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Review of HealthCare Costs Determinants in Iran Applying Systematic Approach

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Abstract: *The studies of healthcare costs (HCC) and the factors affecting them has a long background, however there is a few studies evaluating the relationship between these factors applying a systematic review. All previous studies have been carried out taking into account only part of HC factors. Thus, studying HCC factors of three divisions of household, insurances and government (state) within an integrated review in order to submit a key performance indicators (KPI) for health costs factors in Iran health system is the objective of the current study. The author systematically searched the English and Persian languages literatures indexed in various publications. Meanwhile, the current study has considered a broader area to review which covers both methodologies and determinants of previous studies on healthcare costs, whereas the previous ones covered only one category. Quantitative descriptive, qualitative descriptive, qualitative comparative and quantitative comparative studies along with systematic reviews of healthcare costs and factors affecting them were selected to conduct the current review study. According to the results, the factors of income per capita, tax value and chronic illness affliction are the most frequent applied factors among the factors which are affecting the healthcare costs directly. Meanwhile the factors of coverages quality and job opportunities are utilized within the studies more than the other factors which affect healthcare costs indirectly. In addition, the determinants of income per capita, green manufacturing and non-price rationing are not taken enough into account in Iran comparing the other countries particularly developed countries.*

Keywords: *Healthcare Costs, Household, Insurance, Premium, Direct Payments*

INTRODUCTION

According to (Amouzagar et al., 2016), the studies of healthcare costs (HCC) and the factors affecting them (health costs determinants) has a long background; however there are a few studies evaluating the relationship between these factors applying a systematic approach. All previous studies have been carried out taking into account only part of HCC factors (Amery et al., 2013). Thus, studying HCC determinants applying an integrated review within a systematic approach is the issue which the current study is going to resolve. There are different types of studies using different types of methodologies including qualitative and quantitative methods. Theses methodologies have a wide spectrum including survey, interview, multivariate regression, econometric logit and logarithmic models, analysis of variances, panel data, System Dynamics (SD) and various tests. The current review is going to make an integrated review which covers all these methodologies to grasp a framework for key determinants of health costs. In other word, the study implication

of systematic approach is the consideration of all determinants (factors) which have impact on healthcare costs directly and indirectly. As an example, the methodology of estimating health insurances premiums has not been considered as a HCC determinants in previous studies, while the current study approach takes it as an indirect determinant affecting HCC. The advantage of this approach is a proactive output which will clarify those determinants (indirect factors) that their consideration will make the consideration of other determinants (direct factors) unnecessary for health authorities in Iran. This is due to the preventive effects of this approach.

(Amery et al., 2013) believes that the healthcare costs (HCC) have been increased along with the growth of global community over the last few decades. A closer look at the trends of these increases indicates that not only they are different across the countries, but also the slope of these increases is very different within them. In such circumstances, recognizing the determinants of HCC and the intensity of their influence has been taken into account by researchers of health and economic fields, since it has remarkable applications for policy makers (Amery et al., 2013). Meanwhile, this recognition will help us to estimate and determine the optimal amount of health costs, the right path for financing, supplying the required resources for health sector and the quality of insurance coverage by private and public insurers in a community (Amery et al., 2013). Regarding these issues, recognizing the aforementioned determinants within different countries including Asian countries and in a particular concentration on Iran is one of the major objectives of the current review. In other word, this recognition will lead the study to discover those factor which are most frequently considered all over the world and not considered in Iran.

Another output of this study is its ability to lead the health authorities to decide about financing strategies, as (Asadi-Lari & Vaez-Mahdavi, 2011) stated all countries need to reach a final decision on financing strategy for healthcare costs. In other word, they should specify that what combination of financing plans is to be used to finance the health system. Five possible categories are discussed as:

1. Public revenue
2. Social insurance
3. Private insurance
4. Direct payment (out of pocket)
5. Community based financing

These financing methods are going to be assessed respectively; as major sources of health costs in Iran health system to figure out the required factors in the review.

Literature Review

As (Asadi-Lari & Vaez-Mahdavi, 2011) stated it needs to be specified that what combination of financing plans is going to be applied to finance the health system with five possible options of public revenue, social insurance, private insurance, direct payment (out of pocket) and community based financing. Since approximately all studies are discussed within these categories, these financing plans are going to be assessed respectively; as major sources of health costs in Iran health system to figure out the required factors in the review.

Most countries use a combination of these methods. For example, in the United Kingdom, 76% of health costs are made up of public revenues, 12% from the shares of social insurance contributions, 10% from private insurance and 2% from direct payments of people. On the contrary, in India, 30% from total health costs is derived from public revenues and 60% from the direct payments of patients (Asadi-Lari & Vaez-Mahdavi, 2011). This means that there is diversity of combination of methods to meet the health costs requirements in a country that varies from a country to another depending on the following considerations; considerations which are essential factors to improve the health system performance (Abbas & Hiemenz, 2011):

- Economic and social development of the country (income per capita): The ability of a country to transfer, mobilize and equip its financial resources has a profound connection with the per capita income of the country. Income determines the capacity of households to pay for healthcare and their demand for services. There are three categories of countries pertaining to the income:
  - Low income countries: In this category, tax-based capitals typically account for 40 to 60 percent of total health costs, 10 to 15 percent through social insurance (covering most of the government employees) and 40 to 50 percent from the direct payments of the patients. Private insurance in these countries is either absent or very small and ignorable, since there are few households who are able to buy private insurance.
  - Middle income countries: With the industrialization of the country, the growth of its per capita income and becoming a middle income country, social insurance would usually become wider. It is because the number of employees working in the formal sector of the economy becomes higher. Private insurance starts to develop, but it still has a small responsibility. A large part of the total national health costs is still provided through tax and direct payments to patients.
  - High income countries: All high-income countries (except the United States) have established a financing system that assures accessibility to the public healthcare.
- Financial capacity: The financial capacity from public revenue in a country is depended on its various tax sources. For social insurance, it is depended on the ability to collect stakeholder's shares and the premium of the corresponding workers and employees. In case of private insurance, it has the ability to attract financial credits from high income people who are volunteers to pay for the expensive private insurances. Finally in the case of community based financing, this type of financing has limited capacity to collect healthcare related funds in poor societies.
- Implement-ability: There are two aspects for this consideration. The first aspect argues about the executive ability of a country. Does the country have the executive and human resources required to run a financing program? This consideration is depended on the social acceptability of the financing plan as well. The range of funding plans is mainly dependent on public attitudes towards the state and taxes. Therefore, applying plans that are reasonable in people point of view is likely to lead to more success.
- Political accountability: This consideration highlights the responsibility of the people who are in charge of financing plans and the essential need for independency of these plans from the politic.

Public revenues based finance of health system

In financing health system from public revenues, many types of taxes are used to support the entire range of government activities. Therefore, it is necessary for the health system to compete with other government-financing plans to obtain its required funds and receive its resources through the state budgeting process. Public tax revenues are a major source of financing for health systems in both poor and rich countries. International experience indicates that when a country is richer, its tax base is also increased; as well as, by increasing government capacity to attract tax sources, the capacity to cover health costs by public revenues get increased. Financing health system by public revenues is politically manageable as well. It can be regulated and guided by this source of financing so that it takes into account the concerns of horizontal and vertical justice. Manageability is not the only issue in politics and responsibility should be taken into account as well. Financing from public tax, in democratic political systems, has higher degrees of political accountability, since key decisions directly pass through the legislative process. Therefore, the financing process can be controlled and decision makers will respond to their decisions. (Atun et al., 2012). believes that potential growth of health system as long as financing by public revenue is more in the long run, due to the higher capacity of this plan to accumulate the health risk comparing the other types of financing plans in a larger population.

According to the (Atella & Marini, 2007), the state public revenues are made up of grants, the revenue from government ownership, the revenue from services and sales of goods, the revenue from crimes and damages and miscellaneous revenues. These are the subparts of public revenues which affects the health costs covered by this plan. (Berndt et al., 2000). believes that due to the overlap among some of subparts of the state public revenues and the Gross Domestic production (GDP), the growth of GDP affects the public revenues and the health costs directly and indirectly respectively. According to (Baltag & Moscone, 2010), GDP per capita or income per capita has a positive correlation with the state's public revenues and health costs. In addition, (Baltag & Moscone, 2010) states that the growth slope of state's public revenues is not equal with the slope of GDP growth in Iran; however they have a positive correlation with each other. (Bazyar et al., 2016) believes that to realize an economic growth, the index of public revenues should experience a faster growth comparing to the index of GDP. Another issue corresponding to the tax structure for applying the financing plan of public revenues is stated by (Bazyar et al., 2016), which is the methodology of funds distribution among the different executive levels of the state. In addition, this study implies that the growth or decline of the economy, which is depended on the growth of GDP subparts like agriculture, service, industry, oil and construction, has a great impact on the growth of public revenues and subsequently health costs through income per capita.

Household based finance of health system

According to (Bazyar et al., 2016), public and private sectors healthcare costs have a profound difference among the different countries over the global arena; since according to published figures, health cost per capita over past two decades has a remarkable fluctuation among the Asian countries. Moreover, there is considerable difference between Asian and western countries health costs per capita as well (Busse et al., 2007). Regarding these differences, (Baltagi & Moscone, 2010) has pointed out the role of income as one of the most important factors affecting these differences. Another factor that has influence on health costs is the 'income elasticity' of these costs for households (Busse et al., 2007; Baltagi & Moscone, 2010; Bazyar et al., 2016). There are different studies and researches in this field summing up with different conclusions. Part of these studies indicates that the value of income elasticity of health cost is much greater than 1 and these costs need to be categorized within luxury costs (Breyer et al., 2011). On the contrary, there have been studies which provide evidences indicating that the income elasticity of these costs is not greater than 1 and they should be considered such as other products and services; concluding that the intervention of the state to finance these costs is unavoidable (Busse et al., 2007). To justify these fluctuations of income elasticity of health cost, (Baltag & Moscone, 2010) argued for first time and highlighted the development of countries. (Busse et al., 2007) believed that the income elasticity of the health costs is depended on the development of countries. Hence, the developed counties experience a greater elasticity comparing less developed countries, since in the developed countries the nature of health costs is not applied for epidemiologic disease or infectious and premature deaths which mostly individuals in less developed countries face. But also, they spend health costs to postpone the deaths, gaining calm for life anxieties, better diagnose of illnesses, and so on. However, there are still studies in the previous reviews that have reported different elasticities for the same regions of the world (for example, the OECD countries) (Breyer et al., 2011). Also, some non-income factors have been introduced in explaining health costs fluctuations among the countries. For example, demographics indices such as the ratio of young people and the ratio of population over 65 or 70 years in a country are some of these non-income factors (Coursey & Hartwell, 2000) applied the data from the 13 member countries of the Organization for Economic Co-operation and Development (OECD) using variables such as per capita income, demographic variables and technological based variables in the field of health and concluded that more than 80 percent of the observed fluctuations of health costs among countries can be explained using income variable. In his study, he obtained an elasticity ranging from 1.15 to 1.31 for corresponding health costs ranges in different countries, and concluded that the nature of these costs in these countries was Luxury. (Coursey & Hartwell, 2000) carried out studies applying the data and information of

the 20 OECD member states between 1960 and 1987 to explain the health costs fluctuations in these countries. Utilizing variables such as gross domestic product (GDP) and variables from the demographic and structural parts and obtaining econometric model, lead them to the conclusion that there is elasticity greater than 1 for health costs explaining household income fluctuations and confirming previous studies results. Using same data and different statistical model, controlling the unobservable variables due to the existing differences among countries and adding new y-intercepts for different countries, (Clarke & Islam, 2003) earned elasticity close to one for healthcare costs which questioned the results of previous studies implying luxuriousness of these costs. As well as, (Cummins, 1973) in his study titled "Determining the Key Factors Affecting Health Costs in African Countries", which is one of the few studies available in the world's less developed countries; used panel data for 44 African countries and applied the 2001 figures for these countries and considered variables such as per capita income, foreign aid received by governments, the number of physicians per thousand and the proportion of people over 65 years. Finally they conclude that income per capita is one of the most important variables in explaining the health costs fluctuations of less developed countries, while the role of other variables is far less significant and states that the health costs in these countries are incurred for essential treatment than ordinary healthcare. He emphasized in this study that these costs are in the form of absolutely necessary costs for these countries and the corresponding elasticity is close to 1. (Cummins, 1973) tried to determine the effects of demographic, income variables and time-related fluctuations (t) on the health costs of the United States and Canada, using panel data regression and data from 1980-1988 have concluded that merely the proportion of people over 65 years old variable is not significant in explaining the observed health costs fluctuations, and other demographic variables such as people aged 18 - 64 years is significant as well. He also emphasizes that approximately 60% of health costs fluctuations can be justified considering time variable of the panel data regressions over the United States and Canada. In this study, he summed up with value lower than 1 for income elasticity of the studied states. Another study performed by (Clarke & Islam, 2003), titled “Empirical analysis of the relationship between health costs and GDP in Iran” for the years of 1959 - 2003 and applied Johansson convergence and band tests to conclude that there is a significant correlation between GDP and the state health costs. Meanwhile, regarding the obtained coefficient of panel data, they also concluded that the government health costs elasticity was nearly equal to one meaning these costs were crucial over Iran within the corresponding time span. (Clarke & Islam, 2003) also emphasizes in his study of “The relationship between health costs and economic growth in the Middle East countries” that the importance of GDP to justify the health costs fluctuations and the recognition of its scale is unavoidable for policy makers and decision making process in a community.

Health costs have always been one of the major issues discussed by economic researchers and health researchers. The development of technology and population growth and lifestyle changes caused by industrialization have led to the emergence of new illnesses and consequently, the increasing costs of healthcare in recent decades Calthrop & Maddison, 1996). This dramatic increase in health costs around the world, and especially in Iran, has led communities to seek permanent solutions to ensure that people who do not have healthcare services due to lack of financial support will not be deprived from these services (Clarke & Islam, 2003). There is also a significant concern today about the economic impact of health costs on households facing chronic, severe, and latent illnesses. The economic costs associated with the illness are divided into two parts: the cost of diagnostic and therapeutic services for illness which are caused by a reduction in income resulting from a drop in the productivity and working capacity of the patient Calthrop & Maddison, 1996). Also health costs since there is no prepayment system, pushes households to pay out of pocket for healthcare purposes Calthrop & Maddison, 1996).

The high out of pocket payments indicate that the health system imposes a large financial burden on households. Often public health-based resources and pre-payments show a fair financing system, and direct financing of unfunded health systems from people shows an unfair financing system Calthrop & Maddison,

1996). Out of pocket payments can lead the households to the poverty, since households need healthcare and cannot afford to pay heavy or even proportional payments (Davies, 2009). Also, when the patient's payments (out of pocket) are the main source of financing for the health system, they can even endanger the wealthy families (Davies, 2009). Therefore, one of the unfortunate consequences of these financing policies is the imposition of soaring or so-called downright costs to the households dealing with illness (Devlin & Hansen, 2001). Out of pocket payment for healthcare will be catastrophic when it comes to a certain level of household income, resulting in lower consumption of other goods and services, thereby reducing the standard of living (Davari et al., 2012). This level is usually estimated 40% of household expenses disregarding food costs (Davari et al., 2012). When individuals or families use a large part of their resources to pay for healthcare, they face financial problems that can threaten living standards. In the short term, leads to the reduction of goods and services consumption such as food and non-food costs, and in the long run, leads to the sale of assets and the consumption of savings that ultimately causes accumulation of debts for individuals and families (Davari et al., 2012). In other words, households often adopt reactive strategies for healthcare costs, but this strategy, although beneficial in the short term, is likely to lead to poorer households or poverty in the long run; especially among families that are not currently well-off (Davari et al., 2012). Today, the lack of financial support in the health sector is recognized as a major dilemma for health systems, because in the absence of these supports, households will suffer not only from illnesses, but also from the economic poverty. In other words, exposure to the catastrophic health costs and poverty due to the lack of financing resources would cause households to suffer as well (Davari et al., 2012). Household's support from catastrophic Healthcare costs is desired target for health systems around the world (Davari et al., 2012). In spite of all these interpretations, still there is not an ideal health system or secondary factors to be able to support households espousing these costs (Drabo, 2011). 'Urban Health Equity Assessment and Response Tool' was carried out in Tehran to assess the gap between the health parameters in the health sector and the socio-economic factors of health over two phases within 2008 - 2011. According to the results of this plan (Ekman, 2007) in 2011, which was benchmarked with previous studies, approximately 11.3% of the population of Tehran was exposed to catastrophic health costs. Benchmarking indicates that this result is in line with the results of similar studies such as a study conducted in Kermanshah province (Drabo, 2011). It matches with the similar study of the catastrophic cost of the Tehran region 17 as well. Although this study is far from previous studies in terms of sample size and study methodology, according to the study of Kermanshah, 22.2% of the people of this province have been exposed to healthcare catastrophic costs. Meanwhile, according to the results the healthcare costs of the region 17 in Tehran is estimated at about 11.7%. These figures indicate the farness from the fifth development plan of the country, which aims to reduce the cost of health services to less than one percent in Iran (Drabo, 2011). The results of this study were benchmarked with studies (Ekman, 2007) and the conclusions are as follow:

- According to the results of (Drabo, 2011), the presence of individuals with chronic illness in households increases the likelihood of household exposure to catastrophic healthcare costs and the effect of this variable on the probability of household exposure to catastrophic health costs is more than other variables. The results of various studies like (Ekman, 2007) confirm this, since it also concluded that the presence of individuals with physical or mental problems in the household relatively increases health costs to the total household cost. (Drabo, 2011) and (Ekman, 2007) also concluded in their study that the presence of people with chronic illnesses in households is one of the factors that can cause households face with catastrophic healthcare costs. In addition (Ekman, 2007) in Georgia believes that one of the most important determinants of financial disaster is the members of households with chronic illness.
- The results of study (Erdi & Yetkiner,2004) had been benchmarked with the results of study (Drabo, 2011) and they all believed that in the households where their head is employed, exposure to healthcare costs is less likely. These quantitative studies have resulted one of the smallest f-value for the factor of 'supervisor employment' comparing to other factors. According to the (Erdi & Yetkiner,2004) which

confirms these result as well, having an employed household supervisor plays a protective role against the cost of healthcare due to increased capacity and ability to pay for the household.

- In addition, based on the results of researches (Flores et al., 2008), household head education is among variables affecting the probability of household exposure to healthcare costs. They states that in a household with a higher education level, the chances of experiencing catastrophic health costs are reduced. The research (Flores et al., 2008) conducted in Turkey, stated that there is negative correlation between household head education and exposure to healthcare costs. In other word, the lower the level of household head education, the greater likelihood of exposure to healthcare costs.

Another study conducted in Tabriz – province stresses that the factor like the number of people over 65 years old in the household increases the likelihood of household exposure to healthcare costs. Studies of some developed countries have been benchmarked and they have achieved same results as well (Panahi et al., 2014). Based on these studies, the most important factors affecting health costs are the presence or absence of health insurance, patient over 60 years of age and the patient's gender and age. Along with these outstanding factors, these studies include other factors such as: accessibility to safe drinking water, residency status (native or non-native), hospital (private or public), urbanity or rurality, the education of the head of household, the presence or absence of person under 12 years of age in the household and household size are other factors affecting the health costs of the household sector. These studies, often carried out using a two-step Heckman methodology, have concluded that these factors cause households to exposure to the catastrophic expenses in the long-term.

As the aforementioned studies indicated, there are many factors effecting healthcare costs and they all were summarized. In addition, there are some other studies which have been conducted to find out the factors causing household to face catastrophic healthcare costs. The findings of these studies have been highlighted in the form of benchmarking as follow (Table1). According to the results of these studies using logarithmic methodology, there is an overlap among these studies and aforementioned ones with approximately same results.

Table 1. Factors causing households to face catastrophic health costs (Comparative benchmark)(Floreset al., 2008; Panahi et al., 2014; Gerdtham & Löthgren, 2000)

Variable	Z test coefficient (Study1)	Z test coefficient (Study2)	Z test coefficient (Study3)	Z test coefficient (Study4)	Z test coefficient (Study5)	Z test coefficient (Study6)	Effect
Y intercept	-2.05(-9.82)	-2.05	-1.93	-3.85	-2.02	-2.08	Negative
Household head education	-0.25(-5.02)	-0.25	-0.258	-0.01	-0.001	-0.04	Negative
Age	0.019(8.67)	0.019	0.019	0.005	0.002	0.005	Positive
Employment of head	-0.14(-2.06)	-0.14	-0.169	-0.57	-0.25	-0.54	Negative
Members over 65	0.25(5.59)	0.248	0.25	0.22	0.1	0.25	Positive
Employed members No	-0.114(-3.3)	-0.114	-0.11	0.45	0.18	0.24	Positive /Negative
Insured members No	-0.245(-5)	-0.245	-0.24	-0.32	-0.14	-0.15	Negative
Adjusted household size	-0.73(-12.6)	-0.73	-0.74	-0.49	-0.2	-0.45	Negative
Household income deciles	0.146(9.61)	0.146	0.145	0.17	0.06	0.1	Positive
Members under 5	0.25(3.95)	0.246	0.244	0.13	0.05	0.24	Positive
The femaleness of the head	0.056(0.85)	0.057	0	0.23	0.11	0.15	Positive
Members with chronic illness	0.78(17.32)	0.78	0.785	0.65	0.55	0.54	Positive
Per capita costs of household	0 (-0.28)	0	0	0	0	0	Negative
Urban / rural-ian	-0.29	-034	-0.45	-0.74	-0.32	-0.25	Negative
Marital status	0.26	0.35	0.19	0.36	0.15	0.2	
Residency area per capita	-0.06	-0.03	-0.02	-0.01	-0.007	-0.01	Negative

The results is indicating the type of affect which in most cases there are negative correlation between the studied factors and catastrophic healthcare costs meaning the increasing of these factors would reduce the healthcare costs. As an example, existing of chronic illness would increase the healthcare cost more than any other factors based on the studies. This benchmark indicates that the applied studies are not in same idea only in factor of employed household members.

The previous Table 1 indicated studies which were conducted to find out factors causing catastrophic healthcare costs that means these studies have a bias objective comparing with studies looking for factors causing healthcare costs (not necessarily catastrophic). Hence the difference of studies in previous Table was in objective whereas the difference of the following Table 2 studies is in methodology, as they are experimental studies (Mehrara & Fazaeli, 2009). The studies objective same as the previous ones is to analyze the associated studies evaluating factors having impact on household's healthcare costs.

Table 2. Comparative experimental studies (Household's factors having impact on HCC) (Mehrara & Fazaeli, 2009)

Variables	Findings
Misery index	Health costs experience a dynamic nonlinear pathway and a high level of sustainability compared to the sustainability of fixed health costs in a linear model.
Income per capita	Increasing incomes has an important role in increasing the proportion of health expenditure to gross domestic product.
Income per capita, Urbanization and unemployment	There is a long-term relationship between public health costs and the variables used in the model.
Income inequality	Income inequality has a negative impact on inequality of health expenditure in rural and poorer regions.
Income and education	The results of the study indicate a positive and significant effect of income and education on household health expenditure. Household income has a significant impact on health costs, but the impact of education is negligible.
Income per capita	Healthcare is an essential commodity with income elasticity less than other elasticities which is estimated in other studies.
GDP	Health costs are rising faster than GDP, and it is the most important factor influencing changes in health expenditure in the economy.
Income, population and the price of healthcare	Income has a positive and significant relationship with health costs. In addition, the proportion of people under the age 15 and over 65 and the relative price of healthcare can also determine health costs.
Income per capita, urbanization and education	Despite increasing the accessibility to health resources such as doctors and nurses, their use and distribution are considered to be a major problem.
GDP and relative price of healthcare	The results of the study indicate the importance of gross domestic product on health expenditures with income elasticity over one. Also, the importance of some non-income variables such as the relative price of healthcare is approved.
Income, unemployment, education, age and household members No.	Increasing the age, education level, income, and number of household members on the health costs of low-income households in the informal sector have a positive effect and the increase in urban unemployment rates has a negative impact on the health costs of low-income households.
Air pollution, urbanization, income per capita, Government size and dependency ratio	Air pollution, urbanization, dependency ratio, per capita income and government size have a positive and significant effect on the public health costs.
GDP	In the MENA countries, there is a strong positive correlation between per capita health cost and GDP per capita, and the relationship between health expenditure share of GDP and GDP per capita is negative.

Social insurance based finance of health system

Social insurance is a compulsory insurance. Each member of the group must contribute and pay a share premium. The share of the company is often determined in percentage terms. When a person has paid the least number of premiums, he or she will be subject to specific and predetermined benefits (Hitiris & Posnett,

1992). Most social premiums demonstrate a social commitment. According to the legislations, the level of participation and obtained benefits simply cannot be changed through mere administrative actions. Instead, these values are determined through legislations which are difficult to enact and change. Citizens are willing to pay a certain amount and expect the credits to be used equitably and effectively to support financially those who belong to this system and who are covered by it (Mehrara & Fazaeli, 2009). Social insurance plans do not necessarily cover all individuals, and many countries have multiple systems. Most plans cover only formal sector employees, but when a state decides to provide public coverage, the government must specifically use public tax revenues to pay subsidies to pensioners, the unemployed, the poor, unofficial workers and even some small-sized businesses (Hitiris & Posnett, 1992).

The economic science literature often suggests that social insurance financing is indistinguishable from the tax financing based of the state. But the experts are strongly opposed to this view. Economists consider social insurance as a financing plan since the participation is mandatory. This view overlooks many social and organizational differences between tax (Sweden) and social insurance (Germany) based financing plans. First, the premiums paid for social insurance plans are allocated for this plan lonely, apart from public payments. In other word, the social insurance fund is usually designed to keep this system up to date. The philosophy of this fund is to make more transparent and responsive financial interactions of the insurance system. Secondly, social insurance is not the right of all citizens, but covers only eligible individuals who have at least fulfilled their cooperative obligations. The benefits that covered lives receive are often corresponded to their participation. As a result, people assume that they have paid their premiums and in return, they have been allowed to receive pre-determined benefits. In other words, their benefits are not welfare granted to them by the state (Hitiris & Posnett, 1992). The effects of social insurance plans on justice depend on their details, which are remarkably in various aspects (Nosratnejad et al., 2016). The vertical justice of salary taxes depends on how much the wealthy incomes are exempted from the tax system because it is part of the capital, and whether there are limits for the level of participation and premium or not? Horizontal justice depends on whether some of the groups like small-sized businesses are exempted from paying a fair tax due to their legalization or simply a simple avoidance of taxes. Horizontal justice may also be diminished if there are multiple social insurance plans, since some of these plans may offer cheaper and better cares at the same price (Hajizadeh & Nghiem, 2011). There is a probability of this kind of horizontal injustice, because plans that cover higher-income workers, not only have more income and revenues, but also they are likely to have less disadvantaged populations due to the existing correlation between health and the economic circumstances (Hajizadeh & Nghiem, 2011). This is why, in Germany in the 1990s, the amount of tax on salaries for white-collar workers were less than that of blue-collar workers. Both economic theories and empirical observations show that workers pay the highest share of health insurance premium over a medium-term period (either directly through their insurance premiums or indirectly form lowering wages) even if the employers have made a substantial contribution in nominative terms (Hitiris & Posnett, 1992).

At the end of this section, the study applies Table3 to make a comparison between social and private health insurances to clarify the differences of them within the areas of individual responsibility, insurance responsibility, risk threshold, membership, premium adjustment and justice.

Table 3. Comparison of social and private health insurances in Iran (Hajizadeh & Nghiem, 2011)

Factors	Private health insurances	Social health insurances
Individual responsibility	People have knowledge about the health related hazards and the benefits of insurances. This knowledge is the indicator of the obtained benefits.	The qualified groups which are able to identify common risks can increase the expanded impact of health insurances.
Insurance responsibility	The insurance companies are legally contributing to the provision of insurance premiums.	The insurance company provides standard benefits for all members that vary based on time, regardless of their status since entry into the coverages.

Risk saturation threshold	The accumulation of a limited number of similar individuals can lead to a reduction in the risk saturation threshold; thereby bad risks are covered.	To the insured population as a national group would be viewed.
Membership	Optional: The client and the insurance company have the right to make a decision. The client can decide to pay the premium and can also decide on the conclusion or termination of the insurance contract.	Compulsory: Risk avoiding or selection of the risk saturation threshold is universal and inclusive, and insurance is not able to repel bad risks.
Premium adjustment	The premium is based on the survey of the insured person by the insurance company. "Risk rating" requires that different people pay different expenses in order to benefit from insurance; in case of any incident.	The premium is depended on the solidarity and mutual financial participation of the members. This can be carried out by determining the amount of money paid per income percent, which is called "income rating".
Justice	Justice is enforced when insurance and all necessary benefits are paid to any insured person. The emphasis is on the relationship between the insurer and the insured.	Justice is enforced when all members receive benefits regardless of insurance premiums and the date of entry into the coverage. The emphasis is on the relationship between the insured persons.

Thus, these categories and the policies to meet their requirement will have impact on HCC. For example policies of risk saturation threshold and premium adjustments would absolutely assure the justice or injustice in societies (Hajizadeh & Nghiem, 2011).

Private insurance based finance of health system

Private insurance is a type of insurance that customers voluntarily buy the insurances and get covered by independent and competitive insurers. These insurers claim premiums and shares that reflect the risks of the buyer and in return, take the buyers payment abilities into account. Insurance purchases can be either individually or in group form (Hajizadeh & Nghiem, 2011). In recent years, due to the two issues expressed below, there has been a growing desire across the world for different types of private insurance to be another mechanism for financing the health sector. One of the two issues is that the private sector will provide and equip more resources, due to the fact that those who do not pay are not covered, thereby the tax evasion problems would be minimized as well (Hajizadeh & Nghiem, 2011). Private insurance advocators also point out that when people choose a plan or a job, they feel more empowered, more powerful and more willingness to pay for healthcare. The second argument is that people who have different views and values (including those at different levels of income) also ask for different plans of health insurance. It has been argued that the competitive market for private insurance will respond to existing needs by providing a distinct and wider range of services and products. This is what a monopoly system of government-controlled social insurance is not motivated, nor willing to do it (Hajizadeh & Nghiem, 2011).

PHI implementation and characteristics in Iran comparing with other countries

In this section, the study is going to review the categories of private health insurances over other countries where there is accessibility to the statistics associated with health insurances affairs aiming to benchmark their PHI characteristics with that of Iran and find out the associated factors affecting health costs. The following Table 5 indicates what coverage categories or types exist in target countries and data refer to. The categories of PHI and the referred data include six parts which are as follow:

- **Type of coverage**: According to (Hajizadeh & Nghiem, 2011), there are 4 types of PHI well known all over the world. These types includes primary, duplicate, complementary and supplementary. Based on (Hadian, 2006), the primary PHI is a type of coverage which represents the only available access to health coverage, since individuals are not qualified to be covered by social and governmental ones or chose to opt out of them. The duplicate coverage is a type which offers coverage for health services already included by government health insurance, while also offering access to different providers (e.g.,

private hospitals) or levels of service (e.g., faster access to care). It does not exempt individuals from contributing to government health coverage plans. Meanwhile, the complementary coverage is a type which complements coverage of government/social insured services by covering all or part of the residual costs not otherwise reimbursed (e.g., cost sharing, co-payments). As last type, supplementary PHI is a category of coverage that provides coverage for additional health services which is not covered by the government/social schemes at all (Hajizadeh & Nghiem, 2011) and (Hadian, 2006). In this part of data, as it is given below most of countries only cover one or two PHI coverages and almost none of them entitle all aforementioned PHIs. According to (Hadian, 2006), in Iran there are only primary, duplicate and supplementary types which are covered and all coverages are not available as well. These data indicate that the diversity of PHI in Iran is acceptable and in a competitive range comparing with other countries including developed countries.

- **Number of covered lives/ policyholders**: Based on (Hadian, 2006; Henke & Schreyögg, 2004), this category of PHI indicates the number of individuals covered by a private health insurance policy. This includes both individuals covered in their own name, and dependents of the policyholder (or other persons) covered via policyholder insurance. The number of policyholders refers, conversely, to the number of individuals having purchased (or obtained, for example through an employer) a PHI policy. According to (Henke & Schreyögg, 2004), there are 17.8 million insurance policies which are received by many sectors in Iran. The health sector receives 38.52% of total amount payout and is considered as biggest part in Iran. For each person there is a policyholder and the number of life policyholder is equal with 147824. According to (Henke & Schreyögg, 2004), the aforementioned number is the number of main covered lives and the depended covered lives which include the families of covered lives is more than 40 million people that is approximately 50% of Iran population.
- **Voluntary or mandatory**: According to (Henke & Schreyögg, 2004), the insurance of Social Security is the only mandatory insurance in Iran. Of course, it is partially mandatory meaning that it has voluntary part as well. According to the (Henke & Schreyögg, 2004) at 2017, approximately 12% of Social Security policies are mandatory which are owned by enterprises of industry and service sectors. The voluntary percentage is owned by self-insured and self-employed individuals.
- **Individual or group policies**: Based on (Hajizadeh & Nghiem, 2011) and (Hadian, 2006), Insurance policies can be purchased by individuals or by employers on behalf of their employees. Group policies can be paid by the employer, deducted from wages, or a combination. According to (Hajizadeh & Nghiem, 2011), PHI covers mostly are proposed and sold to the groups. Only in some cases they are sold to the individuals. On the contrary, the last reports of (Henke & Schreyögg, 2004) indicated that the voluntary part of Social Security insurances which is approximately 88% and owned by self-insured/employed, is purchased by individuals.
- **Insurance products and elements**: Based on (Hajizadeh & Nghiem, 2011) and (Hadian, 2006), some of insurance companies offer life products which include a health element (e.g., disease specific, lump sum, critical illness, income replacement, cash products, and temporary or permanent disability insurance). In Iran there are many health elements offered by PHIs such as: Infertility, cataract, strabismus, polyps and nasal irradiation, sinusitis, tonsil, open heart surgery, chronic kidney disease, spinal disc, prostate, varicoceles, myomectomy and hysterectomy, cytoskeletal, rectocele, anthraxes, lysis, joint replacement, corneal transplantation, Cochlear implantation, varices and treatment costs due to accidents related to the continuation of treatment that occurred before the date of commencement of the first insurance coverage for the insured (Henke & Schreyögg, 2004).
- **Long Term Care insurances:** According to the last report of WHO (Hadian, 2006), there is no long-term care insurances supported over Iran.

Table 4. Coverage categories or types exist in countries, and data refer to(Hajizadeh & Nghiem, 2011; Henke & Schreyögg, 2004)

Country	Type of coverage	Number of covered lives / policyholders	Voluntary or mandatory	Individual or group policies	Insurance Products and elements	Long-term care insurance (LTC)
Australia	Duplicate and supplementary	Covered lives	Voluntary	Individual	Yes	No
Austria	Complementary	Covered lives	Voluntary	Individual	Yes	No
Belgium	Complementary (primary small risks coverage for self-employed)	Covered lives	- Voluntary (private and mutual companies) - Mandatory (long-term care in Flanders)	- 100% individual (Mutual) - 25% individual and 75% group (private companies)	No	Yes (Health insurance in Flanders)
Canada	Supplementary	Covered lives	Voluntary	10% individual and 90% group	Yes (e.g. Critical illness and disability)	Yes
Chile	Primary PHI	3.396.877 (number of covered lives) in 2017	Mandatory plus a part voluntary to upgrade services	18.2% in 2017 (both groups)	-	-
	Complementary PHI	4.081.135 (number of covered lives) in 2017	Voluntary	21,7% in 2017 (both groups)	-	-
Czech Republic	Supplementary. Primary: for foreigners who are not eligible for public health insurance coverage.	-	Voluntary	Individual	Yes - Critical illness - Income replacement - Permanent disability.	No
Denmark	Complementary, supplementary	Policyholders (Number is n.a)	Voluntary	Group and individual (% is n.a.)	No	No
Estonia	Primary and Complementary	Number of policyholders (one for each person)	Voluntary	- Individual 75%, - Group 25%	Yes	No
Finland	Supplementary	-	Supplementary	-	-	-
France	Complementary	Covered lives	Voluntary	Individual and group	-	-
Germany	Primary, complementary and supplementary	Covered lives	Voluntary and mandatory	Individual and group (% of n.a)	Yes (e.g. permanent disability insurance)	Yes
Greece	Duplicate	-	Voluntary	-	Yes	-
Hungary	Supplementary	-	Voluntary	-	Yes	No
Iceland	Primary	Covered lives	Voluntary	Individual	Yes	Yes, but just recently offered
Ireland	Duplicate	2 million covered lives	Voluntary	Individual and group policies	- Critical illness	Yes

		(including children)		combined	- Income replacement - Permanent disability.	
Italy	-	-	-	-	-	-
Japan	Complementary and supplementary		Voluntary (except the compulsory automobile liability insurance)	Individual and group	Yes (e.g. cancer insurance, specified disease insurance, etc.)	Yes
Korea	Complementary and supplementary	-	Voluntary	Individual	Yes	Yes
Latvia	Total	Number of persons insured	Voluntary	Both	-	-
Luxembourg	-	-	-	-	-	-
Mexico	Duplicate	-	Voluntary	-	-	No
Netherlands						
Up to 2005	Primary and supplementary	5.834 million				
2006 onwards	Supplementary	Covered lives: approximately 15 million.	Voluntary	Individual and group (group max. 44%, but from the total insured population of 16.5 million)	No	No
New Zealand	Duplicate, Complementary and Supplementary	Covered lives	Voluntary	Individual and group	Yes	No
Norway	Duplicate	-	Voluntary	-	-	No
Portugal	-	-	Voluntary	-	-	-
Slovak Republic	-	-	-	-	-	-
Slovenia	Complementary	Insured persons and dependents	Voluntary	-	Yes	No
Spain	Primary, duplicate	Covered lives	Voluntary	Individual	-	Yes
Sweden	-	-	-	-	-	-
Switzerland	Supplementary	Covered lives	Voluntary	-	-	-
Turkey	Complementary and supplementary	Policy holders	Voluntary	-	Critical illness	-
United Kingdom	Duplicate	Covered lives	Voluntary	Individual and group (% is Critical illness n.a.)		-
United States	Primary and complementary	Covered lives	Voluntary	-	No	Yes
Poland	-	-	-	-	-	-
Iran	primary, duplicate and supplementary	50% of population	12% mandatory and 88% voluntary	88% individual and 12% groups	Yes	No

To sum up, the study concludes that based on (Hajizadeh, M., & Nghiem, 2011; Hadian, 2006; Henke & Schreyögg, 2004). type of available coverage, number of covered lives/policyholders, voluntariness of insurances, individual or group policies of insurance and health elements products of private insurances are

the categories which have impact on health costs over many countries around the world including Iran. In other word, policyholders are setting up different costs for health system applying or giving up each of these categories. For instance, taking all types of coverages will increases/ reduce health system costs for policyholders, but in return would reduce/ increase health costs for customers. This means that there will be a tradeoff for health system costs depending on various policies for health coverage categories (Henke & Schreyögg, 2004).

Studies on five developed countries insurance system comparing with Iran

There are many studies, which have conducted benchmarks to evaluate the differences and characteristics in common of different countries implementing health insurances including private and none private. One of the current study objectives is to focus on providing a broad framework for evaluating different systems to compare with Iran health system rather than lonely comparing specific countries. This is why the current study selected those studies that have carried out their researches on countries spanning much of the diversity exhibited by health insurance systems around the globe.

(Hitiris & Posnett, 1992) states that developed countries vary significantly in how they generate revenue used to fund health costs (see Table 5). In most countries, proportional or progressive taxes earmarked for healthcare are used as the primary source of revenue (e.g., Canada, Germany, Singapore and Japan), although in some cases general tax revenues predominate. In the US and Japan, since employers are the primary sponsors, revenue comes from premiums paid by each worker. In the US, the premium is typically shared between the employer and the employee with the employer free to choose the portion of the premium paid by the employee. State and federal tax systems partially subsidize health insurance in the US, by allowing these health insurance contributions to be exempt from income taxes, a widely discussed subsidy of health insurance and potential distortion. In Japan and Germany, premium contributions are set by law at a fixed rate which is evenly split between employees and employers. In Iran taxes have main role for public based revenue methodology of financing while premiums and out of pocket payments are for the methods of social and direct payments respectively as well (Henke & Schreyögg, 2004). In addition, in some of developed countries risk adjustment formulas are used to allocate funds among geographic areas within each province. In systems with multiple competing health plans (i.e., Germany, Japan, US) risk adjustment is sometimes used to redistribute money away from plans enrolling predominantly healthy enrollees and towards plans that enrollee disproportionately sick or high cost enrollees. In Iran also risk adjustment has been applied for rural and low income enrollees (Henke & Schreyögg, 2004). As an example and according to (Hitiris & Posnett, 1992), Medical Services Insurance Organization (MSIO) provides coverage to the rural population only for in-patient care in Iran. Thus, in either ways risk adjustment would be a basis for redistributing the costs whereas taxes, premiums, subsidies of employers and out of pocket payments are main sources of revenue generation for covering health costs.

Table 5. Revenue generation and revenue redistribution in five countries (Hitiris & Posnett, 1992)

Sources of healthcare spending revenue	Canada	Germany	Japan	Singapore	USA	Iran
Proportional payroll taxes		√√	√√		√	ε
Progressive income taxes	√	√	√			√
General tax revenue	√√	√	√	√	√	√
Implicit subsidies from employers		√	√√	√	√√	ε
Fixed dollar premiums	ε	√	√	√	√√	√
Charitable donations		ε	ε	√	ε	ε
Consumer out-of-pocket payments		ε	√	√√	√√	√√
Revenue redistribution: The use of risk adjustment						
Primary insurance program	√	√√	√			
Specialty insurance programs	ε		√	√	ε	ε
Public programs	ε	ε	√	√	√√	√

Notes: √=allowed, √√=dominant, ε=allowed but minor

While every country faces the challenge of controlling healthcare costs, countries vary significantly in their methods for doing so (Hitiris & Posnett, 1992). According to (Kim & Yang, 2011), fundamentally there are four broad strategies for controlling healthcare costs which includes: demand-side cost sharing or using prices imposed on consumers to encourage them to reduce utilization, supply-side cost sharing or using prices paid to suppliers to reduce utilization and/or reduce plan payments per unit, non-price rationing or setting limits on the quantity of key resources available to provide healthcare and information provision that influences care provision and demand.

Table 6. Cost containment in selected countries (Hitiris & Posnett, 1992; Kim & Yang, 2011)

	Canada	Germany	Japan	Singapore	USA	Iran
Demand-side Cost sharing						
Is it used to control costs?			√√	√√	√√	√
Copayment for office visits			√√	√	√√	√√
Deductibles			√√		√√	
Coinsurance				√√	√√	√
Coverage ceilings			√	√√	√	√
Stop-loss					√	
Tiered provider pricing					√	√
Supply-side Cost Sharing						
Is it used to control costs?	√√	√√	√	√	√	√
Prevalence of MD fee-for-service	√√	√√	√√	√√	√√	√√
Use of bundled hospital payment	√	√√	√√		√√	
Bundled payment for primary care	ε				ε	
Salaried hospital physicians	√	√	√√	√	ε	√
Capitated provider groups					√	
Monopsony pricing	√√	√√	√			√
Government sets fee levels	√√	√	√			√
Global budgets	√	√√	√			
Pay for performance bonuses			√		√	
Non-Price rationing						
Government regulation of:						
Hospital beds	√√	√	√	√√	ε	√√
Imaging equipment	√√	√	√	√		√
Numbers of doctors	√√	√	√√	√	ε	√
Health plan use of:						
Selective contracting		ε			√√	
Utilization controls	√			√	√√	
Managed Care				√	√√	
Gatekeeper	√√			√	√	√
Information						
Hospital quality measures		ε	√	√	√	√
Physician quality measure		ε	√		√	√
Health plan quality measures		ε			√	
Patient satisfaction surveys			√	√	ε	
Notes: √=allowed, √√=dominant, ε=allowed but minor						

Table 6 summarizes the various cost control features used in the five countries we focus on. It is interesting to note that Japan and the US rely extensively on demand-side cost sharing to control costs, while Canada and Germany rely heavily on supply side cost sharing, Iran and Singapore utilizes both. A growing number of countries have moved to bundled payment for hospital care, which originated in the US where hospital payments are based on Diagnosis Related Groups (DRGs). This system is now used in Germany, Japan, and

many other countries including Iran. Experimentation with other forms of bundled payment such as for primary care and multispecialty clinics is ongoing but not yet widespread in Canada and the US (Hitiris, & Posnett, 1992; Kim & Yang, 2011; Karami et al., 2009). Meanwhile, Non-price rationing techniques are used quite differently in the different countries. In Canada and Iran, gatekeepers and provincial level restrictions on capacity are common. In the US the government uses these tools very little, though many private health plans use selective contracting and some managed care plans use gatekeepers, though they are rarely mandatory. Gatekeepers are rare in Germany, Japan and Singapore. Consumer information about hospitals, doctors, and health plans is of growing availability in the US and Japan, but rare or non-existent elsewhere (Hitiris, & Posnett, 1992; Kim & Yang, 2011; Karami et al., 2009).

At the end of reviewing healthcare cost factors within the private health insurances division, the study reviews internal studies, which have been carried out to assess the correlations of effective variables for life insurances demand applying Table 7. The studies have been conducted since 1979, meaning that study of private health insurances has a long background.

Table 7. Variables affecting life insurance demands in internal researches

Variable	Studies	Relationship
Income	(Karami et al., 2009), (Kavosi et al., 2009), (Gerber, 1997)	Positive
Inflation	(Kavosi et al., 2009), (Gerber, 1997), (Lotfalipour et al., 2012)	Negative
Dependency ratio	(Gerber, 1997), (Lotfalipour et al., 2012), (Murthy & Okunade, 2009)	Negative
Education	(Lotfalipour et al., 2012), (Murthy & Okunade, 2009), (Neumann, 1969)	Positive
Likelihood of household head death	(Lotfalipour et al., 2012) and (Murthy & Okunade, 2009)	Negative
Population	(Gerber, 1997) and (Lotfalipour et al., 2012)	Positive
Paid dividend	(Kavosi et al., 2009)	Negative
1979 revolution impact	(Gerber, 1997)	Positive
Approved law of Gov. at 1998	(Lotfalipour et al., 2012) and (Murthy & Okunade, 2009)	Positive
Interests rate	(Lotfalipour et al., 2012) and (Murthy & Okunade, 2009)	Negative
Life expectancy	(Neumann, 1969)	Positive
Financial markets development	(Neumann, 1969) and (Nekoei et al., 2014)	Positive
Insurances monopoly level	(Murthy & Okunade, 2009)	Negative
The existing of foreign companies in internal markets	(Murthy & Okunade, 2009)	Positive
Price	(Murthy & Okunade, 2009) and (Neumann, 1969)	Negative
Stock market returns	(Murthy & Okunade, 2009)	Positive
Compensation payments	(Murthy & Okunade, 2009) and (Neumann, 1969)	Negative
Religious believes in fate and fortuity	(Lotfalipour et al., 2012), (Murthy & Okunade, 2009), (Neumann, 1969)	Negative
Companies bureaucratic policies	(Gerber, 1997)	Negative
Meeting commitments requirements	(Gerber, 1997)	Positive
Advertisement	(Murthy & Okunade, 2009) and (Neumann, 1969)	Positive
Religious believes	(Gerber, 1997)	Negative
Social security insurances	(Gerber, 1997)	Negative
Maleness gender	(Neumann, 1969) and (Nekoei et al., 2014)	Positive
Age	(Neumann, 1969) and (Murthy & Okunade, 2009)	Positive
Occupation	(Murthy & Okunade, 2009) and (Neumann, 1969)	Positive
Marital status	(Murthy & Okunade, 2009)	Positive
Familiarity with insurance	(Murthy & Okunade, 2009)	Positive
Unemployment rate	(Murthy & Okunade, 2009)	Negative

Community based finance of health system

In this method of financing, various demographic groups through their local repayment plans initiate to submit and control their own primary care. Many low-income countries in the world have been dreaming of finding ways to deliver rural health services reliable and sustainable over the rural areas. Often, it's difficult to get doctors to employ government-managed treatment centers. Doctors usually avoid or refuse to accept this responsibility, do not regularly attend their work or provide low-quality services to their clients. At the same time, the residents of rural area do not usually rely on existing services and facilities. As a result, the use of traditional healers and local therapists would be intensified to provide outpatient care and refers to district hospitals only when they are severely ill (Naeem, 2009).

In many poor countries, there is a problem that additional income cannot be derived from public tax, corruption and inefficiency are widespread, support for lawsuits regarding non-payment of taxes is very weak and tax evasion is abundant. This situation has led to a growing desire for community based financing in recent years. The main idea is to collect and consume required capital for primary care locally and at the village level. The philosophy behind this method is that local control ensures transparency and accountability. It ensures efficient, respectful and culturally acceptable services (Naeem, 2009). The advocators of this financing method refer to the significant costs that are spent by relatively poor local people who visit traditional healers and unconventional doctors for treatment. Locations associated with these potential credits which have the ability to support public health activities has been attractive for the defenders this approach. An example of a community based financing program which is a combination of local and political responses, can be primary cares provided by the community itself, as well as; public prepayments. In fact, the concept is that a small community-based healthcare organization in which doctors receive salaries better be founded. Secondary cares (hospitals) are clearly beyond the scope of such programs, since these cares are very expensive and the coverage area is very wide which the local management of effectiveness and economic sustainability would create problem. Public prepayment is intended to eliminate free participation by healthy people, as well as; reverse selection of sick people (Naeem, 2009).

Community based health financing by System Dynamic methodology

The System Dynamics (SD) have entered in the health issues through various forms and analyzed health costs in the following sections including macro and micro issues. The following subdivisions are based on study (Ritchie-Dunham & Galvan, 1999) and taken from the American Institute of Healthcare in the United States.

- **Studies type 1**: The main purpose of such studies (Ritchie-Dunham & Galvan, 1999) example of these system-based studies of chronic diseases can be found in studies on hypertension and obesity, which has undergone many systematic researches to find appropriate preventive methods. This type of studies addresses the onset causes and in general, proactive prevention, since these studies essentially believe that a high amount of health costs are being invested in the prevention sector, and reactive prevention would lead to a loss of capital. These studies believe that over-investing for therapeutic medical devices instead of focusing on health-based prevention has led to an increase in the number of patients with chronic and severe illnesses. Thus, the spent costs invested by policyholders would be increased for reactive interventions and thereby would reduce the health based treatments or proactive preventions which ultimately lead to an increase in severe and chronic illnesses costs.
- **Studies type 2**: In the second type of health based dynamic system models (Rehan et al., 2011), the model has a broader view of community. These studies keep all the variables of the first type models, and in a larger form they consider not only preventive factors, but also secondary factors that affect the preventive factors and indirectly deals with the occurrence or absence of various diseases, including chronic diseases. In other words, these types of models go beyond the preventive factors and evaluate the secondary factors affecting preventive methods and the rate of affliction. One such study is described by

(Ritchie-Dunham & Galvan, 1999). Their community health model examines the typical feedback interactions among broadly defined states of affliction prevalence, adverse living conditions, and the community's capacity to act. These studies have led to some conclusions about how different types of outside assistance are likely to affect a community in the short and long term. For example, the model suggests that outside assistance focused on building a community's capacity to act may be the most effective place to start in a community struggling against disease and poverty, ensuring longer-term success in a way that more direct interventions fail to do.

- **Studies type 3:** In this type of models (Rehan et al., 2011), the dynamics system model analyzes health issues more closely. The main purpose of these types of models is to predict and control the demand for medical care in the form of a referral system and taking into account behavioral, demographic and preventive factors. In other word, these studies try to control health costs focusing on the demand of consumers.
- **Studies type 4:** In this type of models (Rehan et al., 2011), the goal of the model is to find the relationships between chronic diseases and behavioral factors. Ultimately, after finding these relationships and their mutual influences, we can address the impact of these interactions on health costs and reduce them. Behavioral factors such as lifestyle, drug use, body fat, exercises, dietary habits and weight are considered in these studies, since all these factors directly and indirectly affect the costs imposed on insurance companies by increasing or decreasing diseases particularly chronic diseases. Hence, these relationships and the interactions existing inside the health system's behavior cause to predict health costs through insurance entity costs.
- **Studies type 5:** The main purpose of this type of study (Hirsch & Homer, 2004) is to understand the consumer pattern and how other forces influence it. The default assumptions of models in such studies is that consumer demand for illness, injury, and other factors remains unchanged unless factors such as technological and hospital capacity, specialist doctors, innovations, and management standards change. In other words, these models seek to predict consumer behavior and health providers. Behavior that reflects consumption patterns of consumers and pricing patterns of health system providers. From the perspective of these models, the first factor affecting the behavior of consumers and providers of health services is "research and development", that its output is in the form of medical technology and clinical innovations, which in turn they influence behavior of Consumers and health providers. The second factor is the pricing policies of regulatory and legislation organizations, as well as insurance companies. Regulators direct the demand of consumers and the supply of health services by providers applying pricing policies. Insurer's organizations motivate or demotivate consumers and providers for the demand and supply of health services by adjusting the amount of premium as well. It also deals with interactions between insurance organizations and health providers, and believes that progressive interactions between these two groups will reduce health costs in the insurance sector. This is because of effective collection of premiums from Health providers that will protect them from medical errors and eventually medical petitions. In such cases, the insurer organizations can easily support them. Meanwhile, the proper adjustment of premiums will lead to appropriate pricing of health services, as the level of premiums is one of the main factors influencing the price of health services. Thereby, appropriate pricing for health services, causes the demand for healthcare consumers to be adjusted appropriately as well.

Methodology

This section of the study include two subsections which first one is going to explain the studies selection process for review paper and the second will point out the methodologies conducted for related studies which have focused on healthcare costs and its associated determinants. As it is illustrated at the following flowchart, the study has applied three levels of screening to find out the most related researches in this issue

(healthcare costs). At the beginning all sources to search and figure out the heath pertaining studies have been applied which included libraries, journals (including open access, online and so on), references and secondary data. The titles of these studies have been scanned at the first step. Then, in case of finding the health - related key words, they would be selected, otherwise they would be rejected. At the next screening stage, after selection of relevant titles, their abstract have been studies carefully and based on their contents, the studies would be screened again. At the final step and after the selection of most health related studies, the selected studies were evaluated in full text. The final studies in full text lead the review paper to the last screening stage which submitted the most related papers. Finally the screened papers were refined to get rid of issues like duplications and application of other languages but English. This stage provided a group of studies with maximum qualifications and relevancy.

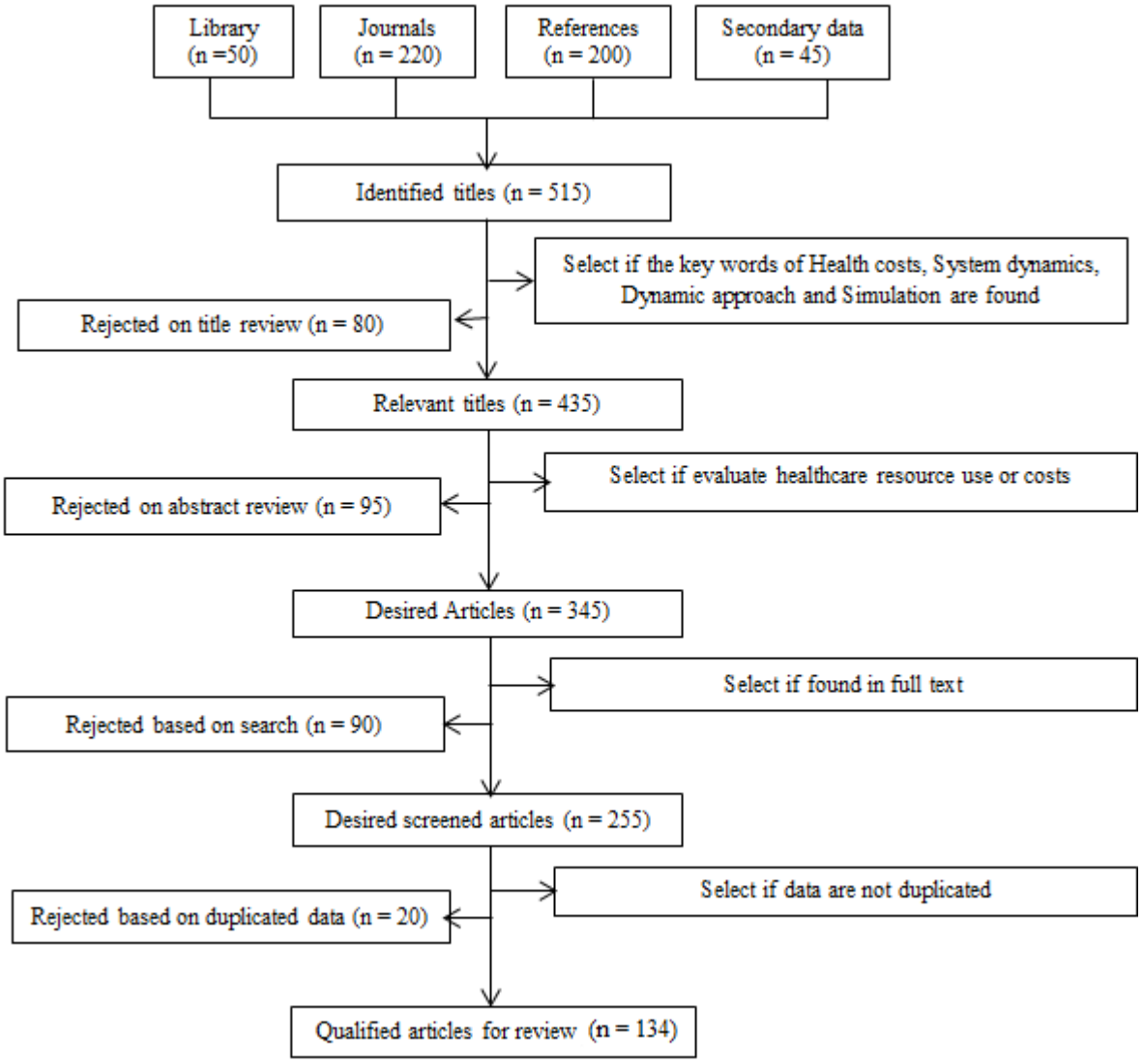

Figure 1. The selection process diagram

According to the content analysis carried out by the author, there is a diverse spectrum of methodologies which have been applied to study the healthcare costs. These methodologies based on their frequencies are as follow respectively:

- **Regression logarithmic models**: Regression analysis is a quantitative research method which is used when the study involves modelling and analyzing several variables, where the relationship includes a dependent variable and one or more independent variables. In calculus, logarithmic differentiation or differentiation by taking logarithms is a method used to differentiate functions by employing the logarithmic derivative of a function F, The technique is often performed in cases where it is easier to differentiate the logarithm of a function rather than the function itself. This is why the regression models have proceeds logarithmic transformation.
- **Econometric models**: This methodology allows estimating the relation between a dependent variable and a set of explanatory variables. Econometric models are statistical models used in econometrics. An econometric model specifies the statistical relationship that is believed to hold between the various economic quantities pertaining to a particular economic phenomenon. An econometric model can be derived from a deterministic economic model by allowing for uncertainty, or from an economic model which itself is stochastic. However, it is also possible to use econometric models that are not tied to any specific economic theory.
- **Panel data methodology**: In statistics and econometrics, panel data or longitudinal data are multi-dimensional data involving measurements over time. Panel data contain observations of multiple phenomena obtained over multiple time periods for the same firms or individuals.
- **Dynamic systems modeling**: System dynamics (SD) is an approach for understanding the nonlinear behavior of complex systems over time using stocks, flows, internal feedback loops, table functions and time delays. The systems modeling methodology of system dynamics is well suited to address the dynamic complexity that characterizes many public health issues. The system dynamics approach involves the development of computer simulation models that portray processes of accumulation and feedback and that may be tested systematically to find effective policies for overcoming policy resistance. In the system dynamics methodology, a problem or a system (e.g., ecosystem, political system or mechanical system) may be represented as a causal loop diagram. A causal loop diagram is a simple map of a system with all its constituent components and their interactions. By capturing interactions and consequently the feedback loops (see figure below), a causal loop diagram reveals the structure of a system. By understanding the structure of a system, it becomes possible to ascertain a system's behavior over a certain time period.
- **ANOVA or Analysis of Variances**: Analysis of Variance (ANOVA) is a statistical method used to test differences between two or more means. It may seem odd that the technique is called "Analysis of Variance" rather than "Analysis of Means." As you will see, the name is appropriate because inferences about means are made by analyzing variance. Those studies which have been carried out applying this methodology, have concentrated on intra-organizational factors such as structural and consequential factors. These studies require for observations for estimations of variables and this is the reason to apply this methodology. Numbers of medical equipment/crews per capita or the patient satisfaction are examples of these factors.

Review Results and Conclusion

The screening process and the review of most related studies in the area of healthcare costs and the issues affecting them, led the current paper to review and scan more than 220 papers, which approximately resulted 120 factors having impact on health costs directly and indirectly. These factors have been derived and screened within five categories of public revenue, social insurance, private insurance, household (direct payment) and community based financing of healthcare costs. In addition, these studies have been conducted applying different methodologies. These methodologies have been applied within five categories as well. These categories include regression logarithmic model, econometric models, panel data, System Dynamics and

Analysis of Variances based on their frequency of applications respectively. To conclude and grasp all relevant studies with their methodologies, they all are briefed at the following Table 8. Meanwhile, factors of studies are presented in Table 14 rather than the studies title. The methodologies of each study have been submitted to associate to the factors as well.

According to the results, the factors of income per capita, tax value and chronic illness affliction are the most frequent applied factors among the factors, which are affecting the healthcare costs directly. Meanwhile the factors of coverages quality and job opportunities are utilized within the studies more than the other factors which affect healthcare costs indirectly. In addition, the determinants of income per capita, green manufacturing and non-price rationing are not taken enough into account In Iran comparing the other countries particularly developed countries. As well as, based on review, in most cases the most frequent methodologies which have been implemented in the previous studies are mathematical such as regression logarithmic model, econometric models, panel data, System Dynamic modeling and ANOVA (Based on frequency of studies respectively). Thus, the current study systematic approach (which is the consideration of direct and indirect determinants of healthcare costs simultaneously), is more applicable in case of using Dynamic System methodology due to the nonlinearity of this methodology.

Table 8. Review of studies including key finding factors and methodologies

Methodology	Key factor
Review (panel data)	Duplicate insurance coverages
Review (panel data)	Risk based Premium calculation methods
Review (panel data)	Character based Premium calculation methods
Review (panel data)	Salary based Premium calculation methods
Review (panel data)	Health based Premium calculation methods
Review (panel data)	Deductibles usage
Review and survey	Selective contracting rationing usage
Review and survey	Hospital beds rationing usage
Review and survey	Imaging equipment rationing usage
Review and survey	Numbers of doctors rationing usage
Review and survey	Gatekeepers rationing usage
Review and survey	Managed care rationing usage
Review (panel data	Private insurer and franchise existence
Survey, observation and ANOVA	Household head education
Survey, observation and ANOVA	Household educated members
Survey, observation and ANOVA	Household academic members
Survey, observation and ANOVA	Household educated jobholders
Survey, observation and ANOVA	Household adjusted size
Survey, observation and ANOVA	Household population
Review (Secondary data	Fertility rate
Logarithmic models	Primary coverage inequity
Logarithmic models	Type of primary coverage
Panel data	High diversity of coverages
Panel data	High diversity of tariffs
Panel data	Complementary coverage inequity
Panel data	Type of complementary coverage
ANOVA	Residency status
Panel data	Drinking water accessibility
Survey, observation and ANOVA	Drinking water per capita
Survey, observation and ANOVA	Juvenile member
Survey, observation and ANOVA	Old member
Survey, observation and ANOVA	Employed members
Survey, observation and ANOVA	Household head gender
Survey, observation and ANOVA	Household head employment
Survey, observation and ANOVA	Household head unemployment

Survey, observation and ANOVA	Unemployment rate
Survey, observation and ANOVA	Part time job opportunities
Survey, observation and ANOVA	Low income job opportunities
Survey, observation and ANOVA	Household head age
Dynamic system	Destruction of the environment
Dynamic system	Sulfur and CO2 pollutant
Dynamic system	Air pollution
Dynamic system	Public green constructions
Dynamic system	PM10 pollutant
Dynamic system	Poisonous pollutants
Dynamic system	Drinking water accessibility
Dynamic system	Suspended particle pollutants
Dynamic system	Environment quality
Dynamic system	monocytes carbon particles
Dynamic system	Pollutants
Dynamic system	Waste, gas Spill, Pollution of water and dust
Dynamic system	Emissions of carbon monoxide, sulfur and nitrogen
Johansen convergence	Income per capita
Logarithmic and regression models	Income per capita
Dynamic system	Household members income
Dynamic system	Urbanity rate
Dynamic system	Rurality rate
Dynamic system	Chronic illness of members
Dynamic system	Chronic illness affliction
Dynamic system	Life expectancy
Logarithmic and regression models	Inequity of salaries
Logarithmic and regression models	School based training plans
Dynamic system	Pollution mass
Dynamic system	Suspended particle of air
Dynamic system	Smoking rate
Review and survey	Health savings accounts usage
Review and survey	Group policies of coverages percent
Review and survey	Mandatory coverages
Review and survey	Voluntary coverages
Review and survey	Prevalence of MD fee-for-service
Review and survey	Use of bundled hospital payment
Review and survey	Number of policyholders
Dynamic system	No of driving incidents
Dynamic system	Occupational incidents
Dynamic system	Welfare index
Band test	Income per capita
Panel data	Household income
Review and survey	Individual policies of coverages percent
Review	Tax value policies
Review (panel data)	Gov income of crimes fine
Review (panel data)	Gov income of capital assets
Review (panel data)	International safes loans
Review (panel data)	Oil exploration amount annually
Review (panel data)	Urban duties and tariffs rate
Review (panel data)	Short and long term productive industries
Review (panel data)	Service sector productivity
Dynamic system	Inflation
Dynamic system	Dollar rate promotion/demotion
Eco-metric models	Gross domestic product
Eco-metric models	Gov employees salary calculation method
Eco-metric models	Social security premium value
OR	Addiction rate

Survey, observation and ANOVA	Per capita medical crews
Survey, observation and ANOVA	Per capita medical equip
Survey, observation and ANOVA	Life style
Dynamic system	Technological factors
Dynamic system	Inflation
Dynamic system	Cure based medical equip
Dynamic system	Proactive treatment policy
Dynamic system	reactive treatment policy
Panel data	Tax estimation methodology
Review and survey	Direct tax value
Panel data	Added tax value
Survey, observation and ANOVA	Fast foods consumption rate
Dynamic system	Emissions of carbon monoxide
Dynamic system	Marginalization
Dynamic system	Desertification
Dynamic system	Pollution of water, soil & air
Dynamic system	Destruction of the ozone layer
Dynamic system	Economic activities waste
Dynamic system	CO2 emissions
Dynamic system	Climate change conventions
Dynamic system	Per capita energy consumption
Dynamic system	Energy over-usage of sectors
Dynamic system	High urbanity percentage
Survey, observation and ANOVA	Health centers internal layout
Dynamic system	four environmental elements
Logarithmic models	Gov size
Logarithmic models	dependency ratio
Logarithmic models	Paid dividend
Logarithmic models	1979 revolution impact
Logarithmic models	Approved law of Gov. at 1998
Logarithmic models	Interests rate
Logarithmic models	Stock market returns
Logarithmic models	Religious believes in fate and fortuity
Logarithmic models	Advertisement
Logarithmic models	Marital status
Logarithmic models	Households members over 65
Logarithmic models	Households members under 5
Logarithmic models	Household head gender
Econometric models	Industrial output
Econometric models	Agricultural output
Review	Annual raining (mm)
Solow model	Social norm
Review	Harvest Processing loss
Review	Urban duties per capita
Review	Reproductive lifetime
Review	Women employment rate
Solow model	Religiousness
Panel data	Life expectancy
Review	Dedication (Rial/dollar)
Dynamic system	Settlement delays of health centers
Dynamic system	Diesel fuel consumption per capita
Review	Bundled payments value for Gov employees
Eco-metric models	GNP percent of service sector
Eco-metric models	GNP percent of industry sector
Eco-metric models	GNP percent of agriculture sector
Eco-metric models	R & D investments of Gov
Eco-metric models	GNP allocated on health

Eco-metric models	Arable land area
Dynamic system	R & D studies of arable land exploration
Dynamic system	Investment in service division
Dynamic system	Investment in industry division
Dynamic system	Investment in agriculture division
Dynamic system	Service output
Eco-metric models	Paramedicines salaries calculation methods

Conclusion and Future Direction

The current study applied a systematic approach to submit a review of healthcare costs determinants. According to the previous studies, in most cases the review studies on healthcare costs have concentrated on applied methodologies, systems, information systems and health costs. Despite previous studies the current study has taken both determinants and methodologies into its account. Meanwhile the study has defined (assumption) the determinants as factors which not only directly has an impact on healthcare costs, but also affect them indirectly. In other word, the major difference of the current review approach and the previous ones is in two different cases. Firstly, the perspective of studies on healthcare costs determinants and secondly the area which studies cover. The current study perspective of healthcare costs determinants include all factors which influence on healthcare costs directly and indirectly. As an example, the methodology of estimating health insurances premiums has not been considered as a HCC determinants in previous studies, while the current study approach takes it as an indirect determinant affecting HCC. The advantage of this approach is a proactive output which will clarify those determinants (indirect factors) that their consideration will make the consideration of other determinants (direct factors) unnecessary for health authorities in Iran. This is due to the preventive effects of this approach. The factor of income per capita has a direct impact on health costs, but this factor would be adjusted by determinants like premium calculation methodology, as health insurance premiums has a direct influence on affordability of patients for treatment. Secondly, the current study has considered a broader area to review which covers both methodologies and determinants of studies on healthcare costs, whereas the previous ones covered only one category.

The study concluded that the factors of income per capita, tax value and chronic illness affliction are the most frequent applied factors among the factors which are affecting the healthcare costs directly. Meanwhile the factors of coverages quality and job opportunities are utilized within the studies more than the other factors which affect healthcare costs indirectly. In addition, the determinants of income per capita, green manufacturing and non-price rationing are not taken enough into account in Iran comparing the other countries particularly developed countries. As well as, based on review, in most cases the most frequent methodologies which have been implemented in the previous studies are mathematical such as regression logarithmic model, econometric models, panel data, System Dynamic modeling and ANOVA (Based on frequency of studies respectively). Thus, the current study systematic approach (which is the consideration of direct and indirect determinants of healthcare costs simultaneously), is more applicable in case of using Dynamic System methodology due to the nonlinearity of this methodology.

The author believes that review studies considering healthcare costs with application of non-mathematical methodologies can be a remarkable review to fill the gap of studies in this area in future.

References

1. Abbas, F., & Hiemenz, U. (2011). Determinants of public health expenditures in Pakistan.
2. Amery, H., Jafari, A., & Panahi, M. (2013). Determining the rate of catastrophic health expenditure and its influential factors on families in Yazd province. Journal of Health Administration, 16(52), 51-60.

3. Amouzagar, S., Mojaradi, Z., Izanloo, A., Beikzadeh, S., & Milani, M. (2016). Qualitative examination of health tourism and its challenges. International Journal of Travel Medicine and Global Health, 4(3), 88-91.
4. Asadi-Lari, M., & Vaez-Mahdavi, M. R. (2011). An overview on URBAN-HEART Tehran experience: Tehran municipality. Deputy for Social and Cultural Affairs.
5. Atella, V. & G. Marini. (2007). Is Healthcare Expenditure Really a Luxury Good? A Reassessment and New Evidence Based on OECD Data. Revista di Politica Economica, Anno XCVII-SERIE III (III-IV)): 87-119.
6. Atun, R., Knaul, F. M., Akachi, Y., & Frenk, J. (2012). Innovative financing for health: what is truly innovative?. The Lancet, 380(9858), 2044-2049.
7. Baltagi, B. H. And Moscone, F. (2010), " Healthcare expenditure and income in the OECD Reconsidered: Evidence from Panel Data", IZA DP. No. 4851.
8. Bazyar, M., Rashidian, A., Kane, S., Mahdavi, M. R. V., Sari, A. A., & Doshmangir, L. (2016). Policy options to reduce fragmentation in the pooling of health insurance funds in Iran. International journal of health policy and management, 5(4), 253.
9. Berndt, E. R. et al (2000), " Medical care prices and output, in : Culyer, A. J. and Newhouse, J. P. (Eds): Handbook of Health Economics, Vol. 1a,Amsterdam: Elsevier.
10. Breyer, F., Bundorf, M. K., & Pauly, M. V. (2011). Healthcare spending risk, health insurance, and payment to health plans. Handbook of Health Economics, 2, 691-762.
11. Busse, R., Schreyögg, J., & Gericke, C. (2007). Analyzing changes in health financing arrangements in high-income countries. Health, Nutrition and Population Discussion Paper. Washington, DC, World Bank.
12. Calthrop, E., & Maddison, D. (1996). The dose—response function approach to modelling the health effects of air pollution. Energy Policy, 24(7), 599-607.
13. Clarke, M., & Islam, S. (2003). Health adjusted GDP (HAGDP) measures of the relationship between economic growth, health outcomes and social welfare.
14. Coursey, D., & Hartwell, C. (2000). Environmental and public health outcomes: An international and historical comparison(No. 0010).
15. Cummins, J. D. (1973). An econometric model of the life insurance sector of the US economy. Journal of Risk and Insurance, 533-554.
16. Davari, M., Haycox, A., & Walley, T. (2012). The Iranian health insurance system; past experiences, present challenges and future strategies. Iranian journal of public health, 41(9), 1.
17. Davies, A. (2009). Human development and the optimal size of government. The Journal of Socio-Economics, 38(2), 326-330.
18. Devlin, N., & Hansen, P. (2001). Healthcare spending and economic output: Granger causality. Applied Economics Letters, 8(8), 561-564.
19. Drabo, A. (2011). Impact of income inequality on health: does environment quality matter?. Environment and Planning A, 43(1), 146-165.
20. Ekman, B. (2007). Catastrophic health payments and health insurance: Some counterintuitive evidence from one low-income country. Health policy, 83(2), 304-313.
21. Erdil, E., & Yetkiner, I. H. (2004). A panel data approach for income-health causality.
22. Flores, G., Krishnakumar, J., O'donnell, O., & Van Doorslaer, E. (2008). Coping with health -care costs: implications for the measurement of catastrophic expenditures and poverty. Health economics, 17(12), 1393-1412.
23. Gerber, H. U. (1997). Life insurance. In Life Insurance Mathematics (pp. 23-33). Springer Berlin Heidelberg.

24. Gerdtham, U. G., & Löthgren, M. (2000). On stationarity and cointegration of international health expenditure and GDP. Journal of Health Economics, 19(4), 461-475.
25. Hadian, M. (2006). shojaee S, Rajab zade D. Analysis of effect Health Ependiture on Economic Growth. Faslname 37-44diraite Salamat, 9(24),
26. Hajizadeh, M., & Nghiem, H. S. (2011). Out-of-pocket expenditures for hospital care in Iran: who is at risk of incurring catastrophic payments?. International journal of healthcare finance and economics, 11(4), 267-285.
27. Henke, K. D., & Schreyögg, J. (2004). Towards sustainable healthcare systems: Strategies in health insurance schemes in France, Germany, Japan and the Netherlands; a comparative study (No. 2004/9). Diskussionspapiere//Technische Universität Berlin, Fakultät Wirtschaft und Management.
28. Hirsch G, Homer J. Modeling the dynamics of healthcare services for improved chronic illness management. In22nd International System Dynamics Conference. Oxford, England: System Dynamics Society 2004 Jul.
29. Hitiris, T., & Posnett, J. (1992). The determinants and effects of health expenditure in developed countries. Journal of health economics, 11(2), 173-181.
30. Karami, M. A. N. O. U. C. H. E. H. R., Najafi, F., & Karami Matin, B. (2009). Catastrophic health expenditures in Kermanshah, west of Iran: magnitude and distribution. Journal of research in health sciences, 9(2), 36-40.
31. Kavosi, Z., Rashidian, A. R. A. S. H., Pourmalek, F. A. R. S. H. A. D., Majdzadeh, R., Pourreza, A., Mohammad, K. A. Z. E. M., & Arab, M. O. H. A. M. M. A. D. (2009). Measuring household exposure to catastrophic healthcare expenditures: a Longitudinal study in Zone 17 of Tehran. Hakim Research Journal, 12(2), 38-47.
32. Kim, Y., & Yang, B. (2011). Relationship between catastrophic health expenditures and household incomes and expenditure patterns in South Korea. Health policy, 100(2), 239-246.
33. Lotfalipour, M. R., Falahi, M. A., & Borji, M. (2012). The effects of health indices on economic growth in Iran. Journal of Health Administration, 14(46), 57-70.
34. Mehrara, M., & Fazaeli, A. (2009). Relationship between health expenditures and economic growth in MENA countries. Faslname-Modiraite Salamat, 12(35), 49-59.
35. Murthy, N. R. And Okunade, A. A.(2009), " The core determinants of health expenditure in the African context: some econometric evidence for policy", Journal of Health Policy 91,57-62.
36. Naeem, A. (2009). Short Run and Long Run Dynamics of Impact if Health Statuse on Economic Growth. MPRA paper, 15454, 13-38.
37. Nekoei Moghadam M, Banshi M, Akbari Javar M, Amiresmaili M, Ganjavi S. Iranian Household Financial Protection against Catastrophic Healthcare Expenditures. Iranian Journal of Public Health. 2014;41(9):62-70.
38. Neumann, S. (1969). Inflation and saving through life insurance. Journal of Risk and Insurance, 567-582.
39. Nosratnejad, S., Rashidian, A., Mehrara, M., Jafari, N., Moeeni, M., & Babamohamadi, H. (2016). Factors influencing basic and complementary health insurance purchasing decisions in iran: analysis of data from a national survey. World Medical & Health Policy, 8(2), 179-196.
40. Panahi, H., Janati, A., Narimani, M., Assadzadeh, A., Mohammadzadeh, P., & Naderi, A. (2014). Catastrophic expenditures for hospitalized patients in Tabriz, Iran.
41. Rehan, R., Knight, M. A., Haas, C. T., & Unger, A. J. A. (2011). Application of system dynamics for developing financially self-sustaining management policies for water and wastewater systems. Water research, 45(16), 4737-4750.
42. Ritchie-Dunham, J. L., & Galvan, J. F. M. (1999). Evaluating epidemic intervention policies with systems thinking: a case study of dengue fever in Mexico. System Dynamics Review, 15(2), 119.