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**Object:** evaluation on the example of foreign countries, of efficiency of financing the healthcare system by comparing non-market and market mechanisms of healthcare and financial management of the healthcare system

**Methods:** in process of the research, the scientific methodology was used, suggesting a systematic approach to solving problems, ensuring the unity of qualitative and quantitative methods. In particular, the method of econometric modeling, correlation analysis of data on health care costs and life expectancy was applied.

**Findings:** in the paper the financial models underlying various health systems (using the example of foreign countries) is compared and analyzed, and also based on the method of econometric modeling, the nature of the correlation between increase in private and public health spending and life expectancy is established.

**Conclusions:** according to the results of the econometric research, the authors concluded that the development and implementation of reforms in the health care system should be based on significant shift in the balance of private and public financing towards the latter. The increase in the degree of participation of private financing in healthcare is justified only by stimulating competition and should not be linked to the reduction in public funding.

**Keywords:** healthcare, healthcare finance, commercialization of healthcare, healthcare system, models of healthcare systems, public financing, private financing, financial management

**Introduction**

The demand for medical services is growing all over the world, as are the costs of them. If earlier this was due to the tendency to aging of the population, the widespread fixation of chronic diseases and related pathologies, today the counteraction to epidemics has been added.

Currently, there is a critical need for capital investment to create resilient health systems that must respond to key public health needs to ensure safety. These systems are designed to prevent and mitigate crisis situations similar to pandemic of COVID-19.

It actualizes the problem of comparative opportunities and a balanced combination of non-market and market mechanisms of healthcare, financial management of the development of the healthcare system (HCS).

**Literature Review**

Content analysis of current materials on healthcare issues by the Deloitte international audit network has shown that the main directions of financial management of healthcare in the world are as follows (table 1).

Table 1. Current trends in financial management in global healthcare

Direction	Tasks
1	2
Rising healthcare costs	- increasing the availability of medical services for different segments of the population; - improvement of infrastructure and equipment.

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Continuation of Table 3	
1	2
Reducing healthcare costs	- improving operational efficiency; - minimization of administrative costs; - improvement of the quality management system; - integration of connected processes.
Optimizing the costs of hospital services	- reducing the duration of treatment in hospitals; - the increase in the use of rehabilitation, hospital replacement, minimally invasive technologies necessary to minimize the stage of hospitalization of patients.

*Note — Compiled by the authors*

Typology is the most important tool for comparing, identifying similarities and distinguishing features in the financing and organization of health systems, the provision of medical services in a particular country. In the study, we will use the classification proposed by N. Reibling (Reibling, 2019), with the allocation of state, social insurance and market models, since this approach is closest to the criterion of the ratio of private and public principles in healthcare financing. Table 2 shows their general evaluation characteristics.

Table 2. Models of HCS in foreign countries

Models	State (Semashko-Beveridzha)	Market (non-state)	Social insurance (Bismarck)
Countries	England, Italy, Portugal, Ireland, Greece, Denmark, Spain	USA, South Korea, Israel,	Germany, Belgium, France, Switzerland, Japan, Austria, Canada, Netherlands, Holland
Strengths	Pronounced focus on society, achieved by an increase in the coverage of the population involved in compulsory medical care. Preventive approach in the provision of medical services. Medical services are free for all citizens.	1. Within the framework of market competition, the latest technologies and methods of treatment are being developed and improved. 2. There are a large number of organizations and medical institutions on the market.	1. Universal insurance makes it possible to cover the population to a high extent. 2. Each insured person has access to a full list of medical services. 3. High development of the medical services market. 4. The predominance of private non-profit medical organizations using world experience and advanced technologies.
Weaknesses	The system has little flexibility and increased bureaucratization. The patient is not free to choose a medical institution. Centralized management of the market capacity and the volume of assistance provided. Long waiting for help due to the possibility of applying an unlimited number of times.	1. The costs of medicine are continuous. 2. Permanent medical care is not available to the unsecured segments of the population. 3. The secondary role of the state in quality management of medical goods and services.	1. Extra-budgetary funds are experiencing an increased financial burden. 2. Artificial imposition of expensive methods of examination and treatment. 3. Asymmetry in the information field, weak control over the quality and reliability of information.

*Note — Compiled by the authors*

It should be noted that in recent decades, there has been a tendency in all countries of the world to permanently modernize health systems to one degree or another, and therefore there is no strict correlation between them and one of the above models.

Based on this, three countries can be identified that are closest to these three models, in particular England (the state model of the healthcare system), the RF.

Table 3 shows which sources provide financial support in foreign countries with different models of healthcare financing (for example, England, the Russian Federation (RF) and the USA) in

2021.

Table 3. Financial support (sources) of HCS in the RF, in England, and in the USA (2021)

Source	The share of source in total financing amount, in percentage		
	Russian Federation (social insurance model of HCS)	USA (market model of HCS)	England (state model of HCS)
Revenue from receipts of cumulative taxes	27,6	45,4	97,6
Revenue from contributions of compulsory insurance	58,9	14,1	missing
Personal finances of citizens	13,5	40,5	2,4

*Note — Compiled by the authors based on World Bank data (World Development Indicators)*

H. Montgomery and A. Hines emphasize the existence of a crisis in England: the state budget, which is the main source of centralized financing, cannot cope with the growing demand of the population. The most important detail of an effective healthcare model is a properly functioning system of disease prevention or prevention and the formation of the right attitude to health among the population (Montgomery, et.al., 2017).

The authors of the study emphasize that the result of medical care should be balanced with the alternative price of its implementation. So, over time, the actual costs incurred by the British National Health Service (NHS) grew by 3.7 % annually. Innovative medicines and technologies lead to increased costs, compounded by growing patient expectations, an increase in the number of elderly and disabled patients, as well as the level of non-communicable diseases.

As a result, patients who do not need hospitalization actually occupy hospital beds. The first wave of the pandemic showed an ineffective disbursement of 179 million pounds, with 39 % of NHS medical institutions facing a deficit reaching 69 %. The main performance criteria showed negative growth as a result of the low level of integration between social care and healthcare.

England does not have the financial capacity to improve the efficiency of the healthcare system, as priorities are set for other areas of the economy. In this regard, experts suggest several ways to solve the crisis of British healthcare (Howarth, et.al., 2021; Davillas, Jones, 2021; Barker, Barker, 2022):

1. To increase the cost-effectiveness of disease control, it is proposed to involve more patients and medical personnel, increase the level of investment in prevention and self-control, and support the coordination of evidence and decision-making.

2. It is necessary to establish a constructive dialogue between politicians, healthcare professionals and society, which should address the need for costs and efficiency of certain aspects of medical care. The evaluation of the effectiveness of financing should be determined by the degree of the system's work in achieving the goals: the development of prevention and improvement of the quality of medical services.

3. To evaluate efficiency of HCS, it is proposed to evaluate in accordance with six indicators from the OECD health quality requirements: the number of hospitalizations per 100,000 population (taking into account age standardization) with diagnoses: asthma and COPD (1), congestive heart failure (2), diabetes (3); mortality in the period up to thirty days after hospitalization for every 100 patients (standardization by gender and age) with diagnoses of acute myocardial infarction (4), hemorrhagic stroke (5), ischemic stroke (6). All indicators are considered collectively in the form of an index of the sum.

The evaluation of efficiency of HCS, taking into account funding according to these indicators, was carried out by T. Smith. As a result, Germany, Austria, Ireland and France are among the countries with the highest performance of the healthcare system. England took the third place in the ranking. The least effective were the USA, Switzerland, Korea and Japan (Smith, 2017).

Bloomberg, based on data provided by the UN, World Health Organization (WHO) and the World Bank, makes ratings of countries on the effectiveness of health systems based on indices derived from selected indicators (life expectancy, relative and absolute health expenditures per capita, etc.), adjusted for the corresponding coefficients. According to this rating agency, Russia, which has been included in the monitoring since 2014, ranked fiftieth with a drop to 62<sup>nd</sup> place in 2022. England in 2022 took the 16th place, the USA — 33.

In Bloomberg, Singapore, Hong Kong, Israel, Spain, Italy, South Korea and Japan consistently hold high ratings. At the same time, Kazakhstan, China, Iran, Romania, Turkey, Algeria, Malaysia and other

countries whose per capita health care costs are similar and even lower than in the Russian Federation are always positioned 15-30 points higher relative to Russia.

The efficiency assessment offered by Bloomberg does not allow for correct comparisons of changes and ratings, since the set of indices varies every year, and the number of countries covered by monitoring is constantly increasing. In addition, the results are summed up in different periods throughout the year, so sometimes the data are predictive.

### Methods

The method of research was chosen econometric modeling, which allows to identify the ratio of the desired elements in the system (EViews). This study was conducted according to the data of the World Bank and the World Health Organization for 2011-2021 — country indicators for the USA, the Russian Federation and England. In the course of the analytical work, a hypothesis was formulated about a positive correlation between the growth of private health spending and life expectancy, prevailing over a similar correlation with respect to the growth of public spending. According to this hypothesis, the econometric model has the form (formula 1):

$$P_n = f_l + c_1G_s + c_2F_s + c_3D + c_4H_{0-17} + c_5H_{18-55} + c_6H_{56+} + v_{nt} \quad (1)$$

where:

- $P_n$  — expectancy life in country  $n$  for  $t$  period;
- $c_{1...6}$  — correction coefficients;
- $f_l$  — factors not considered in economic model;
- $F_s$  — private expenses on health care of population;
- $G_s$  — expenditures of government on HCS;
- $D$  — average revenue;
- $H_{17,18-55,56}$  — share of age audience in total population;
- $v_{nt}$  — possible errors in time.

### Results

According to the results of the application of econometric modeling, the following data were obtained (table 4).

Table 4. The results of assessment of econometric model according to the hypothesis

Values	GLS-model with fixed effects		GLS-model with random effects	
	(1)	(2)	(1)	(2)
Constant	41,577	42,261	41,357	43,000
Government spending	-	1,039	-	0,983
Private expenses	-	0,528	-	0,443
Population 0-17	0,041	0,024	0,051	0,024
Population 18-55	0,103	0,104	0,111	0,102
Population 56+	-0,421	-0,491	-0,433	-0,509
Coefficient of determination	0,173	0,161	0,142	0,136
The Durbin-Watson indicator	21,705	20,952	11,180	9,502

Note — Compiled by the authors on the basis of econometric analysis

The results showed that both public and private healthcare expenditures have a significant positive correlation with the life expectancy of the population. With a 1 % increase in government spending, life expectancy increases by 12 months. In relation to private expenses, the increase occurs only for 6 months. Consequently, government spending has a stronger impact (Wagner, 2021).

The increase in the volume of services provided on a paid basis should occur on such a scale as not to damage the work of budget organizations that guarantee equal access of citizens to key types of social services, which include the basic services of healthcare organizations.

Ensuring guarantees for equal access to key services provided by the health care system is possible only with financing in appropriate amounts, according to a correctly structured structure of budget disbursement

and in the provision of appropriate services free of charge. Undoubtedly, measures to ensure protection from the epidemic are among the key health services. Anti-epidemic measures with high efficiency, which cover a wide range of citizens with different income levels and different standards in matters of consumption, cannot be carried out in the form of paid services. Measures of this type lose their effectiveness when the level of outpatient care in the field is minimized.

There has been repeated confirmation from world experience that the model of financing medical services aimed at making a profit in the provision of medical care is limited in its efficiency (Salvador-Carulla, et al., 2020; Rosenau, Lindner, 2003; Holmes, 2020). Special threats arise in the so-called risk groups, which are difficult or impossible to cover with medical services on a paid basis.

The fundamental failure of the healthcare system with a preponderance towards commerce is illustrated by the leadership in the United States in terms of deaths from COVID-19. This situation has developed despite the huge US spending on healthcare and the leading indicators of the ratio of medical costs to GDP (table 5).

Table 5. Share of health expenditure and mortality from COVID-19 in some countries (2021)

Indicator	USA	Russian Federation	Germany	Italy	England	China
Healthcare costs	17,1	5,2	10,8	8,8	9,6	5,1
(% of GDP)	421849	390892	140734	137657	134786	106587

*Note — Compiled by the authors according to the World Health Organization (the global health observatory)*

In fact, the United States has demonstrated the inability to provide anti-epidemic measures and relevant services to the required extent (Gugushvili, 2022). As this experience has shown, the world's leading positions in high medical and pharmaceutical technologies cannot withstand epidemics, the epicenter of which is concentrated in groups with financially limited access to medical care.

### ***Discussion***

Researches show that in different countries, megacities with their inherent high population density, poor environmental indicators and a large percentage of marginal groups act as regional centers of COVID-19 distribution (Wickramasinghe, et al., 2020; Hill, 2020; Rose-Redwood, et al., 2020). Blocking social contacts of well-off segments of the population and marginal groups, even for anti-epidemic needs, is considered impossible. The greatest danger is posed by pandemic foci that occur in places where low-wage workers live, with unsanitary conditions and high crowding characteristic of these places, at the time of their contact with other people who are at risk.

The level of the state of services resisting the epidemic, outpatient and polyclinic care, the availability of these services for each of the population groups in certain regions are key pillars that determine the ability of society to withstand the threats of a pandemic. A priori, the level of the healthcare system in regional entities, its ability to respond to emerging epidemic threats play a key role in preventing these threats, while it is equally important not only to what extent funding is provided, but also how and for what funds are spent, what dominant incentives are present in healthcare.

V. Navarro believes that due to the commercialization of medicine over the past forty years, the world has shuddered from at least four extensive epidemics (Ebola, SARS, MERS, COVID-19). The decrease in the level of state financing of socially significant areas has significantly worsened the quality of life of people (Navarro, 2020). Semancik also notes that the phenomenon of privatization, which has penetrated the healthcare system and the introduction of free market provisions in areas related to human health, has brought a lot of negative aspects, deteriorating the quality of life and health of citizens, caused tangible damage to people's social rights in order to extract economic profit (Semancik, 2022).

M. Basel and T. Boyce, as a result of the study, came to the conclusion about the noticeable negative consequences of the introduction of market restructuring in HCS of England, including deterioration of country's residents health. In Italy, due to the epidemic, those regions in which market reforms were forcibly introduced were most affected: fragmentation of the system at the regional level, reduction of financing, privatization and saving of technical and human resources.

Spanish healthcare specialist M. Angelis notes that the privatization of the state healthcare system has fallen into a state of crisis since the late 90s. And also emphasizes that no one cancels paid medicine, but

universal health care can only be provided by the state. The predominant effectiveness of private healthcare is a myth. The state health care system works to prevent diseases, not to profit from the diseases of citizens. Targeting private companies in the healthcare system is counterproductive (Angeles, 2021).

This is directly related to the security of society and the state, with the level of well-being, with the desire for stable development, of which social inclusion is a part.

### **Conclusions**

The lack of funding and efficiency experienced by the healthcare system with a vector for commercialization has acquired the character of a global problem. To complement existing HCS in country, market reforms have turned out to be focused on privatization of medical services previously owned by the public sector.

In a situation of instability of financial systems, taking into account recent events in the world, it is important that the state share of healthcare expenditures ensures sustainability of HCS. At the same time, it is necessary equal access to medical care that is guaranteed for all population, regardless of level of income. The grow in participation's degree of private financing in healthcare is justified only by stimulating competition.

The development and implementation of reforms in the healthcare system should be based on a significant shift in the balance of private and public funding towards the latter.

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### **Денсаулық сақтау жүйесін қаржыландырудың нәтижелілігін бағалау: шетелдік аспект**

#### **Аңдатпа**

**Мақсаты:** Денсаулық сақтаудың нарықтан тыс және нарықтық тетіктерін және денсаулық сақтау жүйесінің дамуын қаржылық басқаруды салыстыру арқылы шет елдердің мысалында денсаулық сақтау жүйесін қаржыландырудың нәтижелілігін бағалау.

**Әдісі:** Зерттеу барысында сапалы және сандық әдістердің бірлігін қамтамасыз ете отырып, проблемаларды шешуге жүйелі көзқарасты қамтитын ғылыми әдістеме қолданылды. Атап айтқанда, эконометрикалық модельдеу әдісі, денсаулық сақтау шығындары мен өмір сүру ұзақтығының корреляциялық талдауы қолданылды.

**Қорытынды:** Жұмыста денсаулық сақтаудың әртүрлі жүйелерінің негізінде құрылған қаржылық модельдерді салыстыру және талдау жүргізілді (шет елдердің мысалында), сондай-ақ эконометрикалық модельдеу әдісі негізінде жеке және мемлекеттік денсаулық сақтау шығындарының өсуі мен өмір сүру ұзақтығының корреляциясының сипаты анықталды.

**Тұжырымдама:** Үргізілген эконометрикалық зерттеу нәтижелері бойынша авторлар денсаулық сақтау жүйесіндегі реформаларды әзірлеу және іске асыру қаржыландырудағы жеке және мемлекеттік принциптердің тепе-теңдігінің соңғысына қарай айтарлықтай сусуына негізделуі керек деген қорытындыға келді. Жеке қаржыландырудың денсаулық сақтауға қатысу дәрежесінің өсуі тек бәсекелестікті ынталандырумен негізделген және мемлекеттік қаржыландырудың қысқаруына байланысты болмауы керек.

**Кілт сөздер:** денсаулық, денсаулық сақтауды қаржыландыру, денсаулық сақтау саласын коммерцияландыру, денсаулық сақтау жүйесі, денсаулық сақтау жүйесінің модельдері, мемлекеттік қаржыландыру, жеке қаржыландыру, қаржылық басқару.

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## Оценка результативности финансирования системы здравоохранения: зарубежный аспект

### Аннотация

**Цель:** оценка на примере зарубежных стран результативности финансирования системы здравоохранения путем сопоставления вне рыночных и рыночных механизмов здравоохранения и финансового управления развитием системы здравоохранения.

**Методы:** В процессе исследования была использована научная методология, предполагающая системный подход к решению проблем, обеспечивая единство качественных и количественных методов. В частности, применен метод эконометрического моделирования, корреляционный анализ данных расходов на здравоохранение и ожидаемой продолжительности жизни.

**Результаты:** В работе проведено сравнение и анализ финансовых моделей, заложенных в основе различных систем здравоохранения (на примере зарубежных стран), а также на основе метода эконометрического моделирования установлен характер корреляции увеличения частных и государственных расходов на здравоохранение и ожидаемой продолжительности жизни.

**Выводы:** По результатам проведенного эконометрического исследования авторами было заключено, что разработка и реализация реформ в системе здравоохранения должны основываться на значительном смещении равновесия частного и государственного начал в финансировании в сторону последнего. Рост степени участия частного финансирования в здравоохранении оправдан только стимулированием конкуренции и не должен увязываться к сокращению государственного финансирования.

**Ключевые слова:** здравоохранение, финансы здравоохранения, коммерциализация сферы здравоохранения, система здравоохранения, модели систем здравоохранения, государственное финансирование, частное финансирование, финансовое управление

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