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Historical origins of corruption in the Romanian public health system - path dependency and contagion effect

Aurelian-Petruş Plopeanu[1*]

Abstract

Background In this paper, we estimate the long-lasting influence of the former Habsburg Empire's border on the territory of Romania, specifically on the prevalence of corrupt behaviour and practices in health services.

Methods Employing microdata from the 2016 Life in Transition Survey and applying ordered probit regression, we explore the hypothesis that the geographical proximity of respondents' residences to the former imperial border—restricting the analysis within a bandwidth of 50 km, 75 km or even 100 km on either side – significantly influences current individual tendencies towards corrupt behaviour.

Results The results indicate that individuals in Transylvania living in the immediate vicinity of the former border of the Habsburg Empire (no more than 75 km away) show a higher propensity towards corrupt behaviours, similar to those from Moldova and Wallachia who reside in the same bandwidth but to the east of the former historical border. Interestingly, on one hand, after a series of tests with various relevant factors, the contagion effect is observed from right to left, meaning from those in Moldova and Wallachia towards those in Transylvania, and not the other way around as might be expected based on other previous studies. On the other hand, individuals living more than 75 kms west of the former historical border show clear reluctance to engage in informal payments and gift-giving when interacting with the public health system as patients.

Conclusion By rigorously controlling for various variables that comprehensively show different legacies of the communist regime, our results confirm the persistence of these influences across different bandwidths, thereby corroborating the hypothesis of path dependence influenced by the former Habsburg Empire.

Keywords Corrupt behaviour, Romanian public health system, Former border of the Habsburg Empire, Former Romanian Gulag

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Introduction

There is a general consensus among academics and policy makers that the prevalence of corruption has negative consequences, from health status to social welfare systems [1]. The complexity of the linkages that build the health ecosystem, both public and private, has made it prone to corruption [2]. If we add public spending, which sometimes totals the largest allocations of countries' GDP [3], we have a complete picture. The phenomenon

of corruption is found at different levels in both developing and developed countries [4–7]. Of these, particular attention has been paid to former communist countries in Central and Eastern Europe, which have shown a high prevalence of informal payments for health services [8].

Due to their ambiguous and complex nature based on specific cultural and historical idiosyncrasies, it is difficult to define for good what informal payments really are. Let us notice that, among them, is bribe payments [9] In our view, two of the best definitions for informal payments in the health system were given by [10]: 276: "A direct contribution, which is made in addition to any contribution determined by the terms of entitlement, in cash or in-kind, by patients or others acting on their behalf, to health care providers for services that the patients are entitled to." and [11]: 985): "payments to individual and institutional providers, in-kind or cash, that are made outside official payment channel, or are purchases that are meant to be covered by the health care system." In-kind payments include gratitude that can take the form of offering gifts [12]. Moreover, the typology of informal payments comprises four main types: gratuity payments (gratitude for medical treatment) [13], "greed" payments—to obtain more than usual rights and "need" payments—to manipulate the patient to pay for something which is normally free [14] and "implicit expectation" payments, when these are made to fulfil one's customary expectations [15]. The mechanism through which bribe payments from various stakeholders (especially insured citizens/patients) affect the healthcare system could be insidious and subtle [16]. For example, less wealthy citizens could be disadvantaged and discouraged to access high quality medical services [17],reforms of the public healthcare system are difficult to implement and postponed [18],the level of satisfaction decreases within the system [19], while the treatments costs will become overpriced [20].

Romania has a predominantly centralised public health system, which faces various problems every year, from poor management, its monolithic, cumbersome and inflexible structure, underfunding to lack of specific medical infrastructure and lack of specialised medical staff. The existence of corruption in the system leads to certain inequalities in terms of access to health services and differences in their quality [21]. The lack of competition from other free alternatives for the majority of the insured in the public social security system generates low quality services and thus a high level of patient dissatisfaction with some medical services [22]. For example, according to the 2014 Special Eurobarometer 397 and the 2016 Euro Health Consumer Index, perceived levels of corruption in health care were high, while the quality of medical services was low [23]. In the period 2015–2018,

several European reports showed a very poor improvement in the performance of the Romanian health system, represented by a single place in the ranking (in 2018, 34th place out of 35 European countries analyzed) [24–27].

Various studies have presented data that health services in Romania are affected by corruption, especially bribery [28]. In a recent Eurobarometer, it was stated that almost 50% of Romanian citizens considered that different facets of corruption (e.g., bribery, abuse of power for personal reasons) are present in the health sector [29]. Another interesting studies confirm that the Romanian health system is the most exposed to bribery practices, with the perceptions of Romanian officials being almost twice as high as the European average [30, 31]. Using official data from the Romanian Ministry of Health obtained through the Patient Feedback Mechanism (data.gov.ro) and visually processed (graphs.ro), it was found that when patients were asked whether they were asked for money or attention by medical staff in public hospitals, at regional level, the data show that hospitals in counties that were under the Habsburg Empire until 1918 show the lowest percentages of corruption in the Romanian healthcare system (in 2021, 1.72%,in 2022, 1.70%,in 2023, 1.50%) compared to those in the counties belonging to the former Kingdom of Romania (in 2021, 3.69%,in 2022, 3.26%, in 2023, 2.98%) [32, 33].

Our paper is among the first to link the variations in corruption behaviour observed in Romania to the former historical border of the Habsburg Empire and the legacy of communist repression and affiliation with the defunct Romanian Communist Party. Combining individual-level geocoded data from the most recent Life in Transition Survey (LiTS) with information on the former historical border and the locations of communist-era concentration system (prisons, forced labour colonies, deportation centres, and mandatory residence centres) in Romania, as well as family members past affiliation with the Romanian Communist Party, we demonstrate that the imperial legacy exerts enduring influences that have been transmitted across generations.

Our paper makes four significant contributions. First, it highlights the crucial role of imperial legacy in understanding corruption, particularly in terms of values, norms, behaviours, and institutions. This legacy is a catalyst for economic development and has been shown to significantly influence trust, education, infrastructure, health or institutions in general [34]. Despite its importance, the historical roots of corruption in Romania's public health system, a vital and strategic societal component, have received little attention. Second, this is the first study to analyze the role of extermination prisons and forced labour camps from the communist period, as well as the membership of family members in the Romanian

Communist Party prior to 1989, on contemporary corrupt behaviour in the Romanian healthcare system. Considering these significant historical events makes the results robust and meaningful for understanding this complex phenomenon. Third, we provide solid evidence that the lasting role of the Habsburg Empire is not homogeneous but depends significantly with proximity to its border. Additionally, the communist regime played a crucial role in shaping corrupt behaviour in Romania's public healthcare sector. Counties outside the Habsburg Empire's influence exhibited a higher propensity for corrupt behaviour, and a buffer zone within 50 km of the old border experienced a contagion influence from right to left, spreading corruption from non-Habsburg to Habsburg-influenced regions. Finally, this study examines the actual experience of corruption in a specific context, as opposed to the perceptions and attitudes towards corruption commonly explored in other researches.

The paper aims to test the validity of three primary hypotheses. The first objective is to check whether the historical border of a former empire, i.e., the Habsburg Empire, influences bribery behaviour within the Romanian health system. This hypothesis is based on existing literature which suggests that even historical or political borders that ceased to exist over 100 years ago can significantly affect current levels of trust and corruption in institutions, such as courts and police [35]. The second objective is to investigate whether bribery behaviour in the health sector is related to the fact that the respondents', their families', and any other family members' membership in the Romanian Communist Party prior to 1989. The third hypothesis explores whether the geographical proximity of respondents' residences to localities of major communist prisons, forced labour camps, labour colonies, and/or deportation camps that operated before 1989 influences current bribery behaviour in the Romanian health sector. Previous literature has documented that such proximity has a notably negative impact on present-day social trust and civic engagement [36].

Literature review
Informal payments in the health sector are an important focus of this study. It is known that in some countries there is a well-defined cultural and historical context, which often does not equate to any form of corruption or bribery. Several researchers have pointed out that there is a very blurred line between bribery as a gift or as a corrupt practice [37, 38]. For example, in Ukraine, this practice is the effect of an existing culture of bribery [39]. Especially in poor institutional settings, such payments in health services sector are an important trigger for increasing the quality of healthcare services [40], as there is a general distrust in institutions [41]. Moreover, bribe

payments are a coping strategy to overcome the distrust at individual level [42]. At the same time, such informal payments have crucial effects on satisfaction with the quality of these services [43–45]. More comprehensively, a recent study has found that these types of informal payments are more likely to occur when there is a mismatch or asymmetry between informal rules (e.g., values, norms, mindsets or "civic morale") and formal rules (e.g., laws, regulations or "state morale") among patients [46]. According to the theory of bribery in healthcare, previous research has found that high-income patients are more likely to pay bribes to physicians than low-income patients [47]. Based on the magnitude of income levels, bribery patterns are considered relevant in classifying patients [48].

Recently, a large body of literature has emerged highlighting the impact of history on shaping attitudes and norms of behaviour in various contexts [49, 50]. The persistence of former historical and political borders in trade and economic activities is echoed in numerous studies, underscoring the difficulty of erasing their influence, as they are not merely statistical artefacts.

Certain historical events have caused significant structural changes, altering the appearance and role of formal institutions in society and the economy [51]. These historical changes have significantly impacted human societies, changing their evolutionary trajectories for better or worse [52–54]. Other seminal contributions have focused on the long-term impacts of different formal institutions (e.g., legal systems based on British common law versus Roman civil law) or historical institutions on present-day economic development [55–57].

An interesting study empirically demonstrates that regions in Peru and Bolivia, where the Spanish established the *mita* system of extensive forced mining labour for almost 250 years (until the early nineteenth century), have long afterwards registered significant synapses in the process of economic development compared to districts where there were no such systems established [58]. In the same vein, Banerjee and Iyer [59] found that after India's independence in 1947, districts where revenue was collected by British officials were more developed than those where indigenous landowners performed this work.

Additional evidence that history matters is provided by other scholars. For example, Max Weber's [60] well-known thesis argues that the Protestant work ethic was responsible for and nurtured the rise of industrial capitalism in Northwestern Europe. Mokyr [61] emphasized the robust impact of a so-called "gentlemanly culture" in augmenting the Industrial Revolution. Deirdre McCloskey [62] conjectured the a "revolution of ideas" was the

main catalyst for the "Great Enrichment" of the past two centuries.

The mechanisms of the transmission of informal institutions, such as cultural norms, on the long run are unclear, ranging from intergenerational contagion [63, 64], schooling, peer effects or interactions with the local culture [65].

Regarding the effect of former Habsburg Empire legacies on various contemporary economic and political outcomes, the literature highlights some noteworthy findings. Grosjean [66] documents the persistence of cultural norms among those living under common institutions after centuries of imperial rule on social trust. In contemporary Poland, individuals on the Prussian side of the former Prussia-Russia border exhibited higher voter turnout and generalised trust [67]. Similarly, the Polish people living on the Austrian side of the former political border demonstrated superior educational outcomes [68, 69].

Grosfeld and Zhuravskaya [70] provided empirical evidence that in Poland, differences in income, education, corruption due to the division of its territory until 1918 between Prussia, Russia and Austro-Hungary have been attenuated in the meantime, but differences in the intensity of religious practices and democratic capital continue to be present in society. A recent investigation about the role of the long-gone Habsburg Military Frontier on modern institutions in Croatia demonstrated that regions of the former border exhibit poorer economic performances, while resident people are more likely to get involved in corrupt practices when interacting with public authorities [71].

Another research provided empirical evidence that, after the fall of communism in Central and Eastern Europe, countries that were part of the former Austro-Hungarian Empire achieved substantially higher trade due to the benefits they gained from this membership, such as high trust and quality infrastructure [72]. Nitsch and Wolf [73] documented that following the reunification of Germany after the fall of the Berlin Wall, it would take up to 40 years to erase the negative imprint of the former East–West border on German domestic trade.

Mendelski and Libman [74] found a significant influence of the historical legacies of the former Ottoman and Habsburg Empires on the current demand for litigation in criminal cases in Romania. Specifically, they observed that in Habsburg counties, there is a positive relationship between the number of such cases and income, while in Ottoman counties, the demand for litigation remains constant. Moreover, in poor Romanian counties, the demand for litigation is lower in Habsburg counties compared to Ottoman ones. In recent research, Karaja and Rubin [75] conducted a natural experiment (trust game experiment) in three villages in northeastern Romania, located arbitrarily on both sides of the former Habsburg Empire border from 1775–1919. Their findings highlight the intergenerational persistence of trust norms, showing that those currently residing on the Habsburg side are more likely to trust outsiders.

The capacity of the Habsburg Empire to build a functional modern state was a fact since the reigns of Maria Theresa and Joseph II [76]. Thus, as Hutton [77] noted, "in the Habsburg hereditary lands the notion of legal sovereignty of a central authority which alone could command obedience had made inroads into a concept of law which only guaranteed particular and personal privilege."

In the sample of former communist countries from Central and Eastern Europe, Romania is a representative model. The communist regime was characterised by a high degree of centralization and a strong repression against critics, from simple peasants to the intellectual elite. When considering the peasants who rejected collectivisation, according to Stoica et al. ([78]: 116) "in many villages in Romania there were uprisings against the authorities, suppressed by the army's intervention. Approximately 80,000 peasants were arrested between 1949 and 1962 for opposing collectivization, and 30,000 of them were sent to trial." Moreover, Stoica et al. ([78]: 118) emphasised that, in 1952, a report of the Department of State Security (known as Securitate) stated that "at that time, 12,073 people were in prisons or under arrest, for working in or supporting counterinsurgency organisations."

Petre et al. [79]: 104) provided evidence that other acts of repression involved forced relocation (deportations) from private property to arid areas of the Baragan hundreds of kilometres away: "the deportations from Banat to the arid areas of the Bărăgan, which had begun in 1951, meant the destruction of many homes, families and destinies. Initially, the deportation to the Bărăgan targeted about 40,000 people, who were not to the liking of the new regime. The deportees were allowed to take only the goods they could carry, the rest of their property being bought by specially set up commissions, which paid much less than they were worth."

Regarding the extermination prisons, deportations and communist forced labour camps in which the country's intellectual elite was imprisoned, Stoica et al. ([78]: 119) highlighted that "Authorities arrested more than 100,000 people who opposed the communist regime or who were suspected of opposing it. Some were executed on the spot, but most were sentenced to years' imprisonment in inhumane conditions, where they were frequently interrogated and tortured. From among the many prisons that have become torture centres, where the country's former elites were exterminated, those in Piteşti, Sighet, Gherla,

Jilava and Aiud stand out. The relatives and friends of those detained did not escape persecution either, and were accused of hostility to the regime, collaborationism or even treason. Thousands of people deemed hostile to the regime were deported to the Bărăgan or sentenced to years of forced labour on dangerous construction sites in the country (dams, mountain roads etc.)." As for the construction of the massive infrastructure, namely Danube-Black Sea Canal, more than 22,000 people, considered enemies of the regime, worked there between 1950 and 1954 and it is estimated that more than 2,000 died for this project, most of them political prisoners of the communist regime who had not received final court sentences [80].

Brief historical overview

The Ottoman and Habsburg empires spanned much of contemporary Central and Eastern Europe. Among the countries in this region, Romania embodies an effervescent political and social realm, consisting of three historical provinces: Transylvania, Moldova and Wallachia.

The imperial border divided modern Romania into two distinct regions. Between 1711 and 1918, Transylvania was part of the Habsburg Empire, while the rest of contemporary Romania, including Moldova and Wallachia, was under Ottoman Empire's rule from 1462 (Wallachia) / 1473 (Moldova) until 1867. In 1877, the Kingdom of Romania was created by the union of Moldova and Wallachia.

In 1765, the Grand Principality of Transylvania emerged, receiving special status as an independent region within the Habsburg monarchy [81]. In 1867, the formation of the Austro-Hungarian Empire ended this autonomy, and Transylvania was then ruled by the oppressive Hungarian Diet [82] until the First World War. During this time, despite social and political unrest, the Habsburg Empire made significant investments in infrastructure (e.g., railways, waterways), industry (e.g., coal mining, metallurgy, local production of timber, food processing), agriculture, and banking and capital networks [83]. Unlike Transylvania, Moldova and Wallachia experienced much less Habsburg influence, with the Ottoman Empire dominating these society for centuries. In 1877, these two provinces united to create the Kingdom of Romania.

Although Romania is a contiguous and homogeneous country, at least in the early stages of its social, political and economic development, there were notable institutional differences among its regions. Habsburg political institutions were decentralized at the local level, whereas the Ottoman bureaucracy was highly centralized.

In the imperial establishment, property rights, especially land tenure institutions, were enforced from the early seventeenth century [84]. Subsequent reforms and improvements enabled the creation of an institutional infrastructure that was ahead of the other two Romanian provinces [85]. In contrast, the extractive institutions of the Ottoman Empire towards the tenure system required paying a certain amount of tribute to the Sultan to receive certain gains and opportunities [86].

Regarding legal institutions, organisational culture, and bureaucracy, the Habsburg Empire promoted accountability of judges and an efficient bureaucracy based on the predictability of laws, regulations and political reforms [84, 87]. When it comes to corruption, there is a long tradition to evoke corruption in the Ottoman Empire bureaucracy [88]:120): "From the seventeenth century onward the typical Ottoman official holding a position of any importance regarded it as a private investment from which he was justified in deriving as large a return as possible." Corruption was widespread throughout the Ottoman Empire, favour exchanges, clientelist networks, nepotism and black-market activities being the rule, especially at the dawn of its decline [89]. This behavior permeated all social strata, including the dominated territories and regions. Seton-Watson [90] observed in early 18th-century Wallachia, it was common practice to collect taxes twice without providing any receipts.

With the Habsburg Empire advancing and the Ottoman Empire beginning to decline, Transylvania benefited from significant reforms, whereas Moldova and Wallachia faced increasing fiscal pressure [91]. Especially after the reign of Joseph II (1765–1790), reforms in Transylvania aimed to reduce regional disparities and promote schools and enhance education [92]. Moreover, in 1822, at least 45% of the total expenditures in Moldova were channeled to the Ottoman Empire [92]. By 1872, Transylvania had 34 joint-stock companies in operation, while the Kingdom of Romania had only three such companies by 1903. Also, the first modern bank started operating in Transylvania since 1835, whereas in the other part only appeared in 1864 [93]. In 1910, Transylvania had around 430 banks, compared to just 140 in Wallachia and Moldova [89].

Economic improvements in Transylvania under Austrian administration were further noticed [94]. Despite the former Habsburg Empire ceased to exist more than 100 years ago, its provinces have continued to benefit from certain retained rules and institutions [95].

Data and methodology
Data
The data for corruption experience in the public health system and different control variables are collected from

the Life in Transition Survey (LiTS III) survey which was conducted between the end of 2015 and the beginning of 2016 and carried out by the European Bank for Reconstruction and Development in collaboration with the World Bank [96]. LiTS III was designed using multi-stage random probability stratified clustered sampling, where the sample was stratified by geographic regions and level of urbanity, therefore collecting nationally-representative household data.

Table 1 presents the descriptive statistics for the full sample. The dependent variable (*Bribes_public_health_system*) is taken from LiTS III, based on the question: "In your opinion, how often do people like you have to make unofficial payments or gifts when receiving medical treatment in the public health system?" This variable is measured on a scale from 0 to 4, whereby 0 indicating "never", 1="seldom", 2="sometimes", 3="usually", and 4="always". Across the entire sample, only 32.19% of Romanian respondents report never paying bribes. On a descriptive level, in Transylvania, this percentage increases to 41.07%, while in Moldova and Wallachia the

phenomenon of corruption in the medical sector is significantly more prevalent, where only 25.94% of respondents state that they never make unofficial payments or give gifts to medical staff.

In addition to the outcome variables, the LiTS III dataset provides individual-level and household-level covariates, such as respondents' age, gender, marital status, religion, ethnicity, employment status, level of urbanity (rural versus urban), education level, and household wealth index. The household wealth index was calculated by summing the values corresponding to dummy variables for the following items: telephone (including mobile phone), colour TV, computer/laptop/tablet, washing machine, car (including car used for private purposes), bicycle, and motorcycle.

Information on the spatial distribution of former communist repression institutions in Romania (extermination prisons, colonies and forced labour camps, deportation centres and compulsory residences) was obtained from the Institute for the Investigation of the Crimes of Communism and the Memory of the Romanian Exile

Table 1 Descriptive statistics

	Observations	Mean	Standard Deviation	Min	Max
Bribes_public_health_system (dependent)	1314	1,72	1,44	0	4
Age	1512	52,97	17,96	18	95
Gender	1512	0,42	0,49	0	1
Marital_status	1512	0,54	0,50	0	1
Religion	1512	1,10	0,47	0	3
Ethnicity	1512	0,91	0,28	0	1
Residence	1512	0,58	0,49	0	1
Employment status	1512	0,87	0,34	0	1
Education_level	1512	1,96	0,74	0	3
Household_wealth_index	1512	4,01	1,44	0	7
Former_Habsburg_Empire_In	1512	0,41	0,49	0	1
Distance_nearest_gulag_under_43km	1512	0,55	0,50	0	1
Distance_border_categ1 (50 to 50 km)	1512	2,32	1,02	1	4
Distance_border_categ2 (75 to 75 km)	1512	1,71	0,69	1	3
Distance_border_categ3 (100 to 100 km)	1512	1,54	0,64	1	3
Nr_20km	1512	0,36	0,68	0	3
Nr_75km	1473	1,43	1,16	0	4
Mother_member_PCR	1512	0,08	0,27	0	1
Father_member_PCR	1512	0,13	0,33	0	1
Other_family_members_PCR	1512	0,05	0,23	0	1
Family_moved_WWII	1278	0,05	0,22	0	1
GDP_per_capita_2015	1512	34,605,48	18,971,33	16,196	96,637
Unemployment_rate_2015	1492	5,23	2,49	1,36	11,4
latitude	1512	45,81	1,17	43,92	48,09
longitude	1512	25,23	2,02	21,24	28,66
NUTS2	1512	4,31	2,23	1	8

Source: Author's calculation in Stata 17

(IICCMER). To calculate the minimum distance from a place of permanent residence to the former border of the Habsburg Empire (Fig. 1), as well as to the extermination prisons and forced labour camps of the communist period, we used ArcGIS 10.6.

To analyse the significance of membership in the Romanian Communist Party prior to 1989, we used a question from LiTS III: "Were you or any member of your family a member of the Communist Party prior to 1989?" The responses included information about the respondent, their father and mother, and other family members.

Data on the gross domestic product per capita (expressed in national currency, lei) and the unemployment rate from 2015 by county were collected from the National Institute of Statistics [97]. NUTS2 refers to the Nomenclature of Territorial Units for Statistics regions in Romania, which are divided into 8 regions: North-West (RO11), Centre (RO12), North-East (RO21), South-East (RO22), South-Muntenia (RO31), Bucharest-Ilfov (RO32), South-West Oltenia (RO41) and West (RO42). The North-West, West and Centre regions comprise Transylvania, while the remaining 5 NUTS2 regions encompass Moldova and Wallachia.

Data analysis methods

The methodology aims to estimate whether historical legacies have a persistent or lasting influence on contemporary corrupt behaviour in the case of interaction with the public health system. In our analysis, the dependent variable is ordinal in nature. Therefore, we choose for a superior alternative to OLS regression, such as ordered probit model [98].

Let us define Y_{ilc}^* as the latent level of corruption behaviour of individual i living in location l in county c as a function of whether residing in a certain town or village that historically was a part of the former Habsburg Empire until
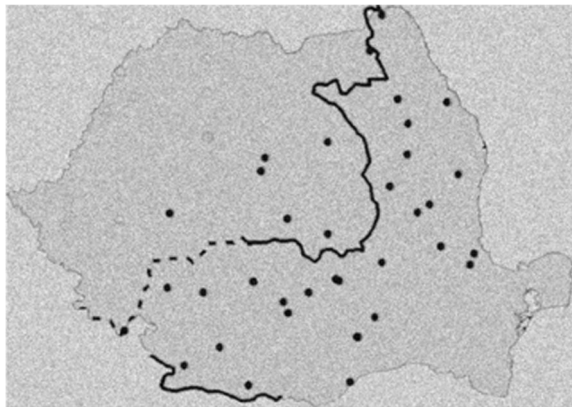

Fig. 1 Current map of Romania with the overlap of the former border of the Habsburg Empire around 1900. Source: Map processed after Becker et al. [35]

1918 (*Former_Habsburg_Empire_In*). In this study, this dependent variable y_{ilc}^* has five categories, thus the levels of corruption behaviour can be presented as follows [99, 100]:

$$Y_{ilc} = \begin{cases} 0 \; if \; Y_{ilc}* \leq \mu_1 \\ 1 \; if \; \mu_1 < Y_{ilc}^* \leq \mu_2 \\ 2 \; if \; \mu_2 < Y_{ilc}^* \leq \mu_3 \\ 3 \; if \; \mu_3 < Y_{ilc}^* \leq \mu_4 \\ 4 \; if \; \mu_4 < Y_{ilc}^* \end{cases} \tag{1}$$

where μ_r (r=1,2,3,4) are threshold variables that define each category of Y_{ilc}^*. Therefore, Y_{ilc} could take the value of 0 if respondent i living in location l in county c answers "never", 1 if "seldom", 2 if "sometimes", 3 if "usually" or 4 if "always".

The general model specification of ordered probit regressions is indicated as follows [101]:

$$Y_{ilc}^* = X_{ilc}\beta + \varepsilon_{ilc} \tag{2}$$

where:

- Y_{ilc}^* is latent level of corruption behaviour of individual i living in location l in county c;
- X_{ilc} are explanatory variables that capture the individual-level and household level control variables, the geographical and the macroeconomic controls, pre-1989 affiliation to former Romanian Communist Party and the distances from location of residence to former communist extermination prisons and forced labour camps;
- β represents the vector of coefficients of explanatory variables;
- ε_{ilc} is the independently and identically distributed error term;
- including county fixed effects, time-invariant within country heterogeneities were controlled for in order to focus on cross-regional variation [102, 103].

The probability that corruption-related behaviour could be associated with one of the five categories can be presented as follows [99]:

$$P(Y = 0) = P(Y^* \leq \mu_1 = \Phi)(\mu_1 - X_{ilc}\beta) \tag{3}$$

$$P(Y = 1) = P(\mu_1 < Y^* \leq \mu_2) = \Phi(\mu_2 - X_{ilc}\beta) - \Phi(\mu_1 - X_{ilc}\beta) \tag{4}$$

$$P(Y = 2) = P(\mu_2 < Y^* \leq \mu_3) = \Phi(\mu_3 - X_{ilc}\beta) - \Phi(\mu_2 - X_{ilc}\beta) \tag{5}$$

$$P(Y = 3) = P(\mu_3 < Y^* \leq \mu_4) = \Phi(\mu_4 - X_{ilc}\beta) - \Phi(\mu_3 - X_{ilc}\beta) \tag{6}$$

$$P(Y = 4) = P(\mu_4 < Y^*) = 1 - \Phi(\mu_4 - X_{ilc}\beta) \tag{7}$$

In all models, the estimated coefficients represent associations with the practices of informal payments when

receiving treatment in the public health sector rather than causal relationships [104].

Results

This section reports the main results on how the former historical border of the Habsburg Empire influences current corrupt behaviour among citizens when interacting with the public health sector in Romania.

Table 2 details the initial results of our regression analysis, which is based on ordered probit estimations with interactions. All models control for individual-level variables, such as age, gender, marital status, religion, ethnicity, residence, employment status, household wealth index and education level. Geographic controls include latitude and longitude, while macroeconomic controls comprise GDP per capita and the unemployment rate. Moreover, all regressions include county fixed effects. The use of county fixed effects is based on the assumption that it restricts the models to variations within Romanian

counties only, thereby avoiding to capture unobserved county heterogeneity [35].

Models (1) to (3) provide different perspectives on the role of the former Habsburg Empire's border in stimulating or reducing corrupt behaviour when receiving medical treatment in the public health system. We divided the sample into groups based on people living in towns and villages within 50 km, 75 km and 100 km of each other to observe what is happening near this historical border.

Based on these specific bandwidths, the preliminary conclusion is that individuals residing in different administrative-territorial units in Transylvania (which was part of the Habsburg Empire until 1918) show notable peculiarities. Whether they live 50 km or 75 km away from the former border of the Habsburg Empire, in a village or town that used to be part of the former Empire, the results confirm that these citizens display corrupt behaviour when accessing public health services. As we move further into the Transylvanian core (at least 75 km from

Table 2 Proximity to former Habsburg Empire's border and present-day corruption behaviour in the public health system, ordered probit regressions, baseline specifications

	(1)	(2)	(3)
Individual-level controls	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes
Macroeconomic controls	Yes	Yes	Yes
County-fixed effects	Yes	Yes	Yes
1.Former_Habsburg_Empire_In#1.Distance_border_categ1	1.0973**		
	(0.4638)		
1.Former_Habsburg_Empire_In#2.Distance_border_categ1	0.3317		
	(0.3858)		
1.Former_Habsburg_Empire_In#3.Distance_border_categ1	-0.8972***		
	(0.3183)		
1.Former_Habsburg_Empire_In#1.Distance_border_categ2		0.6703*	
		(0.3993)	
1.Former_Habsburg_Empire_In#2.Distance_border_categ2		-0.8716***	
		(0.3127)	
1.Former_Habsburg_Empire_In#1.Distance_border_categ3			0.5987
			(0.4168)
1.Former_Habsburg_Empire_In#2.Distance_border_categ3			-0.5172
			(0.3705)
N	1295	1295	1295
chi2	341.36	331.66	283.38
p	0.0000	0.0000	0.0000
Pseudo R^2	0.0730	0.0767	0.0640
AIC	3778.55	3759.44	3810.27
BIC	3990.37	3960.93	4011.75
AUROC (after probit)	0.7717	0.7712	0.7845
Goodness of fit (after probit)	0.0692	0.0409	0.1316

Source: Author's calculation in Stata 17 based on data from LiTS III

Notes. Standard errors are in parentheses. **** $p < 0.001$, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Coefficient estimates are raw coefficients from ordered probit (*oprobit*) estimations

the former imperial border), we observe a shift, with people exhibiting clearly anti-corrupt behaviour in these particular situations. This seems to confirm the general pattern that despite the long-gone Habsburg Empire, significant echoes of corruption persist in the particular case of interacting with public services.

These findings indicate that in the near vicinity of the former border, the influence of history is shifting from right to left, potentially due to the centuries-long role of the extractive institutions of the Ottoman Empire in fostering corruption especially in the other two historical regions of Romania, Moldova and Wallachia. Previous researchers have documented that these extractive institutions negatively impact various individual well-being and social welfare variables [105, 106], maintaining their persistence across generations [107]. This path dependence appears to be the mechanism through which intergenerational transfer of informal institutions from the Ottoman Empire and the Habsburg Empire

occurs, ensuring a certain persistent regional institutional specificity [84].

Discussion

We further consider a set of control variables that reveal the role of former communist regime in augmenting or not respondents' current corruption behaviors. To test their relevance, we performed another ordered probit regression for Transylvania and for the other two historical parts of Romania: Moldova and Wallachia.

As can be seen from the results presented in Tables 3 and 4, the factors that outline a number of historical influences of the former communist regime affect respondents living in Transylvania differently compared to those in Moldova and Wallachia. The results indicate that in both Moldova and Wallachia, the membership of respondents' parents or other family members in the Romanian Communist Party before 1989 does not significantly affect the tendency to make informal payments or give gifts when

Table 3 Former communist heritage and present-day corruption behaviour in the public health system, ordered probit regressions, baseline specifications (Moldova and Wallachia)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nr_20km	0.2646****						
	(0.0671)						
Nr_75km		0.1021*					
		(0.0566)					
Distance_nearest_gulag_under43km			0.3883***				
			(0.1297)				
Father_member_PCR				0.1779			
				(0.1106)			
Mother_member_PCR					0.0108		
					(0.1357)		
Other_family_members_PCR						0.1177	
						(0.1601)	
Family_moved_WWII							0.3403**
							(0.1625)
N	771	771	771	771	771	771	690
chi2	207.30	187.83	194.33	189.31	187.53	186.68	175.66
p	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R^2	0.0927	0.0896	0.0930	0.0892	0.0881	0.0883	0.0913
AIC	2241.88	2249.39	2241.22	2250.23	2252.86	2252.46	2017.53
BIC	2395.26	2402.76	2394.59	2403.60	2406.24	2405.83	2167.24
AUROC (after probit)	0.7853	0.7866	0.7893	0.7841	0.7840	0.7845	0.7865
Goodness of fit (after probit)	0.0435	0.0108	0.0501	0.0460	0.0204	0.0198	0.0159

Source: Author's calculation in Stata 17 based on data from http://hartagulagului.ro/ merged with LiTS III [108]

Notes. Standard errors are in parentheses. **** $p < 0.001$, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Coefficient estimates are raw coefficients from ordered probit (*oprobit*) estimations

Table 4 Former communist heritage and present-day corruption behaviour in the public health system, ordered probit regressions, baseline specifications (Transylvania)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nr_20km	0.0287						
	(0.1411)						
Nr_75km		0.0115					
		(0.0679)					
Distance_nearest_gulag_under43km			-0.1832				
			(0.1347)				
Father_member_PCR				-0.0970			
				(0.2013)			
Mother_member_PCR					0.2588		
					(0.2937)		
Other_family_members_PCR						0.4899**	
						(0.2188)	
Family_moved_WWII							0.3072
							(0.2427)
N	524	524	524	524	524	524	438
chi2	616.81	619.01	3968.66	631.69	621.54	623.53	140.02
p	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R^2	0.1005	0.1005	0.1016	0.1006	0.1011	0.1039	0.1047
AIC	1456.65	1456.66	1452.83	1456.46	1455.67	1451.32	1228.04
BIC	1588.75	1588.76	1580.67	1588.56	1587.78	1583.43	1350.50
AUROC (after probit)	0.7753	0.7745	0.7752	0.7759	0.7755	0.7754	0.7803
Goodness of fit (after probit)	0.0836	0.1007	0.0747	0.0751	0.0677	0.0974	0.1578

Source: Author's calculation in Stata 17 based on data from http://hartagulagului.ro/ merged with LiTS III [108]

Notes. Standard errors are in parentheses. **** $p < 0.001$, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Coefficient estimates are raw coefficients from ordered probit (*oprobit*) estimations

receiving treatment in the Romanian public health care system. Conversely, the presence of former repressive prisons or forced labor camps from the communist era within various distances (e.g., 20 km and 75 km) positively influences these practices in interactions with the public health care system. In Transylvania, a completely different pattern emerges. Here, only the affiliation of other family members to the Romanian Communist Party before 1989 significantly increases the likelihood of making informal payments or giving gifts as a patient in the Romanian public health care system. Additionally, none of the variables associated with the communist repressive system influence this practice of informal payments. One possible explanation for this difference is that communism, with its meteors in terms of attitudes, norms, values and behaviors, was more strongly embraced in regions historically dominated by empires that promoted extractive institutions. These empires, such as the Ottoman Empire, were characterized by corruption, dysfunctional bureaucracy,

the use of force, and a disregard for private property and civil liberties. Therefore, this historical background may have influenced the population of these areas not to obey the legal norms in a natural or organic way and to become much more easily compatible with the institutional status-quo that communism proposed and imposed.

As depicted in Table 5, residing within no more than approximately 43 km (the average distance for each locality in our sample to the nearest communist repression prison(s) in Romania) of at least one former communist extermination prison or forced labour camp correlates with a higher likelihood of individuals making unofficial payments or offering gifts when accessing medical services in the public health system. Notably, around 55% of respondents in our analysis sample live within this proximity to a former communist and/or forced labour camp. Specifically for respondents from Transylvanian localities situated within 50 km (Model 1) or 75 km (Model 2) of the former historical border of the Habsburg Empire,

Table 5 Proximity to former Habsburg Empire's border and former communist extermination prisons and forced labour camps and present-day corruption behaviour in the public health system, ordered probit regressions, baseline specifications

	(1)	(2)	(3)
Individual-level controls	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes
Macroeconomic controls	Yes	Yes	Yes
County-fixed effects	Yes	Yes	Yes
Distance_nearest_gulag_under43km	0.3614****	0.2747***	0.2894****
	(0.0899)	(0.0861)	(0.0859)
1.Former_Habsburg_Empire_In#1.Distance_border_categ1	1.1988**		
	(0.4695)		
1.Former_Habsburg_Empire_In#2.Distance_border_categ1	0.4598		
	(0.3873)		
1.Former_Habsburg_Empire_In#3.Distance_border_categ1	-0.8793***		
	(0.3219)		
1.Former_Habsburg_Empire_In#1.Distance_border_categ2		0.6757*	
		(0.4075)	
1.Former_Habsburg_Empire_In#2.Distance_border_categ2		-0.9016***	
		(0.3173)	
1.Former_Habsburg_Empire_In#1.Distance_border_categ3			0.4965
			(0.4167)
1.Former_Habsburg_Empire_In#2.Distance_border_categ3			-0.6946*
			(0.3771)
N	1295	1295	1295
chi2	359.19	339.13	298.34
p	0.0000	0.0000	0.0000
Pseudo R^2	0.0775	0.0796	0.0672
AIC	3762.47	3749.92	3799.64
BIC	3979.46	3956.57	4006.29
AUROC (after probit)	0.7783	0.7747	0.7864
Goodness of fit (after probit)	0.0565	0.0375	0.1552

Source: Author's calculation in Stata 17 based on data from http://hartagulagului.ro/ merged with LiTS III [108]

Notes. Standard errors are in parentheses. **** $p < 0.001$, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Coefficient estimates are raw coefficients from ordered probit (*oprobit*) estimations

there is a statistically significant positive association with corrupt behaviour. Conversely, as the distance from this border increases (at least 75 km and 100 km (Model 3), respectively), the initial association diminishes, with respondents totally unwilling to tolerate corrupt practices when interacting with public health institutions. Overall, these results underscore that proximity to a former communist repression institution increases tendencies toward corrupt behaviour. Importantly, they highlight that both legacies from the long-gone Habsburg Empire and more recent impacts of communism continue to exert influence on current corrupt behaviours. These findings align with other previous research that has similarly established these results [109]. Moreover, such institutional arrangements (e.g., former communist repressive institutions) were not taken incidentally but deliberately.

In general, it is widely acknowledged that, among other positive effects, democratic institutions play a crucial role in fostering the conditions for better public health policies and reducing levels of corruption [110]. Strictly related to the history of communism in Eastern Europe, the regime's coercive institutions heavily relied on informants and loyalists, including citizens who betrayed each other for ideological, opportunistic, material or other benefits. This pervasive mistrust significantly undermined interpersonal trust and social cohesion. In such a context, distrust became a survival strategy to adapt and navigate the social and political environment and avoid being labelled a social enemy, which could have led to imprisonment and loss of social status. Moreover, there is a well-established connection between trust and corruption [111]. Thus, people who lack trust in others

may resort to acts of corruption to achieve their goals [112, 113].

Table 6 illustrates that the closer respondents live to only a growing number of communist extermination prisons and forced labour camps within a radius of 20 km or 75 km of their residence, the more likely they are to engage in corrupt behavior in order to receive medical services in the public health care system. In addition, the influence of these communist-era prisons, which constituted an essential part of the Gulag network in Romania aimed at supressing political enemies and dissidents, decreases as they are located further away from the respondents' residences. The influence of this geographic density of these repressive institutions during the communist period is most statistically significant in the 50 km bandwidth on either side of the former imperial border (Models 1 and 4). These findings support the thesis that residents of Transylvanian villages and towns located close to the former historical border of the Habsburg Empire (less than 50 km, Models 1 and 4) exhibit significant and positive corrupt behaviour in the position of patients receiving medical treatment in the public health sector. In contrast, those residing farther away from this border (beyond 75 km – Models 2 and 5, and 100 km – Models 3 and 6) tend to oppose any of these corrupt practices.

Table 6 Proximity to former Habsburg Empire's border and spatial density of former communist extermination prisons and forced labour camps and present-day corruption behaviour in the public health system, ordered probit regressions, baseline specifications

	(1)	(2)	(3)	(4)	(5)	(6)
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes
County-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Nr_20km	0.2411****	0.1276**	0.1825***			
	(0.0628)	(0.0580)	(0.0608)			
Nr_75km				0.1998****	0.0823**	0.0719*
				(0.0505)	(0.0417)	(0.0435)
1.Former_Habsburg_Empire_In#1.Distance_border_categ1	1.1244**			0.9195**		
	(0.4674)			(0.4673)		
1.Former_Habsburg_Empire_In#2.Distance_border_categ1	0.2903			0.1559		
	(0.3882)			(0.3865)		
1.Former_Habsburg_Empire_In#3.Distance_border_categ1	-0.9484***			-1.2013****		
	(0.3204)			(0.3254)		
1.Former_Habsburg_Empire_In#1.Distance_border_categ2		0.6070			0.4832	
		(0.4030)			(0.4113)	
1.Former_Habsburg_Empire_In#2.Distance_border_categ2		-0.9314***			-1.0447***	
		(0.3154)			(0.3230)	
1.Former_Habsburg_Empire_In#1.Distance_border_categ3			0.1995			0.4338
			(0.4385)			(0.4243)
1.Former_Habsburg_Empire_In#2.Distance_border_categ3			-0.9311**			-0.7267*
			(0.3912)			(0.3918)
N	1295	1295	1295	1295	1295	1295
chi2	361.99	340.46	292.71	354.01	335.30	284.79
p	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R^2	0.0759	0.0776	0.0655	0.0775	0.0777	0.0647
AIC	3768.69	3757.84	3806.27	3762.52	3757.56	3809.42
BIC	3985.67	39,644.87	4012.93	3979.50	3964.21	4016.07
AUROC (after probit)	0.7756	0.7726	0.7876	0.7762	0.7723	0.7907
Goodness of fit (after probit)	0.0257	0.0242	0.1160	0.0766	0.0289	0.1974

Source: Author's calculation in Stata 17 based on data from http://hartagulagului.ro/ merged with LiTS III [108]

Notes. Standard errors are in parentheses. **** $p < 0.001$, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Coefficient estimates are raw coefficients from ordered probit (*oprobit*) estimations

The presence of several repressive institutions operating under communism (before 1989) within a 20 km radius (even 75 km) of respondents' residences correlates with increased corrupt behaviour. This result is consistent with previous research, which indicates that proximity to former gulags, extermination prisons, and forced labour camps, which have sustained the salience of fear and terror in society, typically erodes various forms of civic capital, thereby fostering civic disengagement [36]. Such conditions have further contributed to a culture of mistrust and contagion among neighbours, which negatively impacts the levels of corruption [114].

In addition, we examine whether people living at different distances from the former imperial border (50 km, 75 km, or even 100 km) exhibit the same corrupt behaviour in the public health system, taking into account the political background of their family members before 1989 (if they were affiliated to the Romanian Communist Party) or the situation when the respondent or close family (e.g., parents or grandparents) had to relocate because of World War II. These variables are included for specific reasons. First, it is documented that many individuals who were members of the Romanian Communist Party before 1989 held influential positions in factories, plants and other state-owned companies. Economic problems, such as shortages of raw materials and technology, made it difficult to achieve planned production targets. Under such conditions, in order to avoid punishment, they had to engage in corrupt activities, including dealings on the black market [115, 116]. Second, we have identified in the literature that people who endured hardship in the aftermath of World War II were often rewarded and advanced by the communist regime, rising to prominent roles in the nomenklatura. This conjuncture positively influenced their corrupt behaviour [117]. Overall, both personal and familial affiliations with the Romanian Communist Party have persistent effects on various socio-economic outcomes, including contemporary corruption [118].

Table 7 (Models 1 to 3) highlights the influence of family members' pre-1989 membership in the Romanian Communist Party in understanding contemporary corrupt behaviour within interactions with the public health system. As can be seen, the hypothesis that pre-1989 membership in the Romanian Communist Party positively influences corrupt behaviour [119] is (partially) confirmed. Thus, individuals with family members (but excluding parents) who were Party members before 1989 are more inclined to engage in unofficial payments or gift-giving when receiving medical care in the public health system (Models 1 to 3). The empirical results highlight that respondents living in Transylvania within the first 50 km in the proximity of the former border of the Habsburg Empire show the same stable and strong

positive influence towards tolerating corrupt practices in the public health care system (Model 1). The further we move away from the 50 km limit from this former historical border (at least 75 km) and further inland into Transylvania, they display clear anti-corruption behaviour, being inimical to informal payments and gift-giving in the public health sector (Models 1 and 2). This finding may suggest a spillover effect, from regions that were part of the Kingdom of Romania (Moldova and Wallachia) to regions that were part of the former Habsburg Empire, but only over a geographically narrow bandwidth (e.g., 50 km) on either side of the former Habsburg Empire. At the same time, the situation in which the respondent or close family (e.g. parents or grandparents) had to move because of World War II shows a significant positive influence on current corrupt behavior. respondents, depending on their residential proximity to different bands (50 to 50 km, 75 to 75 km or 100 to 100 km). Specifically, only Transylvanian citizens living in the first 50 km band from the historical imperial border (and whose other family members were members of the Romanian Communist Party) exhibit corrupt behavior towards public health services. Above this limit, the results are not statistically significant. Moreover, beyond the 75 km and 100 km limits of the long-gone political and historical border of the Habsburg Empire, they show anti-corrupt behavior.

Robustness checks

This section provides deeper analyses (robustness checks) to validate the initial findings. On the one hand, we sequentially eliminate several controls that could be endogenous and different counties where communist extermination prisons or forced labour camps operated. It is considered that individuals' employment status, wealth, and educational attainment could be outcomes given by the geographical location of former communist extermination prisons and forced labour camps and, in addition, could function as channels through which the effects of living near such repressive institutions influence corrupt behaviours [35]. The possibility of living near such repression prisons and camps made them endogenous [36]. Therefore, as they could introduce selection bias, they are labelled as "bad controls" [120].

In the following tables (Tables 8 and 9), we exclusively control for these potentially endogenous variables and eliminate "good controls" such as age, gender, marital status, religion, ethnicity, and residence. Under these revised conditions, living less or more than 75 km from the former border of the Habsburg Empire and considering both the spatial density of former communist repressive institutions (in terms of their number within specific geographical bandwidths), the distance to the nearest

Table 7 Proximity to the border of the former Habsburg Empire, as well as affiliation with former Romanian Communist Party extermination prisons and forced labour camps and current corrupt behaviour in the public health system, ordered probit regressions, baseline specifications

	(1)	(2)	(3)	(4)	(5)	(6)
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes
County-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Father_member_PCR	0.1731	0.1121	0.1647			
	(0.1231)	(0.1220)	(0.1226)			
Mother_member_PCR	-0.1058	-0.1070	-0.1077			
	(0.1623)	(0.1606)	(0.1618)			
Other_family_members_PCR	0.3618***	0.3568***	0.3829***			
	(0.1379)	(0.1373)	(0.1360)			
Family_moved_WWII				0.2347*	0.2393*	0.2358*
				(0.1339)	(0.1304)	(0.1330)
1.Former_Habsburg_Empire_In#1.Distance_border_categ1	1.1000**			0.8364		
	(0.4662)			(0.5447)		
1.Former_Habsburg_Empire_In#2.Distance_border_categ1	0.3345			0.0742		
	(0.3878)			(0.4280)		
1.Former_Habsburg_Empire_In#3.Distance_border_categ1	-0.8963***			-1.1959****		
	(0.3209)			(0.3557)		
1.Former_Habsburg_Empire_In#1.Distance_border_categ2		0.6283			0.7036	
		(0.4005)			(0.4693)	
1.Former_Habsburg_Empire_In#2.Distance_border_categ2		-0.8827***			-1.0095***	
		(0.3140)			(0.3546)	
1.Former_Habsburg_Empire_In#1.Distance_border_categ3			0.6102			0.6934
			(0.4181)			(0.4648)
1.Former_Habsburg_Empire_In#2.Distance_border_categ3			-0.5183			-0.5066
			(0.3713)			(0.4077)
N	1295	1295	1295	1128	1128	1128
chi2	346.23	334.65	292.91	307.48	301.41	250.11
p	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R^2	0.0753	0.0786	0.0665	0.0707	0.0761	0.0608
AIC	3775.34	3757.90	3806.41	3314.16	3291.50	3344.63
BIC	4002.66	3974.88	4023.39	3525.34	3492.63	3545.76
AUROC (after probit)	0.7748	0.7732	0.7859	0.7699	0.7694	0.7799
Goodness of fit (after probit)	0.0638	0.0472	0.1067	0.1129	0.1059	0.1720

Source: Author's calculation in Stata 17

Notes. Standard errors are in parentheses. **** $p < 0.001$, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Coefficient estimates are raw coefficients from ordered probit (*oprobit*) estimations

such institution, alongside factors like family members' affiliation with the Romanian Communist Party before 1989 and/or their experiences of forced relocation during World War II, the results fit the baseline model. As can be seen, all estimated coefficients consistently confirm the baseline model (Table 2, model 2), that near the former historical border of the Habsburg Empire, corrupt behaviour among Transylvanian respondents is significantly positive, whereas those residing at least 75 km from the border exhibit a markedly negative attitude towards corrupt behaviour.

We found that the primary regressor (*Former_Habsburg_Empire_In*) exhibits the same consistent pattern as seen in the extended version (Table 2, Model 2), demonstrating that the additional inclusion of bad controls was justified. These results hold even when including variables such as pre-1989 membership in the Romanian Communist Party, other family members' wartime

Table 8 Different historical events and current corruption behaviour in the public health system, ordered probit regressions, robustness checks (from 75 in 75 km of the former imperial border)

	(1)	(2)	(3)	(4)	(5)	(6)
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes
County-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Former_Habsburg_Empire	0.3835*	0.3989**	0.4426**	-0.9437***	-0.8111**	-0.8130**
	(0.1971)	(0.1927)	(0.1964)	(0.3313)	(0.3356)	(0.3361)
Nr_20km	0.2319			0.4181***		
	(0.1590)			(0.1530)		
Nr_75km		-0.1636**			0.2757***	
		(0.0827)			(0.0911)	
Distance_nearest_gulag_under43km			0.2958*			0.7061****
			(0.1588)			(0.1697)
N	544	544	544	586	586	586
chi2	134.21	142.45	138.73	183.63	176.39	186.35
p	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R^2	0.0771	0.0783	0.0786	0.0958	0.0979	0.1011
AIC	1537.25	1535.31	1534.84	1699.95	1696.25	1690.36
BIC	1649.02	1647.08	1646.61	1822.40	1818.70	1812.81
AUROC (after probit)	0.8124	0.8113	0.8319	0.8039	0.8047	0.8041
Goodness of fit (after probit)	0.1750	0.0849	0.0749	0.0698	0.0573	0.1255

Source: Author's calculation in Stata 17 based on data from http://hartagulagului.ro/ merged with LiTS III [108]

Notes. Standard errors are in parentheses. **** $p < 0.001$, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Coefficient estimates are raw coefficients from ordered probit (*oprobit*) estimations

The individual-level controls are employment status, household wealth index and level of education. The geographic controls are latitude and longitude. The macroeconomic controls are GDP per capita and unemployment rate in 2015. All regressions include county fixed effects

forced relocation experiences (e.g., World War II), and the density of communist prisons and forced labour camps within specified distance radii from respondents' residences.

Further soundness and validation checks were conducted (Table 10). We excluded from the overall sample all counties where communist extermination prisons and/or forced labour camps were historically active. These counties include: Alba, Argeș, Bacău, Bihor, Botoșani, Brașov, Cluj, Constanța, Galați, Ilfov, Maramureș, Prahova, Satu Mare, Suceava and Timiș. Table 10 (Models 1 to 3) underscores the influence of family members' affiliation with the Romanian Communist Party before 1989 and the experience of forced relocation due to World War II on understanding contemporary corrupt behaviour within the public health system. The results indicate that communist political legacies do not influence these behaviours significantly. However, respondents residing within the closest 75 km bandwidth to the former imperial border show a tendency to be less tolerant of corrupt practices in their interactions with the Romanian healthcare system, although this finding is not statistically significant. Crucially, the analysis confirms that individuals

from Transylvania who reside more than 75 km but less than 150 km from the historical border consistently exhibit a reluctance to engage within the public health system.

The final set of robustness checks consists of sequentially removing one NUTS2 region from the overall sample (specifically, NUTS6, NUTS7, NUTS5, NUTS8, NUTS3 and NUTS1, one at a time) and re-estimating Eq. (1) according to the remaining sample. This additional analysis aimed to verify whether the results obtained are dependent on specific historical–geographical regions in Romania. This process was repeated until only two NUTS2 regions remained on both sides of the former Habsburg border. As can be seen from the tables below (Tables 11, 12, 13, 14, 15), even after controlling for all categories of variables used above, the results confirm the main hypothesis: irrespective of the communist regime's influence, the former Habsburg Empire continues to exert a persistent influence on corrupt behaviour. Specifically, living further from the former border increases the likelihood of not offering bribes when interacting with public health institutions.

Table 9 Different historical events and current corruption behaviour in the public health system, ordered probit regressions, robustness checks (from 75 in 75 km of the former imperial border)

	(1)	(2)	(3)	(4)
Individual-level controls	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes
Macroeconomic controls	Yes	Yes	Yes	Yes
County-fixed effects	Yes	Yes	Yes	Yes
Former_Habsburg_Empire_In	0.4402**	0.6242***	-0.9249***	-0.8869*
	(0.1910)	(0.2268)	(0.3315)	(0.4724)
Father_member_PCR	0.1353		0.1143	
	(0.1842)		(0.1798)	
Mother_member_PCR	0.0772		-0.0763	
	(0.2397)		(0.2309)	
Other_family_members_PCR	0.3035		0.1899	
	(0.1965)		(0.1904)	
Family_moved_WWII		0.1159		0.2039
		(0.2078)		(0.2124)
N	544	477	586	508
chi2	132.71	118.58	172.13	667.52
p	0.0000	0.0000	0.0000	0.0000
Pseudo R^2	0.0786	0.0853	0.0922	0.0954
AIC	1538.90	1333.08	1710.46	1487.29
BIC	1659.27	1441.44	1841.66	1601.52
AUROC (after probit)	0.8136	0.8062	0.8010	0.8024
Goodness of fit (after probit)	0.0511	0.1252	0.1228	0.0328

Source: Author's calculation in Stata 17

Notes. Standard errors are in parentheses. **** $p < 0.001$, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Coefficient estimates are raw coefficients from ordered probit (*oprobit*) estimations

The individual-level controls are employment status, household wealth index and level of education. The geographic controls are latitude and longitude. The macroeconomic controls are GDP per capita and unemployment rate in 2015. All regressions include county fixed effects

Table 10 Different historical events and current corruption behaviour in the public health system, ordered probit regressions, robustness checks (from 75 in 75 km of the former imperial border), 15 counties less than the total sample

	(1)	(2)	(3)	(4)
Individual-level controls	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes
Macroeconomic controls	Yes	Yes	Yes	Yes
County-fixed effects	Yes	Yes	Yes	Yes
Former_Habsburg_Empire_In	-0.7056	-0.4397	-1.2375*	-1.5279*
	(0.5098)	(0.5435)	(0.6541)	(0.8148)
Father_member_PCR	0.2090		0.1322	
	(0.2579)		(0.2279)	
Mother_member_PCR	-0.1077		-0.2402	
	(0.2929)		(0.2871)	
Other_family_members_PCR	0.4095		-0.0580	
	(0.2520)		(0.2757)	
Family_moved_WWII		0.2810		0.5044*
		(0.2670)		(0.2712)
N	281	256	358	310
chi2	1152.79		1174.02	577.36
p	0.0000		0.0000	0.0000
Pseudo R^2	0.1507	0.1306	0.1553	0.1654
AIC	772.24	719.59	1018.00	878.56
BIC	903.22	836.58	1157.69	1001.87
AUROC (after probit)	0.7431	0.7128	0.8060	0.8296
Goodness of fit (after probit)	0.0123	0.2675	0.1549	0.4326

Source: Author's calculation in Stata 17

Notes. Standard errors are in parentheses. **** $p < 0.001$, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Coefficient estimates are raw coefficients from ordered probit (*oprobit*) estimations

Conclusion

In this study, we examine whether respondents from Romanian counties that were part of the former Habsburg Empire, compared to those from Moldova and Wallachia, which were under Ottoman Empire domination for the longest period, display less corrupt behaviour when interacting with the public health system, when seeking and receiving specialized treatment as patients. Overall, we findings illustrate that the former Habsburg Empire has left a lasting imprint on its formal institutions through enduring cultural norms, even more over a century after its collapse. This paper makes a substantial contribution to the burgeoning literature on the historical origins of corruption, both more and less distant, being the first to attribute within-county differences in Romania to the border of the former Habsburg Empire

and membership in the Romanian Communist Party before 1989, as well as to the pre-1989 repressive institutional system during communism. Using individual-level data from the 2016 Life in Transition Survey (LiTS III), along with macroeconomic, geographic, and county fixed effects, and applying ordered probit regression, our results are particularly notable. Despite all these citizens living in the same country and sharing the same norms, they exhibit different historical exposures to both the former Habsburg Empire and communism.

Our results indicate that, more than 100 years after its dissolution, the Habsburg Empire still seems to influence the mentality and practices of citizens in their interactions with public institutions. Similarly, we have identified a contagion effect from the citizens of Moldova and Wallachia to those in Transylvania in the proximity of the former imperial border. In this proximity (50 and 75 km), the transfer of attitudes and mentalities that encourage informal practices and gift-giving when a citizen seeks treatment in the public

Table 11 Different historical events and current corruption behaviour in the public health system, ordered probit regressions, robustness checks (from 75 in 75 km of the former imperial border), decreasing sample of Romanian counties

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Distance_nearest_gulag_under43km	0.2970****	0.2614***	0.2795****	0.2169**	0.0394	-0.1062	0.0628
	(0.0795)	(0.0798)	(0.0827)	(0.0883)	(0.1042)	(0.1351)	(0.3570)
1.fHabsb_Empire_ln# 1.Distance_border_categ2	0.2110	-0.0844	0.4488	0.5202	0.2365	2.3381**	2.9925****
	(0.2939)	(0.2977)	(0.3481)	(0.4302)	(0.5843)	(1.0396)	(0.7771)
1.fHabsb_Empire_ln# 2.Distance_border_categ2	-0.6730***	-1.2296****	-0.7765**	-0.8497**	-0.7770*	-0.1540	0.0000
	(0.2418)	(0.2626)	(0.3070)	(0.3774)	(0.4498)	(0.7299)	(.)
N	1295	1201	1107	932	732	503	351
chi2	229.73	241.40	243.54	215.32	211.46	220.62	227.84
p	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R2	0.0540	0.0571	0.0618	0.0626	0.0865	0.1380	0.1678
AIC	3838.33	3524.42	3221.86	2681.02	2066.04	1375.42	959.96
BIC	4008.82	3692.42	3387.17	2840.65	2217.70	1510.48	1079.65

Source: Author's calculation in Stata 17 based on data from http://hartagulagului.ro/ merged with LiTS III [108]

Notes. Standard errors are in parentheses. **** $p < 0.001$, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Coefficient estimates are raw coefficients from ordered probit (*oprobit*) estimations

Table 12 Different historical events and current corruption behaviour in the public health system, ordered probit regressions, robustness checks (from 75 in 75 km of the former imperial border), decreasing sample of Romanian counties

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Father_member_PCR	0.1133	0.1403	0.1237	-0.0296	0.0758	0.1254	0.0949
	(0.1203)	(0.1277)	(0.1318)	(0.1575)	(0.1795)	(0.2038)	(0.2318)
Mother_member_PCR	-0.0374	0.1030	0.1068	0.2666	-0.0123	-0.2372	-0.2387
	(0.1589)	(0.1721)	(0.1751)	(0.1991)	(0.2065)	(0.2319)	(0.2578)
Other_family_members_PCR	0.3524**	0.4670***	0.4490***	0.6204****	0.3136	0.0169	0.0256
	(0.1385)	(0.1543)	(0.1558)	(0.1723)	(0.2118)	(0.2701)	(0.2965)
1.fHabsb_Empire_ln #1.Distance_border_categ2	-0.0190	-0.2649	0.1764	0.4087	0.2221	2.4129**	2.9349****
	(0.2875)	(0.2935)	(0.3348)	(0.4305)	(0.5803)	(1.0884)	(0.7472)
1.fHabsb_Empire_ln #2.Distance_border_categ2	-0.7513***	-1.3010****	-0.9166***	-0.8336**	-0.7628*	-0.0366	0.0000
	(0.2408)	(0.2621)	(0.3033)	(0.3818)	(0.4457)	(0.7373)	(.)
N	1295	1201	1107	932	732	503	351
chi2	217.39	233.34	235.97	217.61	211.77	222.60	234.60
p	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R2	0.0521	0.0578	0.0618	0.0656	0.0873	0.1383	0.1686
AIC	3849.79	3525.82	3225.99	2676.49	2068.25	1379.06	963.07
BIC	4030.61	3704.01	3401.32	2845.80	2229.10	1522.56	1090.47

Source: Author's calculation in Stata 17

Notes. Standard errors are in parentheses. **** $p < 0.001$, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Coefficient estimates are raw coefficients from ordered probit (*oprobit*) estimations

Table 13 Different historical events and current corruption behaviour in the public health system, ordered probit regressions, robustness checks (from 75 in 75 km of the former imperial border), decreasing sample of Romanian counties

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Family_members_move_WWII	0.2848**	0.3966***	0.4445***	0.4355***	0.3377*	0.1289	0.4517
	(0.1350)	(0.1414)	(0.1532)	(0.1642)	(0.1853)	(0.2364)	(0.2938)
1.fHabsb_Empire_In #1.Distance_border_categ2	-0.1064	-0.3842	0.0748	0.2960	0.8656	2.0893*	2.9479****
	(0.3178)	(0.3273)	(0.3757)	(0.4974)	(0.7789)	(1.1008)	(0.7613)
1.fHabsb_Empire_In #2.Distance_border_categ2	-0.9943****	-1.5759****	-1.2084****	-1.1224***	-0.6769	-0.4667	0.0000
	(0.2661)	(0.2866)	(0.3340)	(0.4338)	(0.5516)	(0.7713)	(.)
N	1128	1058	970	816	619	433	311
chi2	178.01	216.78	216.17	192.27	209.79	197.16	187.65
p	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R2	0.0475	0.0571	0.0613	0.0636	0.0936	0.1437	0.1558
AIC	3377.09	3121.42	2837.12	2353.99	1747.33	1191.60	871.58
BIC	3543.02	3285.24	2998.07	2509.24	1893.46	1321.86	987.52

Source: Author's calculation in Stata 17

Notes. Standard errors are in parentheses. **** $p < 0.001$, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Coefficient estimates are raw coefficients from ordered probit (*oprobit*) estimations

Table 14 Different historical events and current corruption behaviour in the public health system, ordered probit regressions, robustness checks (from 75 in 75 km of the former imperial border), decreasing sample of Romanian counties

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nr_20km	0.2037****	0.1453***	0.1159**	0.1291**	-0.0031	-0.1590*	-0.1483
	(0.0553)	(0.0564)	(0.0562)	(0.0599)	(0.0650)	(0.0854)	(0.1016)
1.fHabsb_Empire_In #1.Distance_border_categ2	-0.1121	-0.3515	0.0796	0.1983	0.2583	2.8335***	2.8757****
	(0.2861)	(0.2915)	(0.3355)	(0.4329)	(0.5841)	(1.0785)	(0.7049)
1.fHabsb_Empire_In #2.Distance_border_categ2	-0.9107****	-1.4038****	-1.0361****	-1.0687***	-0.7522*	0.3072	0.0000
	(0.2405)	(0.2625)	(0.3053)	(0.3867)	(0.4517)	(0.7521)	(.)
N	1295	1201	1107	932	732	503	351
chi2	230.57	232.58	232.94	209.41	209.10	222.50	247.69
p	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R2	0.0526	0.0552	0.0589	0.0612	0.0864	0.1393	0.1691
AIC	3843.72	3531.36	3231.54	2684.81	2066.21	1373.45	958.49
BIC	4014.20	3699.36	3396.85	2844.44	2217.87	1508.51	1078.17

Source: Author's calculation in Stata 17 based on data from http://hartagulagului.ro/ merged with LiTS III [108]

Notes. Standard errors are in parentheses. **** $p < 0.001$, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Coefficient estimates are raw coefficients from ordered probit (*oprobit*) estimations

Table 15 Different historical events and current corruption behaviour in the public health system, ordered probit regressions, robustness checks (from 75 in 75 km of the former imperial border), decreasing sample of Romanian counties

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nr_75km	0.0756**	0.0387	0.0227	0.0139	0.0659	0.0184	-0.6100***
	(0.0346)	(0.0358)	(0.0368)	(0.0478)	(0.0607)	(0.0950)	(0.2358)
1.fHabsb_Empire_In #1.Distance_border_categ2	0.0106	-0.2848	0.1338	0.3451	0.0720	2.4097**	2.7403****
	(0.2869)	(0.2941)	(0.3335)	(0.4251)	(0.6135)	(1.0462)	(0.7070)
1.fHabsb_Empire_In #2.Distance_border_categ2	-0.8499****	-1.3670****	-0.9955***	-0.9210**	-0.9524**	-0.0356	0.0000
	(0.2377)	(0.2600)	(0.3032)	(0.3906)	(0.4815)	(0.7181)	(.)
N	1295	1201	1107	932	732	503	351
chi2	215.96	228.36	230.88	209.13	210.10	219.14	235.04
p	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R2	0.0513	0.0542	0.0581	0.0602	0.0870	0.1377	0.1746
AIC	3848.95	3535.09	3234.22	2687.57	2064.85	1376.00	952.56
BIC	4019.43	3703.09	3399.53	2847.21	2216.51	1511.06	1072.25

Source: Author's calculation in Stata 17 based on data from http://hartagulagului.ro/ merged with LiTS III [108]

Notes. Standard errors are in parentheses. **** $p < 0.001$, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Coefficient estimates are raw coefficients from ordered probit (*oprobit*) estimations

health system flows from Moldova and Wallachia to Transylvania. Beyond these bandwidths (over 75 km and 100 km, respectively), the citizens of Transylvania completely change their behavior and exhibit well-defined anti-corruption behaviors in their interactions with the national health system, a result that confirms the theory of Becker et al. [35]. These findings remain robust even when controlling for county fixed effects, as well as various socio-demographic, macroeconomic, geographic, and more recent historical ones (e.g., the distance to the nearest communist repression prison and forced labour camp). When we controlled for other historical factors such as the number of these repressive institutions within a certain geographic radius from the respondents' residence, family members' affiliation with the former Romanian Communist Party, and forced relocations due to World War II, these results remain highly significant and robust only within the 50 km bandwidth. By considering such complex and numerous control variables, we excluded other potential historical influences, such as geography and human capital. Additionally, we conducted a series of robustness tests to validate our interpretations, ensuring their stability and reliability.

An additional analysis provides empirical evidence of a contagion effect from right to left in the immediate vicinity (within at most 75 km) of the former imperial border.

Although we did not find significant influences exerted by variables related to the proximity networks of extermination prisons and forced labour camps of the communist repression system, and only a marginal positive influence from the affiliation of other family members with the defunct Romanian Communist Party, we consider the following rationale. Respondents from the right side of the former Habsburg Empire border (Moldova and Wallachia) show a higher and significant likelihood of engaging in corrupt behavior when living near such communist repression institutions. Therefore, this contagion effect from right to left in the immediate vicinity of the former imperial border (up to 75 km) may still be influenced by the existence of the Romanian gulag, which played a significant role in perpetuating a set of values of an extractive institutional system, similar to the Ottoman model that historically dominated the regions of Moldova and Wallachia for centuries.

Further investigation must delve deeper into the mechanisms by which historical membership in a particular political regime or former empire, characterized by either inclusive or extractive institutions, managed to transmit values and norms that continue to prevail. Specifically, additional research should focus on understanding what precisely facilitated the contagion effect from right to left in the immediate vicinity of the former imperial border, and why a reverse contagion did not occur.

The analysis is beset by several limitations. Firstly, when discussing informal payments typically associated with bribery and corruption, respondents often exhibit a powerful reluctance to acknowledge such behaviors. This hesitancy is supported by the psychological and personality construct of social desirability, wherein individuals tend to present themselves in a more favourable light than reality warrants [121]. Even in human communities where informal payments are culturally and historically tolerated, respondents adhere to this cognitive pattern, leading to an underestimation of the prevalence of informal payments and rendering the data unstable. Furthermore, selection bias may affect the accuracy of certain types of informal payment data, potentially resulting in either an underestimated or overestimated portrayal of these practices [16]. Lastly, a significant limitation is the overly broad nature of the dependent variable. The analysis lacks granularity regarding whether informal payments and offering gifts given in the national health system align with the four already specified types of informal payments. Therefore, it may remain unclear whether these practices are expressions of patients' gratitude or just straightforward bribes for better services and privileges.

Declarations

Competing interests
The author declares he has no competing interests.

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