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Article

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Research Article

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Public Spending on Health as Political Instrument? – Regime-type dependency of public spending

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Abstract: The paper argues that the level of public spending on health varies according to the type of political regime in a country. A simple political economic model is employed to analyse the rationale of policy makers when implementing healthcare policy. The theory of dictatorship as described by Wintrobe (1990, 1998, 2001) is used to differentiate between the types of autocratic regimes. Furthermore, an empirical analysis is conducted for 170 countries for the years 1995–2014. We found that public spending on health is decreasing with the level of political freedom. At the same time, public spending on health care competes with military expenditures. Moreover, public spending on health in neighbouring countries affects the level of public spending within the country.

Keywords: public spending, health regime, selection effect, Wintrobe

JEL Classification: I18, H51

1 Introduction

In light of the continuing dire health situation in many developing countries, key objectives of both the United Nations' Millennium Development Goals and their Sustainable Development Goals, among others, has been to eradicate epidemic diseases and to increase access to health services around the world (United Nations, 2015). Both cross-country studies and case studies (for example in Brazil, South Africa and Uganda) show that the prevalence of epidemic diseases such as HIV/AIDS is explained not only by the economic characteristics of the respective country, but also by political commitment and institutional quality¹.

Political and institutional features seem to play a crucial role in the effective allocation of funds to combat infectious diseases. Often, the political commitment to provide health care is also associated with regime type. So, for example, democracies are associated with higher levels of public health spending and better health outcomes, *ceteris paribus* (Baum and Lake, 2003; Mulligan et al., 2003; Besley and Kudamatsu, 2006; Deacon, 2009; Muntaner et al., 2011; Wigley and Akkoyunlu-Wigley, 2011). It is thereby argued that democratic regimes serve the interest of low- or middle-income median voters, and that extensive expenditure on public goods such as health increases a government's chance of re-election.

Since many less developed countries have autocratic regimes, it is also important to explore their level of effort in the fight against epidemic diseases. This fight varies with different characteristics of such regimes. Drawing on the theory of dictatorship (Wintrobe, 1990, 1998, 2001), this paper seeks to explore in more detail if certain types of dictator pursue selective strategies to secure the loyalty of certain segments of the population, thereby fostering inequality in

¹ See, for example, Walt and Gilson (1994), Evans et al. (2001), Ghobarah et al. (2004), Gauri and Lieberman (2006), McGuire (2006), Navarro et al. (2006), Gilson and Raphaely (2008), Gizelis (2009), Croke (2011), Justesen (2012).

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health provision. In particular, we aim to differentiate between ‘totalitarian’ and ‘tinpot’ regimes. Different autocratic regimes may apply different strategies in the provision of public goods such as health.

In the next section, we take a closer look at the theoretical literature, thereby combining the political economy of dictatorships with the political economy of public good provision. In the third section, we present our own empirical model of public spending on health, which will be tested in section 4. The results will be discussed in section 5. The paper concludes with a brief discussion.

2 Political Regimes and Health Expenditures: Theoretical Considerations

To characterize their degree of inclusiveness, political regimes can be labelled as democratic on the one hand and dictatorial on the other. These regimes have different preferences when it comes to the provision of public goods, including health services. In a democratic system, politicians are elected by the population and are held accountable for their actions. Thus, they are obliged to observe the rule of law and may be punished for misconduct (e.g. by not being re-elected). Therefore, democratic regimes should theoretically act in the interest of the majority of the population and provide a wide range of public goods such as health care, education, roads and safety (Mulligan et al., 2003; Gauri and Lieberman, 2006; Ross, 2006; Deacon, 2009). Besley and Kudamatsu (2006) provide evidence on a number of health-related variables, including health expenditure, which is consistent with this theory.

By contrast, in a dictatorship political actions are determined by one person (or one small group) who has monopoly power over formal political offices and is not restrained by the interest of different lobby groups, but rather is able to implement a strategy perceived as serving their interest best (Wintrobe, 2001; Deacon, 2009). According to Besley and Kudamatsu (2006), health expenditures do not belong to this category. For democracies, the health of the population is part of the objective function, whereas for dictatorships it belongs to the budget constraint. The theory of dictatorship (Wintrobe, 1990, 1998, 2001) suggests that the utility of a dictator depends on consumption and power. Consumption hereby refers to the private consumption of the ruling elite such as luxury goods (e.g. castles, cars etc.). Power (π), on the other hand, is generated by a production function dependent on loyalty (L) and repression (R):

$$\pi = \pi(L, R) \quad (1)$$

Thus, autocratic regimes can be categorized by their level of repression as either: (1) tinpot, minimizing the resource cost of staying in power in order to pursue conspicuous consumption, or (2) totalitarian, maximizing power using both repression and loyalty (Wintrobe, 1990). Assuming that both consumption and power (including loyalty and repression) have a price, and that the dictator faces a budget constraint, there is a non-trivial problem of deciding the optimal mixture of the strategies to secure office. The fixed budget of the dictator encompasses private consumption as well as the resource cost of staying in office (B):

$$B = P_R R + P_L(L, R, PE)L \quad (2)$$

The resource cost depends on the cost of obtaining manpower and capital equipment to enforce repression P_R (e.g. police, prisons, or the court system) and the cost of creating and maintaining loyalty P_L (e.g. cost of creating and distributing monopoly rents, of building dams or bridges, or of doing favours for the citizenry including health expenditures). Thus, L can be expressed as

$$L = L(H, \dots) \quad (3)$$

with H representing health expenditures². Loyalty is increasing in such spending. Moreover, it is assumed that the supply of loyalty depends on the economic performance (PE) of the regime.

² Moreover, it is assumed that the supply of loyalty depends on spending categories such as subsidies and education, as well as the economic performance of the regime.

In order to stay in office, the dictator has to decide on a strategy in terms of loyalty and repression, which are not independent of each other. An increase in loyalty implies a reduction in repression and vice versa. Moreover, both strategies have decreasing marginal returns. We assume further that ‘buying’ loyalty is more effective if the strategy applied is selective. Hence, discrimination between population segments may not only raise loyalty but also prevent the organization of opposition groups. By implementing such a selective strategy, the provision of public goods such as H will be limited, and obtainable only by specific groups within the population. Therefore, they become club goods for the groups recognized by the dictator as most valuable in ensuring loyalty.

Wintrobe (1998) argues that the tinpot dictator minimizes the resource cost of staying in office in order to maximize his private consumption (i.e. difference between total revenue and total costs of staying in office). In a tinpot dictatorship, one should therefore find a low level of repression with minor intervention in the social and economic life of citizens. Public spending is used in this regime to ensure loyalty. A threat to this regime will be answered by reducing private consumption in order to finance the maintenance and creation of loyalty within the population (i.e. theoretical optimal solution according to Wintrobe, 1998).

By contrast, the totalitarian dictator seeks to maximize power and is constrained only by the supply of loyalty (i.e. building up a core of loyal supporters). Repression is his major tool to secure office. This regime intervenes massively in the economic and social life of the population. In case of an exogenous shock, this regime will seek to increase repression to secure office. Thus, a purely selective strategy (in most cases targeted on the military elite) can be found in a totalitarian regime, so a larger military apparatus should be seen.

To sum up, compared with the totalitarian regime, the tinpot regime displays a lower level of repression along with higher levels of private consumption and spending on public goods, including health.

The empirical analysis that follows is the attempt to show the differences in spending on public goods (with focus on public spending on health) for the different regimes: democracies, tinpots and totalitarian. It is expected that democratic regimes reveal a higher spending level on the public good than the both autocratic regime types in order to secure widely the loyalty of the citizenship. One can assume that the tinpot regime is buying loyalty by providing access to public good like health care (Bell, 2011), but at the same time repression is used as additional tool which substitutes public good provisions. In a totalitarian regime, however, the level of spending on health care depends solely on the political commitment of the regime on health care. Due to the higher selectivity of beneficiaries, the level of public spending should be in sum lower than the one in democratic or tinpot regimes. Additionally, repression may counteract the necessity of spending on public goods to ‘buy’ loyalty. In this case, there is a linear relationship between the degree of repression and public health spending.

On the other hand, it may well be plausible that the tinpot does care less about general public health than the totalitarian. In this scenario, spending on public goods may compete with loyalty related expenditure for the first, whereas for the latter repression related expenditures compete with public goods. It depends on price elasticities how the very type reacts. The totalitarian who have convex preferences over both personal consumption and political power may well consider may public health a good tool to decrease opposition (and increase general well-being). In this case, the function would be a negative quadratic one.

3 Data

The theoretical considerations will be tested empirically by using data on 170 countries for the years 1995-2014. We focus on public health care spending by studying the dependent variable ‘*Public expenditure on health*’ as a percentage of government expenditure (GH_{it}) as published by the Worldbank (2017). Under a given budget restriction determined by the wealth of the country (i.e. GDP), it is the task of the government to allocate funds for the provision of public goods such as health care. Hence, this variable appropriately captures the importance regimes assign to the provision of health care for their citizens.

The independent variable of most interest is regime type. In real world settings the types of regimes, tinpot and totalitarian, are corner solutions. Empirically, different regimes are likely to display a mixture of democratic, tinpot and totalitarian institutions. Our analysis follows the approach of Islam and Winer (2004) to classify regime type using the

Freedom House 1-7 indices of civil liberties (*CL*) and political rights (*PR*). A single index (*FR*) is constructed from the Freedom House data, with zero denoting no political freedom and one denoting full political freedom:

$$FR = [14 - (CL + PR)] / 12 \quad (4)$$

The convex preference structure of the dictator is implemented empirically by introducing FR^2 . If the preference structure of the dictator is convex, a possibility for which we allow empirically by introducing FR^2 , we would expect that the lowest levels of spending on healthcare will be for regimes with intermediate values of FR , i.e. the tinpot regimes.

The level of health expenditures and health outcomes can be further explained by the income levels of the population (Parkin et al. 1987). However, other characteristics such as the age structure of the population, the level of technological progress in the country, the effectiveness of health policy measures, the institutional designs of the health sector and the characteristics of neighbouring countries are often significantly related to the level of health expenditures (Gerdtham and Löthgren, 2000, Bor, 2007; Hsiao and Heller, 2007; Gizelis, 2009). While inferring causality from this correlation is econometrically challenging, regardless of whether the correlation is inter-temporal (Hansen and King, 1998; McCoskey and Selden, 1998; Gerdtham and Löthgren, 2000) or cross-sectional (Baltagi and Moscone, 2010), we use several independent variables as controls.

The natural logarithm of GDP per capita (GDP_{pc}) serves as a proxy for the financial capacity of the regime. The efficiency of health expenditure is hypothesized to depend on, among others, corruption (Delavallade, 2006; Adam et al., 2011). The indicator *corruption* is taken from Standaert (2015). Corruption can increase or decrease the level of health spending. So, for example, a highly corrupt country needs to spend more to achieve the same outcome compared with a less corrupt country. The regime also allocates financial resources to military expenditure (*military exp.* as % of GDP), which competes with the provision of basic public goods such as health (Delavallade, 2006) and fits to our theoretical framework. Besides the competition between different expenditure components, another stream of literature emphasizes the influence of natural resources on spending behaviour and institutional quality (Bulte et al., 2005). To capture the effects of natural resource abundance on governance, the fraction of *oil rents* in the GDP is included in the analysis.

The stability of the political system might be challenged internally and externally due to civil conflicts. They have the tendency to destroy the health infrastructure, which leads to severe long-term health problems (Ghobarah et al., 2003) and shifts the focus from basic public goods provision to military expenditure (Delavallade, 2006). Therefore, the number of *battle deaths* (as fraction of total population) in the country is included to measure political stability.

As pointed out above, spending on health also depends on national characteristics such as the age structure of the population. As the age structure of the population is highly correlated with *life expectancy* at birth, which serves also as an indicator for general health status, only the latter will be included in the regression. As an indicator for the health status of the population, the reported number of *tuberculosis incidents per 100,000 people* (as fraction of total population) is included as an additional control variable. Tuberculosis is chosen because the spread of this disease is not dependent on climate (like e.g. malaria) or unobserved individual behaviour (like e.g. HIV). Additionally, this disease can be treated with antibiotics, so with an appropriate health infrastructure (which depends in turn on political willingness) the number of tuberculosis death may be reduced substantially. *Population density* (population per km²) is included to capture the pressure put on the health care system due to the concentration of many people in a limited space. As it is argued that ethnic/linguistic kinship determines the level of health care provision (Alesina et al., 1999; Franck and Rainer, 2009; Platas, 2011), the *ethnic fractionalization* of the country is used as further control variable (Fearon, 2003).

For historical or cultural reasons, public spending on health might be offset by private funds (see for example the U.S. health care system) or external sources of aid. To account for the difference in health care funding, we include as control further *private spending* on health care as well as funds from *official development assistance* per capita. The latter is rather relevant for low income countries which might be dependent on development aid to finance the health care provision.

The list of countries and descriptive statistics including the source of the variables used in the empirical analysis can be found in the appendix. We only included countries for which most of the data was available. We seek to incorporate low income countries even if the data on them is rather sparse in order to represent the full range of political freedom and avoiding a bias of results in favour of democracy (Ross, 2006).

4 Method

Our empirical analysis is based on Deacon's (2009) extension of Wintrobe's definition of dictatorships. In Deacon's empirical model, the level of public good provision is specified as follows:

$$GH_{it} = \beta_0 FR_{it} + \beta_1 Y_{it} + \beta_2 X_{it} + \varepsilon_{it} \quad (5)$$

with GH_{it} denoting the level of public good provision in country i in year t (here representing the percentage of government spending devoted to health care), FR_{it} as the level of repression, or in our case the constructed normalised index of political freedom (FR) in country i in year t , Y_{it} as the regime income/wealth in country i in year t , and X_{it} as other explanatory variables in country i in year t . Testing our dataset for multicollinearity with the help of the variance inflation factor, we find an average variance inflation factor of 2.30 [1.07-6.64], hinting to low probability of biased coefficients due to collinearities between the independent variables of interest.

Regarding the regression model, endogeneity as well as spatial correlation are the major issues already discussed in the literature (Bor, 2007; Hsiao and Heller, 2007; Gizelis, 2009). Baltagi and Moscone (2010), for example, use a spatial ML approach to explain public health spending in OECD countries and to control for spatial dependency in their dataset. Preliminary inspection of the data employed in this study indicates several econometric complexities; including serial correlation and cross-sectional dependency determined following De Hoyos and Sarafidis (2006). A random effects model needs to be rejected due to serial correlation and cross-sectional dependence in the error term. Testing the error-term for global spatial dependency (Moran's I), a special form of cross-sectional dependency, we find significant spatial dependency in the error term. We further observed higher between country-variance than within country-variance for all variables (i.e. dependent and independent). Therefore, the empirical analysis will focus on explaining between country-variance by acknowledging the time dimension in the data structure by including time-fixed effects.

Instead of using regional indicators to control for the spatial correlation, we seek to model the country location by its position within the neighbourhood. Hence, the assumption is that countries closer to each other are more similar with respect to unobserved characteristics than countries further apart. Therefore, a pooled Spatial Lag Model (SAR) with time fixed-effects was chosen. The spatial autocorrelation of the data structure was incorporated in the model with help of a spatial lag of the dependent variable:

$$GH_{it} = \rho \sum_{j \neq i} w_{ij} GH_{jt} + \beta_0 FR_{it} + \beta_1 Y_{it} + \beta_2 X_{it} + \gamma_t + u_{it} \quad (6)$$

where w_{ij} is a spatial weight based on the inverse distance between the centroids of countries i and j , γ_t is the time-fixed effect, and u_{it} is a normally distributed error term. To test for non-monotonicity of our variable *political freedom*, equation 6 is adapted as follows:

$$GH_{it} = \rho \sum_{j \neq i} w_{ij} GH_{jt} + \beta_0 FR_{it} + \beta_1 FR_{it}^2 + \beta_2 Y_{it} + \beta_3 X_{it} + \gamma_t + u_{it} \quad (7)$$

with FR_{it}^2 capturing the continuous non-monotonicity of the relationship between FR and GH_{it} . We also test whether the sensitivity of health spending to freedom depends on the level of economic development by fitting a model that includes an interaction term in FR and Y :

$$GH_{it} = \rho \sum_{j \neq i} w_{ij} GH_{jt} + \beta_0 FR_{it} + \beta_1 (FR_{it} * Y_{it}) + \beta_2 Y_{it} + \beta_3 X_{it} + \gamma_t + u_{it} \quad (8)$$

which includes an interaction term between political repression and the natural logarithm of country's GDP per capita. Additionally, we explore the relationship between military expenditure, political repression and public health care expenditure by fitting a model to:

$$GH_{it} = \rho \sum_{j \neq i} w_{ij} GH_{jt} + \beta_0 FR_{it} + \beta_1 (FR_{it} M_{it}) + \beta_2 M_{it} + \beta_3 X_{it} + \gamma_t + u_{it} \quad (9)$$

with M_{it} denoting the percentage of governments military expenditure related to the country's GDP.

5 Results

Table 1 shows the estimation results with help of a pooled SAR and time fixed effects corresponding to equations 6 to 9. As the dependent variable is in the estimations also included as spatial lag on the right-side of the estimation, marginal effects are calculated as direct, indirect and total effects (LeSage and Pace, 2009) and reported in Table 2, appendix. However, focus here is the relationship between political freedom and confounding factors (e.g. state wealth and military expenditure) and public spending on health.

Results of the estimation of equation 6 does not hint to a significant direct relationship between political freedom and public spending on health. However, if the quadratic term is included into the estimation (equation 7) a significant non-monotonic relationship between the level of political freedom (FR_{it}) and public spending on health care (equation 7) can be found. To explore this relationship further, a partial plot of the interaction term was created by predicting the government expenditure on health by the level of political freedom and its square, keeping the other variables in the estimation model at their mean level (Figure 1). The trend line in this Figure 1 is smoothed with help of the Loess method and shows the relationship between the fitted values of the dependent variable GH_{it} based on the different levels of political freedom as well as the spatial dependency inherent in the estimation model. Methods to assess the confidence interval for this kind of spatial error models are so far not further theoretically established (Fischer et al., 2010) and therefore not included here. Similar issue is found considering excluding the spatial dependency from the partial plot. Therefore, interpretation of the partial plot is not straight-forward only the relationship between the variables at hand but includes the spatial weights in the prediction.

Our results show that the relationship between government expenditure on health and political freedom is rather a steep positive linear relationship if higher levels of political freedoms, i.e. democratic regimes are considered. For autocratic regimes, the relationship is rather flat linear positive one if the totalitarian regime is considered, while the tinpot regime seems to vary highly.

Considering the argument of redistributive capacity, we found a significant positive direct relationship in our analysis that the level of public spending on health is dependent on state wealth (measured as natural logarithm of GDPpc). Exploring the relationship between state wealth, political freedom and public health care spending further with help of a partial plot (Figure 2), we found that with increasing wealth and political freedom the public health care level increases. In this plot, as well, the other independent variables were set to their mean, but the spatial dependency was kept as in the original dataset to calculate the fitted values. However, lots of regimes predicted to have low levels

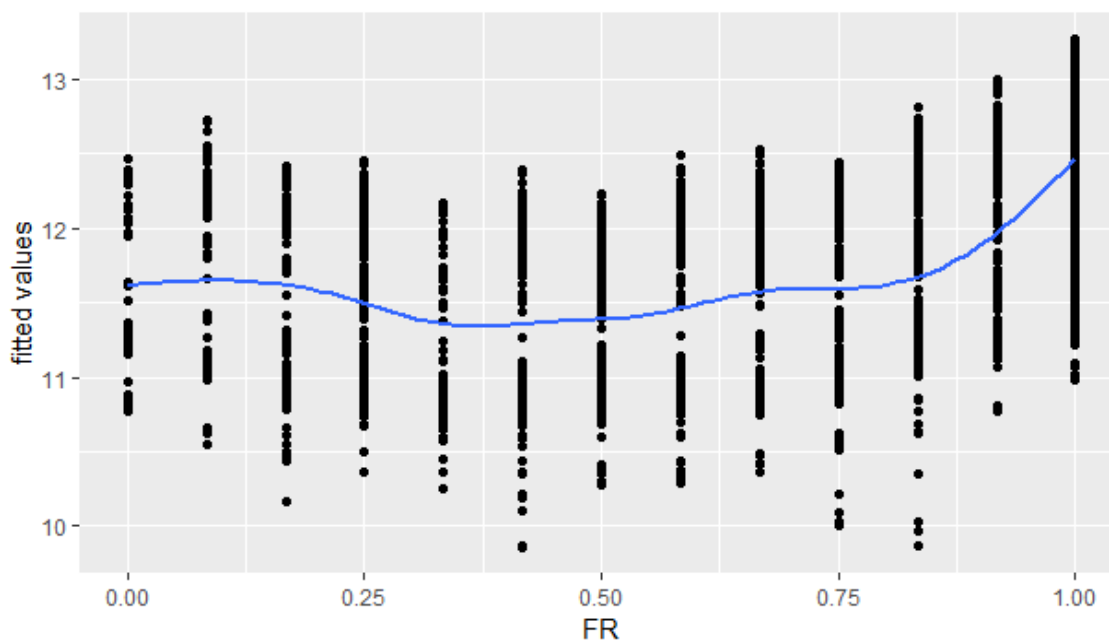


Figure 1: Partial plot – Fitted values for government expenditure on health and political freedom.

Table 1: Estimation results (coefficients) of the pooled SAR – time-fixed effect estimations.

| Dependent Variable: GH_{it} | | | | |
|---|------------------------------|------------------------------|------------------------------|------------------------------|
| Variables/Equation | (6) | (7) | (8) | (9) |
| FR | 0.211 (0.365) | -2.098* (1.189) | -4.424** (1.769) | 0.808* (0.470) |
| FR ² | | 2.294** (1.124) | | |
| FR*ln(GDPpc) | | | 0.559*** (0.209) | |
| FR*Military exp. | | | | -0.289** (0.145) |
| ln(GDPpc) | 0.257** (0.124) | 0.183 (0.129) | -0.097 (0.180) | 0.259** (0.124) |
| Corruption | -0.092*** (0.009) | -0.087*** (0.010) | -0.083*** (0.010) | -0.091*** (0.009) |
| Military exp. | -0.329*** (0.049) | -0.315*** (0.050) | -0.292*** (0.051) | -0.206*** (0.079) |
| ODApc | 0.006*** (0.001) | 0.007*** (0.002) | 0.007*** (0.002) | 0.006*** (0.001) |
| privHE | 0.057 (0.055) | 0.058 (0.055) | 0.031 (0.056) | 0.080 (0.056) |
| Oil rents | -0.071*** (0.011) | -0.070*** (0.011) | -0.067*** (0.011) | -0.076*** (0.011) |
| Battle deaths | 0.018 (2.620) | -0.399 (2.625) | -1.386 (2.667) | 0.360 (2.623) |
| Life expectancy | 0.015 (0.017) | 0.023 (0.018) | 0.024 (0.018) | 0.015 (0.017) |
| Tuberculosis deaths | -2.753* (1.446) | -2.387 (1.455) | -2.066 (1.466) | -2.342 (1.461) |
| Population density | -0.001*** (0.0001) | -0.001*** (0.0002) | -0.001*** (0.0002) | -0.001*** (0.0002) |
| Ethnic frac. | 0.507 (0.380) | 0.653* (0.386) | 0.617 (0.381) | 0.522 (0.379) |
| Rho | 0.929*** (0.044) | 0.928*** (0.045) | 0.920*** (0.049) | 0.920*** (0.049) |
| Intercept | 1.116 (1.466) | 1.229 (1.471) | 2.903* (1.647) | 0.799 (1.486) |
| Observations | 2,175 | 2,175 | 2,175 | 2,175 |
| Wald-test | 442.5*** | 430.19*** | 356.6*** | 355.92*** |
| AIC | 11,336 | 11,334 | 11,331 | 11,334 |

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

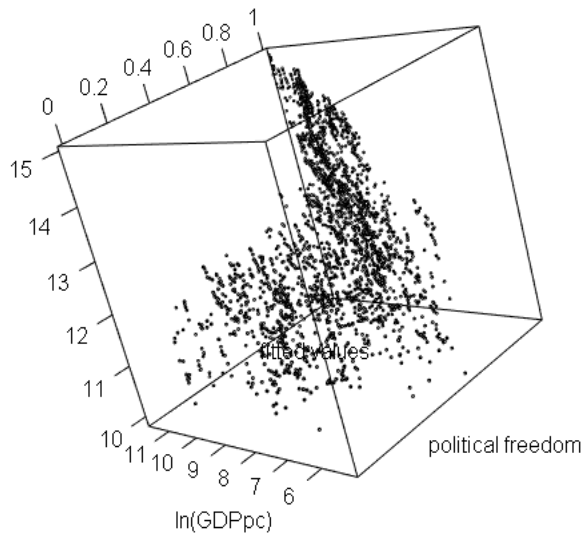


Figure 2: Partial plot - Government expenditure on health, political freedom and log(GDPpc).

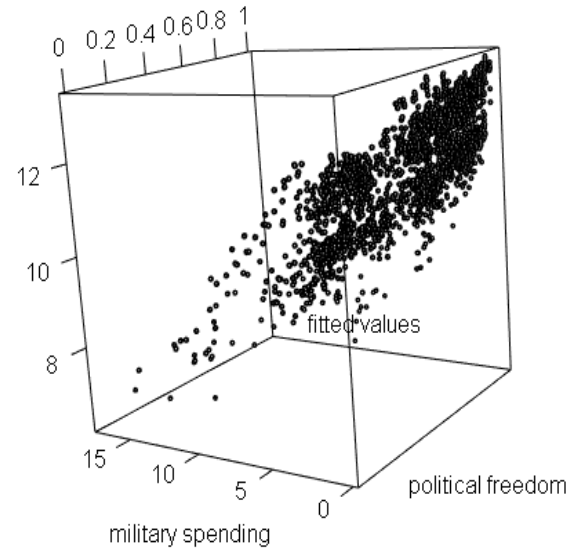


Figure 3: Partial plot – Fitted values of government expenditure on health by various levels of political freedom and military spending.

of public spending on health vary in wealth per capita and their level of political freedom. Hence, only wealthy democracies tend to commit a high proportion of the government budget to health.

While there is a significant negative direct relationship between the level of public health expenditure and military expenditure, we found also negative significant interaction term between the military expenditure, political freedom and the level of public spending on health. Here as well, a the partial plot is employed to assess the relationship between the different levels of political freedom, military expenditure and the fitted values for public expenditure on health GH_{it} (i.e. setting all other independent variables of the equation 9 to their mean value, keeping the spatial dependency as in the original dataset (Figure 3)). We find that this relationship is driven by a cluster of countries with high political freedom and relative low levels of spending for military (as fraction of GDP) and high public commitment on health (i.e. right upper-corner, Figure 3).

To assess whether state wealth or the non-monotonic relationship of FR and government spending on health is driving the results, a partial plot is employed on the regression of a pooled SAR model (as above) including the interaction term of state wealth and FR as well as the FR^2 term³, all other dependent variables are kept at their mean and spatial dependency remains as in the original dataset. This plot shows that the relationship we found between political freedom, state wealth and public spending on health seems to be driven by wealthy democracy while for the other regimes the relationship is not as clearly defined. Hence, we find a direct negative relationship between political freedom and public spending in this estimation which is supported by a positive interaction term between GDPpc and political freedom.

There is a high level of spatial dependency in the model, as reflected in the significant spatial autocorrelation term ρ , suggesting that government spending levels on health is impacted to neighbouring countries level of public spending on health. This might be due to unobserved shared characteristics of neighbouring countries which impacts the level of government commitment to public health, e.g. shared cultural values on who has the responsibility to provide health care.

³ Coefficient of the estimation results are not reported here but can be provided on request.

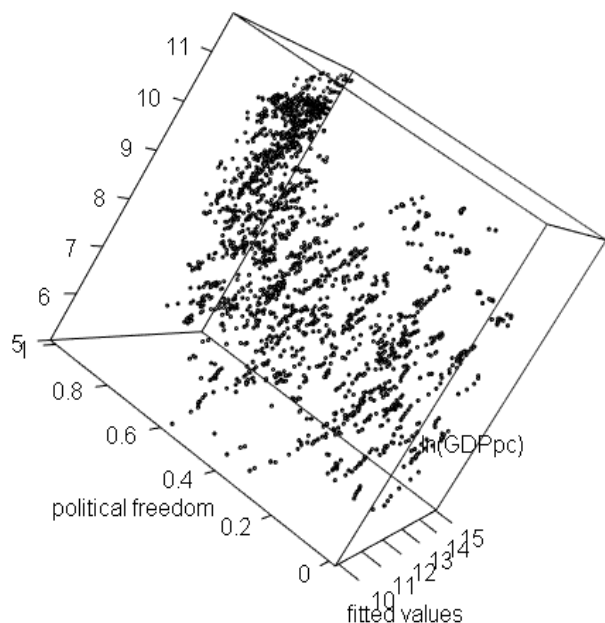


Figure 4: Partial plot – Fitted values of government expenditure on health by various levels of political freedom including the quadratic relationship and state wealth.

6 Conclusion

This paper draws on the theory of Wintrobe (1998) to differentiate between different types of dictatorships, ‘tinpot’ and totalitarian regime, and democracy. Based on the theoretical framework, which combines the political economy of dictatorships with the political economy of public good provision, we derived two hypotheses on the relationship between regime type and the public spending on health: (1) negative linear relationship or (2) negative quadratic one. Our empirical model found support for a non-monotonic relationship between political freedom and the level of public spending on health. It is here suggested that the level of public health provision is increasing with increasing political freedom. In theory, the ‘tinpot’ regime is buying loyalty by providing access to public good like health care, at the same time repression is used as additional tool which substitutes public good provisions. In a totalitarian regime, however, the level of spending on health care depends solely on the political commitment of the regime on health care. Due to the higher selectivity of beneficiaries, the level of public spending should be in sum lower than the one in democratic or ‘tinpot’ regimes.

In our empirical analysis, we found a non-monotonic relationship between political freedom and public spending on health care. One can argue that the ‘tinpot’ regime usually shows a low level of repression as it is more concerned with consumption. Additionally, repression may counteract the necessity of spending on public goods to ‘buy’ loyalty, an effect supported by the negative relationship between military spending, political freedom and public spending on health care. Hence, the substitutionary relationship between military spending and public spending on health seems to be here the key to explain the difference level of public spending on health by regime type.

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References

- Adam, A., Delis, M.D., Kammas, P., 2011. Are democratic governments more efficient? *European Journal of Political Economy* 27, 75-86.
- Alesina, A., Baqir, R., Easterly, W., 1999. Public goods and ethnic divisions. *The Quarterly Journal of Economics* 114, 1243-1284.
- Baltagi, B.H., Moscone, F., 2010. Health care expenditure and income in the OECD reconsidered: Evidence from panel data. *Economic Modelling* 27, 804-811.
- Baum, M.A., Lake, D.A., 2003. The political economy of growth: democracy and human capital. *American Journal of Political Science* 47, 333-347.
- Bell, C., 2011. Buying Support and Buying Time: The Effect of Regime Consolidation on Public Goods Provision. *International Studies Quarterly* 55, 625-646.
- Besley, T., Kudamatsu, M., 2006. Health and democracy. *The American economic review* 96, 313-318.
- Bor, J., 2007. The political economy of AIDS leadership in developing countries: an exploratory analysis. *Social Science & Medicine* 64, 1585-1599.
- Bulte, E.H., Damania, R., Deacon, R.T., 2005. Resource intensity, institutions, and development. *World Development* 33, 1029-1044.
- Croke, K. 2011. *Foreign aid, child health, and health system development in Tanzania and Uganda, 1995-2009*. Dissertation submitted to John Hopkins University, Maryland.
- De Hoyos, R.E., Sarafidis, V. 2006. Testing for cross-sectional dependence in panel-data models, *Stata Journal*, 6, 482-496.
- Deacon, R.T., 2009. Public good provision under dictatorship and democracy. *Public Choice* 139, 241-262.
- Delavallade, C., 2006. Corruption and distribution of public spending in developing countries. *Journal of economics and finance* 30, 222-239.
- Evans, D.B., Tandon, A., Murray, C.J., Lauer, J.A., 2001. Comparative efficiency of national health systems: cross national econometric analysis. *BMJ* 323, 307-310.
- Fearon, J.D., 2003. Ethnic and Cultural Diversity by Country. *Journal of Economic Growth* 8, 195-222.
- Fischer, M., Getis, A. (eds.) 2010. *Handbook of Applied Spatial Analysis – Software Tools, Methods and Applications*. Springer Verlag, Berlin Heidelberg.
- Franck, R., Rainer, I., 2009. *Does the leader's ethnicity matter? Ethnic favoritism, education and health in Sub-Saharan Africa*. Unpublished manuscript, Department of Economics, Bar Ilan University, and Department of Economics, George Mason University.
- Franzese, R.J., Hays, J.C., 2007. Spatial econometric models of cross-sectional interdependence in political science panel and time-series-cross-section data. *Political Analysis* 15, 140-164.
- Gauri, V., Lieberman, E.S., 2006. Boundary institutions and HIV/AIDS policy in Brazil and South Africa. *Studies in Comparative International Development* 41, 47-73.
- Gerdtham, U.-G., Löthgren, M., 2000. On stationarity and cointegration of international health expenditure and GDP. *Journal of Health Economics* 19, 461-475.
- Ghobarah, H.A., Huth, P., Russett, B., 2003. Civil wars kill and maim people—long after the shooting stops. *American Political Science Review* 97, 189-202.
- Ghobarah, H.A., Huth, P., Russett, B., 2004. Comparative Public Health: The Political Economy of Human Misery and Well-Being. *International Studies Quarterly*, 48, 73-94.
- Gilson, L., Raphaely, N. 2008. The terrain of health policy analysis in low and middle income countries: a review of published literature 1994–2007. *Health policy and planning*, 23, 294-307.
- Gizelis, T.-I., 2009. Wealth alone does not buy health: Political capacity, democracy, and the spread of AIDS. *Political Geography* 28, 121-131.
- Hansen, P., King, A., 1998. Health care expenditure and GDP: panel data unit root test results—comment. *Journal of Health Economics* 17, 377-381.
- Hsiao, W.C., Heller, P.S., 2007. What macroeconomists should know about health care policy. International Monetary Fund.
- Islam, M.N., Winer, S.L., 2004. Tinpots, totalitarians (and democrats): an empirical investigation of the effects of economic growth on civil liberties and political rights. *Public Choice* 118, 289-323.
- Justesen, M. K. 2012. Democracy, dictatorship, and disease: Political regimes and HIV/AIDS. *European Journal of Political Economy*, 28, 373-389.
- LeSage, J., Pace, R.K. 2009. *Introduction to Spatial Econometrics*, Taylor & Francis Group: Boca Raton.
- McCoskey, S.K., Selden, T.M., 1998. Health care expenditures and GDP: panel data unit root test results. *Journal of Health Economics* 17, 369-376.
- McGuire, J.W. 2006. Basic health care provision and under-5 mortality: a cross-national study of developing countries. *World Development*, 34, 405-425.
- Mulligan, C.B., Sala-i-Martin, X., Gil, R., 2003. *Do democracies have different public policies than nondemocracies?* National Bureau of Economic Research Working Paper No 10040.
- Muntaner, C., Borrell, C., Ng, E., Chung, H., Espelt, A., Rodriguez-Sanz, M., Benach, J., O'Campo, P., 2011. Politics, welfare regimes, and population health: controversies and evidence. *Sociology of health & illness* 33, 946-964.
- Navarro, V., Muntaner, C., Borrell, C., Benach, J., Quiroga, Á., Rodriguez-Sanz, M., Verges, N., Pasarín, M. I. 2006. Politics and health outcomes. *The Lancet*, 368, 1033-1037.

- Parkin, D., McGuire, A., Yule, B., 1987. Aggregate health care expenditures and national income: is health care a luxury good? *Journal of health economics* 6, 109-127.
- Platas, M., 2011. *Africa's Health Tragedy? Ethnic Diversity and Health Outcomes. Ethnic Diversity and Health Outcomes*. Western Political Science Association 2011 Annual Meeting Paper.
- QoG 2017. *Quality of Governance Database*. University of Gothenburg, Sweden [online resource] www.qog.pol.gu.se. last accessed 2017-11-11.
- Ross, M., 2006. Is democracy good for the poor? *American Journal of Political Science* 50, 860-874.
- Standaert, S. 2015. Divining the Level of Corruption: a Bayesian State Space Approach. *Journal of Comparative Economics*, 43 782-803.
- United Nations, 2015. *Sustainable Development Goals*, [online resource] <https://sustainabledevelopment.un.org/topics>, last accessed September 22nd, 2015.
- Walt, G., Gilson, L. 1994. Reforming the health sector in developing countries: the central role of policy analysis. *Health policy and planning*, 9, 353-370.
- Wigley, S., Akkoyunlu-Wigley, A., 2011. The impact of regime type on health: does redistribution explain everything? *World Politics* 63, 647-677.
- Wintrobe, R., 1990. The tinpot and the totalitarian: An economic theory of dictatorship. *The American Political Science Review*, 849-872.
- Wintrobe, R., 1998. *The political economy of dictatorship*. Cambridge Univ. Press, Cambridge [u.a.].
- Wintrobe, R., 2001. How to Understand, and Deal with Dictatorship: An Economist's view. *Economics of Governance* 2, 35-58.
- Worldbank, 2017. *Worldbank Development Indicator Database*. [online resource] www.worldbank.org. last accessed 2017-11-11.

Appendix

Descriptive Statistics

| Variable | N | Mean | Std. Dev. | Min | Max | average Within Std. Dev. | average Between Std. Dev. | Source |
|----------------------|-------|--------|-----------|--------|----------|--------------------------|---------------------------|--------|
| GH | 3,400 | 11.25 | 4.30 | 0.77 | 34.41 | 1.97 | 4.24 | WDI |
| FR | 3,400 | 0.62 | 0.32 | 0.00 | 1.00 | 0.06 | 0.32 | QoG |
| lnGDPpc | 3,400 | 8.36 | 1.50 | 5.14 | 11.63 | 0.17 | 1.49 | WDI |
| Corruption | 3,290 | 47.1 | 13.12 | 14.52 | 69.01 | 1.40 | 13.13 | QoG |
| ODApC | 3,331 | 103.85 | 347.76 | -149.3 | 11,522.5 | 52.36 | 310.35 | WDI |
| priv.EH | 3,400 | 2.52 | 1.45 | 0.03 | 10.93 | 0.46 | 1.45 | WDI |
| Military expenditure | 2,756 | 2.16 | 1.79 | 0.12 | 17.33 | 0.52 | 1.78 | WDI |
| Oil rents | 2,526 | 4.69 | 10.53 | 0.00 | 83.51 | 1.59 | 10.28 | WDI |
| Battle deaths | 3,400 | 0.01 | 0.07 | 0.00 | 3.48 | 0.01 | 0.04 | WDI |
| Life expectation | 3,303 | 68.27 | 9.60 | 31.96 | 83.59 | 2.04 | 9.41 | WDI |
| Tuberculosis deaths | 3,400 | 0.19 | 1.49 | 0.00 | 38.79 | 0.13 | 1.25 | WDI |
| Population density | 3,390 | 164.19 | 522.81 | 1.48 | 7,714.7 | 15.15 | 520.69 | WDI |
| Ethnic frac | 3,377 | 0.43 | 0.26 | 0.00 | 0.93 | 1.01e-16 | 0.26 | QoG |

List of countries

| | |
|------------------------|--------------------------|
| Albania | Bulgaria |
| Algeria | Burkina Faso |
| Angola | Burundi |
| Antigua and Barbuda | Cabo Verde |
| Argentina | Cambodia |
| Armenia | Cameroon |
| Australia | Canada |
| Austria | Central African Republic |
| Azerbaijan | Chad |
| Bahamas, The | Chile |
| Bahrain | China |
| Bangladesh | Colombia |
| Barbados | Comoros |
| Belarus | Congo, Dem. Rep. |
| Belgium | Congo, Rep. |
| Belize | Costa Rica |
| Benin | Cote d'Ivoire |
| Bhutan | Croatia |
| Bolivia | Cuba |
| Bosnia and Herzegovina | Cyprus |
| Botswana | Czech Republic |
| Brazil | Denmark |
| Brunei Darussalam | Djibouti |

Dominica
Dominican Republic
Ecuador
Egypt, Arab Rep.
El Salvador
Equatorial Guinea
Estonia
Ethiopia
Fiji
Finland
France
Gabon
Gambia, The
Georgia
Germany
Ghana
Greece
Grenada
Guatemala
Guinea
Guinea-Bissau
Guyana
Honduras
Hungary
Iceland
India
Indonesia
Iran, Islamic Rep.
Ireland
Israel
Italy
Jamaica
Japan
Jordan
Kazakhstan
Kenya
Kiribati
Korea, Rep.
Kuwait
Kyrgyz Republic
Lao PDR
Latvia
Lebanon
Lesotho
Lithuania
Luxembourg
Macedonia, FYR
Madagascar
Malawi
Malaysia
Mali
Malta
Marshall Islands
Mauritania
Mauritius
Mexico
Micronesia, Fed. Sts.
Moldova
Mongolia
Morocco
Mozambique
Myanmar
Namibia
Nepal
Netherlands
New Zealand
Nicaragua
Niger
Nigeria
Norway
Oman
Pakistan
Palau
Panama
Papua New Guinea
Paraguay
Peru
Philippines
Poland
Portugal
Romania
Russian Federation
Rwanda
Samoa
Saudi Arabia
Senegal
Seychelles
Sierra Leone
Singapore
Slovak Republic
Slovenia
Solomon Islands
South Africa
Spain
Sri Lanka
St. Kitts and Nevis
St. Lucia
St. Vincent and the Grenadines
Sudan
Suriname
Swaziland
Sweden

| | |
|---------------------|----------------------|
| Switzerland | Uganda |
| Tajikistan | Ukraine |
| Tanzania | United Arab Emirates |
| Thailand | United Kingdom |
| Togo | United States |
| Tonga | Uruguay |
| Trinidad and Tobago | Uzbekistan |
| Tunisia | Vanuatu |
| Turkey | Vietnam |
| Turkmenistan | Yemen, Rep. |
| Tuvalu | Zambia |

Table 2: Marginal effects (direct, indirect and total) based on the pooled SAR – time-fixed effect estimations.

| Equation 6 | | | |
|-------------------|---------------|-----------------|--------------|
| <i>Variables</i> | <i>Direct</i> | <i>Indirect</i> | <i>Total</i> |
| FR | 0.213 | 2.764 | 2.976 |
| Ln(GDPpc) | 0.259 | 3.365 | 3.624 |
| Military exp. | -0.331 | -4.298 | -4.629 |
| Equation 7 | | | |
| <i>Variables</i> | <i>Direct</i> | <i>Indirect</i> | <i>Total</i> |
| FR | -2.111 | -26.911 | -29.022 |
| FR ² | 2.309 | 29.426 | 31.735 |
| Ln(GDPpc) | 0.184 | 2.349 | 2.533 |
| Military exp. | -0.317 | -4.043 | -4.361 |
| Equation 8 | | | |
| <i>Variables</i> | <i>Direct</i> | <i>Indirect</i> | <i>Total</i> |
| FR | -4.449 | -50.931 | -55.380 |
| FR* Ln(GDPpc) | 0.562 | 6.436 | 6.999 |
| Ln(GDPpc) | -0.097 | -1.111 | -1.208 |
| Military exp. | -0.294 | -3.365 | -3.659 |
| Equation 9 | | | |
| <i>Variables</i> | <i>Direct</i> | <i>Indirect</i> | <i>Total</i> |
| FR | 0.812 | 9.277 | 10.089 |
| FR* Military exp | -0.290 | -3.314 | -3.605 |
| Ln(GDPpc) | 0.261 | 2.976 | 3.236 |
| Military exp. | -0.207 | -2.369 | -2.577 |