**Political institutions and population health: Democratization and cross-country differences in infant mortality decline in Africa, 1980-2011**

Abstract:

There has been a steep decline in child mortality in Africa recently. Improvements in child health indicators in the region happened concurrently with massive political reforms that instituted democracy and incited political stability. Even though there have been speculations that some of the improvements in health can be attributed to the institution reforms, empirical research connecting the two phenomena is scarce. This paper uses time series data from 53 African countries from 1980 and 2011 to shed light on potential links between democratization and cross country differences in infant mortality rates. Preliminary results from Fixed Effects estimations show democracy (measured by transition to multipartism and Polity2 scores) is associated with faster decline in infant mortality controlling for economic development, fertility, HIV prevalence, and urbanization. The strength of political incumbents and levels of corruption also matter. Further analysis is underway to highlight interactions between democratization and broad measures of political stability.

[Preliminary draft. Please do not cite]

**Moshi Optat Herman**

Fellow in Demography/Population Science
Department of Social Policy,
London School of Economics
Houghton Street, London WC2A 2AE, United Kingdom
Email: m.o.herman@lse.ac.uk

## INTRODUCTION

The African continent has experienced massive improvements in infant and child health in the last few decades.  Between 1950 and 2000, half of the continent experienced either monotonic decline in child mortality or long-term declines punctuated with minor rises (Garenne and Gakusi, 2006). Also, the speed of decline in mortality for children under the age of five accelerated between 2000 and 2010 relative to the preceding decade (Rajaratnam *et al.,* 2010). The rates of decline in child mortality vary across countries and stalled declines and occasional rises are attributed to myriad of factors including political instability, economic, crises, and emerging diseases such a HIV/AIDS (Garenne and Gakusi, 2006).

The aforementioned improvements in child health happened at the time when the continent was also experiencing considerable political transformations, chief among them being democratization. In the context of early political transitions in Africa, democratization signified a transition from political regimes without competitive elections, mostly with only one political party, to a system with *de jure* "free and fair" political competition, a multiparty system. The transformation was palpable: Between 1990 and 1998, 42 African countries conducted multiparty elections whereas only seven countries held competitive elections between 1985 and 1990 (van de Walle, 2000).

Despite the concurrence of improvements in child health indicators in Africa with democratization in the late decades of the 20th century, there is limited empirical literature linking these two phenomena. Typically, the available research linking politics and population health has focused on wealthy nations, particularly OECD members (e.g., Mackenbach, 2013; Navarro et al., 2003; Chang and Muntaner, 2006; Navarro & Shi, 2001; Raphael & Bryant, 2003, Muntaner *et al.*, 2002; Macinko *et al.*, 2004). In addition, the available research has mostly focused on the associations between population health outcomes and varieties of democratic regimes in mature democracies. This strand of work,  for example, emphasizes on the relationship between population health outcomes and type of the "welfare state" in a given nation or whether the dominant ruling parties are left or right-leaning (Navarro, et al., 2006; Navarro and Shi, 2001; Raphael & Bryant, 2003; Muntaner et al., 2002; Macinko et al., 2004).

This paper focuses on Africa which has been underexplored in the research on the relationship between institutional arrangements and health. In addition, we specifically highlight the impact of the actual process of transition to democracy on health.  This paper contributes to our understanding of the impact of structural (political, economic, social) transformation on long term demographic and wellbeing trends. For Africa, in particular, the relationship between countries' institutional make-up and the variability in development trajectories in the continent is a growing topic of interests by scholars and development practitioners alike. Also, the use of infant mortality rates, which is also a broad measure of social development, as an outcome variable, allows for the analysis in this paper to be interpreted in the wider context of the effect of political arrangements on development in general.

The analysis uses time series data from 53 African countries from 1980 to 2011. We apply Fixed Effects models to isolate the effect of democracy on infant mortality controlling for country-specific heterogeneity, level of economic development, HIV prevalence, and proportion of rural residents in a given country.  The distinction between democracy and autocracy is based on the extent to which: (i) the executive (president) is elected through an open, fair, and competitive (multiparty) process,

(ii) there are institutionalized constraints to the executive power, (iii) citizens' civil and political liberties are legally guaranteed. We use two measures of democracy including a period measure capturing the transition to a multiparty system and polity scores as qualitative measure of democracy. In addition, we control for the 2000s Millennium Development Goals period and by "good governance" indicators by including covariates capturing control of corruption, rule of law, and political stability.

Furthermore, in order to highlight the diversity of political transformations in the continent in the 1990s, we also examine variations in infant mortality decline in the 2000s by the specific nature of the electoral reforms. First, we categorize countries by the status of the multiparty elections in the 1990s by whether incumbents prevailed or opposition parties won. Second, we include Freedom House categorization of countries in the late 1990s by level of availability of civil and political freedoms as: free, partially free, or not free.

Finally, the paper examines potential hypothetical mechanisms linking the political transformation with differences in infant mortality rates decline across countries. Following the existing literature two pathways are explored. The first pathway tests the idea that the political transformation impacted infant mortality through its effect on socioeconomic indicators related to infant health including nutrition, birth weight, female education, and inequality. The second pathway explores the idea that the political transformations affected infant mortality through changes in government health expenditure leading to improved access to health care and services.

## LITERATURE REVIEW

### Democratization and development in Africa

Africa's weak economic and social development performance in the late decades of the 20th C has been attributed to poor governance (Mkandawire & Soludo, 1999; Ndulu & O'Connell, 1999; van de Walle, 2001). The single-party state, which was the norm in many African countries before the 1990s, was identified as part of the problem. The lack of political competition fostered a concentration of power which insulated the polity from popular discontent creating few incentives for accountability. As such, instituting democratic "developmental states" was seen as the solution towards improved institutional accountability (Mkandawire, 2001). The first step taken was institutionalization of political competition by allowing formation of opposition political parties, which at the time were illegal in many countries. Creation of multiparty systems went hand-in-hand with expansion of political and civil liberties, such as freedom of press, speech, and association, which were part and parcel of the good governance ethos within development thinking starting in the 1990s.

Democratization in Africa was part of the worldwide movement in the late 20th century, the "third wave democracy," which saw numerous democracies emerge in the Global South as authoritarian regimes increasingly lost legitimacy in the post-Cold War global order (Huntington, 1991). An overwhelming majority of African countries held their first multiparty elections in the 1990s (van de Walle, 2000). However, there was a wide variation in the nature of specific transitions across the continent. For instance, whether the elections were truly open, free, and fair varied greatly across

the continent (Ademojubi, 2000).  In some countries, political incumbents were reluctant to implement political reforms until when pressure from external donors started to mount. The reluctance to reform became especially untenable after the International Monetary Fund and other funding agencies started to include "good governance" among its conditions for receiving loans.

The process of democratizing through introduction of political competition in Africa has however received mixed reviews.  One verdict is that it worked:  because it increased "supply of political goods" by, at the very least, institutionalizing *de jure* guarantee of political rights and removing barriers to entry in the political sphere (Bratton, 2007).  Moreover, whether the elections were truly competitive or not, the mere fact of conducting routine competitive elections has a liberalizing effect that typically leads to less authoritarian states (Howard and Roessler, 2006; Lindberg, 2006, 2009).

Others have argued that introduction of multiparty systems only emboldened the existed patrimonial states, states characterized by concentration of power (one-man rule) and clientilism, i.e., the use of political office for personal gain (Joseph 1997, 1998; van de Walle 2000, 2002, 2003). Potentially, reforms were "elections without democracy," which at the very best mainly led to creation of hybrid regimes that were part democratic and part authoritarian (Diamond, 2002). Some critics have also associated the mixed outcomes to the type of democracy that was implemented in the region, the liberal-cum-pluralist democratic model, arguing that this model merely replicated the neoliberal ideal of politics and good governance which idealizes a very particular type of State that was not necessarily compatible with the existed institutions in the continent (Abrahamsen, 2000; Ayers, 2006).

Other than the numerous studies that have explored the effect of democratization in the political sphere in the continent (Bratton 2001, 2007; van de Walle, 2001; Bratton and van de Waal 1997; Joseph 1997, 1998), there are very few studies that examined the direct effect of the reforms on socioeconomic development in general.  Without empirical testing, early literature mainly theorized that  political competition would reduce inefficiencies in distribution of state and development resources (Berry, 1989; Bates 1981; Herbst, 2000; Mbaku, 1999), and should  improve institutional accountability (Heyden, 1989;  Mbaku, 1999) leading to an overall improvements in social welfare.

Few empirical studies have tested the theory by examining development outcomes very broadly. Alence (2004) examines the relationship between political institutions and governance quality and concludes that  democratization, specifically a combination of open political competition and restraint of executive power, leads to better development policies in Africa (Alence, 2004). Similarly, using a game-theoretic model Stasavage (2005) shows that  introduction of political competition in Africa prompted elected officials to be more responsive to their constituents leading  to improvements in policy and planning  and especially more  spending on social services, such as education (Stasavage, 2005).

However, research exploring the direct effects of democracy and democratization on population health in Africa remains scarce.  In one of the few existing studies, Kudamatsu (2012) finds a positive effect of democratization (defined by weather a country has universal suffrage and competitive elections) on infant survival. Kudamatsu's (2012) analysis finds a 1.2 percentage decline in infant mortality after democratization in Africa even after controlling for country-specific trends and other correlates of infant health. This comprehensive study focuses on periodic changes before and after

democratization, but does not highlight qualitative changes in expansion (or the lack thereof) of civil and political liberties across countries. Moreover, Kudamatsu (2012) only relies on countries with available Demographic and Health Surveys, which was the main data source for the study.

**Political Institutions and population health**

Citizens of democracies, defined as nations in which political power is attained through a competitive process with a possibility of alternation of power between competing parties, enjoy relatively higher social wellbeing than residents of authoritarian regimes in which power is monopolized and competition is outlawed (Przeworski, Alvarez, Cheibub, and Limongi, 2000; Sen, 1999). The oft-paraphrased proclamation from Amartya Sen stating: `there has never been a famine in a democracy' (Dreze and Sen, 1989) echoes this suggestion that democracy leads to improvements in social welfare. For health in particular, empirical research continue to find better health outcomes in democracies than in the counterpart nations (e.g., Besley and Kudamatsu, 2006; Mackenbach, 2013), even though the exact mechanisms connecting the two are still a point of debate.

Cross-country studies of the relationship between political institutions and health outcomes have focused on three main aspects including: (i) democratic status, i.e., whether a given country is democratic or not; (ii) orientation of the dominant party, e.g., whether the ruling party is left-leaning or right-leaning; and (iii) the type of a welfare state in a given country, i.e., the degree at which the state redistribute through social programs. In terms of the effect of democratic status, studies consistently find higher life expectancy in democracies than in non-democracies (Mackenbach, 2013; Besley and Kudamatsu, 2006 Franco *et al.*, 2004; Klomp & de Haan, 2009, Muntaner et al., 2001).

Similarly, studies have found differences in health outcomes across countries by the virtue of the political orientation of the ruling regime. Focusing on OECD countries, Navarro and associates (2006) find an association between population health outcomes and the type of dominant political regime in given country, defined as Social Democratic, Christian Democratic or conservative, liberal, etc.; and argue that the difference emerge from the extent to which these regimes subscribe to egalitarian ideologies (Navarro *et al.,* 2006). Related to the ideology of the ruling regime, studies have argued that there is a relationship between health outcomes and welfare state variables, such government health financing, inequality, and the relative organizational strength of labor vs capital (Macinko et al., 2004; Raphael & Bryant, 2003; Navarro, et al., 2006; Navarro & Shi, 2001; Muntaner et al., 2002). For example, Macinko and associates (2004) find a positive association between wage inequality and infant mortality rates in OECD countries. Similarly, Raphael & Bryant (2003) analysis of indicators of women health in Canada, Denmark, Sweden, the UK, and the US, show that women in countries with government-run social welfare programs in the health sector enjoy better health outcomes than their counterparts in countries with privatized healthcare.

There are however empirical challenges in this strain of research including selection bias issues and confounding effects of myriad of factors that simultaneously affect both population health outcomes and democracy. Ross (2006) argues that the statistical association between democracy and infant mortality disappears once one accounts for the missing data on high-performing authoritarian states, which are often excluded in some of the existing studies (Ross, 2006). Similarly, an analysis by Nelson (2007) show that democracies spend more on social services but there is no noticeable impact on health outcomes.

**Possible mechanisms: improved collective action and institutional accountability**

The positive effect of democracy on health outcomes is predicated on: (i) improvements in collective action in democratic regimes relative to non-democratic regimes (Sen, 1981; Dreze and Sen, 1991; Sen, 1999) and (ii) improved institutional accountability in democratic regime relative to authoritarian regimes (Przeworski, Alvarez, *et al.*, 2000; Carbone, 2012; Lake and Baum, 2001). Institutional accountability often translates into improved socioeconomic wellbeing (Przeworski *et al.*, 2000). Since competitive democracy creates uncertainty in maintaining power, democratic rulers tend to be more accountable to the electorate and they manifest their commitment by high social spending whereas as authoritarian rulers lack such an incentive (Przeworski et al., 2000). As a result of increased institutional accountability, democracies tend to spend more than non-democracies health services (Przeworski, Alvarez, *et al.*, 2000; Ghoborah, Huth, and Russett, 2004). Improved social policy coupled with increased spending on social services, which often accompanies democratization, has been shown to result into reduction in child mortality in Latin America and East Asia (McGuire 2001, 2010). Similarly, a comparison of health policies in Ghana, an enduring democracy, and Cameroon, an enduring autocracy, shows that that in Ghana democratization created electoral pressure that led the government to implement ambitious health reforms whereas an internal pressure to reform was not observed in Cameroon (Carbone, 2012).

*Conceptual framework*

Democratization can thus be considered as a *distal* determinant of infant mortality, that is, as a factor that influences the *proximate* determinants of risk death during the first year of life. Proximate determinants of infant survival, such as maternal characteristics, nutrients deficiency, and availability of ante and post-natal care, are mediated by contextual factors including ecology, climate, political economy, and health systems (Mosley and Chen 1984).

We could envision two pathways through which democracy may influence population health, and specifically infant mortality (Figure 1). First, through its impact on collective action (Sen, 1981; Dreze and Sen, 1991; Sen, 1999). Citizens in democratic societies are better positioned to exert welfare demands on the State leading to improvements on socioeconomic indicators related to infant health (nutrition, birth weight, female education, and inequality). Second, through increased institutional accountability due to political competition (Przeworski, Alvarez, et al., 2000; Carbone, 2012; Lake and Baum, 2001. Democratic regimes invest more on health than their non-democratic counterparts leading to high government health expenditure, better access to ante and post-natal care, and wider immunization coverage.

(Figure 1)


**METHODS**

**Data**

This paper uses yearly time series data for all African countries from the World Bank's African Development Indicators database (World Bank, 2014). The data includes 53 African countries

covering the 1980 to 2011 period[1]. Additional data on years of transition to multiparty system were collected from various online sources including countries' electoral boards' websites and the African elections database. Democracy variables were created from Polity IV project database (Marshal et al, 2013). Finally, the information on governance (corruption, rule of law, and political stability) were obtained from World Banks World Governance Indicators. We also use Freedom House's categorization of countries by availability of political rights and civil liberties (Freedom House, 2014).

**Dependent variable**

We use infant mortality rate as the outcome variable. Infant mortality rate is the number of infants dying before reaching their first birthday per 1,000 live births in a given year. Infant mortality rates are highly responsive to institutional and public health interventions; such as, universal education programs, control of infectious disease, and immunization programs, which are often affected by macro-level institutional changes (Caldwell, 1986, Mosley and Chen 1984). As such, infant mortality rates (and to an extent child health indicator in general) are highly sensitive to the political context (Conley & Springer, 2001, Navarro et al., 2003, Macinko et al., 2004). In addition, infant mortality rates correlate fairly well with other social indicators making it a wholesome proxy of socioeconomic development in general.

**Key independent variables**

The key independent variables are two democratization indicators. The first indicator is Polity2 used as a comprehensive measure of degree of democracy in a given country. Polity IV indices are widely accepted in the Social Science research as valid and reliable measures of democracy (Munck & Verkuylen, 2002). Numerous studies on the impact of democracy on health have utilized Polity indicators (e.g., Mackenbach, 2013; Wigley & Akkoyunlu-Wigley, 2011). Polity2 is a revised combined score that makes it easier to use the original Polity regime measure in time-series analyses as it strictly ranges from +10 (strong democratic) to -10 (strong autocratic) with all other cases (e.g., foreign intervention, interregnum, anarchy, and transitional cases) converted to either system missing or prorated to a numeric equivalent between +10 and -10 (Marshal *et al*, 2013). An autocracy is characterized by restricted political competition where chief executives are selected in a "regularized process" among political elite and once selected "they exercise power with few institutional constraints" (Marshal et al, 2013, p 15). On the other hand, democratic regimes, according to this measure, are characterized by presence of formal procedures through which citizens can express their preferences of how they should be governed (policies) and who should lead, they have institutional constrains to executive power, and they guarantee civil and political liberties (Marshal et al, 2013).

A categorical variable was also created from the Polity2 scale to be used in detailed analysis of the impact of different degrees of democratization on infant mortality and in the analysis of the interaction between income and democracy. The Polity2 measure was thus divided into five categories including strong autocracy (if Polity2 score is between -10 and 6 inclusive), weak autocracy (if polity score is between -5 and -1 inclusive), neutral (if polity score is 0), weak

---

[1] The analysis excludes the newly created South Sudan. No data were available for Somaliland and Western Sahara whose status as countries are contested.

democracy (if polity score is between 1 and 5 inclusive), and strong democracy (if polity score is between 6 and 10 inclusive).

Second, we use a dummy variable coded as 1 for all years after the transition to democracy and as 0 for years before the transition. The multiparty transition is lagged by two years, e.g., even though, Zambia held their first multiparty elections in 1991, the post-transition period is taken as 1993. For countries, such as Angola, Burundi, and the Gambia, which had a civil war or a military coup immediately after the elections, the year of the first post-conflict elections is taken as the proper democratization year. For Angola, 2008 is indicated as the first multiparty election year regardless of their 1992 multiparty elections given the political tumult following the elections. Similarly Burundi 's first multiparty election year is taken as 2005 regardless of the 1993 elections due to the following period of civil war. Also, even though Gambia has one of the longest multiparty systems dating to independence in 1965 (Wiseman, 1998), 2001 is taken as the first multiparty election due to a coup in 1994.

Two additional measures were incorporated in the analysis of the effect of institutional building in the 1990s on IMR trends in the 2000s. The first measure is a refined categorical indicator of the multiparty transition with four dummy variables corresponding to: (i) old democracies, i.e., countries which had multiparty elections before the 1990s, (ii) opposition party win, i.e., countries which had multiparty elections in the 1990s and an opposition party won, (iii) incumbents win, i.e., countries which had multiparty elections in the 1990s and the political incumbents, often in power since independence, won the elections, and (iv) no multiparty elections in the 1990s. The second measure of institutional building in the 1990s capture the availability of political and civil liberties in the late 1990s using Freedom House's categorization of countries as Free, Partly Free, and Not Free. Freedom House's categorization of countries as Free, Partly Free, Not Free, averages political rights and civil liberties ratings obtained through surveys (Freedom House, 2014).

Finally, in order to shed light on the effect of "good governance" in general instead of just merely focusing on the procedural democratization, the analysis also includes three governance measures as predictors including corruption, rule of law, and political stability obtained from World Bank Institute's governance indicators database . Corruption is measured by a corruption perception index from a survey of business people and country analysts conducted by Transparency International which scores perceptions of the extent of corruption in a given country with high values indicating low levels of perceived corruption (World Bank Institute, 2014). Rule of law "measures the extent to which agents have confidence in and abide by the rules of society, in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence" (World Bank Institute, 2014). Finally, political stability "measures the perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including domestic violence or terrorism" (World Bank Institute, 2014). High scores on the rule of law and political stability indices indicate lack of rule of law and political instability respectively.

**Control variables**

Other predictors used include level of economic development measured by GDP per capita. Theories of democracy have long associated social modernization and economic development with a greater propensity for democratization and democracy (Lipset, 1959; Dahl, 1971; Huntington, 1991;

Rusechemeyer, Stephens, and Stephens, 1992). Thus, given the two variables are considered to be associated, including both national income and democracy as predictors could be problematic as it may potentially lead to multicollinearity. A growing empirical has however put into question the assumed positive association between economic development and democracy (Acemoglu *et al*., 2008, Przeworski and Limongi, 1993) with some studies pointing to a potential of democracy effecting economic growth negatively (Tavares and Wacziarg, 2001), while others argue that the relationship is not systematic (Rodrik, 1997). Also, given the strong evidence that economic development has a direct impact on infant mortality (Hanmer et al., 2000; Filmer and Pritchett, 1999; Flegg, 1982), this paper includes GDP per capita as a control variable despite the potential for the issue of multicollinearity. Several other studies of the impact of democracy on population health have also included both GDP per capital and democracy as predictors (e.g., Navarro *et al*., 2006; Mackenbach *et al.*, 2013; Kudamatsu, 2006; Chung and Muntaner 2006; Wigley and Akkoyunlu-Wigley, 2011).

In addition to controlling for level of economic development, the paper takes into consideration differences in demographic structure using Total Fertility Rates. Furthermore, given the African context in question, two other control variables that have been shown to impact infant mortality were also added including HIV/AIDS prevalence (Newell *et al*., 2004; Zaba *et al.,* 2004) and proportion of rural residents in a given country.

**Variables for exploring mechanisms**

In this paper, we hypothesize that democracy affects population health through two pathways: (i) through its positive effect on socioeconomic wellbeing (Sen, 1981; Dreze and Sen, 1991; Sen, 1999) and (ii) through its effect on government health spending and by extension health access (Przeworski, Alvarez, et al., 2000; Ghoborah, Huth, and Russett, 2004). In order to make sense of the associations between democracy and infant mortality, we examine whether socioeconomic indicators and health access and expenditure differ between democracies and non-democracies.

For socioeconomic indicators, the analysis focuses on measures that are directly related to infant mortality as either proximate or distal determinants (Mosley and Chen, 1984) including low birth weight, measured by proportion of births recorded as having low birth weight; nutrition, measured by proportion of adults who malnourished; females educational attainment, measured by females national average educational attainment in number of years and female literate rate; access to clean water, measured by percentage of population with access to improved water source; and inequality, measured by the GINI coefficient. Indicators of government health expenditure and health access included were: proportion if population with access to antenatal care, immunization coverage, number of doctors per 10,000 people, health expenditure by governments as a percent of GDP, and out-of-pocket health expenditure as a percent of total health expenditure. Since the focus is on the state expenditure on health, we also control for foreign aid receipts, measured by total Official Development Assistance (ODA) received in a particular year, as proxy of foreign assistance in general including NGOs and other programs such as the Millennium Development Goals.

**Statistical analysis**

The statistical analysis uses Fixed Effects (FE) estimation to explore the relationship between changes in countries' political context, the key predictor, and changes in countries' Infant Mortality

rates (IMR), the outcome variable. FE allows for the changing relationship between the predictor and the outcome variables to be explored over time within an entity, a country in this case, while controlling for unobserved heterogeneity, i.e., country-specific factors that are not included in the model and are constant over time, such as geography, climate, landlockedness, etc. (Wooldridge, 2001). Controlling for country-specific time-invariant factors that may bias either the predictor or the outcome allows for the net effect of changes in predictor on the outcome to be explored. Given the non-randomness of the units under study, country, and the focus on the effect of changes in the predictor on changes on the outcome FE was the natural choice (Wooldridge, 2001). To confirm, Hausman Tests were conducted to ascertain the whether the alternative, Random Effects (RE), which allows for intercepts to vary randomly, were more appropriate. The tests confirmed FE were better estimations than RE.

The generic model estimated was thus as follows:

$$Y_{it} = \beta_1 DEMOC_{it} + \beta_2 lnGDP_{it} + \beta_3 TFR_{it} + \beta_4 HIV_{it} + \beta_5 RURAL_{it} + \alpha_i + u_{it}$$

Where:
$Y_{it}$ is infant mortality rate in country $i$ in year $t$ from 1980 to 2011
$\alpha_i$ is country-specific intercept
$u_{it}$ is the error term

Two separate sets of model are estimated using the two measures of democracy: polity scores and the multiparty period dummy. The above model is estimated in expanded form controlling for the 2000s Millennium Development Goals era, corruption, rule of law, and political stability. In addition, interaction models examining associations between varieties of transitions to multiparty system in the 1990s and differences in IMR decline across countries in the 2000s are also estimated.

Tests showed the error structure to be serially auto-correlated and heteroscedastic. Under these conditions we estimate robust standard errors using the xtscc STATA program which also account for cross-panel autocorrelation (Hoechle 2007).


**RESULTS**

**Descriptive statistics**

Infant mortality rate ranged from a minimum of 11.5 deaths of new-borns per 1000 live births recorded in Seychelles in 2001 to 169.6 observed in Angola in 1980. Infant mortality rate declined overtime from a mean of 96.94 in the 1990s to 68.84 in the 2000s. For the 53 countries in the 32 year span, countries were under a multiparty system in 47% of the yearly observations. The level of democracy as measured by polity scores also was increasing over time in the continent. In the 1980s, the average polity score was -5.46 (moderately strong autocracy) whereas in the 2000s the average polity score was 1.26 (weak democracy). Also, mean scores by decade on the good governance indicators for corruption, rule of law, and political stability showed a continued improvement in good governance. The plurality of the elections in the 1990s (45%) were the ones where the incumbent won the first multiparty election.

(Table 1)

**Bivariate relationships**

*Yearly predicted IMR by democracy categories*

Both pre-multiparty and post-multiparty countries show decline in predicted IMR by calendar year between 1980 and 2011. However, in any given year, pre-multiparty countries' predicted IMR are consistently higher than those of post-multiparty countries (Fig 2).

(Figure 2)

The yearly predicted IMR values do not show consistent differences between autocratic and democratic regimes. Whereas between 1980 and early 2000s strong democracies have consistently the lowest predicted IMR by calendar year, surprisingly weak democracies show higher predicted IMR values than weak autocracies (Fig 3).

(Figure 3)

*Yearly predicted IMR by levels of economic development*

As expected the higher the GDP the lower the predicted IMR (Fig 4). However, few high income autocratic regimes appear to have unusually high levels of IMR (Fig 5).

(Figure 4)

(Figure 5)

Furthermore, there are no consistent differences between democracies and autocracies in IMR predicted by economic development. Even though strong democracies have the lowest predicted IMR at any income level, at the low GDP spectrum, weak autocracies appear to have lower predicted IMR than weak democracies and at the higher income band, strong autocracies have higher predicted IMR than weak autocracies (Fig 6).

(Figure 6)

*IMR Declines in the 2000s by political institutions in the 1990s: 2000s declines by status of 1$^{st}$ multiparty elections in the 1990s*

Old democracies, countries which had multiparty elections before the 1990s, consistently show the lowest IMR predicted by calendar year between 2000 and 2001 followed by countries which had a multiparty election in the 1990s and the opposition won (Fig 7).

(Figure 7)

However, countries which had multiparty elections but the political incumbents won the elections appear to have higher yearly predicted IMR in the 2000s than countries which did not hold multiparty elections in the 1990s (Fig 7).  Similarly, in terms of IMR predicted by the level of economic development, at any income level, predicted IMR are in the following order from the lowest to the highest: old democracies, had multiparty election in the 1990s and the opposition

11

won, had no multiparty elections in the 1990s, and had multiparty elections in the 1990s and the incumbents won (Fig 8).

(Figure 8)

*IMR Declines in the 2000s by political institutions in the 1990s: 2000s declines by 1990s freedom status*

From mid to late 2000s, the higher the political and civil liberties enjoyed by citizens of a given country the lower the predicted IMR (Fig 9). In early 2000s, "partially free" countries seem to have higher predicted values than "not free," which is perhaps attributed to the fact that the "freedom" values used here were recorded in the late 1990s and as such those institutions would not have impacted social wellbeing immediately in the early 2000s.

(Figure 9)

In terms of IMR predicted my economic development, at most GDP levels, the more there are political and civil liberties in a given country, the lower the predicted IMR with an exception of at the lowest end of the GDP per capita spectrum where the predicted IMR scores of "partially free" countries are slightly higher than the predicted scores for "not free" countries.

(Figure 10)

**Fixed effects regressions results**

*The impact of democracy on IMR*

Both measures of democracy, post-multiparty period and Polity score, have statistically significant effects on IMR net of country heterogeneity and shared time trends. Net of country fixed effects, GDP per capita, fertility, HIV prevalence, and percent of rural residents, a unit increase on the democracy polity scale reduces IMR by 0.37 percent (Table 3) and being a multiparty country reduces IMR by 5.59 percent (Table 4). The effect persists albeit with a slight decrease in magnitude after controlling for the 2000 period and governance indices measuring corruption, rule of law, and political stability.

The coefficients of economic development and demographic variables are as expected. IMR has a negative association with GDP per capita whereas fertility, HIV prevalence, and percent rural are positively associated with IMR.

(Table 3)

(Table 4)

*Interaction of income with democracy in determining IMR*

The descriptive analysis showed that the effect of democracy interacts with country's level of economic development. As such, separate fixed effect regressions were estimated with GDP per capital categorized as low income, low middle income, high middle income, and high income. Then, interaction variables were created combining income categories with multiparty dummy and the Polity scores respectively. Both measures of democracy have an interactive effect with income.

(Table 5)

*Declines in 2000s by institutional reforms in the 1990s*

Additional fixed effect models were estimated including the status of the 1990s elections (categorized as old democracy/ had multiparty elections prior to the 1990s, had multiparty elections and the opposition parties won, had multiparty and the incumbents won, and had no multiparty elections in the 1990s). To capture the effect of these institutional reforms on the 2000s decline, these predictors were interacted with a dummy variable identifying the 2000s period.   Confirming the surprising result shown in the descriptive analysis, countries which had a multiparty election in the 1990s and the incumbents retained power appear to have worse IMR in the 2000s than countries which did not transition into a multiparty system in the 1990s. Also, net of fixed effects and the other predictors, old democracies also seem to enjoy an additional reduction in IMR in the 2000s compared to the countries which did not transition to a multiparty system in the 1990s.

(Table 6)

We also use the late 1990s Freedom House categories of countries as free, partly free, and not free to explore further the impact of the nature of the 1990s reforms on decline in the 2000s. Relative to countries categorized as not free in the late 1990s, partly free and free countries have lower infant mortality in the 2000s (Table 7).

(Table 7)

**Robustness checks**

We tested whether the relationship between democracy and IMR holds when certain categories of countries were excluded. We run the fixed effects regressions with subsamples by first excluding North Africa, then we excluded countries with high population and low population respectively, and finally we excluded high performing autocratic states.

The coefficients remained robust with only a slight increase in magnitude of the Polity coefficient when North African countries (Algeria, Egypt, Libya, Morocco, and Tunisia) were excluded. This result is not surprising as excluding North Africa also precludes few high performing autocratic which would have been pushing the coefficient downwards (Table 12).

High and low population categories where defined by the distribution of total population whereby countries whose total population fell in the fourth quartile of the distribution where categorized as high population countries and those falling in the first quartile were categories as low population countries. Similarly, polity and multiparty coefficients are robust to omission of big and small countries.  The polity coefficient, however, almost doubles when big countries are excluded (Table 12).

Finally, excluding high performing autocratic states did not yield substantive changes in the key coefficients as well. High performing autocratic states were defined as strongly autocratic states (polity scores below -5) with infant mortality in the lowest quartile of the distribution of infant mortality rates (Table 12).

**Mechanisms**

Democratization is expected to affect health outcomes through two pathways: through improvement in socioeconomic development in general and through increase in health access. To highlight mechanisms that are directly related to infant mortality, the analyses here focused on social indicators that are known to be related to infant mortality including proportion of births recorded as having low birth weight, nutrition, females educational attainment, access to clean water, and inequality (Hanmer et al., 2000, Filmer and Pritchett, 1999; Flegg, 1982; Frey and Field, 2000). Health access as potential mechanism linking democracy and infant mortality was explored through indicators of health access including access to antenatal care, immunization coverage, and number of doctors per 10,000 people, health expenditure by governments as a percent of GDP, and out-of-pocket health expenditure as a percent of total health expenditure.

*Are the differences in IMR between democratic and non-democratic regimes due to improving socioeconomic indicators after democratization?*

Net of country fixed effects, GDP per capita, and a dummy for the 2000s period, female educational attainment, female literacy, and water access showed statistically significant association with democracy measures whereas low birth weight, nutrition and inequality as measured by the GINI coefficient did not show statistically, which could be partly attributed to lack of sufficient number of observations. Net of country fixed effects and the other predictors, a unit increase on the polity democracy scale is associated with an increase in educational attainment, female literacy, and water access (Table 8). Net of country fixed effects, score of the polity scale, GDP per capital and the 2000s period, multiparty regimes the analysis show that proportion of residents of multiparty regimes with access to clean water is 3.1% higher than in the pre-multiparty regimes (Table 9).

(Table 8)

(Table 9)

*Are the differences in IMR between democratic and non-democratic regimes due to improving health access?*

The fixed effects regressions showed that immunization coverage for DPT and measles, public health expenditure, and out-of-pocket health expenditure varies between democratic and non-democratic regimes. Antenatal care access, which had substantial missing data, and number of doctors per 10,000 did not show statistically significant associations. Polity scores are strongly positively associated with DPT and measles immunization coverage and public health expenditure, and negatively associated with lower out-of-pocket health (Table 10). Similarly post -multiparty regimes show higher DPT and measles immunization coverage, higher public health expenditure, and lower out-of-pocket health expenditure than pre-multiparty regimes net of all fixed effects, GDP per capita, 2000s dummy, and foreign aid (Table 11).

(Table 10)

(Table 11)

**DISCUSSIONS AND TENTATIVE CONCLUSIONS**

Preliminary results show faster IMR decline in democratic regimes than non-democratic ones with both measures of democracy used (post multiparty period and polity scores). Post- multiparty years show a 4.5% reduction in IMR relative to pre-multiparty years and a unit increase on the democracy scale reduces IMR by 0.2% controlling for country-specific unobserved factors, economic development, fertility, HIV prevalence, urbanization, 2000s period, corruption, rule of law, and political stability.

In addition, the analysis shows that nature of the political reforms in the 1990s matters for the 2000s declines. Countries which had a multiparty election in the 1990s but the incumbents retained power do worse than countries which did not transition into a multiparty system. The poor performance of incumbent-win regimes provides some support for the *electoral authoritarianism* also *multipartism-without-democracy* thesis which holds that when there is a strong incumbent party with only weak opposition, there are no incentives for the incumbent to implement real reforms (Przeworski *et al.,* 2001). As such, true competitive democracy only happens when there is an "appearance of uncertainty," that is, the incumbent faces a real risk of losing power (Przeworski *et al.*, 2001). Furthermore, in terms of governance, control of corruption seems to reduce infant mortality rates, but the preliminary results do not find variations in IMR among countries by the extent to which rule of law is upheld and degree of political stability.

Furthermore, the analysis finds evidence in support of two potential pathways connecting democratization and improved social wellbeing hypothesized in the literature. The preliminary results show that relative to autocratic regimes, democratic regimes have improved socioeconomic indicators related to infant mortality (female education, water access), higher government health expenditure, and improved access to immunization. The existing literature posits that democracy improves collective action and provide avenue for citizens to exert pressure to the State for social reforms, which often translates to improvements in social indicators (Sen, 1981; Dreze and Sen, 1991; Sen, 1999). Democracy also increases governments' accountability which frequently leads to increased public spending in services including health (Przeworski, Alvarez, et al., 2000; Carbone, 2012; Lake and Baum, 2001).

**BIBLIOGRAPHY**

Abrahamsen, Rita. 2000. *Disciplining Democracy: Development Discourse and Good Governance in Africa*. London: Zed Books.

Acemoglu, D., Johnson, S., Robinson, J. A., and Yared, P. (2008). "Income and democracy." *American Economic Review* , 98:3, 808–842

Adejumobi, Said. 2000. "Elections in Africa: A Fading Shadow of Democracy?" International Political Science Review 21(1)59–73.

Alence, Rod. 2004. "Political Institutions and Development Governance in sub-Saharan Africa." *Journal of Modern African Studies* 42(2):163 – 187.

Álverez-Dardet, Carlos, and Álvaro Franco-Giraldo. 2006. "Democratization and  Health after the Fall of the Wall." *Journal of Epidemiological and Community  Health* 60, no. 8: 669–71.

Ayers, Alison. 2006. "Demystifying Democratization: The Global Constitution of (Neo-) Liberal Polities in Africa." Third World Quarterly 27 (2): 331–38.

Bates, Robert H. 1981. *Markets and states in tropical Africa: the political basis of agricultural policies*. Berkeley: University of California Press.

Berry, Sarah. 1989. "Social Institutions and Access to Resources." *Africa: Journal of the International African Institute* 59(1).

Besley, Timothy, and Masayuki Kudamatsu. 2006. "Health and Democracy." *American Economic Review* 96, no. 2: 313–18

Bratton, Michael. 2007. "The durability of political goods? Evidence from Nigeria's new democracy." *Commonwealth and Comparative Politics* 45(1):1-33.

Caldwell, John C. 1986. "Routes to low mortality in poor countries." *Population and Development Review* 12(2):171-220.

Carbone, Giovanni. 2012. "Do new democracies deliver social welfare? Political regimes and health policy in Ghana and Cameroon." *Democratization* 19:2

Chung, Haejoo, Carles Muntaner. 2006. " Political and welfare state determinants of infant and child health indicators: An analysis of wealthy countries." *Social Science & Medicine* 63(3):829-842

Conley, D. W., and K.W. Springer. 2001. "Welfare state and infant mortality." *American Journal of Sociology* 107 (3): 768–807

Diamond, Larry. 1996 "Is the Third Wave of Democracy Over?" *Journal of Democracy* 7, no. 3

Dreze, J., & Sen, A. K. 1991. *Hunger and public action*. Clarendon: Oxford.

Filmer, D, and Pritchett L.H. 1999. "The impact of public spending on health: does money matter?" *Social Science and Med*icine 49: 1309-1323.

Flegg, A. T., 1982. "Income, Illiteracy and Medical Care as Determinants of Infant Mortality in Underdeveloped Countries." *Population Studies* 36 (2): pp 441-458.

Franco, Alvaro; Alvarez-Dardet, Carlos and Ruiz, Maria T. 2004. "Effect of Democracy on Health: Ecological Study*." British Medical Journal*, 2004, 329(7480), pp. 1421-23.

Freedom House. 2014. *Freedom in the World Data.* http://www.freedomhouse.org/report-types/freedom-world#.VCU7t_ldXTo. Accessed July 20th 2014.

Frey R.S and Field C. 2000. "The determinants of infant mortality in the less developed countries: a cross-national test of five theories." *Social Indicators Research* 52:215–34.

Garenne, M. and E Gakusi. 2006. "Health transitions in sub-Saharan Africa: overview of mortality trends in children under 5 years old (1950–2000)." *Bulletin of World Health Organization* 84: 470–478.

Ghobarah, Hazem Adam, Paul Huth, and Bruce Russett. 2004. "Comparative Public Health: The Political Economy of Human Misery and Well-Being." *International Studies Quarterly* 48: 733-794.

Hanmer, L, R. Lensink, H. White. 2003."Infant and child mortality in developing countries: analysing the data for robust determinants." *Journal of Development Studies* 40 (1):101–118.

Herbst, Jeffrey. (2000) *States and Power in Africa: Comparative Lessons in Authority and Control*. Princeton, NJ: Princeton University Press

Hoechle, D. 2007. Robust standard errors for panel regressions with cross-sectional dependence. *The Stata Journal* (3):281–312

Howard, Marc Morje, and Philip G. Roessler. 2006. "Liberalizing Electoral Outcomes in Competitive Authoritarian Regimes." *American Journal of Political Science* 50(2).

Huntington, Samuel P. (1991). "Democracy's Third Wave." *The Journal of Democracy*, 2(2)

Joseph, R. 1997. "Democratization in Africa after 1989: comparative and theoretical perspectives." *Comparative Politics* 29, 3: 363–82.

Joseph, R. 1998. '"Africa, 1990–97: from abertura to closure." *Journal of Democracy* 9, 2: 3–17.

Kudamatsu, Masayuki. 2012. "Has Democratization Reduced Infant Mortality in sub-Saharan Africa? Evidence from Micro Data." *Journal of the European Economic Association* 10(6):1294–1317.

Klomp, J., & de Haan, J. 2009. "Is the political system really related to health?" *Social Science and Medicine* 69(1): 36- 46

Lake, David A. and Baum, Matthew A. "The Invisible Hand of Democracy: Political Control and the Provision of Public Services." *Comparative Political Studies*, 2001, 34(6), pp. 587-621.

Lindberg, Staffan I. 2006. *Democracy and Elections in Africa*. The John Hopkins University Press. Baltimore, MD.

Lindberg, Staffan I. 2009. *Democratization by Elections: A New Mode of Transition.* The John Hopkins University Press, Baltmore.

Lipset S.M. 1959. "Some social requisites for democracy: economic development and political legitimacy." *American Political Science Review* 53(1):69–105

Mackenbach, J. P. 2013. "Political conditions and life expectancy in Europe, 1900-2008." *Social Science & Medicine* 82: 134-146.

Macinko, J.A., L.Y. Shi, and B. Starfield. 2004. "Wage inequality, the health system, and infant mortality in wealthy industrialized countries, 1970–1996." *Social Science & Medicine* 58 (2): 279–292.

Marshall, Monty G., Ted Robert Gurr, and Keith Jaggers. 2011. "Polity IV Project: Dataset Users' Manual." Center for Systemic Peace: Polity IV Project.

Mbaku, John Mukum. 1999. "Democratization and the crisis of policy reform in developing countries," in Mwangi D. Kimenyi John Mukum Mbaku *Institutions and Collective Choice in Developing Countries: Applications of the Theory of Public Choice.* Aldershot : Ashgate, pp. 327 354.

McGuire, James. 2010. *Politics, Policy, and Mortality Decline in East Asia and Latin America.* Cambridge: Cambridge University Press.

McGuire, James. 2001. "Social Policy and Mortality Decline in East Asia and Latin America." *World Development* 29 (10

Mkandawire, T. 2001. 'Thinking about developmental states in Africa', Cambridge Journal of Economics 35, 3: 289–313.

Mkandawire, T. & C. C. Soludo. 1999. Our Continent, Our Future: African perspectives on structural adjustment. Dakar: CODESRIA.

Mosley, W. H., and L.C Chen. 1984. Ana analytical framework for the study of child survival in developing countries. *Population and Development Review* 10(suppl.):25-45.

Munck, G., & Verkuylen, J. (2002). Conceptualizing and measuring democracy: evaluating alternative indices. *Comparative Political Studies*, 35(1):5-34.

Muntaner, C., Borrell, C., Ng, E., Chung, H., Espelt, A., Rodriguez-Sanz, M., & O'Campo, P. 2011. "Politics, welfare regimes, and population health: controversies and evidence." *Sociology of Health & Illness* 33(6):946- 964.

Muntaner, C., J. Lynch, M. Hillemeier, J. Lee, R. David, J. Benach, et al. 2002. "Economic inequality, working-class power, social capital and cause-specific mortality in wealthy countries." *International Journal of Health Services* 32(4):629–656

Navarro, V., Borell, C., Benach, J., Muntanerm, C., Quiroga, A., Rodriguez-Sanz, M. et al . (2006) Politics and health outcomes, Lancet, 368, 1033–7.

Navarro, V., L. Shi, 2001. "The political context of social inequalities and health." *Social Science & Medicine* 52 (3):481–491

Nelson, Joan M. 2007. "Elections, Democracy, and Social Services." *Studies in Comparative International Development* 41, no. 4: 79–97.

Ndulu, B. & S. A. O'Connell. 1999. "Governance and growth in sub-Saharan Africa." *Journal of Economic Perspectives* 13, 3: 41–66.

Newell ML, Brahmbhatt H, Ghys PD. 2004. "Child mortality and HIV infection in Africa: a review." *AIDS* 18:S27–S34.

Przeworski, A, ., M. E. Alvarez,J . A. Cheibub, and F. Limongi. 2000. *Democracy and Development Political Institutions and Well-Being in the World 1950-1990*. New York: Cambridge University Press.

Przeworski A, Limongi F. 1993. "Political regimes and economic growth." *Journal of Economic Perspectives* 7(3):51–69

Raphael, D., and T. Bryant. 2004. "The welfare state as a determinant of women's health: Support for women's quality of life in Canada and four comparison nations." *Health Policy* 68: 63–79.

Rajaratnam, J.K., JR Marcus, AD Flaxman, et al. 2010. "Neonatal, postneonatal, childhood, and under-5 mortality for 187 countries, 1970-2010: a systematic analysis of progress towards Millennium Development Goal 4." *Lancet*,375: 1988–2008

Ross, Michael. 2006. "Is Democracy Good for the Poor?" *American Journal of Political Science* 50, no. 4 : 860–74.

Sen, A . 1981. *Poverty and F amines: An Essay on Entitlement and Deprivation*. New York: Oxford University Press.

Sen, A.  1999*. Development as Freedom*. New York: Alfred A . Knopf.

Stasavage, D. 2005. "Democracy and education spending in Africa."  *American Journal of Political Science 49*(2):343-358.

Tavares J, and Wacziarg, R. 2001. "How democracy affects growth." *European Economic Review* 45(8):1341–1378.

van de Walle, N. 2000. 'The impact of multi-party politics in sub-Saharan Africa', paper prepared for annual conference of the Norwegian Association for Development Research, Bergen.

van de Walle, N. 2001. *African Economies and the Politics of Permanent Crisis* 1979–99. Cambridge University  Press.

van de Walle, N. 2002. "Elections without democracy: Africa's range of regimes."  *Journal of Democracy* 13, 2: 66–80.

van de Walle, N. 2003. "Presidentialism and clientelism in Africa's emerging party systems." *Journal of Modern African Studies* 41, 2: 297–321.

Wigley, S., & Akkoyunlu-Wigley, A. 2011. "The impact of regime type on health: does redistribution explain everything?"  *World Politics* 63(4): 647-677.

Wiseman, John.  1998. "The Gambia: From Coups to elections."  *Journal of Democracy* 9(2):64-75).

Wooldridge, J. 2001. *Econometric Analysis of Cross Section and Panel Data.* Cambridge, MA: MIT Press.

World Bank. 2004. Africa Development Indicators database. http://databank.worldbank.org/data/views/variableselection/selectvariables.aspx?source=Africa-Development-Indicators. Accessed July 15th 2014.

World Bank Institute. 2014. World Governance Indicators (WGI). www.worldbank.org/wbi/governance. Accessed July 21st 2014.

Zaba, B., Whiteside, A., & Boerma, J. T. 2004. "Demographic and socioeconomic impact of AIDS: taking stock of the empirical evidence."  *AIDS* 18, S1-S7

**Fig 1: Conceptual diagram**

**ENHANCED COLLECTIVE ACTION**

Influence public demand for improvements in social indicators related to health

Proximate determinants affected: improved nutrition (birth weight), female education, water access, inequality

**DEMOCRATIZATION**

(a)Transition to multiparty system

(b)Increase in civil and political liberties

**INFANT MORTALITY**

**INCREASED INSTITUTIONAL ACCOUNTABILITY**

Influence public spending on health and access to primary care

Proximate determinants affected: access to ante-natal care, immunization coverage, number of physicians per capita, government health expenditure

**Fig 2: Differences in predicted IMR (by year) between pre and post-multiparty countries**
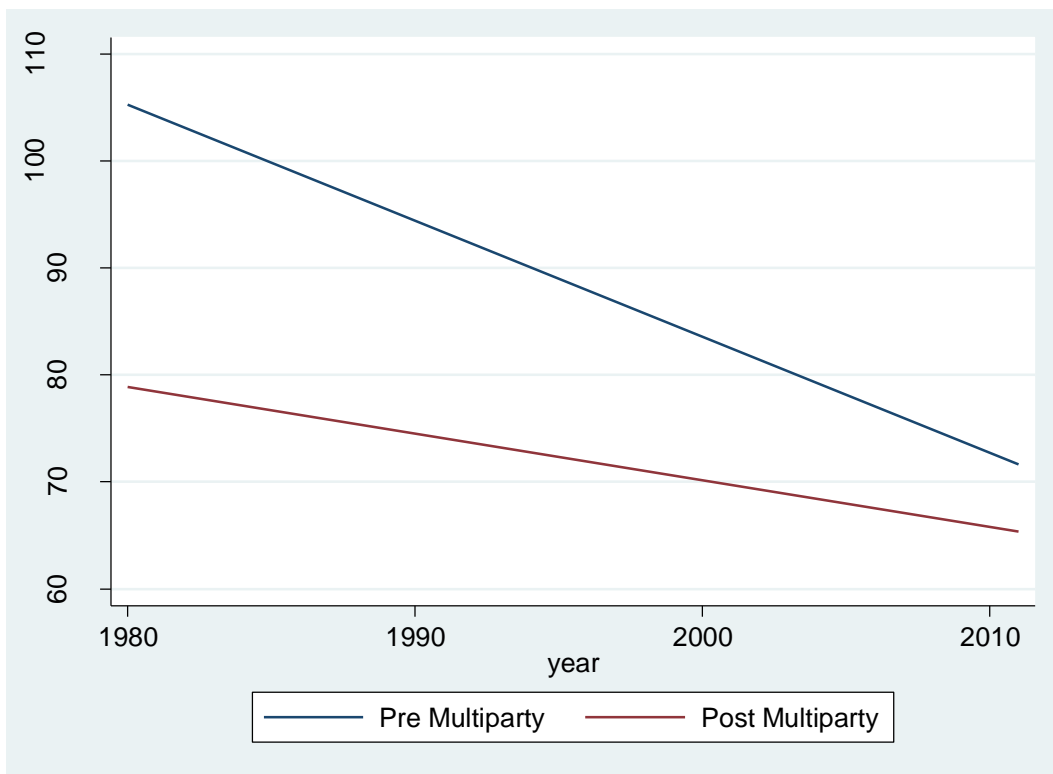


**Fig 3: Differences in predicted IMR (by year) between democratic and autocratic countries**
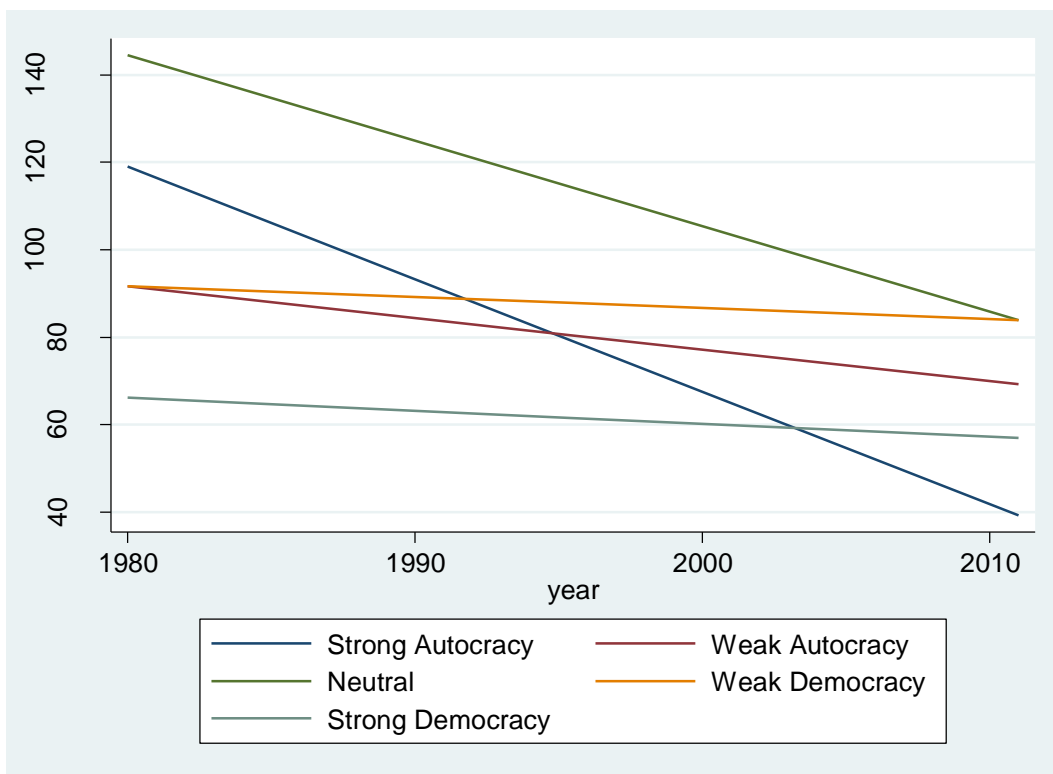
**Fig 4. IMR predicted by national income**
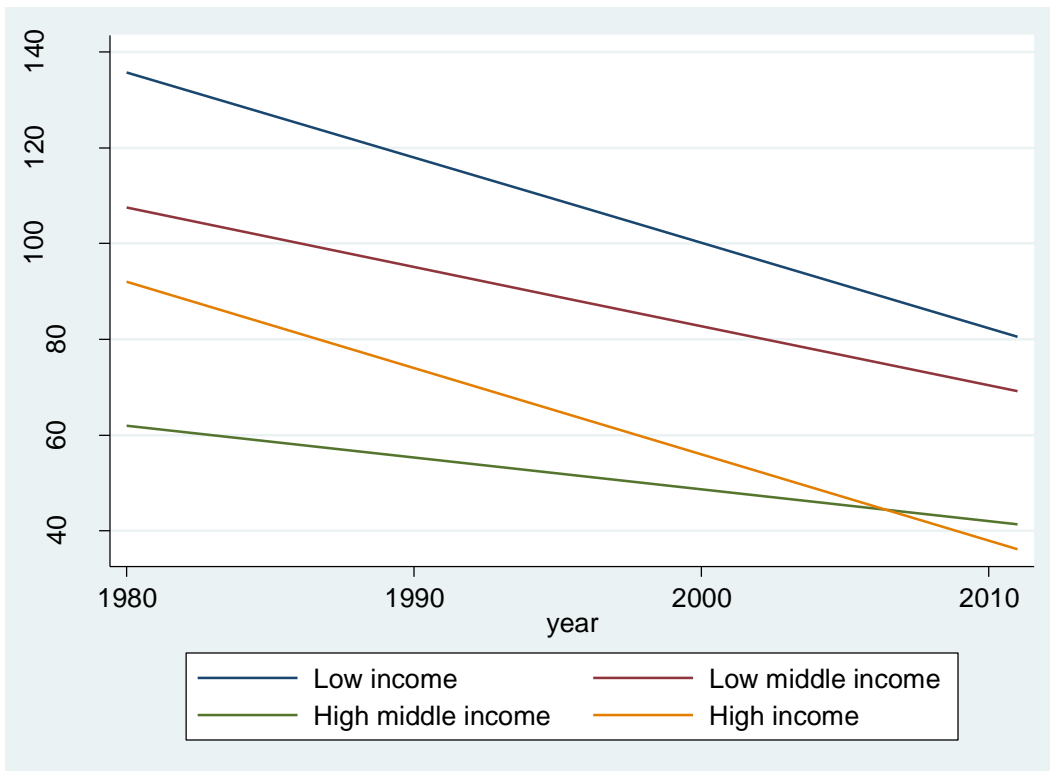


**Fig 5. Scatter of IMR and GDP by democracy**
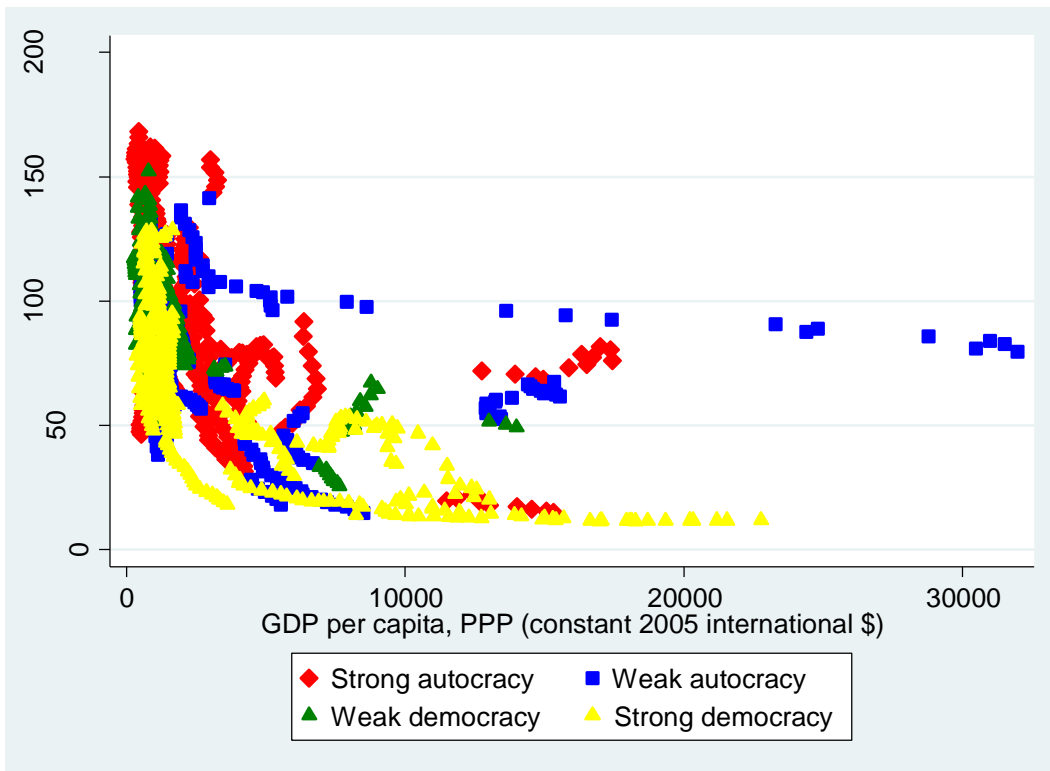
**Fig 6. Differences in IMR predicted by national income between autocracies and democracies**



**Fig 7. Predicted 2000s decline by the status of the 1990s elections**

**Fig 8. 2000s IMR decline predicted by GDP by categories of the status of the 1990s elections**

**Fig 9. 2000s decline by 1990s freedom status**



**Fig 10. 2000s decline by GDP and freedom status**

**Table 1: Descriptive statistics**

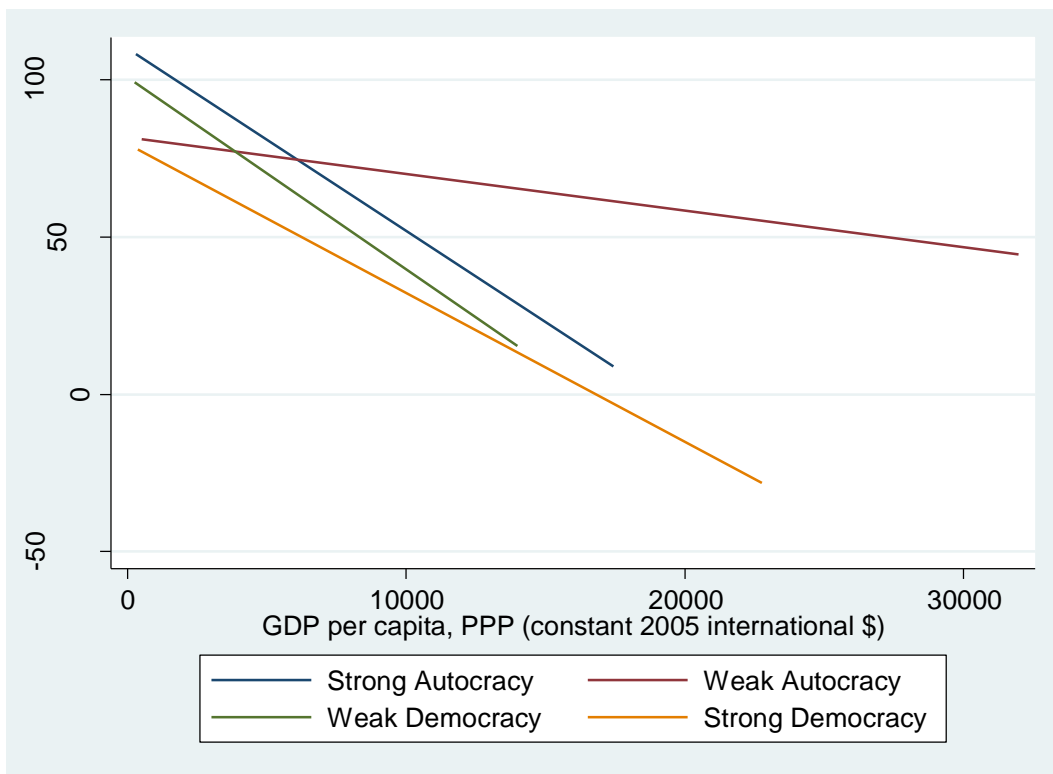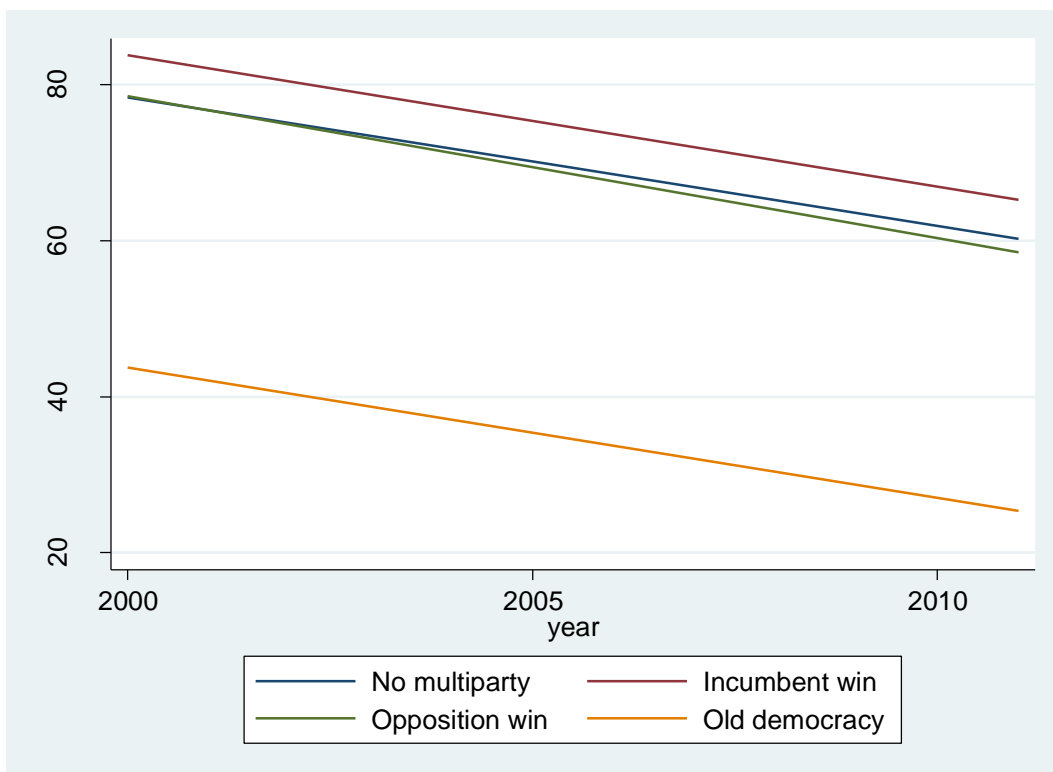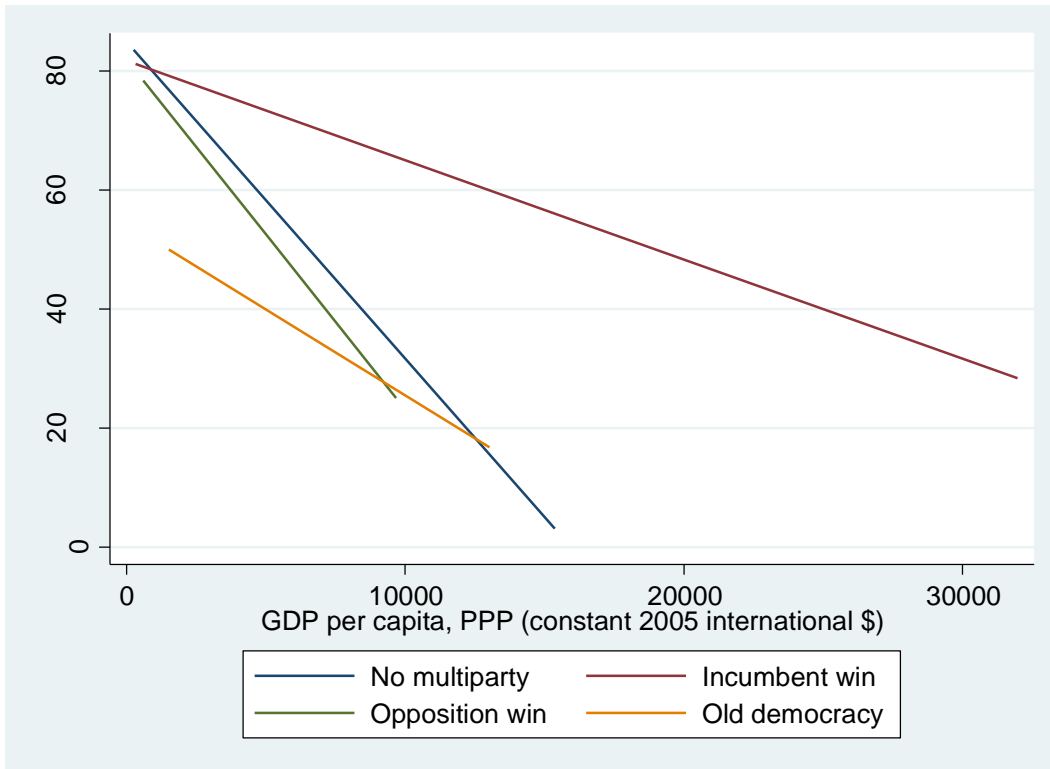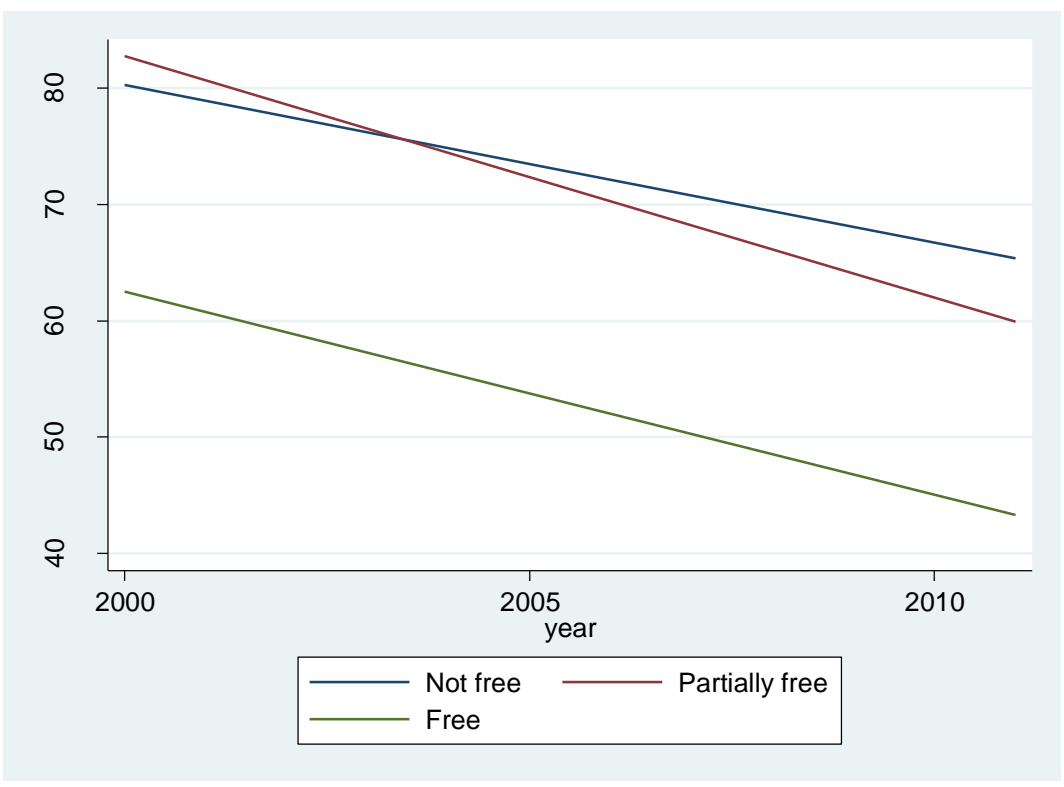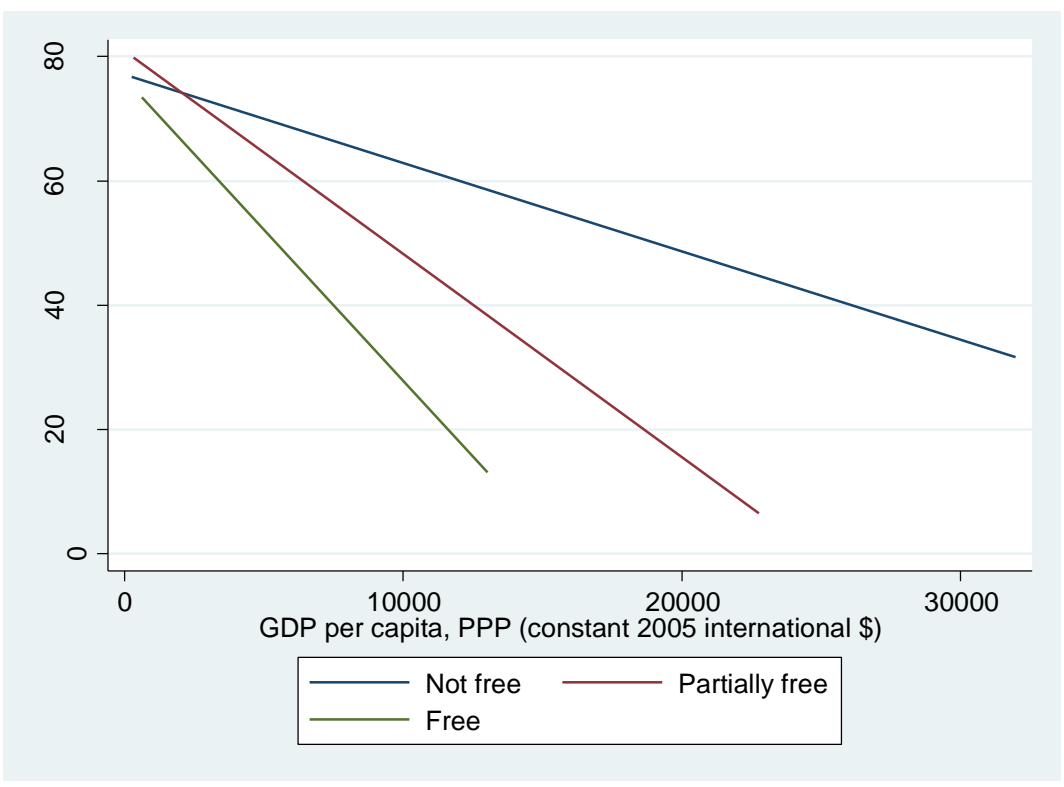| Variable | Obs | 1980 - 2011 | | | Moving averages | | |
|---|---|---|---|---|---|---|---|
| | | Mean | Min | Max | 1980s | 1990s | 2000s |
| *Outcome variable* | | | | | | | |
| Infant mortality rate | 1693 | 82.80 | 11.5 | 169.6 | 96.94 | 85.49 | 68.84 |
| *Democracy variables:* | | | | | | | |
| Multiparty | 1696 | 0.47 | 0 | 1 | 0.08 | 0.40 | 0.85 |
| Polity score | 1608 | -1.63 | -10 | 10 | -5.46 | -1.44 | 1.26 |
| *Control variables:* | | | | | | | |
| GDP per capita | 1539 | 2917 | 101 | 31969 | 2438 | 2546 | 3564 |
| Total fertility rate | 1682 | 5.43 | 1.45 | 8.293 | 6.28 | 5.49 | 4.69 |
| HIV prevalence | 961 | 5.39 | 0.1 | 27.9 | n/a | 4.89 | 5.90 |
| % Rural | 1696 | 64.35 | 13.85 | 95.66 | 69.43 | 64.42 | 60.06 |
| *Good governance indices:* | | | | | | | |
| Corruption | 1696 | 21.00 | 1 | 134 | 1.00 | 7.39 | 49.00 |
| Rule of law | 1696 | 488.36 | 1 | 688 | 587.00 | 543.71 | 360.03 |
| Political stability | 1696 | 416.35 | 1 | 687 | 465.00 | 442.33 | 354.16 |
| *Nature of 1$^{st}$ multiparty election in the 1990s: Who won the presidential seat* | | | | | | | |
| No multiparty election | 1696 | 0.23 | 0 | 1 | | | |
| Incumbents won | 1696 | 0.45 | 0 | 1 | | | |
| Opposition party won | 1696 | 0.25 | 0 | 1 | | | |
| Old democracy | 1696 | 0.07 | 0 | 1 | | | |
| *Mechanism variables 1: Proximate socioeconomic determinants of infant mortality:* | | | | | | | |
| % of new-borns with low birth weight | 144 | 14.10 | 5.3 | 33.7 | n/a | 14.88 | 13.79 |
| % of malnourished adults | 224 | 20.32 | 3.1 | 45 | 18.20 | 21.85 | 19.70 |
| Female average years of education | 600 | 7.29 | 0.86 | 16.56 | 6.19 | 6.52 | 8.47 |
| Female literacy | 155 | 50.94 | 4.59 | 95.59 | 39.87 | 44.28 | 54.57 |
| % with clean water access | 1048 | 64.15 | 14 | 99 | n/a | 60.18 | 67.67 |
| GINI | 148 | 44.43 | 28.9 | 74.33 | 40.98 | 45.84 | 44.17 |
| *Mechanisms variables 2: Health access indicators:* | | | | | | | |
| Antenatal care coverage (%) | 197 | 76.73 | 22 | 99.3 | n/a | 69.50 | 80.06 |
| DPT immunization (%) | 1543 | 63.93 | 1 | 99 | 46.68 | 64.39 | 74.32 |
| Measles immunization (%) | 1535 | 63.99 | 1 | 99 | 48.52 | 64.74 | 72.86 |
| Doctors per 10,000 | 466 | 0.26 | 0.004 | 5.79 | 0.21 | 0.30 | 0.28 |
| Government health expenditure (as % of GDP) | 881 | 2.46 | 0 | 9.45 | n/a | 2.04 | 2.64 |
| Out of pocket health expenditure ( as a % of total expenditure) | 769 | 41.87 | 2.98 | 88.23 | n/a | 44.55 | 40.53 |

**Table 3. Fixed effects regression coefficients of IMR by polity scores, economic development, and demographic variables**

|  | lnIMR | lnIMR | lnIMR |
|---|---|---|---|
| RCPolity | -0.0037 | -0.0027 | -0.0022 |
|  | (3.53)*** | (3.63)*** | (2.99)*** |
| lnGDP | -0.2201 | -0.1955 | -0.1836 |
|  | (9.74)*** | (8.28)*** | (7.04)*** |
| TFR | 0.1626 | 0.1123 | 0.0955 |
|  | (12.54)*** | (6.13)*** | (5.76)*** |
| HIV | 0.0200 | 0.0188 | 0.0185 |
|  | (18.18)*** | (12.03)*** | (11.63)*** |
| % Rural | 0.0120 | 0.0100 | 0.0089 |
|  | (4.70)*** | (3.76)*** | (3.04)*** |
| 2000s dummy |  | -0.0737 | -0.0618 |
|  |  | (2.66)** | (3.11)*** |
| Log Corruption control |  |  | -0.0092 |
|  |  |  | (1.89)* |
| Log Rule of law |  |  | 0.0153 |
|  |  |  | (1.66) |
| Log Political stability |  |  | -0.0054 |
|  |  |  | (1.69) |
| _cons | 4.2245 | 4.4729 | 4.4913 |
|  | (33.41)*** | (29.74)*** | (39.36)*** |
| *N* | 918 | 918 | 918 |

* p<0.1; ** p<0.05; *** p<0.01

**Table 4. Fixed effects regression coefficients of IMR by multiparty status, economic development, and demographic variables**

|  | lnIMR | lnIMR | lnIMR |
|---|---|---|---|
| multpart | -0.0559 | -0.0460 | -0.0453 |
|  | (5.67)*** | (4.75)*** | (4.79)*** |
| lnGDP | -0.2047 | -0.1840 | -0.1722 |
|  | (9.66)*** | (8.20)*** | (7.01)*** |
| TFR | 0.1538 | 0.1065 | 0.0887 |
|  | (11.22)*** | (5.11)*** | (4.66)*** |
| HIV | 0.0201 | 0.0190 | 0.0186 |
|  | (15.52)*** | (11.22)*** | (10.92)*** |
| % Rural | 0.0109 | 0.0091 | 0.0080 |
|  | (3.88)*** | (3.40)*** | (2.73)** |
| 2000s dummy |  | -0.0705 | -0.0580 |
|  |  | (2.62)** | (2.97)*** |
| Log Corruption control |  |  | -0.0096 |
|  |  |  | (1.99)* |
| Log Rule of law |  |  | 0.0150 |
|  |  |  | (1.71) |
| Log Political stability |  |  | -0.0062 |
|  |  |  | (1.95)* |
| _cons | 4.2601 | 4.4988 | 4.5333 |
|  | (28.55)*** | (28.33)*** | (38.84)*** |
| *N* | 919 | 919 | 919 |

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

**Table 5. Fixed effects regression coefficients of IMR by democracy, income groups, and interactions between democracy and income groups**

|  | lnIMR | lnIMR |
|---|---|---|
| RCPolity | -0.0098 |  |
|  | (5.40)*** |  |
| Multiparty dummy |  | -0.1431 |
|  |  | (7.97)*** |
| Low mid inc (ref: low inc) | -0.0105 | -0.0672 |
|  | (0.35) | (1.65) |
| High mid inc (ref: low inc) | -0.0710 | 0.0195 |
|  | (2.87)*** | (0.44) |
| High inc (ref: low inc) | -0.2671 | -0.2270 |
|  | (5.65)*** | (2.22)** |
| Low mid inc*Polity | 0.0117 |  |
|  | (6.35)*** |  |
| High mid inc* Polity | 0.0058 |  |
|  | (1.97)* |  |
| High inc *Polity | 0.0030 |  |
|  | (0.90) |  |
| Low mid inc* multiparty |  | 0.1398 |
|  |  | (5.94)*** |
| High mid inc* multiparty |  | 0.0138 |
|  |  | (0.30) |
| High inc *multiparty |  | 0.0940 |
|  |  | (2.64)** |
| Log corruption control | -0.0115 | -0.0105 |
|  | (2.50)** | (2.37)** |
| Log rule of law | 0.0218 | 0.0199 |
|  | (1.85)* | (1.80)* |
| Log political stability | -0.0038 | -0.0036 |
|  | (1.71) | (1.48) |
| _cons | 3.1640 | 3.1910 |
|  | (15.13)*** | (16.64)*** |
| *N* | 958 | 961 |

* p<0.1; ** p<0.05; *** p<0.01

**Table 6: Fixed effects regressions of IMR by status of 1990s elections**

|  | lnIMR | lnIMR |
| --- | --- | --- |
| RCPolity | -0.0030 | |
|  | (4.00)*** | |
|  |  |  |
| Multiparty dummy | | -0.0704 |
|  | | (5.38)*** |
| lnGDP | -0.1903 | -0.1713 |
|  | (7.13)*** | (6.92)*** |
| TFR | 0.0896 | 0.0720 |
|  | (4.49)*** | (3.17)*** |
| HIV | 0.0196 | 0.0198 |
|  | (11.27)*** | (10.29)*** |
| Rural | 0.0106 | 0.0098 |
|  | (3.45)*** | (3.17)*** |
| 2000s dummy | -0.0763 | -0.0855 |
|  | (3.09)*** | (3.50)*** |
| 2000s* Incumbent win | 0.0490 | 0.0704 |
|  | (3.22)*** | (5.26)*** |
| 2000s* Opposition win | -0.0093 | 0.0127 |
|  | (0.55) | (1.17) |
| 2000s* Old democracy | -0.0795 | -0.1003 |
|  | (2.07)* | (2.16)** |
| Log Corruption control | -0.0071 | -0.0075 |
|  | (1.64) | (1.82)* |
| Log Rule of law | 0.0134 | 0.0131 |
|  | (1.57) | (1.65) |
| Log Political stability | -0.0041 | -0.0055 |
|  | (1.44) | (1.72) |
| _cons | 4.4602 | 4.5142 |
|  | (39.39)*** | (36.33)*** |
| *N* | 918 | 919 |

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

**Table 7: Fixed effects regressions of IMR by late 1990s freedom status**

|  | lnIMR | lnIMR |
|---|---|---|
| RCPolity | -0.0020 | |
|  | (2.49)** | |
| Multiparty dummy | | -0.0483 |
|  | | (3.81)*** |
| lnGDP | -0.1898 | -0.1781 |
|  | (7.04)*** | (7.12)*** |
| TFR | 0.1160 | 0.1090 |
|  | (7.95)*** | (6.14)*** |
| HIV | 0.0200 | 0.0202 |
|  | (11.31)*** | (10.86)*** |
| % Rural | 0.0080 | 0.0070 |
|  | (2.89)*** | (2.59)** |
| 2000s dummy | -0.0207 | -0.0139 |
|  | (1.81)* | (1.21) |
| Partly free * 2000 | -0.0619 | -0.0663 |
|  | (4.73)*** | (4.35)*** |
| Free *2000 | -0.0944 | -0.0985 |
|  | (3.20)*** | (3.07)*** |
| Log Corruption control | -0.0070 | -0.0074 |
|  | (1.56) | (1.64) |
| Log Rule of Law | 0.0122 | 0.0116 |
|  | (1.39) | (1.41) |
| Log Political stability | -0.0040 | -0.0049 |
|  | (1.62) | (1.92)* |
| _cons | 4.4851 | 4.5365 |
|  | (39.13)*** | (36.32)*** |
| *N* | 918 | 919 |

* p<0.1; ** p<0.05; *** p<0.01

**Table 8: Fixed effects regressions of socioeconomic indicators on polity**

|  | Malnutrition | Female Educ Attainment | Female Literacy | Water |
|---|---|---|---|---|
| RCPolity | -0.0291 | 0.0843 | 0.8579 | 0.2337 |
|  | (0.39) | (2.86)*** | (5.83)*** | (2.33)** |
| lnGDP | -10.2181 | 3.7065 | 3.9534 | 2.9615 |
|  | (4.97)*** | (5.93)*** | (1.75)* | (1.66) |
| 2000s dummy | -0.7448 | 1.7458 | 11.3308 | 6.1451 |
|  | (1.62) | (3.56)*** | (6.60)*** | (4.22)*** |
| _cons | 96.0174 | -20.7410 | 10.8246 | 39.3231 |
|  | (6.45)*** | (4.75)*** | (0.67) | (3.07)*** |
| *N* | 209 | 543 | 141 | 979 |

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

**Table 9: Fixed effects regressions of socioeconomic indicators on the multiparty dummy**

|  | Malnutrition | Female educ attainment | Female literacy | Water |
|---|---|---|---|---|
| multpart | -0.7774 | 0.6058 | 5.0957 | 3.1329 |
|  | (0.80) | (2.48)** | (3.40)*** | (2.38)** |
| lnGDP | -10.0101 | 3.3329 | 1.9513 | 2.0548 |
|  | (4.90)*** | (5.96)*** | (0.77) | (1.17) |
| TwoThs | -0.5433 | 1.7666 | 12.5591 | 5.6548 |
|  | (1.10) | (4.07)*** | (6.06)*** | (4.29)*** |
| _cons | 94.8068 | -18.5311 | 22.8131 | 44.4356 |
|  | (6.41)*** | (4.60)*** | (1.26) | (3.47)*** |
| *N* | 212 | 580 | 147 | 990 |

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

**Table 10: Fixed effects regressions of health access and expenditure indicators on polity**

|  | DPT Immunization | Measles Immunization | Doctors per 10000 | Govt health exp as % of GDP | Out of pocket health expenditure |
|---|---|---|---|---|---|
| RCPolity | 0.8827 | 0.6725 | -0.0007 | 0.0387 | -0.2921 |
|  | (2.83)*** | (2.48)** | (0.50) | (5.42)*** | (3.62)*** |
| lnGDP | 1.0846 | 5.1777 | 0.2019 | 0.3402 | -6.6962 |
|  | (0.26) | (1.22) | (4.61)*** | (1.39) | (3.50)*** |
| TwoThs | 14.2641 | 11.4526 | 0.0677 | 0.3540 | -2.0043 |
|  | (3.54)*** | (3.26)*** | (3.31)*** | (3.03)*** | (4.17)*** |
| lnODA | 4.0259 | 3.0019 | -0.0669 | 0.3719 | -1.8816 |
|  | (2.44)** | (1.86)* | (2.77)*** | (4.91)*** | (6.24)*** |
| _cons | -29.1063 | -37.8554 | 0.0444 | -7.6821 | 130.8210 |
|  | (0.65) | (0.91) | (0.15) | (2.74)** | (8.71)*** |
| N | 1,353 | 1,342 | 413 | 817 | 721 |

* p<0.1; ** p<0.05; *** p<0.01

**Table 11: Fixed effects regressions of health access and expenditure indicators on multiparty status**

|  | DPT Immunization | Measles Immunization | Doctors per 10000 | Govt health exp as % of GDP | Out of pocket health expenditure |
|---|---|---|---|---|---|
| multpart | 9.0013 | 6.7210 | -0.0115 | 0.3415 | -2.4355 |
|  | (2.02)* | (1.85)* | (0.28) | (4.54)*** | (2.26)** |
| lnGDP | -0.6358 | 3.8251 | 0.2405 | 0.1467 | -5.5787 |
|  | (0.18) | (1.02) | (4.54)*** | (0.61) | (2.60)** |
| TwoThs | 13.2078 | 10.7791 | 0.0596 | 0.3540 | -2.2234 |
|  | (3.96)*** | (3.35)*** | (2.93)*** | (3.22)*** | (4.58)*** |
| lnODA | 4.9264 | 3.7872 | -0.0697 | 0.3761 | -1.8197 |
|  | (3.00)*** | (2.36)** | (2.49)** | (5.02)*** | (5.37)*** |
| _cons | -38.2940 | -46.6028 | -0.1605 | -6.5007 | 122.4673 |
|  | (0.85) | (1.10) | (0.55) | (2.29)** | (6.68)*** |
| N | 1,398 | 1,387 | 420 | 846 | 745 |

* p<0.1; ** p<0.05; *** p<0.01

**Table 12: Robustness checks: coefficients for polity an multiparty using subsets of countries**

| Model | Polity coefficient | Multiparty coefficient |
|---|---|---|
| *Main model* | *-0.0022* *(2.99)\*\*\** | *-0.0453* *(4.79)\*\*\** |
| North Africa excluded | -0.0032 (3.33)\*\*\* | -0.0462 (7.89)\*\*\* |
| High populations countries excluded | -0.0046 (4.28)\*\*\* | -0.0536 (5.90)\*\*\* |
| Small population countries excluded | -0.0024 (1.93)\* | -0.0611 (3.50)\*\*\* |
| High performing autocratic countries excluded | -0.0029 (3.58)\*\*\* | -0.0550 (9.63)\*\*\* |