POLITICAL ECONOMY ORIGINS OF DEMOGRAPHIC TRENDS: POLITICAL LIBERALIZATION AND WITHIN-COUNTRY POPULATION HEALTH INEQUALITY IN SUB-SAHARAN AFRICA

Moshi Optat Herman

Abstract:

This paper examines the impact of the transition to competitive politics in four eastern Africa countries on population health, which we measure by infant survival indicators. Using more than two decades of Demographic and Health Surveys (DHS), we examine whether changes in institutional accountability and reconfiguration of political patronage after the introduction of competitive politics explain within-country variation in infant mortality across provinces in Kenya, Malawi, Tanzania, and Zambia from the mid 1980s to the late 1990s. Preliminary results show province-level pattern of varying infant mortality risk depending on the degree at which a given province supported the ruling regimes in the first multiparty elections. We interpret the statistical variations by comparing levels of salience of ethnic cleavages, switch of the presidential seat from an incumbent to an opposition political party, and disparity in access to maternal and postnatal care by voting behavior across the four countries.

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Corresponding address:
Moshi Herman, Brown University Box 1916, Providence, RI 02912.
Moshi_Herman@brown.edu

1 Introduction

Starting in the 1980s many observers started to recognize the role of institutions in Africa's development trajectory. In the late 1980s, for example, the World Bank proclaimed, "underlying the litany of African development problems is a crisis of governance" (World Bank 1989 p. 60), which reinforced earlier similar diagnoses such as the Berg Report findings (World Bank, 1981). As such, policy prescriptions such as improving governance, enhancing institutional accountability, and reduction of government interference in the private sector have been a major part of the repertoire of development policies in sub-Saharan Africa in the last three decades or so. One of the major policies which were implemented to deal with the identified crisis of governance was political liberalization in which nation-states were advised to liberalize politics by introducing political competition through multiparty elections.

The extent of the impact of these structural political transformations on wellbeing outcomes, such as health access, in Africa has not been fully explored. Stagnation and at times reversal of improvements in population health indicators, such as life expectancy and child mortality rates have been observed in Africa in the 1990s (World Bank Development Indicators, 2010). Revisiting *distal determinants* of population health such as the aforementioned political transformations may shed light on our understanding of macro political-economic origins of demographic trends in general; and in particular, the potential affinity between different types of political-economic arrangements and effective health systems. In a way, I am suggesting that we resuscitate earlier models of low mortality pathways such Caldwell's (1986) "*Routes to low mortality in poor countries*" and Mosley and Chen's (1984) "*An analytical framework for the study of child survival in developing countries,"* which in addition to highlighting individual-level social and biological correlates of morbidity and mortality also attempted to frame "determinants of health" in the context of their distal macro political-economic origins.

Political liberalization efforts in sub-Saharan Africa transformed the political landscape in the continent by encouraging nation-states to transition from authoritarian, military, and/or single-party regimes to competitive politics. The empirical analyses in this paper thus examines whether introduction of competitive politics in sub-Saharan Africa had real effects on socioeconomic wellbeing of Africans, measured by infant mortality. The paper uses the wealth of 30 years of demographic survey data available to examine spatial/regional inequality in health outcomes, which I measure by temporal trends in infant survival in four sub-Saharan Africa countries: Kenya, Malawi, Tanzania, and Zambia before and after the transition to multiparty system. I pursue the following questions emerging from the available knowledge of political transformations in SSA: Did the new political game centered on competition lead to noticeable improvement in health outcomes (measured by infant mortality) across the four countries? Did the transformation of the political sphere (or its lack therefore of) alter the allocation of health resources across different regions with varying degrees of support of the political incumbents in a given country?

In terms of empirical and substantive contributions this paper attempts to advance the following issues. First, the available social demography literature has not paid much attention to the "political-economic" correlates of the poor performance of the health sector in Africa starting from the late 1980s to the observed rebound in the early 2000s. Second, studies of transitions to competitive politics in SSA mainly focus on the

processes and the *outcomes* of the transformations within the political sphere (e.g., van de Walle, 2001; Bratton and van de Waal 1997; Alvarez et al. 1996, Joseph 1997, 1998; Diamond, 2002; Karl, 1995; Howard and Roessler, 2006; Levitsky and Way, 2002) without paying much attention to substantive socioeconomic outcomes outside the political sphere. We must bear in mind that political attitude surveys show that sub-Saharan Africans view democracy as an instrument that can be used to improve their socioeconomic wellbeing in addition to celebrating it as a tool for improving access to political goods such as civil liberties and political freedoms (Bratton 2001, 2007). There are indeed few studies in comparative politics have explored the relationship between democratization efforts and developmental outcomes (for example Przeworski et al., 2000). However, most of these studies take a comprehensive cross-sectional data covering numerous countries across several continents rendering them unable to identify the details of mechanisms through which specific features of a local institutional context mediate the connection between democratization and aggregate wellbeing outcomes. In addition, most of these studies use data dating to pre-1990 the point at which most African nations had not undergone transitions to competitive democracies.

3.2. Background Literature, Theories, and Hypotheses

3.2.1 Political Liberalization in sub-Saharan Africa (SSA) in the 1990s

Many African nations were part of "the third wave of democratization" in the 1990s (Diamond 1996), through which numerous countries across the globe transitioned from various forms of authoritarianism in the period following the collapse of the Soviet Union. African nations made transitions from varieties of military, dictatorial, and one-party regimes, to pluralistic democracies characterized by competitive and multiparty elections. By the late 1990s, multiparty systems had became a "political norm" in SSA with the majority of countries in the region having held competitive elections by the turn of the century (Adejumobi 2000).

The transitions to multi-party regimes in SSA intended to institute formal democracies. Formal democracies in a sense of political regimes that are characterized by regular free and fair elections, universal suffrage, accountability of state's administrative organs to elected representatives, and guaranteed freedom of expression and association (Huber, Rueschemeyer, and Stephens 1997).

The democratic transitions in Africa and elsewhere have inspired a growing body of theoretical and empirical studies; however, most of these studies have only focused on the necessary pre-conditions for viability and consolidation of such transitions. Observing the transitions in the lens of theories of "social origins of democracy" (Lipset 1959, 1960; Moore 1966), the prospect of democratization in the continent, and especially its deepening, seemed dim. For instance, presence of a "strong middle class," which can mobilize and negotiate when there are tensions arising from "redistributive conflict," has been said to foster democratization in the Global South (Heller 2000, Sandbrook et. al. 2006). However, SSA nations tend to have a plurality (and at times a majority) of peasants/subsistent farmers in rural and peri-urban areas on one end, and on the other end, a minority of businesspeople, private sector professional, and government functionaries in urban areas. Economically homogeneous societies are less likely to democratize or do so at a slower pace (Acemoglu 2006). Also, even though democratic deepening is not the core theme of this dissertation, it is worth mentioning that variables

for effective democratic deepening, such as active civil society (Heller, 2000) have only improved slowly in the region. In countries like Tanzania, formal civil society mobilization had been entirely co-opted in the mono-party ruling machine (Hydén 1999).

An addition to these purported sub-optimal conditions for transition to democracy, an extensive body of empirical work is pointing out to the possibility that the transitions did in fact happen, but *hybrid regimes* that are neither authoritarian nor democratic emerged in lieu of full liberal democracies (Diamond, 2002, Karl, 1995). For example, variations of competitive-authoritarian and electoral-authoritarian regimes are said to have emerged in the continent (Howard and Roessler 2006, Levitsky and Way 2002, Diamond 2002). In such regimes, regular elections, which are relatively fair and free, take place merely to justify the dominance of authoritarian regimes or to replace them with similar ones. "Illiberal democracies", such as neo-patrimonial and patron-client regimes; in which political power holders (patrons) misuse state resources to secure loyalty from citizens (clients), are reported to have emerged or continued to flourish in Africa despite (or because) of introduction of competitive politics (van de Walle 2001, Bratton and van de Waal 1997). The most prevalent element of illiberalism is prebendalism, a system in which elected officials see their "offices" as nothing but "prebends" (i.e., form of entitlements) in service of their material interests and those of their kinship (Joseph 1997, 1998).

Some critics have also associated the mixed outcomes, and at times the lack of viable progress towards deeper democracy in Africa, to the very shortcomings of the "liberal democratic model" that was instituted in the continent through pluralist politics. At times, this model is seen as a mere attempt to reproduce the path-dependent political trajectories from elsewhere (Ayers, 2006), which, despite the good intentions, is frequently incongruent with social realities on the ground in Africa.

On the optimistic side, some argue that, regardless of the ostensibly ambiguous nature of both the democratic processes and their eventual outcomes in Africa, signs of progress towards expansion of civil and political liberties have been observed in the continent. The mere fact of conducting competitive elections often leads to "liberalizing electoral outcomes," that is, they lead to formation of regimes that are relatively less authoritarian compared to the previous ones (Howard and Roessler 2006, Lindberg 2006).

However, in spite of the observed signs of increases in supply of political goods in the continent after the transitions, the durability and deepening of such nascent democracies is often contingent upon substantive changes in the social and economic spheres (Bratton 2007). That is, without improved quality of life and palpable social equality, such basic democratic transitions are unlikely to be sustainable in the long run. As a consequence, for example, almost 20 years after the highly celebrated democratic transitions, political surveys data show that the proportion of Africans who believe that *real* democratic progress has taken place has been declining over time. Cross-country political surveys show that only 46 percent of Africans agreed that they were satisfied with democracy in 2005 compared to 58 percent in 2002; similarly, a decline in support of "democracy in general" is also observed in the same period (Bratton 2007, Afrobarometer 2010).

To sum up, the existing broad and innovative literature on transition to multiparty democracy in sub-Saharan thus far for the most part has continued to delineate the

process of the transition and not their substantive impact outside of the political sphere. In some cases where the spotlight has been on the outcome of the transition the main focus has been on categorization of the type of emerged regimes rather than the transformation of the social arrangements related collective action and provision of public goods such as public health resources. Therefore, the empirical analysis in this chapter starts from few premises from the available literature which are: (i) competitive politics were introduced to enhance governance and incite democratization in sub-Saharan Africa (Lindberg 2009, 2006), (ii) there is demand for democracy as embodied in the concept of political competition in SSA (Bratton 2007, 2001), and (iii) the transitions to competitive politics have led to expansion of civil and political liberties (Howard and Roessler 2006, Lindberg 2006), but, in some instances, the transitions exacerbated the existed illiberal clientilistic elements (van de Walle 2001, Bratton and van de Waal 1997).

3.2.2 Political Arrangements, Health Outcomes, and Inequality

An active body of research has attempted to delineate systematic relationships between "political variables" and population health and mortality outcomes (e.g., Navaro et al. 2003, Navaro and Shi 2001, Navia and Zweifel. 2003). For instance, the type of political arrangements in OECD countries, e.g. whether a given nation is liberal, social democratic, or Christian democratic, has been found to be associated by different levels of health outcomes (Navaro and Shi 2001). Other studies have also found a positive effect of democracy (e.g. through electoral competition) on health outcomes such as infant mortality (McGuire 2010, 2001; Przeworski et al. 2000, Navia and Zweifel *2003*). A positive correlation between democracy and life expectancy has also been observed in (Besley and Kudamatsu 2006).

However, the research on whether democratization initiatives have led to improvements in population health in the African context remains scarce. In one such rare studies, Kudamatsu (2010) finds a positive effect of democratization (defined by weather a country has universal suffrage and competitive elections) on infant survival. However, given the confluence of multitudes of other development outcomes that are simultaneously affected by democratization, it is hard to isolate the effects of the transition to democracy on health using pooled data from such a group of diverse countries as it is done in such studies. A detailed comparative study using few selected countries with similar socio-political context, as suggested in this chapter, may yield more conclusive results.

Other than simply looking at the effect of political transitions, such as democratization, on wellbeing outcomes, Political Sociologists, from whom I will dear from, pay particular attention to organization/constellation of political power in a given society, in addition to looking for associations between types of political systems/regimes and inequality across social categories. In addressing the connection between political systems and social inequality four theoretical typologies are often used by sociologists. These theoretical frames include: *welfare regime type, power constellation, varieties of capitalism, and political-institutionalism of inequality* (Beckfield and Krieger 2009). The welfare-regime-types approach (Esping-Andersen 1990) looks at the correlation between different "varieties of capitalism," such as liberal, social democratic, or conservative, and standard of living outcomes. The power

constellation approach focuses on types of political parties as main predictor of the types of social welfare policies that emerge from a given polity (e.g., Moller et al 2003). The varieties-of-capitalism approach, on the other hand, identifies the nature of the relationship between labor (employees) and capital (employers) in determining welfare policies and eventually wellbeing outcomes in a given country (e.g., Orloff 1993). Finally, the political-institutionalism-of-inequality" approach pays attention to the manner in which specific institutions in a given country, such as the education system, penal system, and discriminatory policies, affect standard of living outcomes across different categories, such as race as gender (e.g., Western 2006).

3.3 Hypotheses

The empirical hypotheses drawn in this chapter and the assumed mechanisms are thus informed by literature from both Political Economy of Development and Political Sociology. The first hypothesis focuses on the impact of the transition to competitive politics as a transformation of the entire institutional arrangement in given country to enhance institutional accountability, as the "good governance" rationale upholds. The second hypothesis focuses on changes in political arrangements themselves and as such it makes use of the "power constellation" thesis by focusing on political parties as a key variable and the shift of power from incumbents to opposition parties as the key mechanism.

3.3.1 Competitive Elections, Improved institutional Accountability, and Health Outcomes

It has been argued that "democratic" societies have better quality of life outcomes because citizens in such societies are able to exert demands for better social conditions through public action (Sen and Drèze 1999, Drèze and Sen 1991, Sen 1999). The literature from before and during the transitions in Africa theorizes that political competition would have reduced inefficiencies in distribution of state and development resources (Berry 1989, Bates 1981, Herbs 2000, Birdsall and James 1993, Mbaku 1999), and should have improved institutional accountability (Heyden 1989, Mbaku 1999) leading to an overall improvements in social welfare, such as health provisions.

Thus, starting at the country-level, I posit that we should observe differentially lower rates of infant mortality after the transition to multiparty systems in all four countries.

> *(Institutional Accountability/Good Governance) Hypothesis 3.1 In a given country, the period after the transition to multipartism is associated with differentially lower infant mortality risk compared to the period prior to the transition (after statistically controlling for secular trend and other known determinants of infant mortality).*

3.3.2 Competitive Elections, Patrimonialism, and Health Inequality across Provinces

As stated in the theory and background section, some critics of democratization efforts in Africa have pointed out that since sufficient social and political prerequisites were not in place, illiberal democracies may have emerged as a result of introducing multiparty systems (van de Walle, 2001, Bratton and van de Waal 1997, Joseph 1997, 1998). Such illiberal practices are likely to emerge especially when political allegiance is

organized by essentialized identities such as ethnicity and regionalism, tribal connections, or religion.

In addition, the four countries in question have presidential systems (as opposed to parliamentary system)—a system by which the President's office hold a substantial power in decision-making relative to the legislature. Such a system which gives the president such level of power is likely to exacerbate the aforementioned clientistic and patrimonial elements, and some empirical research point out the possibility that in fact presidentialism grew after the transitions (van de Walle 2003).

Thus, given the context of clientilism and concentration of power around the president's office, I hypothesize that differential allocation of primary health care resources (e.g., by ethnicity or tribe and hence by region/province) as the link between provinces' voting behavior in the presidential elections and differential rates of infant survival across provinces of a given country. I suggest a punish or reward mechanism; the presidential election winners, who maintained control of the government in a given country, used the provinces voting outcome as a signal for whether they should channel more resources to the region to maintain control of the region (if the region supported them), or to punish the region so that they may regain control (if the region voted for the opposition).

> *(Realignment of Patronage Networks/Punish or Reward) Hypothesis 3.2: Following the transition to a multiparty system, provinces which voted for the winning party had lower risk of infant mortality than provinces which opposed the winning party or were neutral towards them (holding other determinants of infant mortality constant).*

4 Methods

4.1 The Context of Transition to Multiparty System in Kenya, Malawi, and Tanzania

The four southeastern Africa nations of Kenya, Malawi, Tanzania, and Zambia followed a typical transition to multiparty systems; typical in the sense of the prevailed political system in sub-Saharan Africa at the time which was characterized by majority of countries having strong largely uncontested political parties that had ruled since independence. The transition in all four countries took place between 1990 and 1995. Also, all four countries had first multiparty elections which were categorized as either "free" or "partly free" (Freedom House 2004). In that way, the transitions to competitive politics were not affected by protracted civil unrest, which has been symptomatic of such transitions in few countries in SSA.

However, the transitions in the four countries differed in the extents to which the incumbents prevailed or were defeated, which is an essential analytical component of this paper. In Kenya and Tanzania, the incumbent parties won the first presidential elections whereas in Malawi and Zambia opposition parties won the first presidential elections; i.e., a power switch took place.

In addition, in terms of examining political transitions, Kenya, Malawi, Tanzania, and Zambia are ideal candidates as they share a similar historical and socio-political structure and hence somewhat a shared legal and constitutional heritage on the virtue of their having been under the same British colonial structure. All four countries also

transitioned from direct colonialism around the same time: Tanzania obtained independence in 1961, Kenya in 1963, and Malawi and Zambia followed suit in 1964.

Key specific similarities which make the comparison of the political transitions in these four countries possible are: All four countries have presidential systems, which are systems of government where an executive branch exists and presides separately from the legislature. All four are have Representative Democracies, in which elected individuals represent the people; and they are Republics in a sense that at least a part of its people have some element of formal control over its government, and head of state is not a monarchy. Also, all four nations are unitary states, as opposed to Federations, which are sovereign state governed as one single unit in which the central government is supreme and any administrative divisions (sub-national units) exercise only powers that the central government chooses to delegate. Kenya changed its constitution in 2010 to create a system a Federal system. This study covers the period before this change. This overwhelming centrality of power around the central government, and hence the president, is especially crucial in the manner by which the hypotheses and the mechanisms which I propose operate. Also, another crucial similarity is that all four countries follow the First-Past-the-Post (FPTP) system in their presidential elections, a system by which the party with the most votes wins regardless of whether it gains an absolute majority of the votes or not. Finally, these nations went through the political transition to competitive politics around the same time between 1991 and 1995 and they all hold general elections every five years.

4.2 Inconsistent Infant Mortality Trends in Kenya, Malawi, Tanzania and Zambia, 1985-1995

As already mentioned, the empirical motivation for this paper comes from observed anomalous infant mortality trends in the four countries. As Figure 1a shows, with an exception of Malawi, there is a clear increase in infant mortality in the other three countries (The area highlighted by the box).

Figure 1a around here:
Infant Mortality Trends from 1969 – 2010 in Kenya Malawi, Tanzania, and Zambia

In Zambia and Kenya especially, the increase between mid 1980s and mid 1990s, the period corresponding with the early phase of liberalization, is fairly noticeable. The trends are further highlighted in separated time series graphs shown on Figure 1b.

Figure 1b around here:
Infant Mortality Trends from 1969 – 2010 in Kenya Malawi, Tanzania, and Zambia

To get a clear sense of these infant mortality trends relative to other socioeconomic and demographic variables. I predicted infant mortality rates conditioned on two regressors that are known to determine cross-national differences in infant mortality fairly well, which are the level of a given country's economic development and fertility rates (Hanmer 2003, Wang 2003). I measured economic development using

yearly Gross Domestic Product (GDP) per capita (transformed to logarithmic form) and fertility using Crude Birth Rate (CBR).[1]

As shown on Figure 2, the difference between observed IMR and predicted IMR conditioned on levels of economic development and fertility rates also seem to be associated with the liberalization era (A spline is added on the graph at year 1990, the approximate beginning of liberalization, to make the visualization easy). The trend in Kenya is fairly remarkable as at exactly 1990 the actual IMR switches from being lower than the predicted IMR conditioned on economic development to being higher than the predicted IMR (Figure 2). A similar shift in 1990 is observed in Malawi, but in the opposite direction when compared to Kenya—starting in 1990 it appears that Malawi had lower IMR rates relative to what would have been expected (predicted) given the level of economic development. Zambia is also an interesting case; even though actual IMR rates appear to have always been higher that predicted ones, the gap between the two values grew between mid 1980s and early 1990s. It appears, however, that actual IMR has been falling steeply since mid 1990s and at around 2008 IMR rates are lower than those predicted from level of economic development. Tanzania did not have economic variables available before 1990s; therefore a predicted trend before this period is not available. After 1990s however actual IMR is consistently lower than the predicted IMR; between 1990 and 1995 the gap is narrow, but it grows continuously after mid 1990s.

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[1] I used a basic fixed effects model to account for the correlation between unobserved country specific factors, the repressors and the unexplained error. The two predictors explained 55% of the variation of yearly IMR changes in the four countries (R-squared =0.55), which is expected given the two predictors used are well known determinants of cross country differences in IMR. Also, as expected, the results showed that in the four countries, increases in economic development (GDP per capital) are associated with lower rates of infant mortality whereas increases in fertility are associated with higher rates of infant mortality. Details of the results are as follows:

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Fixed-effects (within) regression               Number of obs      =       112
Group variable: cntrcode                        Number of groups   =         4

R-sq:  within  = 0.3667                         Obs per group: min =        22
       between = 0.7224                                        avg =      28.0
       overall = 0.5529                                        max =        30

                                                F(2,106)           =     30.69
corr(u_i, Xb)  = -0.6138                        Prob > F           =    0.0000

------------------------------------------------------------------------------
         imr |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   logGDPcap |  -64.37001   12.86686    -5.00   0.000    -89.87981   -38.86021
         cbr |   2.681591   .4684852     5.72   0.000     1.752774    3.610408
       _cons |   416.0583   92.30664     4.51   0.000     233.0514    599.0651
-------------+----------------------------------------------------------------
     sigma_u |  14.374309
     sigma_e |  13.570231
         rho |  .52875027   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(3, 106) =    13.85              Prob > F = 0.0000
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Figure 2 around here:
A Comparison of Actual Infant Mortality Rates to Estimates of Infant Mortality Predicted by Level of Economic Development and Fertility Rates

To sum up, Kenya and Zambia appears to have higher infant mortality than you would expect from their level of economic development. For Kenya this trend appears to have started in 1990, and in Zambia the gap between actual IMR and expected IMR given the level of economic development, appear to have grown between mid 1990s and mid 1990s. Malawi's case is similar to Tanzania's in which since 1990 actual IMR rates are consistently lower than expected from the level of economic development.

4.2 Data

The statistical data used in this paper is from Demographic and Health Surveys (DHS). I use Demographic and Health Surveys collected in Kenya (1989, 1993, 1998, 2003, and 2008), Malawi (1992, 1996, 2000, and 2004), Tanzania (1992, 1996, 1999, 2004, and 2010), and Zambia (1992, 1996, 2001, and 2007).

I use information from retrospective fertility histories (Birth Files) which contain vital data on births and survival for all children born in the five year period preceding the survey. For example, from Tanzania's 1992 DHS I can create information (birth histories) on children born between 1987 and 1992. Using data from births in the five year preceding the survey is a common practice in social demography that endeavors to reduce measurement errors associated with recall bias.

I then merge the birth files from all available DHS data collection rounds which for the four countries span from 1989 to 2008. In that way, we have information data points for infants born between 1984 and 2008. Given that the transitions to multiparty system took place in the mid-1990s, merging data from different DHS rounds provides sufficient yearly observation spanning the periods before and after transition. Finally, I map the birth history data with infants mother's household and community characteristics which are available in the DHS individual (women) data files, household files, and community data files.

I collected the presidential election data from national electoral commission websites and cross-checked the information using various African elections online databases and Nohlen and Thibaut's (1999) *Elections in Africa: A data handbook.*

4.3 Variables, Measures, and indicators

4.3.1 Dependent Variable

I use the birth history data to compute a measure of infant mortality risk, the outcome variable, which identifies infants who die in their first year of life. Furthermore, I separate neonatal mortality (death in the first month of life) from post-neonatal mortality (death between the 1st month and the end of the 1st year). Post-neonatal mortality is more responsive to social and environmental factors than neonatal mortality which is highly attributed to congenital and other biological factors.

4.3.2 Key Independent Variables

Transitional (temporal) variables

Following the first stated hypotheses, to highlight the transitional effect, *temporal variables* (pre/post transition) are computed. The post transition to multipartism era is

defined as the 5-year period starting two years after the multiparty elections in a given country. A *two-year lag* is applied to allow for the hypothesized mechanisms linking the political transition and infant survival to take effect. That is, it is expected that the effect of the political transition will not take effect immediately following the election rather it takes time for the hypothesized mechanism, which is (re)distribution of health resources to manifest. Thus, for instance, even though Malawi held the first multiparty elections in 1994, the post-transition period is defined as 1997 and beyond.

In addition, two variables are included to capture and control for *secular change*, to wit, expected automatic temporal swings in infant mortality for varieties of other reasons unrelated to the hypotheses. Secular trend (assumed to be a decline) is not trivial in this case since all four countries in question still have high infant mortality rates and thus considered to be still enjoying declines associated with general improvements in socioeconomic development as the theory of epidemiological transition dictates (Omran [2005]1971).

Province voting behavior variables

The second set of key independent variables is the province *voting behavior indicators*. A province's voting behavior is measured by the proportion of region's residents who voted for the party which won the first multiparty elections in the presidential elections. In order to separate provinces by their relative degrees of support of the incumbent or winner in the first elections, the variable for the percent of votes garnered by the winning party in the presidential elections is then used to divide provinces into *pro-* , *neutral*, and *anti-winner* provinces. Instead of simply categorizing provinces as being anti or pro the winning presidential regime, this approach includes neutral provinces in order to create a conservative separation between provinces which were clearly in favor of the regimes from those which opposed the regimes.

4.3.3 Control Independent Variables

The list of predictor variables includes known determinants of infant mortality as control variables by loosely following the Mosley and Chen's (1984) "proximate determinants" of IMR model. These control predictors thus include individual-, household-, regional, and country-level covariates. For individual-level and household-level variables, the empirically established correlates of infant mortality are used. At the individual-level, these predictors are mother's age, mother's level of education, infant's birth order, and birth interval. At the household-level the predictors are: household socioeconomic status, which can be measured by a household wealth index, head of household's level of education, household's access to health care, and household place of residence depending on whether the household is located in urban area or rural area. Household's access to sanitation and clean water, a known determinant of child health, is also included.

4.4 Statistical Analysis

Since the outcome variable is binary (survival, or not), the statistical analysis in this paper applies logistic regression models to estimate the differential risk of infant mortality predicted by the transitional variables, the province voting behavior variables,

and control variables representing the known proximate determinants of infant mortality. I use the statistical software, *STATA*.

It is well known that mortality during the first year of life is duration-dependent, i.e., the mortality risk varies depending on age in month since birth. I therefore demarcate neonatal mortality, which is mortality in the first month of life, from post-neonatal mortality, which is mortality between the first month and the 12^{th} month. In order to provide the most comprehensive picture possible, the hypothesized pre/post effects and the province voting behavior effects are estimated separately for infant mortality as whole, then separately for neonatal and post-neonatal mortality.

I then proceed to estimate two sets of logistic models. The first set of models makes a comparison between pre and post transition periods; again bearing in mind that the post-transition period is defined as the period starting three years after the first multiparty elections in a given country. I use logistic regressions to estimate the differential survival for infants born after the transition relative to those born before the political transition using the following model:

$$\ln\big(P\big|(1-P)\big) = \beta_0 + \beta_1 POST\ PERIOD + \beta_2 YEAR\ + \beta_3 YEAR\ SQUARED + \beta_{4i} VECTOR\ OF\ CONTROL\ VARS$$

where P is the probability that an infant dies within the first twelve months of life. I use a quadratic term to capture the decreasing slope of decline in IMR over periods of time.

The second set of models introduces the province voting behavior variables which differentiate infants who were born in pro-election winner provinces, neutral provinces, and anti-winner provinces after the political transition. The statistical models are in the following generic form:

$$\ln\big(P\big|(1-P)\big) = \beta_0 + \beta_1 PRO + \beta_2 NEUTRAL\ + \beta_3 ANTI + \beta_{4i} VECTOR\ OF\ CONTROL\ VARS.$$

5. Results

5.1 Summary Statistics

All four countries had at least four rounds of DHS data collection spanning from 1984 to 2008 (Table 2). This provides a reasonable number of observed live births from which the infant survival outcome variables can be computed.

The infant mortality rates estimated from these nationally representative data are consistent with statistics that are available from other sources. Out of the four countries, Malawi has the highest rates, followed by Zambia, Tanzania and Kenya in decreasing order. In Tanzania, the first election winners garnered an absolute majority of the votes cast at the national level which was not the case in Kenya and Malawi. In Zambia only two parties participated in the first multiparty elections. There was the least amount of variation of the level of support of the incumbents across Provinces in Tanzania. Kenya and Malawi had the highest variation. In Kenya, for example, the national winner of the first multiparty elections, KANU, garnered only 2.1% of the presidential votes in the Central Province whereas they won 78.1% of the presidential votes in the Northeastern Province.

5.2 Coefficients of the Known Determinants of Infant Mortality

Results for the known proximate determinants of infant mortality yield expected coefficients with the magnitude of the effects and their statistical significance varying

between countries. For example, as expected from existing studies, in all four countries female infants have lower risk of mortality in the first year. Moreover, infants born as multiple births (twins, triplets etc) have a relatively higher risk of mortality in their first year than singletons. Also, consistent with research, infants born with low birth weight also have higher mortality risk in their first year of life.

Access and quality of maternal and infant health care are also known strong predictors of infant survival. The results show that infants born to mothers who access pre-natal care from a trained health professional are more likely to survive their first year than those whose mothers did not access pre-natal care from health professionals. Similarly, vaccinated infants are more likely to survive their first year of life than non-vaccinated infants.

In terms of maternal characteristics, as already known in the context of developing nations, the results show that infants who were born to educated mothers have lower risk of death in the first year compared to those born to uneducated mothers.

Table 3 around here:
Logistic Regression Results for a Basic Model of Infant Mortality that Only Includes the Known Determinants

5.3 Infant Mortality Risk after the Political Transition Compared to the Period Before

Infants who were born in the period after the transition to multiparty systems (after allowing for a 2 year lag for the effect to take place) had a statistically significant higher risk of infant mortality in Kenya and Malawi. At the country-level, the analysis does not show statistically significant difference in probabilities of infant survival between infants born in the period before compared to the period after transition to multiparty system in Tanzania and Zambia. These aggregate level results set a stage for the core analysis that disaggregates provinces within a given country by the level of support of winners of the first elections. The magnitude of the differential risk vary from 56% higher risk of infant mortality for infants born in the post transition period in Kenya relative to the period before to 20% higher risk in Malawi (Table 4).

Table 4 around here:
Logistic Regression Results for Differential Risk of Infant Mortality during the Post-political Transition Period Relative to Pre-transition

Infant mortality is then decomposed into neonatal and post-neonatal mortality in order to account for monthly variation in survival during the first year of life; especially the higher correlation of mortality with socioeconomic factors in the post-neonatal period. Looking at probability of mortality in the post-neonatal period alone, infants born in Zambia also appear to have experienced a higher risk of mortality in the period after the transition.

Table 5 around here:
Logistic Regression Results for Differential Risk of Post-neonatal Mortality during the Post-political Transition Period Relative to Pre-transition

To sum up, at the aggregate level, a pre-post effect of the political transition on infant survival is only manifested in Kenya, Malawi, and Zambia. In Kenya and Malawi the pre-post effect is statistically significant for both infant and post-neonatal mortality whereas in Zambia a statistically significant result is only observed when the outcome is restricted to the post-neonatal mortality.

5.4 Differential Infant Survival by Infants Province's Voting Behavior

The results show strong differential survival (both in magnitude and statistical strength) depending on the extent to which infant's province of birth supported the first multiparty election winners. The differential probabilities of infant survival by infants' province's voting behavior are highly statistically significant with the differences in most three categories (of pro, anti, and neutral provinces) in all four countries significant at $p<0.001$ (Figure 3 below).

Figure 3 around here:
Differential Infant Mortality Risk in Pro-, Neutral and Anti-winning Regime Provinces

Kenya shows the most pronounced difference among provinces with varying degrees of support of the first elections presidential winner. In Kenya, infants born in anti-incumbent provinces after the transition to multiparty elections appear to have experienced a 55 percent *increase* in infant mortality risk compared to infant who were born prior to the transition to multiparty system. The result do not show an evidence of differential infant survival for infant who were born in pro and neutral provinces after the first elections relative to those born prior to the transition in Kenya.

On the other hand, a *decrease* in mortality risk during the first year is observed in Malawi, Tanzania, and Zambia in all provinces regardless of the voting behavior of a given province. What differs, however, are the magnitudes of the given decreases, to wit, the differential decreases. In Malawi, which only has three provinces, the steepest decrease in post-neonatal risk, of approximately 27 percent, is observed in the province that voted overwhelmingly against the first election winners. The pro-winner province has a smaller decrease in infant mortality of about 13 percent. In Zambia, as in Malawi, the steepest decline is observed in anti winning regime provinces. In Tanzania, on the other hand, the results do not show a statistical difference in probability of survival in pro and neutral provinces after the transition relative to the period before the transition.

Table 6 around here:
Logistic Regression Results for Differential Infant Mortality in Pro, Neutral-, Anti-Regime Provinces after the Transition to Competitive Politics

Separating Post-neonatal Period

Aggregating all deaths in the first year to compute infant mortality may mask the duration dependency of survival during the first year –for instance, infants who survive the high risk first month (the neonatal period) have a higher chance of surviving the subsequent years. Also, determinants of infant survival in the first month tend to be more heavily biological than socio-economic. That being the case, I focus on survival correlates during the post-neonatal period.

The results are not that different when infant mortality risk is restricted to the post-neonatal period. We still observe a large increase in risk in Kenya's anti-regime

provinces and large relative declines in Zambia and Malawi provinces that were anti regime provinces. On the other hand, in Tanzania, holding all else constant, the largest decrease in risk of post-neonatal mortality is observed in pro-incumbent provinces with an approximately 32 percent decrease. The magnitude of the decreases in anti and neutral provinces are more or less comparable in Tanzania.

Table 7 around here:
Logistic Regression Results for Differential Post-neonatal Mortality in Pro, Neutral-, Anti-Regime Provinces after the Transition to Competitive Politics

To sum up, the analysis shows that whether we consider infant mortality or we restrict the outcome variable to the post-neonatal period only, in the period following the political transitions anti-regime provinces in Kenya seem to have had a health disadvantage whereas surprisingly pro-regime provinces seem to have had a disadvantage in Malawi and Zambia. In Tanzania, we do not see a consistent difference, the analysis finds an anti-regime advantage for infant mortality as a whole but a pro-regime provinces advantage when restricted to post-neonatal period.

6: Discussions

6.1 Political-economic Origins of Demographic Trends

As I posited earlier, the transition to multiparty system inarguably transformed contestation of political capital in these four countries. Bear in mind that all four countries had varieties of single-party regimes prior to the multiparty transitions. In a given country, the incumbent regimes, which had been in power since independence, were marked by different degrees of monopolization of politics. These parties were: the Kenya African National Union (KANU), the Malawi Congress Party (MCP), the Revolutionary Party *(Chama cha Mapinduzi -CCM)* in Tanzania, and the United National Independence Party (UNIP) in Zambia.

I propose to interpret the relationship between the observed infant mortality trends and the specific nature of a political transition in a given country in two ways. First, the first multiparty elections in these countries, especially the legalization of political competitions, produced a positive a radical shift in regards to how political capital was contested in these four eastern Africa states. However, in Kenya and Tanzania, the incumbent political parties won the first multiparty elections whereas in Malawi and Zambia the incumbents lost to opposition parties. Can the observed differences across the four countries on the effect of the political transition on infant survival be tied to whether a given country had a power-switch from an incumbent party to an opposition party or not?

Second, inarguably the legal removal of "barriers to entry" to the political sphere transformed the existed patronage systems. Some observers point to the fact that introducing competition in the political arena may have exacerbated inefficient patron-client systems (van de Walle 2001) whereas others have argued that the transformation should have reduced such illiberal elements (Howard and Roessler 2006, Lindberg 2006). In fact, reducing illiberal patron-client elements in the political arena was part partly the cited justification for multipartism (World Bank 1989). Now, can patterns of allocation of maternal and infant health resources (as a proxy of allocation of development resources

in general, if you will), shed light on the extent to which these patron-client systems were transformed (or not) to lead to the observed differential infant survival rates?

6.2 Incumbent to Opposition Power-switch and Province Level Differentials in Infant Mortality

In both Kenya and Tanzania where the incumbent political regimes won the first multiparty elections and thus a power switch did not take place, infants born in regions which supported the incumbents had better health outcomes. As the statistical results showed, in Kenya where an incumbent-to-opposition power switch did not take place, we observed a drastic increase in post-neonatal mortality risk in anti regime provinces. Again, Kenya is the only country among the four cases in which an increase in risk was observed in some of the provinces. On the other hand, in Tanzania where the incumbents prevailed and won the first multiparty elections like in Kenya, we do not observe a drastic increase in infant mortality risk in anti-incumbent region. The anti-regime provinces' disadvantage in Kenya is observed whether the outcome variable is infant mortality risk or it is restricted to post-neonatal mortality. In Tanzania, on the other, we do not observer a consistent regional advantage conditioned on voting outcome, but a statistically significant relative decline is observed when for post-neonatal mortality.

On the other hand, in Malawi and Zambia, the incumbent party lost the presidential seat to the opposition. In these two countries, like in Tanzania, infants in all provinces experienced lower risk of mortality in the period between the first and the second competitive elections regardless of the political affiliation of the province in which they were born; the only difference being the magnitude of the decreased risk between provinces. The statistical analysis shows a comparable trend in these two nations marked by the highest decrease in risk being observed in anti-winner provinces.

To summarize, when the results are read in relation to whether a given nation had a power switch or not, we observe that in the two countries in which the incumbent regimes prevailed the opposition, infant born in pro-incumbent provinces experience better health outcomes than anti regime (pro-opposition) provinces. On the other hand, in the two nations in which power-switch took place; that is, the incumbent regimes lost the presidential seat to the opposition, the pro-winner (opposition) provinces do not appear to have enjoyed better infant health outcomes after the transition compared to before the transition.

The observed lack of pro-winner province advantage in infant survival in the two countries (Malawi and Zambia) in which the incumbent lost to the opposition can potentially be explained by the fact that the newly formed political parties probably did not have the "bureaucratic base" to immediately change allocation of health resources in favor of the friendly provinces. The fact that pro-old regime province in all four countries had better infant health outcomes after the transition points to a possibility of the observed differential being an artifact of "accumulated advantage." That is, the pro-old regime areas in Malawi and Zambia already had a better health infrastructure (from virtue of being clients of the old regimes) to still benefit these regions more so than the pro-new regime (opposition) areas even after the transition. For the two nations that did not have a power switch, Kenya and Tanzania, the observed better infant health in pro-regime areas could thus be an artifact of this cumulative advantage, in addition to hypothesized punish/reward factor, a reward in the case of these two countries.

Furthermore, as stated, the manifestation of a punish/reward mechanism is the strongest in Kenya. The drastic worsening in health outcomes in anti-incumbent regions in Kenya relative to Tanzania (where incumbents also prevailed) can potentially be traced back to difference in the existing patron-client system in these two countries. Studies have long shown Kenya to be among the African countries in which ethnic cleavages fairly predict regional differences in voting behavior (Oyugi 1997, Bratton and Kimenyi 2008), more so relative to Tanzania where ethnic cleavages in politics are not as salient and in fact pandering to ethnicity for political purposes is socially sanctioned.

The reading of these results in relation to whether a power switch took place and the prevalence of ethnicity/region cleavages can be summarized as follows:

Power switch, ethnic cleavages, and "patronage possibilities"

		Salience of ethnic cleavages	
		High	***Low***
Did a power switch from incumbents to the opposition take place?	***Yes***	(Malawi) Anti- winner (opposition) provinces (i.e., pro-deposed incumbents regions) better-off. - clear qualitative difference between in infant survival among these provinces (per the difference test)	(Zambia) Anti- winner (opposition) provinces (i.e., pro-deposed incumbents regions) better-off. - however, no clear qualitative difference between these regions (i.e., statistically insignificant difference test)
	No	(Kenya) Pro incumbent provinces better-off, anti provinces extremely disadvantaged. - clear qualitative difference between in infant survival among these provinces (per the difference test)	(Tanzania) No clear pro vs. anti regime difference.

6.3 Party Loyalty and Infant Health Outcomes

I continue to explore whether loyalty to the incumbents over time matters. I use Tanzania, for which the ruling regime is yet to lose the presidential seat. The degree of a

region's loyalty to the political incumbents is measured by comparing the level of support of the ruling party, CCM, in the 1995 presidential elections with the 2000 presidential elections. I first divide the distribution of percentage of votes garnered by CCM in the 1995 in a given region/province into three terciles. The regions in the top tercile, in which the incumbents (CCM) received 70% or more of the votes are labeled as *pro-incumbents* regions, regions in the middle tercile, in which CCM received 58-69% of the votes are labeled *neutral*, whereas regions in the lowest tercile, in which CCM received less than 58% of the votes, are labeled *anti-incumbents*. I repeat the same process with the results of 2000 presidential elections by dividing the regions into pro-, neutral, and anti-CCM regions. The level of allegiance to CCM is trichotomous variable for whether the level of support of CCM in a given region decreased, remained the same, or increased. For example the level of loyalty decreased if a pro-CCM region in 1995 elections falls under neutral or anti-CCM category in 2000.

Results from logistic regression models of the effect of loyalty to the ruling part on infant health do not show variation between regions in which support for the incumbent party increased, regions in which support decreased, and regions in which incumbents support remained constant. As the results presented on Table 5.1 show, infants born after the second competitive elections in Tanzania in regions in which support of the incumbents increased experienced a 38% decrease in risk of infant mortality in the five year period following the second competitive elections in 2000. In magnitude this relative decline is approximately similar in magnitude to the risk experienced by infants born in regions in which support of the incumbent party decreased.

Table 8 around here:
Logistic Regression Results for the Effect of Region's Loyalty to the Ruling Party on Infant Mortality in Tanzania, 1987-2006

6.4 Access to Quality Maternal and Infant Health Care

As discussed in previous sections covering theory and hypothesis, access to health services is the assumed underlying mechanism linking the political context of the province where an infant was born and health outcomes. And, as elucidated in the result sections, access to maternal and infant health explains some of the statistical variation in infant survival among pro, anti, and neutral provinces. Now, did access to quality maternal and infant health care vary by province voting behavior?

The quality of maternal and infant health index is measured by three indicators including access to prenatal care, characteristics of place where the infant was delivered, and access to vaccination. An infant received quality care if its mother received professional parental care, the infant was delivered at a hospital or clinic, and the infant received required vaccinations after birth.

I then estimate of logistic regression model testing whether the probability that an infant received quality health care was determined by her province's voting behavior. The model is as follows:

$$\ln\big(P\big|(1-P)\big) = \beta_0 + \beta_1 + \beta_1 PRO + \beta_2 NEUTRAL + \beta_3 ANTI + \beta_4\, YEAR + \beta_5 YEAR\ SQUARED + \beta_{6i} VECTOR\ OF\ CONTROL\ VARS$$

P is the probability that a given infant mother received quality prenatal and antennal care as defined above. For predictor variables, in addition to province voting behavior

variables, I include controls for secular trend, mother's characteristics (age and education), a measure of household socioeconomic status, and urban/rural location

Results show that in Kenya and Malawi infants born after the political transition enjoyed better health care in all provinces (anti, pro, or neutral), whereas in Tanzania and Zambia there was a decline in access in all provinces regardless of political affiliation. In both Kenya and Malawi the biggest increase in magnitude is observed in anti regime provinces; though in Malawi the difference between provinces is not as pronounced s in Kenya. For the decreasing health access countries, Tanzania and Zambia, the largest decline is observed in pro provinces; in Zambia however the decline in anti and neutral provinces is not statistically significant.

Table 9 around here:
Logistic Regression Results for Differential Access to Quality Maternal and Infant Health Care in Pro, Neutral-, and Anti-Regime Provinces after the Transition to Competitive Politics

A consistent correspondence between better infant survival and improved access to quality prenatal and antenatal care is only observed in Malawi, that is, in Malawi the previous infant survival results showed a survival advantage in anti-regime region and correspondingly an improved access to health resources is observed in those regions.

These results are however consistent with the underlying hypothesis in this dissertation which rely on the assumption that the effect of the political-economic transformations is manifested in myriad of ways including but not limited to changes in delivery of maternal and infant health care.

7 Conclusions

At the aggregate country level, population health, as measured by infant mortality risk in this paper, appear to have worsened in the 5-year period after the transition to competitive politics in Malawi, Kenya, and Zambia but not in Tanzania (for Zambia the difference is only observed when the mortality risk is restricted to the post-neonatal period).

In addition, in all four countries, after the transition, we observe different infant health outcomes in provinces categorized as pro, neutral, or anti a given post-transition regime. In Kenya, a pronounced disadvantage is observed in anti-regime provinces after the political transition, whereas in Malawi and Zambia, a disadvantage is actually observed in pro regime provinces after the transitions. For Tanzania, on the other hand, the analysis does not show a consistent anti and pro regime province trend.

In Kenya, in which historically political patronage has been correlated with ethnic identification, the difference in infant health between the provinces which overwhelmingly supported the regime and those which did not is fairly stark. On the other hand, in Malawi and Zambia which both have salient ethnic cleavages and the opposition political parties won the first multiparty elections leading to an incumbent-to-opposition power switch, provinces which voted against the opposition parties (winners of the elections) appear to have an advantage in infant survival.

The hypothesized punish/reward mechanism thus appear to be in effect in Kenya, but not in Malawi and Zambia where the presidential power switched from an incumbent political party to an opposition political party. With this observation in mind, I speculate that "cumulative advantage" also played a role since in all four countries it appears that

provinces which had been supporting the old regimes had better health outcomes even after the transition.

As such, the results so far, answer few questions but they equally motivate a few theoretical and empirical questions. The result affirm that after the transition to multipartism in sub-Saharan Africa, existed patterns of clientilism and patrimonialism were potentially exacerbated (and probably new ones emerged) as witnessed by differential public health outcomes among provinces with varied degrees of allegiances to the governing regimes in these countries. However, it is not clear whether the first competitive elections transformed the existed regimes that much as evidenced by the still salient cumulative advantage of the pro-old regime regions. And also, the link between regional political allegiances and population health outcome does not always appear to be mediated by differential access to maternal and infant health resources in all four countries.

Table and Figures

Table 1. Details of the Transition to Political Competition in Kenya, Malawi, Tanzania, and Zambia

Country	Ruling Party at Transition	Year of 1st multiparty elections	Number of Political Parties	Winner of the Presidential Seat	% of national votes garnered by the winner
Kenya	Kenya African National Union (KANU) -	1992	7	KANU - *incumbents*	36.4
Malawi	Malawi Congress Party (MCP)	1994	4	United Democratic Front (UDF)- *opposition*	47.15
Tanzania	The Revolutionary Party (Chama Cha Mapinduzi) -CCM)	1995	4	CCM – *incumbents*	61.82
Zambia	United National Independence Party (UNIP)	1991	2	Movement for Multiparty Democracy (MMD)- *opposition*	75.8

Sources:

- Nohlen, D, Krennerich, M & Thibaut, B (1999) *Elections in Africa: A data handbook.*
- Throup, David; Charles Hornsby (1998). *Multi-Party Politics in Kenya: The Kenyatta & Moi States & the Triumph of the System in the 1992 Election*. New York: Long House Publishing Services, Cumbria, UK.
- African Elections Database. 2011. http://africanelections.tripod.com/ Accessed September 14 2011.

Figure 1a Infant Mortality Trends from 1969 – 2010 in Kenya Malawi, Tanzania, and Zambia

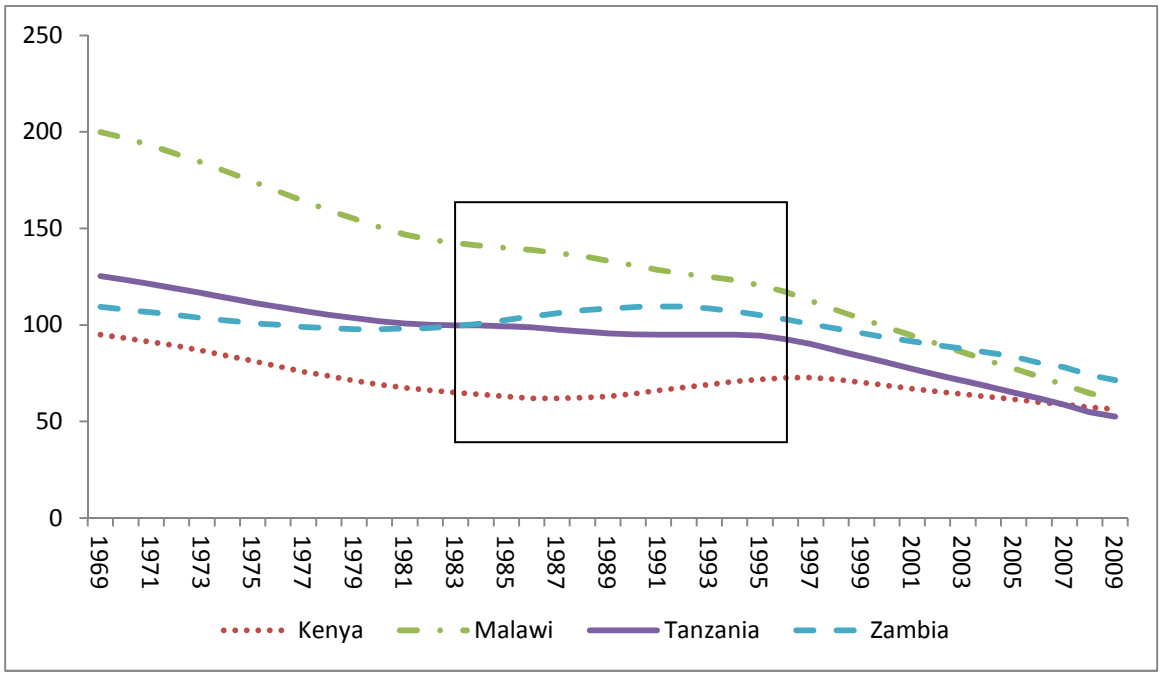

Figure 1b Infant Mortality Trends from 1969 – 2010 in Kenya Malawi, Tanzania, and Zambia

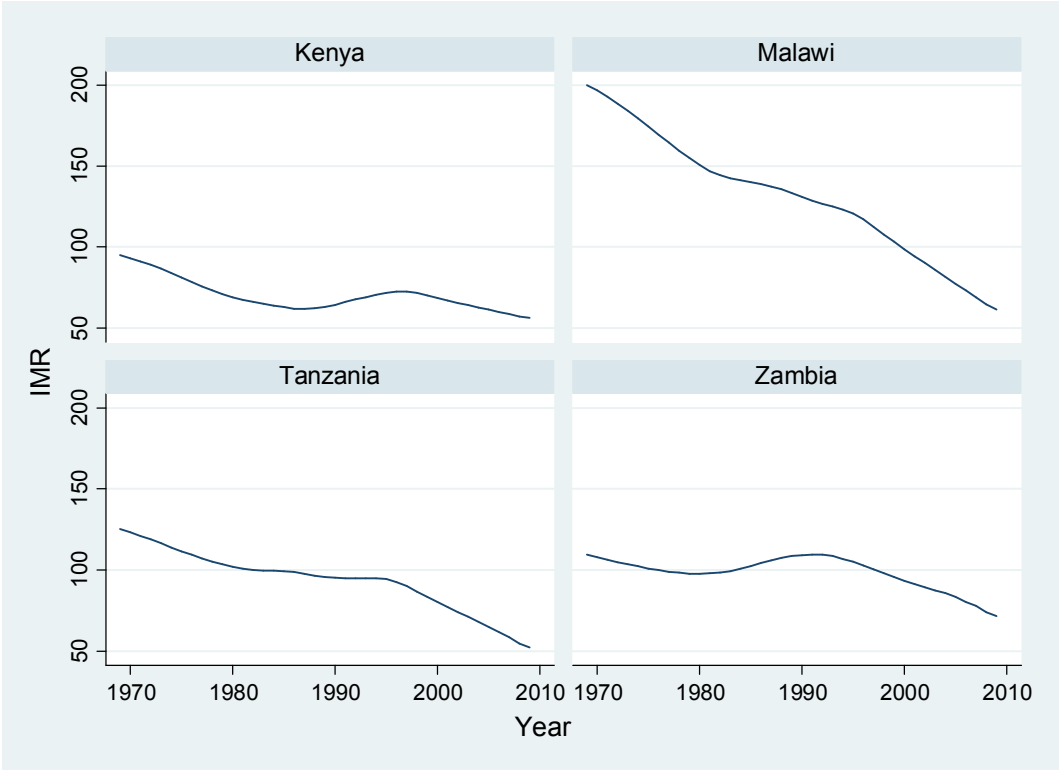

Figure 2: A Comparison of Actual Infant Mortality Rates to Estimates of Infant Mortality Predicted by Level of Economic Development and Fertility Rates

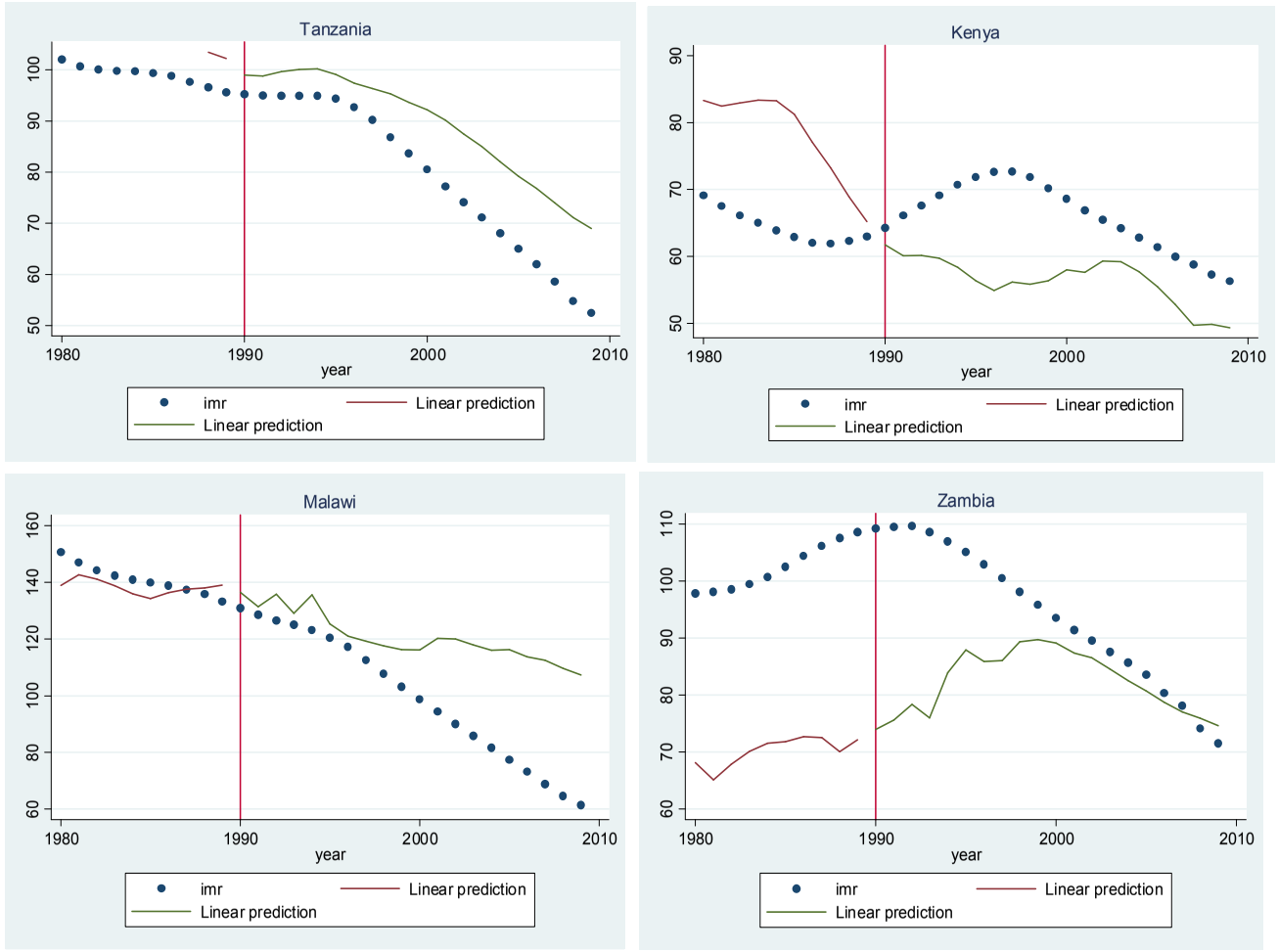

Table 2. Summary Statistics of Key Variables

	KENYA	MALAWI	TANZANIA	ZAMBIA
DATA CHACTERISTICS				
Total number of live births (infants) observed (N)	32284	41454	26809	29741
Span of infants' year of birth	1984 -2008	1987 – 2004	1987 – 2004	1987 – 2007
Number of available DHS data rounds	5	3	4	4
OUTCOME VARIABLES *(as a proportion of observed live births)*				
Observed infant mortality	0.061	0.099	0.077	0.090
Observed Post-neonatal mortality	0.031	0.057	0.044	0.054
Observed neonatal mortality	0.030	0.041	0.033	0.036
KEY INDEPENDENT VARIABLES				
Transition variables				
1st multiparty elections' year	1992	1994	1995	1991
Post-transition period	1995 - 2008	1996 -2004	1998 -2004	1994 - 2007
Proportion of infants born post-transition	0.539	0.622	0.340	0.646
Electoral outcome variables				
% of votes garnered by the winner	41.5	47.4	58.0	74.7
Variation of % of votes across Provinces (St Dev)	24.6	29.7	11.6	19.9
Lowest province-level % of votes	2.1	4.52	41.5	26
Highest province-level % of votes	78.1	78.04	81.2	90.62
Total number of Provinces	8	3	7	9
Proportion of infants born in pro-winner provinces after the transition	14.8%	30.4%	5.4%	20.3%
Proportion of infants born in neutral provinces After the transition	17.8%	8.6%	17.4%	22.8%
Proportion of infants born in anti-winner provinces after the transition	21.3%	23.2%	11.2%	21.4%

Table 3: Logistic Regression Results for a Basic Model of Infant Mortality that Only Includes the Known Determinants of IMR

	KENYA		MALAWI		TANZANIA		ZAMBIA	
	Odds Rat.	*P>|z|*	*Odds Rat.*	*P>|z|*	*Odds Rat.*	*P>|z|*	*Odds Rat.*	*P>|z|*
Maternal and Infant Health Indicators								
Prenatal care from a health professional	0.655	0.000	0.579	0.000	0.819	0.000	0.886	0.049
Infant was vaccinated	0.222	0.000	0.516	0.000	0.544	0.000	0.638	0.000
Infant Characteristics								
Female	0.885	0.042	0.913	0.013	0.839	0.000	0.811	0.000
Multiple birth	3.914	0.000	3.941	0.000	3.378	0.000	4.127	0.000
Birth order	1.073	0.000	1.016	0.199	1.004	0.788	0.943	0.001
Low birth weight	1.809	0.000	1.726	0.000	2.031	0.000	1.758	0.000
Mother's Characteristics								
Age (Ref cat: under 20 yrs of age)								
20 - 24 years	0.583	0.000	0.713	0.000	0.777	0.014	1.028	0.780
25 - 29 years	0.409	0.000	0.547	0.000	0.561	0.000	0.827	0.083
30 - 34 years	0.412	0.000	0.434	0.000	0.516	0.000	0.771	0.045
Older than 35	0.383	0.000	0.443	0.000	0.664	0.004	0.773	0.107
Highest Education Level (Ref cat: no education)								
Primary education	0.943	0.456	0.977	0.571	1.006	0.911	0.873	0.056
Secondary education and higher	0.750	0.008	0.653	0.000	0.557	0.001	0.782	0.011
Household Socioeconomic Status (SES) (Reference Category (Low SES)								
Middle SES	0.960	0.568	0.882	0.002	0.956	0.418	0.851	0.010
High SES	0.758	0.003	0.725	0.000	0.854	0.059	0.768	0.010
Urban (Reference category: rural)	1.117	0.340	0.948	0.396	1.109	0.174	0.974	0.725
Likelihood Ratio Chi^2	647	0.000	1019	0.000	490	0.000	457	0.000

Number of Cases	19776		32802		22613		17214	

Sanitation and clean water predictor variables, which were insignificant, are omitted from the tables

Table 4: Logistic Regression Results for Differential Risk of Infant Mortality during the Post-political Transition Period Relative to Pre-transition Period

	Kenya *Odds Rat.*	*P>|z|*	**Malawi** *Odds Rat.*	*P>|z|*	**Tanzania** *Odds Rat.*	*P>|z|*	**Zambia** *Odds Rat.*	*P>|z|*
Period Variables								
Pre-Post Transition Dummy								
Post Transition Period	1.560	0.007	1.198	0.024	0.979	0.895	1.025	0.845
Controls for secular trend								
Year	0.982	0.613	0.925	0.000	0.945	0.036	1.019	0.588
Year Squared	0.997	0.378	1.001	0.727	1.003	0.317	0.993	0.114
Maternal and Infant Health Indicators								
Prenatal care from a health professional	0.646	0.000	0.550	0.000	0.782	0.000	0.799	0.001
Infant was vaccinated	0.210	0.000	0.508	0.000	0.528	0.000	0.621	0.000
Child Characteristics								
Female	0.886	0.043	0.915	0.015	0.837	0.000	0.808	0.000
Multiple birth	3.910	0.000	3.937	0.000	3.374	0.000	4.126	0.000
Birth order	1.071	0.000	1.019	0.123	1.004	0.828	0.943	0.001
Low birth weight	1.823	0.000	1.780	0.000	2.044	0.000	1.779	0.000
Mother's Characteristics								
Age (Ref cat: under 20 yrs of age)								
20 - 24 years	0.582	0.000	0.687	0.000	0.771	0.011	1.024	0.810
25 - 29 years	0.410	0.000	0.514	0.000	0.557	0.000	0.822	0.075
30 - 34 years	0.418	0.000	0.398	0.000	0.515	0.000	0.762	0.037
Older than 35	0.391	0.000	0.400	0.000	0.661	0.004	0.768	0.101
Highest Education Level (Ref cat: no education)								

Primary education	0.973	0.733	1.006	0.879	1.028	0.629	0.892	0.107
Secondary education and higher	0.789	0.031	0.699	0.000	0.568	0.002	0.811	0.031
Household Socioeconomic Status (SES)								
(Reference Category (Low SES)								
Middle SES	0.885	0.112	0.896	0.007	0.968	0.556	0.862	0.018
High SES	0.634	0.000	0.728	0.000	0.860	0.072	0.771	0.011
Urban (Reference category: rural)	1.250	0.070	0.896	0.080	1.117	0.145	0.949	0.496
Likelihood Ratio Chi^2	661	0.000	1109	0.000	507	0.000	484	0.000
Number of Cases	19776		32802		22613		17214	

 # Sanitation and clean water predictor variables, which were insignificant, are omitted from the tables

Table 5: Logistic Regression Results for Differential Risk of Post-neonatal Mortality during the Post-political Transition Period Relative to Pre-transition

	Kenya Odds Rat.	P>|z|	**Malawi** Odds Rat.	P>|z|	**Tanzania** Odds Rat.	P>|z|	**Zambia** Odds Rat.	P>|z|
Period Variables								
Pre-Post Transition Dummy								
Post Transition Period	1.656	0.019	1.387	0.001	1.138	0.535	1.500	0.007
Controls for secular trend								
Year	1.022	0.647	0.932	0.009	1.010	0.763	1.153	0.001
Year Squared	0.995	0.154	0.999	0.641	0.997	0.337	0.978	0.000
Maternal and Infant Health Indicators								
Prenatal care from a health professional	0.675	0.000	0.647	0.000	0.771	0.000	0.781	0.003
Infant was vaccinated	0.391	0.000	0.872	0.052	0.995	0.944	1.164	0.047
Child Characteristics								
Female	1.004	0.964	1.036	0.446	0.907	0.120	0.966	0.584
Multiple birth	1.878	0.000	2.084	0.000	2.123	0.000	2.084	0.000
Birth order	1.099	0.000	1.012	0.436	0.990	0.622	0.918	0.000
Low birth weight	1.161	0.312	1.317	0.000	1.222	0.043	1.008	0.936
Mother's Characteristics								
Age (Ref cat: under 20 yrs of age)								
20 - 24 years	0.599	0.001	0.959	0.744	0.917	0.535	1.276	0.062
25 - 29 years	0.517	0.000	0.829	0.151	0.765	0.065	1.150	0.324
30 - 34 years	0.448	0.000	0.731	0.028	0.814	0.205	1.229	0.208
Older than 35	0.361	0.000	0.635	0.004	0.950	0.784	1.059	0.776
Highest Education Level (Ref cat: no education)								
Primary education	1.068	0.532	0.968	0.521	1.099	0.194	0.859	0.077

Secondary education and higher	0.694	0.016	0.664	0.002	0.630	0.046	0.769	0.027
Household Socioeconomic Status (SES)								
(Reference Category (Low SES)								
Middle SES	0.835	0.075	0.888	0.020	0.912	0.191	0.902	0.175
High SES	0.534	0.000	0.719	0.000	0.833	0.088	0.723	0.011
Urban (Reference category: rural)	1.423	0.028	0.830	0.022	0.995	0.956	0.952	0.602
Likelihood Ratio Chi^2	194	0.000	290	0.000	84	0.000	135	0.000
Number of Cases	19776		32802		22613		17214	

Table 6: Logistic Regression Results for Differential Infant Mortality in Pro, Neutral-, Anti-Regime Provinces after the Transition to Competitive Politics

	KENYA		**MALAWI**		**TANZANIA**		**ZAMBIA**	
	Odds Rat.	*P>|z|*	*Odds Rat.*	*P>|z|*	*Odds Rat.*	*P>|z|*	*Odds Rat.*	*P>|z|*
Province Post-Transition Electoral outcome								
(Reference: Pre-transition period)								
PRO incumbent province	0.860	0.247	0.865	0.001	0.927	0.589	0.766	0.002
ANTI incumbent province	1.549	0.000	0.725	0.000	0.797	0.007	0.728	0.000
NEUTRAL province	0.875	0.219	0.754	0.000	0.967	0.727	0.836	0.027
Maternal and Infant Health Indicators								
Prenatal care from a health professional	0.651	0.000	0.592	0.000	0.798	0.000	0.839	0.005
Infant was vaccinated	0.221	0.000	0.512	0.000	0.542	0.000	0.618	0.000
Infant Characteristics								
Female	0.885	0.042	0.915	0.015	0.837	0.000	0.808	0.000
Multiple birth	3.965	0.000	4.004	0.000	3.383	0.000	4.088	0.000
Birth order	1.074	0.000	1.019	0.129	1.003	0.874	0.946	0.003
Low birth weight	1.845	0.000	1.761	0.000	2.036	0.000	1.766	0.000
Mother's Characteristics								
Age (Ref cat: under 20 yrs of age)								
20 - 24 years	0.591	0.000	0.707	0.000	0.783	0.016	1.017	0.863
25 - 29 years	0.415	0.000	0.533	0.000	0.568	0.000	0.809	0.053
30 - 34 years	0.413	0.000	0.419	0.000	0.526	0.000	0.748	0.026
Older than 35	0.384	0.000	0.422	0.000	0.679	0.006	0.743	0.063
Highest Education Level (Ref cat: no education)								
Primary education	0.919	0.290	0.999	0.972	1.015	0.791	0.883	0.079
Secondary education or higher	0.729	0.004	0.689	0.000	0.561	0.001	0.803	0.023

Household Socioeconomic Status (SES)								
(Reference Category (Low SES)								
Middle SES	0.967	0.637	0.887	0.003	0.957	0.427	0.865	0.021
High SES	0.763	0.004	0.715	0.000	0.847	0.048	0.774	0.012
Urban (Reference category: rural)	1.059	0.628	0.924	0.209	1.109	0.174	0.945	0.466
Likelihood Ratio Chi^2	669	0.000	1061	0.000	498	0.000	480	0.000
Number of Cases	19776		32802		22613		17214	

Figure 3. Differential *Infant Mortality* Risk in Pro, Neutral and Anti Provinces after the Transition Relative to Pre-Transition Period

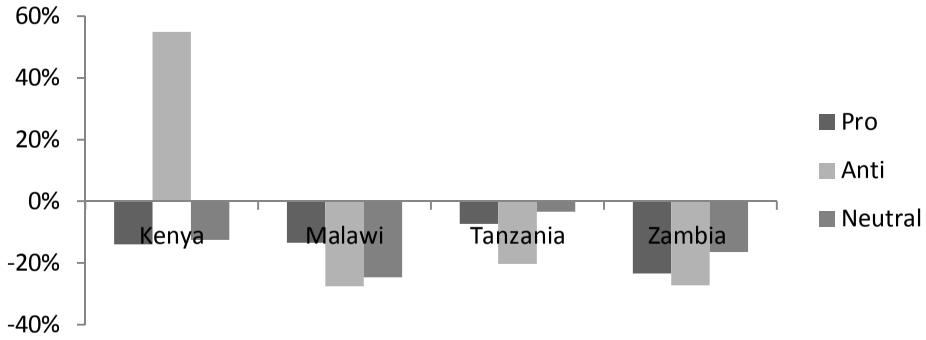

Table 7: Logistic Regression Results for Differential Post-neonatal Mortality in Pro, Neutral-, Anti-Regime Provinces after the Transition to Competitive Politics

	KENYA		**MALAWI**		**TANZANIA**		**ZAMBIA**	
	Odds Rat.	*P>|z|*	*Odds Rat.*	*P>|z|*	*Odds Rat.*	*P>|z|*	*Odds Rat.*	*P>|z|*

Province Post-Transition Electoral outcome								
(Reference: Pre-transition period)								
PRO incumbent province	0.459	0.000	0.911	0.101	0.675	0.050	0.901	0.306
ANTI incumbent province	1.803	0.000	0.735	0.002	0.844	0.104	0.739	0.004
NEUTRAL province	0.926	0.585	0.764	0.000	0.860	0.238	0.945	0.567
Maternal and Infant Health Indicators								
Prenatal care from a health professional	0.694	0.000	0.705	0.000	0.781	0.000	0.898	0.165
Infant was vaccinated	0.413	0.000	0.877	0.058	0.993	0.920	1.117	0.143
Infant Characteristics								
Female	0.999	0.995	1.035	0.457	0.908	0.125	0.969	0.620
Multiple birth	1.899	0.000	2.131	0.000	2.119	0.000	2.065	0.000
Birth order	1.106	0.000	1.011	0.483	0.989	0.587	0.926	0.001
Low birth weight	1.200	0.218	1.297	0.000	1.213	0.051	0.995	0.963
Mother's Characteristics								
Age (Ref cat: under 20 yrs of age)								
20 - 24 years	0.612	0.002	0.991	0.945	0.914	0.521	1.246	0.093
25 - 29 years	0.524	0.000	0.867	0.277	0.766	0.066	1.092	0.533
30 - 34 years	0.439	0.000	0.779	0.080	0.814	0.205	1.161	0.362
Older than 35	0.347	0.000	0.679	0.015	0.957	0.813	0.963	0.852
Highest Education Level (Ref cat: no education)								
Primary education	0.999	0.992	0.959	0.411	1.091	0.230	0.840	0.042
Secondary education or higher	0.638	0.003	0.650	0.001	0.623	0.041	0.752	0.016
Household Socioeconomic Status (SES)								
(Reference Category (Low SES)								
Middle SES	0.903	0.276	0.877	0.010	0.903	0.149	0.922	0.288
High SES	0.617	0.000	0.703	0.000	0.824	0.072	0.733	0.015
Urban (Reference category: rural)	1.186	0.272	0.861	0.065	0.991	0.932	0.930	0.437

Likelihood Ratio Chi^2	226	0.000	249	0.000	81	0.000	116	0.000
Number of Cases	19776		32802		22613		17214	

 # Sanitation and clean water predictor variables, which were insignificant, are omitted from the tables

Table 8: Logistic Regression Results for the Effect of Region's Loyalty to the Ruling Party on Infant Mortality in Tanzania, 1987-2006, N= 29274

	Odds Rat	P>|z|

Provinces' 2nd Election outcome		
(Reference: Pre-election period)		
Increased support of incumbents	0.623	0.000
Decreased support of incumbents	0.628	0.005
Constant support of incumbents	0.645	0.000
Maternal and Infant Health Indicators		
Professional prenatal care	0.754	0.000
Infant Characteristics		
Female	0.832	0.000
Multiple birth	3.612	0.000
Birth order	1.004	0.767
Low birthweight	2.004	0.000
Mother's Characteristics		
Age (Ref cat: under 20 yrs of age)		
20 - 24 years	0.821	0.037
25 - 29 years	0.639	0.000
30 - 34 years	0.540	0.000
Older than 35	0.687	0.004
Highest Education Level (Ref cat: no education)		
Primary education	0.953	0.341
Secondary education or higher	0.458	0.000
Household Characteristics		
Household Socioeconomic Status (SES) (Reference Category (Low SES)		
Middle SES	0.857	0.052
High SES	0.847	0.228
Household Location		

Urban (Reference category: rural)	1.096	0.157
Likelihood Ratio Chi^2	595	0.000

Table 9: Logistic Regression Results for Differential Access to Quality Maternal and Infant Health Care in Pro, Neutral-, and Anti-Regime Provinces after the Transition to Competitive Politics

	KENYA		**MALAWI**		**TANZANIA**		**ZAMBIA**	
	Odds Rat.	*P>|z|*	*Odds Rat.*	*P>|z|*	*Odds Rat.*	*P>|z|*	*Odds Rat.*	*P>|z|*
Province Post-Transition Electoral outcome								
(Reference: Pre-transition period)								
PRO incumbent province	9.285	0.000	2.552	0.000	0.362	0.001	0.545	0.000
ANTI incumbent province	13.612	0.000	3.572	0.000	0.391	0.000	0.754	0.113
NEUTRAL province	7.963	0.000	3.245	0.000	0.555	0.009	0.810	0.210
Temporal Controls								
Year	2.706	0.000	0.593	0.000	0.687	0.000	0.862	0.000
Year Square	0.929	0.000	1.021	0.000	1.024	0.000	0.999	0.840
Mother's Characteristics								
Age (Ref cat: under 20 yrs of age)								
20 - 24 years	1.079	0.570	0.790	0.037	0.923	0.503	0.969	0.772
25 - 29 years	1.014	0.919	0.609	0.000	0.777	0.035	0.777	0.022
30 - 34 years	1.043	0.765	0.640	0.000	0.730	0.013	0.790	0.039
Older than 35	1.006	0.968	0.681	0.001	0.779	0.048	0.849	0.154
Education level (Ref cat: no education)								
Completed Primary	1.430	0.001	1.255	0.000	1.804	0.000	1.555	0.000
Secondary or higher	3.360	0.000	2.340	0.000	2.064	0.000	2.298	0.000
Household Socioeconomic Status (SES)								
(Reference Category (Low SES)								
Middle SES	0.814	0.003	0.976	0.673	1.221	0.003	1.525	0.000

High SES	0.628	0.000	0.968	0.673	1.817	0.000	1.727	0.000
Urban (Reference category: rural)	3.517	0.000	2.011	0.000	2.319	0.000	2.246	0.000
Likelihood Ratio Chi^2	1482	0.000	1448	0.000	1014	0.000	1275	0.000
Number of Cases	19776		32802		22613		17214	

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