

adopting integrated models of modern care. The third step is the development of the leadership approach that can support innovation and sustainability. This step brings a collective leadership approach giving power to individuals at all levels from policy to system from professional to citizen to get involved in process of change.

Sustainability of publicly funded health insurance schemes is among the main difficulties faced by the third world countries in terms of health service planning and health policy. Wedam and Sanyare (2017) report that a number of mechanisms to fund health care have been employed in Ghana since its independence as a wide strategy to improve financial sustainability and to rise access to health care services. The study looks into the present discussions on sustainability and the funding of the National Health Insurance Scheme in Ghana. Despite some attempts to obtain political advantage from the it, the present debate as affected by stakeholders' interest, power and solidarity as part of the policy making process as it is shown by the data from such sources as, interviews, newspapers, conferences workshops, radio and television discussions, public forums and parliamentary Hansards and manuscripts. Since the relationship among stakeholders is not very simple, a discourse was initiated and caused most stakeholders to take strong positions.

Universal health coverage (UHC) has been taken to the first place in the agenda of global health policy due to the requirement of delivering quality and equal health care and to avoid impoverishing health care costs. Contributory financing strategy in other words social health insurance has been given priority by the government as the fundamental financing tool for UHC in Kenya. Okungu et al. (2017) examined financial sustainability of social health insurance in Kenya with the aim of evaluating the financial needs of contributory and non-contributory mechanisms of financing UHC in Kenya for large informal sector populations. In order to evaluate the feasibility of UHC and estimate the need for financial recourses in 17 years (2013–2030) Kenya employed SimIns Basic® model, Version 2.1, 2008. The data were obtained from the related literature concerning demography, inflation, macro-economy, health services unit costs and utilization rates, health insurance, and measured across geographic regions in order to attain accuracy and simulation integrity. In the scope of this study the term sustainability was used for expenditures remaining under revenues, which concluded that SHI is sustainable.

Crisp (2017) claims that the existing problems in the NHS and social care cause suspicions about the sustainability of the whole system in the long run. Crisp (2017) associates sustainability with seven factors. First, Crisp (2017) states that health service delivery and care must be improved. According to Crisp (2017), chronic diseases account for 70% of health expenditure and it can be prevented in advance provided that these diseases are well managed. To this end, society and care based health services must be developed. The primary factor affecting a sustainable health care system is to provide efficient and effective health service delivery. The second factor is raising and presence of well-educated health personnel. The third factor is measuring costs and economic benefit accurately. The health and care system of a country can be affordable based on the resources, the efficiency and effectiveness of the system and political choices of the country. The fourth factor is the society's health status. Health and wellbeing of children in particular has long term effect of the sustainability of a health care system. The fifth factor concerns the positive contribution to the system by health organizations and careers. The decline in the contribution of this informal system would increase the pressure on the formal system. The sixth factor is the integration of health policies and implementations with other sectors. And the final factor the public acceptance of and support for the regulations made for the sustainability of the health care system.

The study conducted by Angelis et al., (2017) looks into the effect of health-related and macro-economic factors on the financial sustainability of health care systems; offers an understanding of the financial resources that could be added to meet the demand for health care and analyses the reforms required for the near future by health care systems. Publicly accessible data are used for the key variables affecting health spending in general, while statistical analysis is employed to estimate the needs for future spending. Considering such factors as macro-economic performance, the need to contain fiscal deficits, high debt levels and adverse demographic developments, competing public sector needs and high outlays on health technologies, a funding gap is expected for the next five year period between required and committed levels of health spending. This gap may be important and range between 39% and 61% of 2012 health expenditure levels over the 2013–2017 period. Outcome-based reimbursement, organizational innovations and priorities dependent on efficiency rules

must be the center of focus of health care decision makers to attain sustainability and affordability. Otherwise, it is possible that services offered may be restricted and some exclusion may be done from the coverage. Some reforms for sustainability in health care are presented below.

1. Health care professionals' and providers' incentive structures should be revised and an outcomes-based reimbursement system must be the focus.
2. It is necessary that health technology assessment rules are applied to provide value for money based on both current clinical trial evidence and in daily clinical practices (relative effectiveness and effectiveness).
3. Procedures, technologies, and health interventions must be made cost-effective and low-cost through agreements on reimbursement rates.
4. Payment models must be arranged in accordance with the benefits they offer, such as tiered payments for interventions administered at a different point in time, which will need important investment while providing the patient with benefits over a lifetime (Angelis et al., 2017).

Sustainable Development Goals (SDGs) was adopted in September 2015 by the UN General Assembly. SDG established the 17 goals for development and SDG 3 is centred on health (UN, 2015). It is a comprehensive goal requiring the insurance of healthy lives and promotion of well-being for all at all ages. (UN, 2015). It involves the achievement of UHC, to allow all individuals to access the services they need without financial strait (UN, 2015). On the basis of SDG 3, Stenberg et al. (2017) established a framework for health care systems empowering, within which individual-level and population-level health care service coverage is steadily scaled up over time. Stenberg et al. (2017) offered projections for 67 middle and low-income countries between the years 2016 to 2030, which accounted for 95% of the total population in these countries. Stenberg et al. (2017) thought of four platforms of service delivery, and designed two scenarios. In the first one, the progress scenario, countries' improvement towards global targets is inhibited by the estimated absorptive capacity of their health care system. The second scenario, the ambitious scenario assumes that most countries reach their global targets. They assessed the related health effects and costs, reduced increases in life expectancy, prevalence of illness, and lives saved. In order to analyse sustainability and affordability they also contemplated on possible

funding by country and year considering expected allocation and economic growth to the health care sector. They came up with the conclusion that an additional \$274 billion health care spending is required yearly by 2030 in order to approach the SDG 3 targets (progress scenario), while it was US\$371 billion to reach the targets in the ambitious scenario. Approximately 75% of costs are for health care systems, particularly for infrastructure and health workforce. Although increases are calculated for health care spending, a yearly gap of \$20–54 billion is estimated in financing. Provided that funds are released and utilized appropriately, 97 million lives would be saved with the ambitious scenario and life expectancy can be extended by 3.1–8.4 years.

In the 21st century, all societies around the world are going through periods of distress. All societies are disintegrated in coping with their political, social and economic problems. One of the most important issues integrating world societies is a better health and the provision of health care services. The World Economic Forum 2018 report summarizes the path followed so far to create a sustainable health care system. The report emphasizes the significance of a value-based health care. In this system, individuals' health outcomes are the focus of care provision. This is a people-centered approach which puts forth that health outcomes that are important to patients must be provided in a financially sustainable manner. The World Economic Forum emphasizes that health systems should be turned into a value-based structure in order for them to be sustainable.

In the review of the literature on Turkish health care system, it was seen that studies gained impetus with the Health Transformation Program introduced in 2003 and that the reforms implemented in Turkish health care system mainly focused on the issues of health insurance and health expenditure, just like other countries in the world. Since the main focus of the present study is financial sustainability, studies comparing Turkish health expenditure with the OECD countries will not be mentioned in this section.

In their study on evaluating the financial sustainability of the Global Health Insurance, Teksöz and Helvacioğlu (2009) level of expenditure, the ratio of expenditure to income and the burden of the system on the budget as well as the composition of expenditure were examined and the reasons behind the changes that occurred in 2009 in the financial structure of the system were studied. 2009 was

determined to be a year when the finance deficit of the social security system and the transfer made from the General Budget increased rapidly. The main reason behind the high financial deficit occurring in the social security system was determined to be the decreased premium incomes due to the fall in the overall level of employment and wages as a result of the economic recession. It was concluded that measures must be taken to reduce health expenditure in order to attain sustainability in the short term. As for the long term sustainability, on the other hand, it was suggested that reforms increasing efficiency and effectiveness such as family practice and referral chain aimed by the Health Transformation Program must be implemented in a dedicated way and policies should be developed to strengthen the income leg of the system.

In the study examining the results of the health reform Teksöz et al. (2009), it was found that the health reform was well-managed in terms of financial sustainability in its implementation in the first five years in Turkey. According to Teksöz et al. (2009), despite the remarkable increases in access and justice levels, the share of expenditure within the national income could be preserved and the level of health expenditure in comparison to the revenues of the SSI remained under the level prior to the reform period. Teksöz et al. (2009) report that health reform must be enhanced and continued in the fields of quality and efficiency. By extending basic health care services, particularly Family Practice, so as to decrease the risk factors concerning preventable diseases, it would be possible to maintain long term financial sustainability of the system as well as increasing the total effectiveness of health outcomes.

Sulku and Bernard (2012) examined if high out of pocket expenditure could be prevented sufficiently by the health insurance system in Turkey in the period prior to “HTP”. The distribution of out of pocket expenditure was examined by , access to health care, poverty status, demographic characteristics, health service type and self-reported health status. For the evaluation of the financial burden of health care expenditure, they used the 2002/03 National Household Health Expenditure Survey data. Similar to the related literature, expenses above 10 and 20% of income are defined as high burdens. Their findings show that 19% of the young population lives in families allocating more than 10% of their income on health care whereas this ratio is 14% among those who have health expenditure of more than 20% of family income. In addition, the greatest risk of high out of pocket burdens belongs to the poor and

those living in economically underdeveloped regions. In the period prior to the reform, five different public schemes provided health insurance and the benefits they offered varied, which caused the risk of high financial burden to differ based on the type of insurance. It can be seen in their study that protection against high health expenditures was not sufficient in the period before the reform.

It is agreed that in order to find a solution to such problems as informal employment, low premium collection ratio, early retirement, and problems in profit-loss balance; some reforms are needed in Turkey. Gürdal and Ocak (2012) examined the Law numbered 5510 and the amendments it brought which caused significant changes in the social security system. The changes brought about with the Law numbered 5510 were assessed in terms of their efficiency in overcoming the problems of the social security system and their contribution to financial sustainability. This study concluded that the changes introduced with the Law numbered 5510 could have positive effects to solve the problems of the social security system and can at least contribute to financial sustainability in the long run.

The stakeholders' opinions were taken into consideration in Akıncı et al. (2012) study of which aim is to assess the reforms in Turkish health care system after 2003 and to summarize the strategical options of the reforms in the 2nd phase of HTP. A total of 47 stakeholders from 29 institutions participated in structure interviews on December 2008 and January 2009. Capacity for stewardship, reorganizing health service delivery, strengthening of the MoH, UHI, human resources development, and national health information system were reviewed, the five main components of HTP. Some stakeholders put emphasis on the necessity of improving SSI's administrative capacity for the assessment of sustainability and determined the significant sections of financial management as payments system, risk pooling, cost controlling, cost based pricing, actuarial analysis (based on safe data), deposit package management, and strategical procurement. They also stated their worries in terms of the scope and financial sustainability of the deposit package and noted that SSI will have to decrease the number of services within this scope. Regarding the times when the global economy declined and its negative impacts on Turkey's macroeconomics resulting in increasing current deficit, a number of stakeholders suggested that financial risk sharing is necessary for financial sustainability. These stakeholders also found the

current premium rate (12%) insufficient. Considering the ageing population, they also noted that state subsidies are essential for the financial sustainability of the general health insurance. Stakeholders also suggested that the rational use of medication should be disseminated and use of generic drug should be encouraged.

According to WHO and UN, the chronic illnesses are considered to be the most serious health problem in the 21st century. Chronic illnesses pose a global threat for the sustainability of health care systems due to high mortality rate and increase in health care expenditure (Akalın et al., 2012). Akalın et al. (2012) put forward a study on hypertension patients that analyses chronic illness management for a sustainable health care system and the positive impact of efficient use of health records on efficiency. In the scope of this study, the content of health care data in Turkey are cumulated based on the current free access data of institutions that collect health care data. Three of generally accepted quality criteria for hypertension are employed for this study and a “hypertension quality cluster” is formed. The study results show that the nation-wide preventive medicine is a must for combat chronic illnesses and a high-performance, financially sustainable health care services cannot be provided without an integrated health care system. In this study, Akalın et al. (2012) emphasized that establishing an infrastructure for a standard quality health care service and technological health care infrastructure are not only significant for reimbursement but also for diagnosing and treating illnesses.

Özsarı (2013) study evaluates, financial sustainability, university hospitals, and separation of powers collectively. According to Özsarı (2013), university hospitals along with public and private hospitals are significant stakeholders in Turkish Health Care System that need to employ principle of separation of powers of which examples can be seen all over the world. Considering both the public perception and the practical reasons, the university hospitals are the ultimate health care institutions, on one hand, of which main responsibility is to educate and research and on the other hand, is to diagnose, treat and rehabilitate illnesses. Financial challenges of university hospitals are discussed and solutions towards this challenges are offered in this study. It is emphasized that the Universities and University Hospitals which allows production and application of health care and health care institution administration practices should not only be considered as institutions providing health care services but also as

educational institutions which provide undergraduate and graduate studies for health care professionals. The status of these institutions within the sector should also be strengthened.

It is considered that the reforms in health care sector in Turkey are “good practice” examples compared to other health care reforms having similar challenges (OECD, 2008; OECD 2014; WHO, 2009; WHO, 2012). There are a number of articles on the impacts of these reforms (Atun et al., 2013; Elveren, 2008; Tatar and Kanavos 2006; Yenimahalleli Yaşar, 2011). The goal of Ökem and Çakar (2015) study is to carry out an inclusive evaluation for health care sector reforms by adopting an empirical approach while evaluating to which extent the aforementioned HTP objectives (equity, financial sustainability, and quality, efficiency) are achieved. The first part of study comprises of the outline of the reform process. They carried out a systematic literature review for the evaluation of the outcomes of HTP. The outcomes put forward that Turkey significantly improved its health care sector, however these achievements are inconsistent within its geographical regions and the long-reaching financial sustainability of these reforms are still uncertain due to structural challenges in employment. The study suggests that the improvements in health care sector brought about increased patient access and satisfaction and, of course, better health outcomes but still these achievements are unevenly disseminated through its regions. Policy makers are still working on the long-term financial sustainability. So long as the allocative efficiency is not enhanced, improvement in efficiency and input quality in public hospitals will not ensure the financial sustainability. There are several ways to achieve this including strengthening effective referral system and the strategic purchasing of the SSI for appropriate, good quality services. Since the economic growth creates new income for government i.e. collecting premiums for it to share larger budget to health services, financial sustainability of these reforms heavily depends on the economic growth. Premium resources in Turkey are neither sustainable nor adequate due to high unemployment rate and widespread illegal employment. Moreover, the health insurance premiums are not only allocated for health care purposes. Health insurance and pension premiums also cover overall social security expenditure.

Carrying out qualitative interviews, Özer et al. (2015) examined the sustainability of Turkish health care system. Adopting purposeful sampling method, total of 108 individuals took a part in the study. During the interviews, over 50% of the participants stated that they do not consider the system as financially sustainable. According to the majority stakeholders, the challenges and risks in financial sustainability are grounded heavily on diplomatic and political set-backs. Despite having thought that health insurance may be instrumental in financial sustainability, 37,35% of the stakeholders are not very supportive of complementary health insurance. The topics that stakeholders have the same opinion on the most regarding financial sustainability are “preventing unnecessary usage or abuse of health care services” and “tackling grey economy effectively” and the topics that were least settled on among stakeholders include “privatizing health care delivery” and “privatizing health care financing”. Özer et al. (2015) prepared 2006-2023 income and expenditure forecast for UHC adopting simple linear regression equations. It was discovered that the gap between income and UHC expenditure will shrink and the income will level with the expenditure, which will lead to positive results in terms of financial sustainability.

The aim of Yiğit and Yiğit (2016) study was to determine the elements that affect the financial sustainability of the university hospitals. Qualitative and quantitative research method was employed in this research. The research data was collected by adopting semi-structured interview technique grounded on the qualitative research method. Evaluation of the financial performance of university hospital was achieved through ratio analysis. The main elements affecting financial sustainability of the university hospital and its associated themes includes administration and organization, reimbursement system, health planning and policy, financial management, efficiency and performance. The financial standards in the university hospitals were ascertained to be unsuitable through ratio analysis. Moreover, it was found out that their expenditure exceed their revenue. Internal and external factors that have great influence on the financial sustainability of the university hospitals were determined. External factors that affect the financial performance of the university hospitals the most are pricing and reimbursement system and the internal factors are personnel, materials and inefficient use of medical technologies. It was found out that

the financial liability of the university hospitals is escalating notwithstanding the measures taken in the last few years.



CHAPTER FOUR

TURKISH HEALTH CARE SYSTEM

The Turkish national health care system is characterized by the following three main features: tax-based financing, universal access, and predominant public provision and universal coverage. The current sustainability of the system is, no doubt, the result of policies implemented for years and the historical heritage transferred from the past to today. Health organization and practices that emerge at a certain period have a great influence on the organization and practices of the subsequent period. Therefore, while evaluating the financial sustainability of the Turkish health care system, it would be beneficial to identify the turning points in its history. Based on this argument, the following section presents the historical background of the system, health financing, and health expenditure in Turkey, the system of providing health care services, and financial resource allocation and payment methods.

4.1. TURKISH HEALTH CARE SYSTEM

4.1.1. Pre-reform Period 1920-1960

The organization of health care services and the problems in the early Republican period were inherited from the Ottoman Empire. Many reforms were made to overcome economic depression and achieve economic development during and following the Independence War. One of the first tasks fulfilled by the Grand National Assembly of Turkey (TRNA) after its opening was to establish the Council of Ministers on 3 May 1920, under Law 3. This established the MoH with the aim of centralizing health care practice (Ministry of Health, 2012a). Despite the severe conditions caused by the Independence War and the fact that few developed countries had an independent MoH in those days, the immediate establishment of the MoH and dealing with health care services at this level indicates the importance attached to the issue by the government of the time (Akdur, 2016).

The first minister of health of the Turkish Republic was Dr. Adnan Adıvar, who handed over the post to Dr. Refik Saydam after about nine months. Dr. Refik Saydam stayed as the minister of health for about 15 years over different terms from

1920 to 1960. The principles and practices established during his period in office constituted the fundamental determinant of the country's health policy (Mazgit, 1998).

The first legal regulation in the field of health was the Law on Forensic Medicine No. 38, issued in 1920, and the policy of health care organization introduced at ministry level on 3 May 1920, which stated that Numune Hospitals¹ were to be established only where necessary while research was mainly focused on preventive health care services (Atasever, 2014).

At the time the Republic was proclaimed, 86 hospitals were actively operating in the country. Half the beds in these hospitals were in municipal and local hospitals, one third were in private and minority hospitals, while the rest were in the three public hospitals. Active hospitals and the number of beds in this period is shown in Table 9.

Table 9: Institutions for Inpatient Treatment in 1923 in Turkey

Institution Type	Number	Number of Beds	Percentage of Number of Beds
Public Hospitals	3	950	14.76
Municipality Hospital	6	635	9.86
Special Administrations Hospitals	45	2,450	38.06
Foundations Hospitals	32	2,402	37.32
Sum	86	6,437	100.00

Source: Ministry of Health, 1983: 29.

In 1950, the number of institutions affiliated to the MoH increased to 118 and the number of beds to 14,581. In 1960, with the change in the affiliation of hospitals from local to central administration, the number of institutions under the MoH reached 442 and the beds 32,398 (Ministry of Health, 2012a).

The first Ten-Year National Health Plan was declared by the minister of health, Dr. Behçet Uz, on 12 December 1946. However, before this plan was made law, Dr. Behçet Uz had to leave office. The National Health Programs and Studies on the Health Bank, which was a follow-up to the first Ten-Year National Health Plan and was again declared by Dr. Behçet Uz on 8 December 1954, divided Turkey into 7

¹ Research and education hospital at that period were named Numune Hospital.

health regions (Adana, Ankara, Balıkesir, Diyarbakır, Erzurum, İzmir, and Samsun). It was intended to set up a faculty of medicine in each region and to raise the number of doctors and other medical personnel. These plans developed under the ministry of Dr. Behçet Uz can be considered as the main building blocks of health planning and organization in Turkey (Ministry of Health, 2012a). Another remarkable phenomenon of the period was the vertical organization set up for fighting contagious diseases, such as tuberculosis, malaria, and trachoma, which continues to prevail today. The 1920-1960 period can be summarized as a term when the government attempted to establish resources and structures in terms of health-related legislation, institutions, financing, and labor.

4.1.2. Health Care Reforms between 1961 and 1980

With an understanding of a continuous, integrated, graded structure that is integrated within each city, health care service structuring was adopted in the form of sanatoriums, community health centers, and town and city hospitals. The government planned to initiate the socialization of health services in underdeveloped regions from 1968, with 22 cities taken under the scope of socialization, but only reaching 25 by the end of 1975. Thus, the Socialization Law existed mainly in theory and failed to create universal access to health care services (Yıldırım, 2015). The primary reason behind the failure to implement this comprehensive plan as initially intended is the fact that adequate resources were not allocated from the state budget. The share of the MoH, which was to implement the socialization plan, from the general budget decreased after the socialization came into practice even though it was supposed to have increased (Mazgit, 1998). Secondly, the socialization program failed because organization-related aims and instruments could not be realized exactly, human resources were limited, and political will and determination were weak.

A great many developments marked this period in the field of social security. The Social Insurance Organization (SII), Government Employees' Retirement Fund (ES), and the Self-Employed People's Retirement Fund (SPRF) were established in 1965, 1950, and 1971 respectively. Moreover, a planned development program was adopted that involved the direction of economic and social growth with plans covering

five-year periods. As in other areas, these five-year development plans (FYDP) constituted one of the main elements in determining health policies (Özer et al., 2015).

In 1978, the Law on the Principles of Health Personnel's Full Time Working prohibited civil service doctors from opening private clinics; however, in 1980, immediately after the 12 September coup, this law was repealed and doctors were given back the right to open such clinics (Sevinç and Özer, 2015).

The reflections of the period in the field of health can be summarized in terms of securing the right to health with the constitution, socialization of health care services, and evaluation of health policies within the framework of FYDP. Making an overall evaluation of 1960-1980 health policies and health organization, it is seen that the phenomena marking this period are socialization of health care services and taking services to distant areas where no doctors were present previously through opening sanatoriums and community clinics.

4.1.3. Health Care Reforms between 1981 and 2002

In order to evaluate the health policies and service organization for 1980-2002, the transformation that Turkey went through in the early 1980s must be taken into consideration. The economies of developed countries that failed to deal with the problems of increasing unemployment and inflation during the second half of the 1970s made it necessary to have a new economic structuring globally as well. Therefore, the understanding of the social state began to lose its significance. In this period, supply-side approaches came into play, and it was argued that the private sector had to be strengthened. To strengthen the private sector, the necessity to limit the share of the public sector in the economy, reduce its tax burden, and restrict social expenditure was highlighted. Starting in the UK, the privatization movement spread gradually worldwide. The health sector was one of the most strongly influenced sectors by the changes resulting from the liberation policies of the 1980s, both in Turkey and around the world (Özer et al., 2015).

After the military coup of 12 September 1980, the political framework created by the 1982 Constitution developed by the 12 September government determined health policies in the following years. Its framework aimed to implement policies pursuant to the principle of “reducing the responsibilities undertaken by the state in

the field of health” gradually. Underlying this aim was that public resources remained insufficient because of the State’s failure to collect taxes. In addition, private sector activities were expanded in curative health care services due to problems in public management (Mazgit, 1998).

Implementation of socialization policies continued in the 1980s. In the 1982 Constitution, the role of the State in the regulation of health care services was strengthened, all citizens were given social security rights, and a clause stating that “Universal Health Insurance could be established” was included. Following these events, Fundamental Law 3359 on Health Services was enacted in 1987. In this period, activities aiming to improve health care systems gained speed, both in Turkey and elsewhere. The First and Second National Health Congresses were held in 1992 and 1993 in order to establish the theoretical framework for the health reform in Turkey. However, no program was agreed either congresses. Afterwards, activities on health reform were maintained within a narrower framework at ministerial level (Atasever, 2014). Following the economic crisis encountered in the middle of 1994, restrictions introduced within the framework of the 5 April Decisions affected health care services negatively and the MoH withdrew its support from public hospitals significantly.

The 1982 Constitution implemented during this period included provisions claiming that citizens had the right to social security, which fell under the State’s responsibility: *“the State shall regulate the main planning and functioning of the health services to ensure that everyone leads their lives in physical and mental health; increase saving and efficiency in human and material resources, and secure cooperation. The State shall accomplish this by employing and supervising the health and social assistance institutions, in both the public and private sectors.”* The same article included a clause on the possibility of “the introduction of universal health insurance” (Ministry of Health, 2012a).

Reform attempts to restructure the health sector inevitably consisted of a long list of regulations because of the comprehensive nature of the health sector. The reform activities of the period can be summarized as follows:

- Separating the supply and financing of health care services from each other and providing financing through a UHI model.

- Integrating a family practice model into the organization of primary health care services in order to ensure effective operation of the referral chain.
- Transforming hospitals that offer curative health care services into autonomous health businesses in order to enable competitive conditions.

The background of the health reforms attempted in the 1981-2002 period was also supported financially and technically by the World Bank (WB). The main objectives of the reforms attempted in this period can be summarized as the transition to UHI and increasing access to health care services. However, none of the reforms suggested could be put into effect until the early 2000s. Among the main reasons behind the failure to realize these reforms in the field of health is the fact that the coalition governments could not last very long, so governmental turnover was rapid and repeated economic crises encountered (e.g. the 1994 and 2001 crises) (Yıldırım, 2015).

A great variety of institutions operate in the organization of health care services in Turkey. The leading service providers are the MoH, universities, and the private sector. The number of in-patient institutions, the number of beds, and the changes from 1923 to the end of 2002 are presented in Table 10.

Table 10: Institutions of In-patient Treatment in 1923 and 2002 in Turkey

Institution Type	1923		Institution Type	2002	
	Number	Number of Beds		Number	Number of Beds
Public Hospitals	3	950	MoH	683	94,710
Municipality Hospitals	6	635	SSI	146	32,438
Special Administrations Hospitals	45	2,450	University Hospitals	52	27,299
Foundation Hospitals	32	2,402	Ministry of Defense (MoD)	42	15,900
			Other Public	16	2,883
			Private	278	14,558
Sum	86	6,437	Sum	1,217	187,788

Source: Ministry of Health, 1983: 29, Ministry of Health, 2003: 13.

In this 79-year period, the number of hospitals in Turkey increased by 14 times approximately, reaching 1,217, while the number of beds reached 187,788 with an increase of 29 times. One of the generally accepted indicators of health is the number of beds per 1,000 people. According to MoH statistics, the number of beds per 1,000 people grew from 5.1 in 1923 to 25.5 in 2002, with the increase in the population (Ministry of Development, 2005: 9).

4.1.4. The Health Transformation Program 2003-2013

In the 2003-2013 period, world economies experienced rapid growth until the global economic crisis of 2008-2009. In Turkey, the average growth rate was 7.2% for 2002-2006 period and steady growth was experienced. Growth in the Turkish economy, affected by the 2008 global crisis, slowed to 4.8% in 2008-2009. An economic recovery took place in 2010 and growth increased to 8.8% in 2011, making Turkey one of the world's fastest growing economies (Sungur, 2015).

Another important feature of the given period is the emergence of the problem of sustainability of increased health care expenditure exceeding GDP, and reform plans initiated in the field of health worldwide (Angelis et al., 2017). Although health care expenditure fell following the 2008-2009 global crisis (OECD, 2015), discussions on the sustainability of health care systems are still ongoing.

Becoming a single-party government following the November 2002 elections, Ak Parti proposed an overall reform framework in their Immediate Action Program (IAP) and a health-related reform framework with the Health Transformation Program (HTP). IAP and HTP included the main issues in health as well as changes concerning all components of the health care system, such as financing, service provision, management, and organization (Özer et al., 2015).

The HTP, which was put into practice in 2003, aimed to organize health care services more effectively, efficiently, and fairly, and to obtain and provide financing for health care services. Included among the main principles of the HTP, sustainability is defined as the system to be developed being compatible with the conditions and resources of the country and ongoing through self-support. Another main proposition of the HTP is having human-centered continuous quality development, participation, and compromising, volunteering, separation of powers, decentralization, and

competitiveness in services. Moreover, it was stressed by the HTP that the financial sustainability of the health care system could only be achievable by maintaining a health financing balance. The factors affecting the health financing of the transformation program were identified as reform costs, supply/demand factors, and macro-economic factors (Ministry of Health, 2012a)

Supply factors are defined as factors affecting health care service provision and cost, new options of treatment, new treatment technologies, and the way taxes and premiums are collected while demand factors are demographic changes like extended life expectancy and aging population, unhealthy life styles, chronic diseases, increase in health awareness, and health expectation levels parallel with socio-economic changes. Finally, such factors as economic growth, the share reserved for health from the budget, the share of health expenditure in the GDP are the macro-economic factors affecting health financing (Ministry of Health, 2012a). The development of the Turkish health care system in terms of macro-economic factors will be analyzed in detail in the following sections. Some of the reforms made in the health care system through the HTP between 2003 and 2013 can be summarized as follows:

Organizational Structure: After the HTP was put into practice in 2003, a Reimbursement Commission was established in 2004 in order for the reimbursement system to operate more smoothly. This commission consisted of representatives of MoH, Ministry of Labour and Social Security, Ministry of Finance (MoF), the State Planning Organization, and Under Secretariat of the Treasury.

In addition, the Directorate of Social Security Institution (SSI) was established in May 2006 with Law 5502, which placed SII, ES, and SPRF under a single roof with the aim of achieving norm unity for social security institutions (Atasever et al., 2017). The law has been in force since 2006. As a result, there is a UHI fund within the body of SSI (OECD, 2008). The Reimbursement Commission was handed over to SSI in August 2007. In 2010, the structure of the MoH changed and the Public Hospitals Agency was established.

The law on the family physician pilot scheme was passed in 2004 by the TGNA, which drew up the required legal framework for the implementation of the scheme. It was first initiated in the city of Düzce and, as of 2008, is practiced in 23 out of 81 cities in Turkey (OECD, 2008). In 2005, a family medicine system was

established by the HTP in order to provide the system with consistency and a structure. The main team consisted of a family physician and a nurse responsible for certain tasks, with particular focus on maternal and child health (OECD, 2014).

Performance: In 2003, Total Quality Management was implemented in MoH-affiliated hospitals, which aimed to track and enhance the performance of health care personnel through a performance-based payment system in MoH hospitals. Thus, these hospitals began to be managed according to common business principles and to make revenue/expense and performance calculations. Criteria for quality, performance, and financial risk were specified and hospitals were observed accordingly (Ministry of Health, 2012a).

One of the most striking reforms in terms of performance in this period was the enactment in 2010 of the Full-Time Medical Practice Law for doctors at university hospitals. The content of this law can be summarized as the obligation to work a full day for doctors and the prohibition of working part-time, making supplementary payments to work within and after normal office hours in organizations based on revolving funds, mutual appointments between MoH hospitals and university hospitals for certain periods of time or in specific cases, and the shared use of health institutions (Tükel, 2009). However, the law forbidding academics from part-time work in other sectors has caused staff, particularly the best qualified doctors, to leave their university positions for better pay offers in the private or MoH sector (OECD, 2014).

Access to care: Access to health was significantly expanded during this period. In 2003, government employees were given the opportunity to receive private health care services and insurance holders were later given the right to be treated both at public and SII hospitals with the MoH and SII-Protocol on Common Use of Their Health Care Facilities”. Until 15 June 2007, SPRF and SII insurance holders benefitted from private hospitals only limitedly; in fact, they could only apply to hospitals affiliated to their own institutions but not go to university hospitals. SPRF and SII members were then given the opportunity to directly apply to contracted university hospitals and contracted private health care institutions like the members of ES within the scope of Medical Enforcement Declaration (MED) as of this date (Dost, 2016).

Before MED, members of SII and SPRF did not need any reference to be admitted to MoH hospital whereas they had to get a referral form for access to

university hospitals (OECD, 2008). In short, these reforms freed citizens to choose the institution they wanted to go for treatment without any restrictions. The numbers of applications to hospitals are presented in Tables 11 and 12.

Table 11: Number of Hospital Applications 2002-2008

Number of Applications (Million)							
	2002	2003	2004	2005	2006	2007	2008
State Health Care Facilities, 2nd and 3rd step	109.78						
Private Health Care Facilities, 2nd step	5.70						
University Health Care Facilities 3rd step	8.82						
General Total	124.30	129.60	152.80	182.70	217.50	249.10	273.70

Source: Atasever (2004), Ministry of Health (2012a).

Table 12: Number of Hospital Applications 2009-2013

Number of Hospital Applications (Million)							Ratio of Change %
	2009	2010	2011	2012	2013		
State Health Care Facilities, 2nd step	122.66	138.61	155.29	202.00	220.79		80.00
State Health Care Facilities, 3rd step	39.91	44.07	50.14	65.12	73.17		83.35
Private Health Care Facilities, 2nd .step	66.88	72.16	86.75	89.07	92.73		38.66
University Health Care Facilities 3rd step	16.49	21.78	25.18	30.59	34.70		110.45
General Total	245.93	276.61	317.36	386.78	421.39		71.35

Source: SSI, Health Statistics, 2017c.

During 2002-2003, the total number of applications to hospitals increased approximately 239% while the increase in the number of application to university

health institutions increased by 293%. The number of applications to emergency units increased as well.

One of the risks for the Turkish health care system stems from the hospital sector. For instance, the rise in people's tendency to apply to hospital emergency units for minor ailments, increased demand for health care services due to payment incentives, attempts to improve care quality without need, and focusing on quantity and productivity instead of providing services in the best possible way have caused costs to go up. (OECD, 2014).

In addition, in 2004, all citizens, including those with no financial protection, were provided with free 112 emergency services and ambulance referrals to any health institution or organization in or outside their city. In order to improve access to health care services, primary health care services were made free for all citizens in 2007. All the population under 18 and those receiving education were covered by UHI and allowed to benefit from health care services without co-payments. In 2009, home care services were initiated for old or bedridden patients who cannot go to any health care institutions (Atasever, 2014).

Financing: In 2006, a Global Budget Model was developed for the financing of health care services and health expenditure, and the public institutions' revenues were determined with this model. A global budget sets a general spending limit, which is one of the reimbursement methods developed for health care systems and is required for the delivery of health care services of a certain volume. This model has been employed by all MoH-affiliated hospitals in Turkey since 2006; recently, some of the university hospitals have begun to practice it where the concerned parties have agreed to it, and discussions about the private health care sector's adoption of the model have already started (Arık and İleri, 2016). The aim of a global budget is to achieve control over health care expenditure. In order to attain control over spending, expenditure to be made or the total amount to be paid must be restricted (Ministry of Health, 2014). A global budget has an upper limit and the amount of the budget is negotiated with the MoH annually, after which a specified monthly sum is paid to hospitals by the MoH. These payments are designed in such a way that can meet the upper limit of the global budget. If expenditure exceeds the upper limit, end-of-year demands may not be paid (OECD, 2008).

As mentioned previously, one of the significant reforms of this period was bringing together SII, SPRF, and ES in 2006. As a continuation of this reform, a UHI fund was generated within the SSI body. Following the establishment of the UHI system, government employees and green card holders became covered by the UHI in 2010 and 2012 respectively. The health expenditure of social SSI in this period are given in Table 13.



Table 13: Health Expenditure of Social Security Agencies (detailed), (2002-2013), (Million NCUs)

		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Increase in
SII	NCUs	3,596	4,981	6,717	7,458	11,107	SSI (SII, SPRF and ES included)			SSI (Civil servants included)		SSI (Green Card included)		2002-2013 (Folds)
	%	47.12	46.72	50.77	53.27	74.42								
SPRF	NCUs	2,195	3,183	3,719	3,626	3,816								
	%	28.76	29.85	28.11	25.90	25.57								
ES	NCUs	1,840	2,498	2,795	2,917	2,744								
	%	24.11	23.43	21.12	20.83	0.02								
General Total	NCUs	7,631	10,662	13,231	14,001	14,926	19,697	25,346	28,277	30,695	34,937	41,630	46,993	5.2

Source: Atasever, 2014: 95.

In the reform process that social security institutions went through from 2002 to 2013, SSI health expenditure increased approximately 513%, or 5 times. Following the implementation of UHI, the financial burden of the health care system increased by bringing almost the entire population under security coverage.

In parallel with UHI, a virtual control and payment system was set up to put all health insurance fund demands within the SSI body, including putting the green card into operation. To this end, all public and private health care institutions contracted with SSI were obliged to use the MEDULA system, which standardized demand presentation of all health insurance funds. Under this integrated system, a single virtual payment system was set up in UHI (OECD, 2008).

In 2007, package pricing was introduced in health care services. In all MoH hospitals, university hospitals, and private hospitals contracted with SSI, a majority of procedures applied to out-patients and in-patients were priced over package prices. Package pricing assumes that frequently encountered diseases do not differ greatly across patients during diagnosis and treatment in terms of service content when pricing the procedures. Therefore, a single, approximately estimated price can be determined for all procedures. In short, package pricing determines the sales price of the service generated in health care procedures in advance and enables health care institutions to provide the same services at the same prices to all costumers (Ceran and Özdemir, 2013). However, package pricing involves some features that may damage the financial structures of university hospitals. Since it fails to provide appropriate payment for particularly complex cases or diseases that need intervention with devices using advanced technology, the service is provided at nearly 30% higher prices in university hospitals than hospitals in general, and as universities have to provide services at lower prices due to non-updated prices, they experience income losses (Gülşen and Yıldiran, 2017).

Health insurance allows Turkish citizens access to services at private hospitals. In 2008, these private health care service providers were allowed to additional charges up to 30% of the price paid for SSI health care services. This extra cost of services to be taken from the patient at private hospitals was subsequently increased from 30% to 200%. In 2008, examination co-payment was introduced to be charged to out-patients. This share was set as 0-NCUs for private sector service providers, 6-NCUs in hospitals, 4-NCUs in education and training hospitals, and 3-NCUs in secondary service providers (Atasever, 2014).

As stated above, citizens were also given direct access to university hospitals, and the practice of package pricing and the performance-based payment system were

introduced in university hospitals. However, changes carried out in 2003-2009 damaged the financial structures of university hospitals. In response to this, the treasury provided financial support to universities in 2010 and 2011. The total amount of financial aid given to university hospitals in 2010-2011 was 377 million NCUs. Yiğit and Yiğit (2016) found that university hospitals only made a profit in 2010 and 2011 during 2007-2015 and made losses in the other years. The reason for the profits in these two years was the treasury aid. In 2011, a once-only fund transfer of 451 million NCUs was made to academicians in university hospitals whose incomes had decreased because of HTP, which helped maintain financial sustainability temporarily (Yiğit and Yiğit, 2016). However, permanent solutions were needed to maintain financial sustainability. In some OECD countries, there are certain payment arrangements in practice for university hospitals to maintain specific public health functions. For instance, in Germany, the structure of case-based payments has been renewed to reward these functions whereas extra payments are applied for “*teaching, research and innovation, emergencies, psychiatry, and certain rehabilitation services*” in France (OECD, 2014).

Value Added-Tax (VAT) rates were reduced for drugs and a reference pricing system based on the lowest prices among five EU countries (Italy, France, Spain, Portugal, and Greece) was introduced on a product basis. Significant savings in drug spending were achieved through the transition to a reference pricing system, the generation of a list of positive drugs and limiting the drugs paid for to this list, setting up a drug spending tracking system, and reducing the ceiling prices of generic and bioequivalent pharmaceuticals (Atasever, 2014).

Protecting Public Health: During this period, vaccination days were organized in 2003 as part of the national immunization campaign, iron and vitamin D supplementation was provided to babies and pregnant women in 2004, an Expanded Program on Immunization was initiated in 2006, measles, mumps, and meningitis vaccines were included in the vaccination program, pentavalent vaccines were included in the routine immunization program in 2008, early cancer screening (breast, cervical, large intestine) expenditure was added to the global budget of the MoH in 2012 (Ministry of Health, 2012b), and a similar change was made to protect public health.

Statistics concerning life expectancy at birth, neonatal mortality, maternal mortality, and infant mortality show that the health of Turkish citizens has improved significantly in the last ten years (OECD, 2014). Life expectancy at birth rose from 71 before HTP to 76 in 2011 while infant mortality rates fell from 31 per 1,000 live births in 2000 to 7.7 in 2012. In addition, maternal mortality ratio fell from 70 to 20 per 100,000 live births in 2013 (Akdağ, 2015).

The most significant steps taken with the HTP in 2003-2013 include the introduction of UHI, starting family medicine practices, restructuring of the MoH, establishing the Public Hospitals Union, and the transition to a performance-based supplementary payment system (Tükel, 2009).

The costs of health reforms are high in general worldwide, and it is inevitable that health expenditure increases somewhat at the start of reforms. Accordingly, total health expenditure in Turkey was 18,774 million NCUs in 2002 and reached 83,390 million NCUs in 2013, an increase of 450% (TUIK, 2017a).

In 2002-2013, the Turkish health care system experienced a serious process of change in the scope of health reforms, the reforms generated during this period were made into laws and were put into practice quickly. Yıldırım (2015) claims that five main reasons underlie these health reforms put into effect during this 11-year process. These reasons include i) the existence of political and economic stability, ii) EU dynamics, iii) reform dynamics, iv) the influence and support of international institutions such as the World Bank, and v) political will, support, and determination.

4.1.5. A New Vision for Health Care in Turkey: 2014-2023

After the competition of the HTP, Minister of Health Dr. Mehmet Müezzinoğlu announced “the 2023 Vision in Health Care” on 21 June 2014, stating that it aimed at placing Turkey among the world’s most developed countries in terms of service provision, technology, drugs, and improved human power in the field of health (Yıldırım, 2015).

The projects of this new vision in health care system can be summarized as follows:

- 1. Human Resources:** The aim is to meet the need for medical personnel without compromising on quality, to ensure that healthcare personnel are

adequately compensated for their work, to make new regulations on retirement, performance, and personnel employee rights, and to solve the problem of violence in health by enhancing trust between patients/patient relatives and health care personnel.

2. **Public Health:** It is planned to renew the infrastructure across Turkey at the primary stage and to enhance the attraction of Family Health Centers with this renovation. Moreover, the referral chain will be extended following pilot schemes with fiscal incentives and promotions.
3. **Emergency Health:** For national and international disasters and emergencies, hospital ships, air ambulance services, and 112 Emergency stations will be renewed.
4. **Clinic Quality in Health:** In order to maintain clinic quality in health, it was decided that accreditation of the international validity of all public, university and private health care providers would be carried out by the Turkish Quality and Accreditation Institute to be established within the body of Directorate of Health Institutes of Turkey (TUSEB).
5. **City Hospitals:** It is intended that a total of 168,494 beds will be increased in quality in 9 years, and Turkey will start 2023 as the only country with a renewed infrastructure of health care facilities.
6. **E-Health:** The Health Informatics Cloud project is to be extended across the country in order to allow institutions and organizations providing services around the country to maintain their communications over a reliable and fast channel.
7. **Directorate of Health Institutes of Turkey:** TUSEB was established and 6 affiliated institutes were planned in order to keep up with scientific developments and innovative activities carried out in the field of health institutes around the world.
8. **University of Health Sciences:** A university of health sciences was established in order to satisfy the need for qualified academics in the field of health.
9. **Promotion of Health Industry:** Among the 25 prioritized transformation programs in the 10th Development Plan of the Health Industry, domestic

drug and medical device manufacturing has been promoted through the coordination of MoH and Ministry of Development.

10. Health Tourism and Health Free Zones: Health tourism will be increased by establishing health free zones to provide a health care service worth 25 billion dollars.

11. Traditional and Complementary Medicine: The infrastructure for the regulation of traditional and conventional medical practices was completed and put into practice in 2015.

12. Universities and Private Sector: University and private sector integration will be increased.

13. Financing: The share of total health expenditure in GDP is aimed to be increased to 6% in the 2023 vision and out-of-pocket payments should remain in the 15-20% range.

14. Health Diplomacy: Turkey plans to play a more active role in WHO.

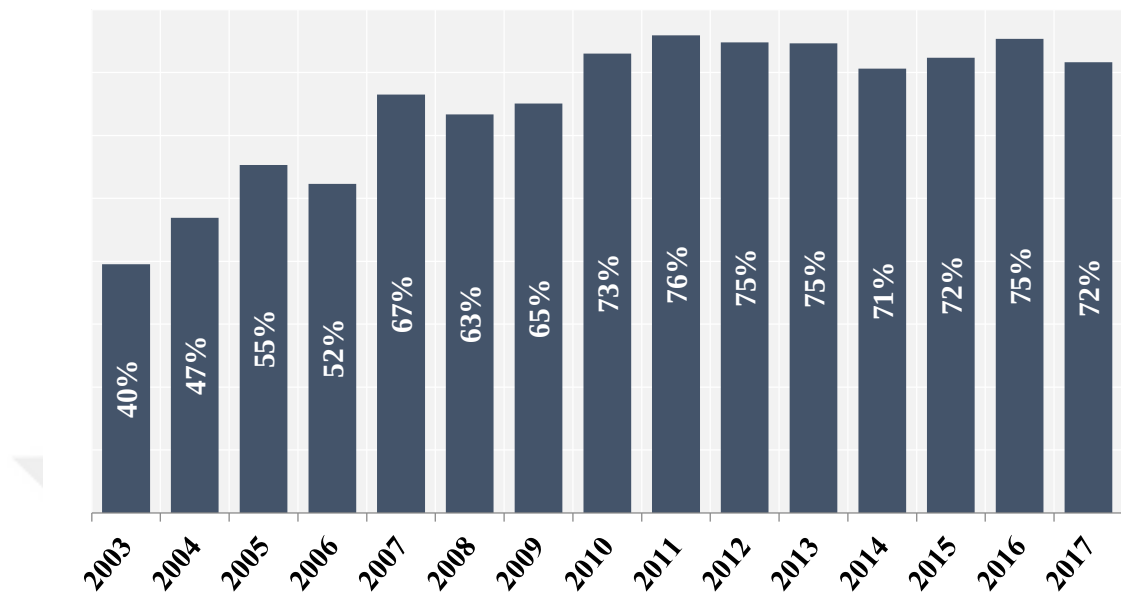
15. Renewal of Health Legislation: Legislation dating back to the 1930s is to be renewed.

16. Health Communication: SABİM TV, SAĞLIK WEB TV, and GEBE TV were established in order to increase accurate information about health. (SASDER, 2014).

In order to fulfill these projects, the financing structure of the health care system must be strong and unaffected by bottlenecks occurring both inside the country and internationally. As mentioned previously, development levels of health care systems parallel their financial development.

Finally, looking at the effects of reforms implemented in 2002-2016 regarding citizen satisfaction with health care would provide information about how the reform process was perceived.

Figure 12: Satisfaction with Public Health Services, 2003-2017



Source: TUIK, (2018).

Except for the decline in 2006, satisfaction with health care services increased rapidly from 2003 to 2011, and reached its highest level of 75.9% in 2011. However, in 2017, it retreated to 71.7%. It can be concluded that the level of satisfaction with health care services, which increased rapidly in the early years of HTP, fluctuated after 2011 as citizens responded quickly to changes in the health care system.

4.2. HEALTH CARE SERVICE DELIVERY IN TURKEY

Good service delivery is an essential element of all health care systems and a basic input to population health status, together with other components like the social determinants of health. Although the organization and content of health services vary by country, in a well-functioning health care system, the following key features should be included in the service delivery network (WHO, 2010c).

- 1. Comprehensiveness:** The range of health services provided must be broad, suitable with the needs of the population, which includes “preventative,

curative, palliative and rehabilitative services and health promotion activities”.

2. **Accessibility:** Services must be directly and permanently reachable regardless of cost, language, culture, or geography. Health care services should be close to the people, giving them easy access to the service network at primary care level. Services could be delivered in the home, community, workplace, or suitable health facilities.
3. **Coverage:** Service delivery is intended to cover all people in a specified target population including all income groups and social groups, whether sick or healthy.
4. **Continuity:** Service delivery should be provided continuously to individuals for receiving care across *“the services network, health conditions, levels of care, and over the life-cycle”*.
5. **Quality:** Preferred quality health services should be provided in an effective, safe, and timely manner, and centered on the patient’s needs.
6. **Person-centeredness:** Services should focus on the individual rather than the disease or financing. Health care service users expect to receive responsive and acceptable services. The target population should participate in service delivery design and assessment. That is, people are considered partners in their own health care.
7. **Coordination:** Local health service networks should be actively coordinated, across types of *“provider, types of care, levels of service delivery”* for routine and emergency readiness. The primary care provider simplifies the route through the services required as well as working collaboratively with other provider levels and types. Coordination should also be managed with other partners (e.g. community organizations) and sectors (e.g. social services).
8. **Accountability and efficiency:** The management of health care services should aim to include the key elements mentioned above by wasting the lowest amount of resources. Authority is given to reach planned objectives and health care systems are also held accountable for general performance and results. Suitable mechanisms to enable the participation of the target

population and civil society should be included in assessment (WHO, 2010c).

In Turkey, health care services are provided in a model that consists of both public and private sectors, but being predominantly based on the public sector. TGNA is where the fundamental political decisions are made. The MoH, on the other hand, is the primary unit responsible for the provision of health care services. A wide variety of actors may provide preventive, curative, and rehabilitative health care services. The main service providers include the MoH, university hospitals, and the private sector (Yıldırım, 2013).

In the Turkish health care system, service providers are staged as primary, secondary and tertiary care.

Primary Health Care Services: Services that are designed for home or outpatient diagnosis and treatment of diseases. These services are usually provided in institutions where treatment is last a short time, does not require advanced technological equipment and treats non-serious illness for example flu infection, diarrhea.

Secondary Health Care Services: Services organized for the diagnosis and in-patient treatment of diseases that do not require intensive medical knowledge and technology. They provide the necessary services for the treatment of diseases that cannot be treated in primary health care services.

Tertiary Health Care Services: Services intended for diseases that require further examination and special treatment, involve intensive knowledge and technology, and are provided by teaching hospitals like university hospitals.

Service providers according to stages are presented in Figure 13.

Figure 13: Health Care Service Providers



Source: SSI, 2017a.

At the operational level, Provincial Directorates of Health are responsible for implementing health policies in every city. Municipalities also have health-related roles and responsibilities, but are generally limited to public health. Private service providers are also included as part of the health care system (Tatar et al., 2011b).

While they are theoretically supposed to offer tertiary health care services, by their nature and definition, university hospitals may provide all types of health care services in practice. The private sector, on the other hand, produces health care services through hospitals, outpatient clinics, private practices, pharmacies, laboratories, medical devices, and pharmaceutical companies. In addition, the Ministry of Defense, religious groups, minorities, and foundations can also offer health care services (Yıldırım, 2013).

Table 7 divides the institutions directly or indirectly included in the health sector into groups depending on the provision of health care services, whether they are related to the financing of health care services, and whether they have the authority to make administrative decisions in the provision of health care services.

Table 14: Health Sector Institutions and Organizations by Function

Function	Management
Policy Making	TGNA Ministry of Development MoH Higher Education Institution Judicial Institutions
Administrative Decision Making	MoH-Public Hospitals Agency Provincial Directorate of Health-Public Health Institution of Turkey
Health Care Financing	MoF SSI Private Insurance Companies Self-financing Institutions International Agencies
Delivery of Health Care: Public	MoH University Hospitals MoD
Delivery of Health Care: Private	Private Hospitals Foundation Hospitals Minority Hospitals Private practitioners / Physicians Outpatient Clinics
Suppliers	Laboratory and Treatment Centers Pharmacies Medical Equipment Seller
Non-governmental Organizations	The Red Crescent in Turkey Foundations, Associations, Unions

Source: Özer et al., 2015: 84.

4.3. ALLOCATION OF FINANCIAL RESOURCES AND PAYMENT METHODS IN HEALTH CARE SERVICES

It is among the leading issues of concern for health policy makers to determine the most accurate and effective payment method that allows fair allocation of resources and enables the sufficient use of resources for financing services in countries where health care services are met mainly through public resources (Arık and İleri, 2016).

Payment methods, which are generally grouped as salaries, payments per person, payments per service, and performance based payment, are usually used in combination. In Turkey, allocation of resources in health care services is framed around the general budget to a large extent, and resources allocated to the MoH from the budget are distributed to hospitals in accordance with the global budget. In

secondary and tertiary public health care services, health care personnel are paid through salaries as well as a performance-based payment system (Yıldırım, 2013).

In its broadest sense, a payback system is a system which specifies and arranges the principles concerning repayment by the payer institution of the price for the services provided to service demanders by health care service providers (Akyürek, 2012).

Table 8 shows the 2017-18 total management budget of the MoH and Affiliated Institutions while Table 9 presents the 2017 central management budget of the MoH and Affiliated Institutions, which included 50.4% for the central management budget and 49.6% for the revolving funds budget. In 2018, it included 53% for the central management budget and 47% for the revolving funds budget.

Table 15: 2018 Annual Budget of MoH and Affiliates (Million NCUs)

	2017	2018	Change %
Central Administration Budget	32.302	37.914	17.37%
Revolving Fund Budget	31.741	33.583	5.80%
Total	64.043	71.497	11.64%

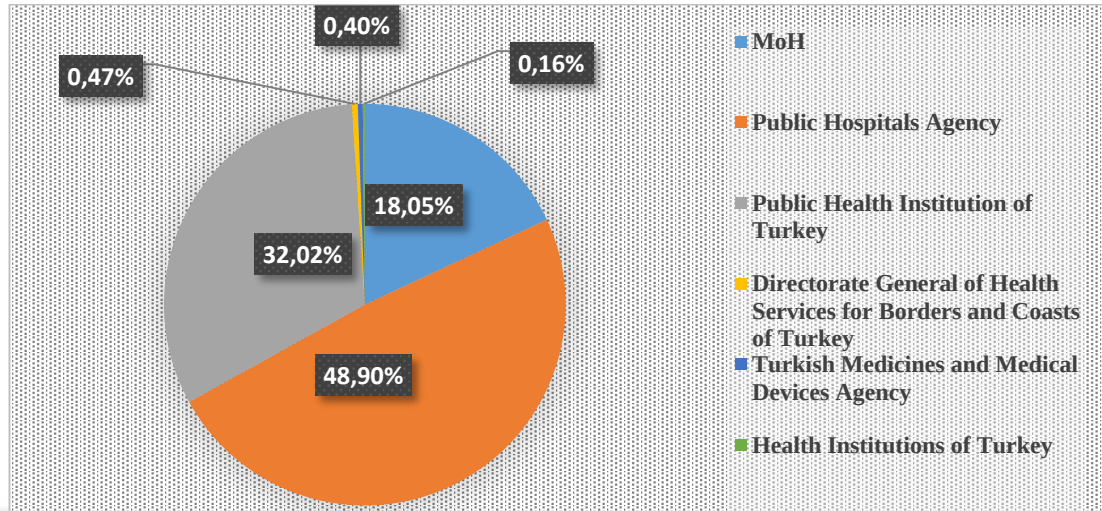
Source: Ministry of Health, 2018.

Table 16: 2017 Central Administration Budget of MoH and Affiliates (Million NCUs)

	Personnel	Other Current	Investment	Total
MoH	1,784	458	3,589	5,831
Public Hospitals Agency	12,774	1,238	1,784	15,795
Public Health Institution of Turkey	2,457	7,524	362	10,343
Directorate General of Health Services for Borders and Coasts of Turkey	32	14	106	152
Turkish Medicines and Medical Devices Agency	55	54	21	130
Health Institutions of Turkey	12	18	21	51
Total	17,114	9,306	5,883	32,302

Source: Ministry of Health, 2017.

Figure 14: 2017 Central Administration Budget of MoH and Affiliates

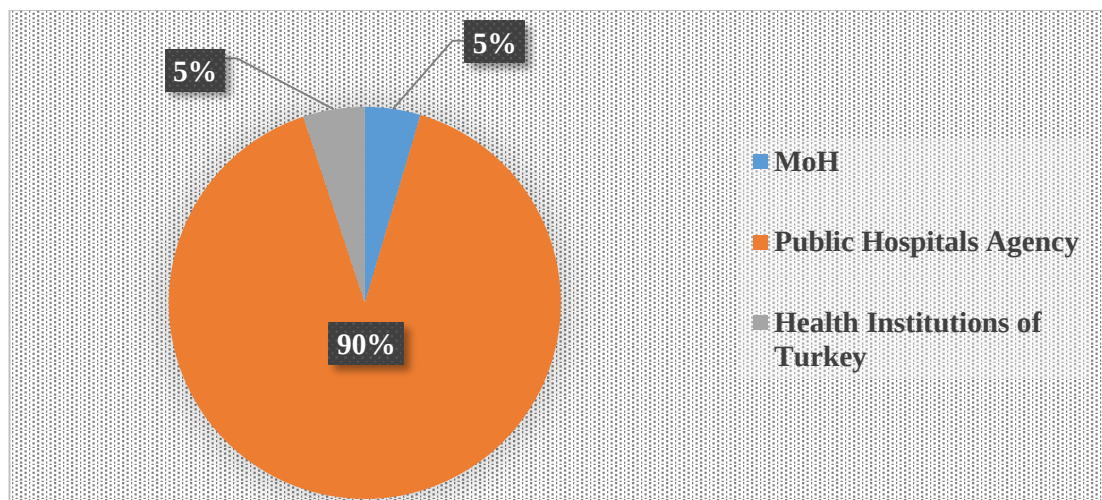


Source: Ministry of Health, 2017.

As seen in Figure 9, the highest share in the central administration budget belongs to the Public Hospitals Agency with 48.90%, followed by the Turkish Public Health Institution (32.0%) and MoH (18.05%).

When the distribution of the revolving fund budget to institutions is examined, it is seen that the Turkish Public Hospitals Agency is in first place followed by the MoH while the third is the Turkish Public Health Institution (Figure 10).

Figure 15: Revolving Fund Budget



Source: Ministry of Health, 2017.

4.4. FINANCING OF HEALTH CARE SERVICES AND HEALTH EXPENDITURE IN TURKEY

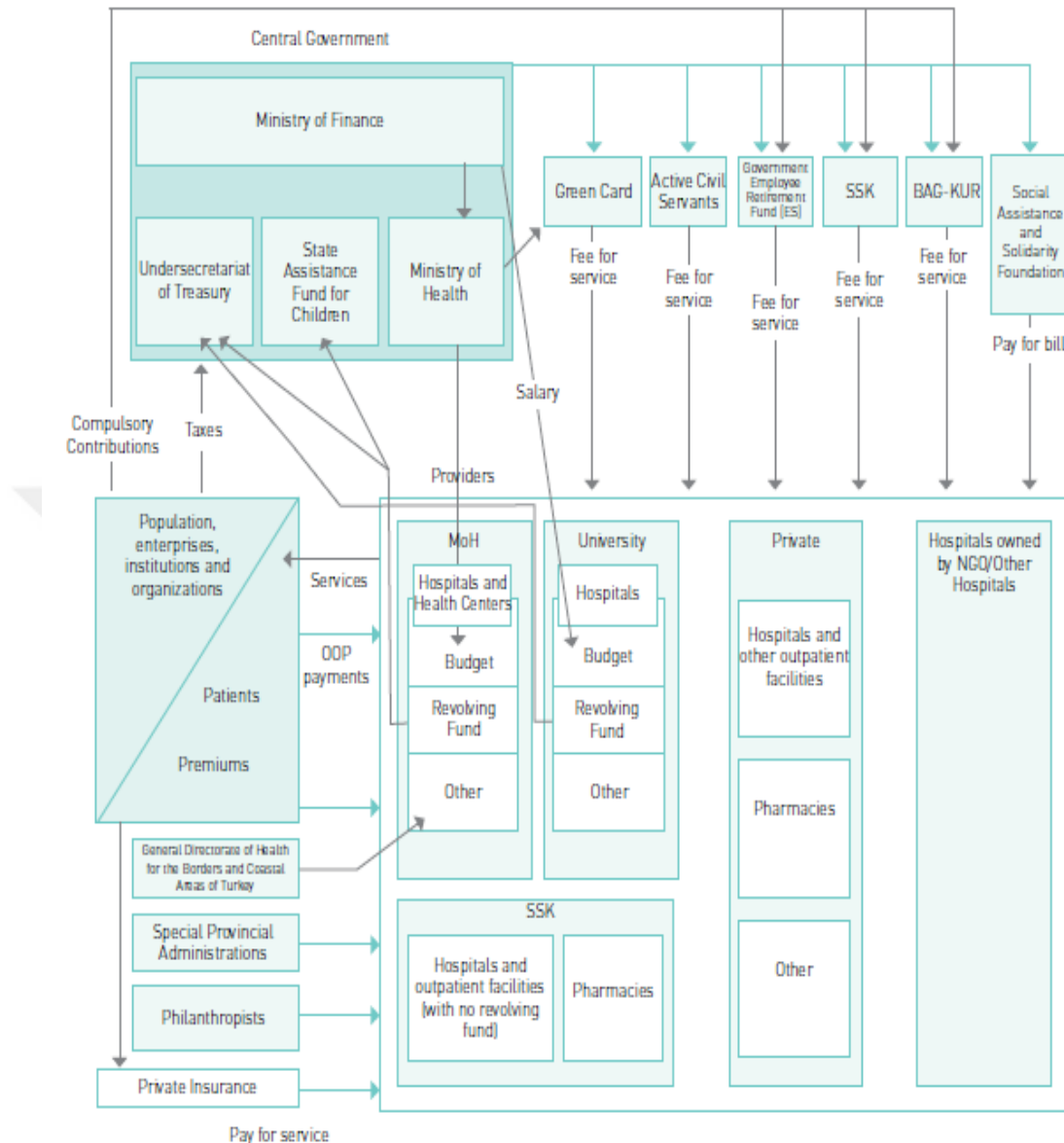
4.4.1. Financing Health Care Services

Financing methods of health care services vary across countries. Moreover, even if certain countries implement the same financing methods, outcomes may be different, particularly because of their payment methods to health care service providers, the way health care services are provided, and the differences in the rules applying to service accession (Tatar, 2011a). In other words, financing of services is a significant and subtle issue for many countries (Atasever, 2014).

As also stated in the 2010-2014 Strategic Plan of the MoH (2014), the financing of the health care system in Turkey encompasses an area in which revenues are collected, put together in funding pools, distributed among health care service providers within the process of active purchase for the provision of necessary services, and used in investments for creating resources to this end.

The financing structure of the health care system in Turkey has a complex nature. On one hand, a health insurance system (Bismarck Model) is implemented for a certain groups while a public assistance (Beveridge Model) model is also in use. On the other hand, special expenditure are also included in the financing of the system. Since the premiums collected for the financing of health care services remained insufficient in 2002 in Turkey, funds collected through taxes compensated for this gap. In addition, 29.3% of the total health spending was on private sector expenditure, including private health insurance (albeit at a low level), insurance funds, sources like foundation universities (9.5%), and the household health expenditure (19.8%). The primary source of finance in health care services in 2002 was public financing. Almost all preventive services, particularly, were covered by the state (Atasever et al., 2017). The flow chart of the funds in the Turkish healthcare system in 2002 is presented in Figure 16.

Figure 16: Flow of Funds in the Turkish Health Care System (2002)

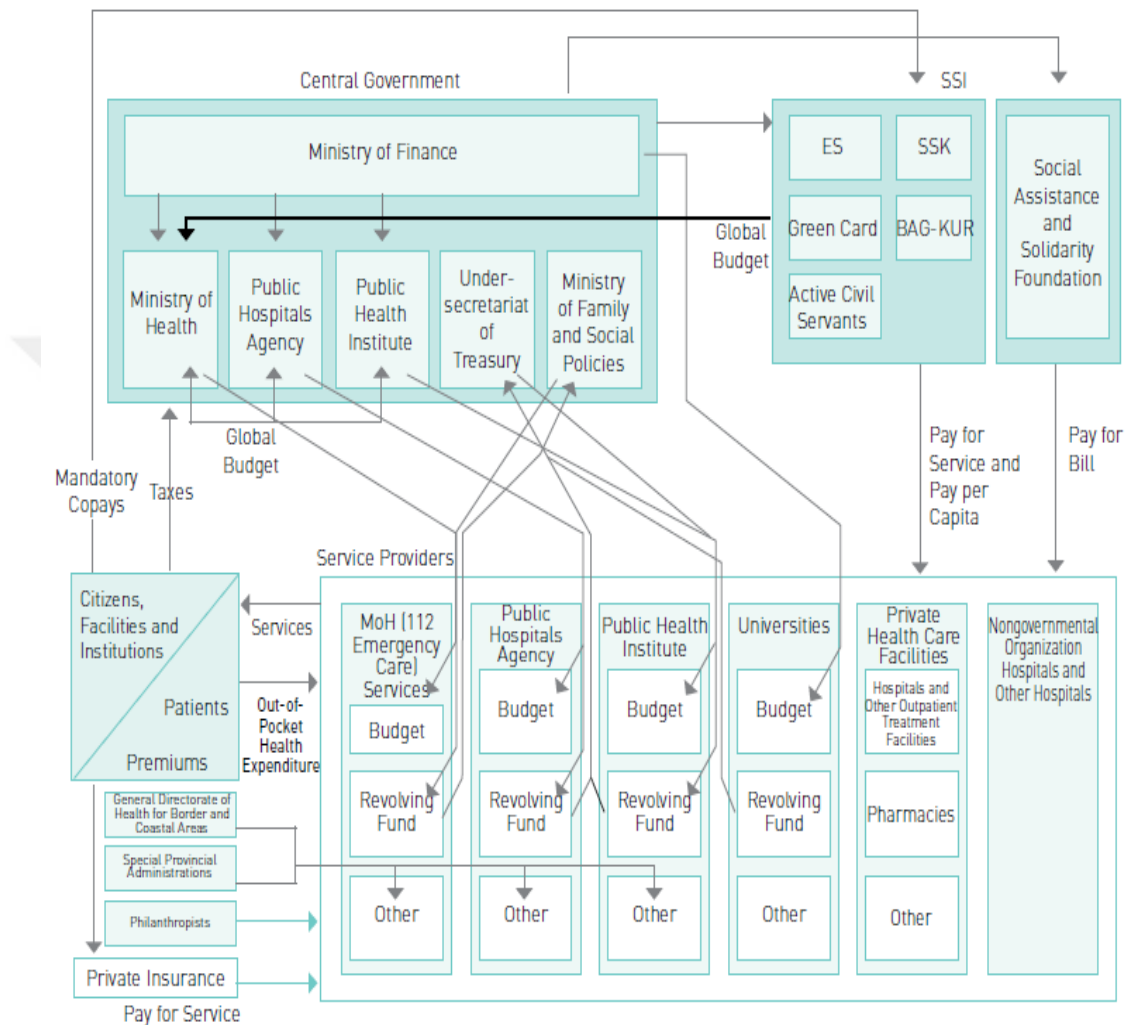


Source: Atasever, 2014: 44.

The Turkish health care system has gone through a comprehensive reform process since 2003, with radical changes made in the financing and provision of health care services. The first step in social security reform in health care financing was made with Law 5502 whereby all the security institutions were restructured and taken under a single roof called SSI. Following this, the whole population was brought within the scope of social security through Law 5510, which aimed at eliminating inequalities in access to and financing of health care services. With a great variety of amendments made during the reform process from 2003 to the present day, the flow chart of the

funds in Turkish health care system has changed as well. The fund flow chart for 2017 can be seen in Figure 17.

Figure 17: Flow of Funds in the Turkish Health Care System (2017)



Source: Atasever et al. 2017: 8.

Figure 17 summarizes the financial flows in Turkish health care system. Following the amendments realized in the system, health payments made on behalf of government employees, Green Card, SII, SPRF, and pension funds were brought together under a single roof within the body of SSI in the first place, which simplified the financing of the system.

4.4.2. Universal Health Insurance

As explained above, health care services in Turkey are mainly financed through a social insurance model. This model, called UHI, is managed by SSI. UHI is a health insurance system that allows all individuals of the society to benefit from health care services equally, accessibly, and efficiently against possible risk of disease, regardless of their economic power (SSI, 2013).

Individuals included within the coverage of UHI are all citizens living in the country, individuals who have applications or status of international protection or those defined as stateless, foreigners having a residential permit of at least 1 year, and foreign students during their study periods in Turkey. Individuals excluded from UHI, are members of TGNA, members of the constitutional court, members of bank funds, and prisoners and convicts. The population covered by UHI as of 2016 is presented in Table 17.

Table 17: UHI Coverage in 2016

UHI Coverage in 2016	
Population	78,741,053
Social Security Coverage	67,897,846
Social Security Coverage (%)	86.2 %
UHI Coverage	77,672,020
UHI Coverage (%)	98.6%
UHI Out of Coverage (%)	1.4%

Source: SSI, 2017a.

With a coverage rate of 98.6%, UHI in Turkey has a much greater coverage than many other countries (Koçkaya et al., 2016).

According to the UHI Law, financing of health care services is based on a social health insurance system, in other words the premium principle (Akyel, 2006). According to Article 81 of the Social Insurance and Universal Health Insurance Law no 5510, the UHI premium accounts for 12.55% of the earnings subject to premium of the insured individual for those subject to short and long-term insurance branches. 5% of this premium is the insurance holder's share and 7.5% belongs to the employer. For those subject to UHI only, the UHI premium is 12% of earnings subject to premium. Moreover, the state makes a contribution of 3% over the earnings subject to premium.

This contribution is calculated as one fourth of the premium (Official Gazette, 2006). Contribution fees have come into common use with UHI in Turkey. The UHI premium rates applying to different status are presented in Table 11.

Table 18: UHI Premium Rates

Statute	Premium Rate	
	Employer's Share	Employee's Share
Compulsory Insurances	7.50%	5%
Insurers subject to Annex 5 th and 6 th		12.5%
Voluntary Insurance		12%
Apprentice candidate, apprentice, vocational high school students, university student who is an intern	5%	
Advocacy Interns	6%	
Turkish Labor Agency and Vocational course trainees	12.5%	
People who have unemployment compensation	12%	
People who have job loss indemnity payments		
People who are only subject to the UHI.		

Source: SSI, 2017a: 28.

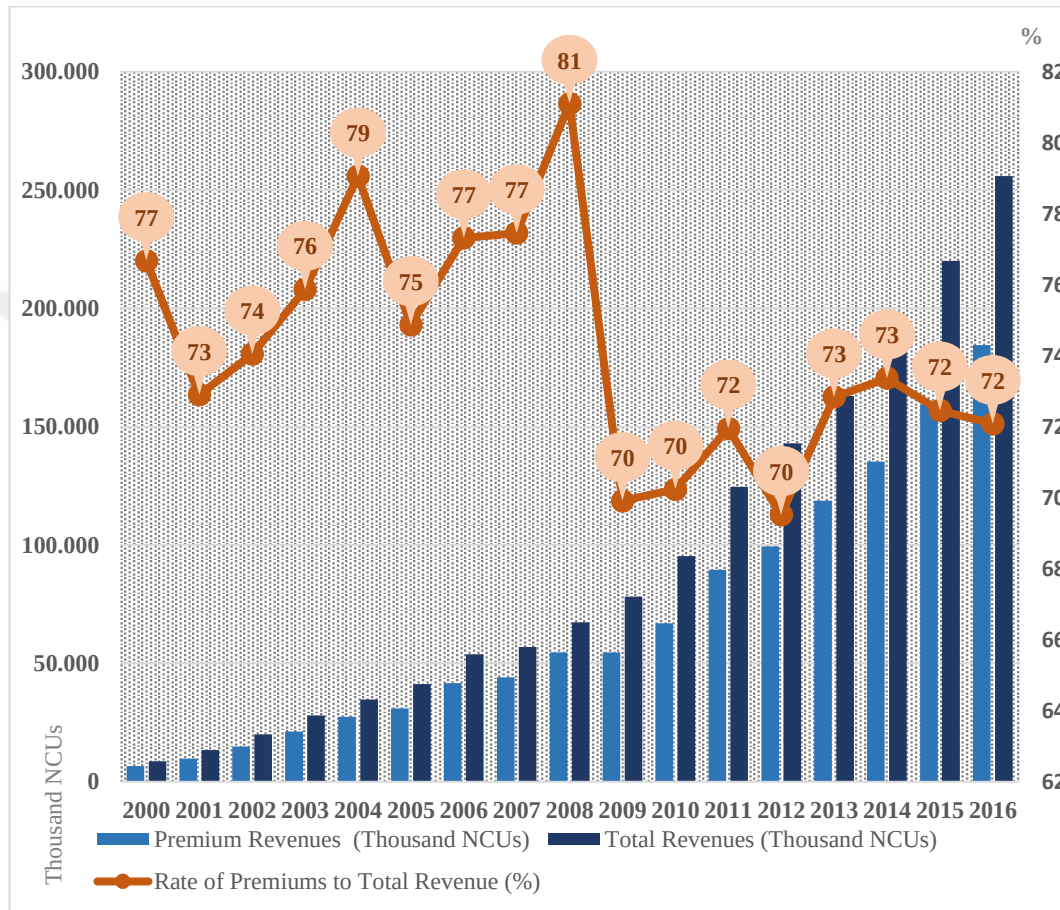
The aim of UHI is to ensure that everyone has access to adequate and quality health care services, insurance holder contributions do not exceed paying ability, the health indicators of the society are improved, insurance holders are content with the service provided, and there is financial sustainability (SSI, 2017a).

4.4.3. The Social Security Institution

In order to establish a healthy social security system and to be able to provide the service expected from it, the system needs strong financing. The most significant source of income for a social security system is premium income. In Turkey, social security premiums are collected from employees and employers over a certain rate of the worker's wage. The premium can be seen as part of the wage since it is taken from

the wage. It can also be seen as a price since it is paid in return for security support and as a tax since it is collected compulsorily (Cural, 2016). The income balance of SSI in Turkey can be seen in Figure 18.

Figure 18: Revenues of SSI

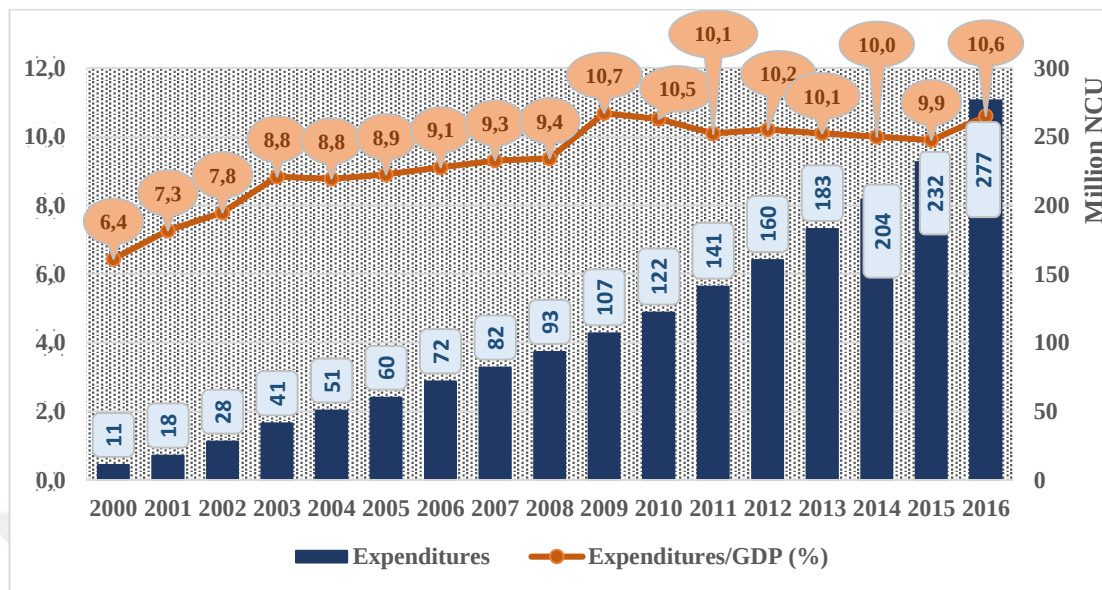


Source: SSI, 2017c. (Calculation made by the author of thesis).

As seen in Figure 18, the premium revenues of SSI excluding state contributions have followed an increasing trend to reach approximately 184 million NCUs in 2016. With the state contribution added to SSI revenues, it reached nearly 255 million NCUs. The state's contribution to SSI as premium revenue has increased in recent years.

Social security expenses were approximately 11 million NCUs in 2000 and went up to 277 million NCUs in 2016. Parallel to this, the share of social security expenses in the GDP was 6.4% in 2000 and increased to 10.6% in 2016 (Figure 19).

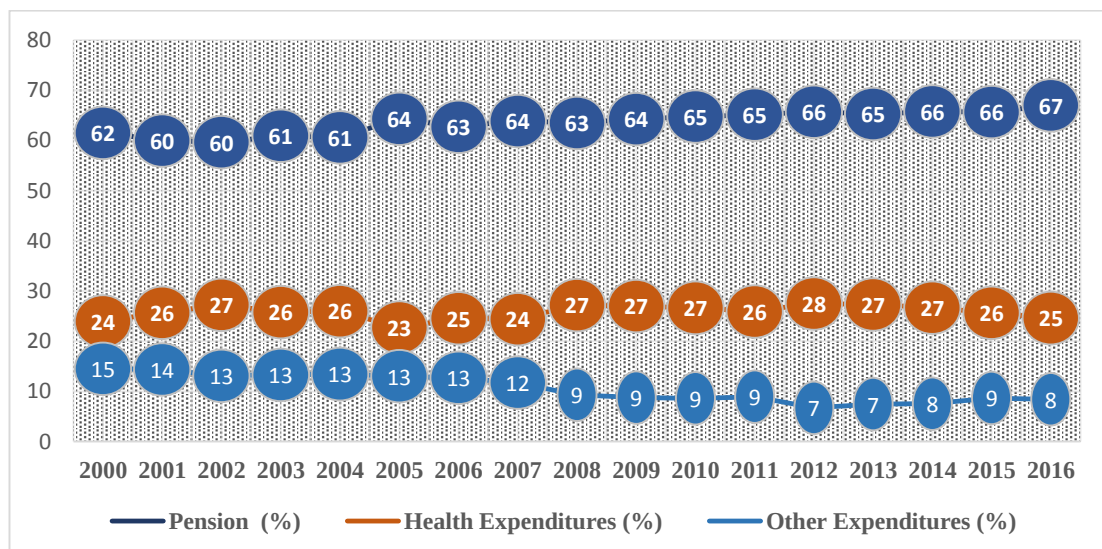
Figure 19: Expenditure of SSI



Source: SSI, 2017c. (Calculation made by the author of thesis).

Social security expenses basically consist of pension expenses, health care expenses, and other expenses. The distribution of social security expenses in Figure 20 shows that the share of pension expenses is 63% on average and has increased in recent years.

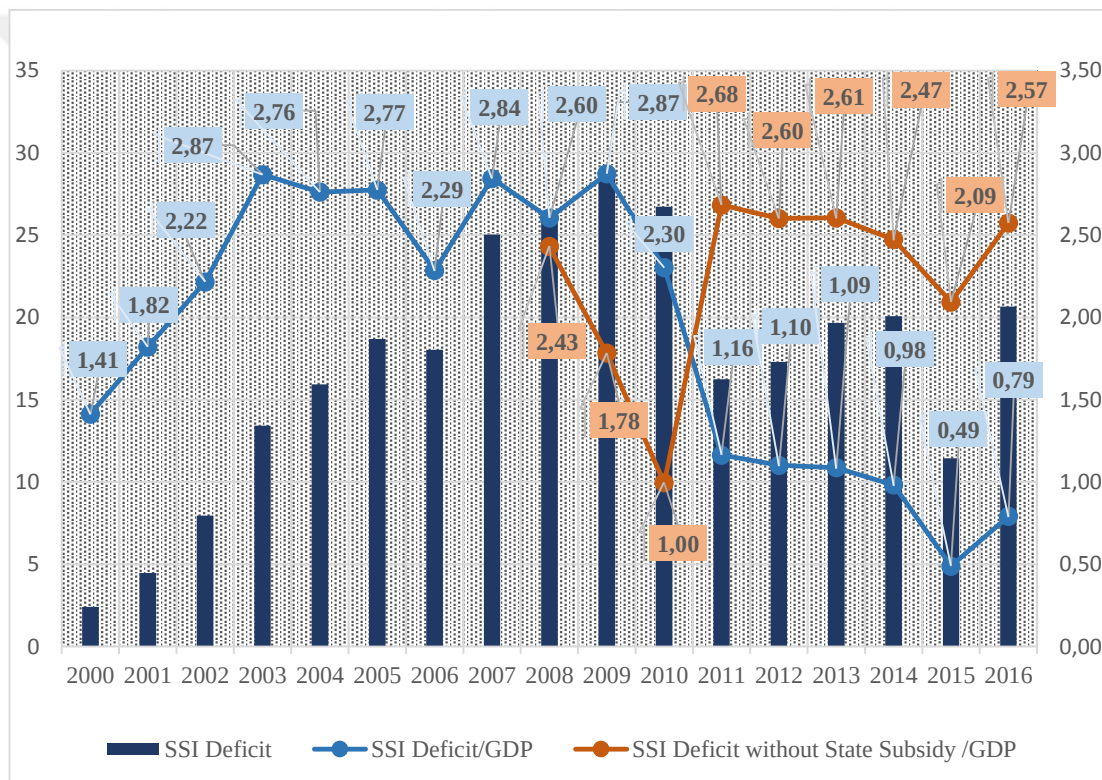
Figure 20: SSI Expenditure Divisions



Source: SSI, 2017c. (Calculation made by the author of thesis)

As seen in Figure 20, health care expenses have a share of nearly 26%. The share of health care expenses maintains its significance after extending the scope of health care services and increasing access to health, expanding the insurance package, and handing health care expenses of civil servants and green card health care expenses over to SSI following UHI implementation (Ministry of Development, 2014a: 6) The other expenses item consists of such expenses as management, investment, and commissions. The share of other expenses reduced to 8% from 15%. In short, the main reason behind the financial deficit of SSI is pension expenses.

Figure 21: Development of SSI Fiscal Deficit, 2000-2016



Source: SSI, 2017c. (Calculation made by the author of thesis).

Turkey's social security system started to have financial deficits as of the 1990s and this gap became unsustainable in the 2000s. The most significant factor in the financing deficit is the low active/passive ratio. This declined from 1.95 in 2006 to 1.78 in 2009, then increased only to 1.86 as of November 2016 (SSI, 2017b), which means nearly two employees for each retired individual. According to current opinion, in order for social security systems to operate effectively, the required active/passive

ratio is 4; that is, 4 active insurance payers must cover 1 passive insurance payer. The most significant factors in the low active/passive ratios are early retirement practices and illegal employment (Cural, 2016). The main reason behind the improvement occurring in the financial deficit of the social security system is the state's contribution to the system as of 2008 through state contributions, supplementary payments, and invoiced payments.

4.4.4. Turkey Health Care Expenditure

4.4.4.1. Health Expenditure

Total health expenditure in 1999-2016 in Turkey is presented in Table 19. Between 2002 and 2015, health expenditure increased 23 times nominally and 1.27 times in real terms (Table 19).

Table 19: Health Expenditure (1999-2016), Turkey

Year	Health expenditure	Health expenditure
	Current (Mill. NCUs)	Constant, 2009 (Mill. NCUs)
1999	4,985	31,912
2000	8,248	35,356
2001	12,396	34,747
2002	18,774	38,252
2003	24,279	40,114
2004	30,021	44,110
2005	35,359	48,507
2006	44,069	55,276
2007	50,904	60,113
2008	57,740	60,859
2009	57,911	57,911
2010	61,678	57,636
2011	68,607	59,259
2012	74,189	59,655
2013	84,390	63,854
2014	94,750	66,740
2015	104,568	68,309
2016	119,756	72,370
Increase (fold)	23.02	1.27
1999-2016		

Source: TUIK, 2017b. (Calculation made by the author of thesis).

4.4.4.2. Health Expenditure as a Share of GDP

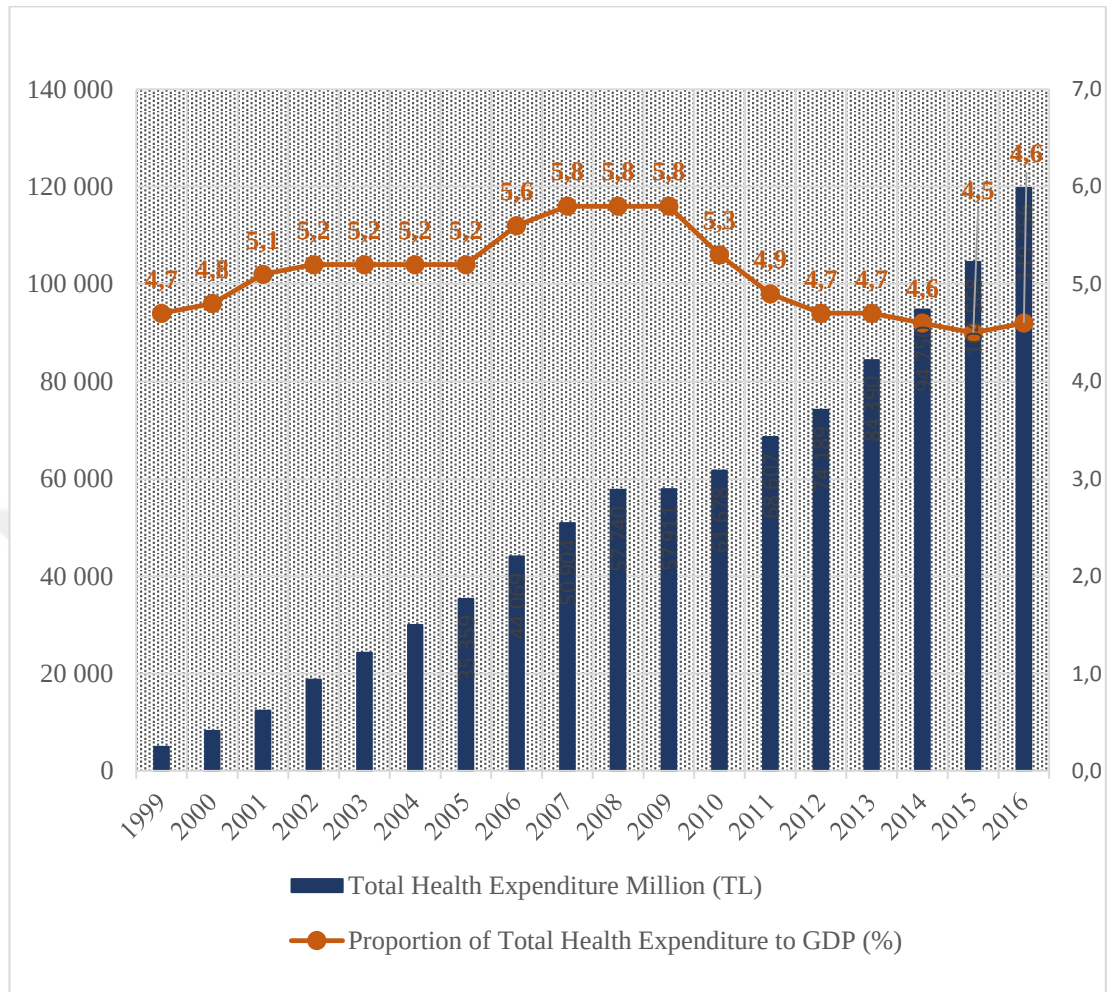
The share of health expenditure in GDP in 1999-2016 in Turkey is shown in Table 20. Despite the developments achieved in health care services in 1999-2016, the share of health expenditure in GDP rose until 2009, when it reached 5.8%. After 2009, despite the demand for health care services, the ratio of expenditure in GDP started to fall, reaching 4.6% in 2016. This ratio, which is quite low in comparison with the OECD35 2016 average of 9% (Table 20), must be assessed considering such factors as the elderly/child population rate and the number of personnel in Turkey.

Table 20: Total Health Expenditure as a Share of GDP (1999-2016), Turkey

Year	Total Health Expenditure Million (NCUs)	GDP Million (NCUs)	Proportion of Total Health Expenditure to GDP (%)	OECD35 proportion of total health expenditure to GDP (%)
1999	4,985	107,164	4.7	7.2
2000	8,248	170,667	4.8	7.2
2001	12,396	245,429	5.1	7.4
2002	18,774	359,359	5.2	7.7
2003	24,279	468,015	5.2	7.9
2004	30,021	577,023	5.2	8.0
2005	35,359	673,703	5.2	8.0
2006	44,069	789,228	5.6	8.0
2007	50,904	880,461	5.8	7.9
2008	57,740	994,783	5.8	8.2
2009	57,911	999,192	5.8	8.9
2010	61,678	1,160,014	5.3	8.8
2011	68,607	1,394,477	4.9	8.7
2012	74,189	1,569,672	4.7	8.8
2013	84,390	1,809,713	4.7	8.9
2014	94,750	2,044,466	4.6	8.9
2015	104,568	2,338,647	4.5	8.9
2016	119,756	2,608,526	4.6	9.0

Source: TUIK 2017c, OECD Health Data 2017b.

Figure 22: Proportion of Total Health Expenditure in GDP (1999-2016)



Source: TUIK, 2017b.

4.4.4.3. Health Expenditure per Capita

Countries are supposed to allocate a certain amount of health care expenditure per capita for basic health care and preventive services. A decrease in health spending lower than this means those individuals are deprived of even basic health care. Table 21 shows health expenditure per capita in 1999-2016 in Turkey.

Table 21: Per capita Health Expenditure, (1999-2016), (NCUs), Turkey

Year	Per capital health expenditure Current (Mill. NCUs)	Per capital health expenditure Constant 2009 (Mill. NCUs)
1999	79	504
2000	128	550
2001	190	533
2002	284	580
2003	363	601
2004	444	653
2005	517	709
2006	636	798
2007	726	857
2008	813	857
2009	804	804
2010	843	788
2011	924	798
2012	987	794
2013	1,110	840
2014	1,232	868
2015	1,345	879
2016	1,524	921
Increase (Fold) 1999-2016	18.37	0.83

Source: TUIK, 2017b. (Calculation made by the author of thesis).

In 1999-2016, health expenditure per person increased 18.37 times nominally and 0.83 times in real terms.

4.4.4.4. Government and Private Health Expenditure as Share of GDP

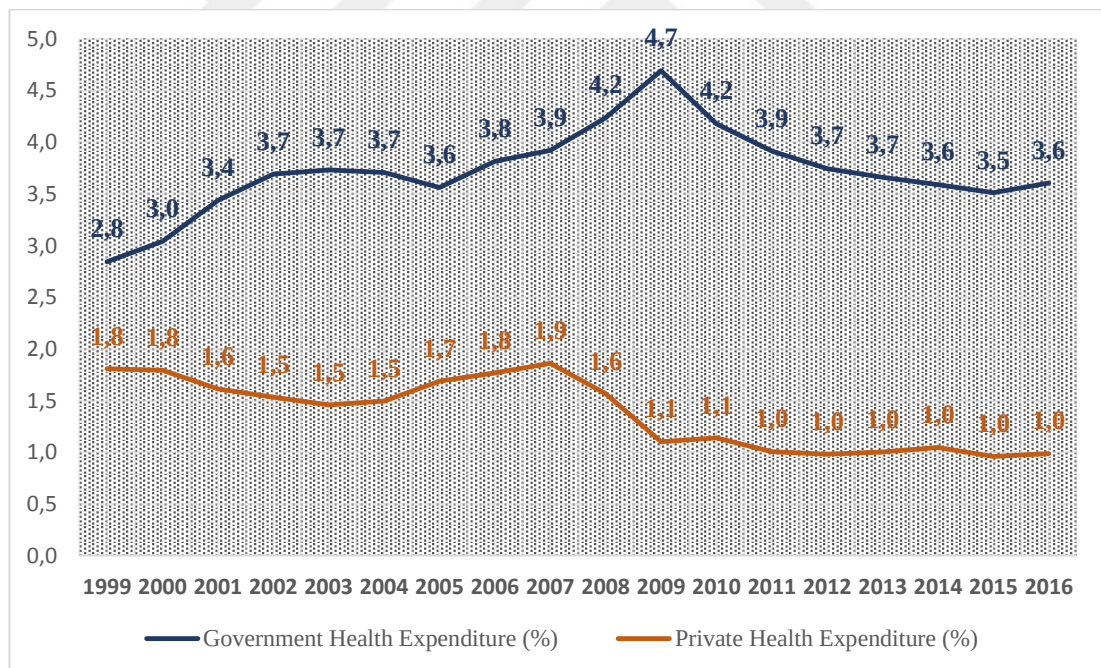
Comparing 1999 and 2016, the GDP ratio of health care expenditure in Turkey decreased from 4.7% to 4.6%. On the other hand, the financing structure changed. While 2.8% of the ratio of health expenditure to GDP was financed by the public in 1999, this ratio increased to 3.6% in 2016 (Figure 23). Between 1999 and 2016, health expenditure per person increased 22.61 times nominally and 1.23 times in real terms.

Table 22: Government and Private Health Expenditure as Share of GDP (1999-2016), Turkey

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Government Health Expenditure (%)	2.8	3.0	3.4	3.7	3.7	3.7	3.6	3.8	3.9	4.2	4.7	4.2	3.9	3.7	3.7	3.6	3.5	3.6
Private Health Expenditure (%)	1.8	1.8	1.6	1.5	1.5	1.5	1.7	1.8	1.9	1.6	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0
Total Health Expenditure (%)	4.7	4.8	5.1	5.2	5.2	5.2	5.2	5.6	5.8	5.8	5.8	5.3	4.9	4.7	4.7	4.6	4.5	4.6

Source: TUIK, 2017b.

Figure 23: Government and Private Health Expenditure as Share of GDP (1999-2016), Turkey



Source: TUIK, 2017b. (Calculation made by the author of thesis).

4.4.4.5. Public Health Expenditure per Capita

Private health expenditure per capita increased 10.71 times nominally in 2016 compared with 1999 whereas a slight difference occurred in real terms (Table 23).

Table 23: Public Health Expenditure per Capita, (1999-2016)

Year	Per capita health expenditure Current (Mill. NCUs)	Per capita health expenditure Constant, 2009 (Mill. NCUs)
1999	51	324
2000	81	345
2001	129	363
2002	201	410
2003	261	431
2004	316	464
2005	351	482
2006	435	546
2007	492	581
2008	593	625
2009	651	651
2010	663	620
2011	735	635
2012	782	629
2013	871	659
2014	954	672
2015	1,056	690
2016	1,196	723
Increase (Fold) 1999-2016	22.61	1.23

Source: TUIK, 2017b. (Calculation made by the author of thesis).

4.4.4.6. Private Health Expenditure per Capita

Private health expenditure per capita increased 10.71 times nominally in 2016 compared with 1999 whereas a slight difference occurred in real terms (Table 24).

Table 24: Private Health Expenditure per Capita, (1999-2016)

Year	Per capita health expenditure	Per capita health expenditure
	Current (NCUs)	Constant, 2009 (NCUs)
1999	28	179
2000	47	201
2001	61	171
2002	83	169
2003	102	169
2004	128	188
2005	166	228
2006	201	252
2007	233	275
2008	219	231
2009	153	153
2010	180	168
2011	189	163
2012	205	165
2013	239	181
2014	278	196
2015	289	189
2016	328	198
Increase (Fold) 1999-2016	10.71	0.11

Source: TUIK, 2017b. (Calculation made by the author of thesis).

4.4.4.7. Catastrophic Health Expenditure

In general, a health financing system has three main purposes: protecting health expenditure from financing risk, efficiency in the delivery of health care services, and being fair among service providers (Ellis and McGuire, 1993: 138). Cost-sharing, which was put forward with reform purposes in the health care system, causes conflicts between the aims of financing. As a result, the out-of-pocket spending method generated with the opinion of cost-sharing seems to be the least fair and most inefficient (Wagstaff, 1989; Xu et al., 2003).

In addition, policy makers encounter the problem of the effect of health care financing systems on the welfare of households, especially poor ones, while developing health care systems and insurance mechanisms (Xu et al., 2003). There is a general agreement that the primary goals in designing health sector reform strategies must include financial protection against high levels of out-of-pocket health

expenditure because this is considered to violate the vertical equity principle requiring that payment should be related to ability to pay (WHO, 2000).

Obviously, the level of unacceptability of out-of-pocket health expenditure, frequently referred to as ‘catastrophic’ in the literature, must be defined for reforms in health care systems to this end (Brown et al., 2014).

The literature defines “catastrophe” as the situation when households have to cut their basic expenditure to finance their health care services for a certain period, when out-of-pocket spending exceeds total household expenditure, or its share in the household’s income reaches a critical threshold. Since there is no consensus about the degree of the ratio causing catastrophe due to its share in the household’s consumption, some studies define it as 5% of the household’s income (Berki, 1986) while others accept 10% (Waters et al., 2004), 25% (Berki, 1986), or 20% (Wyszewianski, 1986) of household income as the critical threshold value.

When making catastrophic crosscheck calculations, TUIK defines households where the ratio of health spending to payment capacity is 40% and over as “*households making catastrophic expenditure*”. Non-poor households where spending other than health remains under the poverty limit determined according to the equivalent household size are defined as “*households impoverished due to health spending*” (TUIK, 2017b). Table 25 shows the ratio of catastrophic health expenditure in 2002-2016 in Turkey.

Table 25: Levels of Catastrophic Health Expenditure, 2002-2016, Turkey

-	Years														
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Percentage of poor households	4.07	4.51	4.16	3.6	3.26	2.72	2.77	2.62	1.78	1.01	1.29	1.2	1.8	1.33	0.96
Percentage of households with catastrophic health expenditure	0.81	0.75	0.84	0.64	0.59	0.68	0.36	0.48	0.37	0.17	0.14	0.22	0.31	0.30	0.29
Percentage of impoverished households due to health expenditure	0.43	0.25	0.28	0.23	0.34	0.19	0.17	0.22	0.15	0.15	0.07	0.15	0.12	0.13	0.10

Source: TUIK, 2017b.

Both the percentage of households with catastrophic health expenditure and those impoverished due to health spending fell during in this period. Between 2002 and 2016, the poor household ratio was 4.07 in 2002 while it declined to 0.96 in 2015. Although catastrophic health spending was lower than in 2002, it rose after 2011 to reach 29% in 2016.

4.4.4.8. SSI Health Expenditure

Financing of health care services in Turkey is mainly provided by SSI, as shown in Table 26. In 2017, SSI health expenditure reached 74,687,000 NCUs, with 51,260,000 NCUs on treatments, 25,166,000 NCUs on pharmaceuticals, and 948,000,000 NCUs on other spending. In 2001, the shares of SSI health expenditure on treatments, pharmaceuticals, and other spending were 39%, 53%, and 8% respectively. In 2017, 66% of spending went on treatments, 32% on pharmaceuticals, and 1% on others. Treatment expenditure increased 2,849% while pharmaceutical expenditure increased 1,034% from 2001 to 2017.

The increase in treatment expenditure may have been caused by the rise in the number of hospital applications from 124,300,000 in 2001 to 519,058,000 in 2017 (SSI, 2017c). The increase in pharmaceutical expenditure did not parallel treatment expenditure, perhaps because MED prices did not rise for approximately 10 years (Yiğit and Yiğit, 2016) while drug prices fell within the scope of HTP.

Health care service financing refers to the applicable principles and procedures for meeting the medication expenses of SSI-covered individuals by the institution, as well as the prices (MED) to be paid for these services (Mısırlıoğlu et al., 2016). If MED prices are not increased accordance with market conditions then medication expenditure remain low.

Table 26: SSI Health Expenditure, Million NCUs

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
TREATMENT	1.799	2.831	4.363	5.906	5.626	8.490	10.267	13.953	15.129	18.469	21.848	29.206	33.507	36.295	39.557	45.594	51.260
<i>MoH Hospitals</i>	1.185	1.815	2.998	4.083	3.521	5.442	6.399	7.325	7.875	9.584	11.255	16.746	19.718	21.585	23.858	28.704	31.242
<i>University Hospitals</i>	330	620	827	1.079	1.083	1.325	1.523	2.247	2.572	3.558	4.100	5.152	5.950	6.516	7.087	8.133	10.264
<i>Private Hospitals</i>	284	396	538	743	1.021	1.723	2.345	4.381	4.682	5.327	6.493	7.308	7.839	8.194	8.612	8.757	9.754
PHARMACEUTICALS	2.434	4.300	5.615	6.399	7.001	8.372	8.858	10.717	13.161	13.547	14.144	14.300	15.590	17.388	18.895	21.374	25.166
PRESCRIPTIONS COST													83	154	145	217	313
OTHER	343	498	685	846	980	805	859	676	521	541	550	645	757	765	814	863	948
<i>Medical Equipment, Optics etc.</i>	299	433	573	712	871	659	655	409	225	493	508	605	708	713	758	807	893
<i>Travel Allowance</i>	44	66	112	133	110	146	203	267	296	47	42	40	49	51	55	56	55
SUM	4.576	7.629	10.662	13.151	13.607	17.667	19.983	25.346	28.811	32.557	36.542	44.151	49.938	54.603	59.411	68.048	77.687

Source: SSI, 2017c.

4.4.4.9. Distribution of Health Expenditure by Service Provider

Turning to the distribution of health expenditure by service providers in Turkey, according to the data of TUIK (Table 27), total health spending was 24,279,000,000 NCUs in 2003 and 57,911,000,000 NCUs in 2009, an increase of 139%. In 2016, total health spending reached 119,756,000,000 NCUs from 61,678,000,000 NCUs, an increase of 94%.

The share of current health expenditure in total health spending was 98% in 2003, fell to 95% in 2009, and was 94% in 2016. In 2016, the top three spending items in the current health expenditure of public and private sectors were hospitals, retail sales, and other medical supplies, as well as expenditure on ambulatory health care (TUIK, 2017b).

Table 27: Distribution of Health Expenditure by Service Provider

	Health expenditure by service providers																				
	2003			2004			2005			2006			2007			2008			2009		
	General total	General Government Total	Private sector Total	General total	General Government Total	Private sector Total	General total	General Government Total	Private sector Total	General total	General Government Total	Private sector Total	General total	General Government Total	Private sector Total	General total	General Government Total	Private sector Total	General total	General Government Total	Private sector Total
Total health expenditure	24 279	17 462	6 817	30 021	21 389	8 632	35 359	23 987	11 372	44 069	30 116	953 12	50 904	34 530	374 14	57 740	42 159	580 14	57 911	46 890	11 021
Current health expenditure	23 676	16 859	6 817	28 616	20 519	8 098	33 292	22 554	738	40 949	28 194	755	46 495	31 981	514	52 320	38 033	286	55 294	44 511	783
Hospitals	8 579	7 555	1 024	11 425	10 380	1 044	12 649	11 170	1 480	16 170	14 701	1 469	19 030	16 841	2 189	22 984	20 906	2 078	23 241	21 443	1 798
Nursing and residential care facilities	78	-	78	0	-	0	1	-	1	1	-	1	1	-	1	2	-	2	1	-	1
Providers of ambulatory health care	4 414	1 556	2 857	4 412	1 497	2 915	5 628	1 630	3 998	6 556	1 897	4 659	7 777	2 380	5 396	7 762	2 532	5 230	8 733	5 061	3 673
Retail sale and other providers of medical goods	8 750	6 768	1 982	10 245	7 845	2 399	12 332	9 218	3 114	14 789	10 881	3 908	16 040	11 937	4 103	17 608	13 819	3 789	20 018	16 102	3 916
Provision and administration of public health programs	200	186	14	258	243	14	281	264	17	337	318	19	376	355	21	395	369	26	699	699	-
General health administration and insurance	506	254	252	251	-	251	290	-	290	332	-	332	368	-	368	459	-	459	294	184	110
Not specified by kind	1 149	539	610	2 026	553	1 473	2 111	273	1 838	2 765	398	2 367	2 903	468	2 435	3 110	408	2 702	2 307	1 021	1 286
Investment	603	603	-	1 405	871	534	2 067	1 433	634	3 120	1 922	1 198	4 409	2 549	1 860	5 420	4 126	1 294	2 616	2 379	237

	2010			2011			2012			2013			2014			2015			2016		
	General total	General Government Total	Private sector Total	General total	General Government Total	Private sector Total	General total	General Government Total	Private sector Total	General total	General Government Total	Private sector Total	General total	General Government Total	Private sector Total	General total	General Government Total	Private sector Total	General total	General Government Total	Private sector Total
Total health expenditure	61 678	48 482	13 196	68 607	54 580	14 028	74 189	58 785	15 404	84 390	66 228	18 162	94 750	73 382	21 368	104 568	82 121	22 446	119 756	94 012	25 744
Current health expenditure	58 623	45 726	12 897	65 372	51 728	13 644	70 288	55 648	14 640	79 702	62 447	17 255	88 878	68 974	19 904	96 786	75 622	21 163	112 540	88 279	24 261
Hospitals	24 933	22 497	2 436	28 543	26 135	2 408	36 088	29 609	6 479	41 785	34 095	7 689	46 429	37 606	8 823	51 083	41 521	9 562	60 141	49 099	11 042
Nursing and residential care facilities	2	-	2	2	-	2	2	-	2	2	-	2	1	-	1	1	-	1	1	-	1
Providers of ambulatory health care	11 024	6 333	4 691	13 082	8 027	5 056	10 125	7 718	2 407	10 807	7 978	2 830	11 624	8 334	3 290	12 341	8 857	3 484	14 257	10 283	3 974
Retail sale and other providers of medical goods	19 275	15 171	4 104	20 331	15 855	4 476	19 106	14 492	4 614	21 230	15 742	5 489	24 136	17 627	6 509	25 888	19 122	6 766	29 321	21 675	7 646
Provision and administration of public health programs	664	664	-	579	579	-	2 546	2 546	-	3 167	3 167	-	3 836	3 836	-	4 374	4 374	-	5 355	5 355	-
General health administration and insurance	289	155	135	317	171	146	345	194	151	312	207	106	374	225	149	416	241	174	498	272	227
Not specified by kind	2 436	907	1 529	2 518	961	1 556	2 077	1 090	987	2 398	1 258	1 140	2 479	1 346	1 133	2 683	1 507	1 176	2 967	1 596	1 371
Investment	3 054	2 756	299	3 236	2 852	384	3 901	3 137	764	4 688	3 781	907	5 871	4 407	1 464	7 782	6 499	1 283	7 216	5 733	1 483

Source: TUIK, 2017b.

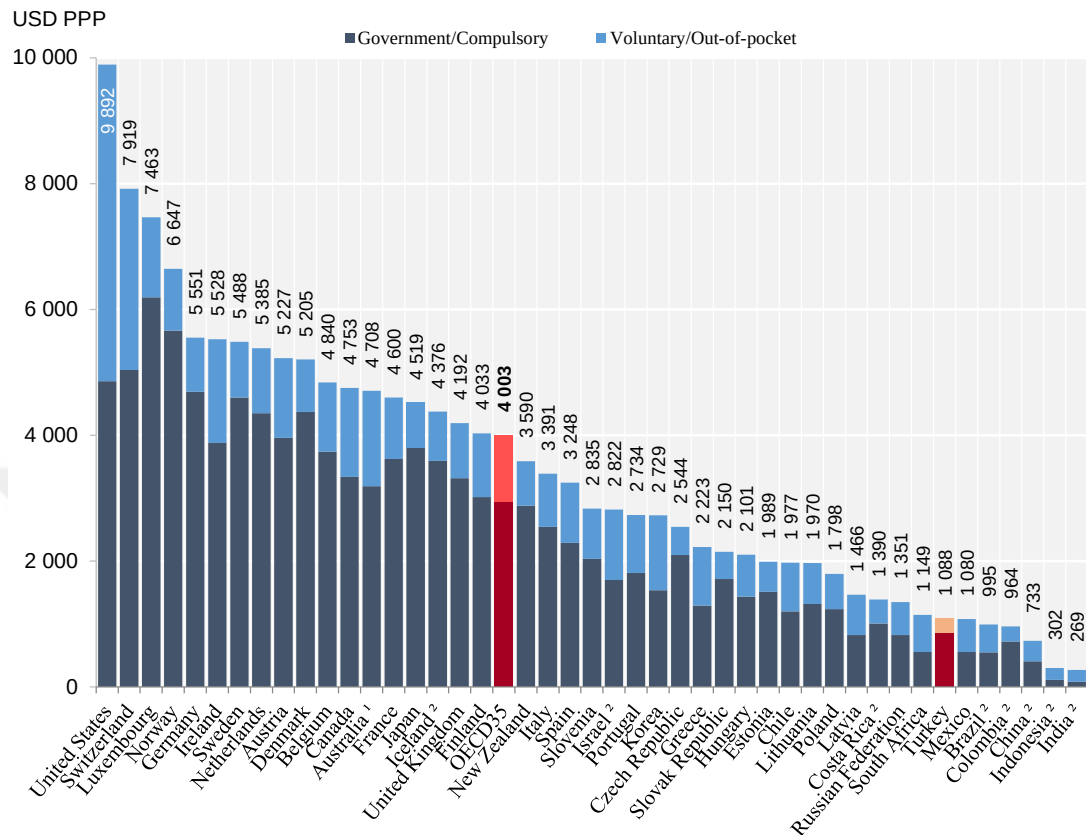
4.4.5. International Comparison of Health Expenditure in Turkey

4.4.5.1. Health Expenditure per Capita, OECD

The financial resources allocated to health care vary among countries according to their welfare levels, organizational structure of the health care system, the structure and needs of the country's population, and the expectations of citizens. The amount allocated for health expenditure tends to increase together with a country's level of development and income per capita.

Figure 19 compares countries' 2016 health expenditure per capita in terms of purchasing power parity. In 2016, the United States spent 9,892 USD per person, making it the highest spending country among all OECD countries. Its spending level is approximately two and a half times the average of all OECD countries (USD 4,003) and is followed by Switzerland, which is 25% less. Health care spending per person in the United States is nearly 80% above Germany's and more than twice as much as Canada, France, and Japan among the other G7 countries. Many central and Eastern European OECD members, like Estonia, and Poland spend half or less than the OECD average on health care. At 1,088 USD, Turkey is among the countries that allocate the fewest resources to health expenditure per person. Recent figures available show that the lowest per capita spenders on health in the OECD were Mexico and Turkey with levels of almost a quarter of the OECD average. This is also similar to the spending by the leading emerging economies, such as the Russian Federation, South Africa, and Brazil (OECD, 2017a).

Figure 24: Health Expenditure per Capita, 2016 (or nearest year), OECD



1. Mainland Norway GDP price index used as deflator.
2. CPI used as deflator.

Source: OECD, 2017a: 133.

4.4.5.2. Annual Average Growth Rate in per Capita Health Expenditure, OECD

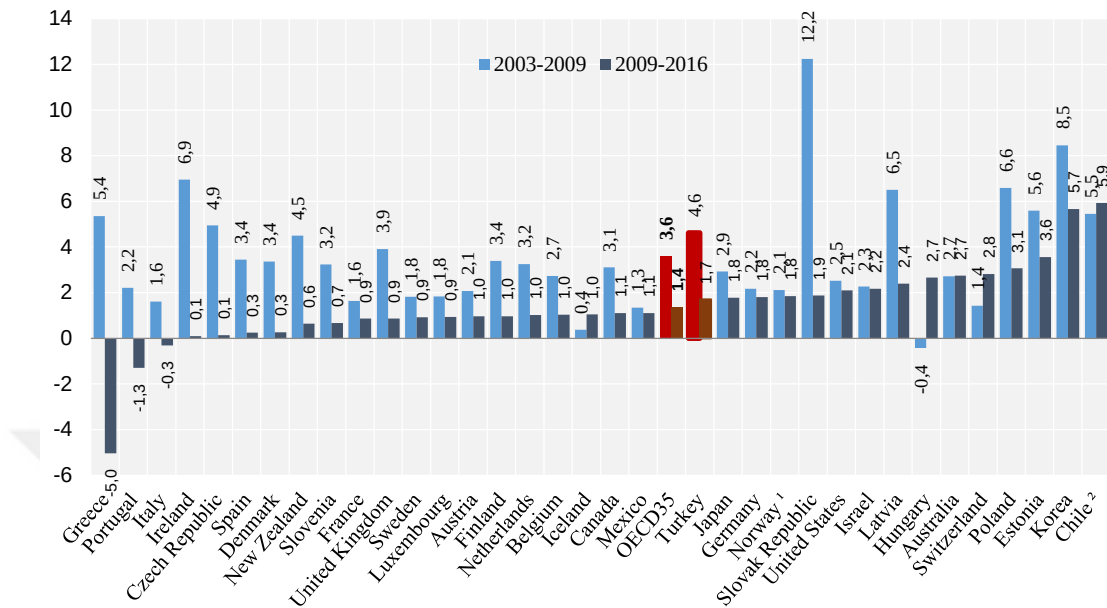
The average annual growth rates of total health expenditure are presented in Figure 20. In recent years, health care spending per capita among OECD countries has increased and went on growing in 2016 as well. This increase corresponds to the time following global financial and economic crisis between 2009 and 2011, when health spending experienced a sudden decline. Since 2009, the increase in the average yearly health spending among the OECD countries has been 1.4%, compared to 3.6% in the previous six-year-period (Figure 25).

Several countries saw significant turnarounds in annual growth rates in health spending in the years before compared with after the financial crisis. In Greece, strong annual growth increases were reversed after 2009 (5.4% versus -5.0%). A similar if less dramatic picture is also observed in Portugal (2.2% versus -1.3%). In general, health spending growth slowed down in the vast majority of OECD countries while preliminary figures or estimations for 2016 also point to negative or near-zero growth in a few countries. Only four countries – Iceland, Hungary, Switzerland, and Chile – have recorded higher average growth in the period since 2009 compared to the period before.

Annual growth rates in health spending were significantly different before and after the financial crises in several countries. Greece, for example, had good annual growth rates, which changed after 2009 (5.4% versus -5.0%). Likewise, the growth rate was reversed in Portugal from 2.2% to -1.3% in the given period. On the whole, most OECD countries experienced a decline in health spending growth rates; in fact, in some of these countries, preliminary estimates for 2016 show negative to near-zero growth. Only in Iceland, Hungary, Switzerland, and Chile has average growth been higher since 2009 compared to the period before. On the other hand, annual health spending in Hungary, Poland, and Estonia has grown at a rate of 2.7-3.6% since 2009, which can be considered relatively strong (OECD, 2017a).

In 2003-2009, Turkey had a growth rate of 4.6%, which was higher than the OECD average of 3.6%. Similarly, in 2009-2016, health expenditure fell by 1.4 across the OECD countries whereas Turkey saw a fall of 1.7 in the average annual growth rates of total health expenditure, which was again higher than the OECD average. During the reform process initiated with the 2003 HTP program in Turkey, radical changes were made to Turkey's health care system and resources allocated to health expenditure increased rapidly. Thus, Turkey had a higher expenditure rate than the OECD average despite the decline in health spending following the financial crisis of 2008-2009.

Figure 25: Annual Average Growth Rate in per Capita Health Expenditure, Real Terms, 2003 to 2016 (or nearest year)

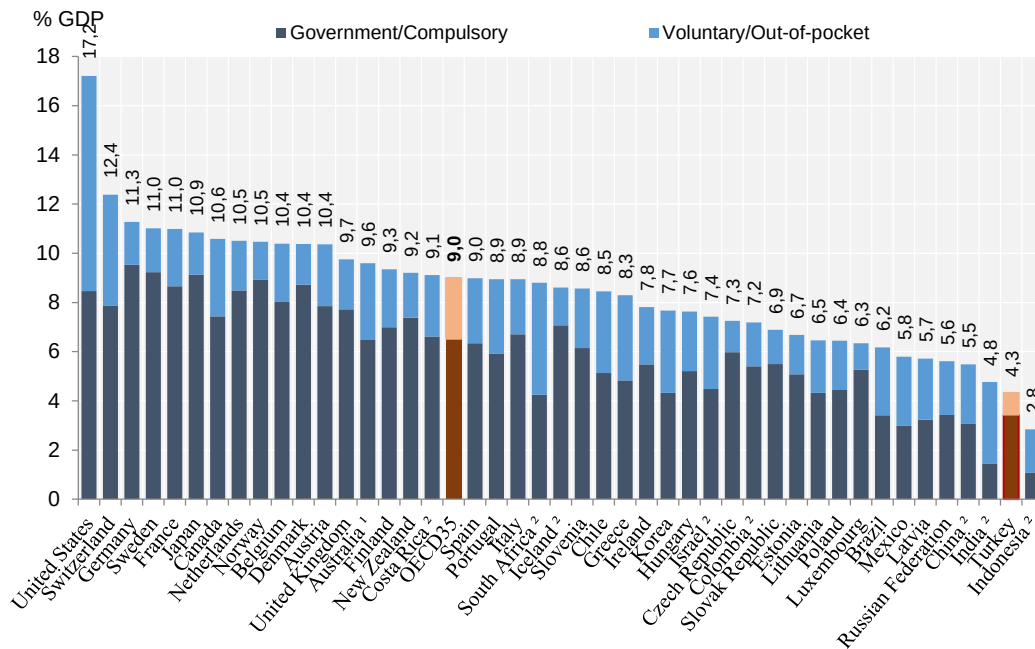


Source: OECD, 2017a: 135
 1-Mainland Norway GDP price index used as deflator.
 2- CPI used as deflator.

4.4.5.3. Health Expenditure as a Share of GDP, OECD

The share of expenditure on health care compared to other goods and services may be associated with both growth in health spending and the overall performance of the country's economy. Figure 21 shows the resources allocated to health care out of GDP by country. Health spending accounted for 9.0% of GDP across OECD countries in 2016, which has not changed much recently. In 2016, 17.2% of GDP was spent on health in the United States, which is nearly 5% higher than the next country, Switzerland, and over 8% higher than the average across OECD (Figure 26). Ten countries with high incomes, such as Germany, France, Japan, and Canada, were next on the list, spending 11% of GDP on health care while another group across Europe, together with Australia, New Zealand, and South Africa, spent 8-10% of GDP on health. In another group of countries in Central and Eastern Europe, including Hungary, the Czech Republic, and Poland, 6-8% of GDP was spent on health services. Finally, Mexico, Latvia, and Turkey spent about 4.3% of GDP (less than 6%) while Turkey had a similar share of GDP spent on health to India's (OECD, 2017a).

Figure 26: Health Expenditure as a Share of GDP, 2016 (or nearest year)

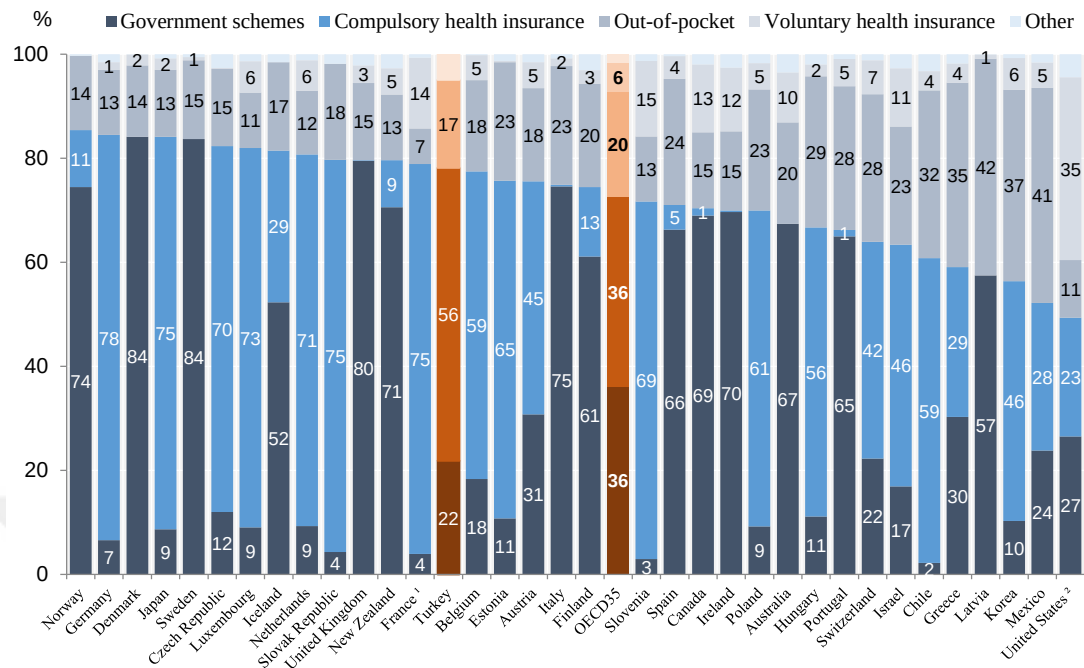


Source: OECD, 2017a: 135.

4.4.5.4. Health Expenditure by Type of Financing, OECD

Figure 27 shows health expenditure across OECD countries according to their financing methods. The public sector constitutes the main source of financing in health care services in almost all OECD countries. As clearly seen in Figure 22, approximately three thirds of all health expenditure was financed by the public in 2015. In Denmark, Sweden, and the United Kingdom, 80% or more of all health spending was financed by ,central, regional, or local government. In Germany, Japan, France, and the Slovak Republic, on the other hand, compulsory health insurance paid for over 75% of all health spending. The United States was the only country where less than half of health spending was financed by the government or compulsory health insurance whereas a large proportion (35%) was paid for through voluntary health insurance. In Turkey, on the other hand, the general public health expenditure rate was 22% in 2015, the social security expenditure rate was 56%, and out-of-pocket spending was 17%. Regarding OECD averages, these ratios were 36% for public spending, 36% for social security spending, 20% for out-of-pocket expenditure, and 6% for private health insurance (OECD, 2017a).

Figure 27: Health Expenditure by Type of Financing, 2015 (or nearest year)

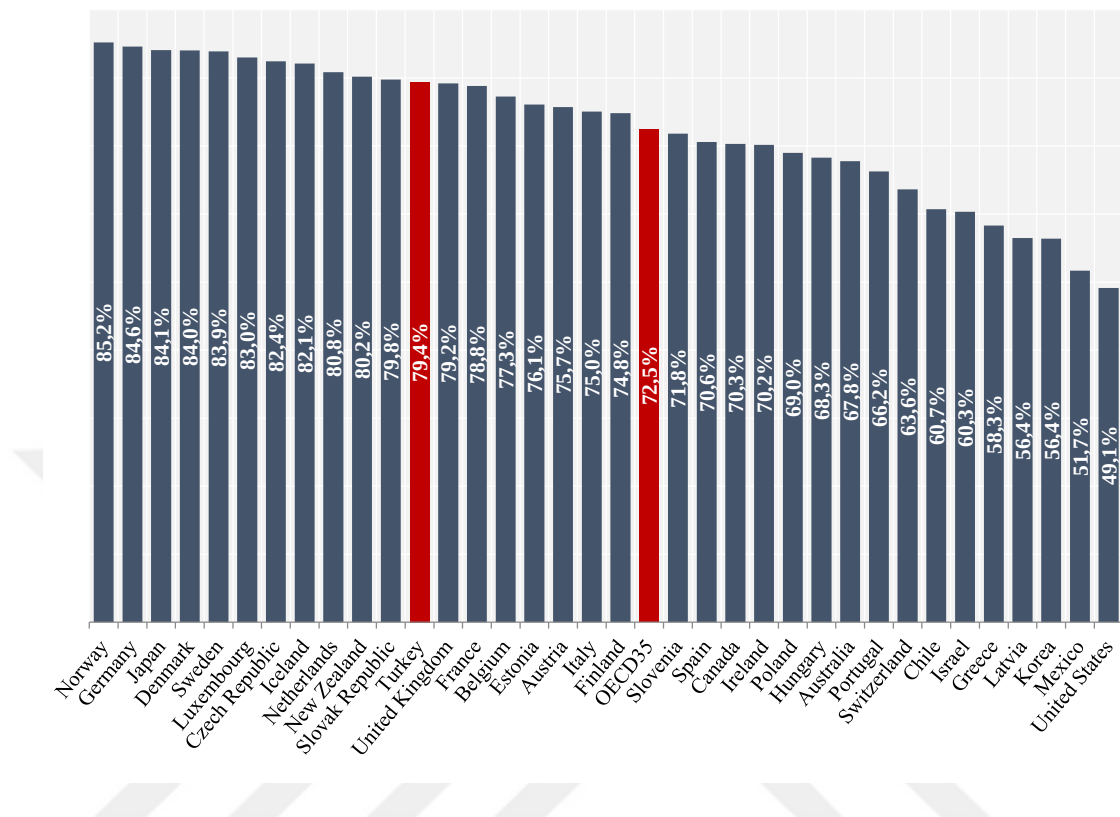


Source: OECD, 2017a: 136.

4.4.5.5. Government and Compulsory Schemes as Share of Health Expenditure by Type of Financing, OECD

Considering the share of public health expenditure among the total health expenditure of OECD35 countries, it can be seen that public health expenditure was higher in Turkey than in many OECD35 countries. The rate of average public health expenditure was 72.5% across OECD35 countries while it was 79.4% in Turkey (Figure 23).

Figure 28: Government and Compulsory Schemes as Share of Health Expenditure, 2016 (or nearest year)

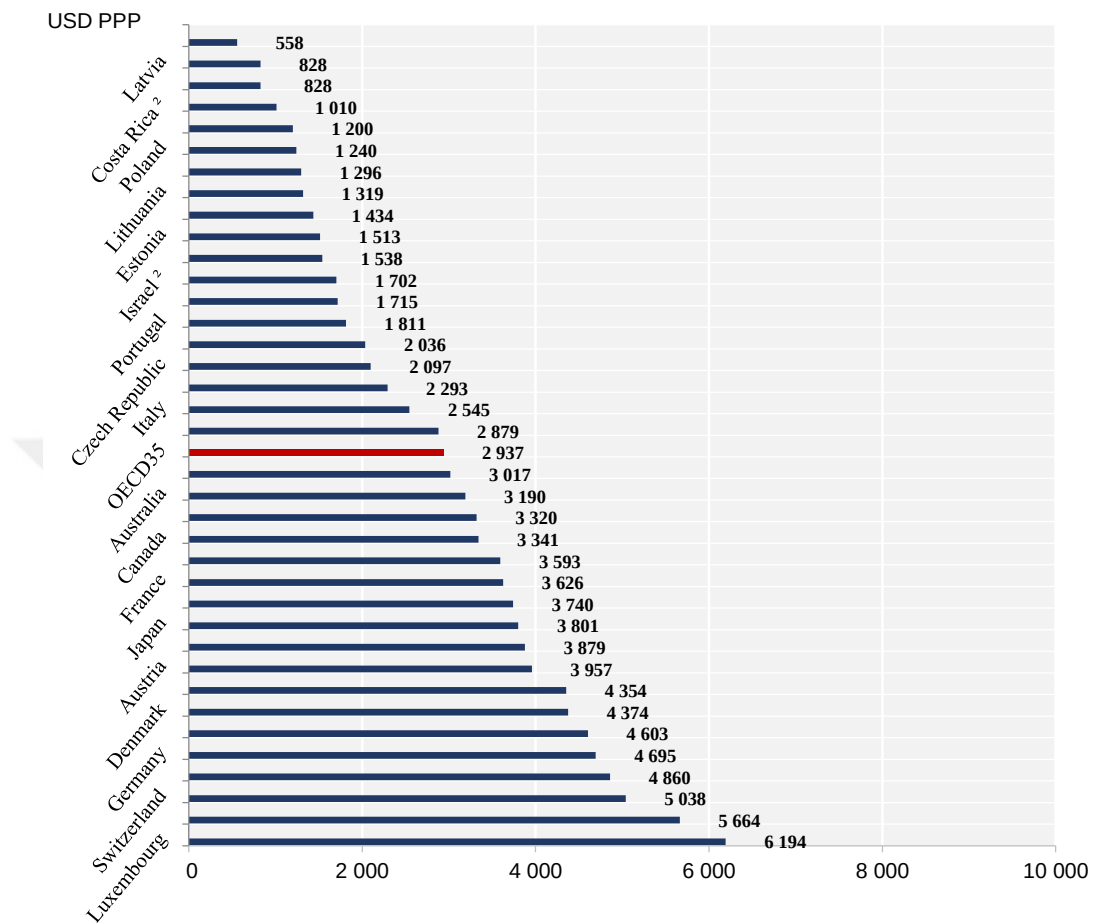


Source: OECD, 2017b.

4.4.5.6. Government and Compulsory Schemes Health Expenditure per Capita, OECD

Figure 24 presents the level of public health expenditure per capita in 2016 or the closest year compared to purchasing power parity. Public health expenditure per person was 863 USD in Turkey while the OECD average was 2,937 USD, which indicates that Turkey lies far behind the OECD35 average. The highest public spending per capita is in Luxembourg was 6,194 USD whereas Mexico has the lowest rate among the OECD countries at 558 USD.

Figure 29: Government and Compulsory Schemes Health Expenditure per Capita, 2016 (or nearest year)

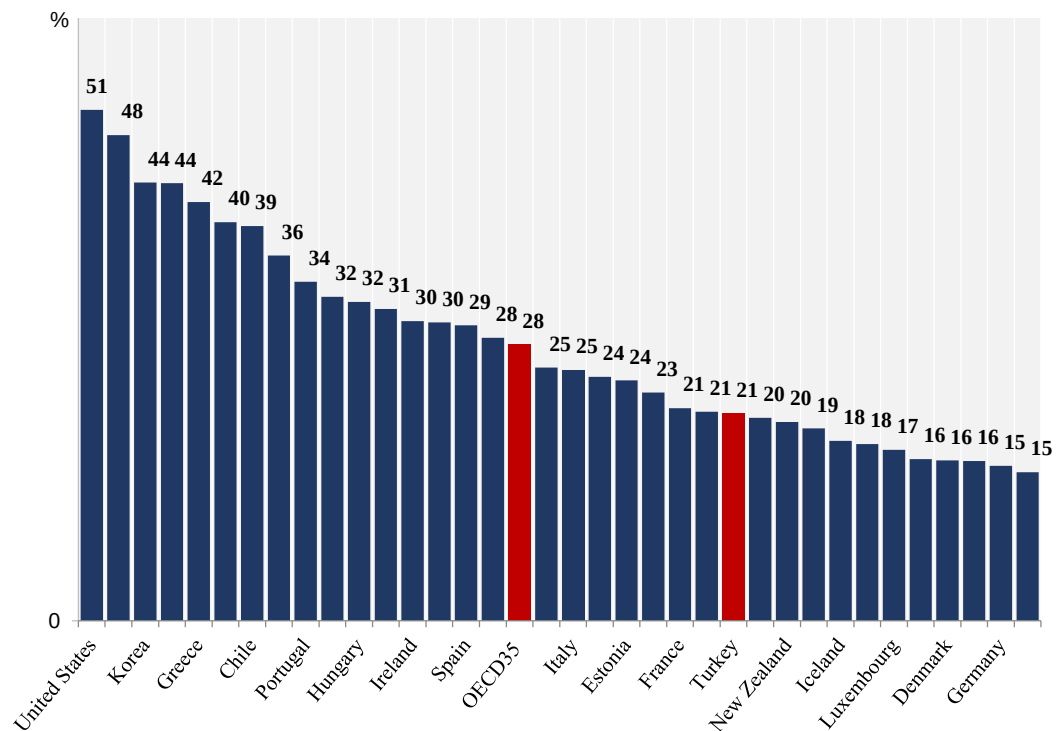


Source: OECD, 2017b.

4.4.5.7. Voluntary Schemes and Household Out-of-pocket Payments as Share of Health Expenditure, OECD

Figure 30 shows the share of out-of-pocket health expenditure in total health expenditure across OECD countries. The country with the highest out-of-pocket health expenditure is the USA with at 50.9%, followed by Mexico with 48.3%. The OECD35 average is 27.5% while Turkey is below the OECD average at 20.6%. However, out-of-pocket health expenditure is known to have increased in recent years in Turkey.

Figure 30: Voluntary Schemes and Household Out-of-pocket Payments in Health Expenditure 2016 (or nearest year)

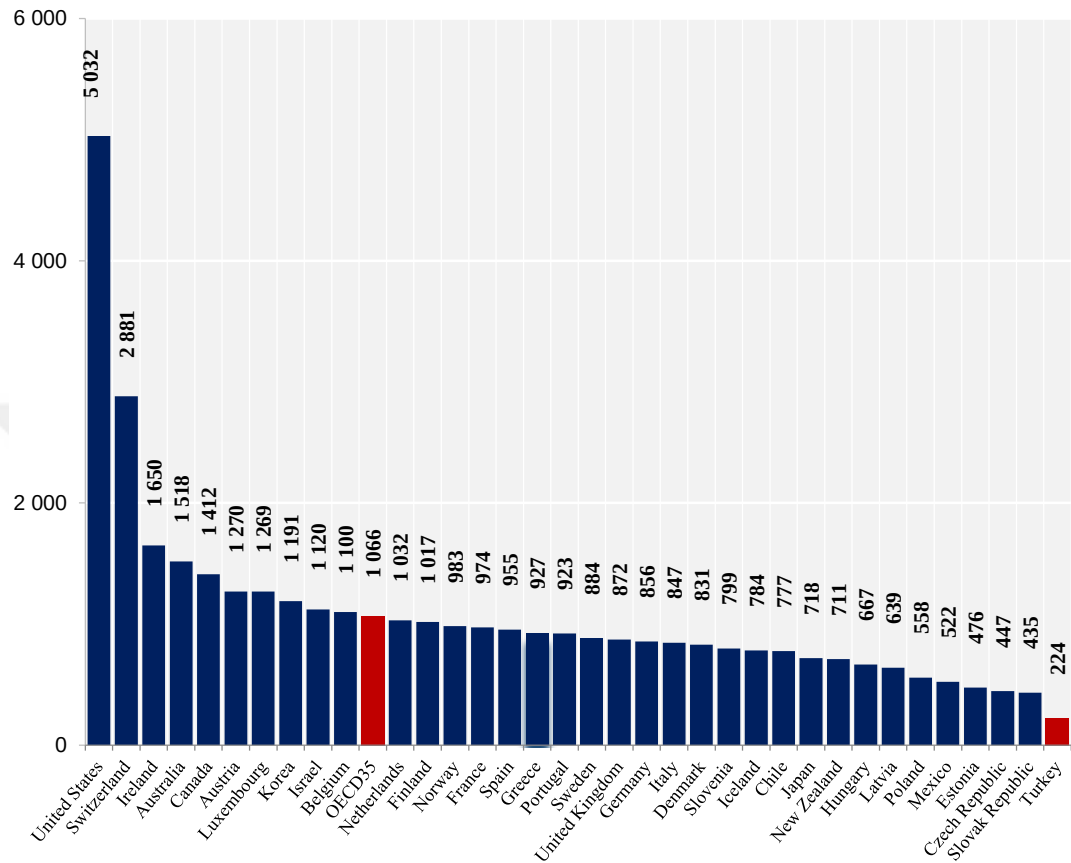


Source: OECD, 2017b.

4.4.5.8. Voluntary Schemes and Household Out-of-pocket Payments in Health Expenditure per capita, OECD

Data concerning health expenditure per capita across OECD countries is presented in Figure 24. Turkey has the lowest share in out-of-pocket expenditure at 224 per person USD. The OECD average is 1,066 USD while the USA has the highest costs at 5,032 USD.

Figure 31: Voluntary Schemes and Household Out-of-pocket Payments in Health Expenditure per Capita 2016 (or nearest year)



Source: OECD, 2017b.

Although UHI in Turkey is large, health indicators are still among the lowest in the OECD (OECD, 2014).

CHAPTER FIVE

EMPIRICAL ANALYSIS: FINANCIAL SUSTAINABILITY OF THE TURKISH HEALTH CARE SYSTEM

5.1. DATA AND METHODOLOGY

5.1.1. Purpose of the Study

Financial sustainability is a broader concept than financial condition or fiscal distress because it covers three dimensions: debt, revenues, and services (IFAC 2013; Rodríguez et al., 2016). The financial sustainability of health care systems is an issue that has frequently come up in recent years. Similarly, it has been a common topic of discussion in Turkey, and reforms implemented in the health care system since 2003 have made this issue even more popular. The health sector reforms in Turkey are considered to have been among the most successful of middle-income countries undergoing reform. Numerous articles have been published that review these reforms in terms of, financial sustainability, efficiency, equity, and quality. Evidence suggests that Turkey has indeed made significant progress, although these achievements are uneven across regions, and their long-term financial sustainability is unresolved due to structural problems in employment. As yet, there has been no comprehensive evidence-based analysis of the financial sustainability of Turkey's health care system. In this respect, this study aims to define financial sustainability based on experts' opinions and to determine the financial sustainability of the Turkish health care system through quantitative data.

The primary aim is to evaluate the financial sustainability of the Turkish health care system. In this study, specific comparisons of the expenditure-resource base indicators of financial sustainability was made. This analysis should determine whether government health spending is rising faster than the resources of country. This evaluation is expected to reveal the Turkish health care system's current and past financial sustainability status. It is also expected to reveal the economic changes in the system as a result of the health reforms implemented by policy makers.

This study will contribute to the literature by identifying developments in the Turkish health care system regarding financial sustainability for 1980-2016. Financial sustainability may be separated into two, one of which is sustainability in general health expenditure and the other one of which is financial sustainability in terms of institutions within the health care system. One of the important institutions in health care system is public university hospitals (PUnH). PUnH in Turkey have a different organizational structure to university hospitals elsewhere in the world because they are company with revolving funds. Since their primary aim is not to make profit, it is possible to consider them as non-profit organizations. On the other hand, they need to act in accordance with the company's principles because the health care service they provide has a charge. PUnH have high treatment costs. Indeed, as academic institutions, they are responsible for providing education and research in addition to health service. PUnH are thus supposed to conduct academic and clinical activities simultaneously to realize their missions (Uğurluoğlu, 2015). This requires increasing the productivity and supply of cost-effective health services and guaranteeing financial sustainability. The financial sustainability of PUnH, which are important in terms of health service provision and quality in Turkey, is often discussed in the media, although studies regarding this are few. The secondary aim of the study is thus to evaluate the financial sustainability of PUnH.

5.1.2. Problem Statement of the Study

This study tries to answer the following three fundamental questions:

- What are experts' opinions about financial sustainability in Turkey's health care system?
- Is Turkey's health care system financially sustainable?
- Are Turkey's public university hospitals financially sustainable?

5.1.3. Population and Sample

This study consists of three parts: analysis of experts' opinions, evaluation of the financial sustainability of Turkey's health care system, and evaluation of the financial sustainability of PUnH.

The population of the study for gathering expert opinions consists of the participants of the First International Congress on Patient Safety and Health Financing. The reason for choosing this congress is that the main theme of the congress was "patient safety for sustainable health financing" and that the congress mainly sought an answer to the issues of the new modeling of Turkey's health care system pricing and creating an international perspective that prioritizes patient safety. As one of the most used methods in qualitative research, purposive sampling was used in this study. Purposive sampling allows using judgment to choose cases that will help find answers to your research questions in the best way to meet your objectives (Neuman, 2005). This study included 6 individuals from the MoH, 2 from SSI, 9 from private hospitals, 1 individual from training and research hospitals, 1 from HSSWU, 5 individuals from university hospitals, 5 from universities, 3 from medical companies, and 1 individual from the International Consortium for Health Outcomes Measurement (ICHOM). In total, 33 individuals participated in the study by responding to open-ended questions. Of the 15 people who refused to take part, 7 individuals worked in SSI, 2 in university hospitals, 3 in universities as academics and 3 in MoH. A great majority of the participants were academics.

Second part of study employed public data sources. In order to evaluate the financial sustainability of the health care system, GDP, total health expenditure (THE), government health expenditure (GHE), government total spending excluding interest payments (GTS-I), and government tax revenues (GTR) were used for 1980-2016.

For the third part of the study, 44 PUnH were evaluated that are registered with the Revolving Fund Financial Management (RFFMS) System. Their names and abbreviations can be seen in Appendix 1.

5.1.4. Limitations and Assumptions

The study used both qualitative and quantitative research models in order to attain its goals. In the qualitative part, interviews held with the participants were limited to the semi-structured interview forms developed for the interviews, the interview records, and the academic experience of the researcher in qualitative research. The opinions of the participants reflect their own personal opinions, not those of their institutions. Therefore, they cannot be generalized as institutional opinions. It is assumed that the participants' responses to the semi-structured interview were truthful. In addition, the individuals who were interviewed are specialists in their fields and had sufficient knowledge and experience to give reasonably applicable answers to the questions.

For the quantitative part of study, since the longest period that could be accessed for data concerning THE and GHE was 1980-2016, evaluations including health expenditure were limited to this period.

There are some restrictions in evaluation of financial performances of PUnH. These restrictions are as follows;

1. University hospitals do not record their tangible assets in their balance sheet as a matter of their legislations. Instead, they are recorded in the balance sheet of the university. The exact value of tangible fixed asset cannot be determined.
2. Some of the university hospitals do not record any inventory entries.
3. The fact that tangible assets and inventories are not included in the balance sheet results in the appearance of negative equity.

5.1.5. Data Collection

Qualitative research allows for carrying out inductive analyses with a holistic approach benefitting from the experiences of the participants interviewed (Yıldırım and Şimşek, 2013). In terms of experts' views and evaluations, a semi-structured interview form was designed in order to collect the qualitative data concerning

financial sustainability. The semi-structured interview form² consisted of 2 sections. In the first section, participants were asked about their individual and demographic information with 5 questions. The second section included 5 open-ended questions asking about the participants' opinions on financial sustainability. The semi-structured interview form asked the participants open-ended questions about the meaning of the concept of financial sustainability of the health care system, whether the Turkish health care system is financially sustainable or not, problems affecting financial sustainability of the Turkish health care system, internal and external factors affecting financial sustainability, and their recommendations for the maintenance of financial sustainability. The interviews were held face to face with the participants, who agreed to respond during their free time at the conference. Due to the nature of interviews, the order of semi-structured questions was sometimes changed. The interviews took place between November 22 and 26, 2017. Some participants permitted the use of a voice recorder, while the responses of those who refused to allow the voice recorder were noted by the researcher. The interviews lasted for 20 to 45 minutes.

GDP data were obtained from the World Bank Development Indicators database (2017). GHE, government total spending (GTS), GTR, and GTS-I were obtained from the General Directorate of Budget and Fiscal Control (GDBFC) (BÜMKO, 2018a).

GDP, THE, GHE, GTS-I, and GTR measured in NCUs, were deflated using the World Bank yearly GDP deflator³ based on 2009 (World Bank, 2017).

5.1.6. Data Analysis

5.1.6.1. Content Analysis

For the experts' views, the evaluation of the open-ended responses was carried out using Maxqda 12, one of the programs used for qualitative analysis. Qualitative data obtained from the semi-structured interview forms were arranged into word documents separately for each participant and transferred into the program. Each

² The semi-structured interview form can be seen Appendix 2.

³ The GDP deflator can be seen in Appendix 3.

question was assessed individually and content analysis conducted using Maxqda 12. For the content analysis, a coding system was developed based on the data obtained from the interviews and the analyses were carried out in accordance with the coding list. In addition, one content analysis method, frequency analysis, was employed as well. Words, phrases, or sentences were turned into their related codes, which allowed for numbers and frequencies to be extracted. In addition to the codes, other remarkable and significant responses were quoted as stated.

5.1.6.2. Financial Sustainability of Health Care System

This study aims at evaluating the financial sustainability of the Turkish health care system. First, it compares the growth of resources (e.g. GDP and government revenue) with the growth of government health expenditure. It is a matter of concern for Turkish government whether Turkey's recent general health care system, funded in a public manner, can be sustained for longer. More specifically, the most accepted indicators financial sustainability is the ratio of total health expenditure (THE) to GDP, the ratio of public health expenditure to GDP, the ratio of public health expenditure to public revenues, the ratio of public health expenditure to the average growth, growth rate of GDP against the average growth rate of public health expenditure, the percentage of health expenditure within non-interest public health expenditure, the tax revenue ratio, and the growth rate of public health expenditure (Di Matteo and Di Matteo 2012; Knowles et al., 1997; Rovere and Skinner 2011; Ruggeri, 2006). In this study, real GDP and real GTR are determined resource base indicators. Real THE, real GHE, real GTS-I are determined expenditure base indicators.

The history of Turkey's health care system can be divided into 5 periods in terms of health care reform processes: i) the pre-reform period of 1920-1960, ii) the health care reform period of 1960-1980, iii) the health care reform period of 1981-2002, iv) the health care reform period of 2003-2013, and v) the new health care vision in Turkey of 2014-2023 (Özer et al., 2015). By considering the classification in the literature and data limitations in the first section of the study, financial sustainability is examined in terms of four periods: 1980-2002; 2003-2013; 2014-2016; and 1980-

2016. In this periods, average annual growth rates and increase rate comparisons of the expenditure-resource base indicators of financial sustainability was made in.

5.1.6.3. Financial Sustainability of PUnH

One of the aim of study evaluate financial sustainability status of PUnH. Ratio analysis revolves around liquidity, activity, profitability and financial structure and is employed as the financial analysis method. Several researchers often use ratio analysis to evaluate financial status of hospitals. Table 28 indicates the ratios and definitions used in the study.

Table 28: Financial Ratios and Definitions

Financial Ratios	Definitions
Liquidity Ratios	
1-Current Ratio	Current Assets/Short-term Liabilities
2-Quick (Acid Test) Ratio	Current Assets-(Inventories+Prepayments and Accrued Income for the Next Months +Other Current Assets)/Short-term Liabilities
3-Inventories to Current Assets	Inventories/Current Assets
4-Inventory Dependency Ratio	(Short-term Liabilities-(Liquid Assets+Marketable Securities))/Inventories
5-Cash Ratio	(Liquid Assets+Marketable Securities)/Short-term Liabilities
6-Short-Term Receivables to Current Assets	(Short-term Trade Receivables+Other Receivables) / Current Assets
Activity Ratios	Definitions
1-Receivables Turnover	Net Sales/(Short-Term Trade Receivables+Long-Term Trade Receivables)
2-Inventory Turnover	COGS/Inventory
3-Working Capital Turnover	Net Sales/Current Assets
Financial Structure Ratios	Definitions
1-Short-Term Liabilities to Long-Term Liabilities	Short-Term Liabilities/Long-Term Liabilities
2-Short-Term Liabilities to Total Liabilities	Short-Term Liabilities/(Short-term Liabilities +Long-term Liabilities)
Profitability Ratios	Definitions
1-Gross Profit Margin	Gross profit/Net Sales
2-Operating Expenses to Net Sales	Operating Expenses/Net Sales
3-Operating Profit Margin	Operating Profit/Net Sales
4-Net Profit Margin	Net Profit/Net Sales

Myser (2016) investigated the financial health of non-profit organizations through determining the ratio of financial sustainability by dividing revenues by expenditure. Alonso-Cañadas et al. (2017) found that the financial sustainability of public universities in Spain can be measured in terms of two criteria: the volume of public debt and the average period of reimbursement to providers. Bundaberg Regional Council (2017) measured the financial sustainability of its public institutes through net financial liabilities ratio, operating surplus ratio, working capital ratio while Arunachalam (2016) used 10 financial ratios, including profit margin ratio, working capital ratio (current ratio), operating surplus ratio (operating cash flow to total revenue) ratio, and net financial liabilities ratio (net debt to total revenue ratio). Byus et al. (2010) used gross profit margin and return on assets as the dependent variables for measuring financial sustainability.

The Grey Relational Analysis Method (GRA) method was applied to determine the financial performance for each alternative specified in the problem to find out their significance regarding the selection criteria. In this study, the performance of the PUnH listed above in the dataset was indicated by these importance values considering the selected financial sustainability indicators. GRA was chosen for its flexibility in calculation. The power of the method can thus be maintained while analyzing the various numbers of criteria set while normalizations can be performed regarding the diverse ideal values of the criteria. Eight variables adopted as indicators of sustainability were employed in the performance rankings. Table 29 lists the selected variables and their descriptions used to evaluate the financial sustainability of PUnH.

Table 29: Financial Sustainability Indicators

Name	Formula	Ideal Value
Financial Sustainability Ratio	Total Revenue*/Total Expenses**	= 1
The Volume of Debt	Short-Term Liabilities+Long Term Liabilities	min
Net Debt to Revenue Ratio	Short-Term Liabilities+Long Term Liabilities - Financial Assets (cash and cash equivalents)/ Operating Revenue	min
The Average Period of Payment to Suppliers	Accounts Payable/(Annual Purchases/ 365)	min
Receivables Collection Period	Accounts Receivables/(Annual Sales/ 365)	min
Net Financial Liabilities Ratio	Short-Term Liabilities+Long Term Liabilities - Current Assets/Operating revenue	min
Current Ratio	Current Assets/Short-term Liabilities	1.5
Gross Profit Margin	Gross Profit/Net Sales	max

*Total Revenue=Net Sales+Income and Profit from Other Operations+Extraordinary Revenues and Profits

**Total Expenses=Cost of Goods Sold+Operating Expenses+Expenses and Losses from Other Operations+ Extraordinary Expenses and Loses+Provisions for Taxes Payable and Other Statuary Obligations

In the research, ratio analysis is used in order to determine capital structures and financial sustainability performance status of hospitals while GRA is used to see how financial sustainability performance of hospitals changes in years.

GRA Methodology

Grey System Theory, developed to solve the problems of multi-criteria decision making, is used when a decision-maker needs to consider the relationship between more than one variable and factor. GRA is an analysis method that can be used when there is incomplete or discrete information, extreme data and uncertainty in decision-making problems (Kurt Gümüş and Balcı, 2017).

Grey System Theory was developed by Deng (1982) and suggested as a solution to the problems that cannot be modelled due to incomplete data and uncertainty. Systems are symbolized as white, black and grey in grey system theory. A system with thorough information, which means there is no uncertainty, is labelled as white color whereas a system with opposing features, which means there is

uncertainty and unknown information, is defined in black color. Grey only represents the systems with partial information (Lin et al., 2004). Multi-criteria decision making methods such as Regression analysis, Cluster Analysis, Discriminant Analysis, Analytic Hierarchy Process, Analytic Network Process, Data Envelopment Process, TOPSIS, Electre are used when the data is sufficient (Feng and Wang, 2000: 135). For that reason, GRA method can be preferred when uncertainty appears.

Step 1. Decision matrix construction: The following indicates the decision matrix for the m selection criterion and the values that the n alternatives take (1):

$$x_{ij} = \begin{bmatrix} x_1(1) & x_1(2) & \dots & x_1(m) \\ x_2(1) & x_2(2) & \dots & x_2(m) \\ \vdots & \vdots & \ddots & \vdots \\ x_n(1) & x_n(2) & \dots & x_n(m) \end{bmatrix} \quad i:1,\dots,n \quad j=1,\dots,m \quad (1)$$

Step 2. Standard series construction: In the model of decision-making, standard series are the values targeted in the selection criteria.

$$x_0 = (x_0(1), x_0(2), \dots, x_0(m)) \quad (2)$$

Step 3. Normalization of the decision matrix: Since variables are measured in various units in decision-making problems, the third step of GRA is converting the data into same units. The data take values in range of [0,1]. As indicated below, there are three different normalization ways:

The following displays the normalization equation (3) in “the higher, the better” situation (3):

$$x_i^* = \frac{x_i(k) - \min_k x_i(k)}{\max_k x_i(k) - \min_k x_i(k)} \quad (3)$$

In the equation (3), $x_i(k)$ i series represents the original value in k. line, $\min_k x_i(k)$ represents minimum value in i. series, $\max_k x_i(k)$ represents maximum value in i. series, x_i^* represents the value in k. line in i. series after normalization.

The normalization equation (4) is displayed below in situation of “the lower, the better”:

$$x_i^* = \frac{\max_k x_i(k) - x_i(k)}{\max_k x_i(k) - \min_k x_i(k)} \quad (4)$$

The normalization equation (5) is indicated below in situation of “the more ideal value, the better”:

$$x_i^* = 1 - \frac{|x_i(k) - x_0(k)|}{\max(\max_k x_i(k) - x_0(k); x_0(k) - \min_k x_i(k))} \quad (5)$$

In the equation (5), $x_0(k)$ represents the required ideal value.

Step 4. Construction of the difference series: The difference matrix is constructed by taking and subtracting absolute value from normalized decision matrix. In the equation (6), the calculation of difference matrix is displayed. Difference matrix (7) is obtained by subtracting reference series from normalized decision matrix:

$$\Delta_{0i} = |x_i^*(k) - x_0^*(k)| \quad (6)$$

$$\Delta_{0i} = \begin{bmatrix} \Delta_{01}(1) & \Delta_{01}(2) & \dots & \Delta_{01}(m) \\ \Delta_{02}(1) & \Delta_{02}(2) & \dots & \Delta_{02}(m) \\ \vdots & \vdots & \vdots & \vdots \\ \Delta_{0n}(1) & \Delta_{0n}(2) & \dots & \Delta_{0n}(m) \end{bmatrix} \quad i: 1, \dots, z \quad j: 1, \dots, m \quad (7)$$

Step 5. Calculation of grey relational coefficients and construction of grey factor matrix: Grey relational coefficients are employed in calculation of approximation of series related to evaluation criteria to reference series. For this operation, firstly maximum and minimum values are found in difference matrix and then the equation (8) is constructed:

$$\gamma(x_0(k), x_i(k)) = \frac{\Delta_{min} + \xi \Delta_{max}}{\Delta_{0j} + \xi \Delta_{max}} \quad (8)$$

Δ_{max} : the highest value in the difference series

Δ_{min} : the lowest value in the difference series

ξ : Adjustment coefficient $\xi \in [0,1]$

Adjustment coefficient takes values in range of [0,1]. Generally it is taken as 0.5; however, the studies show that it does not influence the sorting process that will be constructed after grey relational grade even if the coefficient takes different values in the given range (Wen, 2004).

As indicated in the equation (9) below, grey factor matrix is composed of grey relational coefficients.

$$\gamma_{0i} = \begin{bmatrix} \gamma_{01}(1) & \gamma_{01}(2) & \dots & \gamma_{01}(m) \\ \gamma_{02}(1) & \gamma_{02}(2) & \dots & \gamma_{02}(m) \\ \vdots & \vdots & \ddots & \vdots \\ \gamma_{0n}(1) & \gamma_{0n}(2) & \dots & \gamma_{0n}(m) \end{bmatrix} \quad i:1,\dots,n \quad j=1,\dots,m \quad (9)$$

Step 6. Determination of grey relational grades: Grey relational grade is calculated by multiplying weight value of the selection criteria with each value in grey factor matrix and taking its totalization. In case weight values of the selection criteria is equal, the calculation method of grey relational grade is displayed below (Equation 10):

$$\tau(x_0, x_i) = \frac{1}{m} \sum_{k=1}^m \gamma(x_0(k), x_i(k)) \quad (10)$$

In case weight values of the selection criteria are different, the formula in equation (11) is employed:

$$\tau(x_0, x_i) = \sum_{k=1}^m \gamma(x_0(k), x_i(k)) * w_i(k) \quad (11)$$

w_i = Weight value of the selection criteria i .

In this equation (11), $w_i(k)$ shows the weight of i . selection criteria. When sorting the relational grades from highest to the lowest, the highest value indicates the best alternative while the lowest value indicates the worst alternative.

5.2. EXPERTS' OPINIONS ON THE FINANCIAL SUSTAINABILITY OF THE TURKISH HEALTH CARE SYSTEM

5.2.1. Personal and Demographic Characteristics of Participants

The demographic distribution of the 33 participants of the study show that a great majority were males (70%). As for the institution they work in, the participants were divided between private hospitals (27%), university hospitals (15%), universities (15%), and MoH (15%). Regarding the distribution of occupations, 49% of

participants were administrators while 15% were academics. Regarding length of employment at the current institution, 33% of participants had been there between 5 and 10 years while 42% had been in their present position for 5-10 years.

Table 30: Demographic Characteristics and Descriptive Characteristics of Participants

Variables	Number	Percent
<i>Gender</i>		
Male	23	69.7
Female	10	30.3
Sum	33	100
<i>Institution</i>		
MoH	6	18.2
SSI	2	6.1
Private hospital	9	27.3
Research and training hospital	1	3.0
HSSWU	1	3.0
University hospital	5	15.2
University	5	15.2
Medical company	3	9.1
ICHOM	1	3.0
Sum	33	100
<i>Working time at the current institution</i>		
Less than 5 years	5	15.2
5-10 years	11	33.3
11-15 years	4	12.1
16-20 years	10	30.3
21 years and above	3	9.1
Sum	33	100
<i>Position</i>		
Consultant	2	6.1
Expert/Specialist	1	3.0
Administrator (vice-president, chief executive officer, hospital manager)	16	48.5
Doctor	3	9.1
Unit supervisor	2	6.1
Academic	5	15.2
Diagnosis related groups (DRG) education coordinator	1	3.0
Civil servant	3	9.1
Sum	33	100
<i>Working time at the current position</i>		
Less than 5 years	14	42.4
5-10 years	14	42.4
11-15 years	2	6.1
16-20 years	2	6.1
21 years and above	1	3.0
Sum	33	100

5.2.2. Content Analysis Findings

Expert opinions on financial sustainability in the Turkish health care system obtained through the focus group interviews were analyzed in Maxqda 12 program. Since the questions were answered by 33 participants, the evaluations were conducted over 33 individuals in total.

5.2.2.1. The Concept of Financial Sustainability in the Health Care System

The interviewees were asked to define the concept of financial sustainability in the health care system. While 33 participants answered the question, 2 stated they had no idea. The concept was considered to refer to mean revenues' meeting expenses by 27% of the participants, while 18% defined it as financing health services and expenditure. These two answers which also corresponds with the most frequent definition in the literature and 15% of the participants considered to effective and efficient use of recourses allocated for the health care system (Table 31).

Table 31: Participants' Opinions on Defining Financial Sustainability in Health Care Systems

What is financial sustainability in health care systems?	Frequency	Percent
Revenues meeting expenses	9	27.27
Financing health services and expenditure	6	18.18
Effective and efficient use of recourses allocated for the health care system	5	15.15
Accurate staging of the service algorithm of the health care system	4	12.12
Treatments being comprehensive and attaining stakeholders satisfaction	2	6.06
No idea	2	6.06
A system in which real policies and strategies are formed and predictability is assured	1	3.03
Health care services ongoing without any faults	1	3.03
Cost efficiency	1	3.03
Making profit for the private sector	1	3.03
A system that places value at the forefront	1	3.03
Sum	33	100

Wang (2015) stated that system revenues must be more than health expenditure, the government must support the system in case the system needs more resources and the citizens' demand for health care services should be met comprehensively in a financially-sustainable health care system. 27% of the participants in the study, similarly defined financial sustainability as the revenues covering the expenditure while 18 % of them defined it as financing the health care services, in other words, health expenditures. It can be said that 45% of the participants emphasized the revenue and expenditure aspects of financial sustainability.

It is defined that sustainability in health care systems guarantees the existence of adequate resources in the long term which will allow reaching quality services for the health care needs that will appear (Romanow, 2002). 15% of the participants likewise defined financial sustainability in health care as "effective and efficient use of resources allocated for the health care system". Even though the definition made by the participants is not adequate to define financial sustainability precisely, it corresponds to the definition of sustainability of health care system. Resources of the system should be evaluated accurately and used efficiently and effectively so that a health care system can be sustainable.

12% of the participants defined sustainability as accurate staging of the service algorithm of the health care system. What is implied is the fact that health care system should be designed accurately and preventive and curative health care services should be properly included. Attention to design, implementation and monitoring is required by well-performing health systems. A three-tiered health care system has three steps. Primary health care centres are the places we can receive ambulatory care and should apply in the first place. Public Health Care, Family Medicine Service Centers and Centres for Maternal and Infant Health are among the institutions providing primary medical care. Secondary health care centres are the hospitals where patients are diagnosed for any disease and their treatments are given by specialists. Public hospitals and Municipality are within the institutions providing secondary health care. Tertiary health care centres are the university hospitals where medical technology is intensely used, cancer research centres and psychiatric hospitals. It is aimed to reach more patients through accurate methods by a three-tiered medical care system. Patients

who cannot be treated in a previous care centre are transferred to the latter care centre, which does not cause any congestion in a tiered health care system and allows a healthy care service. A better health outcomes is attained at lower cost thanks to a focus on primary care which makes contribution to a more sustainable, accessible, and equitable health care system (Cotlear et al., 2015). A system should be accurately designed in order that a health care system can be sustainable. It is not possible that health care services can be sustained for a long time in a system not designed accurately.

For Guyatt et al. (2002), there are mechanisms that health care system sustainability has to ensure that all citizens have ongoing access to sufficient, immediate, technologically advanced, and humane health care that can cover all their needs. Likewise, 6% of the participants defined financial sustainability of health care system as “treatments being comprehensive and attaining stakeholder satisfaction”. The participants defined general sustainability of the system rather than financial sustainability. While sustainability of health care system is being discussed, one of the leading topics is the fact that resources are restricted, human needs grow steadily despite this and health expenditures increase excessively due to both extended life expectancy and senility period and technological advances. Health expenditure has risen swiftly in the last 15 years in Turkey. With this increase, satisfaction from health care services has also risen and reached to 72% in 2017 (TUIK, 2016). Although it is not known whether the satisfaction of all the stakeholders in the health care system is ensured with the transformation process, it is certain that the satisfaction of the society in health services increased.

3% of the participants defined sustainability as a system in which real policies and strategies are formed and predictability is assured. The policies and strategies enforced take place in the second section of Birch et al. (2015)’s Health Care Sustainability Framework. It is important to enforce right policies in order to maintain the sustainability in health care systems. It is likely to say that sustainability in health care systems is also a political choice. Health policies enforced have a direct influence on financial sustainability. Balance of revenue and expenditure can be maintained by dampening health expenditure and restricting the health care service scope. However, this situation may especially result in the problem that health care needs of low-income

individuals are not met. It is clear that this may affect health of the society adversely in the long run. Therefore, strategies and policies to be implemented for a sustainable health system should be selected very carefully by policy makers.

For Prada et al. (2014), a sustainable health care system is a system which protects individuals' health and provide health care needs until the end of their lives. 3% of the participants defined sustainability as "health care services ongoing without any faults". It is implied by this that citizens' right to benefit from health care services needs to be provided without any restriction and fault at present and for the future generations. As of 2017, in Turkish health care system, 98% of the population can access health care service in scope of UHI. This ratio is a very high. It is one of the fundamental requirements of a sustainable health care system the fact that the individuals can access the service they need. Financing is essential; however, a UHI program is not worse than the services it can buy, and if they are unavailable when and where they are needed, no effort toward UHI will be complete. The capacity of health care provision must be considered by the policy makers and necessarily it must be enhanced to attain their UHI objectives (Cotlear et al., 2015).

3% of the participants defined financial sustainability of health care system as "cost efficiency". This definition is one of the elements that need to be achieved in order to maintain financial sustainability even though this depiction is insufficient. It is not likely to design a sustainable health care system as long as costs of the health care systems provided are not accurately determined and cost-efficiency and precise pricing is not made.

3% of the participants clarified financial sustainability of health care system from the perspective of private sector and defined it as earning profit. To USAID (2001), financial sustainability can be marked by an organization's excess revenues over expenses, accessible cash to pay bills and the relation between assets and debt or liabilities. This definition can be accepted accurate when evaluating financial sustainability in terms of private health institutions in a health care system.

Value is one of the most significant matters to be focused while discussing about financial sustainability in a health care system. In the simplest terms, the notion of "value" formulated by comparing health outcomes to its costs is considered in a

perception different than efficiency comparing inputs to outputs in a classical meaning. On one hand, the notion of value is balanced with equity and considered in every aspect and phase of health management. Herein, value-based health care service approach becomes a current issue. Thomson et al. (2009b) stated that the value generated by health care must outstrip its opportunity cost in order that health systems can be financially sustainable. Although the notion of value has just been begun to be discussed in Turkish health care system, value must be foregrounded for a sustainable health care system.

Examples of the Participants Definitions

The participants considered the concept of financial sustainability from different viewpoints. One participant, for example, gave the following definition with an emphasis on value:

“It is a system that maximizes the quality of service provided to patients by placing value to the forefront and aims to do this with the minimum cost as well. I believe what we have to do is not to focus solely on quality or finance. We have to focus on value. And when it comes to measuring the success of the health care system, we need to elaborate on maximizing the quality of services provided to patients. We have to work for fulfilling this with the lowest cost possible. If we manage to do this, if we can determine the high cost of health care systems, it is what would help us always be sustainable”

Another participant considered the economic aspect of the service to be delivered and offered the following definition:

“Financial sustainability in health is the potential to economically meet the service liabilities that the health care system desires to provide for citizens.”

Another participant suggested the following definition, which emphasizes the importance of the organizational structure among service providers within the health care system.

“Financial sustainability in health is allocating the resources properly through accurate staging of the service algorithm of the system and managing the system through data.”

One participant highlighted business logic in the following definition:

“It is a system in which hospitals are able to balance revenues and expenses on equal terms, provide health care services at the highest quality and get by with what they have. There are three types of management models in financing in health; successful, unsuccessful and breakeven point. In the successful model, the health care system makes a profit, while in the breakeven point they both provide and substitute the service, but get no extra investment revenue out of it. Unsuccessful systems are those going into a debt spiral with high expenses versus low revenues. The model we predict to be suitable in public terms for us is the breakeven point, it is the ideal one. A health institution does not certainly make profit, it envisages profiting like all businesses; however, what is important for us is to keep close to the breakeven point. This is reflected in our purchasing costs etc.”

5.2.2.2. Financial Sustainability of the Turkish Health Care System

The participants were asked their opinions as to whether the Turkish health care system is financially sustainable or not. All 33 participants responded, with 67% stating that it was not financially sustainable whereas 18% claimed that it was (Table 32). In addition, the responses of the participants were matched with their previous definitions of health care system financial sustainability in Table 32.

Table 32: Participants' Opinions on the Financial Sustainability of the Health Care System in Turkey

Do you think Turkish health care system is financially sustainable?	Fr.	Percent	Health Sustainability Definition	financial	Fr.	Percent
No, unsustainable *	22	66.67	Revenues meeting expenses	6	18.18	
			Financing health services/expenditure	4	12.12	
			No idea	2	6.06	
			Accurate staging of the service algorithm of the health care system	2	6.06	
			Treatments being comprehensive and attaining stakeholders satisfaction	2	6.06	
			Effective and efficient use of recourses allocated for the health care system	2	6.06	
			A system in which real policies and strategies are formed and predictability is assured	1	3.03	
			Making profit for the private sector	1	3.03	
			A system that places value at the forefront	1	3.03	
			Yes, sustainable**	6	18.18	Effective and efficient use of recourses allocated for the health care system
Revenues meeting expenses	1	3.03				
Accurate staging of the service algorithm of the health care system	1	3.03				
Financing health services/expenditure	1	3.03				
Health care services ongoing without any faults	1	3.03				
Sustainable in short-term, unsustainable medium and long-term	3	9.09				Revenues meeting expenses
			Accurate staging of the service algorithm of the health care system	1	3.03	
			Effective and efficient use of recourses allocated for the health care system	1	3.03	
Uncertain	2	6.06	Financing health services/expenditure	1	3.03	
			Cost efficiency	1	3.03	
	33	100.00		33	100.00	

*Responses as "Cannot be sustained unless changes are made" were coded as "No, it cannot be sustained".

**Responses as "Can be brought to a sustainable point" were coded as "Yes, it can be sustained".

Most of the participants who have the opinion that Turkish health care system is unsustainable or unsustainable in the long run defined financial sustainability in health care systems as the fact that revenues cover the expenses and health care services and expenditure are financed. It is possible to say that the participants have the opinion that the revenues cannot meet the expenses and there is a problem in financing the health care service. In addition, even though two participants do not have any idea about financial sustainability, they thought that the system unsustainable (Table 32). In spite of excluding these two participants from the sample, it is found that 60% of the participants evaluate Turkish health care system as unsustainable.

Similarly, it is possible to say that the participants who find the system unsustainable or unsustainable in the long run have the opinion that the service algorithm is not accurately designed in Turkey and the resources are not effectively and efficiently used.

Examples of the Participants Answers

According to one participant who thought that the Turkish health care system is financially sustainable,

“Yes, the Turkish health care system can be sustained financially. The most basic point in this is the resources allocated for the services. One of the factors affecting financial sustainability is resource-based factors. As resource-based, we deal with it in two contexts as public health expenditure and private health expenditure. The ratio of health expenditure within GDP is around 4.6% including investment expenditure despite the latest methodology change. The basis of public health expenditure is tax revenues. The ratio of public health expenditure to total health expenditure is 78.5%. The Turkish health care system is one evolving mainly around public health expenditure. Moreover, when considered as resource-based, public health expenditure has a gradually decreasing share. It has a share like 11% if I am not mistaken. Secondly, the ratio of public health expenditure within non-interest public expenditure is also gradually falling. In addition, if the percentage difference is small between the growth ratio of GDP in the last ten years and the growth ratio of

health expenditure in the last ten years, it means there is no problem; if it is positive, health expenditure is growing more than GDP and more resources are needed to be allocated since it grows more, which brings about a sustainability problem in financial terms. Our system has no such problem.”

Another participant who claimed that the Turkish health care system is sustainable made the following comment:

“Yes, it is sustainable. The law on Social Insurance and Universal Health Insurance No. 5510 requires the state to provide health care services obligatorily based on the constitution, but the state has left this to health service providers by social policies at this point. Health service providers are classified as public and private, but the private ones are not completely independent. Private ones can move within certain standards. This is because everyone has to take Universal Health Insurance (UHI). Unless one is liable to receive services for over a relative or a right owner, he/she has to pay UHI premiums plus he/she has to pay for a part up to 200% of the service received from private health providers. In fact, there is no unsustainability in the area intervened by the state. The state does not go bankrupt. The state intervenes, always closes the gaps/meets the deficits.”

Another participant explained that the Turkish health care system is sustainable, but it has to be improved:

“I believe it is sustainable. However, it has to be improved through novel financing models. Since the health care system in Turkey is one that goes by 95% public insurance, it is sustainable for the time being. On the other hand, research has shown that personal health expenditure increases as countries’ development levels increase. The most significant reason behind this is that current diseases have become complicated, and that recent technology is being used in diagnosis and treatment as a result of new improvements in health technology. Although these may seem like secondary factors – say, you buy an MR device for 2 billion lira and it has maintenance costs, depreciation costs, etc. – advances in health technology are causing difficulty for systems. Increases in personal health expenditure, particularly people’s actions and the activities they do without caring about their health, makes it necessary to benefit from health services more, which in turn breaks the balance.”

One participant who thinks that the Turkish health care system can be brought to a sustainable point, made the following evaluation:

“Actually, the data shows that it could be brought to a sustainable level. There are deficits right now of course. In the SSI, even in the first 7 months of 2017, a deficit of 24.4 billion can be seen. Public subventions have reached 108 billion; the money allocated from the budget is almost close to the amount spent in an entire year on health. It is just 10 billion lower than that amount. It seems to be a problem in the short term. I think, unless sufficient precaution is taken now, this will cause bigger trouble in the medium and long term because there is still a serious international economic crisis; the 2009 crisis has not yet been fully overcome. Growth rates in developed countries are around 1% to 2%. The GDP increase rate is around 2.4% globally. Economic growth has a great effect on financial sustainability. A second effect is to be able to parallel GDP increases with an increase in expenditure. Economic growth is important in this respect. If you support the increased health expenditure with the growing economy in some way, it may not pose a big problem. However, economies are giving signals; therefore, maybe, the solution or areas of solution must be driven to some other points.”

The participants were also asked about their opinions on possible problems that might affect sustainability in the Turkish health care system. 12% of the participants' answers stated that the Turkish health care system is negatively affected by the lack of resources of health system and university hospitals' problems. 11% of the participants' answers show that participants thought the populist policies and organizational structure of the Turkish health care system is not built appropriately and that there are problems in staging amongst health service providers. 8% of participants answers explained that the Turkish health care system is negatively affected by the unnecessary medical interventions and examinations and another 7% stated that Turkish health care system is negatively affected by reimbursement system and performance-based supplementary payment system is create a problems (Table 33).

Table 33: Participants' Opinions on Problems Affecting Financial Sustainability in the Turkish Health Care System

Problems Affecting Financial Sustainability	Frequency	Percent
Lack of Resources	11	11.96
University hospitals' problems	11	11.96
Populist policies	10	10.87
Organizational structure of the health care system	10	10.87
Unnecessary medical interventions and examinations	7	7.61
Reimbursement system and problems created by performance-based supplementary payment system	6	6.52
SSI benefit package having an over-comprehensive scope	5	5.43
Non-current/Low MED prices	5	5.43
Excessive/Unnecessary demand for health care services	4	4.35
Foreign dependency in medical equipment/devices and drugs	4	4.35
High costs of health services	2	3.26
Lack of generic products or the low quality of available generic products	2	2.17
Gradual increase in health expenditure	2	2.17
Increased immigration from Syria	2	2.17
Lack of education, low health awareness and health literacy of the population	2	2.17
Incompetency of administrators	2	2.17
The fact that diagnosis treatment algorithms are not available or not used	1	1.09
Creating serious quality problems in order to reduce costs at hospitals	1	1.09
Failure to reach a sufficient number of patients in terms of health	1	1.09
Not paying enough attention to preventive health services	1	1.09
Insufficient informing about city hospitals	1	1.09
HTP being insufficient	1	1.09
Sum	92	1.00

One of the major problems the participants have focused on is the lack of resources. A system primarily needs to have a sufficient resource structure for a financially sustainable health care system. In Turkish health care system, SSI is the only payer institution in the health care system using the premiums it collects from all citizens in scope of health insurance. The problems regarding insufficiency of the resources may essentially be separated into two as problems that decrease revenues

and problems that increase expenditure. The factors that cause decrease of revenues in Turkish health system may be summarized as early retirement, decrease in labour force participation rate, understatement of earnings subject to premium, high unregistered employment, low premium collection rate, the decrease of tendency of premium payment chance with amnesty, amnesty imposed on the penalty for delay of the unpaid premiums, low limits of earnings subject to premium (at the level of minimum wage) and lack of fund revenues. It is possible to summarize the factors that increase expenditures as early retirement applications, insurance payments without obtaining the premium (for example, covering health care expenses of all children below 18 years by the government), borrowing laws, increased monthly payments due to extended average life expectancy and health aids as well as the weakness of the relationship between premium revenues and salaries paid. As seen in the examples given below, the participants stated that resources of the system are not sufficient by emphasizing the similar points. Even though the topic dwelled on most is to decrease the expenditures in order to establish a financially sustainable health care system, what needs to be firstly evaluated is to increase necessary resources. It will be easy to provide sustainability in a system in which regular and sufficient premiums are collected and which is supported by a regular increase of GDP.

Another problem that the participants have focused most on is the ones university hospitals encounter. The participants stated that financial sustainability of university hospitals have been influenced by vast web of expenditures of the hospitals and high costs, insufficiency of resources, problems caused by reimbursement system, problems encountered during medical equipment and medicine supply, and problems resulting from lack of staff. Approximately 50% of expenditures of revolving fund management at the university hospitals is allocated personnel, while 40% of them is allocated to medicine, medical equipment and devices and 10% of them is composed of current expenditures such as stationery, electricity, water and natural gas. An obligation on meeting medical supplies and medicines of the inpatients has been enforced since 2008 by the hospitals (Yiğit and Yiğit, 2016). Along with an unchanged MED prices for nearly 9 years, reimbursement policy applied in university hospitals put a difficulty on financial sustainability of university hospitals. Moreover, the

number of hospital admissions in Turkey increased as 296% while the admission to university hospitals as 370% in recent 2002- 2016 years (Atasever, 2004, Ministry of Health 2012a). In the same period, the number of doctors increased as 58%, the number of nurses as 111% and the number of health care personnel in total as 196% (TUIK, 2017c). It is not possible to provide health care service without sufficient number of staff. All these causes necessitate reorganization of procedures that are being applied for the number of staff, their duty leave, maternity leave, breast-feeding leave etc. in a way that will put the hospitals in comfort. One of the participants emphasized this situation with an example which is that 100 out of 250 nurses working in the hospital didn't take their turns of duty due to the reasons mentioned above. The problem of financial sustainability of the hospitals is examined in details in the next chapters of this study. It is determined in this study that university hospitals have a problem of financial sustainability, expenditures are more than revenues and they have a heavy burden with debt due to the factors the participants stated.

Other two significant problems the participants focused on are policies and organizational structure of the health care system. It is likely to say that many policies which are in force in order to improve health care services have a populist approach if they are put into practice without being laid on strong foundation. For example, Turkish Medical Association Central Council stated that the practice of "check-up" initiated by the government in order to enhance the admission to primary care clinics is a product of a populist approach and warned about the fact that a new model increasing the demand for admission to primary care health services artificially will cause new problems in the system (Turkish Medical Associations, 2018). As another example, children under 18 years old are provided with free health care service without asking their families' premium debt in Turkish health care system. This situation may also be evaluated as a populist policy. What is right is to provide health care service to the child over his/her family if his/her family can afford it, if not, then to cover his/her health care expenditures by the government. Another example to populist policies may be moving the age of retirement to an earlier time. This situation causes both the decrease of premium revenues and the increase of expenditures. While determining health policies, the initial topic to be considered is how these policies will have an

effect on sustainability of the system in the long run and how it will influence the public health.

The organizational structure of a health care system has a significant role among the elements providing health care services at a financially sustainable level in a country. The first and most important step of establishing a financially sustainable health care system is to set the organizational structure of the system accurately. On the other hand, it is unlikely to say a certain statement such as “System A is better than System B” in health care systems. The organizational structure of a health care system must be arranged in accordance with the aims each country’s health care system desired to reach at and the country’s resources. In evaluating the Turkish health care system in terms of admissions to the hospitals, it is seen that the intensity is in secondary and tertiary care hospitals. Whereas, it is more suitable for the countries to support the patients initially getting services from ambulatory care institutions because it is cost-effective. For this reason, the patients must be encouraged to go through ambulatory care institutions first. In other words, protective and preventive health care services must be given more importance and intense admission to the hospitals must be decreased. The main reason for the high number of applications to hospitals is non-implementation of the referral chain.

Another problem occurring due to the deficiencies in organizational structure is unnecessary procedures and examinations at hospitals. In accordance with the report based on the study carried out by Agency for Research on Cancer, abbr. IARC, affiliated to World Health Organization in 12 countries (the USA, Australia, Denmark, Finland, France, England, Italy, Sweden, Switzerland, Norway, Republic of Korea, Japan), there has been an ‘unnecessary’ increase in thyroiditis cancer diagnosis since 1980s when the ultrasound started to be used. 470 thousand women and 90 thousand men were diagnosed with cancer unnecessarily in these 12 countries because the ultrasound technology which got increasingly more sensitive and fine-needle aspiration biopsy helped the diagnosis of very tiny and in fact nonfatal nodules. When compared on international terms, the usage of the MR device is the highest per person in Turkey. For each MR device, which provides inpatient treatment in the hospitals of Turkey the number of screening is 14,992, whereas in the OECD countries it is 5,125

(OECD, 2017b). The system is considered to be abused by the service providers supported by the extreme number of screening per MR device in Turkey, the view of which is stated by the experts that participated in this study.

According to participants of this study, one other problem is the reimbursement system and performance system. Participants believe that the performance-based reimbursement system applied in government and university hospitals adversely affects health care systems. As reported by participants artificial health services are produced on paper in order to meet performance targets. Performance pressure on health care personnel causes deterioration of health service quality. Today, patients with high risk of treatment costs are directed from private hospitals to public and university hospitals. In public and university hospitals, such patients are not wanted because of the loss of revolving fund. Health policy-makers should assess this situation and find solutions without creating a irreversible threat to sustainability

The other problem posed by the participants to adversely affect the financial sustainability of the health system is SSI benefit package over-comprehensive scope. Social security systems are available at SSI, which is a public entity that Turkish citizens make use of. The Law No. 5520 provides GHI system administered by SSI. A high rate of the Turkish population is covered by GHI, the rate of which is 98.6% (SSI, 2017a). The universal health insurance system in Turkey is considered to be highly detailed compared to the ones in the world. Koçakaya et al. (2016) states that Turkey's insurance system is highly comprehensive compared to that of the world in terms of universal health insurance. In reviewing the samples all around the world, it is seen that health care systems are provided over general health insurance and private health insurance (complementary insurance and private insurance). In this scope, private health insurances provide insurance takers additional payment options for such health care services as dental and optometry cares of private hospital treatments not included in general health insurance. In addition, individuals are able to get access to faster and more quality health care services in private hospitals (Deloitte, 2015). The majority of examination fees at private hospitals and dental cares not included in many health care systems are paid in scope of universal health insurance in Turkey. Private health

insurance should be supported and scope of universal health insurance should be narrowed in order to reduce the load on public health care sector.

Another topic mentioned among problems of Turkish health care system is MED prices. MED prices are paid by SSI for various medical procedures and examinations. It is determined upon operations or in packages. Packages consist of pricing of certain operations together, for example heart transplantation. There is only one price for heart transplantation and this price includes all medical equipment, disbursement and other equipment prices. In general, clinic chiefs and lecturers called from public and university hospitals prepare these prices. These prices do not reflect personnel costs, overheads and some other costs because these expenditures are met from general budget at public institutions, and from budget of revolving fund of university hospitals. Private hospitals request an extra fee in amount of 200% of prices of MED in order to meet such kind of expenditures and make profit. In scope of this study, price increase rate of 6,857 operations or packages whose fees are determined and which are included in MED were calculated between 2008 and 2017. It is found that there was no increase in the price of 79% of these operations or packages during these nine years, the price of 3% decreased in percentage of 26 (%), and 18% of them increased in rate of 91%. In light of these information, it is highly difficult to say that prices of MED are not updated and the prices formed are related to actual costs excessively. It is clear that this situation influences financial sustainability of the system adversely.

Another problem emphasized by the participants is the demand for excessive health care services. There are differences between demand for health care services and demand for other goods and services due to distinctive characteristics of health care services. Briefly, it can be said that the demand of health care is affected by mainly five factors which are, (i) price (the quantity of the money anticipated regarding the payment of health care services) (ii) income (In the case of a low-income earner, health care may not be required by the consumer for common sickness. Similar to which, a higher income earner might be more inclined to spend on healthcare) (iii) the medical condition and degree of illness (iv) the impact of government (the demand for

healthcare can increase with policies like aids since the patients are charged a lower price) (v) supply (health service for consumers) (Babalola, 2017).

In case health care services are met by the government for free or they are provided free of charge in scope of universal health insurance, the fee of health care services will decrease to zero in terms of the individual and this situation may cause excessive demand for health care service. This issue should be examined for Turkish health care system.

Apart from these, the participants stated that the problems related to the topics such as health policies and planning, efficiency and performance, management of finance, administration and organization affect financial sustainability in health.

Examples of the Participants Answers

One participant who stated that the health care system is not financially sustainable made the following explanation:

“I do not think that the health care system is financially sustainable. The health care system is currently financed from the central administration budget through deficit financing. We do not have a health care system which can meet its expenses with its own dynamics.”

Another participant who believed that the system is unsustainable highlighted HTP:

“No, the Turkish health care system cannot be sustained. HTP met the needs for a certain period of time; however, the program is no longer sufficient. Currently, different reimbursement models are arranged, which shows that the path is blocked off.”

One participant made the following evaluation by focusing on the problems created by the performance-based supplementary payment system:

“No, the system cannot be sustained. The present performance-based supplementary payment system and the direct contribution of the state to the private sector is a support which solely depends on the consideration that the doctors and health care personnel are objective, knowledgeable, merciful, and fair. It seems to me

that it is not right for the doctors to be paid according to the number of operations they carry out, the medical interventions they make at public hospitals or private hospitals; that is, they are paid per piecework. For example, assuming we make the same evaluation for a teacher, should he/she be paid according to the number of students who pass the university entrance exam? Therefore, since it is not possible for doctors to go beyond ethical limits, and they are brought up in the same field as this country's police offices, teachers, and members of all other occupational groups, everybody is equally ethical and reliable. Therefore, I do not think there are gaps in these points. People's understanding of accessing health care services is also problematic. In Western countries, the quality and quantity of the center where individuals can apply depending on their problems vary as primary health care (1st level), secondary health care (2nd level), tertiary health care (3rd level) service providers. People cannot just go and apply to the center they want directly. There is a specific algorithm to be followed. Since we have no such system, people can go anywhere they want; for instance, you live in İzmir and you can apply to Ege University Faculty of Medicine with a throat infection or you can go to the emergency in order to avoid waiting in lines. That a person cannot apply to the place he/she wants does not necessarily mean that he/she receives this service insufficiently. Certain operational algorithms have to be followed. Unless this is realized, unnecessary examinations and radiological imaging are done for patients and extra payments are made to the system. In the previous meeting, the high number of MR devices in Turkey was boasted about. This means to me that the system is abused and used unnecessarily. The support given to health by the state has facilitated citizens' access to health in a sense. In Turkey, health expenditure per person has reached 1,500 Lira annually. This may be a great number in comparison to the past despite not being at the same level as the western countries. However, as the economic situation, exports and imports in Turkey are apparent, I do not really know how much it can be supported, particularly with the present growth rate in the private sector. ”

Another participant who believed that the health care system is not sustainable made evaluations specifically in terms of university hospitals:

“To me, it is not sustainable. It is not possible to operate like this for university hospitals; this applies to all university hospitals with the current financial structure and payment methods. Let’s consider a simple commercial undertaking: even a grocery store wants to make profits over sales; by profit, I do not mean a business house, but you have to pay the employees’ salaries, supply equipment after all. There is no such system in the world as buying something for 10 lira and selling it for 5 lira. You can buy medicine above the prices determined by MED, but for equipment, big firms may insist on their own prices and you have to buy for the sustainability of the services. Naturally, university hospitals have the problem of buying the service for 5 lira and marketing it for 3 lira. Today, all university hospitals are facing the problem of supplying medical equipment and drugs. This is not a sustainable situation in any part of the world; it is impossible. Which business can stand this and for how long? Unless financed by the state, university hospitals will soon be trapped in debt and taken over by the ministry.”

Another participant who addressed the difficulties experienced by university hospitals gave the following comments:

“As a long-established university hospital, we have excellent expertise in academic terms. We offer many specific services. One of these is transplant operations. We carry out liver, kidney, bone marrow transplants. The payments we get from the MED for our devoted service are obvious. Although we attempt to get extra payments in some ways, we cannot get out of the debt trap within our body. This is because university hospitals have too many expense networks, such as medical equipment, drugs, personnel expenses, etc. We need to be supported in some way and we cannot receive this support unfortunately. Firms no longer come to university hospitals for bidding today; there are no tenders because university hospitals cannot make payments to firms.”

Another participant emphasized the increase in health expenditure with the following explanation:

“Actually, with its present state, I think it is not sustainable because health expenditure is gradually rising. Especially out-of-pocket health expenditure are on a serious rise. Although there has been a recent fall, it has a fluctuating course. Besides

that, even if the out-of-pocket health expenditure does not affect the health care system much, we know that it deeply influences households. But with its current state, I do not think it is sustainable.”

Other participant stated that financial sustainability has been attained in the short term, but that it would not be possible in the long term:

“It cannot be sustained in the long term because currently there is one single employer in the health care system. I cannot imagine it to be sustainable in the long term. One of the main problems faced by the health care system today is the central financing of health services already.”

A different participant explained that all health care systems are unsustainable in their current states:

“I think in the current form, no health, in my view, no health care systems are sustainable because what we are focusing on, we focus on the finance and how we pay for services that are being delivered in their current form. That I think is not sustainable. What we have to do is we have to focus and have to write a goal and the goal has to be maximizing value. And if we don’t focus on the maximization of value then I don’t think health care systems are sustainable as they are currently.”

As stated above, the participants also mentioned the problems of the health care system while explaining that it is sustainable. 7.7% of the participants mentioned populist policies as one of the factors harming financial sustainability. As one participant put it,

“Populist policies implemented in Turkey bring the system to an unsustainable point. For example, being in the edge of a new election period will bring about expenses that an institution cannot meet or provide under normal conditions and create unexpected increases in expenditure. Because of these policies in implementation, the financial sustainability of the health care system will be put into further difficulty.”

Another participant expressed the following opinions about populist policies:

“Populist policies are being implemented in the Turkish health care system. For instance, it is said that children under 18 will be provided with free health care services regardless of their parents’ UHI premium debts; however, this burden is left

to hospitals. How can you claim that you will pay the premiums for the green card as the state? Then for 18-year-old children, if their families can afford it, let them take care of the children; if the parents are indebted, then determine the number of these children, record them, and establish a separate fund for their payments. We see that the actions are not very well planned or programmed.”

One participant who claimed that the health care system is not sustainable in Turkey offered the following opinions about the lack of referral chain, the policies implemented, and city hospitals:

“I do not believe that the health care system is sustainable because I think central policies are carried out. There is no referral chain and a health policy mainly governed by the private sector, which makes me think that the system is not sustainable in its current state. Doctors must be made to believe in financial sustainability. For instance, new city hospitals are being established. This has been made into a policy. However, no satisfactory explanation is given to the media as to how city hospitals will be operating. Lots of devices are bought by city hospitals, but no information is available concerning how health care personnel will be employed. Doctors have to be informed about the policies in implementation and be convinced about the financial sustainability of the health care system.”

Another participant thinking that the system is not sustainable associated this situation with two factors:

“The primary reason why it is not sustainable is the SSI benefit package; that is, the UHC insurance package is too broad; and the second one is resources. It is a fact that the resources allocated for the health care system are insufficient. If these two factors were overcome, no problems would be present in the Turkish health care system.”

Another participant explained the system is not sustainable as follows:

“To me, the health care system is not sustainable. We wish to do everything. We have a highly populist health care system but while we are trying to do everything, most things remain incomplete. In the Turkish health care system, there are problems with drugs, problems in terms of medical devices, the scope of the UHI is too broad.

The state claims to meet every health cost of citizens; however, we have some fundamental problems at this point.”

A different participant explained this unsustainable situation in terms of 4 factors:

“No, it cannot be sustained. Maybe it is unsustainable because of the presence of young pensioners, because the ratio between the number of premium payers and that of pension receivers has deteriorated gradually and the state subsidizes the deficits of the system each year. The state has to transfer extra money into the system and this money given each year will increase as well. The state has started to take new taxes from citizens in order to increase this money it gives. These taxes will further increase in the future. Let me open a parenthesis here: I have researched, I have looked at the health care systems of America etc. Our health care system is better than the system in many other countries. However, it will deteriorate gradually like them. The main reason behind this breakdown is the deterioration of the balance between the money going into and out of the system. In order to maintain the balance, our citizens will pay more contributions each passing year; the contribution for drugs will increase further. It will be like other systems.”

Another participant summarized the factors affecting sustainable health financing as follows:

“One of the main factors affecting sustainable health financing in Turkey is individuals’ preferences in receiving health care services while another factor, which is even more significant, is that the private sector is currently dependent on the public sector; in the private sector, a budget is formed depending on the public sector patients. Therefore, the formation of this budget is again influenced by political governance. For approximately 12 years, no change has been made in the process called MED, which specifies the financial basis for all hospitals regarding billing – concerning pricing, the same prices are being used. Prices in the MED are not up to date. It is very difficult to control costs or maintain competition conditions in the market for service providers, both in the public and private sectors. This is a factor influencing service delivery. Similar cost issues apply to human resources as well. What is more important, however, is the foreign dependency in both consumable goods

and medical equipment/devices and drugs used in health care services. Domestic production must be promoted in medical equipment and drugs, but there is no promotion in our country. Therefore, it is among the most significant factors.”

5.2.2.3. External Factors Affecting Financial Sustainability in Turkey’s Health Care System

The influences coming from outside that can affect financial sustainability of a health care system are defined as external factors. The possible achievement of a health care system’ or health care investment’ strategic goals and objectives may be influenced by diverse external factors. These may be as follows: (i) social factors such as resilience and health of the population, (ii) technological and legal factors like carers’ contribution and informal networks of care, (iii) the economic and political medium such as the act of integrating policy and practice with other sectors and establishing healthy communities that create health.

This question asked for participants’ opinions on the external factors affecting financial sustainability in health care. External factors that the participants were most focused on, respectively; reimbursement system (%20), resources allocated for the health care system (19%), policies (17%), foreign dependency (9%) economic growth (8%) (Table 34).

Table 34: Participants’ Opinions on the External Factors Affecting Financial Sustainability in Turkey’s Health Care System

External Factors Affecting Financial Sustainability	Frequency	Percent
Reimbursement system	18	20.45
Resources allocated for the health care system	17	19.32
Policies (Popular/Populist/ Macro/Health/Price)	15	17.05
Foreign dependency (Medical devices/Supplies/Pharmaceuticals)	8	9.09
Economic growth	7	7.95
Increased elderly population	5	5.68
Exchange rates	5	5.68
Public awareness and health literacy	3	3.41
Immigration from Syria	2	2.27
Rapid changes in technology	2	2.27
Organizational structure of the health care system	2	2.27
Health expenditure of other countries	1	1.14
Increased demand for health care services	1	1.14
International pressure in the establishment of health policies	1	1.14
Increased global burden of disease	1	1.14
Sum	88	100%

Similarly, the answers given to the problems of Turkish Health System are one of the external factors that affect the health system; reimbursement system, resources allocated for the health care system, policies and organizational structure of the health care system. These factors are explained in the previous section and they can be considered as external factors.

One of the common answers of the participants have given to the questions as to the problems of the health care system in Turkey and the external factors is the dependence on foreign countries. The dependence on which should be examined in terms of the medical device industry and pharmaceutical industry. Even though the medical device market developed on a regular basis between 2005-2008 in Turkey, due to the global financial crisis in 2009, there was a market decline in Turkey as well (YASED, 2012). There are about 1000 local medical device manufacturers and suppliers in Turkey and the components that take place in the industry export 70% of

their products. Local manufacturers can only meet 15% of the demands of the medical device market (YASED, 2012). There are no medical device manufacturers that are public in Turkey. The local manufacturers' lack of research-development activities is the cause of meeting market demands by importing. Although there are firms that manufacture locally in the medical device industry, most of which are not of the power to compete with big firms. The advanced technology medical devices are produced by firms that are of limited availability in the world. These firms both decrease the cost and apply the new technology they have developed on medical devices. It is not possible to produce advanced technology products of medical devices in our country. This situation is the root of the external dependence of the healthcare industry on foreign sources.

Additionally, the Turkey Pharmaceutical Market (2017) report states that the importation of NCUs pharmaceutical in 2010 was 7.61 billion in Turkey and that it went up to 13.33 billion NCUs in 2017 (IEIS, 2018). This progress is due to the effects of the increase in the accessibility to doctors and public hospitals, the rise of life span, and the growing and ageing population. What is more, in 2017, when the rate of pharmaceutical exports was compared to that of the imports, the rate was 18% (IEIS, 2018). When sustainability is taken into account, the drawback is that the health care industry relies on foreign products, which is what the import figures of the pharmaceutical sector holds as a view. For a constructive support to the health care sustainability to be provided by the products that are imported in the domestic market, the health care sector's requirements as to all types of medical materials and pharmaceuticals can be increased and new health technologies can be funded.

In addition, the participants have also mentioned about the exchange rate as an external factor that has effect on the system. The fact that the requirements of the health care system are provided by exportation in the medical device and pharmaceutical sector not only makes the system dependent upon foreign resources, but also has to cope with the risk of the exchange rate.

The main imperative so as to make the health care system financially sustainable is to ensure economic growth. Due to the fact that financial sustainability is associated with economic expansion, many countries feel the pressure of which on

their health expenses. According to the estimations of the European Union, if the GDP continues to increase, there will be no problem regarding the health expenses (Thomson et al., 2009-2010). On the condition that a country's health care expenses increase in a higher rate compared to the increase in resources, this will be of a sustainability issue.

The participants indicated that the aging population was an external factor. This issue is one of the issues frequently discussed in the world. It is a known fact that the increase in the elderly population causes an increase in old age diseases. Old age diseases cause more health expenditure. The population of Turkey has started to age. Although this situation is discussed in the following sections, it is clear that aging population is an external factor and it will negatively affect the sustainability of the health system.

What is meant by 'health literacy' is the individuals' skill to have access to, comprehend and be informed so as to preserve and improve their health. The skill of which consists of cognitive, personal and social abilities (Nutbeam, 2000). Individuals are responsible for making the right decision about their health care/illnesses and to be well-informed at all ages and in all domains of their lives (work, school, house, neighbouring relationships etc.). Mothers face with the decisions for their children about their health care management, the elderly encounter the decision of using their prescribed medicines accurately, workers are responsible to know possible health dangers of their working environments, take necessary precautions, while all individuals are confronted with the decision to apply to the right health care centre in case of any illnesses, understand and evaluate the information given by the health care personnel, analyse risks and gains during a treatment process and calculate the right dosages, which are complex treatment decisions. In all these cases, individuals should have a basic level literacy for an effective health care and its management. It is of great importance to develop health care literacy for a healthy public and sustainable health care system.

The participants depicted immigrations from Syria as an external factor. Turkey has been confronted with refugees immigrating from Syria since mid-March of 2011. Millions of Syrian immigrants who cannot get access to fundamental needs

such as food, water, electricity, fuel or medical equipment due to war have taken refuge in our country in poverty, illness and starvation. While the factors such that Syrian refugees settled down in eastern parts of Turkey firstly and there were not sufficient health care institutions and manpower, they were undernutrition, faced with language barrier, they did not have any health care insurance as well as social and psychological stress influenced their health adversely, all these affected the health of community they are in. For example, measles disseminated from these Syrian refugees. 349 cases of measles were seen in Turkey in 2012 and this number rise 20-fold after this Syrian inflow. Turkish Medical Association (TMA) preached at the fact that it is thought that this immigration of Syrian refugees is effective in dissemination of measles cases (Altındış, 2013 and Korkmaz, 2014). In terms of refugee mobility from Syria to Turkey, it may be accepted as an external factor because this immigration is dense. Studies about this issue should be deepened and its effects on both public health structure and financial sustainability of the system should be analysed statistically.

Another factor the participants stated was that the rapid changes in technology affected the system. The tendency of a brand new set of genetic testing and screening technologies leads to extra crucial ethical and economic health matters regarding the question as to how the public system should refer to them (Lee, 2007). The national health insurance contributed to the evolution of the doings of the drug industries, doctors and patients, which is its utmost effect in terms of the favor of the individual. The compulsory enrolment mechanism and the extensive coverage of the health insurance result in high healthcare access rates. So as to gain even more profit and harm the service quality, the national health insurance manages more opportunities for hospitals and drug industries to be cooperative. Therefore, briefly, the dilemma remained unsolved since neither the financing mechanism of the current national health insurance, nor the cost saving were capable to do so , and this is the main cause of the negative financial incident (Wang, 2010).

Participants stated was that other countries health expenditure is an external factor for system. The level of health spending in developed countries may be an indicator for determining the rate of optimal spending income. In 2016, while 9% of GDP was spent on health in OECD35, 4.3% of GDP was spent on health in Turkey

(OECD, 2017a). Considering these ratios, it can be said that the amount of resources allocated by Turkey to health expenditures should be raised.

Multinational conferences have been arranged in various parts of the world by numerous organizations, aims have been determined and many manifestos are being published about this in order to determine the common movement in protection, improvement and dissemination of health care. The participants indicated that international pressure in the establishment of health policies was an external factor. The participants also stated that another external factor was international pressure in the establishment of health policies. Even though it is not true to say that there is a pressure on health policy makers from overseas, it is clear that suggestion and strategic plans (World Economic Forum-Value in Health Care Project) that describe duties to protect human beings' health and make it better can contribute to improvement of health care systems.

Once for all, apart from other factors, it is known that the increase in disease burden and the growing demand of health care service have effect on health care systems.

Examples of the Participants Answers

One of the participants highlighting the importance of resources as an external factor gave the following explanation:

“In countries like ours, unless you have sufficient income, resources allocated for health care system, if you have this much current deficit, the public fails to meet not only these service providers' needs but even their costs. Therefore, in order for the system's sustainability, the state has to create a resource that is adequate for health service providers. This system can never be sustainable unless this resource is created. If the resource is not allocated, where will this take us? It causes the number of service providers to decrease, which impairs health accessibility and decreases satisfaction or reduces quality. Apart from the reduced quality, there is already a cost of providing the service at minimum. The scope of our SSI benefit package is too broad; it is too

comprehensive in terms of delivery to citizens that it has almost no other examples throughout the world.”

Another participant identified several external factors:

“Increased elderly population, reduced income per capita and the price policies implemented can be given as examples of the external factors affecting the health care system.”

One participant summarized the following external factors:

“The policies in implementation can be defined as external factors. Moreover, Turkish health care system is not able to collect UHI premiums. As you know, SSI is the only employer in the health care system. The premiums collected by SSI are not sufficient. Daily policies; they mainly include excessive employment created for future political concerns and therefore the system cannot collect premiums. When excessive employment is created, costs go up as well, and many manufacturing sectors cannot use their own resources efficiently today. Since they fail to use their own resources, pressures such as the tax burden, the SSI premium burden results in situations like illegal employment in the private sector.” Consequently, the ratio of premium collections falls.”

Another participant summarized the external factors affecting the health care system as follows:

“What is the basis of health expenditure basically? It is the macro policies, or in other words, actually factors affecting sustainability among factors influencing health expenditure. Well, what are these? Greenhouse gas emissions, for instance. As greenhouse gas emissions increase and air pollution increases, people’s health problems go up, too. As a result, health care systems have to make more health expenditure. On the other hand, another factor is the global burden of disease. There is an interesting change in the global burden of disease, which constitutes a problem as an external factor. Macro policies, health policies; we can diversify them, valuations in exchange rates, foreign dependency in medical equipment/devices and drugs can be mentioned as external factors. In addition, valuations in exchange rates are reflected as excessive prices for us, which as an external factor.”

Another participant related external factors to the policies implemented and emphasized the necessity for fiscal discipline:

“An external factor is the health policy in implementation. As we have just mentioned, today, you can apply to a private hospital with a mild chest pain, get an MR, go through an effort test, and be discharged with the diagnosis of nothing serious. The examination cost here, the effort test, angiography, is all charged to the state. Therefore, with the examinations, imaging practices, certain algorithms are needed for reaching the examination and treatment methods we have talked about. Not everyone should be able to benefit from any health institution any time they want. This must be arranged in a specific way. In this respect, I believe, the external factors we mention require health policies, health practices, education of sufficient knowledge and experience of the health care personnel, and fiscal discipline. Moreover, I think the budget for the health care is rather high in comparison to the overall status of the country.”

5.2.2.4. Internal Factors affecting Financial Sustainability in Turkey's Health Care System

Originated from inside the system, internal factors influence the performance of health care systems either adversely or positively. These factors may can be system structure, efficiency and effectiveness of health and care provision system stability, management, availability of well-trained health and care workers, incentives, cost and economic benefits.

This question asked for the participants' opinions on the internal factors affecting financial sustainability. According to participants the first three internal factors affecting sustainability were administrator and personnel performance (32%), human resources management and personnel costs (18%), and cost of service and goods (Table 35).

Table 35: Participants' Opinions on the Internal Factors Affecting Financial Sustainability in Health Care Systems

Internal Factors Affecting Financial Sustainability	Frequency	Percent
Administrator and personnel performance	14	31.82
Human resources management and personnel cost	8	18.18
Cost of service and goods	8	18.18
Health care providers	5	11.36
Accurate planning and purchasing	4	9.09
Effective and efficient use of resources	2	4.55
Organizational memory	2	4.55
Patients' doctor preferences	1	2.27
Sum	44	100.00

Maintaining administrative efficiency and applying organizational strategies effectively have a critical role in the improvement of organizational performance (Malina and Selto 2004). This research has stated that the performance of the participants, administrators and health care personnel internally affected the sustainability of the system. One of the issues that disturbed the participants regarding the performance of the administrators was that they weren't determined on professional bases. Disregarding the quality when the administrators are chosen affects both the motivation of the staff negatively and disrupts the corporate functioning. It has also been stated by the participants that the administrative positions were individualized and that they had worries about protecting their position, putting aside the corporate objectives. The criteria of appointing for administrative positions should be developed for a sustainable health care system. It is required that the performance criteria of administrators be determined and applied and taken into consideration during administrative dismissals and pricing. Successful managers should be supported and remain in office as long as they continue to be so.

Similarly, the participants have considered organizational memory as an internal factor. The necessity of memory applies to corporations as well, like humans. A corporation is made up of processes, procedures and values, which are of great importance. Participants have especially complained about the lack of memory in governmental institutions. The reasons of which are that the processes are dependent

on a person and the administrators change a lot, during the process of which a lot of information regarding previous actions isn't conveyed neither to them nor the staff. Health organizations should be managed by professional administrators and the durability of corporate memory should be maintained. Otherwise, it is clear that many problems are around the corner.

The participants have considered human resources management and personnel costs as an internal factor. The main determinant of health care service quality and costs is the human resources management. Health systems have a quite different personnel combination in terms of their education and experiences. So as to form a financially sustainable health care system, the planning of the health care human resources should be carried out in a way that meets the requirements of the corporations. With the help of an appropriate performance management, the performance of the participants should be measured and they should be provided a chance for a rise. Apart from this, the participants have stressed that the human resource planning wasn't done correctly and that there was a staff shortage along with the troubles concerning performance measurement.

Another internal variable stated by the participants was the cost of the health care service. The excessive number of health care services provided within a health care system and not distinguishing interrelation between them make it difficult to calculate the costs. As mentioned before, the cost of providing health care service is high due to the reasons such as developing technologies, high importation rate of products like medicine and medical equipment in our country and the fact that health care services are based on manpower. The main priorities in health care services should be the cost, efficiency and financial sustainability since the unbalanced increase in the cost of health care services challenges sustainability. High costs cause compulsory usage of resources efficiently and effectively. From the point of view of the participants on this issue, they indicated efficient and effective use of resources as an internal factor.

As an internal factor stated by the participant, health care providers are given as an example. Health care providers' contribution to the system is undoubtedly a factor impacting the system. Health care providers can be separated into three as

private health care providers, university hospitals and public service providers. One of the attitudes of health care provided meant is the execution of unnecessary tests and examinations. The participants stated that there is a tendency of unnecessary tests and examinations at public and university hospitals due to performance system. They think that the system is being abused with unnecessary examination and operations because many of these operations are met by the government in private hospitals. Additionally, another problem they exclaimed is that private university do not accept risky patients, which means it is possible they will need high treatment costs, and direct them to university hospitals. Such kind of attitude of the hospitals is stated to affect the system negatively.

According to the participants, another internal factor is planning and purchasing. The correct planning and purchasing are of importance for a sustainable health care system. It is imperative for it to work like clockwork to maintain an active planning and purchasing process. When considered especially in terms of the public health servers, the importance of planning and purchasing doubles. The necessities of public hospitals are purchased by the National Association of Public Hospitals through collective procurements. While this condition not only leads to cost containment, but also exclusive managing of the purchasing processes, it is seen that the exclusive purchases decrease the cost in some provinces, yet increase it in some others. As for university hospitals, they use the procurement method or direct purchase. That said, this increases the purchase costs to increase in university hospitals. So as to maintain sustainability, the co-purchasing system should be supported and improved.

Finally, another factor the participants described is the choice for doctor. It is considered that the participants mean that the patients should be able to choose the institution they will be treated at according to their own preference. It is a controversial topic if this can be seen as an internal factor or not.

Examples of the Participants Answers

One participant explained how administrator performance can be an internal factor:

“The performance of administrators influences financial sustainability. Administration is an art, a scientific art. However, as long as administrator appointments are made according to objective criteria, this will have either a positive or a negative effect. If the persons are able, they can be successful, but if this person has not received professional executive training, if he/she does not know how to perform this art, successful financial management is not possible.”

One participant highlighted costs as the most important internal factor:

“Our main element is our cost, and the main element of this cost is, of course, personnel expenditure. Personnel expenses are around 50-55% of service delivery around the world while it is about 40% of the costs in our country today.”

Another participant noted that costs constitute an internal factor::

“First of all, like in all countries, health service providers, drug costs, diagnosis/treatment costs, and medical equipment prices can be taken as internal factors before what the citizens ask for. Health service providers want to sell newer products and newer methods for higher prices, and the public argue that this is a loss of rights when these are not allowed and demand that these are provided and that innovative treatments are offered to them.”

Another participant summarized the internal factors as follows:

“We can accept effective and efficient use of public resources, tendering methods, human resources management and personnel planning. Manager positions, performances of managers; that is, the people you assign as managers are active and productive can also be listed as internal factors. Human resources management/personnel planning is extremely important because, in health expenditure, particularly for a hospital, generally the biggest share of expenses is personnel cost. You have to use the health service sector, hence human resources, much more efficiently. Human resources expenditure/personnel expenditure influences sustainability.”

Concerning organizational memory, one participant stated that it did not enable sustainability and was an internal factor:

“Considering the SSI terms of its internal factors, frequent management changes, frequent personnel changes inhibit the formation of experienced and

competent personnel in order to achieve organizational memory as well as to remove such financial sustainability risks. Organizational memory and stability have to be attained at the management level.”

5.2.2.5. Participant Recommendations for the Maintenance of Financial Sustainability in the Turkish Health Care System

The evaluation of the specialists working in the field, the stakeholders that are in the health care system, the servers and the identification of the solution offers will be valuable resources for the decision-makers in terms of the improvement of the health care system. The suggestions of the participants of this study have been categorized under 41 titles.

The participants responded to the request for their recommendations concerning the financial sustainability of the health care system with a variety of opinions.

Table 36: Participants Recommendations for Maintaining the Financial Sustainability of the Turkish Health Care System

Participants Recommendations	Frequency	Percent
Novel financing models should be developed.	15	12.93
Health care service staging system among health service providers must be based on the accurate ground/referral chain.	6	5.17
Preventive health services must be improved.	5	4.31
Expenditure tracking systems must be set up.	5	4.31
Unnecessary health service demands must be prevented.	5	4.31
Public awareness and health literacy must be raised.	5	4.31
The scope of the SSI benefit package must be reduced.	5	4.31
Price policies implemented in Turkey must change. MED prices must be updated/increased.	5	4.31
Accurate planning and purchasing should be done.	4	3.45
Savings should be made in health expenditure.	4	3.45
Unnecessary medical interventions and examinations must be avoided.	4	3.45
Problems of university hospital should be solved.	3	2.59
Premiums must be collected and premium collection methods must be changed.	3	2.59

Participants Recommendations	Frequency	Percent
Institutions must be managed by professional administrators.	3	2.59
Diagnosis-related groups (DRGs) should be employed.	3	2.59
Efficient auditing must be ensured.	3	2.59
Private health insurance must be promoted.	3	2.59
Populist policies must be avoided.	2	1.72
Personnel-related arrangements must be made.	2	1.72
Resources allocated for the health care system must be increased.	2	1.72
Resources should be used efficiently and effectively.	2	1.72
The State's economic contribution to private service providers must be limited.	2	1.72
An effective workshop/consortium could be held concerning stakeholders.	2	1.72
The State must supply drugs and equipment.	2	1.72
State policies on creating employment fields must be abandoned.	2	1.72
Economic growth must be attained.	2	1.72
Domestic production must be promoted in medical equipment/devices and drugs.	2	1.72
Premiums must be collected/Premium collection methods must be changed.	2	1.72
Activities of quality management and patient safety in health must be increased.	1	0.86
Doctors must be convinced to believe in financial sustainability.	1	0.86
Resources allocated for health care services must be reduced.	1	0.86
Organizational memory and stability must be attained at management level.	1	0.86
Solutions must be found for the problems concerning the labor market.	1	0.86
Errors caused by health service providers must be reduced.	1	0.86
Extra price restrictions must be abandoned/out-of-pocket payments must be made.	1	0.86
Staff must receive sufficient training, have experience and knowledge.	1	0.86
Accuracy of personnel expenditure and the extra payment system must be ensured.	1	0.86
Job satisfaction must be ensured for health care personnel.	1	0.86
Impaired doctor-patient trust relationships must be mended.	1	0.86
Importance must be attached to foreign tourists/health tourism.	1	0.86
Sum	116	100%

Examples of the Participants Answers

One participant indicated the necessity for a new financing model:

“A value-oriented and patient safety-based manageable reimbursement mechanism should be adopted. A new financing model must be developed and the rules in the reimbursement mechanism should be loud and clear. Health service providers must base the staging systematically on an accurate basis. Effective auditing must be ensured, and health literacy should be increased.”

Another participant who stated that financial sustainability in health poses a problem globally, expressed his/her opinion as follows:

“In order to attain financial sustainability in the health care system, UHI premiums must be collected. The state must calculate the cost of failure to collect premiums as well. There is no cost-based study in many areas. The state has to estimate its own costs. The system may not be able to operate with the premiums alone; it has to be improved through new financing models. There are several models followed to this end in the world, financial sustainability in health is a problem all over the world. Health expenses constitute a significant item for the whole world. How savings can be made is another important question. What is needed to be done for savings must definitely be specified. Public resources have to be used efficiently and effectively.”

Another participant emphasized the importance of savings:

“The most critical thing to do for achieving financial sustainability is saving. The term saving refers to correct planning, selecting correct products. Buying cheap products is not saving. The most important point is buying the correct products here. For example, you buy a certain product, use it for two years and then the product becomes deformed quickly and you throw it away, or you buy a product and use it for 5 to 10 years; these two come up as very different issues. Maintenance costs of a product, saving, maintaining balance and manpower are important. Correct spending management is important. As for health services, it is important to extend primary health care services, it is important to inform individuals; public awareness must be raised in benefitting from health services. Benefitting from health services is somehow perceived as going to the grocery store; this must be corrected. Unnecessary demand

for health services must be prevented. In a country where public expenditure is very heavy, personnel expenditure, particularly the accuracy and distribution of the wages paid to personnel and extra payments must be analyzed.”

One participant mentioned the problems faced in university hospitals and offered several solutions:

“There is a need for innovations, especially for the personnel. In such issues as days off, maternity leave, breast-feeding permission, procedures must be arranged. Let’s assume that I am a university hospital operating with 250 nurses and 100 of my nurses do not come on duty because they have reports for maternity leave, breast-feeding permission, and inability to be on duty. I have to be given the authority to recruit a nurse until my nurse on unpaid leave is back. The Ministry of Finance already has a certain budget for nurses’ salaries, nurses are on unpaid leave and their salaries are left to the budget. If I can go on paying this salary to some other person, this can sustain my nursing service. We have to come up with solutions. For instance, diagnosis-based practices must be carried out. Not each doctor should ask for MRs. Unnecessary medical operations and examinations must be avoided. The systems applied abroad must be adopted for domestic practices. If nothing serious is observed in a patient’s radiograph, a step-by-step course must be followed accordingly, asking for MRs from all patients directly; these put our sustainability in trouble. There are many factors ranging from the doctor to the cleaners. As I suggested at the beginning, while thinking of an income-based payment system, our expenses must also be considered. A cost-based payment system must be developed. While considering expenses, everyone must be evaluated individually; for instance, training hospitals must be assessed differently, primary-secondary-tertiary health care service providers must be evaluated differently. Health care service providers must place the staging system on an accurate basis. A referral chain should be introduced to our country. I offer tertiary health care services; I still deal with basic diseases such as flu; everyone is applying to university hospitals. Applications to university hospitals with basic diseases must be prevented. University hospitals should focus on different types of diseases. Such a system in which state hospitals do not allow C-section operations and the patients come to university hospitals must be abandoned. This decreases my

normal delivery rate and is reflected negatively in the records. Certain things must be corrected for sustainability.”

One participant offered the following suggestions regarding preventive health services, the referral chain, and the staging system in:

“Many arrangements are to be made within the health care system in order to enable a more efficient use of resources. As has always been highlighted, preventive health services do not catch the required attention unfortunately. The share allocated for preventive services in the total health expenditure is 4-5%, or so. It is really low. In addition, the referral chain being inoperable must be considered together with the promotion of preventive services as well. Once you establish a strong preventive health system, together with the referral chain, it is possible to reduce the burden on hospitals operating at the secondary health care and tertiary health care.”

Another participant emphasized the need for abolishing the extra pay enforcement to the private sector:

“The extra pay restriction must be removed. If the extra pay restriction is removed, patients will have to make out-of-pocket payments to private health care services, which in turn reduces unnecessary demand for health care services since the patient will have to make the extra payment in some way. With the removal of the extra pay restriction, the application rate, which is 8% higher in Turkey than OECD countries, may fall to 4% or 3%. The present payment system must be changed. DRGs must be adopted. Sustainability seems impossible with the payment system in hand.”

Another participant suggested that adopting diagnosis-related groups would be the best solution:

“My suggestion is, as I am also a believer in DRGs, that the issue should be dealt with by DRGs. I believe it would be more beneficial since DRGs provide future predictability as well and also systemizes it. As a matter of fact, DRGs emerged when financial sustainability became difficult internationally, I think it will be better when we adopt DRGs.”

5.3. THE FINANCIAL SUSTAINABILITY OF TURKISH HEALTH CARE SYSTEM

In today's world, because health expenditure is increasing, countries are implementing quick reform programs to make their health care systems sustainable. These reform programs are centered on sustainability and the financial power of the health care system in the face of the increased cost pressures. Some of the most important elements affecting the financial power of a system are the changing structure of the population and increased disease burden, the inability of countries' macro-economic structures and GDP to grow at the same rate as health expenditure, difficulties experienced by pension funds in financing health expenditure, the increase in the number of health care personnel employed and the resulting burden on the health care system, increased health awareness and individuals' growing health care expectations, and the pressures of advances in health care technology on public finances (Angelis et al., 2017; Crisp 2017; Harper, 2010; Thomson et al., 2010).

In Turkey, since the reform period initiated in 2003 through the HTP, the rapid increase in health expenditure within the health care system has become a critical topic of discussion concerning sustainability. In this respect, Turkey's system needs to be evaluated in terms of its financial sustainability. In this section, in order to evaluate its financial sustainability, the compliance of the growth in resources with expenditure is examined and different scenarios are developed for future sustainability by making future projections of endogenous factors that could possibly affect financial sustainability.

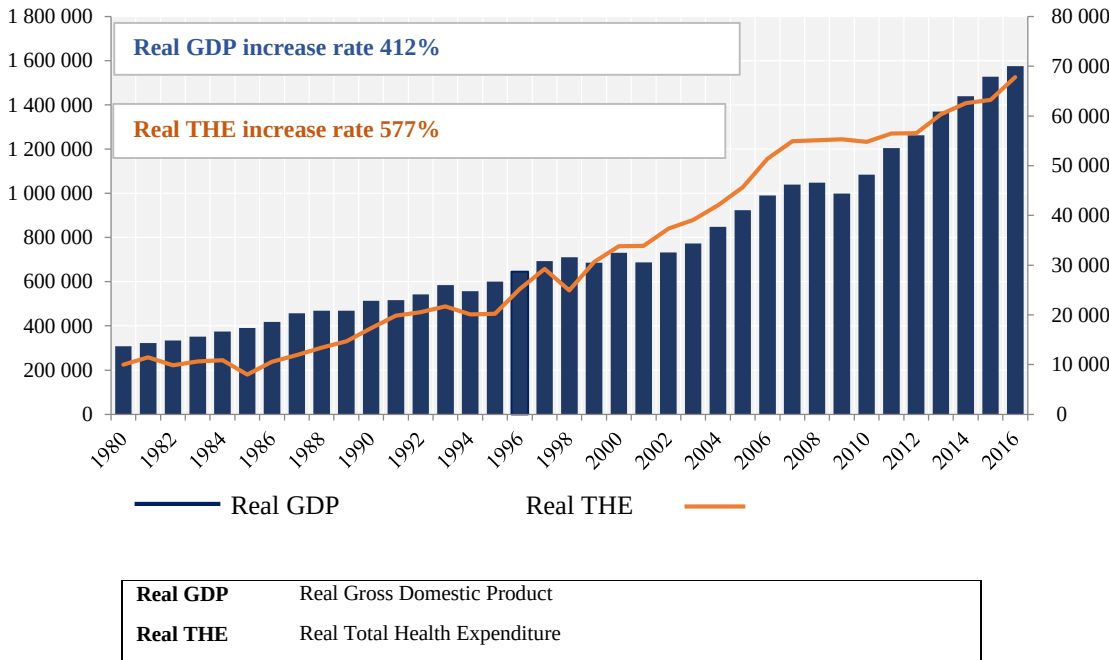
5.3.1. Measuring the Financial Sustainability of the Turkish Health Care System

The indicators for the financial sustainability of a health care system can be divided into two main groups. These are measurements based on health expenditure and revenue/resources versus measurements based on the opinions of stakeholders (Özer, et al., 2015). The former are mainly employed when evaluating and measuring

the financial sustainability of a health care system. More specifically, the most common indicator concerning sustainability is the ratio of total health expenditure (THE) to GDP, the ratio of public health expenditure to GDP, the ratio of public health expenditure to public revenues, the ratio of public health expenditure to the average growth, growth rate of GDP against the average growth rate of public health expenditure, the percentage of health expenditure within non-interest public health expenditure, the tax revenue ratio, and the growth rate of public health expenditure (Di Matteo and Di Matteo 2012; Knowles et al., 1997; Rovere and Skinner 2011; Ruggeri, 2006). In this part of the study, first GDP, THE, GHE, GTS-I, and GTR data for 1980-2016 are deflated real data in accordance with 2009 prices. After that, growth rates of GDP, GTR are compared to the growth rates of THE, GHE, GTS-I. Thus, it is intended to find determine if growth rates in resources have matched the growth in expenditure.

5.3.1.1. Comparison of GDP and THE Growth Rates

Figure 32: Real GDP and Real THE (Constant 2009 prices) Million NCUs



Source: Calculations made by author of thesis based on World Bank and OECD data.

In 1980-2016, real GDP increased by 412% while real THE rose by 577% (Figure 32). That is, the change in health expenditure in the given period was greater than GDP growth. Average annual growth rates compared to sub-periods are given in Table 37.

Table 37: Real GDP and Real THE Average Annual Growth Rates and Increase Rates (%), 1980-2016

Time Period	Real GDP		Real THE	
	Average Annual Growth Rate (%)	Increase Rate (%)	Average Annual Growth Rate (%)	Increase Rate (%)
1980-2002	3.82	137.76	6.66	273.16
2003-2013	5.95	77.09	4.53	54.17
2014-2016	4.81	9.46	4.00	8.27
1980-2016	4.53	411.87	5.81	577.21

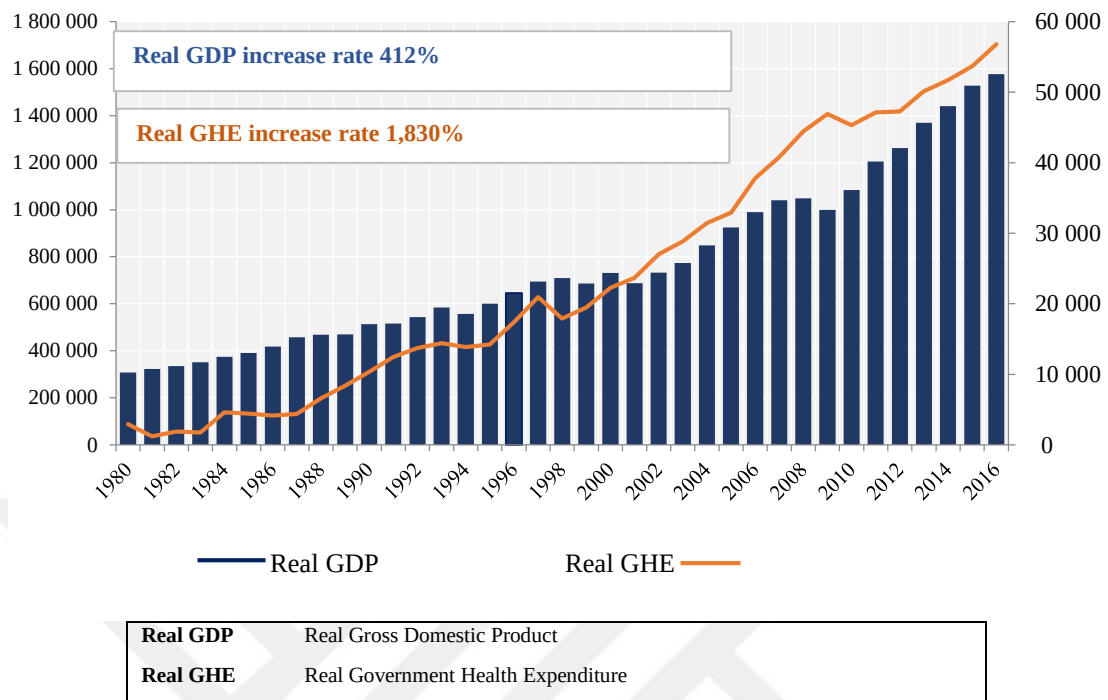
Source: Calculations made by author of thesis based on World Bank and OECD data.

The average annual growth rate of THE was 5.81% in 1980-2016, which exceeded the average annual GDP increase of 4.53%, GDP growth was higher in both 2003-2013 and 2014-2016 than the increase in health expenditure. Thus, health expenditure was at a sustainable level since it remained less than GDP growth rate after 2003 in Turkey.

5.3.1.2. Comparison of real GDP and GHE Growth Rates

Expenditure-resource based indicators of financial sustainability seek to determine whether public health expenditure increases faster than the resource base (Di Matteo and Di Matteo, 2012). Real GDP and Real GHE values for 1980-2016 are presented in Figure 33.

Figure 33: Real GDP and Real GHE (Constant 2009 prices) Million NCUs



Source: Calculations made by author of thesis based on World Bank and OECD data.

Real GHE increased significantly between 1980 and 2016, particularly between 1980 and 2002.

Table 38: GDP and GHE Average Annual Growth Rates and Increase Rates (%), 1980-2016

Time Period	Real GDP		Real GHE	
	Average Annual Growth Rate (%)	Increase Rate (%)	Average Annual Growth Rate (%)	Increase Rate (%)
1980-2002	3.82	137.76	16.62	818.45
2003-2013	5.95	77.09	5.87	73.69
2014-2016	4.81	9.46	4.28	9.91
1980-2016	4.53	411.87	12.42	1,829.89

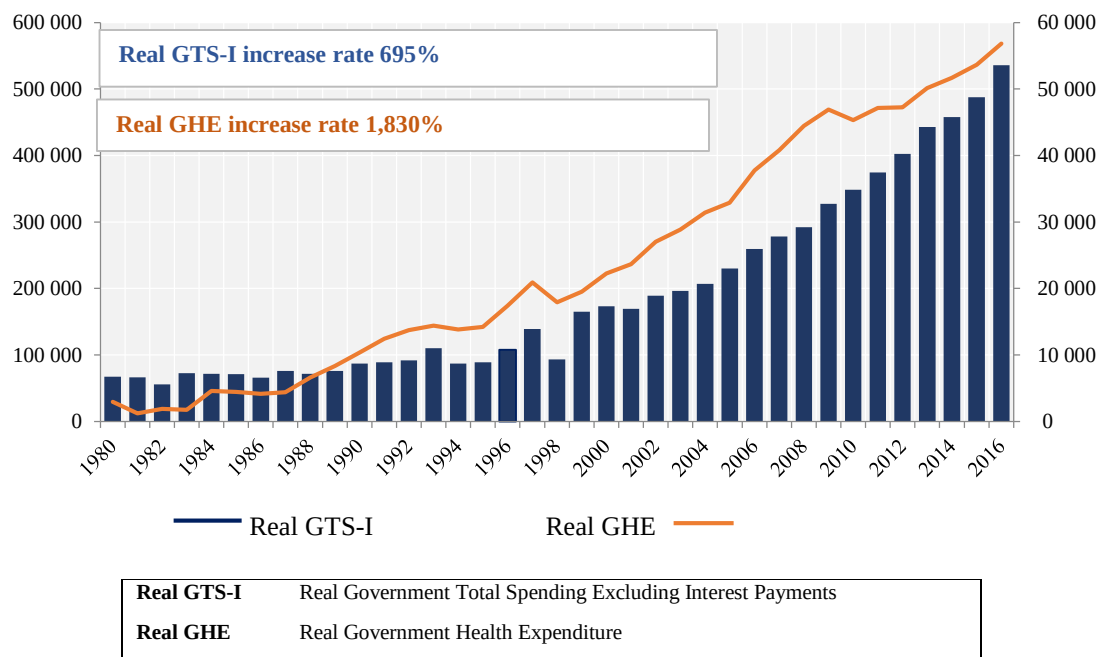
Source: Calculations made by author of thesis based on World Bank and OECD data.

Average annual growth rates of real GDP and real GHE were close to each other during 2003-2013 and 2014-2016. In 2003-2013, when the HTP was implemented, average GDP and GHE growth rates were very close to each other and higher than for 2014-2016. In the early years of the health reforms, the process caused an unavoidable rapid increase in health expenditure (Ministry of Health, 2012a). In 2014-2016, a decrease in both the real GDP and real GHE growth rates happened. However, the decline in the real GHE growth rate was greater than that of the real GDP average growth rate. This indicates that expenditure growth rates started to fall on completing the first phase of the health reforms in Turkey.

5.3.1.3. Comparison of GHE and GTS-I Growth Rates

Whether GHE has a very high share in the GTS and if they have an increasing or decreasing tendency is an extremely significant indicator of the sustainability of a health care system (Di Matteo and Di Matteo, 2012). Based on this approach, real GTS-I growth rate should be compared with the real GHE rate (Atasever et al., 2017; Di Matteo and Di Matteo, 2012; Özer et al., 2015).

Figure 34: Real GTS-I and Real GHE Growth Rates (Constant 2009 prices) Million NCUs



Source: Calculations made by author of thesis from GDBFC and OECD data.

In Turkey, real GTS-I has increased by 695% and real GHE rose by 1,830% over the last 37 years (Figure 34). Thus, the increase in health expenditure has been greater than the increase in the resource base.

Table 39: Real GTS-I and Real GHE Average Annual Growth Rates and Increase Rates (%), 1980-2016

Time Period	Real GTS-I		Real GHE	
	Average Annual Growth Rate (%)	Increase Rate (%)	Average Annual Growth Rate (%)	Increase Rate (%)
1980-2002	5.64	180.48	16.62	818.45
2003-2013	8.23	125.34	5.87	73.69
2014-2016	6.66	17.01	4.28	9.91
1980-2016	6.49	695.19	12.42	1,829.89

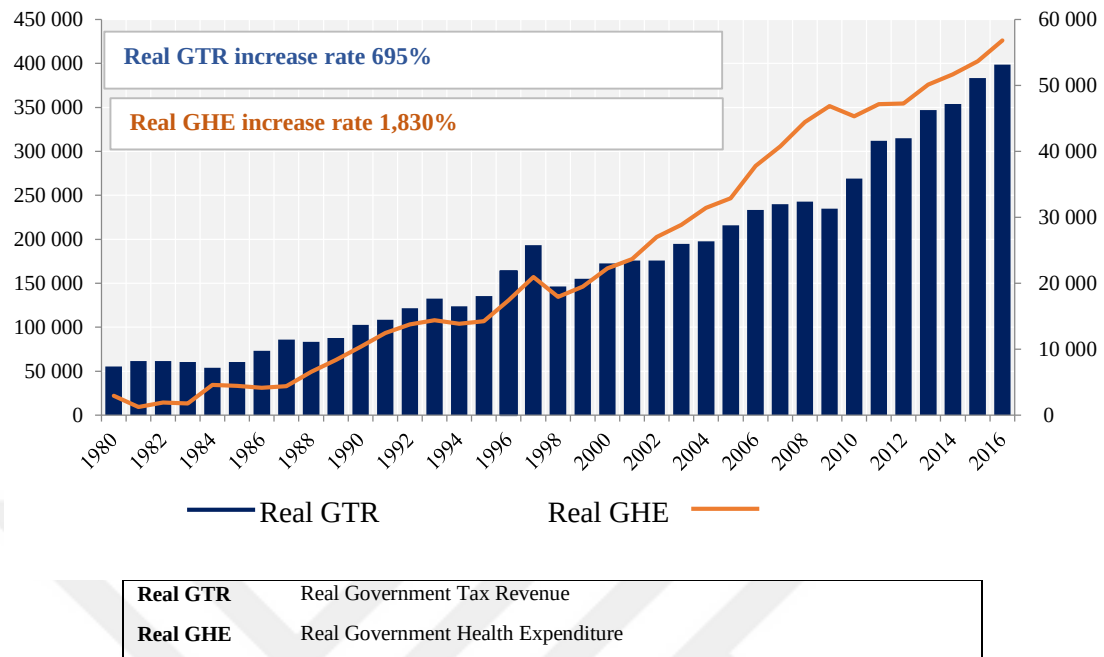
Source: Calculations made by author of thesis with GDBFC and OECD data

However, when considered on periodical basis, real GHE average growth rate has lagged behind the real GTS-I average growth since 2003. The falling trend in the real GHE average growth rate after 2003 can be accepted as an indicator that positive steps have been taken towards increasing sustainability in the Turkish health care system (Table 39).

5.3.1.4. Comparison of GTR and GHE Growth Rates

Finally, real GTR and real GHE can be compared in order to assess financial sustainability of Turkish health care system. As of 2016, 75% of the total health expenditure was made by the public (TUIK, 2017b). Therefore, the growth rates of GTR, the public's greatest resource, and the growth rates of GHE are important in terms of sustainability.

Figure 35: Real GTR and Real GHE (2009 Constant Prices), Million NCUs



Source: Calculations made by author of thesis from GDBFC and OECD data.

When real tax revenues are compared with public health expenditure, it can be seen that the increase in tax revenues fell behind the increase in health expenditure in 1980-2016 (Figure 35). Similarly to the previous results, real GHE increase rate was lower than the increase in real GHE between 2003 and 2016 (Table 40).

Table 40: Real GTR and Real GHE Average Annual Growth Rates and Increase Rates (%), 1980-2016

Time Period	Real GTR		Real GHE	
	Average Annual Growth Rate (%)	Increase Rate (%)	Average Annual Growth Rate (%)	Increase Rate (%)
1980-2002	6.59	217.97	16.62	818.45
2003-2013	5.62	78.11	5.87	73.69
2014-2016	6.83	12.61	4.28	9.91
1980-2016	6.32	621.09	12.42	18 29.89

Source: Calculations made by author of thesis from GDBFC and OECD data.

5.3.2. Is Health Care Funding Sustainable over the Long Term?

The sustainability of health care system financing has been a topic of discussion for several decades (Angelis et al., 2017). Problems in health care system financing have caused the acceleration of health care system reforms worldwide. In Turkey, a series of reforms were put into practice in 2003 in order to organize health care services more effectively, efficiently, and fairly, to supply and provide finance for health care services. This reform program was named the HTP. In its New Vision Program in Health Care Services, which is a follow-up to the HTP, the government aimed to provide a health care service at or above European standards. These reform programs have caused a critical increase in health expenditure. This rapid increase of health expenditure since 2003 has brought the issue of sustainability to the agenda. Health expenditure has been increasing for various reasons, such as population ageing, changing disease burden, health care inflation from new health care technologies, increasing requests for services depending on health awareness. This has kept financial sustainability on the agenda (Ministry of Development, 2013). The sustainability of the Turkish health care system has been a significant matter of debate for both citizens and health care policy-makers. This study therefore aimed to analyze its financial sustainability through quantitative data and carry out an evaluation for the future.

This study first assessed the financial sustainability of the Turkish health care system based on expert opinions, with 67% of participant in the study believing that the system is not financially sustainable. The lack of resources was of the participants' concern as one of the major problems. A financially sustainable health care system is possible with a system that basically meets the necessity of a decent resource structure. So as to guarantee that the health system has the power to reach its aims at present and in the long term, the expansion of the public revenue base for the health sector is required. Financing of health care services in Turkey is mainly provided by SSI. SSI is the only institution in the health care system that pays in the Turkish health care system with the premiums that it gathers from all citizens to the extent that health insurance covers. Beginning from 1990s, financial deficits started to appear in the social security system of Turkey, which resulted in an unsustainable gap in the 2000s.

Total revenue of SSI met its total expenditure in the rate of 92.5% in 2016. It is stated in the activity report of SSI (2017) that there was a deficit in amount of 20.6 million NCUs in 2016 and received 46 million NCUs state's contribution. The deficit without state's contribution is 66.6 million NCUs. The low active/passive ratio is the most important factor in the financing deficit. There was a decline of this ratio from 1.95 in 2006 to 1.78 in 2009, then an increase only to 1.86 as of November 2016 (SSI, 2017b). This means approximately two employees for each individual retired. In consideration with the present view, the required active/passive ratio is 4 so that social security systems can operate effectively, which means it is compulsory that 1 passive insurance payer be covered by 4 active insurance payers. Early retirement practices and illegal employment are considered as the most important factors in the low active/passive ratios. There occurred an improvement in the financial deficit of the social security system mainly thanks to the state's contribution to the system as of 2008 through state contributions, supplementary payments, and invoiced payments. In summary, sustainability of the expenditure performed in scope of general health insurance, which occupies a significant place in public health expenditure, gives rise to anxiety. As stated by the experts in their views, it will make positive contributions to sustainability of Turkish health care system to ensure collect UHI premiums regularly, to reduce the resources transferred by the state to the social security system and to ensure balance of revenues and expenditure thanks to the premiums collected in the system.

Moreover, participants stated that the performance system applied in public and university hospitals is deviated from its goal. The system, rather than serving the patient, has been rendering service to those who produce performance on paper. Risky transactions are avoided. Examination of the patients with the concern of decreasing the revolving fund is ignored. Obviously, there is an internal quality degradation. This situation will negatively affect public health and sustainability.

The issues that university hospitals face lead to the experts' views that the health care system in Turkey is not sustainable. The further analysis in this study supports the participants' views. The main problems of university hospitals can be summarized as follows: their expenses are more than their income, they are not able to pay their debts and their personnel needs cannot be met. Particularly, the

reimbursement system, the prices of MED and the lack of professional managers have brought hospitals to a financially unsustainable point.

MED is the most important and regulation in Turkey that determines the limitations and rules on pricing health care services. MED prices are a detailed pricing application, which is determined by SSI on transaction and package bases for certain services and procedures that are used by health institutions providing these services. This pricing is determined by the Health Services Pricing Commission. Participants of this study stated that sustainability of health care system is negatively affected by low MED pricing. In scope of this study, price increase rate of 6,857 operations or packages whose fees are determined and which are included in MED were calculated between 2008 and 2017. It is found that there was no increase in the price of almost eighty percent of these operations or packages during these nine years, the price of three percent of these operations or packages decreased, and the price of eighteen percent of these operations or packages increased. In light of this information, it is highly difficult to say that prices of MED are updated and the prices formed are related to actual costs excessively. It is clear that this situation influences financial sustainability of the system adversely. Therefore, it is considered that MED prices need to be revised and updated according to price inflation.

As mentioned previously, health care systems of countries vary according to decision-makers' preferences about policies. The fact that there are surplus of treatment method and procedures which are in scope of reimbursement may be a deliberate policy preference as a matter of a country's health care policy. The reforms implemented in 2003 in the Turkish health system are policy choice, and they increased the satisfaction of health care services from 39.5% in 2003 to 71.7% in 2017. Despite the significant rise in satisfaction of health care services, it was determined that the experts participating in this study were concerned about the populist policies implemented in Turkey. Among the policies that they consider to be populist are the high coverage of the universal health insurance in other words SSI benefit package. SSI is a public entity from which Turkish citizen benefits and at which social security systems are applied. UHI system is put into practice by SSI in accordance with the Law No. 5520 in Turkey. UHI covers 98.6% of the total population of Turkey (SSI,

2017a), which is a high rate. According to Koçakaya et al. (2016) when we compare Turkey UHI in terms of coverage with world, Turkey has excessive comprehensive insurance system. The re-evaluation of the coverage of the UHI and the creation of new resources that will facilitate the financing of this coverage rather than the narrowing of the coverage of citizenship are considered to be an important contributor to sustainability.

One of the reason why experts find the Turkish health system unsustainable is the organizational structure of the system. The structure and function of the Ministry of Health has been changed with the reforms implemented in the Turkish health system in 2003, the first and second step health care services have been transformed and put Universal Health Insurance (UHI) into force and the organizational structure of the Turkish health care system have been subject to the most radical regulation. The views on this deep-rooted change lead to disagreement in the literature. Some studies indicated that changes in the organizational structure of the health system is successful (Atasever et al., 2017), some of them indicated that these changes is unsuccessful (Doğan, 2017; Sevinç and Özer, 2015). It is believed that the changes in the organizational structure of the Turkish health system should be discussed through open sessions, workshops and should be investigated the positive and negative changes brought about by the transformation of the health system. Furthermore, as participants mentioned that second and third step health care institutions applications very high in Turkey. However, countries in the world generally primarily support preventive health care service providers in other words first step health care providers. Because it is less costly. For this reason, patients are encouraged to go through outpatient diagnosis and treatment facilities. It can be also create sustainability problem in the future.

According to literature, health expenditure and increasing wealth levels are significantly correlated. In consideration with Maslow's hierarchy, as people's fundamental needs are met, their expectations of the required services become more and more sophisticated. Expectations from health care services increase as the income rises in Turkey. Other factor that experts consider to be financial unsustainability is the demand for excessive health care. The rise of health care expenditure does not correspondingly affect the rise of need for care within populations. While total number

of applications to hospitals was 124,300 in Turkey in 2002, it was 492,489 in 2016. During 2002-2016, there was an increase in the total number of applications to hospitals, which is nearly 296%. The rate of increase in the number of applications to second and third line public health care institutions was 234% and the rate of increase in number of applications to university hospitals was 370% while the increase in number of applications to second-line private health care institutions was 1,374% (Atasever, 2004; SSI, 2017d). This situation gives rise to concern about the excessive increase of demand for health care services. The evidence-based detailed investigations are carried out about health service demand and if there is an excessive demand for health care, policy-makers should be take precautions to prevent this.

According to Turkey Pharmaceutical Market (2017) report, 7.61 billion NCUs pharmaceutical was imported in 2010 in Turkey, this amount increased 13.33 billion NCUs in 2017 (İEİS, 2018). In this expansion, factors such as rise in access to public hospitals and physicians, increase in life expectancy, rising and aging population are effective. In addition, the ratio of pharmaceutical exports to imports was 18% in 2017 (İEİS, 2018). Import figures of the pharmaceutical sector support the view that the health sector is dependent on foreign products and the dependency is a disadvantage in terms of sustainability. By increasing the production for all kinds of medical materials and pharmaceuticals needed by the health care sector, by investing in new health technologies, the production of imported products in the domestic market will provide a positive contribution to health care system sustainability.

On the other hand, participants are concerned about city hospitals and Syrian refugees. In media reports that each of city hospital cost 3-5 billion dollars and all health care services free for Syrian refugees. There is not enough and reliable information of city hospitals and Syrian refugees health cost. These problems may negatively affect revenue an expenditure balance of Turkish health care system. The participants concerns about sustainability should be taken into account.

27% of participants defined financial sustainability as equality of revenues and expenses. In this study, according to expert' opinions and a literature view, financial sustainability was defined as "the growth in the resources of a health care system being equal to or larger than the increase in health expenditure". Accordingly, growth rates

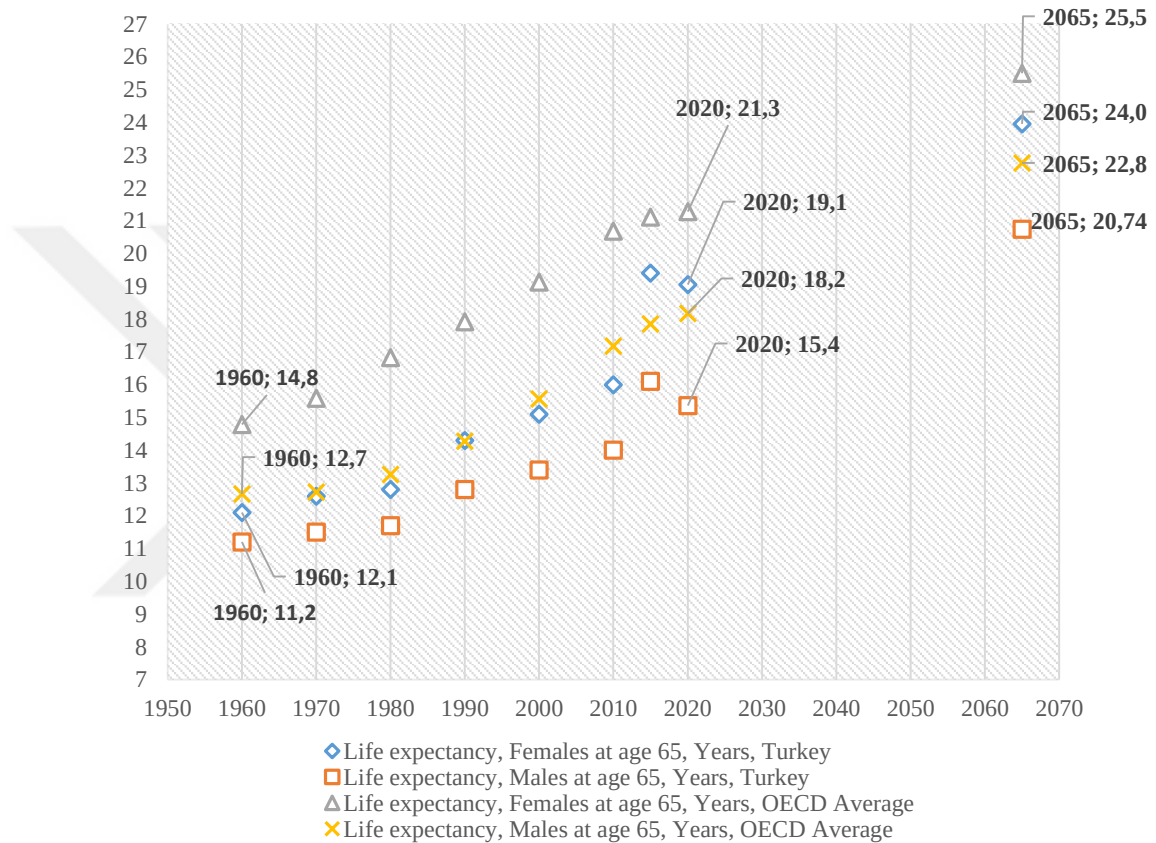
of resources and expenditure were examined for 1980-2016. The findings show that health expenditure grew faster than resources, especially for 1980-2003. Nevertheless, this cannot be considered as direct evidence that the system is unsustainable. After examining the health care system in terms of reform periods, it was found that the increase in health expenditure since 2003 was less than the increase in resources. This clearly shows that the reforms carried out since 2003 have made a positive contribution to the sustainability of the Turkish health care system.

In the discussions concerning financial sustainability in health care systems, the demographic structure of the population and the gradual aging of the population in particular play a critical role. In other words, demographic factors may increase the demand for health care services and affect financial sustainability. Life expectancy at age 65 has increased since the 1960s in both OECD countries generally and Turkey specifically (Figure 36). Although Turkey generally falls below the OECD average, life expectancy at age 65 has increased rapidly since 2010 for both females and males. Figure 36 presents the OECD and Turkey's statistics for life expectancy at 65 for females and males between 1960 and 2015, and the projected values for 2020 and 2065. According to the OECD average, life expectancy at age 65 for females increased by 42.8% from 14.8 years in 1960 to 21.1 years in 2015. In Turkey, on the other hand, life expectancy at age 65 for females had a 60.3% increase from 12.1 years in 1960 to 19.4 years in 2015. Similarly, average life expectancy for males in OECD countries increased by 40.9% from 12.7 years in 1960 to 17.9 years in 2015. In Turkey, life expectancy at 65 for males increased by 43.8% from 11.2 years in 1960 to 16.1 years in 2015.

According to OECD projections, compared to 2015, women's average life expectancy at age 65 is projected to increase by 0.81% to reach 21.3 years in 2020 and 25.5 years in 2065, rising by 27.5%. In Turkey, on the other hand, it is expected to decline by 1.8% to reach 19.1 years in 2020 while increasing by 23.5% to 24 years in 2065. The OECD average for men's life expectancy at age 65 is estimated to increase by 1.8% compared to 2015 and reach 18.2 years in 2020 and by 27.5% to reach 22.8 years in 2065. In Turkey, life expectancy for men at age 65 is projected to fall by 4.6% to reach 15.4 years in 2020 and to reach 20.4 years with an increase by 28.8% in 2065.

compared to 2015. Thus, while life expectancy at 65 in Turkey is estimated to decline in the short term, it is expected to have a growth close to the OECD growth rate and life spans will approximate to the OECD average in the long term (Figure 36). While increased health care expenditure has influenced life expectancy in a positive way, other social determinants also play an important role (OECD, 2017a).

Figure 36: Life Expectancy at 65, 1960-2015 and 2020-2065 Projections, Years



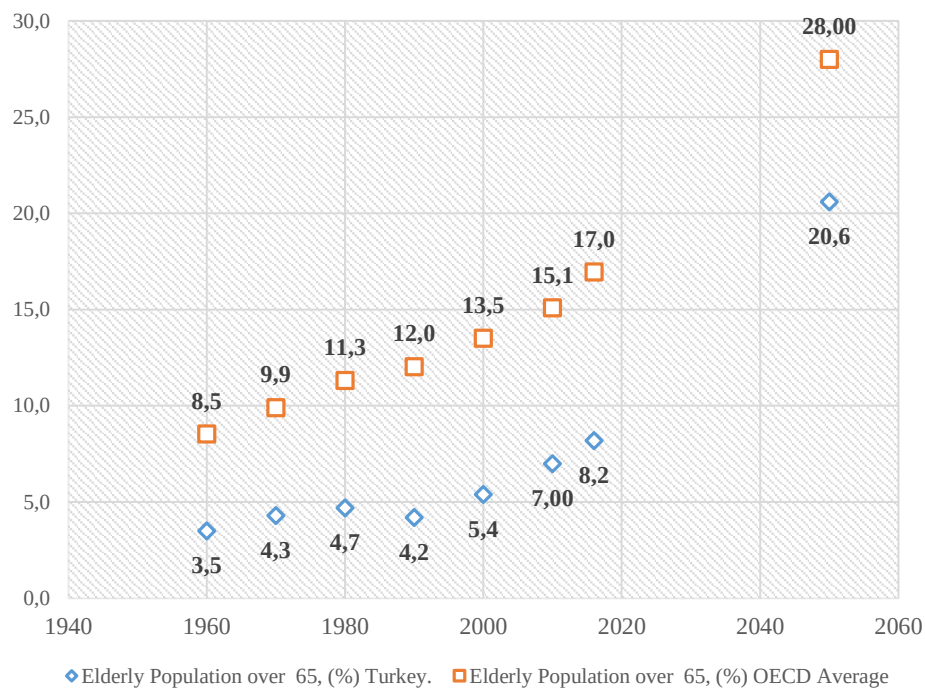
Note: Life expectancy at 65 in the years 2020 and 2065 are based on OECD projections.

Source: OECD, 2017a; 2017b.

Extended life expectancy at age 65 and over causes a larger elderly population ratio. According to the OECD average, the ratio of the population aged 65 and over to the total population was 8.55% in 1960 compared to 17% in 2016, an increase of 98.5%. In Turkey, the ratio of the population aged 65 and over to the total population rose by 134.28% from 3.5% in 1960 to 8.2% in 2016 (Figure 37).

According to OECD estimates, the OECD average for the ratio of the population aged 65 and over to the total population will increase by 61.1% compared to 2016 and reach 28% in 2050. As for Turkey, it is estimated to reach 20.6% with an increase of 151.2% compared to 2016 (Figure 37). Although the mean age of the elderly population over 65 years in Turkey lags behind the OECD average, it is remarkable that the elderly population increase rate in Turkey is two times higher than the OECD increase rate. This could possibly result from the improvement in the population's health status as a result of recent developments in health care services in Turkey.

Figure 37: Elderly Population over 65, 1960-2016 and Projection 2050, (%)

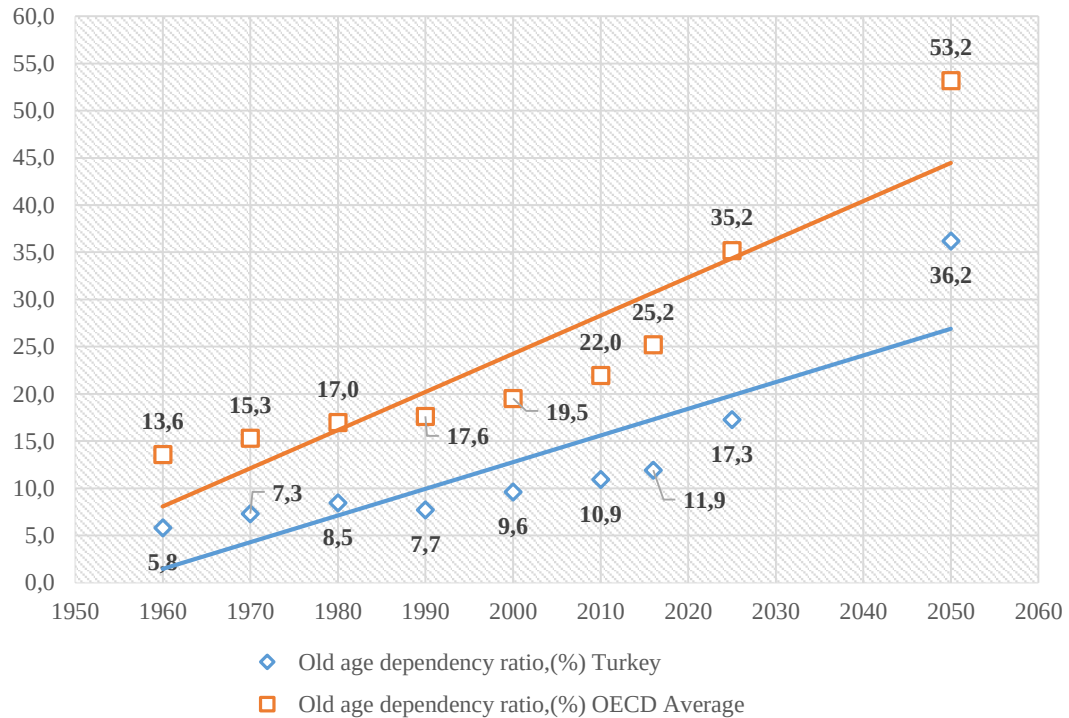


Note: Life expectancy at 65 in the years 2025 and 2050 are based on OECD projections.

Source: OECD, 2017a, 2017c.

The increase in life expectancy at age 65 and over and in the ratio of the population aged 65 and over to the total population will also impact old-age dependency.

Figure 38: OECD average and Turkey Old Age Dependency Ratio, 1960-2016 and Projections 2025-2050, (%)



Note: Life expectancy at 65 in the years 2025 and 2050 are based on OECD projections.

Source: OECD, 2017a., 2017c.

Figure 38 shows OECD old-age dependency ratios and projections for the 2025-2050 period. The ratio was 13.65% in 1960 and increased by 85.3% to reach 25.2% in 2016. As for Turkey, it rose by 105.4 % from 5.8% in 1960 to 11.9% in 2016. Based on OECD projections, the OECD's average old-age dependency ratio is estimated to increase by 39.6% to 35.2% in 2025 and by 111.1% to 53.2% in 2050 compared to 2016. In Turkey, on the other hand, it is envisaged to rise by 45%, reaching 17.3% compared to 2016 and 36.2% in 2050 with an increase by 203.3%. Despite being behind the OECD average, it is apparent that the Turkish population has entered an aging process and the possibility that this may significantly increase health expenditure must be taken into consideration by policy makers.

Projections provided for endogenous variables reveal that life expectancy at age 65 and the ratio of people aged 65 and over to the total population are rapidly increasing. These increases, which have especially occurred since 2003, are indicators that the reforms implemented in Turkey have resulted in a rapid improvement in citizens' health status, and this extended life expectancy has raised the old-age dependency ratio. This is considered to put pressure on the future financial sustainability of the Turkish health care system.

It is obvious that health care expenses increase if the citizens' lives are lengthened thanks to improvements in their health status. A higher growth of health care expenditure than resources will damage the sustainability of the health care system. As seen in the health exogenous factors projections for 2030, a possible sustainability gap may threaten the sustainability of the system. For that reason, it is necessary that growth rates in resources and expenses should be carefully monitored. In general terms, sustainability comes under the influence of a variety of parameters, and that one of the most popular study fields of sustainability worldwide is health care systems.

Additional significant ethical and economic health issues about how technological advances must be referred by the public system are raised by the likelihood for a whole new suite of genetic testing and screening technologies. On the individuals' side, the change in behaviors of the drug industries, doctors and patients is the most vital factor national health insurance has led. Most especially, high health care utilization rates are caused by compulsory enrolment mechanism and comprehensive coverage of the national health insurance. Hospitals and drug industries are provided with more chances for collaboration to make excessive profits and give damage to service quality under the operation of the national health insurance. Hence, in summary, not only financing mechanism of the present national health insurance but also cost containing were not able to resolve the vicious cycle, which stands out as the major reason for the negative financial phenomenon. For example, Turkey has become the country using MR device most per person in international comparisons. While the number of screening is 14,992 per MR device in hospitals providing inpatient treatment in Turkey, this rate is 5,125 in OECD countries (OECD,

2017b). As stated by the experts who participated in this study supports the notion that the system is perhaps abused by service providers support by the excessive the number of screening per MR device in hospitals in Turkey.

Overall, to ensure the long-term financial sustainability of health care systems and to keep the public nature of publicly-funded ones, a set of profound reforms must be implemented.

5.4. FINANCIAL SUSTAINABILITY OF PUBLIC UNIVERSITY HOSPITALS

This section focuses on the financial sustainability of PUnH since in the section 5.2 participants mentioned various problems experienced in Turkey's hospital sector. The financial statements of 44 PUnH were analyzed using balance sheet, income statement, and general journal information. The findings revealed weak financial structures. Suggestions that could contribute especially to financial sustainability were developed.

5.4.1. General Financial Structure of Public University Hospitals

PUnH try to operate under extremely harsh conditions due to difficulties in their financial liabilities (Varol, 2009). Table 41 presents an overview of the financial structure of PUnH.

Table 41: General Financial Structure of PUnH, NCUs (Consolidated)

	2013	2014	2015	2016	2017
Total Assets	2,054,375,409	2,193,846,077	2,131,632,025	2,025,259,116	2,100,978,524
<i>Current Assets</i>	2,022,620,467	2,151,696,437	2,095,378,902	1,996,552,881	2,048,742,402
<i>Long-Term Assets</i>	31,754,941	42,149,640	36,253,123	28,706,235	52,236,122
Total Liabilities	2,784,652,682	3,445,770,561	4,179,763,495	5,409,240,987	6,678,853,482
<i>Short-Term Liabilities</i>	2,767,622,710	3,439,512,510	4,073,951,974	5,229,388,293	6,411,123,316
<i>Long-Term Liabilities</i>	17,029,972	6,258,051	105,811,521	179,852,694	267,730,166

	2013	2014	2015	2016	2017
Equity	-730,430,648	-1,251,924,485	-2,048,131,470	-3,384,319,426	-4,577,874,958
Net Sales	5,098,047,508	6,003,316,356	6,605,971,068	7,513,139,441	8,665,524,050
Net Profit or Loss	-448,602,370	-569,141,773	-799,462,766	-1,336,248,029	-1,193,057,968

Source: Author calculations based on RFFMS data.

As indicated in Table 41, total assets are around 2 billion NCUs. It is noteworthy that the share of long-term assets in the total assets is much lower than that of current assets. It should be mentioned that fixed assets are shown under university's accounts, not under the hospitals own accounts. Thus, fixed assets values of the PUnH do not show their exact position.

The fact that the assets are not displayed in the records of the hospital but in the records of the university may be misleading for those who want to comment on the financial situation of hospitals. In order to indicate the value of fixed assets, undepreciated tangible fixed asset values were also requested from two PUnH at the same number of patients beds (Table 42). The purpose here is to show how much fixed asset amount that is not record in hospital own records has a share of approximately total assets.

Table 42: Two PUnH' Tangible Fixed Assets Values (Undepreciated), NCUs

	A- PUBLIC UNIVERSITY HOSPITAL	2013	2014	2015	2016	2017
25	<i>D-Tangible Fixed Assets (I)</i>	24,507,333	24,805,366	26,624,768	35,058,866	41,551,788
253	4- Machinery, plant and equipment	18,806,449	18,924,184	19,814,360	26,724,315	31,516,404
254	5-Vehicles	343,912	506,091	489,152	489,152	489,152
255	6- Furniture and fixtures	5,356,971	5,375,090	6,321,256	7,845,399	9,546,233
	RFFMS TOTAL ASSETS* (II)	13,508,894	13,629,755	19,721,148	22,737,281	17,325,061
	RFFMS TOTAL ASSETS+ HOSPITAL'S TANGIBLE FIXED ASSETS (I+II)	38,016,227	38,435,120	46,345,916	57,796,148	58,876,849
	<i>Tangible Fixed Assets/Total Assets [I/(I+II)]</i>	0.64	0.65	0.57	0.61	0.71
	B-PUBLIC UNIVERSITY HOSPITAL	2013	2014	2015	2016	2017

25	D-Tangible Fixed Assets (I)	73,985,736	80,641,023	85,524,581	95,028,153	101,925,166
253	4- Machinery, plant and equipment	61,725,479	67,459,342	71,032,856	78,930,137	85,489,076
254	5-Vehicles	143,768	192,522			
255	6- Furniture and fixtures	12,116,489	12,989,160	14,491,724	16,098,016	16,436,090
	RFFMS TOTAL ASSETS* (II)	54,851,156	61,693,654	64,101,346	60,162,924	43,799,151
	RFFMS TOTAL ASSETS+ HOSPITAL'S TANGIBLE FIXED ASSETS (I+II)	128,836,892	142,334,677	149,625,927	155,191,076	145,724,317
	Tangible Fixed Assets/Total Assets $[I/(I+II)]$	0.57	0.57	0.57	0.61	0.70

* Tangible fixed assets values of the same hospitals on RFFMS database.

Source: Author calculations based on RFFMS data.

As Table 42 shows, the ratio of tangible fixed assets/total assets was 0.70 for hospital A and 0.71 for hospital B in 2017. In the RFFMS records; the ratio of tangible fixed assets to total fixed assets was 0.29 for hospital A and 0.30 for hospital B in 2017. There was a deviation of approximately 40% in hospital records. Although fixed assets value is high, tangible fixed assets cannot be seen on those hospitals' financial accounts at RFFMS. This situation should be considered while evaluating the financial performance of PUnH.

Moreover, Table 41 indicate that the debts of hospitals have increased swiftly: total liabilities were nearly 2.7 billion NCUs in 2013 and increased by approximately 140% to 6.7 billion NCUs in 2017. Additionally long-term liabilities were much lower than short-term liabilities. Hospitals are indebted substantially to suppliers. Goods and material procurement is performed through tendering or direct supply. Since the longest payment period in the tenders was 12 months, the short-term liabilities of these hospitals were very high.

In Table 41, it is also seen that the value of equity was negative. One of the reasons is that tangible fixed assets are not recorded in the balance sheets, as mentioned above. Another reason is the ever-increasing debts. The value of equity, which was nearly -730 million NCUs in 2013, decreased by 527% to -4.6 billion NCUs in 2017 indicating financial problems of PUnH.

In addition, the net sales of PUnH, had a steady increase of 70% from approximately 5 billion in 2013 to 8.6 billion NCUs in 2017. In contrast, net loss rose by 166% in 2017 compared to 2013 to -1.1 billion NCUs. Despite the increasing net sales, declining profitability shows that PUnH have difficulty covering their expenses.

5.4.2. Financial Ratios of Public University Hospitals

Ratio analysis was also performed to examine the financial performance of PUnH more carefully⁴. Due to the restrictions mentioned above, the analysis did not include any ratio that needs the tangible fixed assets value in its calculations.

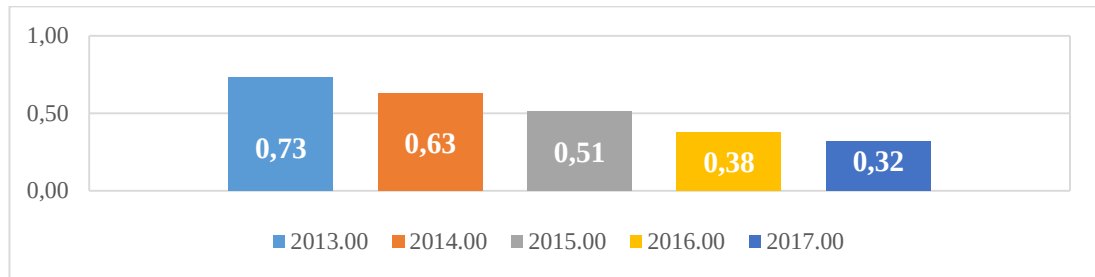
5.4.2.1. Liquidity Ratios

Health institutions need large amounts of liquid assets to sustain their activities (Kurt Gümüş and Balcı, 2017). In this study current, quick, inventories to current assets, inventory dependency, cash, and short-term receivables to current assets ratios were calculated.

The accepted standard for the current ratio is 2, which provides information about the general liquidity status of the company. However, the accepted standard for the current ratio changes according to the economic conjuncture, sector and competitors. As seen in Figure 39, the current ratio has decreased over the years. The highest value of the current ratio is lower than 2 in 2013, which indicates that the PUnH have problems with liquidity. In other words, the fact that the ratio is already below 1 and gradually decreases indicates that these hospitals have significant difficulty in paying for their short-term liabilities. It is possible to say that liquidity tend to decrease while financial risks tend to increase.

⁴ The sector averages were calculated bringing together all ratios. It was given in Appendix 5.

Figure 39: Current Ratio, 2013-2017

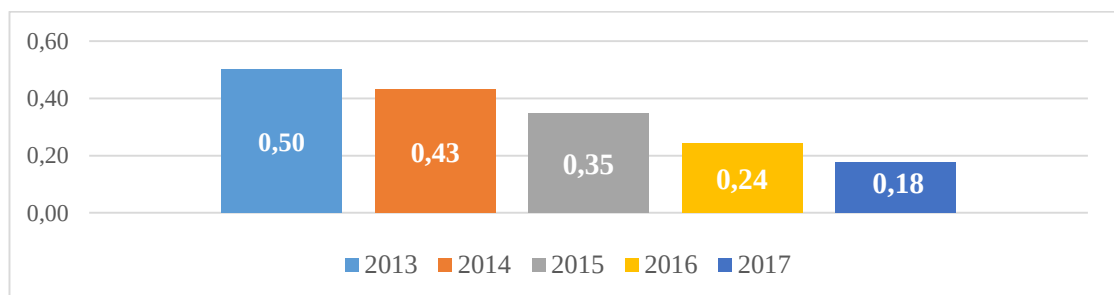


Source: Author calculations based on RFFMS data.

The generally accepted standard for the quick (acid-test) ratio is 1. It evaluates inventory dependency and indicates whether the hospitals can afford their short-term liabilities with other current assets. As seen in Figure 40, ratio was below 1 (0.50). Their dependency on inventories increases and the ability to pay short-term liabilities decreases each year. The current and quick ratios, having the same trend, show that there are difficulties for PUnH to pay their short-term liabilities.

Özgülbaş (2006) determined standard value of quick ratio for public hospitals 0.72 in 2000. Yiğit and Yiğit (2017) indicated quick ratio of university hospitals was 0.55 in 2013 and 0.46 in 2014. These results may reveal that standard for PUnH quick ratio can be below 1. On the other hand, PUnH should have a strong liquidity structure because they require cash for payment of contracted personnel salaries, medical equipment (for example cardiac valve) etc.

Figure 40: Quick (Acid-Test) Ratio, 2013-2017*



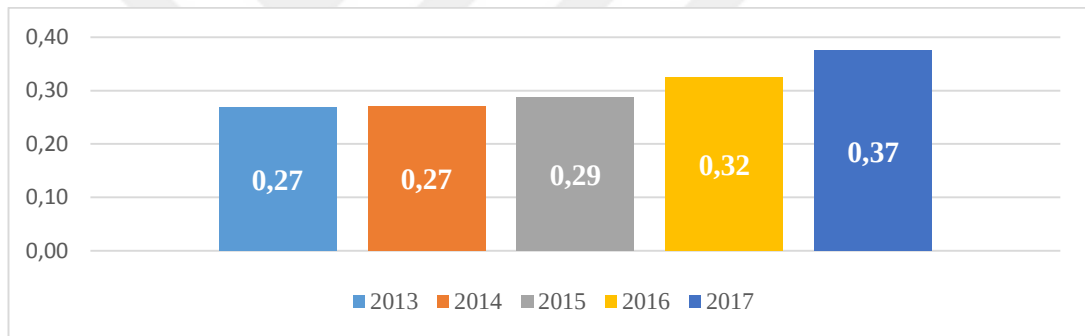
Source: Author calculations based on RFFMS data.

*Calculated from the data of 38 PUnH. Adnan Menderes, Atatürk, Balıkesir, Düzce, Giresun, and Kafkas PUnH are excluded because the inventory values in their balance sheets were 0 NCUs for at least one year in the study period.

The ratio of inventories to current assets is an indicator similar to quick ratio, which shows the weight of inventory in current assets. The ratio for PUnH, which was 0.27 in 2013, rose to 0.37 in 2017, affecting liquidity in a negative way.

Inventories for hospitals are drugs, medical supplies, laboratory and non-medical stocks. Başcı et al. (2012) found average of this ratio was 0.18% between the years 2000 to 2010 for private hospitals in Turkey. Orak (2015) determined this ratio was 0.28% in 2008 and increased to 0.52% in 2013 for public hospitals and was 0.11% in 2008 and rose to 0.35% for research and education hospitals. Health companies are obliged to keep the inventory as health care services can be maintained without malfunction. Since hospitals are companies providing health care services, they must bear the cost of keeping higher inventories than other companies as well.

Figure 41: Inventories to Current Assets Ratio, 2013-2017*



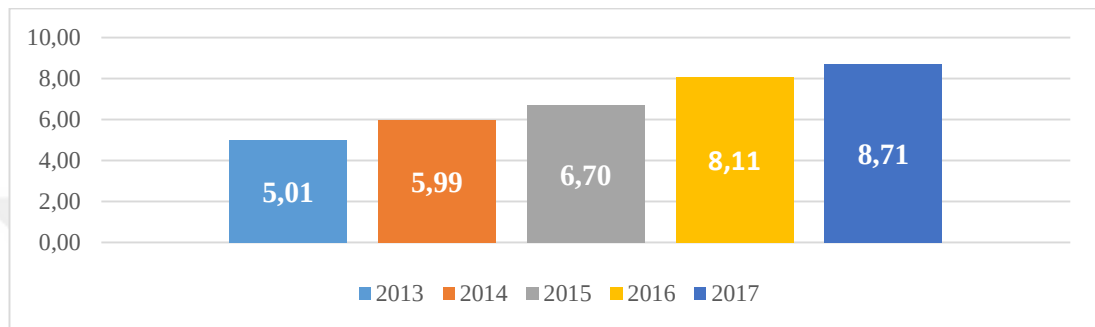
Source: Author calculations based on RFFMS data.

*Calculated over the data of 38 PUnH. Adnan Menderes, Atatürk, Balıkesir, Düzce, Giresun, and Kafkas PUnH were excluded because their inventory values in the balance sheets were 0 NCUs for at least one year in the study period.

Inventory dependency ratio shows the dependence on inventories for the payment of short-term liabilities. The generally accepted standard for the inventory dependency ratio is below 1. Since inventories are converted into cash slowly, the level of inventories required to pay for short-term liabilities increases as this ratio grows. In the examined hospitals, this ratio rose from 5.01 in 2013 to 8.71 in 2017 (Table 42). In spite of hospitals' high inventories, it is not sufficient to pay for their short-term liabilities. Hence, to cover their debts, approximately 8 times more inventory is needed

than they have now. Hospitals' inventory dependency is extremely high. So, there is a problem with inventory management and inventories are not being conducted effectively. Moreover, it is possible to interpret that the PUnH are dependent on inventories to pay their liabilities and have a cash shortage.

Figure 42: Inventory Dependency Ratio, 2013-2017*



Source: Author calculations based on RFFMS data.

*Calculated from the data of 38 PUnH. Adnan Menderes, Atatürk, Balıkesir, Düzce, Giresun, and Kafkas PUnH were excluded because their inventory values in the balance sheets were 0 NCUs for at least one year in the study period.

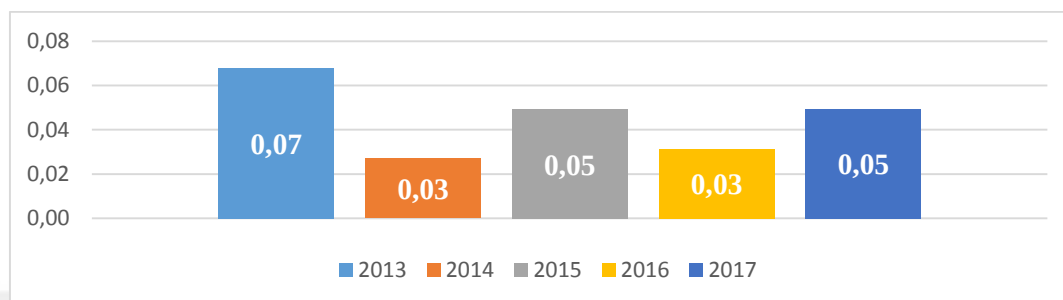
Cash, cash equivalents, and marketable securities are the most liquid assets that a company holds. The generally accepted standard for this ratio is 0.20 and above in developed countries (Akgüç, 2017). It is therefore recommended that cash ratio should not drop below 0.20 to cover short-term liabilities.

Health institutions purchase a wide range of goods and services from companies, including pharmaceutical products, cleaning and security services, medical equipment, and catering. Services such as security, cleaning, and catering need monthly payments. Similarly, when medical equipment and pharmaceutical products are purchased, it is necessary to make monthly payments to the supplier. Hence, the cash ratio of a health institution needs to be kept at an acceptable level (Balcı and Kurt Gümüş, 2017).

As seen in Figure 43, this ratio is below 0.10. They have very low level of cash to pay their short-term liabilities. In Turkey, PUnH have a high amounts of debt so this ratio was below 0.10. Moreover, supplier firms know that PUnH don't have enough

cash to pay short term liabilities on time. For that reason, supplier firms charge a higher price to the goods and services they sell by considering PUnH cash shortage and low ability to pay short-term liabilities.

Figure 43: Cash Ratio, 2013-2017



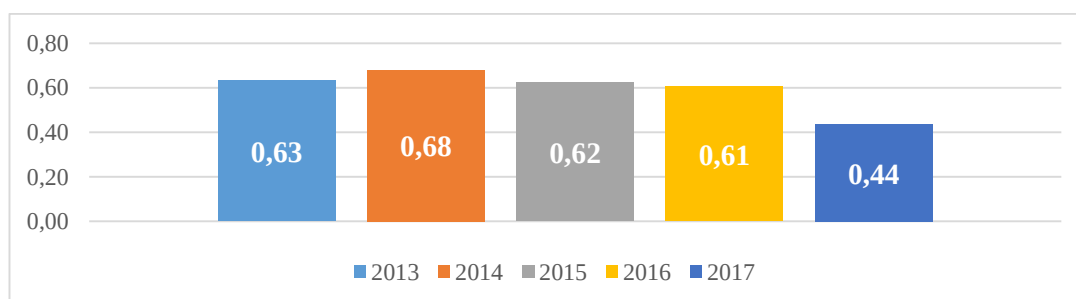
Source: Author calculations based on RFFMS data.

Short-term receivables to current assets ratio indicates weight of short-term receivables among current assets. Since, in the health care sector a great majority of the patients have SSI and hospitals have to wait for SSI payments. So, it is expected that the ratio of short-term receivables should be high in the health care sector.

The ratio of short-term receivables to current assets fell from 0.63 in 2013 to 0.44 in 2017. It is probable that this ratio decreased in 2017 because the receivables collection periods of hospitals were shortened.

To evaluate this ratio with the receivables collection period can help reach more accurate conclusions. If receivables can be collected and converted into cash within a short time, then there is no problem.

Figure 44: Short-Term Receivables to Current Assets Ratio, 2013-2017



Source: Author calculations based on RFFMS data.

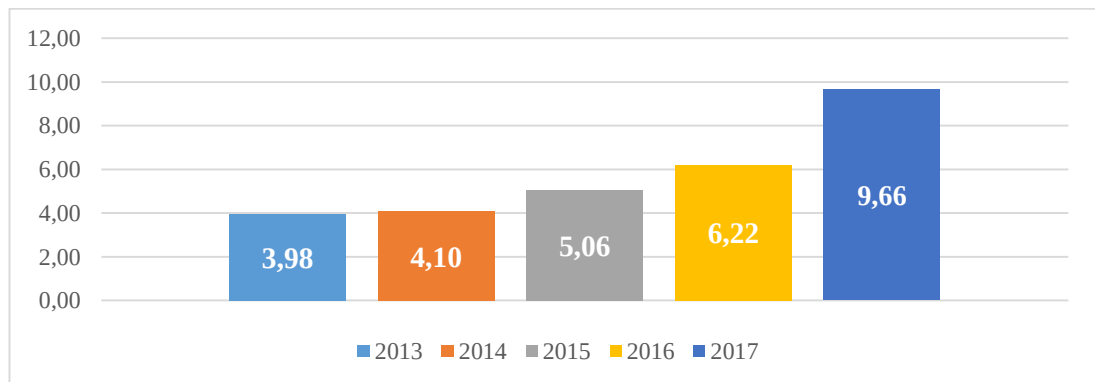
5.4.2.2. Activity Ratios

Activity ratios show a company's ability to convert different financial accounts in its balance sheets into cash or sales. In this study receivables turnover, accounts payable turnover, inventory turnover, and working capital turnover ratios were examined.

The receivables turnover ratio shows how many times receivable accounts were collected in a year, and measures the efficiency of receivables management. This ratio rose from 3.98 in 2013 and 9.66 in 2017. Thus, given the increase in turnover, it is likely that they started to collect their receivables more quickly. As receivables turnover goes up, collection periods shorten (Table 45).

One of the most important aspects here is payment method and length of receivable period. Until the end of 2016, hospitals obtained their receivables from SSI through the MEDULA system and waited two months for payment (Balci and Kurt Gümüő, 2017). After 2016, however, their reimbursement method changed, which reduced the receivables collection period from 90 days to 37 days.

Figure 45: Receivables Turnover Ratio, 2013-2017



Source: Author calculations based on RFFMS data.

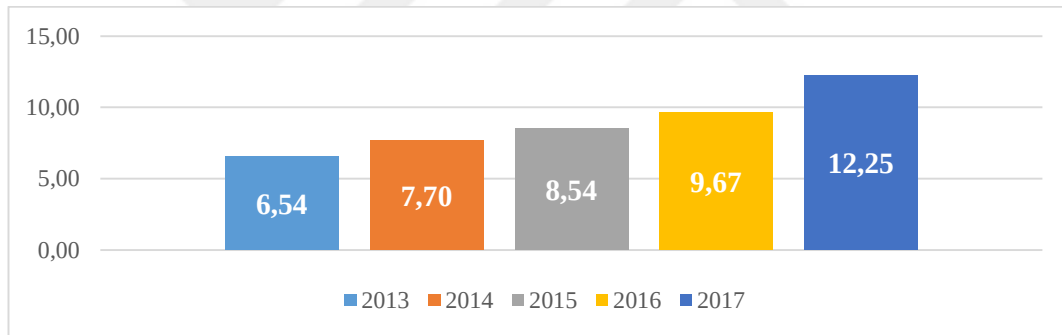
Table 43: Receivables Collection Period

Years	Receivables Turnover Ratio	Receivables Collection Period (Days)
2013	3.98	90.40
2014	4.10	87.88
2015	5.06	71.10
2016	6.22	57.92
2017	9.66	37.28

Source: Author calculations based on RFFMS data.

It is generally a positive sign for firms if inventory turnover, which indicates how effectively the firms use their inventories and how fast they use their inventories, is high. The inventory turnover increased from 6.54 in 2013 to 12.25 in 2017 (Figure 46). This indicates that the hospitals have gradually used their inventories more effectively.

Figure 46: Inventory Turnover Ratio, 2013-2017*



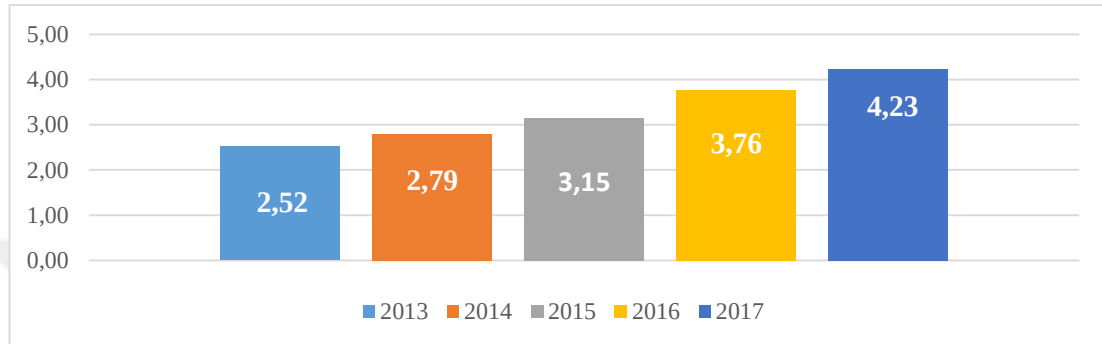
Source: Author calculations based on RFFMS data.

*Calculated from the data of 38 PUnH. Adnan Menderes, Atatürk, Balıkesir, Düzce, Giresun, and Kafkas PUnH were excluded because their inventory values in the balance sheets were 0 NCUs for at least one year in the study period.

The working capital turnover ratio provides information about at what extent working capital is used effectively. That is, how many times the current assets are renewed in one accounting period is measured by working capital turnover. When high, it indicates that patients visit hospitals on a regular basis and that health care services are provided properly, medical and pharmaceutical products' turnover is high, and receivables are collected regularly (Balcı and Kurt Gümüş, 2017).

While the working capital turnover of hospitals was 2.52 in 2013, it was 4.23 in 2017, which indicates that the efficiency of these hospitals has probably increased (Figure 47). As the ratio increases, it means that the current assets are being used considerably more efficiently.

Figure 47: Working Capital Turnover Ratio, 2013-2017



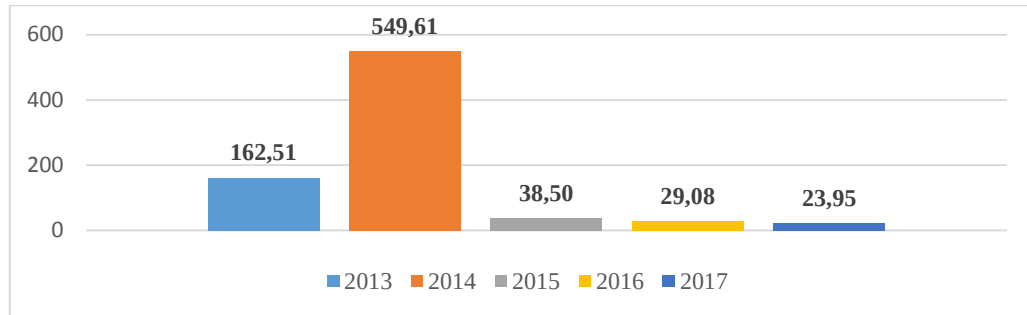
Source: Author calculations based on RFFMS data.

5.4.2.3. Financial Structure Ratios

Financial structure ratios were examined to analyze whether the company is properly funded or the company's is funding and capital risk is high (Akgüç, 2017). In this part of study, short-term liabilities to long term liabilities and short-term liabilities to total liabilities financial structure ratios were calculated due to hospitals' negative equity. Because of these restrictions, most of the financial structure ratios could not be calculated in this study.

The ratio of short-term liabilities to long-term liabilities can be used to evaluate the debt structure of firms. Figure 49 shows that PUnH had very low long-term liabilities in 2013 and 2014. Their long-term liabilities increased slightly after 2015. Generally, the main sources of long-term liabilities are bank loans and bond/bill issues. PUnH do not use either of these methods, so this ratio is extremely high.

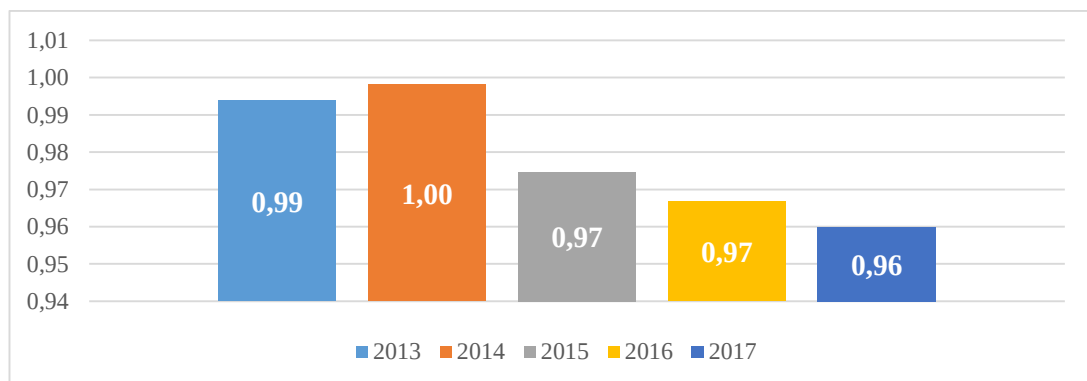
Figure 48: Short-Term Liabilities to Long Term Liabilities Ratio, 2013-2017



Source: Author calculations based on RFFMS data.

The ratio of short-term liabilities to total liabilities, as seen in Figure 50, helps determine and evaluate the risk situations of firms. It also gives information about maturity structure of a firm. This ratio, which was over 0.96 for 2013-2017, indicates that the total debts of the hospitals consisted of short-term liabilities and they have a financial risk. According to Akgüç (2017) this ratio is over 70% in our country and it is observed that it has risen up to 90% in some industry branches. Başcı et al. (2012) found ten years average of this ratio 66% for private hospitals in Turkey. The main question is whether it is normal such a high short-term liabilities to total liabilities ratio for PUnH or not. Moreover, should PUnH use long term debt instruments or should their debts paid by governments? As PUnH an important health service provider, their revenue and expenditure structures should be review carefully and it should be find a solution for their high debt problem.

Figure 49: Short-Term Liabilities to Total Liabilities Ratio, 2013-2017



Source: Author calculations based on RFFMS data.

5.4.2.4. Profitability Ratios

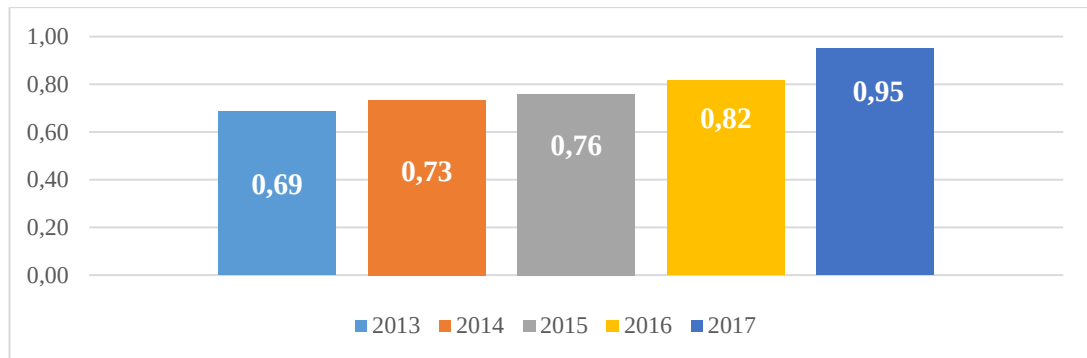
Profitability level indicators are the ratios that show the relationship between the resources firm use, the assets firm have, the costs and expenses firm have been charged and the profits generated (Akgüç, 2017). In this study, gross profit margin, operating expenses to net sales ratio, operating profit margin and net profit margin were calculated.

Gross profit margin shows gross profit in net sales. The upward trend of this ratio is a sign of positive financial development (Akgüç, 2017). In such a case, it is thought that the company follows a good price policy, costs are kept under control, and a sufficient gross profit margin is obtained. This ratio rose from 0.69 in 2013 to 0.76 in 2015 and 0.95 in 2017 (Figure 50). Thus, these hospitals increased their gross profit more than their cost of goods sold. One of the reasons of these increase hospitals signed global budget contract and it rose their gross profit.

On the other hand, for all services/packages within MED, the hospitals must follow MED prices. According to University Hospital Unions (2017) these prices have not changed for the last 8 years. Within the scope of this study, a price comparison was made for 6,857 medical operation in MED for the years of 2008 and 2017⁵. For 6,857 transactions average increase rate was found 18%, 5,190 medical operation price didn't change and 245 medical operation priced decreased (average decrease rate was 35%). Therefore, PUnH need to focus on operations not included in the MED price list to increase their profitability because can determine price of operations not included in MED price list.

⁵ MED price list can be seen Appendix 22.

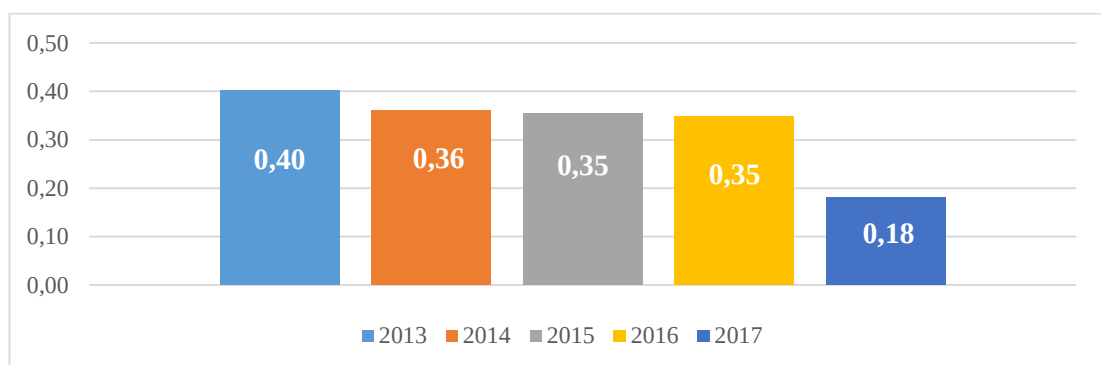
Figure 50: Gross Profit Margin 2013-2017



Source: Author calculations based on RFFMS data.

Operating expenses to net sales ratio shows the weight of operating expenses in net sales. This ratio decreased from 0.40 in 2013 to 0.36 in 2014, 0.35 in 2015, and dramatically to 0.18 in 2017 (Figure 51). The decrease in this ratio indicates that management gradually increased their power to control the hospital's general administrative expenditure over the period or growth rate of net sales is greater than growth rate of operating expenses. Hospitals balance sheets showed that net sales increased 70% and operating expenses decreased 24% between the years 2013 to 2017. This situation may reveal that hospitals were trying to control their operating expenses, especially in 2017, there was an improvement in operating expenses.

Figure 51: Operating Expenses to Net Sales Ratio 2013-2017

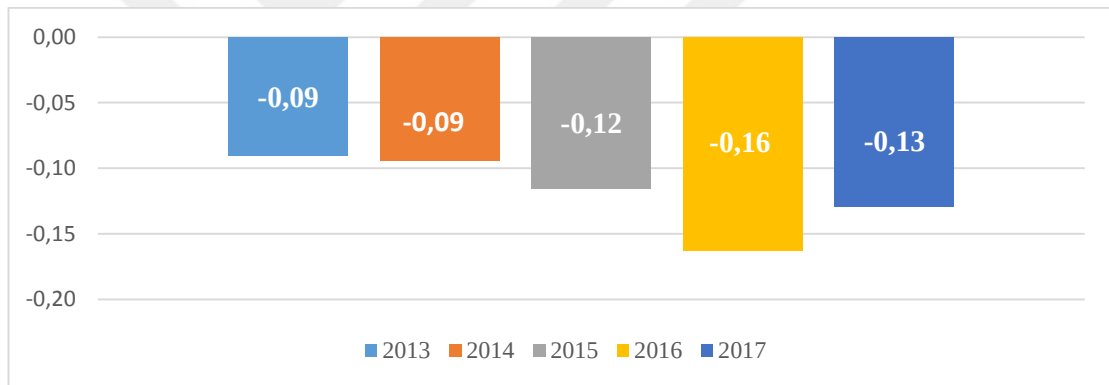


Source: Author calculations based on RFFMS data

The operating profit margin reveals the profitability of the company on core activities. If this ratio is high and tends to go up then this is favorable for the company. This ratio may fluctuate over the years due to changes in sales prices, cost of goods sold, and changes in sales and general administrative expenses (Akgüç, 2017).

As Figure 52 shows, this ratio was negative in the whole analysis period. It decreased from -0.09 in 2013 and 2014 to -0.12 in 2015, -0.16 in 2016, before increasing to -0.13 in 2017. This ratio reveal that PUnH can meet their COGS but they cannot meet their operating costs and there was a slight improvement in 2017 due to decrease of sales and general administrative expenses. Hospitals balance sheets showed that hospital's general administrative expenditure decreased 40% between the years 2016 to 2017.

Figure 52: Operating Profit Margin, 2013-2017



Source: Author calculations based on RFFMS data.

This ratio can be low due to factors that PUnH cannot control. These some of these factors can be summarized as below:

1. *Reimbursement method and MED prices.*

As mentioned above there was a slight in increase in MED prices and private hospitals can charge an extra fee up to prices 200% more than price paid by SSI but PUnH only can charge an extra fee 15%.

In order to determine how the prices in the MED were changed, the latest MED prices published in 2008 and the latest MED prices published in 2017 were compared. There were 7,762 transactions/operations and packages in MED in 2017. Some

medical transactions/operations are combined and priced at a single price in MED. These are priced under package name and there is a “P” in front of the transactions/operations codes. In scope of this study, price increase rate of 6,857 transactions/operations or packages whose charges were determined and which were included in MED were calculated between 2008 and 2017 (Table 44). It was found that there was no increase in the price of 5,189 transactions/operations and packages during these nine years, the price of 215 transactions/operations and packages were decreased in percentage of 26 (%), and the price of 1,423 transactions/operations and packages were increased in rate of 91%.

Table 44: Changes in MED Prices

THE NUMBER OF TRANSACTIONS/OPERATIONS OR PACKAGES WHOSE PRICE REDUCE	AVERAGE % CHANGE		
215	-26%		
THE NUMBER OF TRANSACTIONS/OPERATIONS OR PACKAGES WHOSE PRICE DO NOT CHANGE	AVERAGE % CHANGE		
6,190	0%		
THE NUMBER OF TRANSACTIONS/OPERATIONS OR PACKAGES WHOSE PRICE INCREASE	AVERAGE % CHANGE		
1,423	91%		
EXAMPLE OF TRANSACTIONS/OPERATIONS OR PACKAGES WHOSE PRICE REDUCE	2008 PRICE NCUs	2017 PRICE NCUs	% OF CHANGE
90275-NORTHERN BLOT	152.60	11.86	-92%
P617560-LASER GONIOPLASTY, TRABECULOPLASTY	307.00	30.00	-90%
EXAMPLE OF TRANSACTIONS/OPERATIONS OR PACKAGES WHOSE PRICE DO NOT CHANGE			
P608770-SLEEVE PNEUMONIA	7,146.56	7,146.56	0%
614860-BRAIN NEUROTIMULATOR IMPLANTATION, BILATERAL	1,186.50	1,186.50	0%
EXAMPLE OF TRANSACTIONS/OPERATIONS OR PACKAGES WHOSE PRICE INCREASE			
801550-DAKRIOSINTIGRAFI	15.30	29.30	92%
P605940-HEART-LUNG TRANSPLANTATION	48,125.00	92,400.00	92%

Source: <http://www.resmigazete.gov.tr>, (25.12.2018).

There was no increase in the price of approximately 79% of these transactions/operations or packages during these nine years.

The Consumer Price Index (CPI) rised by 104% between December 2007 to December 2017 (TCMB, 2018). At the same period, dollar exchange rate increased by 152%, while euro exchange rate increased by 112% (BÜMKO, 2018b). The costs of health service providers are increasing every year. MED prices causes a financial hardship for health service providers. MED prices need to be increased at least every year as much as inflation or exchange rate increase rate. Hospitals of the Ministry of Health used the global budget contracts and suffered relatively less than these negative cost effects. The cost of risky and high-cost services is relatively low compared to lower-cost services in MED. This leads health service providers to make low-risk services. Hospitals that do risky services make loss. Hospitals where risky transactions and operations are carried out are University Hospitals. MED prices should be considered to increase for university hospitals.

2. Improvements in employee rights

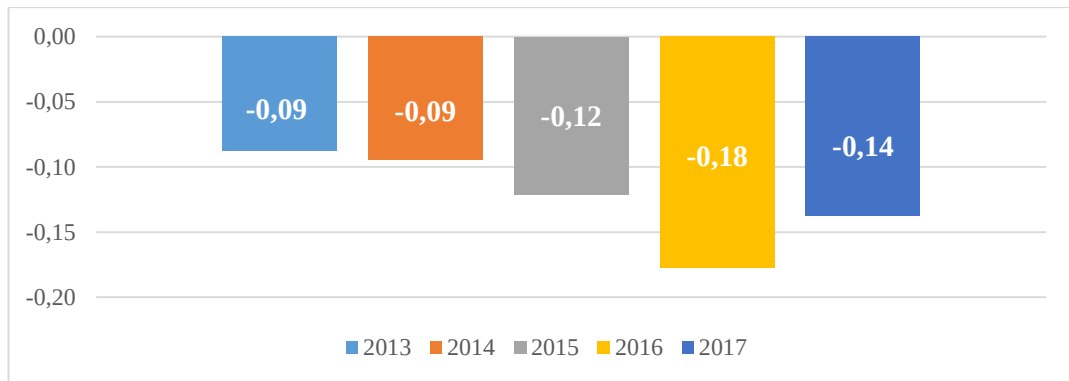
In last 15 years, most of the contracted personnel status changed by governments. They are in the status of 657-Civil Servant. This status change also caused a salary increase but their salaries are still paid by PUnH and it has rose financial burden of hospitals.

3. The Treasury share

The Treasury share of PUnH have to pay was decreased 15% to 1% but they still have to paid it.

The net profit margin measures how much companies can control their expenditure, taking total revenue and cost items into consideration. This ratio was negative for 2013-2017 period, which indicates that the PUnH had difficulty in controlling their revenue-cost balances and were losing money (Figure 53). While the share of operating expenses in net sales was decreasing, the operating profit continues to be negative due to the high level of accumulated debts of the PUnH.

Figure 53: Net Profit Margin, 2013-2017



Source: Author calculations based on RFFMS data.

5.4.3. The Financial Sustainability of Public University Hospitals in Turkey

In this part of study, eight financial sustainability indicators were calculated between the years 2013 to 2017. Table 45 indicates that Turkey's PUnH could not ensure financial sustainability between 2013 and 2017. The financial sustainability ratio decreased from 92% in 2013 to 88% in 2017. Thus, the hospitals' revenues struggled to meet their expenditure. In addition, debts increased by about 140%, from 2.8 billion NCUs in 2013 to 6.7 billion NCUs in 2017. While net debt to revenue ratio was -5.63 in 2013, it was -5.67 in 2017, as showed in Table 45. The ratio was negative since PUnH made loss, which shows that they were at severe financial risk.

Another indicator that shows the hospitals are under a severe debt burden is the average period of payment to suppliers. The reimbursement period of PUnH increased from 7.5 months (225 days) in 2013 to approximately 9.4 months (242 days) in 2016 and decreased 7 months (242 days) in 2017. Conversely, Receivables Collection Period (days) decreased gradually from nearly 2.5 months (88 days) in 2013 to one month (35 days) in 2017. Thus, whereas hospitals were able to collect their receivables within a month in 2017, they took 7 months to pay their debts to suppliers of goods and service (Table 45).

In addition, the value of the net financial liabilities ratio was negative for Turkey's PUnH because of their very high debt burden. The ratio increased by 150% from -1.7 in 2013 to -4.1 in 2017.

Evaluating the current ratio and gross profit margin together, it is clear that PUnH can meet the cost of the goods they sell; however, their total revenues do not meet their expenditure due to large debts and operational expenditure.

Table 45: Financial Sustainability of PUnH in Turkey

Name	2013	2014	2015	2016	2017
Financial Sustainability	0.92	0.91	0.89	0.85	0.88
The Volume of Debt (Billion NCUs)	2.8	3.4	4.2	5.4	6.7
Net Debt to Revenue Ratio	-5.63	-5.92	-5.22	-4.29	-5.67
The average period of payment to suppliers (Days)	225	258	273	282	242
Receivables Collection Period (Days)	88	86	69	56	35
Net Financial Liabilities Ratio	-1.7	-2.3	-2.7	-2.8	-4.1
Current Ratio	0.73	0.63	0.51	0.38	0.32
Gross Profit Margin	0.69	0.73	0.76	0.82	0.95

Source: Author calculations based on RFFMS data.

PUnH, which are extremely important for health care services, have lately become institutions that cannot finance their expenses. Hence, the government granted 377 million and 209 million NCUs in 2010 and 2011, respectively, to PUnH. Total 55 million NCUs, 1,000 NCUs per medical student, was allocated and transferred to the budgets of hospitals as a practical training support in 2015 and this amount was increased to 1,725 NCUs per student, which is 105 million NCUs in total, in 2016. These were examples of arrangements to recover the cost structures of the hospitals (Türkmen, 2016). However, the findings of this study show that financial support has not yielded the expected results, and that hospitals still experience financial difficulty.

From their evaluation of the financial sustainability of PUnH in Turkey, Yiğit and Yiğit (2016) conclude that “the reimbursement method should be changed” to prevent their financial situations worsening. In the present study too, participants

explained the difficulties they experience due to their hospitals' reimbursement methods, which they believe should be changed.

In 2015, a global budget was first implemented in three PUnH – Ankara, Dicle, and Hacettepe – under the framework of “the Contract of Health Care Service Purchase over Lump Sum Price and its Principles and Procedures (Global Budget Contract)”, in accordance with the decision taken by the Economic Coordination Committee (ECC)⁶ (Medimagazin, 2015).

A grant equivalent to 764 million NCUs was provided for the three universities' budget. By 2016, 13 universities signing had signed up under the Contract of Health Care Service Purchase over Lump Sum Price, as shown in Table 46.

Table 46: Hospitals under the Global Budget in 2016

University Name
Ankara University
Dicle University
Gaziosmanpaşa Education and Research Hospital
Bülent Ecevit Medical Faculty
Çukurova University Hospital
Selçuk University
Hacettepe University
Gazi University
Sivas Cumhuriyet University
Meram Medical Faculty Hospital (Necmettin Erbakan University)
Afyon Kocatepe University (01.02.2016 - 31.12.2016)
Süleyman Demirel University (01.04.2016 -31.12.2016)
Karedeniz Teknik University (01.04.2016 - 31.12. 2016)
Harran University (01.04.2016 - 31. 12. 2016)

⁶ The Economic Coordination Committee (ECC) was established in accordance with Law No. 5838 in 28th February 2009. It is composed of 7 ministers under the presidency of the Prime Minister in accordance with Prime Ministry Circular numbered 2017/15 regarding Members of the Parliament to be appointed in Committees, published on 26th July 2017 (Republic of Turkey Prime Ministry Undersecretariat of Treasury, 2018).

The global budget identifies the limits and target of expenses to provide health care services in each fiscal year. The aim is to restrict the total amount spent for a specific health care service or health institution, thereby controlling health care expenditure. The amount added to or deducted from the global budget for health care suppliers within the scope of MoH and its affiliated institutions and health care service-providing departments of the universities, which are included in common usage or in cooperation or left out of this scope after the protocol is signed, is determined under the principles and procedures established by MoF, MoH, and SSI. In other words, the maximum and minimum budgets for universities are determined in accordance with the Contract of Health Care Service Purchase over Lump Sum Price. Once decided, the budget is transferred to the hospitals within a year (Gazi, 2015).

The budget allocated for the universities in 2016 was 2.3 billion NCUs. SSI varies the reimbursement model in implementing the maximum budget is based on the following:

- The income-expense projections of each university for 2017 and the expected service improvements
- Easy terms of payment of debts in the previous period
- Enhancing the motivation of staff through regular payment of revolving funds
- The requests of the universities.

Considering the increase in the universities' health care services and the potential rise of accrual, the maximum and minimum budget are specified by SSI. Upon the request of the universities, the payment is higher in the first six months.

If PUnH indicate that accrual of the first five-month receipt can reach the maximum budget, then the maximum budget amount planned by the SSI for that year can also be paid in the second six-month-period. If the hospitals do not reach the maximum budget in the first five-month-period, they make the payment for the minimum budget in the second six-month-period.

The financial statements received from RFFMS indicate that 41 universities reached agreements with SSI in 2017, which ensured that they have a regular monthly income. The universities that did not sign a global budget contract were Balıkesir

University, Giresun University, and Uludağ University. For these three, repayment was done through payment per service and diagnosis-based operation package methods.

This study examined the journal entries of the hospitals from the system of RFFMS to determine the budget allocated to them in accordance with the global budget. Only 2017 entries were accessed. Global budget amounts are monitored in the section of received money under the global budget in 349.02 SSI. The debts and receivables in the 349.02 account are displayed in Table 47 for 2017.

Table 47: 349.02 -Received Money under the Global Budget

	Debit	Credit
AD17	155,025,536	155,025,536
AFYN17	107,710,181	107,710,181
AKNZ17	280,247,502	280,247,502
ANKR17	382,139,571	382,139,571
ATTRK17	140,384,416	140,384,416
BLKSR17	-	-
BZK17	20,590,489	20,590,489
BLNT17	109,306,604	109,306,604
CHRYT17	128,349,496	128,349,496
ÇNNKL17	47,972,463	47,972,463
ÇKRV17	249,113,980	249,113,980
DCL17	215,076,873	215,076,873
DKZ17	262,332,632	262,332,632
DZC17	61,184,606	61,184,606
EGE17	345,390,446	345,390,446
ERCYS17	294,918,630	294,918,630
EOSMNGZ17	207,957,131	207,957,131
FRT17	177,636,646	177,636,646
GZ17	236,994,993	236,994,993
GZNT17	204,642,884	204,642,884
GZOSMNP17	64,448,417	64,448,417
GRSN17	-	-
HCTTP17	354,163,471	354,163,471
HRRN17	121,359,299	121,359,299
INN17	273,674,158	273,674,158
ISTNCRRHP17	198,250,448	198,250,448
ISTANBLISTN17	220,489,165	220,489,165
KFKS17	26,641,091	26,641,091
KMSTC17	91,806,868	91,806,868
KT17	201,300,345	201,300,345
KRKL17	42,279,007	42,279,007
KCL17	196,416,601	196,416,601

	Debit	Credit
MNSCLB17	116,727,418	116,727,418
MRSN17	108,637,443	108,637,443
MSFTKML17	54,718,444	54,718,444
NMKL17	82,038,063	82,038,063
NCMTN17	241,042,548	241,042,548
ONDKZM17	239,971,926	239,971,926
PMKKL17	63,886,917	63,886,917
SCK17	155,956,145	155,956,145
SLYMNDMRL17	147,947,162	147,947,162
TRY17	75,609,297	75,609,297
ULDG17	-	-
VNYZNCYL17	128,298,060	128,298,060

Source: RFFMS

PUnH that cannot accrued revenue in the amount of the maximum payment in the first five-month-period have a lower payment requirement in the second six-month period. The high payment in the first six-month period allows the hospitals to repay their previous debts. The ratio analysis confirmed this as the account payable ratio decreased by 2017.

As seen above, revising the payment methods of nearly all PUnH in 2017 was not sufficient to provide financial sustainability. Rather, the financial unsustainability that PUnH experience in Turkey forced the MoH to intervene over the hospitals' debts. Naci Ağbal, Minister of Finance, stated that PUnH would rapidly pay their accrued debts for medication, medical equipment, and consumables, while adding that they work on structural precautions to prevent similar debts of PUnH being accrued (Medimagazin, 2018).

5.4.4. Ranking of Public University Hospitals by Financial Sustainability Performance

First of all, decision matrix was formed. For selected PUnH, decision matrix implies the values of financial sustainability indicators. Thus, financial sustainability indicators were calculated for each hospital and Table 48 indicates them.

Table 48: Decision Matrix 2017⁷

Decision Matrix									
	X1	X2	X3	X4	X5	X6	X7	X8	
AFYN17	0.967	80,823,180.600	- 18.516	206.958	47.378	- 12.454	0.377	0.067	
AKNZ17	0.769	361,448,357.190	- 3.957	320.574	11.358	- 3.687	0.106	- 0.101	
ANKR17	0.801	403,109,123.160	- 3.682	404.054	27.182	- 2.814	0.261	0.231	
BLNT17	0.843	84,803,272.540	- 3.516	265.779	4.198	- 2.980	0.202	0.068	
BZK17	0.945	13,507,992.480	- 6.101	108.733	7.399	- 5.178	0.239	0.009	
CHRYT17	0.899	114,728,492.140	- 8.213	329.101	5.526	- 7.546	0.105	0.157	
ÇKRV17	0.803	294,972,140.510	- 5.295	332.371	43.265	- 3.584	0.336	- 0.115	
ÇNNKL17	0.771	47,657,505.850	- 3.094	284.567	46.107	- 2.419	0.219	- 0.156	
DCL17	0.847	105,938,859.700	- 2.170	135.797	46.672	- 1.267	0.463	- 0.038	
DKZ17	0.856	325,660,542.540	- 5.586	303.071	9.809	- 4.992	0.129	- 0.034	
EGE17	0.801	493,792,226.620	- 3.932	459.345	3.107	- 3.434	0.167	0.230	
EOSMNGZ17	0.912	117,278,978.130	- 5.597	148.014	25.699	- 3.843	0.379	0.076	
ERCYS17	1.068	143,291,276.440	6.004	191.202	30.102	3.820	0.418	0.291	
FRT17	0.896	60,209,497.830	- 3.876	77.509	3.487	- 1.884	1.118	0.080	
GZ17	0.784	239,445,833.800	- 3.886	229.419	35.061	- 2.839	0.298	- 0.013	
GZNTP17	0.940	103,759,629.510	- 4.307	100.960	17.743	- 2.660	0.424	0.053	
GZOSMNP17	0.949	67,638,849.380	- 13.398	260.722	4.622	- 12.330	0.133	0.004	
HCTTP17	0.905	468,210,518.510	- 9.985	317.413	87.092	- 6.744	0.386	- 0.040	
HRRN17	1.079	28,894,679.940	1.915	65.726	21.140	0.697	0.825	0.263	

⁷ Decision matrix, normalized decision matrix, difference series, and grey factor matrix tables of the PUnH between the years 2013 and 2016 are indicated in the Appendix 5-20. 6-digit analysis is used for the calculations and due to the limited number of pages, the charts are organized with 3-digit values. Hence, even if it seems that some of the hospitals have the same grades, their 6-digit grades are different.

Decision Matrix										
	X1	X2	X3	X4	X5	X6	X7	X8		
INN17	0.897	131,407,922.790	- 3.811	130.318	13.164	- 3.447	0.116	- 0.051		
ISTNCRHP17	0.703	441,304,469.810	- 4.603	380.572	74.170	- 3.972	0.148	- 0.220		
ISTANBLISTN17	0.626	421,954,667.920	- 3.073	347.593	91.691	- 2.199	0.307	- 0.411		
KCL17	0.902	99,630,082.970	- 4.111	122.905	6.887	- 3.486	0.207	0.069		
KMSTC17	0.802	76,802,441.580	- 2.980	219.275	42.853	- 2.247	0.320	- 0.054		
KRKL17	0.993	41,276,242.130	- 46.235	251.216	44.416	- 32.457	0.351	0.217		
KT17	0.865	191,424,841.150	- 5.475	269.464	5.183	- 4.568	0.220	0.007		
MNSCLB17	0.863	110,383,238.660	- 4.832	245.182	7.008	- 3.513	0.299	- 0.031		
MRSN17	0.833	173,012,047.750	- 4.775	291.008	7.465	- 4.071	0.193	0.001		
MSFTKML17	1.014	96,496,330.410	78.580	291.387	122.684	29.676	0.642	0.110		
NCMTN17	0.923	145,510,964.140	- 6.008	137.705	45.954	- 4.127	0.359	0.025		
NMKL17	0.980	59,545,586.800	- 36.516	166.918	40.886	- 20.445	0.489	0.041		
ONDKZM17	1.015	135,676,988.050	- 45.519	143.807	10.875	- 19.237	0.673	0.072		
PMKKL17	0.877	93,729,478.860	- 4.393	158.574	32.064	- 2.598	0.414	- 0.020		
SCK17	0.929	119,939,759.690	- 9.826	226.404	36.096	- 7.469	0.273	0.024		
SLYMNDMRL17	0.901	100,560,158.930	- 6.627	185.381	98.212	- 2.671	0.612	- 0.051		
TRY17	0.909	179,845,922.920	- 9.668	417.566	79.231	- 7.248	0.282	0.301		
ULDG17	0.888	144,618,976.950	- 3.791	180.933	34.102	- 2.064	0.459	0.018		
VNYZNCYL17	1.026	48,983,798.360	9.228	123.196	45.313	4.821	0.489	0.155		

Secondly, reference series were constructed. Value 1 was allowed for each selection criteria, which composes the reference series.

$$x_0 = (1, 1, 1, 1, 1, 1, 1, 1, 1)$$

Thirdly, decision matrix was normalized. In this step, equations displayed in Part 2 were employed and ratios were converted to standard values between 0 and 1. Whereas equation 5 was constructed for R1, R7 and equation 3 was constructed for R8, for the other ratios equation 4 is employed in normalization process. Normalized decision matrix can be constructed as displayed in Table 49.



Table 49: Normalized Decision Matrix-2017

Normalized Decision Matrix								
	X1	X2	X3	X4	X5	X6	X7	X8
AFYN17	0.912	0.860	0.778	0.641	0.630	0.678	0.196	0.672
AKNZ17	0.383	0.276	0.661	0.353	0.931	0.537	0.001	0.436
ANKR17	0.467	0.189	0.659	0.140	0.799	0.523	0.112	0.902
BLNT17	0.579	0.852	0.658	0.492	0.991	0.526	0.070	0.673
BZK17	0.853	1.000	0.678	0.891	0.964	0.561	0.096	0.590
CHRYT17	0.729	0.789	0.695	0.331	0.980	0.599	0.000	0.798
ÇKRV17	0.474	0.414	0.672	0.323	0.664	0.535	0.166	0.416
ÇNNKL17	0.386	0.929	0.654	0.444	0.640	0.517	0.082	0.358
DCL17	0.592	0.808	0.647	0.822	0.636	0.498	0.257	0.524
DKZ17	0.614	0.350	0.674	0.397	0.944	0.558	0.018	0.530
EGE17	0.467	0.000	0.661	0.000	1.000	0.533	0.045	0.901
EOSMNGZ17	0.764	0.784	0.674	0.791	0.811	0.539	0.197	0.684
ERCYS17	0.817	0.730	0.581	0.681	0.774	0.416	0.225	0.987
FRT17	0.722	0.903	0.661	0.970	0.997	0.508	0.726	0.690
GZ17	0.422	0.530	0.661	0.584	0.733	0.523	0.139	0.559
GZNTP17	0.840	0.812	0.664	0.910	0.878	0.520	0.229	0.653
GZOSMNP17	0.863	0.887	0.737	0.505	0.987	0.676	0.020	0.583
HCTTP17	0.746	0.053	0.710	0.361	0.298	0.586	0.201	0.522
HRRN17	0.787	0.968	0.614	1.000	0.849	0.466	0.516	0.947
INN17	0.725	0.755	0.660	0.836	0.916	0.533	0.008	0.505
ISTNCRHP17	0.205	0.109	0.666	0.200	0.406	0.542	0.031	0.268
ISTANBLISTN17	0.000	0.150	0.654	0.284	0.259	0.513	0.145	0.000
KCL17	0.738	0.821	0.663	0.855	0.968	0.534	0.074	0.674
KMSTC17	0.469	0.868	0.653	0.610	0.668	0.514	0.154	0.501
KRKL17	0.981	0.942	1.000	0.529	0.655	1.000	0.177	0.882
KT17	0.639	0.630	0.673	0.482	0.983	0.551	0.083	0.587
MNSCLB17	0.633	0.798	0.668	0.544	0.967	0.534	0.139	0.534
MRSN17	0.553	0.668	0.668	0.428	0.964	0.543	0.063	0.579
MSFTKML17	0.963	0.827	0.000	0.427	0.000	0.000	0.385	0.732
NCMTN17	0.794	0.725	0.678	0.817	0.642	0.544	0.182	0.613
NMKL17	0.947	0.904	0.922	0.743	0.684	0.807	0.275	0.635
ONDKZM17	0.961	0.746	0.994	0.802	0.935	0.787	0.407	0.678
PMKKL17	0.670	0.833	0.665	0.764	0.758	0.519	0.222	0.549
SCK17	0.811	0.778	0.708	0.592	0.724	0.598	0.120	0.611
SLYMNDMRL17	0.735	0.819	0.683	0.696	0.205	0.521	0.364	0.506
TRY17	0.757	0.654	0.707	0.106	0.363	0.594	0.127	1.000
ULDG17	0.701	0.727	0.660	0.707	0.741	0.511	0.254	0.602
VNYZNCYL17	0.930	0.926	0.556	0.854	0.647	0.400	0.275	0.795

The fourth step is to construct the difference series. The absolute differences between the entries of normalized decision matrix and the standard series values were found in this step. Equation 6 was employed for each cell in Table 49. In this way, it is possible to obtain difference series displayed in equation 7. The results are indicated in Table 50.

Table 50: Difference Series-2017

Difference Series								
	X1	X2	X3	X4	X5	X6	X7	X8
AFYN17	0.09	0.14	0.22	0.36	0.37	0.32	0.80	0.33
AKNZ17	0.62	0.72	0.34	0.65	0.07	0.46	1.00	0.56
ANKR17	0.53	0.81	0.34	0.86	0.20	0.48	0.89	0.10
BLNT17	0.42	0.15	0.34	0.51	0.01	0.47	0.93	0.33
BZK17	0.15	0.00	0.32	0.11	0.04	0.44	0.90	0.41
CHRYT17	0.27	0.21	0.30	0.67	0.02	0.40	1.00	0.20
ÇKRV17	0.53	0.59	0.33	0.68	0.34	0.46	0.83	0.58
ÇNNKL17	0.61	0.07	0.35	0.56	0.36	0.48	0.92	0.64
DCL17	0.41	0.19	0.35	0.18	0.36	0.50	0.74	0.48
DKZ17	0.39	0.65	0.33	0.60	0.06	0.44	0.98	0.47
EGE17	0.53	1.00	0.34	1.00	0.00	0.47	0.96	0.10
EOSMNGZ17	0.24	0.22	0.33	0.21	0.19	0.46	0.80	0.32
ERCYS17	0.18	0.27	0.42	0.32	0.23	0.58	0.78	0.01
FRT17	0.28	0.10	0.34	0.03	0.00	0.49	0.27	0.31
GZ17	0.58	0.47	0.34	0.42	0.27	0.48	0.86	0.44
GZNTP17	0.16	0.19	0.34	0.09	0.12	0.48	0.77	0.35
GZOSMNP17	0.14	0.11	0.26	0.50	0.01	0.32	0.98	0.42
HCTTP17	0.25	0.95	0.29	0.64	0.70	0.41	0.80	0.48
HRRN17	0.21	0.03	0.39	0.00	0.15	0.53	0.48	0.05
INN17	0.28	0.25	0.34	0.16	0.08	0.47	0.99	0.49
ISTNCRRHP17	0.80	0.89	0.33	0.80	0.59	0.46	0.97	0.73
ISTANBLISTN17	1.00	0.85	0.35	0.72	0.74	0.49	0.85	1.00
KCL17	0.26	0.18	0.34	0.15	0.03	0.47	0.93	0.33
KMSTC17	0.53	0.13	0.35	0.39	0.33	0.49	0.85	0.50
KRKL17	0.02	0.06	0.00	0.47	0.35	0.00	0.82	0.12
KT17	0.36	0.37	0.33	0.52	0.02	0.45	0.92	0.41
MNSCLB17	0.37	0.20	0.33	0.46	0.03	0.47	0.86	0.47
MRSN17	0.45	0.33	0.33	0.57	0.04	0.46	0.94	0.42
MSFTKML17	0.04	0.17	1.00	0.57	1.00	1.00	0.61	0.27
NCMTN17	0.21	0.27	0.32	0.18	0.36	0.46	0.82	0.39
NMKL17	0.05	0.10	0.08	0.26	0.32	0.19	0.72	0.37
ONDKZM17	0.04	0.25	0.01	0.20	0.06	0.21	0.59	0.32
PMKKL17	0.33	0.17	0.34	0.24	0.24	0.48	0.78	0.45
SCK17	0.19	0.22	0.29	0.41	0.28	0.40	0.88	0.39
SLYMNDMRL17	0.26	0.18	0.32	0.30	0.80	0.48	0.64	0.49
TRY17	0.24	0.35	0.29	0.89	0.64	0.41	0.87	0.00
ULDG17	0.30	0.27	0.34	0.29	0.26	0.49	0.75	0.40
VNYZNCYL17	0.07	0.07	0.44	0.15	0.35	0.60	0.72	0.21

In the fifth step, grey relational coefficients were calculated and grey factor matrix was constructed. Equation 8 was used for each cell in Table 50, and in this way, it was likely to acquire grey factor matrix displayed in equation 9 can be acquired. The results of this step were shown in Table 51 (Grey factor matrix).

Table 51: Grey Factor Matrix-2017

Grey Factor Matrix								
	X1	X2	X3	X4	X5	X6	X7	X8
AFYN17	0.850	0.781	0.692	0.582	0.575	0.608	0.383	0.604
AKNZ17	0.447	0.408	0.596	0.436	0.879	0.519	0.334	0.470
ANKR17	0.484	0.381	0.595	0.368	0.713	0.512	0.360	0.837
BLNT17	0.543	0.771	0.594	0.496	0.982	0.513	0.350	0.605
BZK17	0.773	1.000	0.609	0.821	0.933	0.532	0.356	0.549
CHRYT17	0.648	0.703	0.621	0.428	0.961	0.555	0.333	0.712
ÇKRV17	0.487	0.460	0.604	0.425	0.598	0.518	0.375	0.461
ÇNNKL17	0.449	0.875	0.591	0.473	0.582	0.508	0.353	0.438
DCL17	0.550	0.722	0.586	0.737	0.578	0.499	0.402	0.512
DKZ17	0.564	0.435	0.606	0.453	0.899	0.531	0.337	0.515
EGE17	0.484	0.333	0.596	0.333	1.000	0.517	0.344	0.835
EOSMNGZ17	0.679	0.698	0.606	0.705	0.726	0.521	0.384	0.612
ERCYS17	0.732	0.649	0.544	0.611	0.689	0.461	0.392	0.974
FRT17	0.643	0.837	0.596	0.944	0.994	0.504	0.646	0.617
GZ17	0.464	0.515	0.596	0.546	0.652	0.512	0.367	0.531
GZNTP17	0.757	0.727	0.598	0.848	0.803	0.510	0.393	0.590
GZOSMNP17	0.785	0.816	0.655	0.502	0.975	0.607	0.338	0.545
HCTTP17	0.663	0.346	0.633	0.439	0.416	0.547	0.385	0.511
HRRN17	0.702	0.940	0.564	1.000	0.768	0.484	0.508	0.905
INN17	0.645	0.671	0.595	0.753	0.856	0.517	0.335	0.503
ISTNCRRHP17	0.386	0.360	0.600	0.385	0.457	0.522	0.340	0.406
ISTANBLISTN17	0.333	0.370	0.591	0.411	0.403	0.507	0.369	0.333
KCL17	0.656	0.736	0.597	0.775	0.941	0.517	0.351	0.605
KMSTC17	0.485	0.791	0.591	0.562	0.601	0.507	0.372	0.501
KRKL17	0.964	0.896	1.000	0.515	0.591	1.000	0.378	0.809
KT17	0.581	0.574	0.605	0.491	0.966	0.527	0.353	0.547
MNSCLB17	0.577	0.713	0.601	0.523	0.939	0.518	0.367	0.518
MRSN17	0.528	0.601	0.601	0.466	0.932	0.523	0.348	0.543
MSFTKML17	0.930	0.743	0.333	0.466	0.333	0.333	0.449	0.651
NCMTN17	0.709	0.645	0.608	0.732	0.583	0.523	0.379	0.564
NMKL17	0.905	0.839	0.865	0.660	0.613	0.721	0.408	0.578
ONDKZM17	0.928	0.663	0.989	0.716	0.885	0.701	0.458	0.609
PMKKL17	0.603	0.750	0.599	0.679	0.674	0.510	0.391	0.526
SCK17	0.726	0.693	0.632	0.551	0.644	0.554	0.362	0.562
SLYMNDMRL17	0.654	0.734	0.612	0.622	0.386	0.511	0.440	0.503
TRY17	0.673	0.591	0.631	0.359	0.440	0.552	0.364	1.000
ULDG17	0.626	0.647	0.595	0.631	0.659	0.505	0.401	0.557
VNYZNCYL17	0.877	0.871	0.529	0.774	0.586	0.455	0.408	0.709

Lastly, grey relational grades were determined. In this study, financial sustainability ratio obtains 0.25 weight since it was aimed to search financial sustainability. 0.11 weight was given to other financial sustainability indicators. The equation 10 was used to perform the calculation. Sorted grey relational grades were indicated in Table 52.

Table 52: Sorted Grey Relational Grades-2017

Sorted Grey Relational Grades	
KRKL17	0.7970
ONDKZM17	0.7698
HRRN17	0.7293
NMKL17	0.7281
FRT17	0.7112
BZK17	0.7076
VNYZNCYL17	0.6836
GZOSMNP17	0.6719
GZNT17	0.6683
AFYN17	0.6652
KCL17	0.6485
ERCYS17	0.6460
EOSMNGZ17	0.6253
CHRYT17	0.6243
INN17	0.6144
SCK17	0.6099
NCMTN17	0.6094
BLNT17	0.5976
PMKKL17	0.5930
MNSCLB17	0.5918
TRY17	0.5900
MSFTKML17	0.5871
ULDG17	0.5846
KT17	0.5807
SLYMNDMRL17	0.5714
DCL17	0.5702
MRSN17	0.5620
DKZ17	0.5457
EGE17	0.5451
KMSTC17	0.5416
ANKR17	0.5245
ÇNNKL17	0.5216
HCTTP17	0.5168
GZ17	0.5144
AKNZ17	0.5020
ÇKRV17	0.4905
ISTNCRRHP17	0.4253
ISTANBLISTN17	0.4031

The best financial sustainability performance for the year 2017 belong to Kırıkkale University Hospital. Kırıkkale University Hospital was followed by Ondokuz Mayıs, Harran, Namık Kemal, Fırat University Hospitals, respectively. Five university hospitals with the lowest financial sustainability performance level were Gazi University Hospital, Akdeniz University Hospital, Çukurova University Hospital, Cerrahpaşa Faculty of Medicine of Istanbul University, Faculty of Medicine of İstanbul University.

Table 53 was constructed with Grey Relational Grades which were calculated by years so that to what extent financial sustainability performances of PUnH change was evaluated as of 2013.

Table 53: Grey Relational Grades: 2013-2017⁸

	2013		2014		2015		2016		2017	
	Grey Relational Grades	Rank	Grey Relational Grades	Rank	Grey Relational Grades	Rank	Grey Relational Grades	Rank	Grey Relational Grades	Rank
AFYN	0.749	23	0.572	25	0.561	16	0.563	17	0.665	10
AKNZ	0.718	33	0.619	14	0.475	33	0.435	35	0.502	35
ANKR	0.703	34	0.525	36	0.765	1	0.573	13	0.524	31
BLNT	0.812	2	0.536	34	0.559	17	0.571	14	0.598	18
BZK	0.824	1	0.598	20	0.665	3	0.643	5	0.708	6
CHRYT	0.757	20	0.531	35	0.489	29	0.529	22	0.624	14
ÇKRV	0.720	31	0.565	26	0.641	7	0.432	36	0.490	36
ÇNKKL	0.794	6	0.650	10	0.465	34	0.437	34	0.522	32
DCL	0.767	15	0.603	19	0.649	4	0.678	1	0.570	26
DKZ	0.722	29	0.538	33	0.483	31	0.472	31	0.546	28
EGE	0.731	27	0.555	28	0.464	35	0.431	37	0.545	29
EOSMNGZ	0.762	16	0.632	11	0.549	19	0.541	20	0.625	13
ERCYS	0.795	5	0.682	7	0.554	18	0.494	30	0.646	12
FRT	0.790	7	0.710	4	0.648	5	0.655	4	0.711	5
GZ	0.665	37	0.711	3	0.589	12	0.566	16	0.514	34
GZNTP	0.721	30	0.552	29	0.508	25	0.603	10	0.668	9
GZOSMNP	0.807	4	0.607	18	0.600	9	0.514	23	0.672	8
HCTTP	0.654	38	0.440	38	0.455	36	0.626	7	0.517	33
HRRN	0.808	3	0.598	21	0.563	15	0.673	2	0.729	3
INN	0.770	11	0.709	5	0.527	22	0.666	3	0.614	15
ISTNCRRHP	0.720	32	0.541	32	0.447	37	0.442	33	0.403	38
ISTANBLISTN	0.682	35	0.612	17	0.444	38	0.425	38	0.425	37
KCL	0.785	8	0.585	24	0.492	28	0.534	21	0.649	11

⁸ The first and last three university hospitals listed in the financial sustainability performance rankings by years are written in bold.

	2013		2014		2015		2016		2017	
	Grey Relational Grades	Rank	Grey Relational Grades	Rank	Grey Relational Grades	Rank	Grey Relational Grades	Rank	Grey Relational Grades	Rank
KMSTC	0.747	24	0.520	37	0.479	32	0.496	27	0.542	30
KRKL	0.762	18	0.857	1	0.590	10	0.494	28	0.797	1
KT	0.752	22	0.624	12	0.525	23	0.504	25	0.581	24
MNSCLB	0.770	10	0.544	31	0.576	14	0.494	29	0.592	20
MRSN	0.736	26	0.549	30	0.484	30	0.457	32	0.562	27
MSFTKML	0.769	12	0.586	23	0.503	27	0.584	12	0.587	22
NCMTN	0.668	36	0.623	13	0.545	21	0.637	6	0.609	17
NMKL	0.757	21	0.680	8	0.548	20	0.497	26	0.728	4
ONDKZM	0.779	9	0.658	9	0.582	13	0.623	8	0.770	2
PMKKL	0.767	14	0.707	6	0.677	2	0.553	18	0.593	19
SCK	0.738	25	0.591	22	0.505	26	0.611	9	0.610	16
SLYMNDMRL	0.760	19	0.612	16	0.647	6	0.543	19	0.571	25
TRY	0.731	28	0.559	27	0.517	24	0.507	24	0.590	21
ULDG	0.767	13	0.711	2	0.631	8	0.569	15	0.585	23
VNYZNCYL	0.762	17	0.615	15	0.589	11	0.591	11	0.684	7

There were critical differences in the sustainability performance rankings of the PUnH over the years. For example, Bozok University Hospital, which had the best performance level in 2013, fall to 20th place in 2014. Ranking rose to 3th place in 2015, and fall to 5th in 2016 and fall to 6th in 2017. For this hospital, total revenue was more than total expenditure in 2013. Receipts issued in the hospitals' MEDULA systems are examined by the SSI receipt committee and deductions in the receipts are mostly seen in the balance sheets of the hospitals. However, there was not any entry in the account of 610-Sales returns in 2013 whereas this account value was 5.4 million NCUs. This situation reduced the hospital's net sales. The revenue of the hospital decreased by 3% from 2013 to 2014 while its expenditure increased by 59% in 2014, which is one of the reasons why its ranking in financial sustainability performance fell in 2014. The increase in the hospital's revenue overtook its expenditure in 2015 and after. In addition, Table 47 indicates that hospital signed the global budget contract in 2017 and hospital received a regular payment. For that reason, its total revenue greater than its total expenditure in 2017.

Bülent Ecevit University Hospital had the second performance ranking but fell to 34th place in 2014. Its total revenue was almost equal to its total expenditure in 2013. On the other hand, while its total revenue decreased 4%, its total expenditure increased 13% in 2014. There was a performance increase in 2015 and 2016. It had 18th place in 2017.

Harran University Hospital ranked among the top three performing universities in 2013, 2016 and 2017. It achieved 42% revenue increase in 2016 and 75% in 2017. Revenue growth in 2017 can be attributed to the global budget agreement. Although, its total revenue less than its total expenditure in 2016 and 2017, there was a performance improvement in these years.

Moreover, Çanakkale University Hospital had the 6th highest performance ranking but took 10th place in 2014. Its total revenue greater than its total expenditure in 2013. While its total revenue increased by 5% in 2014, its expenditure rose 17%. It dropped dramatically to 34th place in 2015, when its total revenue increased by 4% while its total expenditure increased by 18%. In 2016 and 2017, it ranked 34 and 32 in performance ranking. Çanakkale University Hospital, signed the global budget contract for 2017. Even though this situation, its general administrative expenses increased dramatically (192%) in 2017. Because of this, its performance ranking did not improve much.

The changes in the rankings of universities with the lowest performances were similar to those with the highest performance, in that 2014 can be marked a turning point for all hospitals.

Hacettepe University Hospital sustainability performance ranking was 38 in 2013 and 2014. Its ranking slightly increased to 36th place in 2015 then jumped to 7th place in 2016. It decreased to 33th place in 2017. Hacettepe University Hospital, signed the global budget contract in 2015. After global budget contract, its performance ranking did not change in 2015. Though it signed global budget contract, only two years its ranking increased then its ranking decreased again in 2017. This situation may be showed that global budget contract cannot be enough to improve hospitals financial sustainability performance.

Akdeniz University Hospital ranked 33th in financial sustainability performance. Its ranking rose to 14st in 2014. Hospital's revenue increased by 33% from 2013 to 2014 while its total expenditure increased by 15%, which made its ranking higher in 2014. Its ranking fell 33th place in 2015 and 35th place in 2016. It wasn't change in 2017. Due to its total revenue lower than its total expense and hospital made loss all these 3 years, its ranking stayed at almost same place.

In 2013, Namık Kemal University Hospital sustainability performance ranking was 21. Then ranking jumped dramatically to 8th place in 2014. It decreased to 20th place in 2015 and it was 26 in 2016 finally it was 4 in 2017. Its performance rankings showed extreme variation in these years. Its gross sales, sales deductions, general and administrative expenses and cost of services significantly fluctuated in the study period. It can be seen Figure 54 and 55.

Figure 54: The Change in Gross Sales of Namık Kemal Univ. Hospital

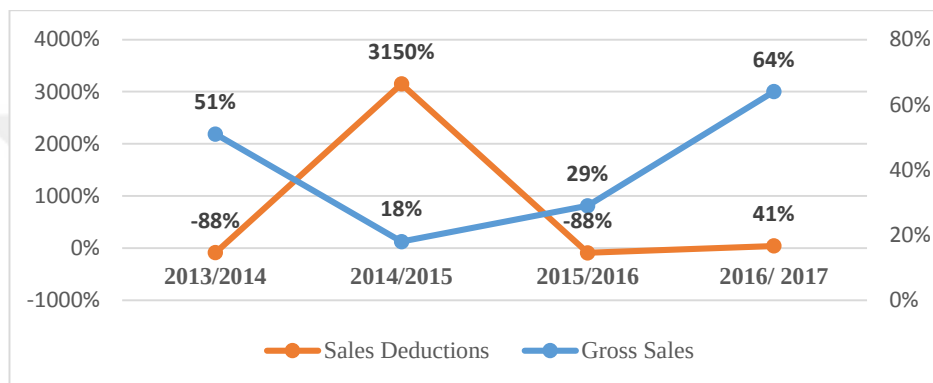
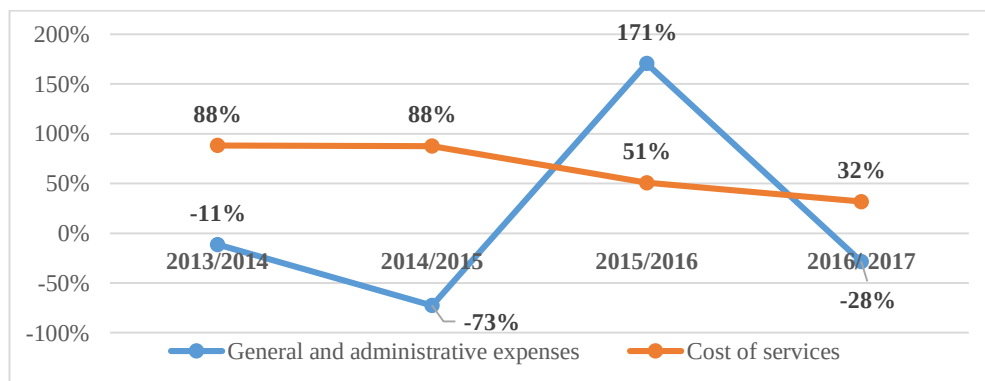


Figure 55: The Change in General and Administrative Expenses and Cost of Services of Namık Kemal Univ. Hospital



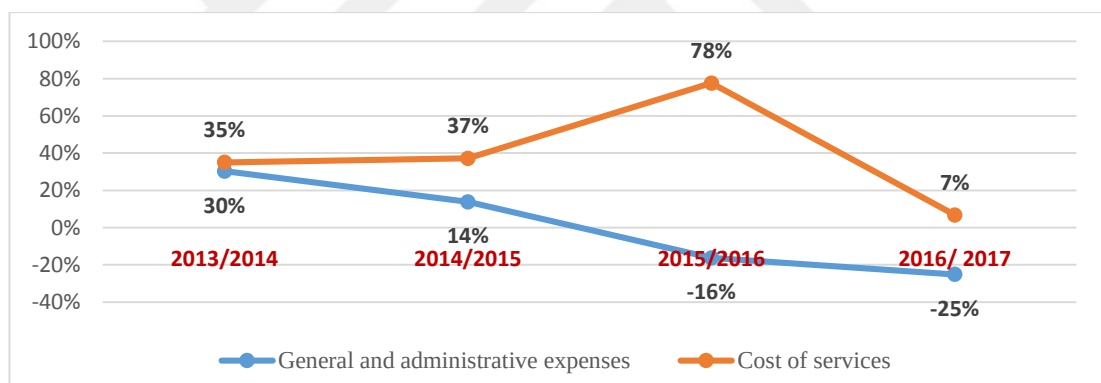
There was a dramatic change in these four accounts because of this situation performance ranking also significantly changed.

Hacettepe University Hospital sustainability performance ranking was 38 in 2013 and 2014. Its ranking slightly increased to 36th place in 2015 then jumped to 7th place in 2016. It decreased to 33th place in 2017. Hacettepe University Hospital, signed

the global budget contract in 2015. After global budget contract its performance ranking didn't change in 2015. Though it signed global budget contract, only two years its ranking increased then its ranking decreased again in 2017. This situation may be showed that global budget contract cannot be enough to improve hospitals financial sustainability performance.

Another extreme ranking case belonged to Kırıkkale University Hospital. It had best performance ranking in 2014 and 2017 on the other hand its performance ranking was 33 in 2013. Its total expenses higher than its total revenues in 2013, 2015 and 2016. Furthermore, general and administrative expenses and cost of services were two important expenditure sources for hospitals. The change in this two account can be seen Figure 56.

Figure 56: The Change in General and Administrative Expenses and Cost of Services of Kırıkkale Univ. Hospital



As seen in Figure 56, there was an unregular change in these two accounts and its affected performance ranking. Moreover, after the hospital signed a global budget contract in 2017, it balanced total revenue and total expenditure again and the performance ranking rose again. It made 433 million NCUs loss in 2017. It may indicate that its loss would be greater in 2017 without global budget contract.

In summary, this change in financial sustainability performance of PUnH between 2013 and 2017 was remarkable. You can see list of the hospitals which made a profit for study years (Table 54).

Table 54: Net Profit Value Positive Hospitals

2013	2014	2015	2016	2017
Atatürk PuH	Fırat PuH	Atatürk PuH		Atatürk PuH
Bozok PuH	Giresun PuH	Bülent Ecevit PuH		Erciyes PuH
Çanakkale PuH	Kırıkale PuH.	Dicle PuH		Harran PuH.
Çukurova PuH.	Kocaeli PuH	Gazi PuH		Ondokuz Mayıs PuH
Dicle PuH	Namık Kemal PuH	Giresun PuH		Van Yüzüncü Yıl PuH
Erciyes PuH	Pamukkale PuH	Süleyman Demirel PuH		
Fırat PuH				
Giresun PuH				

In 2013, eight hospital made a profit from 38 hospitals whereas none of the hospitals made profit in 2016. In 2016, all hospitals made loss. Another significant finding was the hospitals which had a highest number of bed and the well-known were never made profit in study period such as Hacettepe, İstanbul, Ege, Dokuz Eylül university hospital.

Moreover, 2017 was second turning point for the PUnH. It seems the fact that 41 universities signed global budget contract in 2017; they had a positive increase in their performances. It may show that hospitals net loss would be greater in 2017 without global budget contract.

CONCLUSION

The health care system is defined as a system that covers any activity directly aiming at improving, promoting, or protecting health. Most basically, the health care system consists of users, payers, providers, and regulators, as well as the relations among them.

Sustainability of health care systems is one of the most significant issues the countries encounter today. The importance of health care system sustainability can be summarized in two main titles: “practical” and “ethical”. In practical terms, sustainable health care systems can persist the health care service to ensure best quality care into the forthcoming generations, assuming the environmental, social and financial restrictions, which are recognized. In ethical terms, sustainable health care systems minimize contribution of the health service to climate change and its continuous effect on factors of health, which means health of current and forthcoming generations is protected. Financial sustainability in health care system can be depicted as the capability of health care revenues to meet the liabilities of health care system determined by the policy-makers. The policy-makers make the decisions about to what extent and how the investments should be made to health and how the resources should be collected. Proposed solutions for sustainability and financial sustainability in health care system have become one of the most controversial topics all around the world due to restricted resources and financial and demographical problems.

During the last two decades, sustainable health care systems have been continuously discussed in the world. The focus of the discussion is mostly on the reform of the public sector, universal health coverage, and health expenditure. There are no agreed criteria to measure and evaluate financial sustainability in health care systems. The indicators for the financial sustainability of a health care system can be divided into two main groups. These are measurements based on health expenditure and resources, and measurements based on the views of stakeholders.

This study aims to determine financial sustainability status of Turkish health care system. For this aim, firstly we collected the experts’ views about financial sustainability of system to make evaluations in line with these views. Secondly we made growth rate comparisons between resources and expenditure of health care system

and demonstrated financial sustainability status of system. Thirdly we tried to evaluate financial sustainability situation of PUnH which are usually at the top of the agenda in public having problems in terms of sustainability. In the end we made suggestions for financial sustainability policies in Turkish health care system.

Turkish national health care system is characterized by the following three main features: tax-based financing, universal access, and predominant public provision and universal coverage. The current sustainability of the system is the result of policies implemented for years and the historical heritage transferred from the past to today. The history of Turkey's health care system can be divided into 5 periods in terms of health care reform processes: i) the pre-reform period of 1920-1960, ii) the health care reform period of 1960-1980, iii) the health care reform period of 1981-2002, iv) the health care reform period of 2003-2013, and v) the new health care vision in Turkey of 2014-2023. In the Turkey's history, one of the important health reform was the HTP. The HTP was put into practice in 2003. It aimed to organize health care services more effectively, efficiently, and fairly, and to obtain and provide financing for health care services. After the HTP was completed, Minister of Health Dr. Mehmet Müezzinoğlu announced "the 2023 Vision in Health Care" on 21 June 2014. New vision aimed to place Turkey among the world's most developed countries in terms of service provision, technology, drugs, and improved human power in the field of health. The rate of health expenditure in GDP in Turkey is 4.3% in 2016. Average of OECD is 9% in the same year (OECD, 2017a). Compared to OECD, it may be concluded that resources allocated for health care system in our country must be increased. In addition, Turkish health system is a system mostly rotating around public health spending. The ratio of public health spending to total health spending is 79.4% in 2016. OECD average is 72.5% (OECD, 2017b). Public health spending in Turkey exceeds the ratios in OECD countries and middle income countries, concerns about financial sustainability are getting higher and higher.

In the first part of the empirical analysis, views of the experts regarding financial sustainability of Turkish health care system obtained through semi-structured interviews. Interviews evaluated through content analysis using Maxqda 12. Using purposeful sampling, 33 people were included in this study. In this sense, their views on what they understand from the concept of financial sustainability of health care

system, if they find Turkish health care system financially sustainable or not, internal and external factors affecting financial sustainability, the problems causing financial sustainability and what should be done to solve these problems are analyzed in qualitative approach.

Most of the experts participating in this study have depicted financial sustainability as revenues meeting the expenses or as financing the health care services and expenditure. These descriptions coincide with the definitions in the literature. On the other hand, the majority of the experts participating have found Turkish health care system financially unsustainable and stated that the main reasons of the unsustainability are the lack of resources, the university hospital problems, populist policies, the organizational structure health care system, unnecessary medical interventions and examinations, reimbursement system and performance-based supplementary payment system, SSI benefit package having an over-comprehensive scope, and non-current MED prices. Also, the participants indicate major external factors impacting sustainability of health care system as reimbursement system, resources allocated for the health care system, policies, foreign dependency. Moreover, participants of this study indicate internal factors affecting financial sustainability as stated that administrators and personnel performance, human resources management and personnel cost, cost of goods sold, and health service providers, health care personnel performance, accurate planning/purchasing, effective and efficient use of resources, organizational memory. The experts participating in this study suggest that novel financing models should be developed, health care service staging system among health service providers must be based on the accurate ground, preventive health services must be improved, expenditure tracking systems must be set up, unnecessary health care service demand must be prevented, public awareness and health literacy must be raised, the scope of the SSI benefit package must be reduced and price policies implemented in Turkey must change. Similarly, Prada et al. (2014) propose strategies to better manage supply in health care services and to ensure sustainability such as avoid inefficiencies, unsafe practices and wastage; develops financing mechanisms to eliminate inadequate incentives (e.g. budget payments rather than pay per service for primary health care) and promotes health workers' efficiency and effectiveness. So as

to manage the pressures of cost in a better way and upgrade performance, health financing policy should be supported with all these factors taken into consideration.

As previously mentioned, this study aims at evaluating the financial sustainability of the Turkish health care system. Financial sustainability is defined as *“the growth in the resources of a health care system being equal to or larger than the increase in health expenditure”*, therefore, growth rates of resources and expenditure are examined for 1980-2016 period. We examined financial sustainability in terms of four periods: 1980-2002; 2003-2013; 2014-2016; and 1980-2016. In this part of the study, first GDP, THE, GHE, GTS-I, and GTR data for 1980-2016 are deflated real data in accordance with 2009 prices. After that, growth rates of GDP, GTR are compared to the growth rates of THE, GHE, GTS-I.

Findings show that health expenditure grows at a higher rate than revenue growth rate especially for the period between 1980-2003. We found that the increase in health expenditure in 2003 and thereafter fell behind the increase in the resources. A series of reform program was put into practice in 2003 in order to organize health care services in Turkey. It is obvious that reform studies carried out in 2003 and after, and also high GDP growth have made a positive contribution to sustainability of Turkish health care system.

In the literature, it is often stated that financial sustainability of health care systems is adversely affected by such factors as rising life expectancy at 65, elderly population over 65, old age dependency ratio and increased health expenditure. These demographic variables future projections reveal that Turkish population has entered an aging process. This aging population may increase health expenditure significantly and can be a threat to sustainability. It is necessary that policy-makers should monitor the changes in demographical and macro-economic variables that may affect sustainability of health care system carefully and make future plans considering these changes. So Turkey needs high GDP growth to ensure financial sustainability of its health care system and to increase system revenues.

Furthermore, organizations within the system must also be sustainable in order to ensure financial sustainability of health care system. Considering the micro-level, that is to say institutional level, the most significant problem in financial sustainability is the lack of balance between revenue and expenditure so as to meet health care needs

of the public. PUnH, one of the health care service suppliers, provide the highest level of medical service as well as being training centers. It is vital to ensure financial sustainability of university hospitals in order to provide training to needed health care personnel in the country, and to help the public acquire quality health care service. In the first section of the study where experts state their views, they utter their concerns about financial sustainability of university hospitals. In the qualitative part of the study, it is seen that these concerns are right and the hospitals cannot provide financial sustainability and they are in a heavy burden with debt. Examining financial tables of PUnH, it is found that the revenues can meet service costs but cannot meet operating expenses. The hospitals stand a heavy general management expense. The reasons of high general management expenses of PUnH should be investigated. The results of such research will shed light on the policy makers about what kind of policies should be applied to ensure financial sustainability.

It is found that policy makers are aware of the financial problems PUnH face and make efforts to fix financial structures of the hospitals through various arrangements. However, it is detected by the MoF that debts of PUnH continuously increase in spite of recent precautions and significant rises exist in debts of many university hospitals whose financial status was good in the past. Necessary studies were initiated in public universities in order that Global Budget system can be enforced as of 2015 and it was put into practice in Ankara, Dicle and Hacettepe University Hospitals. The number of universities signing under this Global Budget increased to 13 in 2016 and budget appropriations in amount of 2,279 million NCUs in total were supplied for these hospitals. Financial tables obtained from RFFMS indicate that Global budget agreement was contracted between SSI and 41 universities excluding Balıkesir University, Giresun University and Uludağ University in 2017. Therefore, PUnH are ensured to have a monthly regular income. It is aimed with global budget to balance revenue and expense and provide financial sustainability of university hospitals. Ratio analysis is revealed that PUnH can meet cost of services but cannot meet their operating expenses. It will be beneficial to investigate why hospitals cannot meet operating expenses.

Moreover, in the study the changes in financial sustainability performance of the hospitals were observed through GRA analysis. It is detected that serious changes

occur in financial sustainability performance of the hospitals in their working years. It is considered that the main reason of these changes is diverse payment methods and financial aids and it will contribute to maintain financial sustainability to seek into how variables such as managers' performance, organization culture etc., which are found to have influenced financial performance, affect sustainability performance, and also the relationship between productivity and sustainability in further studies.

In evaluating findings of the study integrally, it is not possible to say that Turkish health care system faces a serious financial sustainability problem currently. Since financial sustainability is related to economic growth, as long as GDP increases, the rise in health expenditure will not cause any problem. On the other hand, dynamics such as aging of the population, increased health care demand, high costs for health care service inputs, which cause the problem of financial sustainability, still exist and will also subsist in the future. Interacting factors which affect demand and supply give rise to the sustained growth in health care expenditure. Structural factors that cause greater demand for health care such as ageing, lifestyle and wealth are slightly influenced by health systems. So all these factors should be monitored carefully.

Apparently, the issue of the financial sustainability of the health care operation is always on the agenda. Considering the findings of the study, the following policy implications about what can be done in order to ensure financial sustainability, are offered:

1- Health care system revenue base should be expanded.

Turkey's health financing policy has supplied a constant source of revenue. The necessity of the broadening of the revenue base is the common view among the experts. Health care enterprises need to create new income items outside the Social Security Institution. Especially health policy-makers should focus on health tourism and geriatric care centers. The aging world population increases the need for geriatrics care centers. Turkey may increase health system revenue with geriatrics care centers and health tourism.

2- Value in health care system should be measured.

A sustainable health care system is a system that puts value at forefront, maximizes service quality provided to the patients and also tries to achieve this with the lowest cost. Value should primarily be focused rather than quality or finance for sustainability. In a value-based health care system, an individual is placed in the center of health care system and protective and therapeutical health care services, which are necessary for the individual, results of these services and service costs are systematically tracked. More resources are allocated for the system in order to create a healthier public.

It is necessary to convert Turkish health care system into a value-based structure, to help resources allocated for health care system reach to OECD average level and to measure the value in health care system. Health care systems should provide a better service with same or fewer resources and create value in order to support public health and economy.

3- Health literacy should be risen and customers should be conscious.

Rising health expenditure are particularly dependent on four important factors: aging of the population, increasing lifestyle-related diseases, an increase in public expectations and a lack of value-awareness among health care consumers. In other words, the consciousness of society is one the factors affecting health expenditures.

Awareness of citizens and individuals must be raised through accurate information and at the rightest time. Thus, individuals can make right preferences for their own health. One of the major actions that may be taken is to make regulations that will prevent abuse and unnecessary use of health care services. Precautions that will prevent unnecessary use of services by the citizens should be taken.

Health literacy must be given importance, which is a controversial and highly important issue in Turkish health care system and free trainings and informative meetings should be organized in order to raise awareness about this issue.

4- Payment system should be consider "value", not "volume".

Incentives for paying for integrated care for diseases and protecting health of all population and reimbursement methods should be re-arranged. The current performance-based payment system must be changed and performance criteria must be developed as value-based.

Dissemination of Diagnosis Related Group method, one of the reimbursement methods used extensively on international level, all around the country in addition to current payment methods may make positive contributions to financial sustainability.

Prices of MED should be updated. The burden of medical price inflation should be shifted onto the private sector and so providers should be allowed to charge patients fees as well as the government health insurance reimbursement level.

Moreover, staffing causes high cost, which makes it the greatest vulnerability of the health care system. In-service training should be provided to the staff supplying health care service and they should be encouraged to attend these trainings. Rewarding the successfully staff plays an important role in reaching to quality standards in health care services delivery. On the other hand, the revolving fund payment anxiety should be put aside and cost optimization should be done.

5- By taking precautions in advance, trying hard to forecast and avoiding unhealthiness and handle disease.

It is required for a sustainable health care system to take disease-preventive precautions, to determine the patients under highest risk, to keep the financial resource the system needs at optimal levels, to plan active health care system and management.

There is no evidence showing that expenditure on health care systems (financial sustainability) is related to access to health care and social inequalities in health (political sustainability) at a system-wide level in most countries. It will make great contributions to sustainability of the system to establish a health care council and give place to representatives of all stakeholders in this system such as leading providers, pharmaceutical and medical technology companies, academia, payers, and governmental agencies and organize regular meetings. Regulations regarding health

care should not just be up to policy maker's decisions. All stakeholders should also participate in the decisions and policies enforced related to the health care.

6- Re-establishing the service delivery system.

Service delivery system should be re-established through new health care service models in order to construct a sustainable health care system. UHI package should be reviewed and necessary arrangements should be made. However, these should be performed by reducing the capacity in higher cost channels. Protective health care services should be given importance rather than higher-cost therapeutically services. The policies that will be enforced for arrangement of the current insurance package should not put the citizen in trouble and cause increase in out-of-pocket costs. Services that will not be included in reimbursement should be supported by supplementary health insurance.

Transfer system should be compulsory and citizens should be encouraged to firstly apply to first-line health care institutions instead of second-line or third-line health care institutions. For that reason, family practice system should be primarily adopted by the citizens and developed.

Furthermore, among national health care policies providing sufficient and balanced staff is the most important factor in order to minimize the differences between OECD countries' and Turkish health care indicators and to increase efficiency of health care services. Necessary precautions should be taken in order to enhance employment of the current health care staff.

7-To support the innovations in technology which decrease the amount of cost and leverage so as to improve quality.

As in many industries, health care is in the middle of a digital transformation. The practice of medicine is being converted into an increasingly data-intensive entity thanks to outburst of medical knowledge. To exemplify, as we are informed more about human genetics, highly targeted therapies are more likely to be constructed for individuals with certain genetic profiles. Yet, access to expansive bodies of data from

various sources are required to translate genetic information into clinical treatments so that statistically valid recommendations can be generated. Health care is swiftly becoming an extremely complex information business. For a sustainable health care system, Turkish health care system should keep pace with this transformation and technological advances that both protect public health at the optimum level, and enhance the quality and reduce the costs should be followed.

A data processing structure that supports health care system cycle should be constructed, which data will be collected and how the data collected from different sources and service providers will be assembled should be standardized and health care data architecture should be developed. When these standards are placed, the ability of clinicians and researchers at hospitals, academic institutions and insurance, pharmaceutical, medical technology and analytics companies to analyze vast sets of structured and compatible data will be accelerated. Also different hospital management information systems are used in Turkey and hospitals cannot reach other hospitals' patients' data. Even hospitals using similar hospital management information systems cannot reach each other's data simultaneously. When the patient changes the hospital or the province, this situation causes the same examination, imaging and laboratory procedures to be repeated. It should establish a common platform where patient data is collected.

In addition, domestic drug production in Turkey has not been developed sufficiently yet. Therefore, domestic drug production should be supported in Turkey and essential incentives should be performed for it. Furthermore, drug expenses should be kept under control, citizens' awareness about drug use should be raised, policies on rational drug use should be put into practice efficiently and effectively.

8- Applying modern management practice.

A new contemporary administration system needs to be constructed. In addition, productivity, performance, cost, effectiveness and management problems of the university hospitals must be solved.

It should be easier to access to financial indicators of university hospitals and the public should reach financial statements openly and following them regularly.

Moreover, the reasons of unproductivity should be found through immediate analyses between productive and non-productive hospitals.

Global budget should be put into practice more effectively and in a widespread manner and should be eliminated of the factors that may adversely affect the citizens' access to health care services.

9- Continuing to improve health care system performance through better resource allocation and purchasing.

In a lot of areas, the Turkish health system's performance is currently decent and UHI is globally acknowledged for its successes. Even so, with the improvement in investment and resource allocation process, there is scope to realize progressive efficiency gains. Despite the fact that, the gains of which will be inadequate to fill in the planned revenue-expenditure gap, there are going to be outcomes.

Due to these reasons, this study suggests action to be taken in the areas as follows. Initially, constant effort should be made in order to struggle with the outgrowth in hospital capacity and implement the resource allocation and purchasing plan. What the Ministry of Health should do is to improve a more powerful strategy to lead investment in and the planning of hospital infrastructure. A more preferable strategy would regulate the power balance for the sake of the health system instead of hospital management. Apart from this, the Ministry of Health should determine a policy that controls investment in costly hospital equipment. The place of purchasing methods in the health sector with high import rates is very significant. New purchasing methods should be developed. Especially, the financial burden of university hospitals should be reduced with new methods of purchase.

Primary care should be the focus of the Ministry of Health. The measures that can be taken so as to improve primary care are as follows; empowering family doctors' gate-keeping and function of arrangement and providing them with equipment necessary to guide patients in the health system, developing their governance and accountability and preserving primary care as free of charge for the usage of the whole population.

Distinguishing features of sustainable health care and actions to develop across health care system have been investigated in a number of studies. The fundamental features of 20th century health care systems are being doctor-centered, challenges met by growth, patients as passive compliers, hospitals/centralized delivery, emphasis on effectiveness, bureaucratic controls, high carbon and being driven by finance. In fact, as for 21st century, these fundamental features have changed. Features of 21st century health care systems are being patient-centered, challenges met by transformation, patients as co-producers, systems of care, emphasis on value and waste, networks, low carbon, and being driven by knowledge acquisitions. In the immediate future, it is certain that environmental cost effectiveness become as significant as financial cost effectiveness in medical care. For that reason, the fact that the further studies regarding Turkish health care system are performed considering the health care system's patient health outcomes, population health outcomes, environmental impacts, social impacts and financial impacts will enlighten policy makers in maintenance of sustainability.

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APPENDIX



APPENDIX 1: UNIVERSITY HOSPITALS AND THEIR ABBREVIATIONS

University Hospitals	Abbreviation	University Hospitals	Abbreviation
Adnan Menderes University Hospital	ADNM	Harran University Hospital	HRRN
Afyon University Hospital	AFYN	İnönü University Hospital	INN
Akdeniz University Hospital	AKNZ	İstanbul University Cerrahpaşa Hospital	ISTNCRRHP
Ankara University Hospital	ANK	İstanbul University Hospital	ISTANBLISTAN
Atatürk University Hospital	ATTRK	Kafkas University Hospital	KFKS
Balıkesir University Hospital	BLKSR	Kahramanmaraş Sütçü İmam University Hospital	KMSTC
Bozok University Hospital	BZK	Karadeniz Teknik University Hospital	KT
Bülent Ecevit University Hospital	BLNT	Kırıkkale University Hospital	KRKL
Cumhuriyet University Hospital	CHRYT	Kocaeli University Hospital	KCL
Çanakkale On Sekiz Mart University Hospital	ÇNNKL	Manisa Celal Bayar University Hospital	MNSCLB
Çukurova University Hospital	ÇKRV	Mersin University Hospital	MRSN
Dicle University Hospital	DCL	Mustafa Kemal University Hospital	MSFTKML
Dokuz Eylül University Hospital	DKZ	Namık Kemal University Hospital	NMKL
Ege University Hospital	EGE	Necmettin Erbakan University Hospital	NCMTN
Erciyes University Hospital	ERCYS	On Dokuz Mayıs University Hospital	ONDKZM
Eskişehir Osmangazi University Hospital	EOSMNGZ	Pamukkale University Hospital	PMKKL
Fırat University Hospital	FRT	Selçuk University Hospital	SCK
Gazi University Hospital	GZ	Pamukkale University Hospital	PMKKL
Gaziantep University Hospital	GZNTP	Süleyman Demirel University Hospital	SLYMNDMRL
Gaziosman Paşa University Hospital	GZOSMNP	Trakya University Hospital	TRY
Giresun University Hospital	GRSN	Uludağ University Hospital	ULDG
Hacettepe University Hospital	HCTTP	Van Yüzüncü Yıl University Hospital	VNYZNCYL

APPENDIX 2: THE SEMI-STRUCTURED INTERVIEW FORM

PART-I
1.1 What's your gender?
1.2 What is the name of the institution you are working?
1.3 How many years have you been working in this institution?
1.4 What is your position in this institution?
1.5 How many years have you been working in this position?
PART-2
2.1 What is financial sustainability in health care systems?
2.2 Do you think Turkish health care system is financially sustainable?
2.3 What are the internal factors that affect the financial sustainability of the health care system?
2.4 What are the external factors that affect the financial sustainability of the health care system?
2.5 What can be done to ensure financial sustainability in the health care system? What are your suggestions?

APPENDIX 3: THE SEMI-STRUCTURED INTERVIEW FORM (TURKISH)

1-Bölüm
1.1 Cinsiyetiniz?
1.2 Çalıştığınız kurumun adı nedir?
1.3 Bu kurumda kaç yıldır çalışıyorsunuz?
1.4 Bu kurumda göreviniz nedir?
1.5 Bu görevde kaç yıldır çalışıyorsunuz?
2-Bölüm
2.1 Sağlık sistemlerinde finansal sürdürülebilirlik nedir?
2.2 Türk Sağlık sistemini finansal olarak sürdürülebilir buluyor musunuz?
2.3 Sağlık sisteminin finansal sürdürülebilirliğini etkileyen iç faktörler nelerdir?
2.4 Sağlık sisteminin finansal sürdürülebilirliğini etkileyen dış faktörler nelerdir?
2.5 Sağlık sisteminde finansal sürdürülebilirliği sağlamak için neler yapılabilir? Önerileriniz nelerdir?

APPENDIX 4: INFLATION, GDP DEFLATOR

Year	Inflation, GDP deflator (annual %)	Year	Inflation, GDP deflator (annual %)
1960		1990	58.24439811
1961	4.808894461	1991	59.16410689
1962	5.349371567	1992	65.19943828
1963	6.41669448	1993	68.37942836
1964	2.352436519	1994	104.7491372
1965	3.92450774	1995	86.00754244
1966	6.311991205	1996	77.22351222
1967	5.92343332	1997	81.45486258
1968	4.611560278	1998	143.6925417
1969	6.876317103	1999	54.29047331
1970	8.644504447	2000	49.34068172
1971	16.90208715	2001	52.92365688
1972	10.97567605	2002	37.57442908
1973	21.9302187	2003	23.32004368
1974	28.99234735	2004	12.44688837
1975	21.30924007	2005	7.104863112
1976	15.61265749	2006	9.371704044
1977	24.08902325	2007	6.216641784
1978	47.54114671	2008	12.03733641
1979	76.72086672	2009	5.40180338
1980	93.00322479	2010	7.012657721
1981	44.0570705	2011	8.188568494
1982	28.2268344	2012	7.418217912
1983	26.25824542	2013	6.268813913
1984	48.23683261	2014	7.421677746
1985	53.05447687	2015	7.826941985
1986	36.00688555	2016	8.098262201
1987	33.61222903		
1988	69.01813111		
1989	75.40483061		

APPENDIX 5: FINANCIAL RATIOS SECTOR AVERAGES

Liquidity Ratios	2013	2014	2015	2016	2017	Sector Average
1-Current Ratio	0.73	0.63	0.51	0.38	0.32	0.51
2-Quick (Acid-Test) Ratio*	0.50	0.43	0.35	0.24	0.18	0.34
3-Inventories to Current Assets Ratio*	0.27	0.27	0.29	0.32	0.37	0.31
4-Inventory Dependency Ratio	4.93	5.97	6.87	8.50	7.75	6.80
5-Cash Ratio	0.07	0.03	0.05	0.03	0.05	0.04
6-Short-Term Receivables to Current Assets	0.63	0.68	0.62	0.61	0.44	0.60

ACTIVITY RATIOS	2013	2014	2015	2016	2017	Sector Average
1-Receivables Turnover	3.98	4.10	5.06	6.22	9.66	5.80
2-Inventory Turnover*	6.54	7.70	8.54	9.67	12.25	8.94
3-Working Capital Turnover	2.52	2.79	3.15	3.76	4.23	3.29

FINANCIAL STUCTURE RATIOS	2013	2014	2015	2016	2017	Sector Average
1-Short-Term Liabilities to Long-Term Liabilities	162.51	549.61	38.50	29.08	23.95	160.73
2-Short-Term Liabilities to Total Liabilities	0.99	1.00	0.97	0.97	0.96	0.98

PROFITABILITY RATIOS	2013	2014	2015	2016	2016	Sector Average
1-Gross Profit Margin	0.69	0.73	0.76	0.82	0.95	0.79
2-Operating Expenses to Net Sales Ratio	0.40	0.36	0.35	0.35	0.18	0.33
3-Operating Profit Margin	-0.09	-0.09	-0.12	-0.16	-0.13	-0.12
4-Net Profit Margin	-0.09	-0.09	-0.12	-0.18	-0.14	-0.12

APPENDIX 6: DECISION MATRIX-2013

Decision Matrix								
	X1	X2	X3	X4	X5	X6	X7	X8
AFYN13	0.88	34,360,370.740	-4.139	295.741	79	-1.958	0.559	0.269
AKNZ13	0.84	118,550,968.270	-3.051	274.554	58	-1.924	0.415	0.251
ANKR13	0.88	204,473,307.970	-5.802	516.874	105	-2.431	0.608	0.425
BLNT13	0.99	29,128,922.680	1.108	238.371	80	-7.075	0.679	0.438
BZK13	1.12	1,903,432.300	-21.097	139.240	93	-2.100	2.592	0.567
CHRYT13	0.82	30,896,963.880	-2.457	204.939	80	-0.079	0.971	0.401
ÇKRV13	1.08	92,490,852.620	18.764	496.962	108	-0.678	1.107	0.444
ÇNKKL13	1.04	9,953,475.840	6.130	130.185	117	-4.139	1.220	0.074
DCL13	1.14	65,692,404.820	2.469	409.583	98	-0.120	1.046	0.722
DKZ13	0.89	157,148,308.100	-5.971	273.863	61	-4.115	0.343	0.075
EGE13	0.87	141,277,212.160	-2.824	263.960	55	-0.958	0.690	0.383
EOSMNGZ13	0.92	41,425,870.340	4.354	190.557	81	0.070	1.020	0.319
ERCYS13	1.06	63,521,053.020	-3.178	174.880	52	-0.265	1.053	0.503
FRT13	1.12	24,742,915.850	1.590	140.141	92	-1.508	1.742	0.467
GRSN13	2.85	223,412.730	-8.144	0.000	135	-1.002	5.090	0.779
GZ13	0.94	173,741,582.080	-3.446	426.541	130	-3.838	0.547	0.446
GZNT13	0.96	37,112,237.800	-4.346	82.065	46	0.464	1.108	0.280
HCTTP13	0.89	279,432,891.620	-7.342	356.305	317	-0.986	0.870	-0.056
HRRN13	0.93	10,715,222.980	-2.318	108.814	66	0.636	1.216	0.346
INN13	0.88	50,503,077.900	-1.926	115.653	28	-0.885	0.547	0.225
ISTNCRHP13	0.82	191,169,697.250	-5.622	297.187	96	-3.586	0.368	-0.040
ISTANBLISTN13	0.91	131,055,143.690	-7.731	255.000	115	-0.368	0.953	0.058
KCL13	0.91	64,676,576.180	-3.186	191.172	20	-2.340	0.520	0.359
KMSTC13	0.97	5,738,670.540	-6.205	185.931	121	11.041	3.144	0.396
KRKL13	0.84	14,859,723.860	-2.826	388.233	57	-1.791	0.432	0.433
KT13	0.93	74,382,794.420	-4.398	264.875	91	-1.249	0.811	0.364
MNSCLB13	0.89	38,952,080.450	-4.136	208.485	65	0.362	1.082	0.259
MRSN13	0.83	50,762,606.970	-3.127	406.796	57	-1.568	0.523	0.334
MSFTKML13	0.90	33,370,478.060	-4.861	260.900	60	-1.125	0.786	0.274
NCMTN13	0.76	70,081,761.100	68.331	184.648	76	-0.911	0.567	0.104
NMKL13	0.97	13,227,242.070	-5.722	429.721	47	30.665	0.585	0.472
ONDKZM13	0.93	52,942,743.360	-2.650	164.077	52	-1.127	0.804	0.313
PMKKL13	0.90	41,309,612.690	-2.935	160.840	66	-0.569	0.815	0.271
SCK13	0.84	46,209,753.600	-2.389	210.450	61	-1.629	0.445	0.159
SLYMNDMRL13	0.85	27,440,254.300	-6.800	181.748	85	-0.343	0.860	0.267
TRY13	0.82	108,005,060.910	-8.786	556.784	46	-5.049	0.282	0.346
ULDG13	0.96	81,037,169.390	-3.174	139.949	95	-0.901	0.902	0.391
VNYZNCYL13	0.93	20,291,740.390	-1.744	2285.453	85	0.136	1.039	0.688

APPENDIX 7: DECISION MATRIX-2014

Decision Matrix								
	X1	X2	X3	X4	X5	X6	X7	X8
AFYN14	0.872	44,208,253.850	-4.591	303.818	74	-2.628	0.442	0.238
AKNZ14	0.974	158,483,339.260	-34.256	310.714	88	-18.171	0.494	0.337
ANKR14	0.891	246,200,550.090	-2.804	439.138	90	-1.453	0.496	0.274
BZK14	0.684	39,294,918.770	-1.060	282.906	62	-0.604	0.430	0.326
BLNT14	0.843	6,793,715.710	-2.857	152.317	50	-1.671	0.436	- 0.108
CHRYT14	0.789	55,811,927.890	-2.701	261.301	88	-1.282	0.556	0.200
ÇNKKL14	0.927	132,752,747.610	-4.826	281.977	109	0.292	1.013	0.180
ÇKRV14	0.965	11,592,905.510	9.358	129.495	112	-0.117	1.060	- 0.021
DCL14	0.885	73,810,910.530	-2.883	258.147	69	-0.918	0.709	0.493
DKZ14	0.879	195,808,210.170	-6.591	295.085	63	-4.591	0.307	0.058
EGE14	0.873	205,112,019.930	-4.404	292.270	60	-2.053	0.541	0.335
ERCYS14	0.937	54,486,224.150	-4.944	168.926	83	-1.022	0.970	0.358
EOSMNGZI14	0.986	92,532,362.100	-15.770	203.597	59	-0.493	0.801	0.376
FRT14	1.002	31,070,279.740	-215.169	96.145	86	168.052	1.599	0.138
GZ14	0.969	68,194.860	-22.785	-	88	-10.964	27.996	0.639
GZNT14	0.907	181,755,006.330	-2.966	449.515	120	-0.770	0.523	0.492
GZOSMNP14	0.890	59,940,402.050	-5.373	141.060	62	-2.740	0.742	0.257
HCTTP14	0.816	326,759,717.500	-5.857	313.044	239	-1.905	0.677	- 0.117
HRRN14	0.848	19,364,157.610	-2.009	160.298	64	-0.759	0.629	0.242
INN14	0.987	65,071,521.500	-19.806	144.593	42	-8.393	0.581	0.301
ISTNCRHP14	0.911	201,356,918.710	-9.067	294.539	83	-6.372	0.299	0.044
ISTANBLISTN14	0.976	139,314,239.430	-20.370	229.974	102	-1.777	0.913	0.082
KMSTC14	0.934	18,462,892.410	-4.817	266.910	87	2.083	0.583	0.308
KT14	0.860	20,353,740.240	-3.923	140.128	126	-1.584	1.432	0.275
KRKL14	1.010	18,287,229.340	-17956.751	332.389	65	-8556.334	0.560	0.517
KCL14	0.811	96,077,161.070	-2.577	333.957	99	-1.875	0.608	0.286
MNSCLB14	0.800	49,114,050.980	-2.087	272.138	69	-0.864	0.593	0.149
MRSN14	0.882	80,411,878.540	-6.867	450.570	102	-3.061	0.557	0.345
MSFTKML14	0.922	49,591,291.230	-9.084	307.806	106	-2.596	0.722	0.250
NMKL14	1.055	76,143,457.950	6.650	211.249	72	1.033	0.535	0.289
NCMTN14	0.993	22,945,912.190	-14.995	251.155	116	-6.992	0.847	0.356
ONDKZM14	0.948	60,326,766.620	-4.643	164.438	47	-1.603	0.671	0.281
PMKKL14	1.018	46,404,187.160	4.628	131.555	56	0.177	1.018	0.374
SCK14	0.905	61,551,121.990	-6.280	270.449	65	-3.695	0.415	0.222
SLYMNDMRL14	0.919	46,889,347.360	-9.326	245.330	73	-2.341	0.753	0.314
TRY14	0.826	81,919,518.890	-3.548	351.077	46	-2.472	0.319	0.251
ULDG14	0.997	72,302,868.750	-32.932	156.049	64	-4.000	0.879	0.404
VNYZNCYL14	0.883	34,526,326.340	-3.062	277.107	80	-0.991	0.681	0.542

APPENDIX 8: DECISION MATRIX-2015

Decision Matrix								
	X1	X2	X3	X4	X5	X6	X7	X8
AFYN15	0.919	56,106,443.040	-7.122	329.759	65	-4.344	0.435	0.269
AKNZ15	0.849	197,847,902.350	-4.087	366.859	91	-2.591	0.392	0.227
ANKR15	0.936	220,396,642.160	-32890.546	377.106	7	-24286.772	0.304	0.538
BZK15	1.003	49,781,761.550	-3.161	339.145	87	-126.563	0.555	0.437
BLNT15	0.855	10,313,306.800	-274.885	191.694	39	-2.289	0.319	-0.057
CHRYT15	0.807	80,084,343.010	-3.555	381.002	80	-2.260	0.396	0.267
ÇNKKL15	0.849	178,887,344.180	-58.451	310.967	105	-0.857	0.810	-0.058
ÇKRV15	0.991	24,510,207.620	-4.400	195.501	122	0.117	1.002	0.044
DCL15	1.074	47,439,194.960	1.917	97.087	27	0.237	0.915	0.463
DKZ15	0.866	235,346,392.810	-6.080	350.962	55	-4.610	0.265	0.033
EGE15	0.810	310,040,582.500	-3.763	398.618	59	-2.312	0.420	0.275
ERCYS15	0.903	77,016,734.470	-4.141	207.799	70	-1.133	0.725	0.269
EOSMNGZI15	0.913	124,463,490.330	-3.944	259.290	67	-1.651	0.630	0.326
FRT15	0.972	31,229,981.630	-4.792	82.252	73	2.716	1.461	0.094
GZ15	1.160	45,519.390	-15.997	-	75	-2.061	50.131	0.609
GZNTP15	1.109	176,275,569.070	-4.564	436.246	129	-5.192	0.688	0.449
GZOSMNP15	0.935	68,703,990.420	-3.872	150.819	50	-1.991	0.569	0.278
HCTTP15	0.774	307,696,168.170	-3.859	165.346	63	-2.756	0.451	-0.115
HRRN15	0.907	31,150,455.880	-5.395	272.440	93	-2.272	0.589	0.323
INN15	0.833	100,924,621.120	-2.219	154.825	40	-1.558	0.302	0.125
ISTNCRHP15	0.817	244,001,976.820	-5.636	342.694	96	-4.255	0.245	-0.041
ISTANBLISTN15	0.805	182,545,249.710	-3.538	276.870	114	-1.225	0.654	-0.123
KMSTC15	0.750	24,824,278.720	-3.035	336.047	95	-1.901	0.313	-0.016
KT15	0.853	40,081,033.730	-4.840	189.833	108	-0.435	0.861	0.157
KRKL15	0.917	23,810,086.490	-4.798	323.772	62	-2.637	0.496	0.414
KCL15	0.862	130,412,870.510	-5.365	382.866	94	-2.476	0.518	0.257
MNSCLB15	0.916	56,574,028.600	-6.159	291.209	46	-3.284	0.493	0.301
MRSN15	0.826	112,665,138.670	-7.349	499.902	82	-3.937	0.479	0.318
MSFTKML15	0.840	56,609,087.760	-8.466	310.646	105	-4.627	0.483	0.216
NMKL15	0.920	99,036,337.610	-3.575	251.207	80	-3.179	0.488	0.238
NCMTN15	0.872	24,180,438.190	-5.835	180.803	64	-1.540	0.595	-0.082
ONDKZM15	0.922	78,336,307.260	-4.649	185.176	42	-2.304	0.549	0.224
PMKKL15	0.995	63,309,204.730	118.816	156.356	54	5.210	0.998	0.310
SCK15	0.835	88,950,318.670	-4.671	292.114	56	-3.039	0.350	0.131
SLYMNDMRL15	1.001	60,710,496.080	-6.017	292.405	114	-1.151	0.812	0.301
TRY15	0.836	108,005,060.910	-8.057	484.946	39	-5.983	0.282	0.377
ULDG15	0.971	89,129,882.760	-10.298	168.750	63	-1.948	0.821	0.362
VNYZNCYL15	0.935	46,077,101.540	-5.999	233.180	80	-2.444	0.598	0.352

APPENDIX 9: DECISION MATRIX-2016

Decision Matrix								
	X1	X2	X3	X4	X5	X6	X7	X8
AFYN16	0.884	70,906,111.760	-4.929	280.356	32	-3.759	0.345	0.201
AKNZ16	0.768	303,203,323.480	-3.802	403.839	73	-2.962	0.255	0.159
ANKR16	0.933	290,511,769.140	-4.904	462.890	33	-3.298	0.354	0.505
BLNT16	0.794	59,242,916.260	-8.633	284.745	4	-1.888	0.226	0.252
BZK16	0.955	12,496,491.410	-2.287	194.443	38	-6.034	0.339	0.053
CHRYT16	0.771	99,951,321.560	-2.803	343.197	1	-2.592	0.129	0.230
ÇKRV16	0.734	225,364,429.730	-1.796	296.854	46	-1.377	0.430	-0.214
ÇNKKL16	0.668	39,014,467.830	-2.335	253.748	111	-0.988	0.453	-0.440
DCL16	0.966	58,046,280.120	-3.015	103.564	26	-0.974	0.781	0.354
DKZ16	0.833	287,520,751.160	-5.021	353.842	46	-4.028	0.204	-0.019
EGE16	0.782	432,434,571.160	-3.617	455.228	66	-2.553	0.315	0.193
EOSMNGZ16	0.894	110,355,386.050	-2.792	230.625	65	-2.297	0.561	0.245
ERCYS16	0.827	163,104,123.470	-4.680	275.989	56	-1.796	0.361	0.211
FRT16	0.963	43,313,436.940	-6.226	96.812	95	1.180	1.188	0.095
GZ16	0.869	145,591,838.430	-7.657	283.003	25	-2.426	0.352	0.395
GZNT16	0.951	99,616,470.550	-2.951	188.331	61	-3.233	0.579	0.296
GZOSMNP16	0.771	60,426,607.640	-0.329	368.295	7	-2.783	0.096	0.117
HCTTP16	0.940	391,188,183.870	-12.757	268.720	81	-8.660	0.402	-0.011
HRRN16	0.928	35,864,613.130	-5.036	60.609	28	-2.953	0.477	0.334
INN16	0.960	116,043,081.480	-10.206	158.561	44	-7.232	0.295	0.087
ISTNCRRHP16	0.760	334,446,259.100	-4.804	343.732	80	-3.945	0.179	-0.135
ISTANBLISTN16	0.806	284,292,014.040	-4.813	296.136	101	-2.364	0.546	-0.128
KCL16	1.189	88,348,363.580	-4.197	318.944	54	1.578	0.397	0.553
KMSTC16	0.808	59,149,151.430	-3.067	229.003	95	-1.315	0.564	0.092
KRKL16	0.776	36,201,533.760	-2.324	300.010	52	-1.817	0.272	0.087
KT16	0.786	153,876,227.880	2.608	332.245	3	-2.529	0.243	0.168
MNSCLB16	0.807	90,401,541.410	-3.202	315.324	48	-2.009	0.380	0.136
MRSN16	0.783	150,881,151.210	-3.386	407.767	69	-2.314	0.332	0.152
MSFTKML16	0.925	72,694,277.240	-9.189	326.174	106	-4.686	0.503	0.241
NCMTN16	0.946	98,030,575.650	-2.505	158.483	17	-5.243	0.265	0.258
NMKL16	0.756	47,542,118.610	-6.481	215.360	56	-1.547	0.394	-0.195
ONDKZM16	0.943	108,874,531.620	-7.513	204.198	33	-3.513	0.556	0.277
PMKKL16	0.892	87,344,855.060	-3.853	188.770	68	-1.157	0.710	0.205
SCK16	0.922	97,503,947.000	-6.875	271.130	17	-5.538	0.248	0.207
SLYMNDMRL16	0.899	89,224,975.260	-5.820	225.677	118	-1.733	0.716	0.200
TRY16	0.829	130,305,810.260	-4.298	460.102	30	-3.749	0.135	0.239
ULDG16	0.898	101,520,991.850	-3.266	186.468	38	-1.419	0.569	0.276
VNYZNCYL16	0.929	58,733,997.190	-6.066	256.224	80	-3.063	0.505	0.342

APPENDIX 10: NORMALIZED DECISION MATRIX-2013

Normalized Decision Matrix								
	X1	X2	X3	X4	X5	X6	X7	X8
AFYN16	0.649	0.861	0.491	0.454	0.736	0.521	0.177	0.645
AKNZ16	0.302	0.308	0.417	0.147	0.381	0.443	0.114	0.603
ANKR16	0.798	0.338	0.489	0.000	0.726	0.476	0.184	0.951
BLNT16	0.379	0.889	0.732	0.443	0.968	0.339	0.093	0.697
BZK16	0.864	1.000	0.319	0.667	0.681	0.743	0.173	0.497
CHRYT16	0.310	0.792	0.352	0.298	1.000	0.407	0.024	0.674
ÇKRV16	0.200	0.493	0.287	0.413	0.617	0.289	0.238	0.228
ÇNKKL16	0.000	0.937	0.322	0.520	0.059	0.251	0.254	0.000
DCL16	0.898	0.892	0.366	0.893	0.784	0.249	0.488	0.799
DKZ16	0.496	0.345	0.497	0.271	0.613	0.548	0.077	0.424
EGE16	0.344	0.000	0.405	0.019	0.447	0.403	0.156	0.637
EOSMNGZ16	0.681	0.767	0.351	0.577	0.452	0.379	0.331	0.689
ERCYS16	0.480	0.641	0.474	0.465	0.526	0.330	0.189	0.656
FRT16	0.889	0.927	0.575	0.910	0.200	0.039	0.778	0.538
GZ16	0.606	0.683	0.668	0.447	0.791	0.391	0.182	0.840
GZNT16	0.851	0.793	0.362	0.683	0.486	0.470	0.344	0.741
GZOSMNP16	0.309	0.886	0.191	0.235	0.943	0.426	0.000	0.561
HCTTP16	0.818	0.098	1.000	0.483	0.315	1.000	0.218	0.432
HRRN16	0.783	0.944	0.497	1.000	0.771	0.443	0.271	0.779
INN16	0.879	0.753	0.834	0.757	0.631	0.861	0.142	0.531
ISTNCRHP16	0.278	0.233	0.482	0.296	0.326	0.539	0.059	0.307
ISTANBLISTN16	0.416	0.353	0.483	0.415	0.150	0.385	0.320	0.314
KCL16	0.430	0.819	0.443	0.358	0.547	0.000	0.215	1.000
KMSTC16	0.423	0.889	0.369	0.581	0.197	0.283	0.334	0.535
KRKL16	0.324	0.944	0.321	0.405	0.565	0.332	0.126	0.531
KT16	0.354	0.663	0.000	0.325	0.977	0.401	0.105	0.612
MNSCLB16	0.419	0.814	0.378	0.367	0.597	0.350	0.202	0.580
MRSN16	0.347	0.670	0.390	0.137	0.416	0.380	0.168	0.597
MSFTKML16	0.774	0.857	0.768	0.340	0.104	0.612	0.290	0.685
NCMTN16	0.837	0.796	0.333	0.757	0.861	0.666	0.120	0.703
NMKL16	0.264	0.917	0.592	0.615	0.526	0.305	0.212	0.247
ONDKZM16	0.828	0.770	0.659	0.643	0.722	0.497	0.327	0.722
PMKKL16	0.676	0.822	0.421	0.681	0.431	0.267	0.437	0.649
SCK16	0.764	0.798	0.617	0.477	0.863	0.695	0.109	0.651
SLYMNDMRL16	0.695	0.817	0.549	0.590	0.000	0.323	0.441	0.645
TRY16	0.483	0.719	0.449	0.007	0.751	0.520	0.028	0.683
ULDG16	0.694	0.788	0.382	0.687	0.686	0.293	0.337	0.721
VNYZNCYL16	0.787	0.890	0.565	0.514	0.324	0.453	0.291	0.787

APPENDIX 11: NORMALIZED DECISION MATRIX-2014

Normalized Decision Matrix								
	X1	X2	X3	X4	X5	X6	X7	X8
AFYN14	0.595	0.865	0.001	0.326	0.839	0.020	0.960	0.470
AKNZ14	0.919	0.515	0.002	0.310	0.769	0.021	0.962	0.601
ANKR14	0.654	0.247	0.001	0.025	0.755	0.019	0.962	0.517
BZK14	0.000	0.880	0.001	0.372	0.900	0.019	0.960	0.587
BLNT14	0.502	0.979	0.001	0.662	0.959	0.019	0.960	0.013
CHRYT14	0.331	0.829	0.001	0.420	0.768	0.019	0.964	0.419
ÇNKKL14	0.769	0.594	0.001	0.374	0.658	0.019	0.982	0.392
ÇKRV14	0.889	0.965	0.000	0.713	0.646	0.019	0.983	0.127
DCL14	0.635	0.774	0.001	0.427	0.863	0.019	0.970	0.807
DKZ14	0.617	0.401	0.001	0.345	0.895	0.020	0.955	0.232
EGE14	0.599	0.372	0.001	0.351	0.910	0.019	0.964	0.597
ERCYS14	0.801	0.833	0.001	0.625	0.791	0.019	0.980	0.628
EOSMNGZI14	0.955	0.717	0.001	0.548	0.915	0.019	0.974	0.652
FRT14	0.993	0.905	0.012	0.787	0.775	0.000	0.996	0.338
GZ14	0.900	1.000	0.002	1.000	0.769	0.021	0.000	1.000
GZNT14	0.705	0.444	0.001	0.002	0.602	0.019	0.963	0.805
GZOSMNP14	0.651	0.817	0.001	0.687	0.899	0.020	0.971	0.494
HCTTP14	0.418	0.000	0.001	0.305	0.000	0.019	0.969	0.000
HRRN14	0.520	0.941	0.001	0.644	0.887	0.019	0.967	0.474
INN14	0.959	0.801	0.002	0.679	1.000	0.020	0.965	0.553
ISTNCRHP14	0.717	0.384	0.001	0.346	0.790	0.020	0.955	0.212
ISTANBLISTN14	0.923	0.574	0.002	0.490	0.697	0.019	0.978	0.263
KMSTC14	0.790	0.944	0.001	0.408	0.773	0.019	0.965	0.563
KT14	0.556	0.938	0.001	0.689	0.575	0.019	0.997	0.518
KRKL14	0.968	0.944	1.000	0.262	0.882	1.000	0.965	0.839
KCL14	0.403	0.706	0.001	0.259	0.711	0.019	0.966	0.533
MNSCLB14	0.367	0.850	0.001	0.396	0.861	0.019	0.966	0.352
MRSN14	0.625	0.754	0.001	0.000	0.693	0.020	0.964	0.611
MSFTKML14	0.752	0.848	0.001	0.317	0.677	0.020	0.971	0.486
NMKL14	0.826	0.767	0.000	0.531	0.846	0.019	0.964	0.537
NCMTN14	0.977	0.930	0.001	0.443	0.624	0.020	0.975	0.626
ONDKZM14	0.835	0.816	0.001	0.635	0.977	0.019	0.969	0.527
PMKKL14	0.942	0.858	0.000	0.708	0.928	0.019	0.982	0.650
SCK14	0.698	0.812	0.001	0.400	0.884	0.020	0.959	0.448
SLYMNDMRL14	0.744	0.857	0.001	0.456	0.841	0.020	0.972	0.571
TRY14	0.449	0.749	0.001	0.221	0.983	0.020	0.955	0.486
ULDG14	0.990	0.779	0.002	0.654	0.891	0.020	0.977	0.690
VNYZNCYL14	0.629	0.895	0.001	0.385	0.805	0.019	0.969	0.871

APPENDIX 12: NORMALIZED DECISION MATRIX-2015

Normalized Decision Matrix								
	X1	X2	X3	X4	X5	X6	X7	X8
AFYN15	0.674	0.819	0.004	0.340	0.520	0.000	0.978	0.536
AKNZ15	0.395	0.362	0.004	0.266	0.310	0.000	0.977	0.478
ANKR15	0.743	0.289	1.000	0.246	1.000	1.000	0.975	0.903
BZK15	0.988	0.840	0.004	0.322	0.347	0.005	0.981	0.765
BLNT15	0.421	0.967	0.012	0.617	0.738	0.000	0.976	0.091
CHRYT15	0.227	0.742	0.004	0.238	0.399	0.000	0.977	0.533
ÇNKKL15	0.393	0.423	0.005	0.378	0.194	0.000	0.986	0.088
ÇKRV15	0.963	0.921	0.004	0.609	0.058	0.000	0.990	0.227
DCL15	0.702	0.847	0.004	0.806	0.837	0.000	0.988	0.800
DKZ15	0.464	0.241	0.004	0.298	0.609	0.000	0.975	0.213
EGE15	0.238	0.000	0.004	0.203	0.571	0.000	0.978	0.544
ERCYS15	0.611	0.752	0.004	0.584	0.480	0.000	0.984	0.535
EOSMNGZI15	0.651	0.599	0.004	0.481	0.511	0.000	0.982	0.613
FRT15	0.887	0.899	0.004	0.835	0.458	0.000	0.999	0.296
GZ15	0.359	1.000	0.004	1.000	0.442	0.000	0.000	1.000
GZNT15	0.564	0.432	0.004	0.127	0.000	0.000	0.983	0.781
GZOSMNP15	0.741	0.779	0.004	0.698	0.649	0.000	0.981	0.547
HCTTP15	0.096	0.008	0.004	0.669	0.540	0.000	0.978	0.011
HRRN15	0.626	0.900	0.004	0.455	0.292	0.000	0.981	0.609
INN15	0.332	0.675	0.004	0.690	0.725	0.000	0.975	0.339
ISTNCRRHP15	0.269	0.213	0.004	0.314	0.270	0.000	0.974	0.111
ISTANBLISTN15	0.220	0.411	0.004	0.446	0.121	0.000	0.983	0.000
KMSTC15	0.000	0.920	0.004	0.328	0.280	0.000	0.976	0.146
KT15	0.412	0.871	0.004	0.620	0.170	0.000	0.987	0.382
KRKL15	0.668	0.923	0.004	0.352	0.547	0.000	0.979	0.734
KCL15	0.446	0.579	0.004	0.234	0.288	0.000	0.980	0.518
MNSCLB15	0.665	0.818	0.004	0.417	0.681	0.000	0.979	0.580
MRSN15	0.302	0.637	0.004	0.000	0.383	0.000	0.979	0.602
MSFTKML15	0.357	0.818	0.004	0.379	0.196	0.000	0.979	0.463
NMKL15	0.679	0.681	0.004	0.497	0.404	0.000	0.979	0.493
NCMTN15	0.486	0.922	0.004	0.638	0.532	0.000	0.981	0.055
ONDKZM15	0.688	0.747	0.004	0.630	0.716	0.000	0.980	0.474
PMKKL15	0.978	0.796	0.000	0.687	0.613	0.000	0.990	0.592
SCK15	0.340	0.713	0.004	0.416	0.596	0.000	0.976	0.347
SLYMNDMRL15	0.995	0.804	0.004	0.415	0.126	0.000	0.986	0.580
TRY15	0.344	0.652	0.004	0.030	0.739	0.000	0.975	0.683
ULDG15	0.884	0.713	0.004	0.662	0.544	0.000	0.986	0.663
VNYZNCYL15	0.740	0.852	0.004	0.534	0.400	0.000	0.981	0.649

APPENDIX 13: NORMALIZED DECISION MATRIX-2016

Normalized Decision Matrix								
	X1	X2	X3	X4	X5	X6	X7	X8
AFYN16	0.649	0.861	0.491	0.454	0.736	0.521	0.177	0.645
AKNZ16	0.302	0.308	0.417	0.147	0.381	0.443	0.114	0.603
ANKR16	0.798	0.338	0.489	0.000	0.726	0.476	0.184	0.951
BLNT16	0.379	0.889	0.732	0.443	0.968	0.339	0.093	0.697
BZK16	0.864	1.000	0.319	0.667	0.681	0.743	0.173	0.497
CHRYT16	0.310	0.792	0.352	0.298	1.000	0.407	0.024	0.674
ÇKRV16	0.200	0.493	0.287	0.413	0.617	0.289	0.238	0.228
ÇNKKL16	0.000	0.937	0.322	0.520	0.059	0.251	0.254	0.000
DCL16	0.898	0.892	0.366	0.893	0.784	0.249	0.488	0.799
DKZ16	0.496	0.345	0.497	0.271	0.613	0.548	0.077	0.424
EGE16	0.344	0.000	0.405	0.019	0.447	0.403	0.156	0.637
EOSMNGZ16	0.681	0.767	0.351	0.577	0.452	0.379	0.331	0.689
ERCYS16	0.480	0.641	0.474	0.465	0.526	0.330	0.189	0.656
FRT16	0.889	0.927	0.575	0.910	0.200	0.039	0.778	0.538
GZ16	0.606	0.683	0.668	0.447	0.791	0.391	0.182	0.840
GZNT16	0.851	0.793	0.362	0.683	0.486	0.470	0.344	0.741
GZOSMNP16	0.309	0.886	0.191	0.235	0.943	0.426	0.000	0.561
HCTTP16	0.818	0.098	1.000	0.483	0.315	1.000	0.218	0.432
HRRN16	0.783	0.944	0.497	1.000	0.771	0.443	0.271	0.779
INN16	0.879	0.753	0.834	0.757	0.631	0.861	0.142	0.531
ISTNCRHP16	0.278	0.233	0.482	0.296	0.326	0.539	0.059	0.307
ISTANBLISTN16	0.416	0.353	0.483	0.415	0.150	0.385	0.320	0.314
KCL16	0.430	0.819	0.443	0.358	0.547	0.000	0.215	1.000
KMSTC16	0.423	0.889	0.369	0.581	0.197	0.283	0.334	0.535
KRKL16	0.324	0.944	0.321	0.405	0.565	0.332	0.126	0.531
KT16	0.354	0.663	0.000	0.325	0.977	0.401	0.105	0.612
MNSCLB16	0.419	0.814	0.378	0.367	0.597	0.350	0.202	0.580
MRSN16	0.347	0.670	0.390	0.137	0.416	0.380	0.168	0.597
MSFTKML16	0.774	0.857	0.768	0.340	0.104	0.612	0.290	0.685
NCMTN16	0.837	0.796	0.333	0.757	0.861	0.666	0.120	0.703
NMKL16	0.264	0.917	0.592	0.615	0.526	0.305	0.212	0.247
ONDKZM16	0.828	0.770	0.659	0.643	0.722	0.497	0.327	0.722
PMKKL16	0.676	0.822	0.421	0.681	0.431	0.267	0.437	0.649
SCK16	0.764	0.798	0.617	0.477	0.863	0.695	0.109	0.651
SLYMNDMRL16	0.695	0.817	0.549	0.590	0.000	0.323	0.441	0.645
TRY16	0.483	0.719	0.449	0.007	0.751	0.520	0.028	0.683
ULDG16	0.694	0.788	0.382	0.687	0.686	0.293	0.337	0.721
VNYZNCYL16	0.787	0.890	0.565	0.514	0.324	0.453	0.291	0.787

APPENDIX 14: DIFFERENCE SERIES-2013

Difference Series								
	X1	X2	X3	X4	X5	X6	X7	X8
AFYN13	0.067	0.122	0.190	0.129	0.197	0.136	0.262	0.610
AKNZ13	0.085	0.424	0.202	0.120	0.126	0.136	0.302	0.632
ANKR13	0.063	0.732	0.171	0.226	0.285	0.123	0.248	0.423
BLNT13	0.006	0.104	0.248	0.104	0.202	0.000	0.229	0.408
BZK13	0.065	0.006	0.000	0.061	0.244	0.132	0.304	0.254
CHRYT13	0.097	0.110	0.208	0.090	0.202	0.185	0.147	0.453
ÇKRV13	0.044	0.330	0.446	0.217	0.295	0.170	0.110	0.401
ÇNKKL13	0.019	0.035	0.304	0.057	0.324	0.078	0.078	0.844
DCL13	0.078	0.234	0.264	0.179	0.260	0.184	0.127	0.069
DKZ13	0.061	0.562	0.169	0.120	0.137	0.078	0.322	0.843
EGE13	0.072	0.505	0.204	0.115	0.118	0.162	0.226	0.474
EOSMNGZ13	0.044	0.148	0.285	0.083	0.205	0.189	0.134	0.550
ERCYS13	0.033	0.227	0.200	0.077	0.108	0.180	0.125	0.331
FRT13	0.065	0.088	0.254	0.061	0.240	0.148	0.067	0.373
GRSN13	1.000	0.000	0.145	0.000	0.386	0.161	1.000	0.000
GZ13	0.030	0.621	0.197	0.187	0.370	0.086	0.265	0.399
GZNTP13	0.023	0.132	0.187	0.036	0.087	0.200	0.109	0.597
HCTTP13	0.061	1.000	0.154	0.156	1.000	0.161	0.176	1.000
HRRN13	0.039	0.038	0.210	0.048	0.155	0.204	0.079	0.519
INN13	0.067	0.180	0.214	0.051	0.026	0.164	0.266	0.663
ISTNCRHP13	0.098	0.684	0.173	0.130	0.256	0.092	0.315	0.980
ISTANBLISTN13	0.046	0.469	0.149	0.112	0.317	0.178	0.152	0.863
KCL13	0.049	0.231	0.200	0.084	0.000	0.125	0.273	0.503
KMSTC13	0.018	0.020	0.167	0.081	0.338	0.480	0.458	0.458
KRKL13	0.087	0.052	0.204	0.170	0.123	0.140	0.297	0.414
KT13	0.039	0.266	0.187	0.116	0.238	0.154	0.192	0.497
MNSCLB13	0.057	0.139	0.190	0.091	0.151	0.197	0.116	0.622
MRSN13	0.091	0.181	0.201	0.178	0.122	0.146	0.272	0.533
MSFTKML13	0.053	0.119	0.182	0.114	0.134	0.158	0.199	0.605
NCMTN13	0.128	0.250	1.000	0.081	0.187	0.163	0.260	0.808
NMKL13	0.017	0.047	0.172	0.188	0.088	1.000	0.255	0.367
ONDKZM13	0.036	0.189	0.206	0.072	0.105	0.158	0.194	0.558
PMKKL13	0.052	0.147	0.203	0.070	0.155	0.172	0.191	0.608
SCK13	0.085	0.165	0.209	0.092	0.136	0.144	0.294	0.742
SLYMNDMRL13	0.079	0.097	0.160	0.080	0.219	0.178	0.178	0.614
TRY13	0.096	0.386	0.138	0.244	0.085	0.054	0.339	0.518
ULDG13	0.022	0.289	0.200	0.061	0.250	0.164	0.167	0.464
VNYZNCYL13	0.038	0.072	0.216	1.000	0.217	0.191	0.128	0.109

APPENDIX 15: DIFFERENCE SERIES 2014

Difference Series								
	X1	X2	X3	X4	X5	X6	X7	X8
AFYN14	0.405	0.135	0.999	0.674	0.161	0.980	0.040	0.530
AKNZ14	0.081	0.485	0.998	0.690	0.231	0.979	0.038	0.399
ANKR14	0.346	0.753	0.999	0.975	0.245	0.981	0.038	0.483
BZK14	1.000	0.120	0.999	0.628	0.100	0.981	0.040	0.413
BLNT14	0.498	0.021	0.999	0.338	0.041	0.981	0.040	0.987
CHRYT14	0.669	0.171	0.999	0.580	0.232	0.981	0.036	0.581
ÇNKKL14	0.231	0.406	0.999	0.626	0.342	0.981	0.018	0.608
ÇKRV14	0.111	0.035	1.000	0.287	0.354	0.981	0.017	0.873
DCL14	0.365	0.226	0.999	0.573	0.137	0.981	0.030	0.193
DKZ14	0.383	0.599	0.999	0.655	0.105	0.980	0.045	0.768
EGE14	0.401	0.628	0.999	0.649	0.090	0.981	0.036	0.403
ERCYS14	0.199	0.167	0.999	0.375	0.209	0.981	0.020	0.372
EOSMNGZI14	0.045	0.283	0.999	0.452	0.085	0.981	0.026	0.348
FRT14	0.007	0.095	0.988	0.213	0.225	1.000	0.004	0.662
GZ14	0.100	0.000	0.998	0.000	0.231	0.979	1.000	0.000
GZNT14	0.295	0.556	0.999	0.998	0.398	0.981	0.037	0.195
GZOSMNP14	0.349	0.183	0.999	0.313	0.101	0.980	0.029	0.506
HCTTP14	0.582	1.000	0.999	0.695	1.000	0.981	0.031	1.000
HRRN14	0.480	0.059	0.999	0.356	0.113	0.981	0.033	0.526
INN14	0.041	0.199	0.998	0.321	0.000	0.980	0.035	0.447
ISTNCRHP14	0.283	0.616	0.999	0.654	0.210	0.980	0.045	0.788
ISTANBLISTN14	0.077	0.426	0.998	0.510	0.303	0.981	0.022	0.737
KMSTC14	0.210	0.056	0.999	0.592	0.227	0.981	0.035	0.437
KT14	0.444	0.062	0.999	0.311	0.425	0.981	0.003	0.482
KRKL14	0.032	0.056	0.000	0.738	0.118	0.000	0.035	0.161
KCL14	0.597	0.294	0.999	0.741	0.289	0.981	0.034	0.467
MNSCLB14	0.633	0.150	0.999	0.604	0.139	0.981	0.034	0.648
MRSN14	0.375	0.246	0.999	1.000	0.307	0.980	0.036	0.389
MSFTKML14	0.248	0.152	0.999	0.683	0.323	0.980	0.029	0.514
NMKL14	0.174	0.233	1.000	0.469	0.154	0.981	0.036	0.463
NCMTN14	0.023	0.070	0.999	0.557	0.376	0.980	0.025	0.374
ONDKZM14	0.165	0.184	0.999	0.365	0.023	0.981	0.031	0.473
PMKKL14	0.058	0.142	1.000	0.292	0.072	0.981	0.018	0.350
SCK14	0.302	0.188	0.999	0.600	0.116	0.980	0.041	0.552
SLYMNDMRL14	0.256	0.143	0.999	0.544	0.159	0.980	0.028	0.429
TRY14	0.551	0.251	0.999	0.779	0.017	0.980	0.045	0.514
ULDG14	0.010	0.221	0.998	0.346	0.109	0.980	0.023	0.310
VNYZNCYL14	0.371	0.105	0.999	0.615	0.195	0.981	0.031	0.129

APPENDIX 16: DIFFERENCE SERIES 2015

Difference Series								
	X1	X2	X3	X4	X5	X6	X7	X8
AFYN15	0.326	0.181	0.996	0.660	0.480	1.000	0.022	0.464
AKNZ15	0.605	0.638	0.996	0.734	0.690	1.000	0.023	0.522
ANKR15	0.257	0.711	0.000	0.754	0.000	0.000	0.025	0.097
BZK15	0.012	0.160	0.996	0.678	0.653	0.995	0.019	0.235
BLNT15	0.579	0.033	0.988	0.383	0.262	1.000	0.024	0.909
CHRYT15	0.773	0.258	0.996	0.762	0.601	1.000	0.023	0.467
ÇNKKL15	0.607	0.577	0.995	0.622	0.806	1.000	0.014	0.912
ÇKRV15	0.037	0.079	0.996	0.391	0.942	1.000	0.010	0.773
DCL15	0.298	0.153	0.996	0.194	0.163	1.000	0.012	0.200
DKZ15	0.536	0.759	0.996	0.702	0.391	1.000	0.025	0.787
EGE15	0.762	1.000	0.996	0.797	0.429	1.000	0.022	0.456
ERCYS15	0.389	0.248	0.996	0.416	0.520	1.000	0.016	0.465
EOSMNGZI15	0.349	0.401	0.996	0.519	0.489	1.000	0.018	0.387
FRT15	0.113	0.101	0.996	0.165	0.542	1.000	0.001	0.704
GZ15	0.641	0.000	0.996	0.000	0.558	1.000	1.000	0.000
GZNTP15	0.436	0.568	0.996	0.873	1.000	1.000	0.017	0.219
GZOSMNP15	0.259	0.221	0.996	0.302	0.351	1.000	0.019	0.453
HCTTP15	0.904	0.992	0.996	0.331	0.460	1.000	0.022	0.989
HRRN15	0.374	0.100	0.996	0.545	0.708	1.000	0.019	0.391
INN15	0.668	0.325	0.996	0.310	0.275	1.000	0.025	0.661
ISTNCRRHP15	0.731	0.787	0.996	0.686	0.730	1.000	0.026	0.889
ISTANBLISTN15	0.780	0.589	0.996	0.554	0.879	1.000	0.017	1.000
KMSTC15	1.000	0.080	0.996	0.672	0.720	1.000	0.024	0.854
KT15	0.588	0.129	0.996	0.380	0.830	1.000	0.013	0.618
KRKL15	0.332	0.077	0.996	0.648	0.453	1.000	0.021	0.266
KCL15	0.554	0.421	0.996	0.766	0.712	1.000	0.020	0.482
MNSCLB15	0.335	0.182	0.996	0.583	0.319	1.000	0.021	0.420
MRSN15	0.698	0.363	0.996	1.000	0.617	1.000	0.021	0.398
MSFTKML15	0.643	0.182	0.996	0.621	0.804	1.000	0.021	0.537
NMKL15	0.321	0.319	0.996	0.503	0.596	1.000	0.021	0.507
NCMTN15	0.514	0.078	0.996	0.362	0.468	1.000	0.019	0.945
ONDKZM15	0.312	0.253	0.996	0.370	0.284	1.000	0.020	0.526
PMKKL15	0.022	0.204	1.000	0.313	0.387	1.000	0.010	0.408
SCK15	0.660	0.287	0.996	0.584	0.404	1.000	0.024	0.653
SLYMNDMRL15	0.005	0.196	0.996	0.585	0.874	1.000	0.014	0.420
TRY15	0.656	0.348	0.996	0.970	0.261	1.000	0.025	0.317
ULDG15	0.116	0.287	0.996	0.338	0.456	1.000	0.014	0.337
VNYZNCYL15	0.260	0.148	0.996	0.466	0.600	1.000	0.019	0.351

APPENDIX 17: DIFFERENCE SERIES 2016

Difference Series								
	X1	X2	X3	X4	X5	X6	X7	X8
AFYN16	0.351	0.139	0.509	0.546	0.264	0.479	0.823	0.355
AKNZ16	0.698	0.692	0.583	0.853	0.619	0.557	0.886	0.397
ANKR16	0.202	0.662	0.511	1.000	0.274	0.524	0.816	0.049
BLNT16	0.621	0.111	0.268	0.557	0.032	0.661	0.907	0.303
BZK16	0.136	0.000	0.681	0.333	0.319	0.257	0.827	0.503
CHRYT16	0.690	0.208	0.648	0.702	0.000	0.593	0.976	0.326
ÇKRV16	0.800	0.507	0.713	0.587	0.383	0.711	0.762	0.772
ÇNKKL16	1.000	0.063	0.678	0.480	0.941	0.749	0.746	1.000
DCL16	0.102	0.108	0.634	0.107	0.216	0.751	0.512	0.201
DKZ16	0.504	0.655	0.503	0.729	0.387	0.452	0.923	0.576
EGE16	0.656	1.000	0.595	0.981	0.553	0.597	0.844	0.363
EOSMNGZ16	0.319	0.233	0.649	0.423	0.548	0.621	0.669	0.311
ERCYS16	0.520	0.359	0.526	0.535	0.474	0.670	0.811	0.344
FRT16	0.111	0.073	0.425	0.090	0.800	0.961	0.222	0.462
GZ16	0.394	0.317	0.332	0.553	0.209	0.609	0.818	0.160
GZNTP16	0.149	0.207	0.638	0.317	0.514	0.530	0.656	0.259
GZOSMNP16	0.691	0.114	0.809	0.765	0.057	0.574	1.000	0.439
HCTTP16	0.182	0.902	0.000	0.517	0.685	0.000	0.782	0.568
HRRN16	0.217	0.056	0.503	0.000	0.229	0.557	0.729	0.221
INN16	0.121	0.247	0.166	0.243	0.369	0.139	0.858	0.469
ISTNCRRHP16	0.722	0.767	0.518	0.704	0.674	0.461	0.941	0.693
ISTANBLISTN16	0.584	0.647	0.517	0.585	0.850	0.615	0.680	0.686
KCL16	0.570	0.181	0.557	0.642	0.453	1.000	0.785	0.000
KMSTC16	0.577	0.111	0.631	0.419	0.803	0.717	0.666	0.465
KRKL16	0.676	0.056	0.679	0.595	0.435	0.668	0.874	0.469
KT16	0.646	0.337	1.000	0.675	0.023	0.599	0.895	0.388
MNSCLB16	0.581	0.186	0.622	0.633	0.403	0.650	0.798	0.420
MRSN16	0.653	0.330	0.610	0.863	0.584	0.620	0.832	0.403
MSFTKML16	0.226	0.143	0.232	0.660	0.896	0.388	0.710	0.315
NCMTN16	0.163	0.204	0.667	0.243	0.139	0.334	0.880	0.297
NMKL16	0.736	0.083	0.408	0.385	0.474	0.695	0.788	0.753
ONDKZM16	0.172	0.230	0.341	0.357	0.278	0.503	0.673	0.278
PMKKL16	0.324	0.178	0.579	0.319	0.569	0.733	0.563	0.351
SCK16	0.236	0.202	0.383	0.523	0.137	0.305	0.891	0.349
SLYMNDMRL16	0.305	0.183	0.451	0.410	1.000	0.677	0.559	0.355
TRY16	0.517	0.281	0.551	0.993	0.249	0.480	0.972	0.317
ULDG16	0.306	0.212	0.618	0.313	0.314	0.707	0.663	0.279
VNYZNCYL16	0.213	0.110	0.435	0.486	0.676	0.547	0.709	0.213

APPENDIX 18: GREY FACTOR MATRIX-2013

Grey Factor Matrix								
	X1	X2	X3	X4	X5	X6	X7	X8
AFYN13	0.882	0.804	0.725	0.794	0.717	0.787	0.656	0.450
AKNZ13	0.855	0.541	0.712	0.806	0.799	0.786	0.623	0.442
ANKR13	0.887	0.406	0.745	0.689	0.637	0.803	0.668	0.542
BLNT13	0.987	0.828	0.668	0.827	0.713	1.000	0.686	0.550
BZK13	0.885	0.988	1.000	0.891	0.672	0.791	0.622	0.663
CHRYT13	0.837	0.820	0.706	0.848	0.712	0.730	0.772	0.525
ÇKRV13	0.919	0.602	0.529	0.697	0.629	0.747	0.820	0.555
ÇNKKL13	0.963	0.935	0.622	0.898	0.607	0.865	0.865	0.372
DCL13	0.865	0.681	0.655	0.736	0.658	0.731	0.798	0.879
DKZ13	0.892	0.471	0.747	0.807	0.785	0.864	0.608	0.372
EGE13	0.873	0.497	0.710	0.812	0.809	0.755	0.689	0.513
EOSMNGZ13	0.920	0.772	0.637	0.857	0.710	0.725	0.789	0.476
ERCYS13	0.938	0.688	0.714	0.867	0.823	0.735	0.801	0.602
FRT13	0.884	0.851	0.663	0.891	0.675	0.772	0.881	0.573
GRSN13	0.333	1.000	0.775	1.000	0.564	0.757	0.333	1.000
GZ13	0.943	0.446	0.717	0.728	0.575	0.854	0.653	0.556
GZNT13	0.957	0.791	0.727	0.933	0.852	0.715	0.821	0.456
HCT13	0.891	0.333	0.765	0.762	0.333	0.756	0.740	0.333
HRRN13	0.928	0.930	0.704	0.913	0.764	0.710	0.863	0.491
INN13	0.882	0.735	0.700	0.908	0.950	0.753	0.653	0.430
ISTNCRHP13	0.837	0.422	0.743	0.794	0.662	0.844	0.613	0.338
ISTANBLISTN13	0.915	0.516	0.770	0.818	0.612	0.738	0.766	0.367
KCL13	0.911	0.684	0.714	0.857	1.000	0.799	0.647	0.499
KMSTC13	0.965	0.962	0.750	0.860	0.597	0.510	0.522	0.522
KRKL13	0.852	0.905	0.710	0.746	0.803	0.781	0.627	0.547
KT13	0.927	0.653	0.728	0.812	0.677	0.764	0.723	0.502
MNSCLB13	0.897	0.783	0.725	0.846	0.768	0.717	0.811	0.445
MRSN13	0.846	0.734	0.713	0.737	0.803	0.774	0.648	0.484
MSFTKML13	0.903	0.808	0.734	0.814	0.789	0.760	0.715	0.453
NCMTN13	0.796	0.666	0.333	0.861	0.728	0.754	0.658	0.382
NMKL13	0.967	0.915	0.744	0.727	0.850	0.333	0.662	0.577
ONDKZM13	0.933	0.726	0.708	0.874	0.827	0.760	0.721	0.473
PMKKL13	0.906	0.773	0.711	0.877	0.764	0.744	0.724	0.451
SCK13	0.855	0.752	0.705	0.844	0.786	0.776	0.630	0.402
SLYMNDMRL13	0.864	0.837	0.758	0.863	0.695	0.737	0.737	0.449
TRY13	0.839	0.564	0.784	0.672	0.855	0.903	0.596	0.491
ULDG13	0.958	0.633	0.714	0.891	0.667	0.753	0.750	0.519
VNYZNCYL13	0.929	0.874	0.698	0.333	0.697	0.723	0.796	0.821

APPENDIX 19: GREY FACTOR MATRIX-2014

Grey Factor Matrix								
	X1	X2	X3	X4	X5	X6	X7	X8
AFYN14	0.552	0.787	0.334	0.426	0.757	0.338	0.926	0.486
AKNZ14	0.860	0.508	0.334	0.420	0.684	0.338	0.929	0.556
ANKR14	0.591	0.399	0.333	0.339	0.671	0.338	0.930	0.509
BZK14	0.333	0.806	0.333	0.443	0.834	0.338	0.925	0.547
BLNT14	0.501	0.960	0.333	0.597	0.924	0.338	0.926	0.336
CHRYT14	0.428	0.746	0.333	0.463	0.683	0.338	0.933	0.463
ÇNKKL14	0.684	0.552	0.334	0.444	0.594	0.338	0.965	0.451
ÇKRV14	0.818	0.934	0.333	0.635	0.585	0.338	0.968	0.364
DCL14	0.578	0.689	0.333	0.466	0.785	0.338	0.944	0.721
DKZ14	0.567	0.455	0.334	0.433	0.827	0.338	0.917	0.394
EGE14	0.555	0.443	0.334	0.435	0.847	0.338	0.932	0.554
ERCYS14	0.715	0.750	0.334	0.571	0.705	0.338	0.961	0.574
EOSMNGZI14	0.917	0.639	0.334	0.525	0.855	0.338	0.950	0.589
FRT14	0.986	0.840	0.336	0.701	0.690	0.333	0.993	0.430
GZ14	0.834	1.000	0.334	1.000	0.684	0.338	0.333	1.000
GZNT14	0.629	0.473	0.333	0.334	0.557	0.338	0.931	0.720
GZOSMNP14	0.589	0.732	0.334	0.615	0.832	0.338	0.946	0.497
HCTTP14	0.462	0.333	0.334	0.418	0.333	0.338	0.942	0.333
HRRN14	0.510	0.894	0.333	0.584	0.816	0.338	0.938	0.487
INN14	0.925	0.715	0.334	0.609	1.000	0.338	0.935	0.528
ISTNCRHP14	0.639	0.448	0.334	0.433	0.704	0.338	0.917	0.388
ISTANBLISTN14	0.867	0.540	0.334	0.495	0.623	0.338	0.958	0.404
KMSTC14	0.704	0.899	0.334	0.458	0.688	0.338	0.935	0.533
KT14	0.530	0.890	0.333	0.617	0.541	0.338	0.995	0.509
KRKL14	0.940	0.900	1.000	0.404	0.809	1.000	0.934	0.756
KCL14	0.456	0.630	0.333	0.403	0.634	0.338	0.937	0.517
MNSCLB14	0.441	0.769	0.333	0.453	0.782	0.338	0.936	0.436
MRSN14	0.571	0.670	0.334	0.333	0.620	0.338	0.934	0.562
MSFTKML14	0.669	0.767	0.334	0.423	0.608	0.338	0.945	0.493
NMKL14	0.741	0.682	0.333	0.516	0.765	0.338	0.932	0.519
NCMTN14	0.957	0.877	0.334	0.473	0.571	0.338	0.953	0.572
ONDKZM14	0.752	0.731	0.334	0.578	0.956	0.338	0.941	0.514
PMKKL14	0.896	0.779	0.333	0.631	0.874	0.338	0.965	0.588
SCK14	0.623	0.727	0.334	0.454	0.812	0.338	0.924	0.475
SLYMNDMRL14	0.661	0.777	0.334	0.479	0.759	0.338	0.947	0.538
TRY14	0.476	0.666	0.333	0.391	0.967	0.338	0.918	0.493
ULDG14	0.980	0.693	0.334	0.591	0.821	0.338	0.955	0.617
VNYZNCYL14	0.574	0.826	0.333	0.448	0.720	0.338	0.942	0.795

APPENDIX 20: GREY FACTOR MATRIX-2015

Grey Factor Matrix								
	X1	X2	X3	X4	X5	X6	X7	X8
AFYN15	0.605	0.734	0.334	0.431	0.510	0.333	0.958	0.518
AKNZ15	0.452	0.439	0.334	0.405	0.420	0.333	0.956	0.489
ANKR15	0.661	0.413	1.000	0.399	1.000	1.000	0.953	0.838
BZK15	0.977	0.757	0.334	0.424	0.434	0.335	0.963	0.680
BLNT15	0.463	0.938	0.336	0.566	0.656	0.333	0.954	0.355
CHRYT15	0.393	0.659	0.334	0.396	0.454	0.333	0.957	0.517
ÇNKKL15	0.452	0.464	0.335	0.446	0.383	0.333	0.972	0.354
ÇKRV15	0.931	0.864	0.334	0.561	0.347	0.333	0.980	0.393
DCL15	0.627	0.766	0.334	0.720	0.754	0.333	0.977	0.714
DKZ15	0.483	0.397	0.334	0.416	0.561	0.333	0.952	0.388
EGE15	0.396	0.333	0.334	0.385	0.538	0.333	0.957	0.523
ERCYS15	0.563	0.668	0.334	0.546	0.490	0.333	0.969	0.518
EOSMNGZI15	0.589	0.555	0.334	0.491	0.505	0.333	0.965	0.563
FRT15	0.815	0.833	0.334	0.752	0.480	0.333	0.998	0.415
GZ15	0.438	1.000	0.334	1.000	0.473	0.333	0.333	1.000
GZNT15	0.534	0.468	0.334	0.364	0.333	0.333	0.968	0.695
GZOSMNP15	0.659	0.693	0.334	0.624	0.587	0.333	0.963	0.525
HCTTP15	0.356	0.335	0.334	0.602	0.521	0.333	0.959	0.336
HRRN15	0.572	0.833	0.334	0.478	0.414	0.333	0.964	0.561
INN15	0.428	0.606	0.334	0.618	0.645	0.333	0.953	0.431
ISTNCRHP15	0.406	0.389	0.334	0.422	0.406	0.333	0.951	0.360
ISTANBLISTN15	0.391	0.459	0.334	0.474	0.363	0.333	0.966	0.333
KMSTC15	0.333	0.862	0.334	0.427	0.410	0.333	0.953	0.369
KT15	0.459	0.795	0.334	0.568	0.376	0.333	0.974	0.447
KRKL15	0.601	0.867	0.334	0.436	0.524	0.333	0.960	0.653
KCL15	0.474	0.543	0.334	0.395	0.413	0.333	0.961	0.509
MNSCLB15	0.599	0.733	0.334	0.462	0.611	0.333	0.960	0.543
MRSN15	0.417	0.579	0.334	0.333	0.447	0.333	0.960	0.557
MSFTKML15	0.438	0.733	0.334	0.446	0.384	0.333	0.960	0.482
NMKL15	0.609	0.610	0.334	0.499	0.456	0.333	0.960	0.497
NCMTN15	0.493	0.865	0.334	0.580	0.516	0.333	0.964	0.346
ONDKZM15	0.616	0.664	0.334	0.574	0.638	0.333	0.962	0.487
PMKKL15	0.958	0.710	0.333	0.615	0.564	0.333	0.980	0.550
SCK15	0.431	0.635	0.334	0.461	0.553	0.333	0.955	0.434
SLYMNDMRL15	0.991	0.719	0.334	0.461	0.364	0.333	0.972	0.543
TRY15	0.432	0.589	0.334	0.340	0.657	0.333	0.952	0.612
ULDG15	0.811	0.635	0.334	0.597	0.523	0.333	0.973	0.597
VNYZNCYL15	0.658	0.771	0.334	0.517	0.454	0.333	0.964	0.587

APPENDIX 21: GREY FACTOR MATRIX-2016

Grey Factor Matrix								
	X1	X2	X3	X4	X5	X6	X7	X8
AFYN16	0.588	0.782	0.495	0.478	0.655	0.511	0.378	0.585
AKNZ16	0.417	0.419	0.462	0.369	0.447	0.473	0.361	0.557
ANKR16	0.712	0.430	0.495	0.333	0.646	0.488	0.380	0.911
BLNT16	0.446	0.818	0.651	0.473	0.940	0.431	0.355	0.622
BZK16	0.786	1.000	0.423	0.600	0.611	0.661	0.377	0.498
CHRYT16	0.420	0.706	0.436	0.416	1.000	0.458	0.339	0.606
ÇKRV16	0.385	0.497	0.412	0.460	0.566	0.413	0.396	0.393
ÇNKKL16	0.333	0.888	0.424	0.510	0.347	0.400	0.401	0.333
DCL16	0.830	0.822	0.441	0.824	0.698	0.400	0.494	0.714
DKZ16	0.498	0.433	0.498	0.407	0.564	0.525	0.351	0.465
EGE16	0.432	0.333	0.457	0.338	0.475	0.456	0.372	0.579
EOSMNGZ16	0.611	0.682	0.435	0.542	0.477	0.446	0.428	0.617
ERCYS16	0.490	0.582	0.487	0.483	0.513	0.427	0.381	0.592
FRT16	0.818	0.872	0.541	0.847	0.385	0.342	0.692	0.520
GZ16	0.559	0.612	0.601	0.475	0.705	0.451	0.379	0.758
GZNT16	0.771	0.707	0.439	0.612	0.493	0.485	0.432	0.659
GZOSMNP16	0.420	0.814	0.382	0.395	0.897	0.466	0.333	0.533
HCTTP16	0.734	0.357	1.000	0.491	0.422	1.000	0.390	0.468
HRRN16	0.698	0.900	0.499	1.000	0.686	0.473	0.407	0.693
INN16	0.805	0.670	0.751	0.673	0.575	0.782	0.368	0.516
ISTNCRHP16	0.409	0.395	0.491	0.415	0.426	0.521	0.347	0.419
ISTANBLISTN16	0.461	0.436	0.492	0.461	0.370	0.448	0.424	0.422
KCL16	0.467	0.735	0.473	0.438	0.525	0.333	0.389	1.000
KMSTC16	0.464	0.818	0.442	0.544	0.384	0.411	0.429	0.518
KRKL16	0.425	0.899	0.424	0.457	0.535	0.428	0.364	0.516
KT16	0.436	0.598	0.333	0.425	0.956	0.455	0.358	0.563
MNSCLB16	0.463	0.729	0.446	0.441	0.554	0.435	0.385	0.543
MRSN16	0.434	0.603	0.450	0.367	0.461	0.446	0.375	0.553
MSFTKML16	0.689	0.777	0.683	0.431	0.358	0.563	0.413	0.614
NCMTN16	0.754	0.711	0.428	0.673	0.783	0.600	0.362	0.627
NMKL16	0.404	0.857	0.550	0.565	0.513	0.419	0.388	0.399
ONDKZM16	0.744	0.685	0.594	0.583	0.643	0.499	0.426	0.643
PMKKL16	0.607	0.737	0.463	0.611	0.468	0.406	0.470	0.588
SCK16	0.679	0.712	0.566	0.489	0.784	0.621	0.359	0.589
SLYMNDMRL16	0.621	0.732	0.526	0.549	0.333	0.425	0.472	0.584
TRY16	0.492	0.641	0.476	0.335	0.668	0.510	0.340	0.612
ULDG16	0.620	0.702	0.447	0.615	0.614	0.414	0.430	0.642
VNYZNCYL16	0.702	0.820	0.535	0.507	0.425	0.478	0.414	0.701