

The effects of international aid and remittances on health: short-term evidence from the Republic of Moldova

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Abstract

This paper investigates the effects of socioeconomic development as well as external financial sources such as official development aid and remittances on health indicators in Moldova. Time series annual data from 1997 to 2019 was used mainly from the World Bank data bank. First, it was found that higher values of GDP per capita and development aid lead to higher life expectancy at birth and lower infant mortality rates. Remittances however do not have a positive effect on life expectancy. As a matter of fact, relying on a theoretical background and research framework hypotheses, the results confirm the negative macroeconomic implications of remittances on inflation. Considering the short length of the analysed period, the results obtained while analysing infant mortality are more dynamic and better adapt to the analysed period.

Keywords: Remittances, Official Development Aid (ODA), Healthcare, Life expectancy, Infant mortality

Resumen

Este trabajo investiga los efectos del desarrollo socioeconómico, así como de las fuentes financieras externas, como la ayuda oficial al desarrollo y las remesas, sobre indicadores de salud en Moldavia. El análisis se basa en series temporales de datos anuales de 1997 a 2019, principalmente del Banco de Datos del Banco Mundial. En primer lugar, se encontró que los valores más altos del PIB per cápita y la ayuda al desarrollo conducen a una mayor esperanza de vida y a menores tasas de mortalidad infantil. Sin embargo, las remesas no tienen un efecto positivo sobre la esperanza de vida. De hecho, basándose en las hipótesis del marco teórico, los resultados confirman las implicaciones macroeconómicas negativas de las remesas sobre la inflación. Considerando la corta duración del período analizado, los resultados obtenidos al analizar la mortalidad infantil son más dinámicos y se adaptan mejor al período analizado.

Palabras clave: Remesas, Ayuda Oficial al Desarrollo (AOD), Salud, Esperanza de vida, Mortalidad infantil

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1. Introduction and objectives

The focus on the Republic of Moldova is justified by recorded health indicators that are lagging behind European countries, even the latest European Union members but also the Commonwealth of Independent States.

Health not only can be relevant for poverty alleviation since better health, along with other factors, leads to better productivity, but is also an indicator of wellbeing and therefore better economic performance. This paper aims to answer questions such as what factors lead to better health in Moldova, to what extent can international aid and remittances contribute to higher health outcomes. Although the geographical focus is on the Republic of Moldova, a vast amount of academic evidence will be used to support or contrast the found results.

These questions will be attempted to be answered by seeing the significance of international aid, along with other variables, on the mortality rate, considered as a dynamic health indicator that better fits the available data.

There are two issues with development aid that might lead to suspicious conclusions. As a matter of fact, detecting the relationship between development aid and health indicators is quite challenging. First of all, a non-contemporaneous relationship between those two variables should be suspected since the effects of aid are not to be seen at the moment of the monetary allocation. Second, it might take from three to five years to actually see the effects of development aid and, being Moldova such a young country, the available data might not be enough to see the implications between the involved variables.

As a last consideration, the reliability of the variables is to be questioned since the health sector in Moldova is characterized by out of pocket payments as well as informal economic activities and unreported remittances. Out of pocket payments are still difficult to estimate but they might affect one way or another health indicators. At the same time, remittances from moldovan emigrants abroad through official payment channels are way below the actual remittances that include unreported cash transfers, considered a common practice. Remittances are considered to cause inflation, so the higher remittances the higher inflation and the more negative the outcomes on health services.

The following section includes an insight to the health and socioeconomic indicators of Moldova. In the third section, the relationship between health indicators and aid are studied through a literature review. The variables selected will be described in the fourth section while the fifth section will be focused on data and methodology.

2. An insight to the health and socioeconomic indicators of Moldova

The following paragraphs are intended to give an outlook on the historical and socioeconomic background of Moldova in order to rely on previously explored theoretical concepts but also mechanics of the country. This contextualization will also allow a more intuitive interpretation of the results. At the moment of the global financial crisis, health indicators of Moldova were way below any other comparable developing country. While socioeconomic indicators might explain this backwardness to a certain extent, it is also relevant to mention that Moldova was receiving the highest official development aid per inhabitant but, compared to other aid recipients, it allocated the lowest shares to health. Similarly, remittances represent almost a fifth of the Moldovan gross domestic product and the inflow into the country did not decrease that drastically during the global financial and economic crisis. While remittances might be an interesting source of financing for health expenditure, they have many other macroeconomic implications considering their magnitude and the unbalanced economic structure of Moldova.

2.1 Health indicators

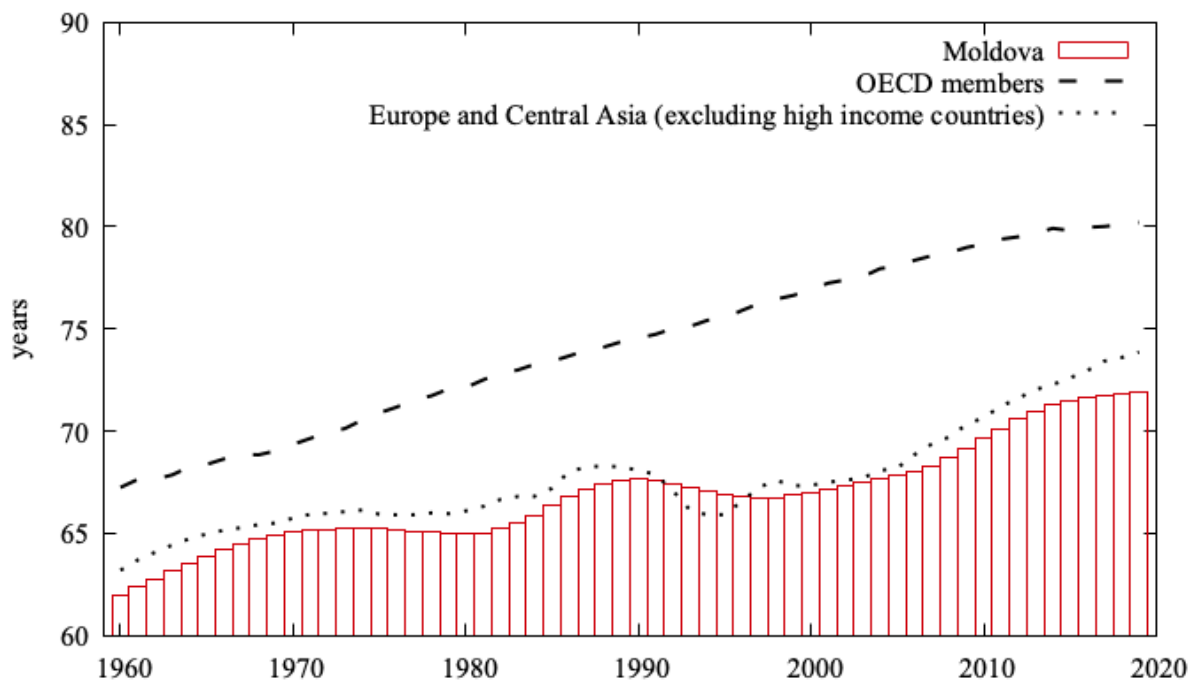
After the independence in 1991, Moldova had one of the most extensive networks of health facilities and health personnel both in western Europe and the countries of the former Soviet Union (MacLehose, 2002). However, although the Republic of Moldova had at disposal health facilities and medical staff, the country started to lack resources to support them. Moldova started to face several health but also socioeconomic challenges. For instance, both medical personnel and the population had very limited awareness of preventive healthcare. After independence, life expectancy started to decrease while transmittable diseases started to increase. During the last decade of the 20th century, there has been a natural decrease in population by 0.7% (MacLehose, 2002). The causes behind this decline lay in decreasing birth rates, increasing mortality rates and emigration. Since mostly young and fertile individuals would leave the country, the decrease in population is partly justified by emigration. Among those able-bodied populations, the country lost a significant number of skilled medical personnel. This had a negative impact on the overall health situation. The health status of the Moldovan population is marked by mortality and morbidity related to noncommunicable diseases (NCDs) and lifestyle risk factors, including smoking and excessive consumption of alcohol. During the first two decades since independence, Moldova had to tackle communicable diseases, especially high rates of tuberculosis (TB). The comparison with other EU and Commonwealth of Independent States (CIS) countries show how Moldova was lagging behind countries it could be comparable with (Table 2.1).

Table 2.1 Health indicators: a comparison, 2011

Indicator	Republic of Moldova	CIS	EU members since 2004 or 2007	EU members before 2004
Life expectancy at birth – male	66.83	64.74	71.83	78.52
Life expectancy at birth – female	75.09	74.83	79.7	83.86
Infant mortality per 1000 births	11	11.27	5.87	3.6
Maternal mortality per 100 000 live births	15.32	20.92	8.16	5.5
Standardized death rate (SDR), all causes, all ages, per 100 000 population	1147.47	1186.57	829.99	535.14
SDR, diseases of the circulatory system, 0–64 years, per 100 000 population	141.84	194.09	91.86	30.49
SDR, selected alcohol-related causes, per 100 000 population	175.3	n/a	88.47	50.25
SDR, selected smoking-related causes, per 100 000 population	689.03	n/a	326.12	163.09
TB incidence per 100 000 population	118.2	76.69	31.44	7.16
Human immunodeficiency virus (HIV) incidence per 100 000 population	20.25	32.08	2.97	6.52

Source: WHO (2013)

Figure 2.1. Evolution of life expectancy at birth (years): comparison between the Republic of Moldova, OECD members and Europe and Central Asia excluding high income countries¹ (1960-2019)



Source: Self elaborated in Gretl with data from World Development Indicators database, World Bank

2.2 Socioeconomic indicators

Since its independence, Moldova has faced significant economic challenges that have negatively affected income and government funds allocated for health. Although an economic reform was attempted after the independence, including the establishment of the local currency, freeing interest rates, privatization of public companies and removing export barriers, Moldova saw negative economic consequences. As for the Human Development Index (HDI), Moldova kept scaling down in the world ranking placing itself 75th in the 1994 Report, 81st in 1995, 98th in 1996, 110th in 1997, 113th in 1998, 104th in 1999 and 102nd in 2000 (UN National Human Development Report, 2000). From 1993 to 1999 GDP decreased by almost 60%. Data shows that more than 90% of the population lived with less than US \$1.00 per day. Based on the 2000 Household Budget Survey, some 40.5% of all households had monthly incomes under the poverty line (EU Commission Moldovan Economic Trends, 2001). Behind such negative health indicators, are many causes that, of course, include socioeconomic issues but that can not be considered to be the only ones. By relying on an agriculture-based economy, Moldova has suffered from a loss of export markets after

¹ Europe and Central Asia (excluding high income countries) is composed by the following countries: Albania, Armenia, Azerbaijan, Belarus, Bosnia And Herzegovina, Bulgaria, Georgia, Kazakhstan, Kosovo, Kyrgyz Republic, Moldova, Montenegro, North Macedonia, Russian Federation, Serbia, Tajikistan, Turkey, Turkmenistan, Ukraine and Uzbekistan

independence. In addition to that, independence had a negative impact on the country's ability to import energy which definitely worsened the quality of life and therefore health.

2.3 Health services

There has definitely been a structural change with the establishment of the Republic in 1991. The design and implementation of health policies require a high degree of supervision and coordination to be managed at national level. From the point of view of health services, it is reasonable to divide the analysis in pre and post periods since there are significant differences.

2.3.1 Pre independence health services (1950-1991)

From 1950 to 1960, the number of hospital beds increased from 27 to 44 per 10 000 inhabitants. Capital investment in the construction of health care institutions increased from 3.5 million roubles in 1955 to 40 million roubles in 1978. The focus on the provision of bed numbers persisted during the entire the Soviet period. The capacity of municipal health care institutions doubled, by increasing from 189 hospital beds in 1970 to 415 beds in 1994. At the same time, hospital beds quadrupled from 110 to 457 in regional hospitals (Goroshenko, Volovei, Mochniaga, 1996). Overall, all indices characterizing hospital service and staff provision increased between 1950 and 1994 (Table 2.2). The high provision of services was related to the Soviet Semashko method, focused on high densities of doctors and hospital beds and paid little importance to productivity of their health outcomes. Considering the centralized management and budgeting systems, local service and budget management was rather limited, requiring unofficial payment requests to patients, becoming a voluntary habit for patients even nowadays.

Table 2.2 Development of the health care system in the Republic of Moldova, 1950–1994

Basic indicators	1950	1960	1970	1978	1994
State expenditure on the healthcare system and physical education million (roubles/lei)	21.2	50.9	114.2	172.0	315.0
Expenditure per capita (roubles/lei)	9.1	16.9	31.8	43.8	70.0
Number of outpatient health care institutions	376.0	405.0	428.0	515.0	559.0
Number of hospitals	236.0	343.0	364.0	339.0	305.0
Hospital beds per 10 000 population	45.1	72.3	99.1	116.6	116.0
Physicians per 10 000 population	10.3	14.3	20.5	29.3	37.9
Nurses and midwives per 10 000 population	32.6	54.0	77.3	89.5	104.0

Source: Health Care Systems in Transition: Republic of Moldova 1996. European Observatory on Health Care Systems.

2.3.2 Post independence health services (1991-onwards)

After independence, government expenditure on health decreased drastically both in terms of percentage of GDP and in real health expenditure per capita. The lack of funding for the healthcare sector together with an emphasis on tertiary care and the use of non-standard and more expensive treatment protocols for certain conditions such as tuberculosis, childbirth and mental illness has threatened the provision of the most basic health services, including immunization, for the Moldovan population. The first years of the Nineties saw shortages of vaccines and medical resources such as medicines and medical equipment.

It is here when the Republic of Moldova starts benefiting from international medical aid. Primary health care and preventive health services were relatively under-resourced with approximately 85% of the programme vaccine and budget supplied through international aid (UNICEF, 2001). According to the World Bank, in 2000, the 17 tertiary level hospitals and 40 district hospitals used over 70% of the total health spending. However, most of this spending was allocated to physical infrastructures and hospital buildings rather than being allocated to medical equipment and pharmaceuticals, treatment or personnel salaries (World Bank, 2000). The inefficient allocation of resources can be seen through the overspending on bed hospitals, considering the low occupancy rates, sometimes reaching only 20%. Besides, the poorest, mostly rural population, couldn't access health services considering the costs imposed through both formal and informal payment requests. The European Observatory on Health Care Systems suggests that rather than exceeding spending on hospital beds and medical staff, the Nineties should have been characterized by the provision of basic services and preventative healthcare.

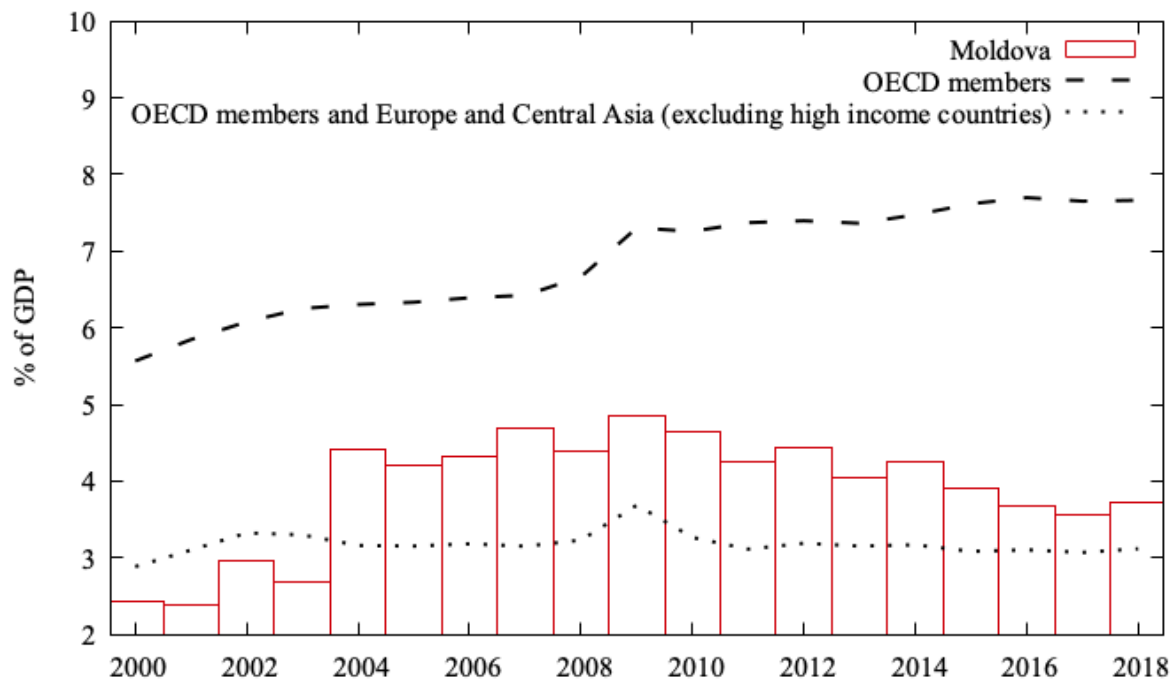
2.4 Healthcare financing and coverage

2.4.1 Government spending

After independence, the health system was completely funded through government expenditure. Although some preliminary legislation was passed in 1998 such as the Law on Compulsory Health Insurance, to facilitate the transition to a social insurance financing system, no major changes have been made in the national financing arrangements except charging for certain health services. The "Basic Law on Health Care" from 1995, followed by the "Law Regarding the Minimum Package of Free Medical Assistance Guaranteed by the State" from 1999, limited the liability of the government to provide only basic health services and legalized the payment of other services. According to the 2000 World Bank Project Appraisal Document, the amount of funds to be allocated centrally to health is determined annually by the Law on the "State Budget of the Republic of Moldova" with the agreement of the Parliament. The 2000 budget was set at 2.4% of GDP (and 17% of the national budget), down from 5 to 6% between 1994 and 1996 and 3.8% in 1998 (United Nations, 2000). In 1999, the health budget was reduced by 35% (World Bank Project Appraisal Document,

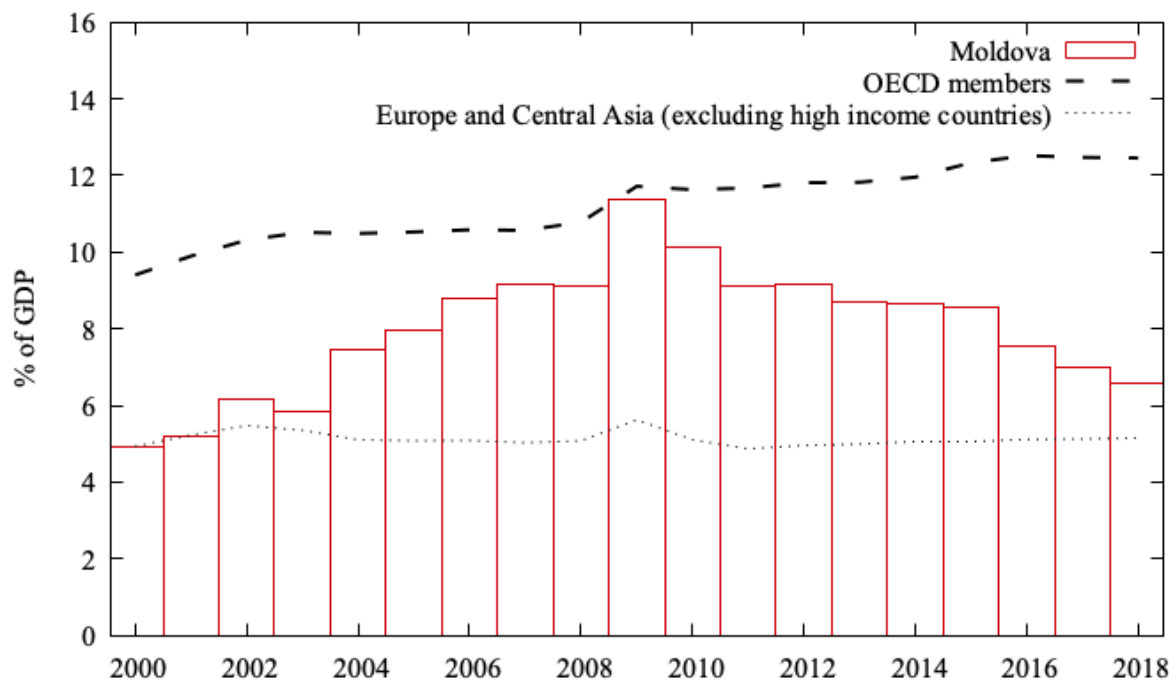
2000). Furthermore, not all funds allocated to the health system are always received. At the beginning of the 2000, funds allocated through the public sector for health equaled approximately US \$10 per capita (World Bank, 2000).

Figure 2.2 Evolution of Domestic general government health expenditure (% of GDP): comparison between Republic of Moldova, OECD members and Europe and Central Asia excluding high income countries (2000-2018)



Source: Self elaborated in Gretl with data from World Development Indicators database, World Bank

Figure 2.3 Current health expenditure (% of GDP): comparison between Republic of Moldova, OECD members and Europe and Central Asia excluding high income countries (2000-2019)



Source: Self elaborated in Gretl with data from World Development Indicators database, World Bank

Table 2.3 Important policy measures, since 2007

Policies	Objectives
National Health Policy for 2007–2021 (2007)	Reducing the health inequalities for all social groups and the consolidation of intersectoral partnership for strengthening the population's health
Health System Development Strategy for 2008–2017 (2008)	Improving public health by consolidating improvements in the health system
Legal separation of primary health care at the district level (2008)	Increasing the efficiency of primary care services at the district level
Regulation of the acquisition of medicines and other medical products for the needs of the health system (2008, 2009)	Efficient and optimal use of financial resources available in the health system
Law on State Surveillance of Public Health (2009)	Regulating the state surveillance of public health and general requirements of public health
Amendments to the Law on Mandatory Health Insurance (2009, 2010)	Increasing financial protection of people from vulnerable families; extending the service package for uninsured persons
Strategy for the Development of Primary Health Care for 2010–2013 (2010)	Strengthening and ensuring sustainability for the primary care system
Programme for the Development of Hospital Care 2010–2012 (2010)	Modernization and increasing the efficiency of hospital care
Regulation on the Approval and Registration of Producers' Prices for Medicines (2010)	Ensuring economic accessibility and the social interests of consumers, as well as transparency in regulating the prices for medicines
Programme for the Development of Medical and Pharmaceutical Education in the Republic of Moldova for 2011–2020 (2010)	Improving medical and pharmaceutical education policies

Source: Republic of Moldova: health system review. Health Systems in Transition, 2012.

Since 2004 however, health financing in the Republic of Moldova has been organized through the introduction of the Mandatory Health Insurance (MHI). The total health expenditure in 2010 reached 11.7% of GDP. Based on revenue source, 40.3% of the total health expenditure derived from MHI contributions and 44.9% from Out-of-pocket (OOP) payments (World Health Organization, 2012). The relatively high level of total health expenditure as well as the balance of prepaid and OOP payments did not drop considering the persisting global financial crisis. Contributions from the working population are collected mainly through payroll contributions as a fixed percentage of the salary (7% in 2011 and

2012: 3.5% paid by the employee and 3.5% paid by the employer); self-employed individuals should purchase their own insurance at a fixed price. The non-working population (14 categories including retired, students, children, registered unemployed, etc.) is covered through transfers from the central budget to the NHIC, the pooling agency for prepaid health care funding. Voluntary health insurance (VHI) accounted for less than 0.1% of total health expenditure in 2010 (Table 2.4). The NHIC is also the only purchaser of health services, which has enabled a purchaser–provider split, and payments for services are made on the basis of contracts, most of which are prospective. Limited government expenditure on health goes along with low levels of tax collection. According to data from the Centre for Strategic Studies and Reforms, the underground economy in Moldova amounts to 65% of the entire economy. Low levels of tax collection create difficulties for the provision of crucial healthcare services. Considering the limited government expenditure on health, Moldova relied on external resources, mainly derived from international aid. As a matter of fact, international funding for certain aspects of the system is an important source of financing.

Table 2.4 Sources of revenue as a percentage of total health expenditure, 1995–2010 (selected years)

Source of revenue	1995	2000	2005	2006	2007	2008	2009	2010
General gov. expenditure	64.2	48.5	45.6	44.4	45.2	47.2	48.5	45.8
MHI contributions	0	0	32.2	31.2	32.6	35.8	41.9	40.3
OOP payments	27.4	42.9	44.7	46.1	45.7	45.1	43.7	44.9
VHI	0	0	0.1	0.1	0.1	0.1	0.2	0
NGOs	7.5	6.8	8.2	8.2	7.8	6.5	6.7	8.8
External resources on health	0	14.7	4.6	4.1	4.3	4.4	7.0	9.6

Source: World Health Organization, 2012.

2.4.2 Out of pocket and informal payments

The Basic Law follows the Republic of Moldova Constitution, Article 36 which guarantees a minimum provision of health care services to be provided free of charge to the population. (European Observatory on Health Care Systems, 2002). Despite this limitation of services, the low level of government financing is not sufficient to meet even those minimum requirements. As previously mentioned, both formal and out of pocket payments constitute an increasing source of financing for health care in Moldova. Direct payments at individual level for health care exceed the amount spent on health through the tax-funded system, raising the total annual health expenditure per capita about US \$20 at the end of the Nineties. The World Bank estimates that payments made direct by individuals at least match the state funding of the health care system. The high level of direct payments requested from individuals is

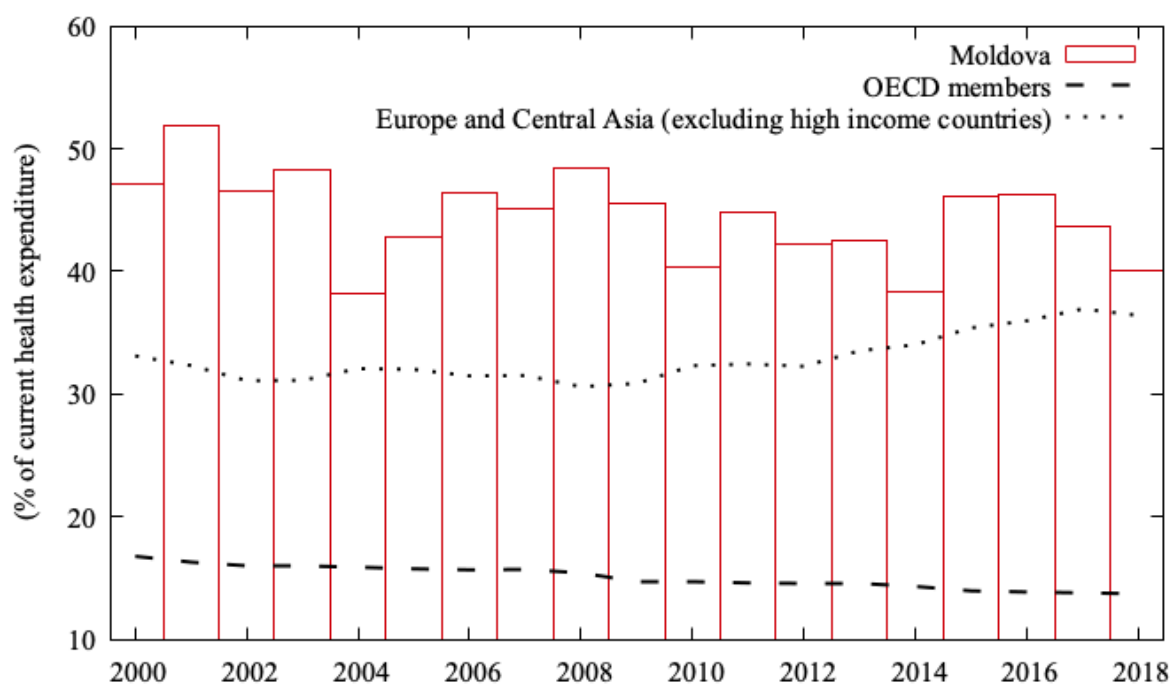
impacting the equity in accessing health care services. The 1997 UNICEF study on accessibility of health services found that the lack of financial resources is the main reason why rural populations don't seek health care .

Although certain fees were introduced as part of the health reforms, high levels of informal payments are being requested to patients. These types of payments have made health services difficult to access, especially for the poorest individuals. Informal payments increase health access related inequalities and contribute to worsening the country's health situation. As a matter of fact, in UNICEF's study on accessibility of health services, 33% of the surveyed individuals revealed that lack of money prevented them from accessing health services.

According to a national poll in 2011, attempts to estimate the share of informal payments in total Out of pocket payments (OOP) expenditure in hospitals resulted in 58% (PAS, 2011). This has implications for financial protection as a significant proportion of the uninsured come from vulnerable groups; in addition, the poorer quintiles pay less not because they are covered but because they are less able to pay (Richardson et al., 2012). For example, a hospital study found that the OOP payments of patients from the poorest quintile are equal to 337.1% of their monthly income, while those from the richest quintile pay a much lower share (36.8%) of their monthly income (PAS, 2011).

Although recognised as a national issue, there is very limited evidence on informal payments and it is difficult to analyse their evolution over time. A survey studying hospital care revealed that 37.9% of hospitalized patients made informal payments to health staff, and the average sum paid reached about US\$ 100 (PAS, 2011). Rural patients are also accustomed to informal payments (40.8% of patients). Even in the most urbanized and better equipped areas, Chisinau and Balti, 36.2% of patients made informal payments and 30% did so in district centres. The highest share of informal payments took place in republican (tertiary) institutions (48.4%). At municipal level, the share was 39.7% and at district level 31.2%. As for medical sectors, maternity services are the most paid ones informally (71%) as well as patients undergoing surgery (50.9%). On the other hand, the survey revealed that 10% less of the insured patients made informal payments (36.8%) compared to uninsured patients (45.5%). This confirms other findings about uninsured patients paying higher out of pocket amounts than the insured ones. Besides, the richer quintile of the population pay more out of pocket than poorer households (Shishkin & Jowett, 2012). As a matter of fact, as revealed from the survey, the frequency of informal payments increased with the income bracket. The age groups 19–29 and 30–39 are those who make informal payments most frequently.

Figure 2.4 Out-of-pocket expenditure (% of current health expenditure): comparison between Republic of Moldova, OECD members and Europe and Central Asia excluding high income countries (2000-2018)



Source: Self elaborated in Gretl with data from World Development Indicators database, World Bank

Table 2.5 Composition of Out-of-pocket payments (OOP)

OOP use (%)	2007	2008	2009	2010
Inpatient care	9.7	9.2	8.9	8.9
Outpatient care	17.9	19.4	17.7	16.4
Medicines	79.1	69.8	71.2	73.1
Medical appliances	2.2	1.5	2.2	1.7

Source: National Bureau of Statistics of the Republic of Moldova, 2011.

2.4.3 Official development aid

Since independence, Moldova has benefited from several alternative systems of financing. In 1999, UNICEF, together with the Ministry of Health, piloted a community-based voluntary contribution project in the district of Hincesti aimed to increase access to basic services for the most vulnerable ones. The area, as the rest of the country, lacked accessibility and affordability to healthcare services (UNICEF, 1977), urging the need for more equity. The

project focused on the provision of a basic package of services and emergency care. UNICEF provided basic equipment to health facilities, training on new health management techniques and initial stocks of essential medicines.

UN agencies and Japan are the biggest donors of health official development aid (ODA). In addition, the European Union is also providing funds to the health sector through the EU emergency fund, ECHO, and as technical assistance to the health reform process. For some health programmes, such as immunization, external sources are the main source of funding. In 1999, external donors funded all purchases of vaccine and disposable supply purchases (UNICEF, 2001).

In 2010, 9.6% of total health expenditure came from external sources in the form of project-based donations and loans from transnational donors such as the EU, the World Bank, the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) and various agencies of the United Nations (Table 4).

The received health aid is divided in four main categories: basic health including prevention of infectious diseases such as tuberculosis; but also non communicable diseases including alcohol and tobacco control, promotion of mental health and wellbeing; medical research and training; and reproductive healthcare (OECD.Stat). In 2012, the share of ODA allocated to hospital care increased by 20% in one year, while the proportions of funds allocated to primary health and emergency care decreased. Later on, it will be shown how significant primary health is for improving health.

Although Moldova received the highest level of official development aid per inhabitant, amounting to US\$ 125, in 2011 among former Soviet Union countries, only 6% was allocated to the health sector (OECD, 2013). Being only US\$ 8 the amount per inhabitant that was designed to health matters (Table 6). The comparison to the other countries certainly calls for a less efficient allocation of the official development aid since Bosnia and Herzegovina, Georgia and Armenia received less aid per inhabitant but allocated much more generous amounts to the healthcare sector (Figure 2.5). As for the territorial coverage, the distribution of targeted projects among regions appears to be uneven, focused on central and northern areas, mainly Chisinau and Balti, received funding from the highest number of donors (Monitoring Official Development Assistance to the Health Sector in the Republic of Moldova, 2012). The discrepancy leads to higher inequalities between more marginalized areas, especially the least urbanized ones.

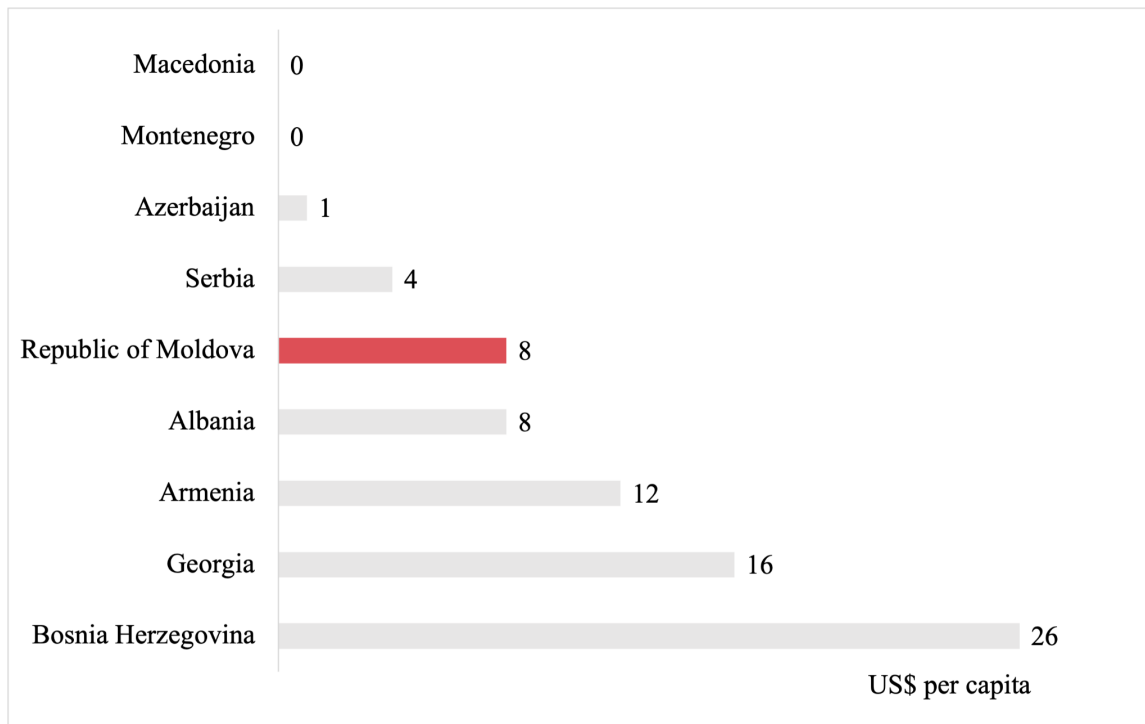
Official development aid health disbursements from 2005 to 2015 increased by 232%. A significant part of International aid in Moldova is addressed to support healthcare being the United Nations once of the main sources of aid. Countries such as the US, Japan and the European Union regularly provide bilateral aid to Moldova (Creditor Reporting System).

Table 2.6 ODA inflows in benchmark countries, 2011

Country	Population (millions)	GNI per capita (US\$)	Net ODA (US\$ million)	ODA per capita (US\$)	Net ODA/ GNI (%)	Proportion of ODA for health (%)	Bilateral share of ODA (%)
Republic of Moldova	3.6	1980	451	125	6	6.2	29
Albania	3.2	3980	307	96	2.4	8.6	65
Armenia	3.1	3360	374	121	3.5	9.9	43
Azerbaijan	9.2	5290	293	32	0.5	4.6	65
Bosnia and Herzegovina	3.8	4780	425	112	2.3	23.4	67
Georgia	4.5	2860	550	122	3.9	13	56
Montenegro	0.6	7060	74	123	1.6	0.4	54
Serbia	7.3	5680	596	82	1.4	4.3	50
Macedonia	2.1	4730	165	79		0.29	

Source: OECD (2013).

Figure 2.5 Official development aid per capita allocated to “health and population” in benchmark countries, 2011 (US\$)



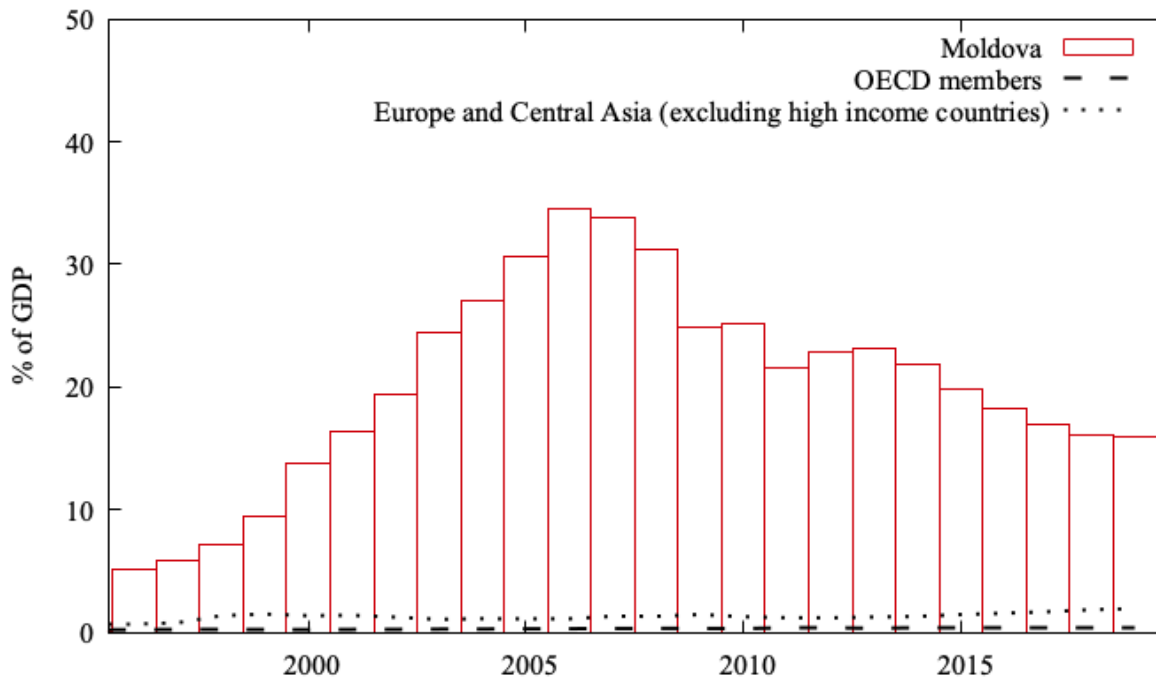
Source: Self elaborated with data from OECD (2013).

2.5 Emigration, remittances and inflation

According to the Migration Data Portal, almost a fourth part of the Moldovan population are emigrants. While the Moldovan economy relies on the agricultural sector, food processing and viticulture, a large-scale labour emigration and the associated remittance flows increasingly shape the economic and social landscape (Atun et al., 2008). Remittances sent from abroad were the engine of the economic growth between 2000 and 2008, accounting for 30% of the GDP in 2008. Even if remittances decreased since the beginning of the global economic crisis, it was estimated that remittances arised to US\$ 1316 million in 2010. Moldova is the most remittance-reliant country in Europe and in 2020 remittances accounted for 16,3 % of GDP (World Bank Annual Remittances Data).

Although remittances boosted private consumption and the construction sector (Table 2.7), the agriculture and industrial sectors lost added value and collapsed rather than benefiting from the increased liquidity in the country. One of the main reasons for such results is inflation. As a matter of fact, the inflation rate in Moldova reached 39% in 1999. Since then, the inflation rate was never stable and kept fluctuating around 10% with another atypical value reaching 33,30 % in 2010 (Figure 2.6). After 2010, the inflation rate in Moldova fluctuated less, although still by about 2 percentage points between yearly periods.

Figure 2.6 Personal remittances, received (% of GDP): comparison between Republic of Moldova, OECD members and Europe and Central Asia excluding high income countries (1996-2019)



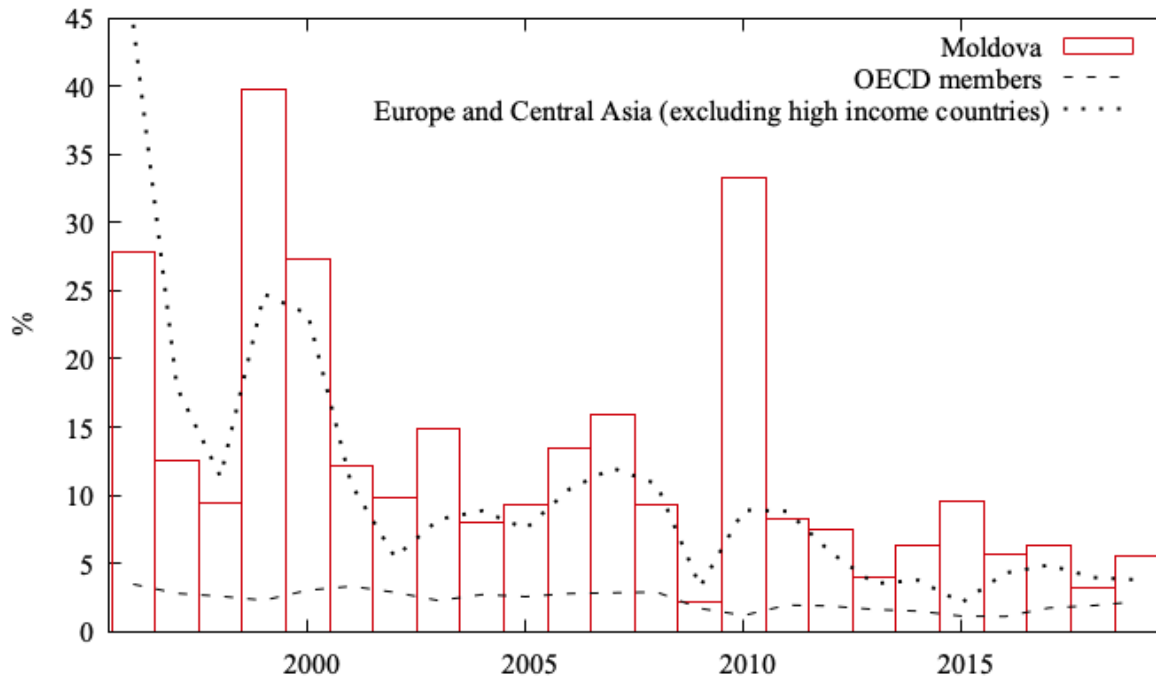
Source: Self elaborated in Gretl with data from World Development Indicators database, World Bank

Table 2.7 Economic sectors growth rates, Republic of Moldova (%)

ECONOMIC SECTORS		Average growth rate 2003-2005	Average growth rate 2006-2008	Average growth rate 2009-2011
Tradable	Agriculture	3,6	1,1	1
	Industry	9	-0,8	-1,3
Non-Tradable	Constructions	15,4	13,3	-3,1
	Real estate	8,3	13,7	3,6

Source: Development and side effects of remittances in the CIS countries: the case of Republic of Moldova (Stratan, Chistruga, Clipa, Fala, Septelici, 2013)

Figure 2.7 Evolution of the inflation rate: comparison between Republic of Moldova, OECD members and Europe and Central Asia excluding high income countries (1996-2019)

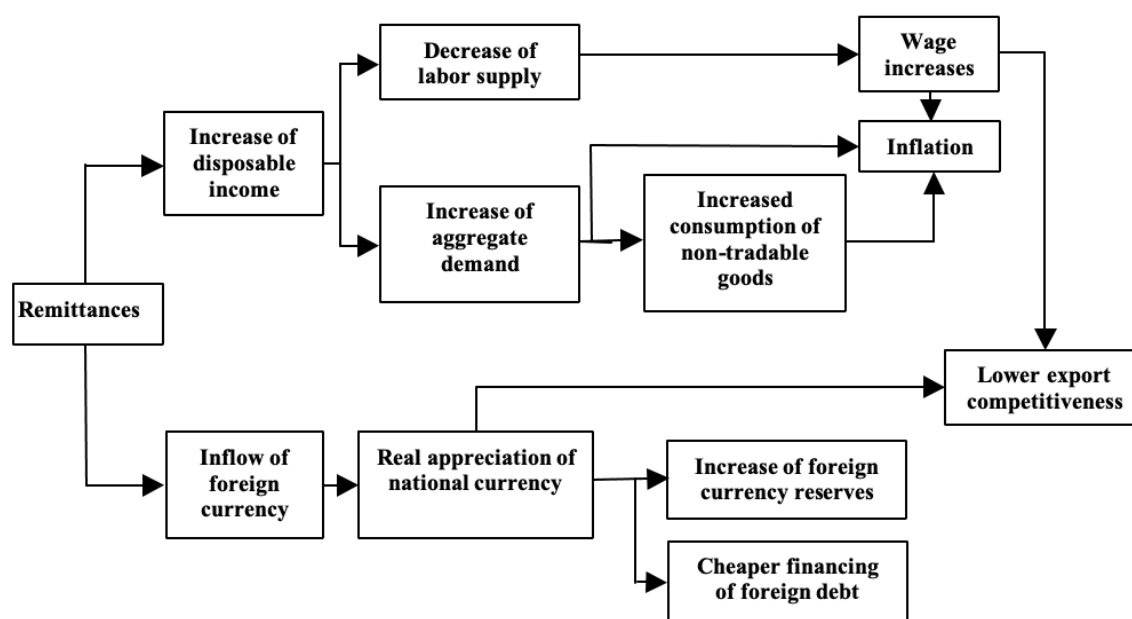


Source: Self elaborated in Gretl with data from World Development Indicators database, World Bank

Remittances inflate the prices of agricultural and industrial goods, making Moldova less competitive. According to Culiuc (2007), the inflow of remittances appreciates the nominal exchange rate and increases the aggregate demand that is partially spent on non-tradable goods, which creates inflation. The same was confirmed by IEFS researchers (2011) stating that a possible increase of currency inflows to the country might make surge the symptoms of the Dutch Disease, which can have two consequences on the Moldovan economy: appreciation of the local currency and the increase of inflation rate caused by an increase in the prices of non-tradable goods. Health services, starting from doctors' visits but also more complex medical services, are considered non-tradable goods since they are generated within the country, are therefore a target for inflation.

Foreign exchange of the inflowing currency also plays an important role in the creation of inflation. Since large shares of foreign currency are being converted into local currency, the supply of domestic currency increases and inflation is generated. A third relevant factor is also responsible for the creation of inflation: labour supply (Acosta, Mandelman, and Lartey, 2007). Since remittances increase disposable income, individuals might not be finding labour that appealing, especially considering the relatively low salaries. Therefore, an increase in the production costs of firms caused by lacking labour supply also leads to inflation.

Figure 2.8 The impact of remittances on inflation and exchange rate



Source: Development and side effects of remittances in the CIS countries: the case of Republic of Moldova (Stratan, Chistruga, Clipa, Fala, Septelici, 2013)

The remittances received through official channels are way below the real amount of remittances transferred to the country. As a matter of fact, there is a huge discrepancy between official remittances and foreign currency exchange. While it is true that remittances do not have to coincide with foreign currency exchange, this gap proves the existence of unofficial inflows of remittances, also defined by IMF “brought in pockets” cash.

In a survey of 1000 Moldovan families with relatives abroad, it was revealed that remittances account for at least 50% of the total household income. 43% of respondents receive remittances through informal channels, either directly from the emigrant relative, or through bus drivers who carry money into the country (IFAD Rural Resilience Project). Besides, according to the survey, most of the recipients do not use formal savings accounts and remittances are kept, in cash, at home. According to the survey, remittances are used to pay for short term basic expenses, including food, health care, and education. From those who invest part of their remittances, 17% of the investment goes to crops, 15% goes to clothing for commercial activities and 12% goes to the manufacturing of agricultural products and food.

Once acknowledged the discrepancy between the net supply of foreign currency in cash from individuals by banks and the net remittances received, net remittances require a more accurate estimation. While considering foreign exchanged currency instead of remittances might get us closer to the actual amounts, it wouldn't be accurate, since exchanged foreign

currency might include informal, underground or illegal economic activities produced within the country and cannot be considered as a substitute of remittances.

This brief insight to the socioeconomic and health indicators in Moldova might facilitate a better interpretation of the upcoming results. But before jumping into any analysis, it is useful to observe already existing literature estimating the impact of development aid and remittances on health in order to understand what the expected signs might be and the reasons behind.

3. Literature review

The incidence of health official development aid and remittances on health indicators has been already analysed from different perspectives worldwide and particularly for developing countries. As for the Republic of Moldova, there are several WHO reports and surveys conducted by the Ministry of Health.

The impact of multilateral health-aid on health outcomes such as infant mortality rate (IMR) and incidences of infectious diseases, more precisely Tuberculosis, in developing countries is explored in the *Empirical Essays On The Impact Of Health-aid on Health Outcomes* published in 2009 by Elsy Thomas Kizhakethalackal. The essay analyses three different perspectives. The results of the first approach confirm that education is an important factor in reducing infant mortality rate although, the effect of health-aid on IMR is not significant. In the second approach, the study continues to focus on the same relationship by changing the regression approach which helps better capture the effect of health-aid on various groupings of infant mortality rates. The second procedure confirms that education and gross domestic product play significant roles in improving health standards across all quantiles of infant mortality rate. The third approach implies the use of annual level data to analyze the dynamic nature of the impact of health-aid on Tuberculosis. The findings from both specifications confirm that education is significant while lowering the incidences of Tuberculosis. Finally, health-aid not only had the wrong sign, but resulted ineffective in lowering the incidence of Tuberculosis. All three approaches revealed that there was no robust evidence of health-aid significantly lowering IMR. The causes behind those results rely on too broad aid targeting and lack of monitoring and coordination processes. The essay suggests that basic education can help health outcomes through increased awareness of nutrition, prevention of diseases, and treatment and therefore donors should focus on it.

While capturing the relationship between health aid and variations in life expectancy and under 5 mortality rate among 140 health aid recipients between 1974 and 2010, Eran

Bendavid and Jay Bhattacharya found that life expectancy increased by 0.24 months faster and under 5 mortality declined by 0.14 per 1,000 live births faster with each 1% increase in health aid. Through their paper, *The Relationship of Health Aid to Population Health Improvements*, they found that the association between health aid and health improvements has been increasing over time, with the closest association between 2000 and 2010. They found that health improvements associated with health aid are measurable 3 to 5 years after aid disbursement takes place.

In another study, *Effectiveness of foreign aid to health: case of developing countries*, published by Solomiya Shpak in 2012, it was found that health targeted aid has a positive effect on the reduction of avoidable mortality. However, in developing countries, government expenditure has very limited effects on avoidable mortality reduction because of poor health systems. The results of the study confirm that multilateral aid in countries lacking transparency does not improve health outcomes and bilateral aid should be handed through NGOs.

Table 3.1 An overview of findings on the impact of health official development aid (ODA) on health indicators

Study	Health-aid and incidence of tuberculosis: an empirical analysis	The Relationship of Health Aid to Population Health Improvements	Effectiveness of foreign aid to health: case of developing countries
Year	2009	2014	2012
Authors	Elsy Thomas Kizhakethalackal	E. Bendavid, J. Bhattacharya	S. Shpak
Countries	worldwide	worldwide	Developing countries
Dependent variable	incidence of tuberculosis per 1000 of the population	under-5 mortality, total life expectancy	avoidable mortality, non-avoidable mortality,
Explanatory variables	Health-aid Government health expenditure Education GDP Physician Population Gini index Density	Health-aid, GDP per capita(log), Fertility rate, Urban population	Public expenditures on health, Public expenditures on education, Access to water, Access to sanitation, Completion rate of secondary education, GNI, Corruption Perception Index, Population
Approach	differenced generalized method of moments (GMM)	Cross-country panel data	
Results	Failure of health aid in weak health care systems because of lacking coordination and too broad aid targeting. Basic education plays a relevant role in tuberculosis incidence and IMR.	1% increase in health aid led to an increase in life expectancy by 0.24 months and a decrease in under-5 mortality by 0.14 per 1,000 live births. An increase of \$1 billion in health aid could be associated with 364,800 fewer under 5 deaths.	Health targeted aid has a positive effect on avoidable mortality reduction. In developing countries, government expenditure has very limited effects on avoidable mortality reduction because of poor health systems. Multilateral aid in corrupt countries does not improve health outcomes and bilateral aid should be handed through NGOs.

Source: Self elaborated

In his *Systematic Review on Impact of Remittances on Healthcare Utilisation and Expenditure in Developing Countries*, Awojobi Oladayo Nathaniel reveals that remittances

have a positive, although short termed, impact on health. From studies conducted in Africa, Asia, Europe and Latin America, it was found that remittances contributed to an increase in healthcare access, usage and expenditure. However, the degrees of these impacts were limited among the studies except for Armenia (Table 3.2), where remittances slightly increased the usage of healthcare services. According to the author, although remittances can not serve as an alternative to formal healthcare insurance schemes, they can serve as a short-term measure in the use of healthcare services in developing countries and governments should be responsible at all levels of designing health policies able to provide universal healthcare coverage to individuals.

Although most studies prove that remittances have a positive impact on health outcomes, it is not always the case as we can see in the case of Mexico (Table 3.2), Bangladesh or Rwanda (Table 3.2). Remittances, when representing a significant share of GDP, tend to influence macroeconomic indicators such as inflation or exchange rates and consequently, influence other economic sectors, especially if those are unbalanced within an economy.

Table 3.2 Review of effects of remittances on the usage of healthcare services

Country	study	Study design	Population	Main outcomes	Results	Impact
Armenia	Murrugarra	Censored model	3,600 households receiving remittances	Healthcare demand	1,000 Armenia Drams (ADM) in Positive remittances (approximately US\$2) enhanced healthcare utilisation rates in a very small, but significant increase.	
Bangladesh	Al Kabir et al	Time series	Individuals that have received remittances	Healthcare usage	In the long run there was a positive relationship between remittance and health improvement. While in the short run there was no positive relationship between remittances and health improvement.	Mixed
Ecuador	López-Cevallos and Chi	Cross-sectional	10,813 households that have received remittances	Healthcare usage	Remittances improved the use of antiparasitic drug (odds ratio)(OR = 1.46, 95% CI = 1.23 – 1.73; OR = 1.34, 95% CI = 1.16 – 1.55) “after adjusting for predisposing, enabling, and need factors”	Positive
Mexico	Frank et al.	Multinomial logistic regression	Remittance recipients	Healthcare usage	Of those households that had received remittances, over twice as many had spent remittances on health than had not (7% versus 3%).	Positive
Rwanda	Rubyutsa		Diaspora community	Healthcare accessibility	Reason for remittance include healthcare issues	Not clear

Source: Impact of Remittances on Healthcare Utilisation and Expenditure in Developing Countries: A Systematic Review

Table 3.3 Review of effects of Remittances on health care expenditures

Country	Study	Study design	Population	Main outcomes	Results	Impact
Albania	Kalaj	Propensity score matching	Households with migrants abroad	Healthcare expenditure	Remittances have a positive and statistically significant impact on health expenditures	Positive
Mexico	Amuedo-Dorantes and Pozo	N/A	Remittance recipients	Healthcare expenditure	\$86.27 rise in remittance from abroad increases healthcare expenditures between \$0.26 and \$0.32	Positive
Mexico	Frank et al.	Multinomial logistic regression	Remittance recipients	Healthcare expenditure	Amount of remittances was not significantly correlated with expenditure on healthcare	Negative

Source: Impact of Remittances on Healthcare Utilisation and Expenditure in Developing Countries: A Systematic Review

4. Variables selection

This section includes an overview of the variables taken into consideration while building up the model that will be introduced in the next section. The main constraint is related to the short period of time since the independence of the Republic of Moldova which might decrease the reliability of the data considering also the non-contemporaneous relationship between the dependent variable and the explanatory ones.

GDP per capita is one of the most common economic indicators widely available and used in literature. It is possible for GDP per capita to capture trends related to other variables such as health. Income per capita reflects the overall living standards and economic position of a country (Avdeev et al, 2011) and since a better economic position might lead to higher health standards, life expectancy might present increasing standards and mortality rates might be decreasing (Mpofu, 2013). Life expectancy is supposed to take increasing values since higher disposable income might translate into higher expenditure on health, both under government expenditure but also at individual level.

Another variable used to measure health outcomes is infant mortality rate also often used in literature. Since the agrarian revolution, infant mortality rates have been reduced thanks to technological progress and improving working conditions. Infant mortality rate is a relevant indicator for health in a specific country and the mortality rates are often used to identify vulnerable populations. According to the World Bank, infant mortality rates are one of the most frequently used indicators when it comes to analyse socioeconomic development.

Remittances represent 15% of the national GDP in Moldova and they reached 35% in 2006. While evidence shows remittances in Moldova have a direct impact on higher education (Matano & Ramos, 2018) it is worth making hypotheses of the impact of remittances on health as well. According to the World Bank 2011 Migration and Remittances Factbook, besides reducing poverty, remittances tend to increase expenditure on health, education, and entrepreneurial activities. The remittances transferred to developing countries, estimated to be US\$ 325 billions in 2010, exceeded the official aid and constitute more than 10 percent of GDP in many developing countries. Nevertheless, in the case of Moldova, remittances have a slightly different effect on health according to the 2012 Health System Review published by the European Observatory on Health Systems and Policies.

Official development aid (ODA) is a variable that might capture trends related to living standards, education and other indicators. This data is easy to access although might be too vague for exploring the effects of aid on health since it includes several categories such as education, economic infrastructure, humanitarian aid, production, social infrastructures but also many others. For this purpose, official development aid might be disassembled into categories. For this study, the focus goes on the share of ODA destined to basic health. This variable will be abbreviated as *basic_health_aid*. This category includes basic healthcares services, basic health infrastructure, basic nutrition, infectious diseases control, health education, malaria control, tuberculosis control and health personnel development (OECD.Stat). Another aid related variable that will be considered is total health aid (*general_health_aid*) which includes health policy and administrative management, medical education/training, medical research and medical services (Table 4.1).

Table 4.1. Total Health Official Development Aid

Categories	Subcategories
General health	basic healthcares services, basic health infrastructure, basic nutrition, infectious diseases control, health education, malaria control, tuberculosis control and health personnel development
Basic health	health policy and administrative management, medical education/training, medical research and medical services
Non-communicable diseases (NCDs)	NCDs control, Tobacco use control, control of harmful use of alcohol and drugs, promotion of mental health and well being, other prevention and treatment of NCDs, research for prevention and control of NCDs

Source: Self elaborated based on the OECD Creditor Reporting System (CRS) Aid Activity database

Due to very short periods available for the different types of development aid categorised into different types of health assistance and in addition to their non-contemporaneous relationship

with the dependent variable, it is yet too early to draw conclusions from the relationship between those variables. The following section reveals which of the above described variables were considered reliable enough to be included into the model.

5. Data and methodology

Since the Republic of Moldova obtained its independence in 1991, most of the data is available starting from the Nineties only, which wouldn't allow enough observations for a completely valid time series analysis. Data for the several type of official development aid was retrieved from the OECD Creditor Reporting System (CRS) Aid Activity database. All data was analysed after being retrieved or converted to constant terms.

Table 5.1 Explanatory and explicative variables

Variable	Description
GDP per capita (constant 2010 US\$)	GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data is constant 2010 U.S. dollars.
Personal remittances, received (% of GDP)	Personal remittances comprise personal transfers and compensation of employees. Personal transfers consist of all current transfers in cash or in kind made or received by resident households to or from nonresident households. Personal transfers thus include all current transfers between resident and nonresident individuals. Compensation of employees refers to the income of border, seasonal, and other short-term workers who are employed in an economy where they are not resident and of residents employed by nonresident entities. Data are the sum of two items defined in the sixth edition of the IMF's Balance of Payments Manual: personal transfers and compensation of employees.
Net official development assistance and official aid received (constant US\$)	Net official development assistance (ODA) consists of disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies of the members of the Development Assistance Committee (DAC), by multilateral institutions, and by non-DAC countries to promote economic development and welfare in countries and territories in the DAC list of ODA recipients. It includes loans with a grant element of at least 25 percent (calculated at a rate of discount of 10 percent). Net official aid refers to aid flows (net of repayments) from official donors to countries. Official aid is provided under terms and conditions similar to those for ODA. Data is in constant 2018 U.S. dollars.
Mortality rate, under-5 (per 1,000 live births)	Mortality rates for different age groups (infants, children, and adults) and overall mortality indicators (life expectancy at birth or survival to a given age) are important indicators of health status in a country. Because data on the incidence and prevalence of diseases are frequently unavailable, mortality rates are often used to identify vulnerable populations. And they are among the indicators most frequently used to compare socioeconomic development across countries.
Physicians (per 1,000 people)	Physicians include generalist and specialist medical practitioners.
Life expectancy at birth, total (years)	Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.

Source: Self elaborated with data and descriptions from UN National Accounts Analysis of Main Aggregates (AMA), World Bank World Development Indicators and OECD.Stat.

Table 5.2 Descriptive statistics

	Mean	Median	Std. dev	Min	Max
life_expectancy	66.741	66.772	2.4052	61.995	71.808
gdp_pc	2462	2037	1335	906.3	5268
remittances	19.406	19.885	9.0443	0.058187	34.499
development_aid	2.2557e+08	2.1701e+08	1.3580e+08	1.5750e+07	4.9818e+08
physicians	2.9029	2.9000	0.52261	2.1810	3.6660
under_5_mortality	34.073	34.500	15.125	14.400	64.100

Source: Self elaborated in Gretl with data from UN National Accounts Analysis of Main Aggregates (AMA), World Bank World Development Indicators and OECD.Stat.

5.1 Life expectancy as dependent variable

The first estimated model includes GDP per capita (constant 2010 US\$), Personal remittances, received (% of GDP), Net official development assistance and Official aid received (constant US\$) as explicative variables for life expectancy at birth, which is the dependent variable. The model was tested for misspecifications, but none of the variables seemed to require any logarithmic or squared form. After not detecting any multicollinearity according to the Variance Inflation Factor (VIF) criteria, the model was tested for heteroscedasticity. The regression is the following:

$$\text{life_expectancy} = 64.8726 + 0.00463680 \text{ gdp_pc} + 1.17449e-09 \text{ development_aid} - 0.0665300 \text{ remittances} - 0.574164 \text{ physicians}$$

GDP per capita and remittances result significant at 1%. Net official development assistance and Official aid is significant at 10%. The coefficient of determination is 0.98, meaning the model explains almost 99% of the variability of the model. Some coefficients have the expected signs although others have ambiguous interpretations of the sign. An increase in GDP and Development aid indeed increases life expectancy. However, remittances and physicians have a negative sign meaning any increase in those variables decreases life expectancy. On one side, considering the previously mentioned negative correlation between inflation and remittances as well as the implications of the Dutch Disease (Acosta, Mandelman, and Lartey, 2007), remittances might indirectly increase the relative price of non-tradable goods and services generated within the country, including healthcare. On another side, the number of physicians per 1000 inhabitants presents an unexpected sign if we rely on literature sources as well as historical data stating that resources were allocated unproductively (Goroshenko, Volovei, Mochniaga, 1996). For instance, after independence,

too many funds were allocated to building infrastructure, hospital beds and personnel. A supply of hospital beds that exceeds demand, led to hospitals' unoccupancy and instead to lacking productivity.

5.2 Infant mortality rate as dependent variable

Although the previously specified model has significant results, it is relevant to mention that life expectancy might explain better long term variables. Since the available data covers a short period of time, a more dynamic dependent variable might adapt better to this specific analysis. To this purpose, life expectancy was replaced by under 5 mortality rate. The regression is the following:

$$\text{under_five_mortality} = 48.3582 - 0.00840236 \text{ gdp_pc} - 1.36020e-08 \text{ development_aid} - 0.490820 \text{ remittances}$$

From this newly specified model, remittances and GDP per capita are significant at 1% while development aid is significant at 5%. The coefficients have the expected sign since an increase in one of the three used variables causes a decrease in under 5 mortality rate.

Table 5.3 The effects of GDP per capita, remittances, development aid and physicians per 1000 inhabitants on life expectancy.

Explicative variables	(OLS) life expectancy	(OLS) under 5 mortality rate
constant	64.8726 *** (96.79)	48.3582 *** (21.62)
GDP per capita	0.00463680 *** (20.65)	-0.00840236 *** (-3.002)
Development aid	1.17449e-09 * (1.874)	-1.36020e-08 ** (-2.262)
Remittances	-0.0665300 *** (-6.978)	-0.490820 *** (-10.12)
Physicians	-0.574164 ** (-2.445)	
<i>T</i>	18	20
<i>S.D.</i>	1.682643	8.595562
<i>R</i> ²	0.989818	0.968974
<i>Adjusted R</i> ²	0.986686	0.963156
<i>F</i>	8.36e-13	2.83e-12

Source: Self elaborated. The regressions were performed in Gretl. ***= significance at 1%, **= significance at 5%, *= significance at 10%, t-statistics between brackets. The linear and non squared function forms are accepted (squares and logs non-linearity test). There is no multicollinearity (VIF<5) except for GDP per capita in Model 2. The residuals follow a normal distribution (Jarque-Bera). The model is homoscedastic (White's and Breusch-Pagan).

6. Conclusion

The established purpose of this paper was to investigate the effects of development aid and remittances on health indicators such as life expectancy and infant mortality in the Republic of Moldova. It was found that higher values of GDP per capita and development aid lead to higher life expectancy at birth and lower infant mortality rates. While presenting the expected sign on infant mortality rate, remittances do not have a positive effect on life expectancy. Considering a wide range of available literature, the negative sign of remittances confirms their macroeconomic effects on inflation. Since remittances present about 15% of GDP in Moldova, their impact goes way beyond appearances.

Since Moldova is a young country with a short analysed period, the results obtained while analysing infant mortality are more dynamic and better adapt to the analysed period. As a matter of fact, if any of those three variables increase, the infant mortality rate decreases.

Although significant, the effects of development aid on health are measurable for 3-5 years after aid disbursement. Being Moldova such a young country, the relatively short term analysed data does not allow to draw solid conclusions on the significance of development aid.

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