

Democratization and Child Mortality

Can democratic reform improve the situation for the children of the current generation?

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***Abstract:** The Millennium Development Goals call for a two-thirds reduction in under-five mortality rate by 2015. Can democratic reforms contribute to this goal? The focus of previous studies has mainly been on verifying the existence of a relationship between democracy and child mortality and not on the dynamics of the relationship. This paper addresses this question by empirically testing the dynamic effects of important changes in the level of democracy on the percentage change in child mortality using a distributed lag model. The findings are that during the 5 to 20 years following a democratic transition child mortality decreases significantly. Following this decrease, child mortality stabilizes at a new, lower level. Disaggregating democratic transitions into different subcomponents the finding is that the single most important aspect for child mortality is the competitiveness of executive recruitment. The results on the effects of an autocratic experience are more inconclusive. Initially the effects of a negative shock to the political system seem to mirror those of a positive shock, child mortality increases for a number of years but there is no conclusive sign of child mortality stabilizing at a new level and the results are not as stable as for positive democratic changes.*

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Introduction

The effect of democratization on different aspects of human life has been the target for a large number of studies. The focus has mainly been on economic outcomes but also the effects on other aspects of human well-being have been studied. One such aspect is health where both life expectancy as well as child mortality has been found to be correlated with democracy. The relationship with child mortality is especially compelling since this measurement demonstrates in a very concrete way the differing conditions of life between countries. In Sweden 1 child out of 300 dies before the age of 5, in Pakistan 1 child out of 10 dies before seeing his or her fifth birthday and in Sierra Leone the figure is close to 1 out of 3. The tragedy behind the latter of these numbers has made lowering child mortality one of the millennium goals of the United Nation's and the understanding of the mechanisms affecting it an important target for research. But apart from being an important measurement in its own right, child mortality has also been considered as an indicator for the quality-of-life in a country, both in the aggregate but also, since it to a large extent is a poor people's problem, as an indicator of the conditions for a country's least advantaged citizens¹. Of course child mortality is highly correlated with economic variables, the correlation with income per capita is negative and in the area off 0.85². But as can be seen from the scatter plot in *figure 1* and the diagram of standard deviation in *figure 2* even for countries with similar income there is a large variation in child mortality which shows the potential for other, parallel causes.

Using improving datasets the studies of the effects of democracy on health and/or child mortality has moved from cross country regressions into panel data using difference in difference methods. The right-hand side variable of interest has also changed. Early studies used a dichotomous definition of democracy but democracy versus autocracy is not an absolute measurement, rather a question of degree. Also improvements to democracy should not be expected to have an immediate influence, rather the effect should be expected to build over time. Using a graded measurement of democracy in combination with fixed country and

¹On child mortality as an indicator of the quality of life see Gerring, Thacker and Alfaro(2005). On child mortality as a poor People's problems see Kanbur and Squire(1999), Gauri (2005) (Gwatkin et al. 2005). Data on child mortality has also been used as the base for imputing values on life expectancy in a large number of countries where reliable historical data is missing.

² This is the 1960-2005 average correlation between the log off child mortality before five and the log off real GDP per capita. There is also a correlation between the income share of the poorest quintile and child mortality in a country

time effects as well as including the level of democratic experience³ more recent studies has addressed this more complex problem.

The conclusion from most of these studies has been that there is a relationship between democracy and child mortality. However we know little about the dynamics of this relationship. How long does it take for political reform to have any impact on child mortality and what is the size and duration of this impact? If the time from reform to effect is short and the magnitude of the effect is large, political reform, apart from being desirable in its own right, would also indirectly contribute to the health and well-being of the children of the current generation. Political reform would potentially be one important factor contributing to the Millennium goal of lowering relative child mortality.

To improve the understanding of the dynamic relationship between political transitions and child mortality I empirically test the dynamic effects of important changes in the level of democracy on the percentage change in child mortality. The result is that between the 5 to 20 years following a democratic transition, child mortality decreases substantially. After this time child mortality stabilizes at the new level⁴. During the 5 to 35 years following large autocratic transitions child mortality increases even though the regressions show a somewhat less robust relationship.

The remainder of this paper is organized as follows: in section two some of the existing literature is surveyed and discussed, section three presents the data and section four the methods used. Section five addresses robustness issues and section six concludes.

Background and Literature

The relationship between democracy and child mortality has been studied in a number of papers using various empirical methods and specifications. One method has been to create a dataset with a dichotomous division between democracies and autocracies. The focus is the effects on child mortality from living in a country with more than x level on some democratic

³ Including a measure of democratic experience (usually the number of years a country has been democratic) is well in line with recent findings that the level of “democratic capital” plays a role in explaining the economic well being in a country, Persson and Tabellini (2006), Gerring, Bond, Barndt and Moreno (2005), Hadenius and Teorell (2005) and Putnam (1993),

⁴ Controlling for global trends in child mortality.

measurement scale compared to living in a country with less than x level on the scale. Using this specification both Przeworski et al (2000) and Zweifel and Navia (2000) find that democracies have about 10 fewer deaths per 1000 children born⁵. Since most democracies are rich and most dictatorships are poor, identification is difficult and requires some special methods⁶. Also they do not address neither the quite distinct global time trend of child mortality nor country specific factors such as disease climate. Pande (2002), tests their calculations controlling for country fixed effects and time effects⁷. She finds that the results from democracy on child mortality are much less dramatic, sometimes even reversed or just marginally significant. Another method has been to acknowledge that democracy and autocracy are a matter of degree rather than binary states. Boone (1996) uses both the Gastil index and dummies representing four categories of political system⁸. He mainly studies the impact of regime on the effectiveness of aid but also finds significant effects from regime type on child mortality. Using a two period panel with 10 year averages 1970-1990, including time dummies, he finds that political regime has a very large effect on child mortality. Lake and Baum (2004), using both cross-country data and pooled time series find that the level of democracy measured by the POLITY IV index lagged between one and seven years, has a significant effect on child mortality. During the last couple of years researchers have introduced democratic experience as an explanatory variable. Thus not only the current level of democracy but also past political experience is allowed to influence the current level of child mortality. McGuire (2005) using cross-country data (year 1990) finds that the stock (but not the level) of democratic experience significantly impacts child mortality. His measure of the level of democracy is from the POLITY IV data and his stock measure is created as a sum of all yearly values of the level of democracy since 1900. Gerring et al (2006)⁹ also find that it is the stock of democracy, but not the current level, that matters for child mortality. They use the POLITY IV data complemented with their own coding of a number of smaller countries excluded from the POLITY IV data as a measure of the level of democracy. Their measure of the stock of democracy is created in the same way as in McGuire (2006) except that they add a 1% depreciation rate. They also include fixed country effects and in some cases time dummies or a trend variable. Beasley and Kudamatsu (2006)

⁵ The main focus in these studies is the relationship between democracy and economic variables but they also study the relationship with child mortality.

⁶Przeworski and Zweifel uses Heckman two step estimations to address the problem of rich democracies creating a virtual set of poor democracies.

⁷ Pande uses a dynamic probit model to capture time effects.

⁸ For a description of the GASTIL index please go to Freedom House. The four categories used are described in Derbyshire and Derbyshire (1989)

⁹ Gerring et al uses a mix of original, interpolated and imputed values for child mortality.

get similar results controlling for time and regional dummies. They mainly look at life expectancy¹⁰ but this measurement is highly related to child mortality. Their results are stable when controlling for education and political history of the country but depend on using only regional dummies and do not survive the inclusion of fixed country effects. They use a dichotomous definition of democracy and their stock measure is the fraction of years a country has been democratic since 1956. Ross (2006)¹¹ on the other hand finds no positive effects on child mortality neither from the five year lagged value neither from the POLITY IV index nor from the log of the stock of democracy¹². His explanation is that previous studies have failed to control for country fixed effects and time trends or suffers from selection bias.

The focus of these previous studies has been on verifying the existence of a relationship between some measurement of democracy and child mortality. They do not address the question of when changes in the level of democracy affect child mortality or the duration of these effects. The contribution of this paper is to pursue these latter questions by explicitly focusing on the dynamics of the relationship between changes in the political system and changes in child mortality. Since there is no obvious reason why the effect of positive and negative shocks to the political system should be symmetric they are separated in the study.

Data

The data on child mortality is from the World Development Indicators¹³. The measurement chosen is number of child deaths below the age of five out of a thousand children born. Using data on child mortality instead of data on infant mortality allows for a wider range of factors to influence the measurement which results in a larger variation in the data¹⁴. Child mortality data is available from 1960 to 1980 on a five year basis for 138 countries. Data is available on a five year basis from 1985 to 2004 for 154 countries¹⁵. The mean for the whole sample is 100 deaths per 1000 children born but there is a very large variation in the data with a minimum of 2.9 in Iceland in 2005 and a maximum of 500 in Mali in 1960 (see *table 1* for

¹⁰ For longer time series life expectancy is quite often imputed based on child mortality which makes the two measurements highly related.

¹¹ Ross is using imputed values for missing data of child mortality to increase the number of data points about 4 times.

¹² Ross uses the log of the number of years a country has been Democratic since 1900.

¹³ There are three data sources available which are highly correlated. World Bank's World Development Report, the UNDP's Human Development Report, and UNICEF's State of the World's Children.

¹⁴ Using infant mortality does not change the main results.

¹⁵ The 2004 values are used for 2005 in order to increase the five year observations.

summary statistics). The focus in this paper is on the relationship between political shocks and relative child mortality, not absolute levels. A country like Iceland is very close to the technologically feasible frontier with regards to child mortality. To lower the absolute level of child mortality in such a country compared to lowering it in Mali, that is very far from the frontier, would require very different efforts. For this reason the log difference or percentage change is used as the dependent variable on the assumption that these measures are more comparable between countries at either end of the scale, very high and very low child mortality. Another reason for this choice is to be able to relate the results to the millennium goal on lowering child mortality by two thirds. When ordering countries according to how much relative child mortality has decreased (*table 2*) two types of countries top the list. One type is the oil-producing countries like Oman, Libya, Bahrain and Syria. The other type is countries combining growth and democratization like Portugal, Chile, Greece and Spain. At the bottom of the list come countries heavily affected by war and internal conflicts like Iraq, Rwanda and Liberia. Preceding these are poor, mostly African countries, many of which are autocracies but also some that have a more democratic system of government. From this list it is obvious that how rich or poor a country is to a large extent determines the probability that a child survives its first 5 years. Child mortality is highly correlated with income per capita but looking at a plot of this relationship (*figure 1*) it is also obvious that for countries with the same income there is a very large span in the level of child mortality. Looking at the standard deviation for the different income deciles (*figure 2*) there is a large variation in child mortality for all incomes. The figure also shows that except for the poorest countries, democracies tend to have lower child mortality than autocracies also within the same income deciles, something that should be expected from the results in previous studies.

There is a clear trend in the data over time (*figure 4*). In 1960 on average 160 children out of a 1000 born died before their fifth birthday, in 2005 the figure had decreased to 60. Given the importance of GDP per capita for child mortality and the global increase in income since 1960 it is safe to say that improved economical conditions play a large role in these improvements. But most certainly also advances in medical technology and improved knowledge have led to large decreases in the world wide level of child mortality. From the 1980:s also the global level of democracy has increased constantly making it possible that this could be another of the factors behind this trend in child mortality. To control for global trends and also to ensure that the results are not driven by spurious regression, time dummies as well as data on PPP adjusted GDP per capita are included in the regressions.

The POLITY value from the POLITY IV database is used to calculate important changes in the level of democratization. This is an index that is constructed based on revising historical information and then making judgments on the level of autocracy and democracy based on a number of sub indexes for each country and year. The sub-indexes used when creating the democracy and autocracy indexes are¹⁶:

1. Competitiveness of Executive Recruitment: “Competitiveness refers to the extent that prevailing modes of advancement give subordinates equal opportunities to become superordinates”.
2. Openness of Executive Recruitment: “Recruitment of the chief executive is "open" to the extent that all the politically active population has an opportunity, in principle, to attain the position through a regularized process”.
3. Executive constraints. “This variable refers to the extent of institutionalized constraints on the decision making powers of chief executives, whether individuals or collectivities. Such limitations may be imposed by any "accountability groups.”
4. Regulation of Participation: “Participation is regulated to the extent that there are binding rules on when, whether, and how political preferences are expressed”.
5. The Competitiveness of Participation: “The competitiveness of participation refers to the extent to which alternative preferences for policy and leadership can be pursued in the political arena”.

Data is created for the last 200 years for all countries in the world with a population exceeding 1/2 million people (2002 census). The process when creating the indexes is highly formalised and there is a very high correlation between this index and other similar indexes. The variable used here , POLITY, is constructed as a difference between the measurement of democracy 0-10 and autocracy 0-10 and thus has a span of -10 to 10. Lower values mean more autocratic and higher values means more democratic regimes. Transitional periods of war or major internal conflict are marked with special notation. Using this variable and its lags in a fixed effects regression makes it possible to see the time-path of the relationship between the level of democracy and child mortality. It is not possible though to differentiate between the effects of positive and negative shocks to the system or to explicitly study the

¹⁶ The following information is cited from the POLITY IV project manual. For more details see Marshall and Jaggers, (2002). Index 4 is only used when creating the autocracy index.

effect of democratic experience. For this reason I create a series of dummy variables with associated lags representing major shocks to the system. A positive shock is defined as a positive change in the level of POLITY where the size of the change exceeds a threshold. This change should occur within the time period of a maximum of 10 years¹⁷. The threshold used is what is defined as a regime transition (6 on the POLITY scale) in the POLITY IV manual (Marshall and Jaggers, 2002). The POLITY IV manual also uses a weaker threshold, regime change (3 on the POLITY scale), and also this weaker threshold will be used for comparison. Following a major positive shock to the level of democratization I create a dummy for this event, MD0 (Major Democratization). I also create 9 five-year lags for this event MD5 up to MD45. Following a major move away from democratization (defined correspondingly as a negative shock) towards autocracy, the dummy MA0 (Major Autocracy) is set and then the corresponding lags MA5 to MA45 are created. This is repeated for every country in the data set for every positive or negative major shock to the political system for as far back as 1915. To be able to test the different disaggregated components of the POLITY variable, similar dummies and associated lags are created for each of the five sub indexes. Their span varies from 1-4 to 1-7 but for simplicity the transition threshold is always set to 1.

Since percentage change in child mortality is available from 1965-2005 the panel will span fifty years. Fifty years is a long time in the political history for some countries and a number of the countries in the data set experiences more than one shock to its political system in that time frame. After the second shock the regression coefficients for the lags related to the first shock does not measure the average lagged effect from the current political system on child mortality any more. Instead they measure the effect of previous political experience. Since the focus here is on the direct effects of a political transition the series of lagged dummies is right censored in this case and a new series relating to the most recent transition is started. See *figure 5* for a graphical explanation. For years of transition when no definite value for POLITY is defined the dummy Transition is set to 1. This is years of “foreign interruption”, interregnum or anarchy and times of political transition. This dummy is included in all regressions to control for these “undefined” time periods. The full POLITY IV dataset is used when creating the democratic and autocratic transitional dummies enabling positive and negative democratization instances from 1915 and onwards to propagate into the time frame

¹⁷ Marshall and Jaggers is maximizing the transition period to three years. Since the length of the transition period is not the issue at stake here and I work with five-year data I allow for longer transition periods in order to facilitate computations. Modifying the transition period from 3 to 10 years does not change the results.

of the child mortality data which means that there will be no data points lost from the child mortality dataset no matter how many lags of the POLITY values that are used in the estimations.

The result is an unbalanced five year panel 1965-2005 (2004 values are used for 2005) for 138-154 countries. There are 88 positive and 64 negative regime transitions within the 40 years spanned by the data but these are not evenly distributed over time (*figure 3*). During the relevant time period the data show two peaks of democratic transitions and two peaks of autocratic transitions. In the case of democratic transitions there is a smaller peak in the 1950:s and one very pronounced in the 1990:s. In the case of autocratic transitions the peaks are in the 1930:s and the 1970:s respectively. The democratic peaks roughly correspond in time to Huntington's (1993) second and third wave of democratization while the autocratic peaks correspond to his first and second reverse wave. Especially the democratic peak in the 1990:s is very dominating and to test if the results are driven only by one of these peak periods¹⁸ breaks are introduced simply by segmenting the data on time. This has the added benefit of addressing the concern of stationarity.

The majority of the political changes occur during the later half of the time period. This means that the larger the lag the fewer the number of observations since the data stop at 2005 and thus all further lags will be right censored. There are on average even fewer positive political transitions in the time period preceding 1965 which increases this effect. The effect is even more pronounced since only effects from the current political system are included. The higher the lags the more probable that there will be a new shock (where data is right censored) and thus the fewer the observations. In the case of negative transitions there are fewer initial transitions but the transitions are more evenly distributed over time and more persistent so the end result is approximately the same as for positive shocks (see *figure 6* and *table 3* for summary statistics for the series). The end result is that for the time period close to the transition there is a large number of observations but the further from the transition year, the fewer the observations. This introduces a problem of precision. If the right censoring is not random with regards to the variables of interest, it also introduces a problem of sample bias in the estimations. The interesting results occur within a rather short time period following the political transitions. Also the arguments are based on the trends of the estimated

¹⁸ Beasley and Kudamatsu (2006) find that the effect is restricted to the first half of the time period.

coefficients and not their respective significance level but there still occur significant right censoring in this short time period. The POLITY variable measuring the level of democracy is present for all years and countries in the dataset as is its lags. Thus it does not suffer from the shortcomings mentioned above. For this reason this variable is used to get a check on the results.

Methodology

Previous research has mainly used a model of the type:

$$CM_{ct} = \beta_0 + \beta_1 D_{ct} + \beta_2 C_{ct} + F_c + TD_t + \delta X_{ct} + \varepsilon_{ct}$$

where the dependent variable CM is either child mortality or the log of child mortality. D is the level of democracy according to some index or a dummy signifying democracy or autocracy and C, if included, is the stock of democratic capital. X is a number of controls and if a panel is used TD is either time dummies or a trend variable while F is either fixed country effects or a regional dummy. Sub indexes are for country and (if relevant) time. If β_2 is significantly different from zero, a countries democratic experience is correlated with child mortality. The specification assume that the more years a country has been democratic (or the larger the aggregated sum of it democratic level) the higher the effect. There is a breakpoint in time before which no democratic experience is credited. This breakpoint is set based on either limitations in the data set or on more or less specified movements in global trends in democratization¹⁹. The specification is sometimes augmented with a discount lowering the weight of more ancient democratic experience. The questions that I am interested to study in this paper is when and for how long does democratic reforms affect child mortality. Using this type of model to answer these questions is not possible since the answer is already assumed a priori in the construction of the model. Democratic experience affects child mortality from the year chosen as breakpoint (if the country has any democratic experience at that year) up to the last year of available data. To allow the effect of democratic experience to vary for each time period I instead use a distributed lag model of the type:

$$CM_{ct} = \beta_0 + \beta_1 D_{ct} + \beta_5 D_{c(t-5)} + \dots + \beta_T D_{c(t-T)} + F_c + TD_t + \delta X_{ct} + \varepsilon_{ct}$$

¹⁹ Most authors choose the year of 1900 with the motivation that democracy started to spread on a larger scale at that time. Beasley and Kudamatsu (2006) chooses 1956 as the limit to fit with the availability of their other data.

where the distributed variable measures democracy. This type of model still assumes a specific functional form but allows for larger freedom in the dynamic relationship than previous specifications²⁰. Since the main focus is on democratic, not autocratic shocks to the political system and since there is no special reason to assume that the pattern following these two shocks are similar, I will also allow for positive and negative political shocks to have a differential impact on child mortality. Thus the model will also be further specified by choosing dummies representing positive and negative shocks to the political system in the form of significant changes in the level of democracy as the distributed variable. The lags of these dummies are constructed so that they represent uninterrupted periods of democracy and thus also represent continuous democratic experience. The model used is:

$$CM5_{ct} = \beta_0 + \beta_1 MD_{ct} + \beta_5 MD_{c(t-5)} + \dots + \beta_T MD_{c(t-T)} + \alpha_1 MA_{ct} + \alpha_5 MA_{c(t-5)} \dots \alpha_T MA_{c(t-T)} + F_c + TD_t + \delta X_{ct} + \varepsilon_{ct}$$

CM5 = percentage change in child mortality below 5 on a 5 year basis

MD = dummy for major democratic change

MA=dummy for major autocratic change

F= fixed country effects

TD= time dummies

X = controls (see text)

c= country

t= time

The coefficients $\beta_1 - \beta_T$ and $\alpha_1 - \alpha_T$ measure the average difference in the change of child mortality between a country having experienced a recent political shock relative to a country that has not experienced a shock given the same level of the control variables. Including country fixed effects allows for a country specific intercept and thus the coefficients represent a country specific (within) difference. Since each coefficient represents a different delay in time following the political shock, it will be possible to get an indication of the dynamics of the changes to child mortality following a political shock. This model will be estimated using OLS. This requires that the data is jointly stationary, an issue that is addressed in the robustness chapter by segmenting the data on time. It also requires that the variables are

²⁰ The alternative would be some sort of non-parametric estimation technique which would be an interesting future path.

exogenous²¹, no omitted variables and no simultaneity bias. Typical examples of potential omitted variables are country specific factors like disease climate that should be expected to have a major impact on child mortality. Since child mortality also to a large extent depends on available medical technology and knowledge, there probably are global trends driven by improved techniques and practices in medicine. Lagging the explanatory variable and including country and time dummies in all the regressions, the impact of simultaneity bias as well as time constant and time varying global omitted variables are excluded. As has been mentioned, income per capita is a main determinant of child mortality and therefore the PPP adjusted real GDP per capita from the Pen world tables 6.2 is included in the regressions. In the robustness chapter a number of other controls as well as interaction terms between time and region are used to further address the issue of exogeneity.

Democracy is a multidimensional concept which is also reflected in how the variable representing it, POLITY, is constructed from a number of sub indexes. To test if anyone dimension is more important than others in explaining the results, dummies for positive changes in each sub index and their respective lags are included one by one in the regression.

Results

The base specification uses a lag length of 50 years and does always include controls for income per capita and transitional periods as well as country fixed effects and time dummies. When testing the robustness of the results using different subsets of the data the lag length is restricted to 30 years to preserve precision in the estimate since, as discussed above, data become scarcer for higher order lags. The justification for this simplification is that most of the interesting results occur in this shorter time span.

The first regression uses the level of democracy (represented by the POLITY value) and its lags as explanatory variables. The advantage with using this variable is that it is present for all countries and time periods except during times of transition²². The disadvantage is that it does not make any difference between democratic and autocratic transitions. Neither does it include the notion of democratic capital. The dependent variable is the percentage changes of

²¹ “Past and present”. Assuming strict exogeneity and using GLS for the regressions does not change the results for democratic transitions while the results for autocratic transitions are more sensitive to this assumption.

²² About 4% of the observations.

child mortality (*table 4 column 1*) but to relate to previous studies also the log of child mortality (*table 4 column 2*) is used. The result from the regressions is that there is a negative correlation between the level of democracy and child mortality. A positive change in the level of democracy is followed by decreases in child mortality and a negative change is followed by increased child mortality. The duration of this effect though is short. After 20 years or less the estimated coefficients become small and insignificantly different from zero. The duration of the effect is longer when using the log of child mortality than when using the percentage change as the dependent variable.

In the next regression the dummies for positive and negative political shocks and their associated lags are entered as explanatory variables instead of the POLITY value. The estimated multipliers measure the average effect on percentage changes in child mortality following a political shock. The multipliers thus indicate the dynamic relationship between democratic and autocratic transitions respectively and changes in child mortality. Looking first at positive regime transitions (≥ 6 on the POLITY scale) the results in *table 5* show that there is no immediate change in child mortality following a democratic transition but for the 5 and 10 years lags the coefficients are highly significant and of the correct sign. Also for the 15 and 20 years lags the coefficients are negative although not significantly different from zero. After this time the estimated coefficients start to have the wrong sign and are insignificantly different from zero. The pattern is clearly discernible when looking at a plot (*figure 7*) of the estimated multipliers from the regression. Child mortality decreases substantially between the 5 to 20 years following a democratic transition but after this time it stabilizes at a new, lower level. When clustering standard errors on country (*column 2 table 5*) the significance levels decrease marginally but not in a way that changes the conclusions. When using smaller democratic changes (a threshold of ≥ 3 on the POLITY scale), (*column 3 table 5*) the results are the same except that the estimated coefficients are smaller. This should only be expected though, the less substantial the transition the smaller the effect. Controlling for the level of Child Mortality, democracy/autocracy and average years of education (*column 4, 5, 6 table 5*) the effects vary somewhat. They are weaker in the case of Child Mortality and democracy/autocracy and stronger in the case of education but the trend is the same. The effects of these potentially important conditional variables are studied further in the robustness chapter.

To test if anyone dimension of a democratic transition is more important for improvements in child mortality, each of the sub indexes used in constructing the POLITY measure is entered separately in the regression as a control. The result in *table 6* is that for all indexes except one there is no change in the effects of the composite index. The coefficients for democratic transitions does not change and the 5 and 10 year lags are still significantly different from zero at better than the 1% level. None of the coefficients for these different sub indexes are significantly different from zero at any conventional level. For one index though, competitiveness of executive recruitment, the result is the opposite. When including the dummies for this sub index in the regression the coefficients for the composite index become small and insignificant. The coefficients for the sub index on the other hand are significant at the 5% and 10% level. The size of the coefficient is comparable to that of the MD5 and MD10 when no sub index was entered as a control²³. The different stages of the index of competitiveness is unregulated, selection, mixed/transition and election. The way the dummies are constructed in this paper gives a transition between each stage an equal weight so it is thus not possible to say if any transition is more important than the others²⁴. Still it is interesting that these results indicate that the only dimension of a political transition that is important for child mortality is its effect on the competitiveness of executive recruitment

In the case of autocratic transitions the results initially pretty much mirror those of democratic transitions (*table 5*). The difference is that the duration of the effects is longer and each coefficient is smaller. During the first 30 years following the transition child mortality increases and then the effect disappears. All the estimated multipliers become insignificantly different from zero and have the wrong sign. However looking at a plot of the estimated multipliers from the regression a different pattern emerge (*figure 8*). The long-term trend seems to be downwards sloping. During the 5 to 30 years following an autocratic transition child mortality increases with a magnitude similar to that following a democratic transition but after this time-period there is no sign of child mortality stabilizing at a new, higher value . Instead the plot indicates that if the autocratic transition is stable child mortality starts to

²³ POLITY varies in 21 steps and MD is set with a threshold of 6 allowing a country moving in steps from the worst case to the best case to experience 3.5 transitions. Competitiveness of executive recruitment (XRCOMP) varies from 0 to 3 (as used when creating DEMOC) allowing 4 transitions going from worst to best. For this reason it is assumed that a direct comparison of the level of the respective regression coefficients would allow a crude comparison of the level of the effects on child mortality.

²⁴ Splitting them up would result in very few data points.

decrease²⁵. This result though is not very robust. Due to the decreasing number of observations of higher-order lags discussed previously, the low precision of the estimations makes the results inconclusive. With the data and methods used here it is not possible to draw any more conclusions on the long-term dynamic effects of autocratic transitions.

For democratic transitions the cumulative decrease in child mortality 20 years after the transition amounts to something between 15% and 20% (*figure 9*). Thus democratic improvements in a country are associated with a substantially improved survival rate for children being born after the democratic change. This change takes place during a limited time period directly following the political transition while democratic experience from further back than 20 to 30 years does not have any substantial impact. This is the average effect for all countries, both those with high initial child mortality as well as those with low initial child mortality. In countries with very high child mortality (the upper quartile with more than 150 deaths / thousand born) 15% change means a decrease of 22.5 deaths or more while in the lower quartile (less than 22.5 deaths / thousand) this instead means 3.5 fewer deaths so the effect in number of deaths will be very different. To test if the aggregate results are valid also for countries at either end of the scale, the data is segmented on level of child mortality. The number of data points decreases drastically making the results, especially for the upper quartile, barely significant at the 10% level but the figures indicate that the results are relevant also for countries at the extremes of the scale (*figure 10*). For countries in the lowest quartile the cumulative decrease is 20%-25% while for the upper quartile the cumulative decrease is around 10%. In the case of autocratic transitions the average cumulative increase is close to 15%.

Robustness

The results presented so far are on the average effect of a political transition but the 154 countries in the data are not homogenous, they differ on a number of parameters. There is an obvious risk that the results are driven by a segment of the countries in the data so that the findings are only representative for this segment. To test if this is the case, the data is segmented on the parameter in question. Then the regression is run on each segment separately and the results are compared. To test for all possible differences is not possible,

²⁵ This result, although very weak, is similar in kind to that in Persson and Tabellini (2006) where their results indicate that stability can sometimes be more important for economic growth than the level of democracy.

both because there is no data available and also because there is no exhaustive list of candidate parameters. For this reason I take the pragmatic decision to test for three of the most plausible sources of differences where there is data available, income, level of democracy and time. I also focus on the most important results, the positive effects of democratic transitions on child mortality. Dividing the data set into autocratic and democratic countries running separate regressions for each set the result (*figure 11* and *column 4,5 table 8*) confirm the previous results. Both sets of countries show short-term, negative relationships between changes in child mortality and positive political shocks. However the effect of the shock in democratic countries peak earlier than in autocratic countries. Obviously improvements in the level of democracy take longer to have any effect in countries where the previous level of democracy was very low. In the case of the democratic segment, the number of data points left is very low resulting in too low precision of the estimates. Using only the three first lags to improve the precision of the estimates, the results are again significantly different from zero (*column 6 table 8*). Segmenting on income, using the 50th percentile as the dividing mark, the estimated dynamic effect follows quite closely the aggregate results for both rich and poor countries (*figure 12* and *column 2,3 table 8*). The magnitude of the percentage change is much larger for rich countries. Since rich countries have much lower child mortality than poor ones this mainly indicates that the specification using percentage change and additive linear effects is not perfect for comparing countries with high and low child mortality. The dynamic trend is still very similar. In the third regression the data is segmented on time, allowing for a break in 1990 and 1995. The result in *figure 12* and *column 7-10 table 8* is that the effects are stationary over time except in the case with 1965 to 1990 where the coefficient for the 10 year lag is very low. The final conclusion is that even when segmenting the data on income, level of democracy and time of political shock, the results hold.

The use of OLS requires that the assumption of exogeneity holds. The risk of simultaneity bias does not pose a problem in this case since the changes in child mortality follow political changes with a lag of between 5 to 20 years. What has to be considered is the potential existence of an omitted variable that affects both the level of democracy and the level of child mortality in the country. Including fixed country effects removes the risk of any bias caused by time-constant omitted variables and the inclusion of time-dummies removes the risk of global, time-varying effects. This leaves local, time-varying omitted variables. To address this issue by considering regional omitted effects I allow for regional time-trends by including

interaction terms between year and regional dummies. The regression, presented in *table 7 column 2*, confirms the results for positive transitions. Following a democratic transition child mortality decreases significantly. The difference compared to the previous results is that the limited duration of the effect is not as marked. The results for negative transitions are more inconclusive. The trend in the coefficients is the same but none of the coefficients are significantly different from zero. The variation in the data when using separate trends for each region is not large enough to support any conclusions about autocratic transitions.

Another way to address the potential problem of omitted variables is to control for those variables considered as possible determinants of democracy, child mortality or both in the literature. Of course such an endeavour can never be conclusive. There is no accepted, agreed on list. Rather it serves the purpose to show that the results are at least not driven by the failure to take into account well-known potentially influential mechanisms. This way of addressing the problem is further hampered by the lack of data. Many of the variables considered are not available for a large enough time-span or number of countries to get enough precision in the estimates. Allowing for these limitations the following variables are considered: Education, population density, fertility, rural population, GDP (lagged), unemployment, inequality (GINI). Data, except for education and GDP, is interpolated to increase the number of observations. Current and 5 year lagged values are entered (separately) for each variable. The regressions (presented in *table 7*) show that the previous results are robust to these controls. In some cases the number of data points decrease drastically resulting in a precision problem but there is no indication of any different trends in the estimated coefficients.

Discussion

The results presented indicate that the effects of a positive democratic transition have significant impact on the change in child mortality but only for a limited time. About 20 years after the democratic transition, child mortality stabilizes at a new level 15% to 20% lower than previously. The predictions for the effects of an autocratic experience are more inconclusive. In the case of a negative shock to the political system the effects seem to mirror those of a positive shock, child mortality increases for a number of years but there is no

conclusive evidence that child mortality then stabilizes at the new level. Also the results are not as stable to the inclusion of different controls as those for democratic transitions.

The majority of studies of the effects of the political system on child mortality find that being or becoming democratic is associated with lower or decreasing child mortality. There are a couple of possible mechanisms through which the quality of the political institutions could influence child mortality. As was mentioned earlier, income per capita is highly correlated with child mortality, rich countries have much lower child mortality than poor countries. If positive shocks to the political system result in higher income per capita this should in turn result in lower child mortality. Since high levels of child mortality is to a large extent a poor people's problem a second possibility is that changes in the political system translate into changes in the distribution of the existing wealth. This would result in fewer poor people and thus lower child mortality. A third possibility is that improvements in democracy result in higher accountability and improved competence in those responsible for funds to healthcare, sanitary improvements, education etc. Existing funds would then be more efficiently used to lower child mortality.

If child mortality is mainly driven by aggregate economic variables the expected effect from shocks to the political system on child mortality should be similar to the effect on economic development. In Persson and Tabellini (2006), these effects are found to be very long term and often asymmetric. The conclusion in this study is that this is not so in the case of child mortality. The effects of political transitions on changes in child mortality are short-term and symmetric. If the effect from democratic transitions on child mortality work through increased equality there should be a link between democratic reform and equality as well as between equality and child mortality. This aspect is not addressed in this paper. What can be seen from the results is that the dominant aspect of democratization that affects child mortality is the competitiveness of executive recruitment. This indicates that one of the mechanisms through which improvements in democracy affect child mortality is through the introduction of more competent utilization of existing resources.

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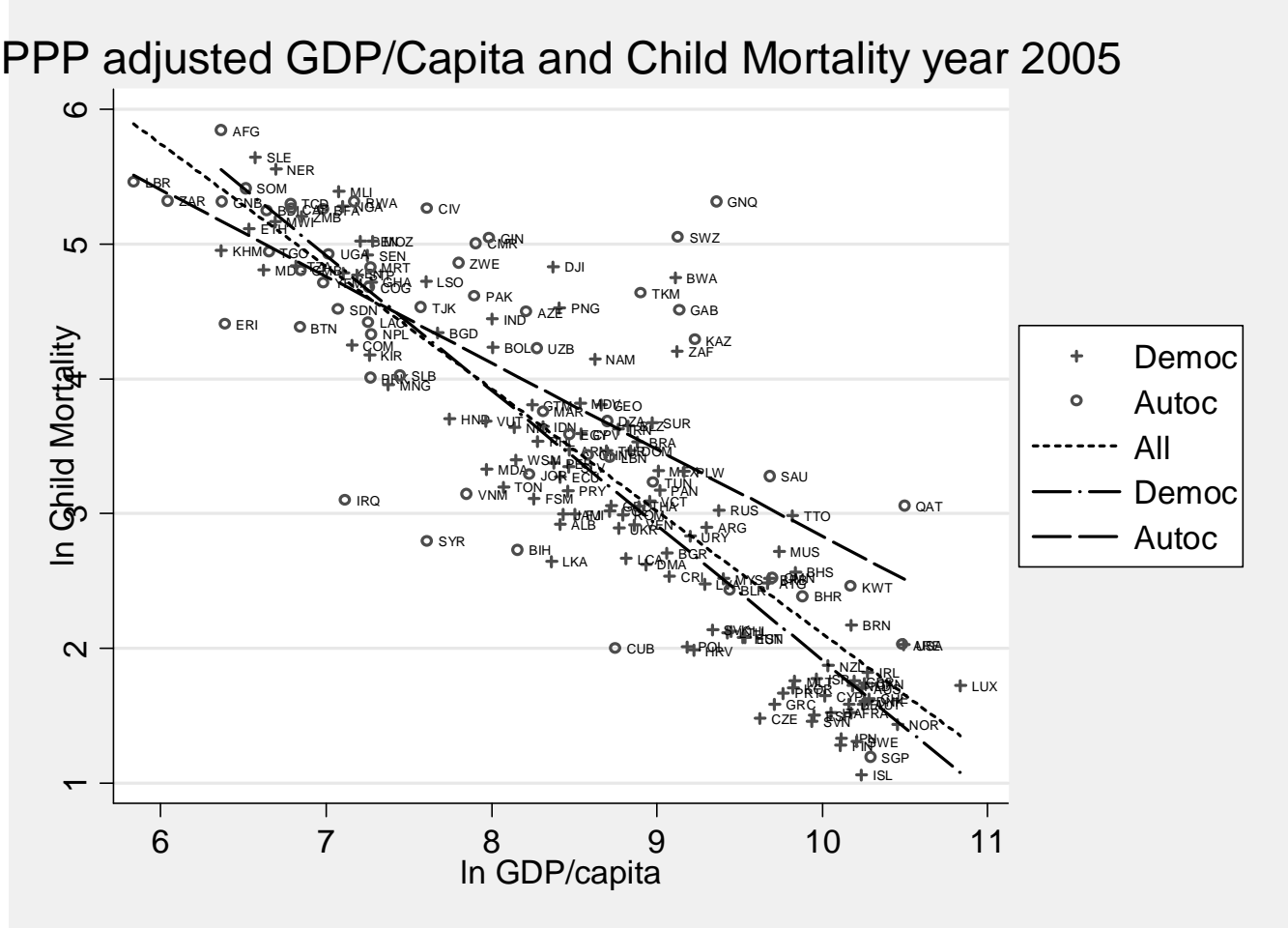
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Tables and figures

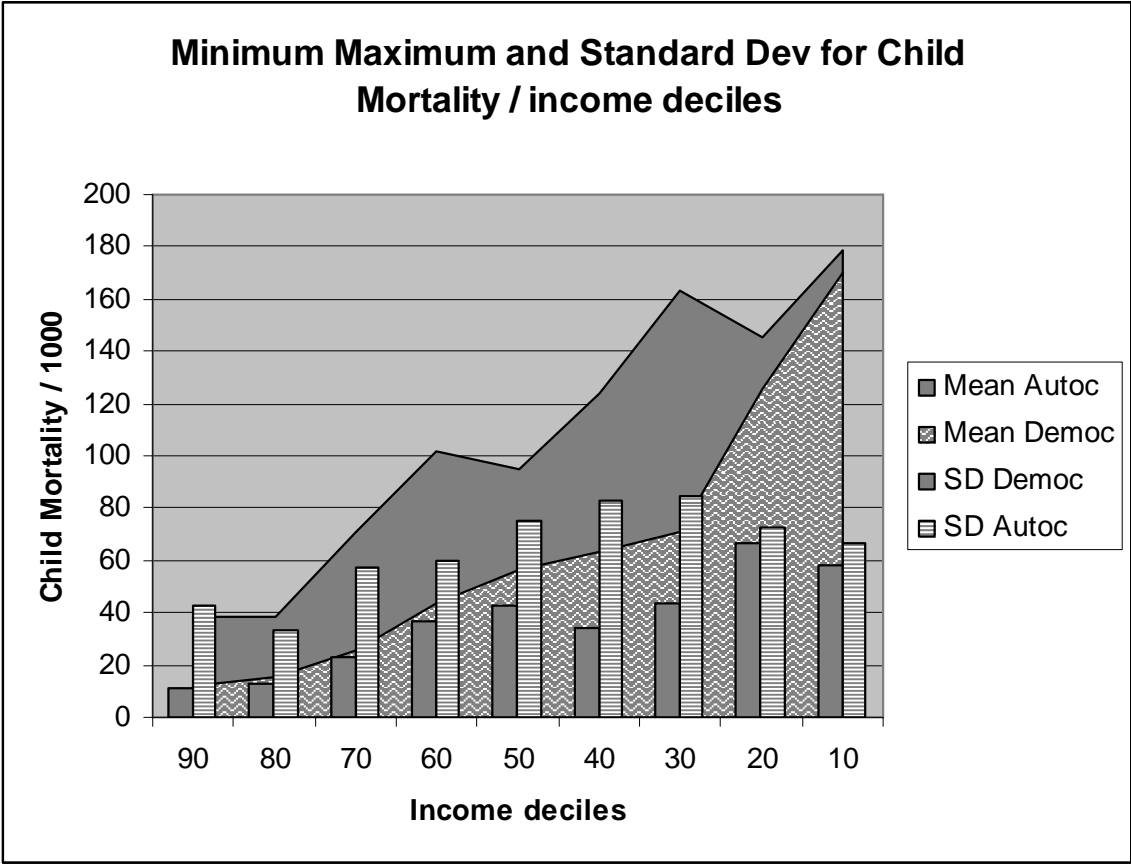
Figure 1: Scatter plot GDP/capita and Child Mortality



Data: GDP/capita is PPP adjusted income / capita from PWT6.2. Child Mortality below 5 from WDI. Democracy/Autocracy from POLITY variable in POLITY IV project.

Note: Scatter plot of ln(GDP/capita) versus ln(Child Mortality). Democratic countries defined as >0 Autocratic countries defined as ≤0 on the POLITY scale.

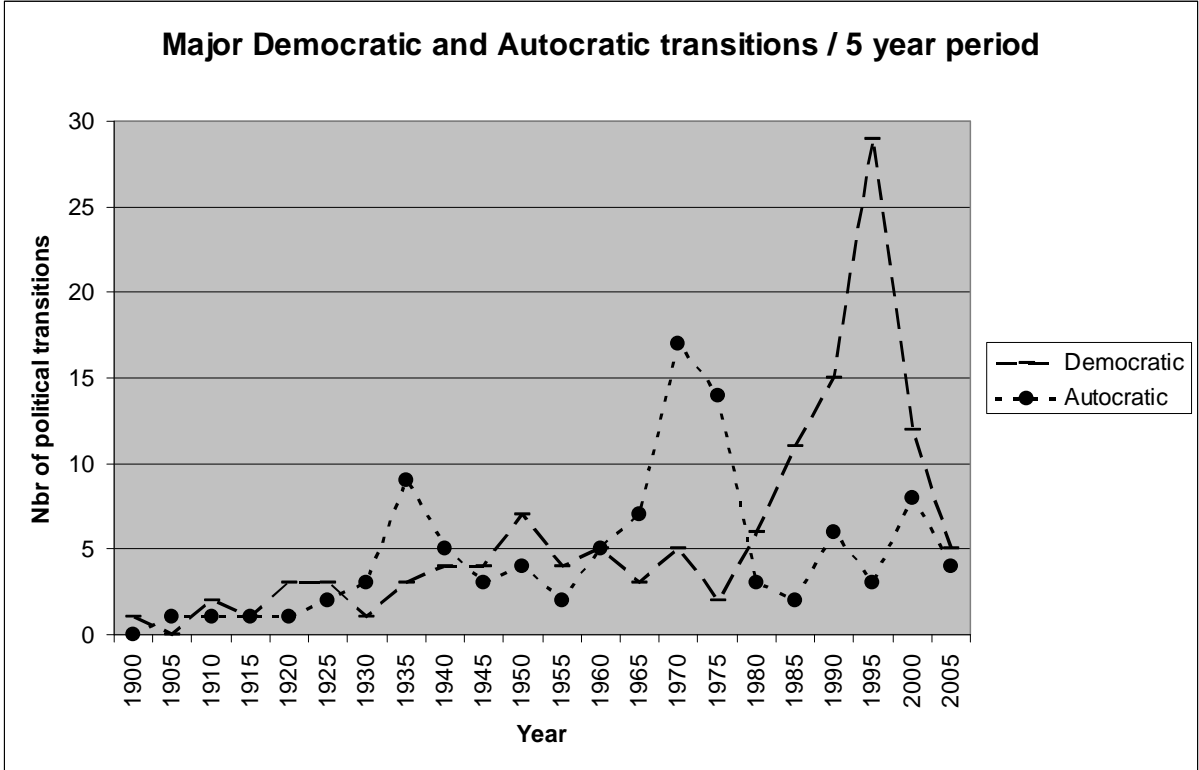
Figure 2: Minimum and maximum child mortality / income deciles. Standard deviation (normalized by deciles mean) divided on democracies and autocracies.



Data: GDP/capita is PPP adjusted income / capita from PWT6.2. Child Mortality below 5 from WDI. Democracy/Autocracy from POLITY variable in POLITY IV project. 1960-2005 data. Deciles limits calculated per 5-year period.

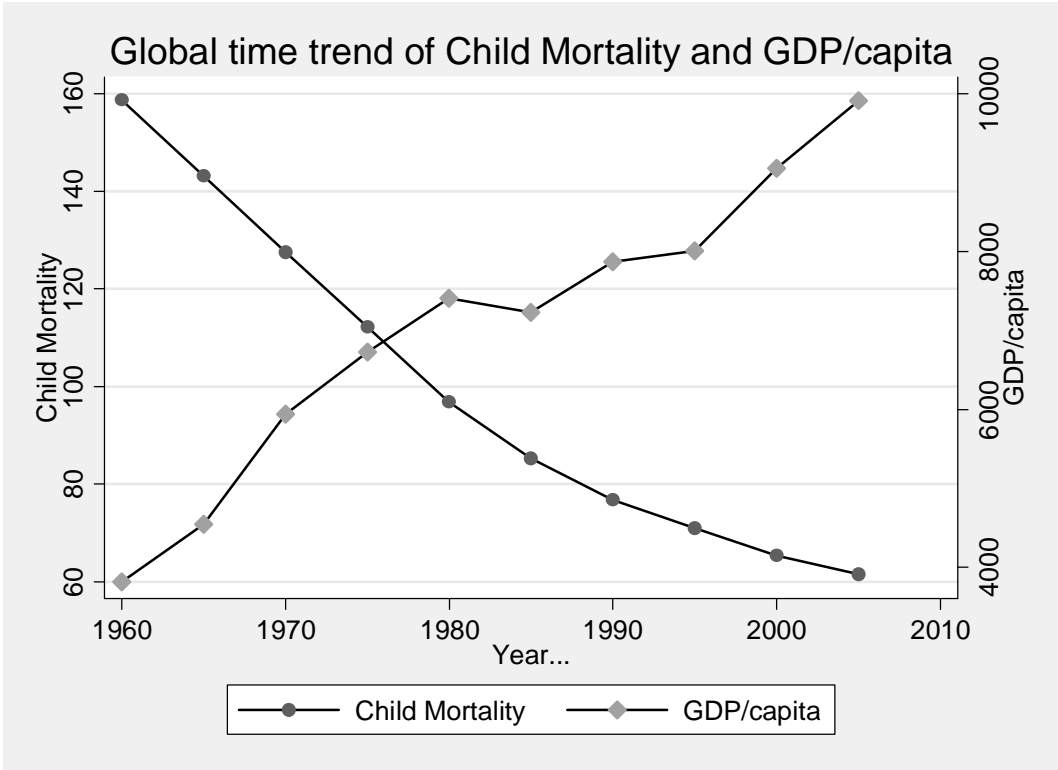
Note: Democratic countries defined as >0 Autocratic countries defined as ≤ 0 on the POLITY scale.

Figure 3: Political transitions



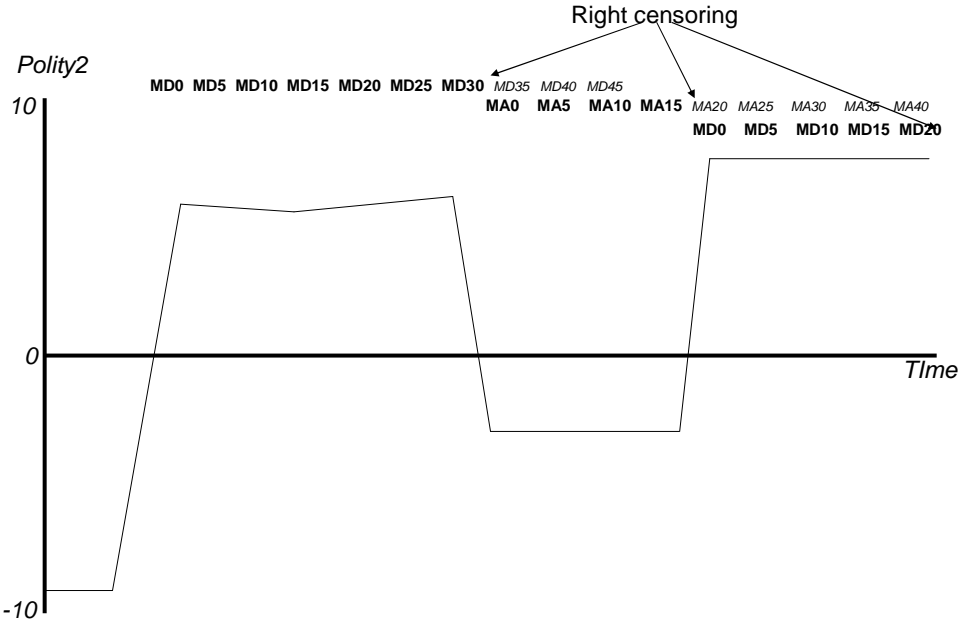
*Data: POLITY from POLITY IV project.
 Note: Number of Democratic / Autocratic transitions per 5 year period from 1900-2005. Political transitions defined as ≥ 6 positive or negative change in POLITY during ten or less years.*

Figure 4: Global time trend of Child Mortality and GDP/capita



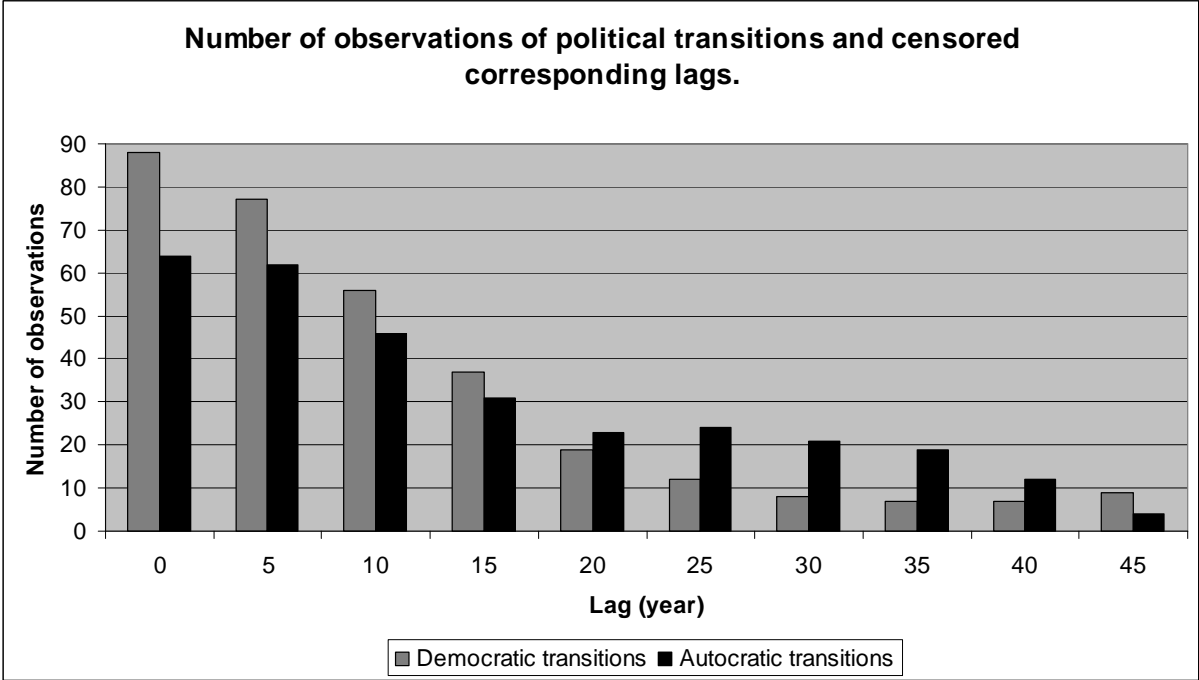
Data: GDP/capita is PPP adjusted income / capita constant 2000 international \$ from PWT6.2. Child Mortality below 5 from WDI.
Note: Global average of Child Mortality and Income per capita from 1965 to 2005.

Figure 5: Creation of series of lagged dummies for positive and negative shocks to the political system.



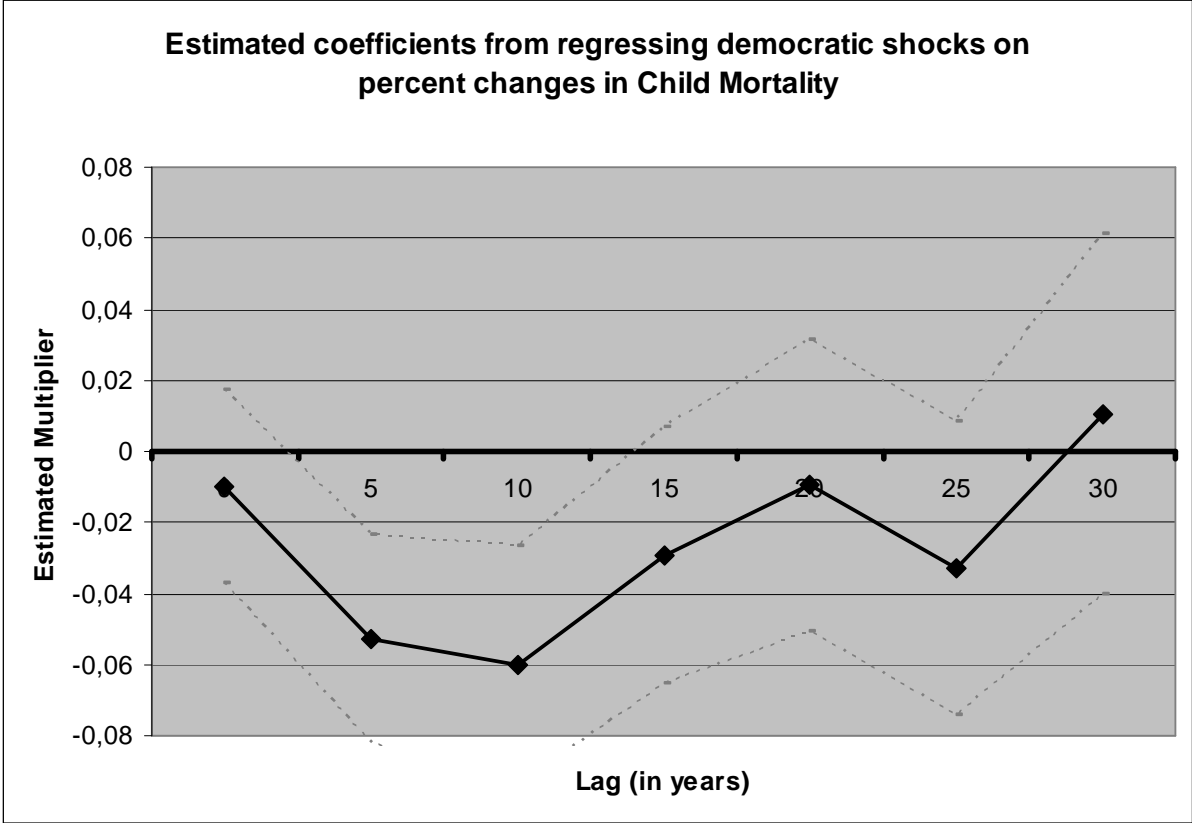
Note: MDx Major Democratization t-x where t is time of shock to political system and x is years lagged.

Figure 6: Number of observations



Data: Political transition dummies created by author using POLITY variable from POLTIY IV project
Note: Number of Democratic / Autocratic transitions and their censored lags in the 1965 to 2005 time span. Political transitions defined as ≥ 6 change in POLITY during ten or less years. All further lags are censored from the time of another political shock.

Figure 7 Democratic shocks

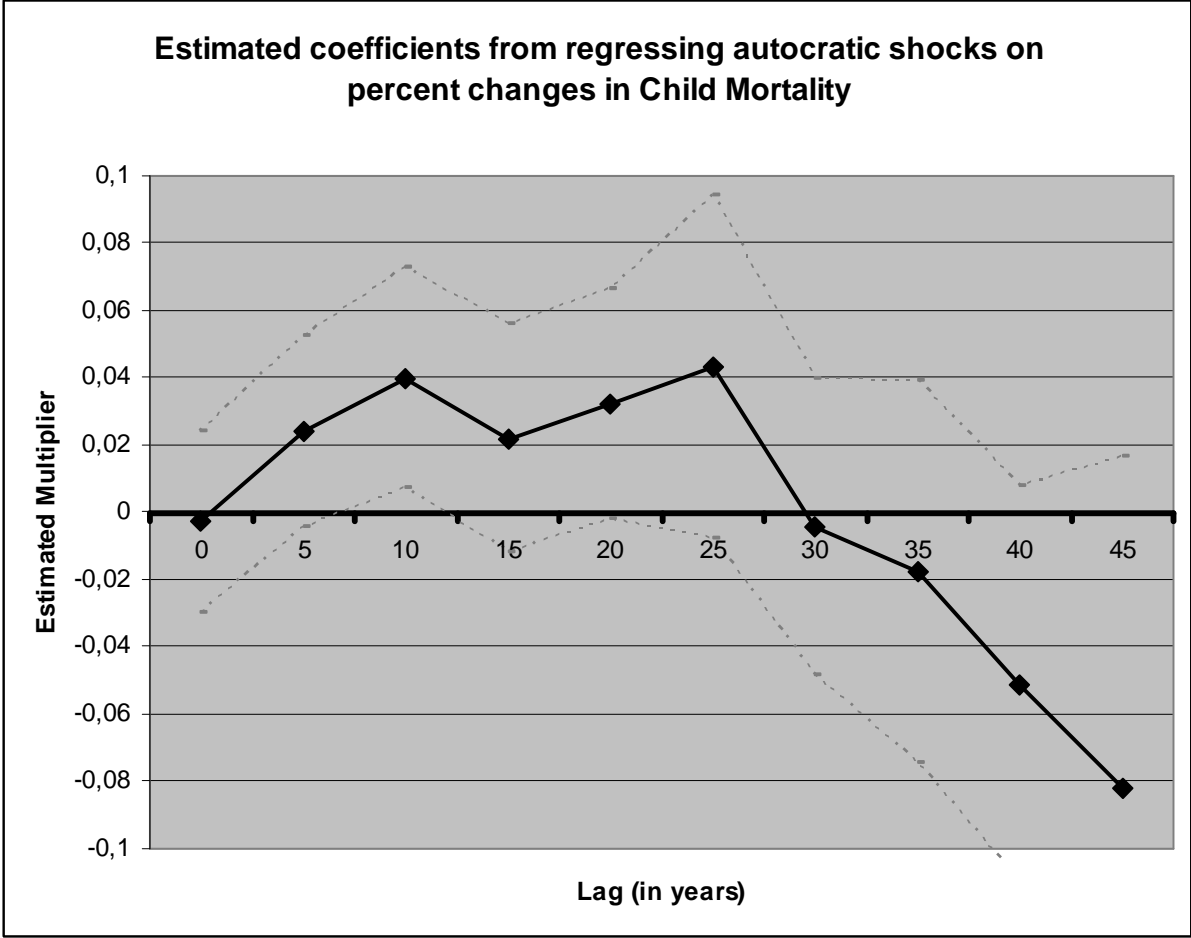


Data: Political transition dummies and Transition variable created by author using POLITY variable from POLTIY IV project, Child Mortality from WDI.

Note: Regression estimated using OLS controlling for GDP/ capita and transitions . Dependent variable percentage change in child mortality defined as $[Child\ Mortality(t) - Child\ Mortality(t-5)] / Child\ Mortality(t-5)$. Estimated coefficients for dummy variable indicating major democratization (≥ 6 positive change in POLITY during ten or less years) with associate 5-yearly lags 5-30 years. Fixed country effects and time dummies included. Significance interval based on robust standard errors.

Legend: Dotted lines indicating 5% significance intervals

Figure 8: Autocratic shocks

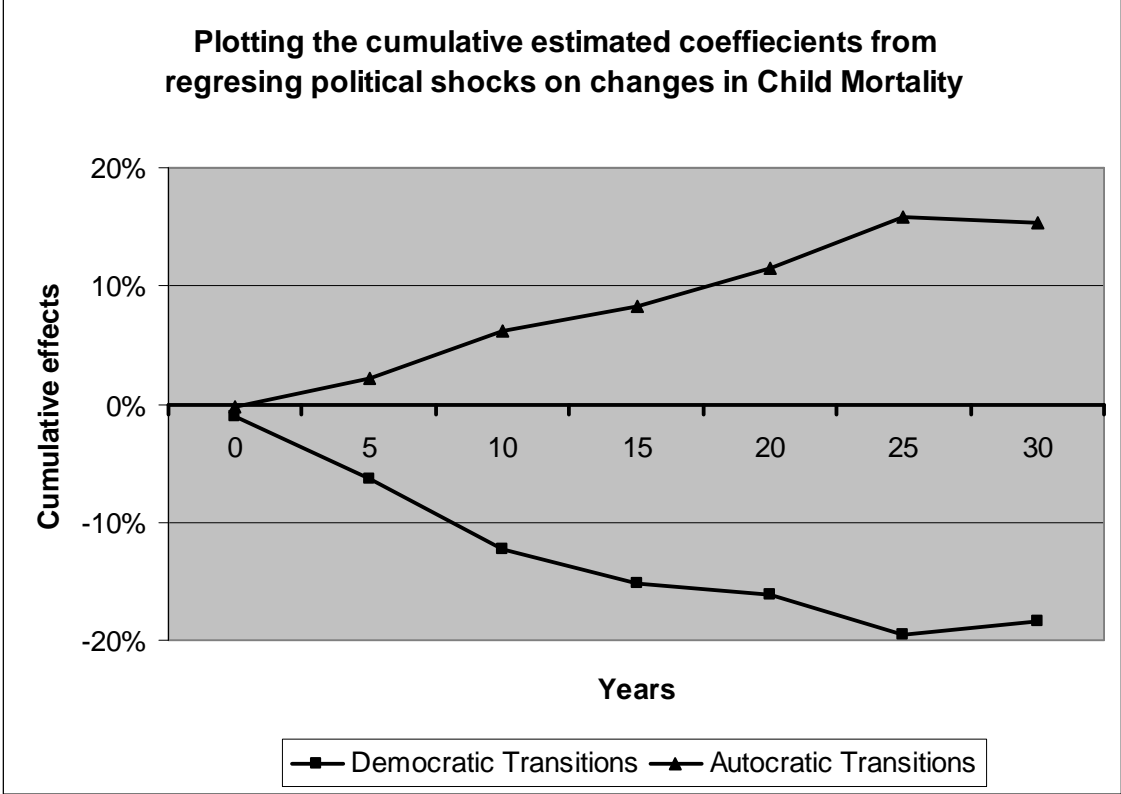


Data: Political transition dummies and Transition variable created by author using POLITY variable from POLTIY IV project, Child Mortality from WDI.

Note: Regression estimated using OLS controlling for GDP/capita and transitions. Dependent variable percentage change in child mortality defined as $[Child\ Mortality(t) - Child\ Mortality(t-5)] / Child\ Mortality(t-5)$. Estimated coefficients for dummy variable indicating major negative political shock (≥ 6 negative change in POLITY during ten or less years) with associate 5-yearly lags 5-45 years. Fixed country effects and time dummies included. Significance interval based on robust standard errors.

Legend: Dotted lines indicating 5% significance intervals

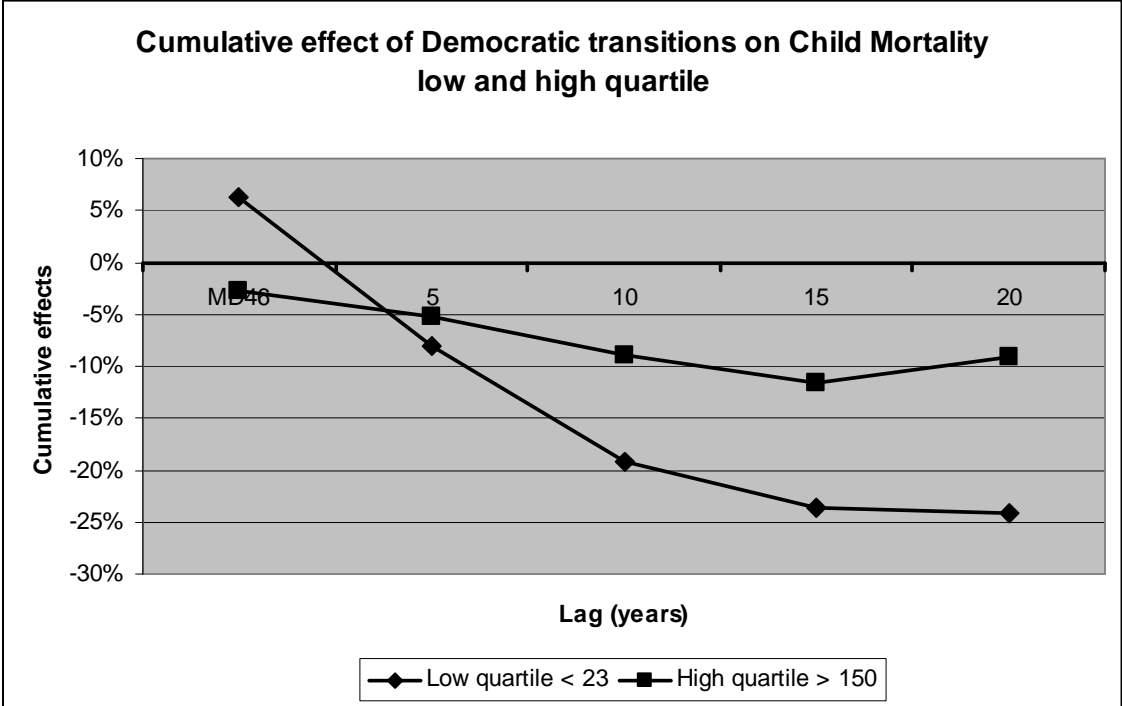
Figure 9: Cumulative effects



Data: Political transition dummies and Transition variable created by author using POLITY variable from POLITY IV project, Child Mortality from WDI.

Note: Cumulative estimated multiplier effect from political shocks transformed into percentage changes. Dependent variable percentage change in child mortality defined as $[Child\ Mortality(t) - Child\ Mortality(t-5)] / Child\ Mortality(t-5)$. Estimated coefficients for dummy variable indicating major positive/negative political shock (≥ 6 change in POLITY during ten or less years) with associate 5-yearly lags 5-30 years. Controlling for GDP/capita and transitions, fixed country effects and time dummies included.

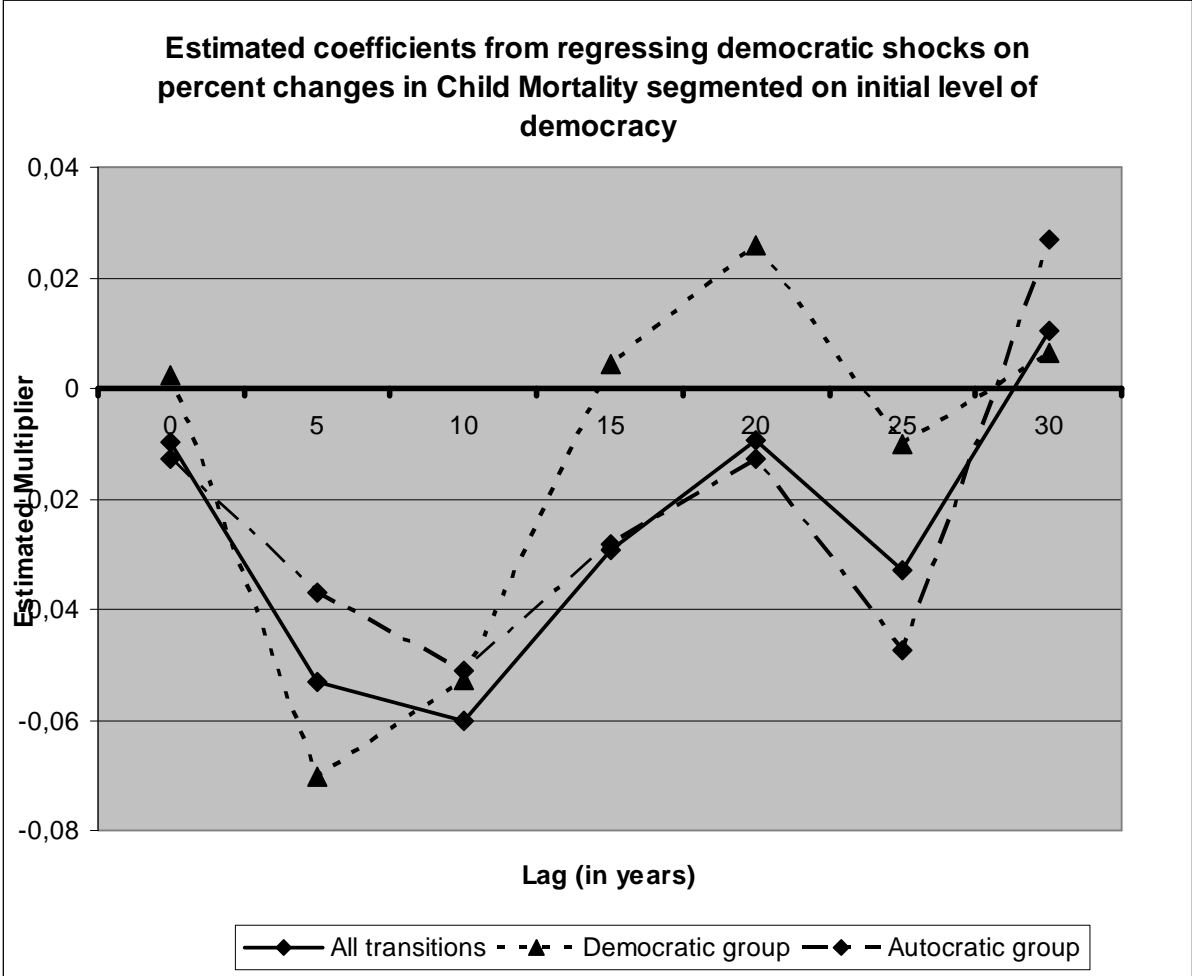
Figure 10: Cumulative effects for the lower and higher quartile.



Data: Political transition dummies and Transition variable created by author using POLITY variable from POLITY IV project, Child Mortality from WDI.

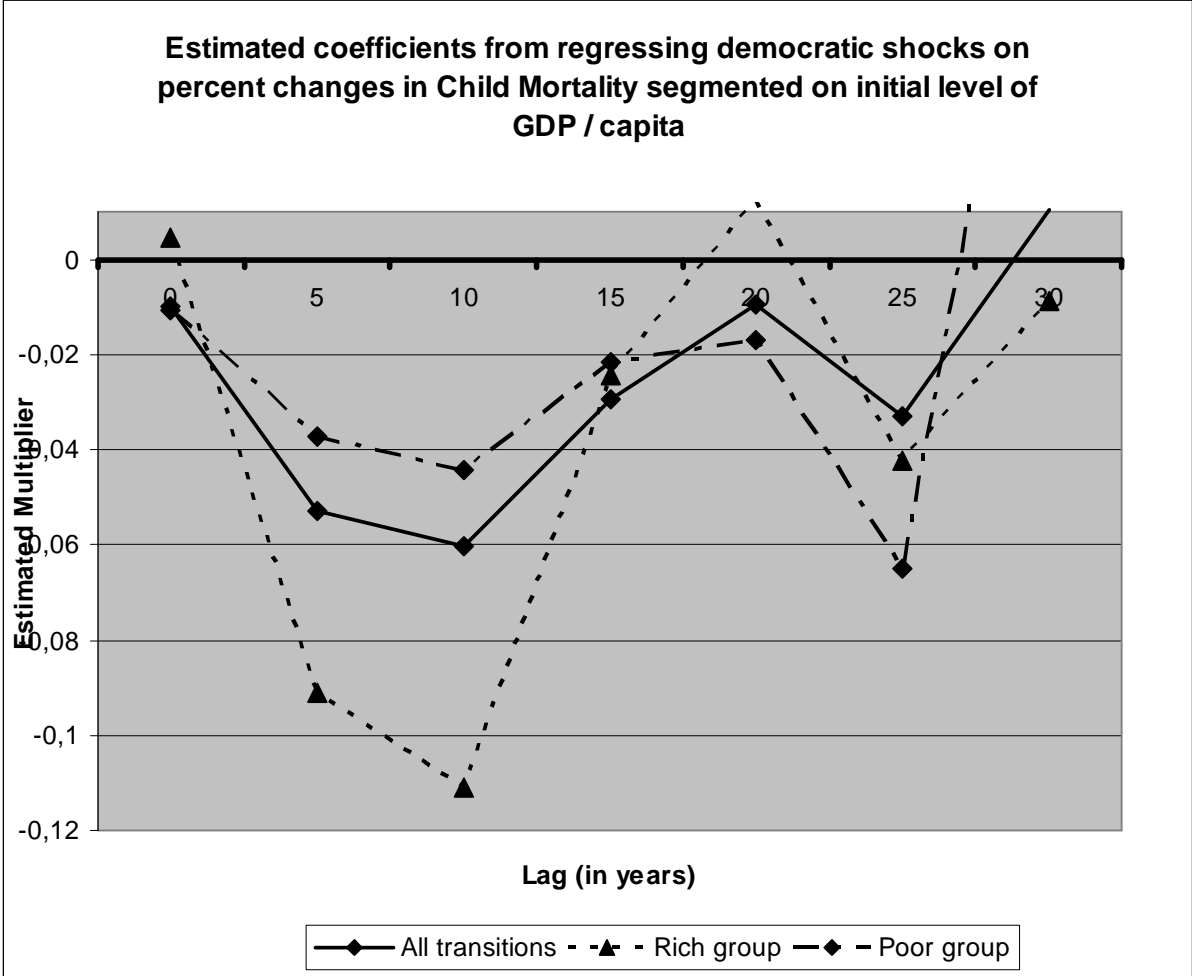
Note: Cumulative estimated multiplier effect from political shocks transformed into percentage changes. Dependent variable percentage change in child mortality defined as $[Child\ Mortality(t) - Child\ Mortality(t-5)] / Child\ Mortality(t-5)$. Estimated coefficients for dummy variable indicating major negative political shock (≥ 6 negative change in POLITY during ten or less years) with associate 5-yearly lags 5-20 years. Fixed country effects and time dummies included. Segmented on child mortality at time of the political shock using a threshold for the lowest and highest quartile, 22.5 and 150 respectively.

Figure 11 Segmenting democratic and autocratic countries



Data: Political transition dummies and Transition variable created by author using POLITY variable from POLTIY IV project, Child Mortality from WDI. Regression, see table 6.
Note: Regression estimated using OLS controlling for GDP/capita and transitions. Dependent variable percentage change in child mortality defined as $[Child\ Mortality(t) - Child\ Mortality(t-5)] / Child\ Mortality(t-5)$. Estimated coefficients for dummy variable indicating major positive/negative political shock (≥ 6 change in POLITY during ten or less years) with associated 5-yearly lags 5-30 years. Fixed country effects and time dummies included. Democratic and Autocratic group segmented on POLITY level at the time of shock. Segmentation threshold set to 6 to emulate a pre shock threshold of 0.

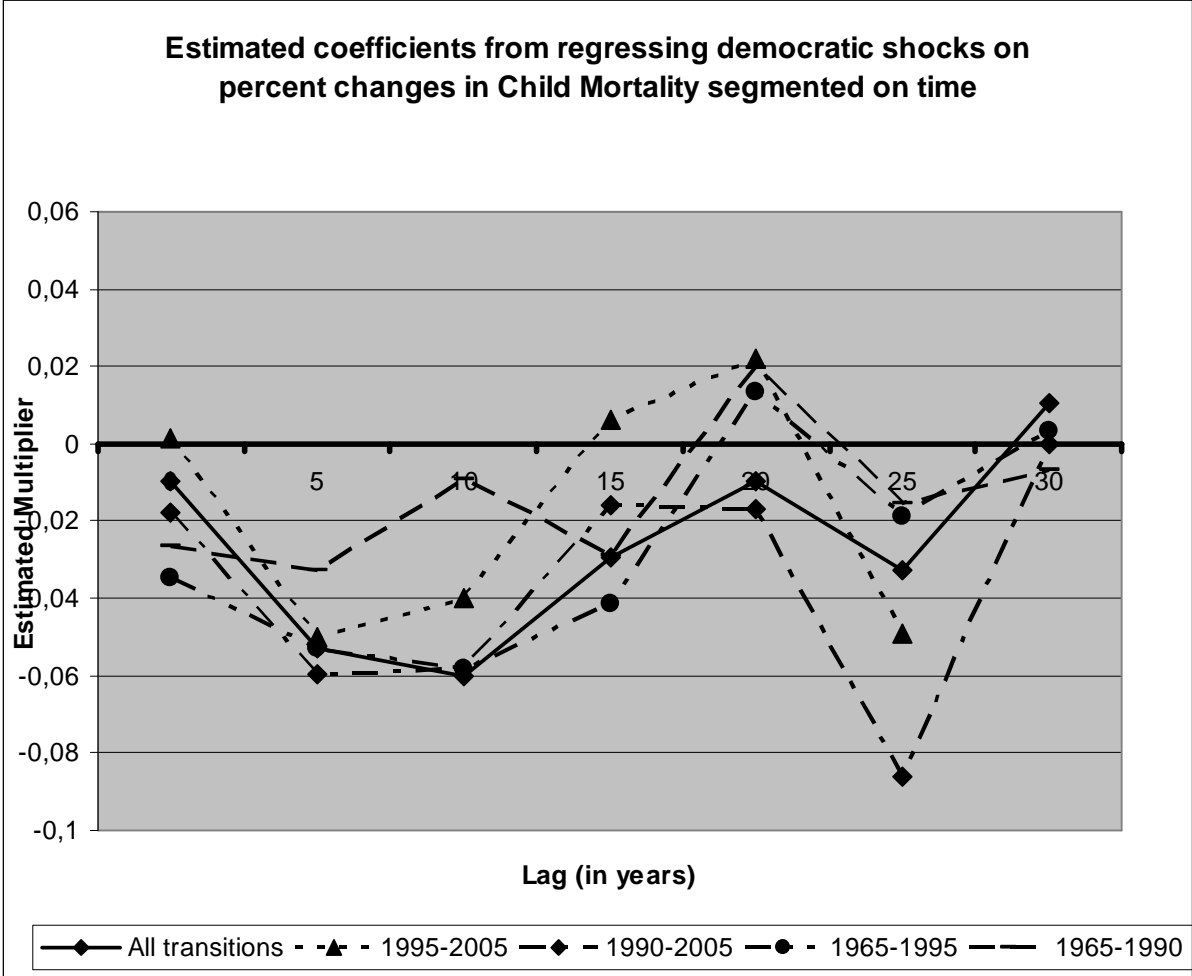
Figure 12 Segmenting on income



Data: Political transition dummies and Transition variable created by author using POLITY variable from POLTIY IV project, Child Mortality from WDI. Regression, see table 6.

Note: Regression estimated using OLS controlling for GDP/capita and transitions. Dependent variable percentage change in child mortality defined as $[Child\ Mortality(t) - Child\ Mortality(t-5)] / Child\ Mortality(t-5)$. Estimated coefficients for dummy variable indicating major negative political shock (≥ 6 positive change in POLITY during ten or less years) with associated 5-yearly lags 5-30 years. Fixed country effects and time dummies included. Poor and Rich group segmented on PPP adjusted GDP/capita. Segmentation threshold set to average income during current 5 year period.

Figure 13 Segmenting on time



Data: Political transition dummies and Transition variable created by author using POLITY variable from POLTIY IV project, Child Mortality from WDI. Regression, see table 6.
Note: Regression estimated using OLS controlling for GDP/capita and transitions. Dependent variable percentage change in child mortality defined as $[Child\ Mortality(t) - Child\ Mortality(t-5)] / Child\ Mortality(t-5)$. Estimated coefficients for dummy variable indicating major negative political shock (≥ 6 positive change in POLITY during ten or less years) with associated 5-yearly lags 5-30 years. Fixed country effects and time dummies included. Segmented on time creating four segments: before and after 1990 / 1995.

Table 1: Summary statistics for the dependent variable percentage change in child mortality and child mortality.

Child Mortality					
Percentiles		Smallest			
1%	4,6	2,9			
5%	7	3,2			
10%	10	3,3	Obs	1441	
25%	22,5	3,6	Sum of Wgt,	1441	
50%	65,2		Mean	94,03404	
		Largest	Std, Dev,	84,48671	
75%	150	365			
90%	220	395	Variance	7138,003	
95%	260	400	Skewness	0,980907	
99%	330	450	Kurtosis	3,2064	

Variable	Obs	Mean	Std, Dev,	Min	Max
% change Child Mortality	1293	-0,13203	0,1131799	-0,47368	1,44

Data: Child Mortality from WDI data.

Note: % change Child Mortality defined as $[Child\ Mortality(t) - Child\ Mortality(t-5)] / Child\ Mortality(t-5)$

Table 2. The countries with the highest and lowest average improvements in child mortality.

Order	Average improvement	Average improvement normalized	POLITY Value 1965	POLITY Value 2005	Real GDP PPP adj 1965	Real GDP PPP adj 2005	Average Growth Real GDP	Country
1	-30%	-16%	-9	10	4922	17401	18%	Portugal
2	-28%	-15%	-10	-8		16273	3%	Oman
3	-27%	-14%	6	9	5294	12681	15%	Chile
4	-26%	-13%	4	10	5991	16491	15%	Greece
5	-25%	-12%	-7	-7				Libyan Arab Jamahiriya
6	-25%	-11%		-7		19561	10%	Bahrain
7	-24%	-11%	-7	-7	1099	2016	9%	Syrian Arab Republic
8	-24%	-10%	-7	10	7249	20973	20%	Spain
9	-23%	-10%	10	10	8822	23174	9%	Italy
10	-23%	-10%	-77	10		22383	18%	Cyprus
11	-23%	-9%	10	10	6879	24660	5%	Japan
142	-3%	10%	-9	-2	1165	884	-8%	Chad
143	-3%	10%	-88	-88	638	764	-18%	Burundi
144	-3%	10%		10		4492	2%	Papua New Guinea
145	-2%	11%		9		9050	22%	Botswana
146	-2%	12%	2	1	1081	946	4%	Zambia
147	-1%	12%		-7	2341	2438	13%	Zimbabwe
148	-1%	13%	-7	-4	1044	1421	-40%	Congo
149	0%	13%	-6	-88		342		Liberia
150	0%	13%	7	-77		672	-7%	Somalia
151	0%	13%	-8	-9		1429	-5%	Korea, Democratic People's Republic of
152	0%	14%	-5	-3	856	1297	21%	Rwanda
153	5%	18%	-5	-66		1230	82%	Iraq

Data: POLITY values from the POLITY IV project. GDPcap is PPP adjusted income / capita from PWT6.2. Child Mortality below 5 from WDI.

Note: Percentage change in child mortality defined as $[Child\ Mortality(t) - Child\ Mortality(t-5)] / Child\ Mortality(t-5)$. Same for GDP growth. Average for the whole time period of available data presented. Normalized average is country average – world average.

Table 3: Number of political transitions and censored lags per year in the dataset.

Year	MD0	MD5	MD10	MD15	MD20	MD25	MD30	MD35	MD40	MD45
1965	3	4	2	6	1	1	1	0	0	2
1970	5	2	2	2	4	1	0	0	0	0
1975	2	1	1	2	1	3	1	0	0	0
1980	6	2	1	0	2	1	3	1	0	0
1985	11	5	2	1	0	2	1	3	1	0
1990	15	10	3	1	1	0	2	1	3	1
1995	29	15	9	3	0	1	0	2	1	3
2000	12	26	13	9	3	0	0	0	2	1
2005	5	12	23	13	7	3	0	0	0	2
Total	88	77	56	37	19	12	8	7	7	9

Year	MA0	MA5	MA10	MA15	MA20	MA25	MA30	MA35	MA40	MA45
1965	7	5	2	1	2	3	1	1	0	0
1970	17	7	4	1	1	2	3	1	1	0
1975	14	17	6	4	1	1	2	3	1	1
1980	3	14	14	6	4	1	1	1	3	0
1985	2	2	13	10	4	4	1	1	1	1
1990	6	2	2	5	9	4	3	1	1	0
1995	3	4	1	0	1	8	3	3	1	0
2000	8	3	3	1	0	1	6	3	1	1
2005	4	8	1	3	1	0	1	5	3	1
Total	64	62	46	31	23	24	21	19	12	4

Data: Political transition dummies created by author using POLITY variable from POLTIY IV project

Note: Number of political transitions per year in the data set MD0 positive transition, MA0 negative transition. Number of lags left after right censoring per year (MD5-MD45 and MA5-MA45)

Table 4: Fixed effect regression of changes in child mortality on lags of democracy (POLITY variable).

	<i>Percentage change Child Mortality</i>	<i>Log of Child Mortality</i>
polity	-0.003*** (0.001)	-0.000 (0.002)
Politylag5	-0.004*** (0.001)	-0.007*** (0.002)
politylag110	-0.001 (0.001)	-0.006*** (0.002)
politylag15	0.001 (0.001)	-0.006** (0.002)
politylag20	0.000 (0.001)	-0.003* (0.002)
politylag25	-0.001 (0.001)	-0.001 (0.002)
politylag30	-0.001 (0.001)	-0.002 (0.002)
politylag35	0.000 (0.001)	-0.001 (0.002)
politylag40	-0.001 (0.001)	-0.001 (0.002)
politylag45	-0.000 (0.001)	0.003 (0.002)
GDP	-0.001 (0.001)	-0.018*** (0.006)
Observations	951	1091
Number of id	150	153
R-squared	0.13	0.81

Data: polity from POLITY variable, POLITY IV project. politylag5-45 associated lags. GDP is PPP adjusted income / capita from PWT6.2. Transition dummy from POLITY IV project. Child Mortality below 5 from WDI.

Note: Regression estimated using OLS controlling for GDP/capita and transitions. Dependent variable ln of child mortality (column 1) and percentage change in child mortality(column 2) defined as $[Child\ Mortality(t) - Child\ Mortality(t-5)] / Child\ Mortality(t-5)$. Fixed country effects and time dummies included. The dummy Transition is set to one for countries experiencing exceptional political situations (other than major democratizations). Robust standard errors in parenthesis.

Legend: *significant at 10%; **significant at 5%; ***significant at 1%.

Table 5: Fixed effect regression of changes in child mortality on democratic transitions.

	(1)	(2)	(3)	(4)	(5)	(6)
MD0	-0.010 (0.014)	-0.010 (0.018)	0.009 (0.013)	-0.001 (0.012)	0.010 (0.014)	-0.019 (0.016)
MD5	-0.053*** (0.015)	-0.053*** (0.020)	-0.025* (0.014)	-0.032** (0.013)	-0.035** (0.014)	-0.070*** (0.018)
MD10	-0.060*** (0.017)	-0.060*** (0.021)	-0.038** (0.016)	-0.034** (0.015)	-0.040** (0.017)	-0.066*** (0.022)
MD15	-0.029 (0.018)	-0.029 (0.022)	-0.019 (0.018)	0.000 (0.015)	-0.011 (0.018)	-0.064*** (0.023)
MD20	-0.009 (0.021)	-0.009 (0.025)	0.012 (0.021)	0.025 (0.017)	0.006 (0.021)	0.022 (0.024)
MD25	-0.033 (0.021)	-0.033 (0.023)	-0.036 (0.023)	-0.015 (0.018)	-0.025 (0.022)	-0.010 (0.027)
MD30	0.010 (0.026)	0.010 (0.025)	0.017 (0.022)	0.004 (0.017)	0.022 (0.027)	0.021 (0.025)
MD35	0.036 (0.024)	0.036 (0.027)	0.030 (0.025)	0.032 (0.023)	0.047* (0.025)	0.062** (0.029)
MD40	0.018 (0.031)	0.018 (0.037)	0.011 (0.036)	0.010 (0.030)	0.027 (0.031)	0.043 (0.033)
MD45	-0.011 (0.041)	-0.011 (0.045)	-0.003 (0.051)	-0.012 (0.039)	-0.007 (0.041)	-0.013 (0.049)
MA0	-0.003 (0.014)	-0.003 (0.017)	0.001 (0.012)	-0.003 (0.012)	-0.017 (0.014)	-0.004 (0.016)
MA5	0.024* (0.014)	0.024 (0.019)	0.020* (0.012)	0.016 (0.013)	0.010 (0.014)	0.028* (0.016)
MA10	0.040** (0.017)	0.040* (0.022)	0.050*** (0.014)	0.025* (0.014)	0.028* (0.016)	0.038** (0.018)
MA15	0.022 (0.017)	0.022 (0.021)	0.047** (0.022)	0.011 (0.014)	0.006 (0.017)	0.024 (0.019)
MA20	0.032* (0.017)	0.032 (0.024)	0.049*** (0.018)	0.038*** (0.015)	0.014 (0.018)	0.028 (0.019)
MA25	0.043* (0.026)	0.043 (0.035)	0.063** (0.025)	0.043* (0.023)	0.029 (0.026)	0.036 (0.029)
MA30	-0.004 (0.022)	-0.004 (0.031)	0.019 (0.021)	-0.002 (0.017)	-0.022 (0.024)	-0.020 (0.024)
MA35	-0.018 (0.029)	-0.018 (0.036)	0.019 (0.027)	0.000 (0.024)	-0.037 (0.029)	-0.029 (0.038)
MA40	-0.051* (0.030)	-0.051 (0.035)	0.017 (0.032)	-0.025 (0.024)	-0.068** (0.029)	-0.056 (0.038)
MA45	-0.082 (0.050)	-0.082 (0.051)	0.066 (0.051)	-0.028 (0.021)	-0.104** (0.050)	-0.170*** (0.033)
GDPcap	-0.002 (0.001)	-0.002 (0.002)	-0.001 (0.001)	-0.006*** (0.002)	-0.002 (0.001)	-0.003* (0.002)
Transition	-0.018 (0.016)	-0.018 (0.022)	-0.015 (0.015)	-0.030** (0.014)	-0.316*** (0.083)	-0.016 (0.018)
ChildMort5				0.002*** (0.000)		
POLITY					-0.004*** (0.001)	
Educ						0.004 (0.007)
Observations	994	994	994	994	994	851
Nbr of id	152	152	152	152	152	152
R-squared	0.12	0.12	0.11	0.24	0.13	0.12

Data: MD0, MA0 dummy for democratic transition, POLITY IV project. MD5-MD45, MA5-MA45 associated lags. GDPcap is PPP adjusted income / capita from PWT6.2. Transition dummy from POLITY IV project. Child Mortality below 5 from WDI. Educ from Barro-Lee 2000

Note: Regression estimated using OLS controlling for GDP/capita and transitions. Dependent variable percentage change in child mortality defined as $[Child\ Mortality(t) - Child\ Mortality(t-5)] / Child\ Mortality(t-5)$. MD0 dummy variable indicating major democratization (≥ 6 change in POLITY during ten or less years in column 1-2, ≥ 3 in column 3). Fixed country effects and time dummies included. The dummy Transition is set to one for countries experiencing exceptional political situations (other than major democratizations). Robust standard errors in parenthesis except column 2 where clustered on country.

Legend: *significant at 10%; **significant at 5%; ***significant at 1%

Table 6: Fixed effect regression of changes in child mortality on democratic transitions including subcomponents of POLITY index.

	<i>Basic reg</i>	<i>Competiveness of executive recruitment</i>	<i>Competiveness of participation</i>	<i>Regulation of participation</i>	<i>Executive constraints</i>	<i>Openess of executive recruitment</i>
MD0	-0.009 (0.011)	0.011 (0.020)	-0.004 (0.012)	-0.008 (0.011)	-0.018 (0.014)	-0.011 (0.014)
MD5	-0.048 (0.012)***	-0.013 (0.016)	-0.049 (0.012)***	-0.048 (0.012)***	-0.048 (0.013)***	-0.056 (0.013)***
MD10	-0.053 (0.014)***	-0.014 (0.022)	-0.052 (0.014)***	-0.050 (0.013)***	-0.057 (0.016)***	-0.055 (0.016)***
xrcompD0		-0.027 (0.024)				
xrcompD5		-0.052 (0.022)**				
xrcompD10		-0.060 (0.030)*				
parcompD0			-0.009 (0.011)			
parcompD5			-0.001 (0.010)			
parcompD10			-0.004 (0.011)			
parregD0				-0.004 (0.020)		
parregD5				-0.009 (0.019)		
parregD10				-0.019 (0.021)		
xconstD0					0.014 (0.012)	
xconstD5					0.001 (0.011)	
xconstD10					0.013 (0.017)	
xropenD0						0.009 (0.021)
xropenD5						0.022 (0.023)
xropenD10						0.005 (0.032)
realGDPcapPPP	-0.001 (0.001)	-0.002 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Transition	-0.018 (0.015)	-0.019 (0.015)	-0.019 (0.015)	-0.017 (0.015)	-0.016 (0.015)	-0.018 (0.015)
Observations	994	994	994	994	994	994
Number of id	152	152	152	152	152	152
R-squared	0.10	0.12	0.10	0.10	0.10	0.10

Data: MD0, MA0 dummy for democratic transition, XRCOMP, XROPEN, XCONST, PARREG, PARCOMP, dummies for positive transition of respective sub index in POLITY index, all from POLITY IV project. X5-X10 associated lags. GDPcap is PPP adjusted income / capita from PWT6.2. Transition dummy from POLITY IV project. Child Mortality below 5 from WDI. Educ from Barro-Lee 2000

Note: Regression estimated using OLS controlling for MA, GDP/capita and transitions. MA (autocratic transitions not shown). Dependent variable percentage change in child mortality defined as [Child Mortality(t) – Child Mortality (t-5)] / Child Mortality (t-5). MD0 dummy variable indicating major democratization (≥ 6 change in POLITY during ten or less years in column 1-2, ≥ 3 in column 3). Transition threshold for sub indexes set to 1. Fixed country effects and time dummies included. The dummy Transition is set to one for countries experiencing exceptional political situations (other than major democratizations). Robust standard errors in parenthesis.

Legend: *significant at 10%; **significant at 5%; ***significant at 1%

Table 7. Regional time-trends and controls

	<i>Base</i>	<i>Time trend</i>	<i>Educ</i>	<i>Educ L5</i>	<i>Fertility</i>	<i>Fertility L5</i>	<i>Pop dens</i>	<i>PopDens l5</i>	<i>Rural pop</i>	<i>Ruralpop l5</i>	<i>GINI</i>	<i>GINI L5</i>	<i>GDP L5</i>	<i>Unemp</i>	<i>Unemp l5</i>
MD0	-0.010 (0.014)	-0.018 (0.014)	-0.013 (0.014)	-0.005 (0.013)	-0.019 (0.016)	-0.010 (0.014)	-0.010 (0.014)	-0.011 (0.015)	-0.010 (0.014)	-0.010 (0.014)	-0.019 (0.021)	-0.007 (0.017)	-0.010 (0.014)	-0.019 (0.021)	-0.007 (0.017)
MD5	-0.053*** (0.015)	-0.046*** (0.015)	-0.063*** (0.017)	-0.048*** (0.014)	-0.070*** (0.018)	-0.053*** (0.015)	-0.053*** (0.015)	-0.055*** (0.016)	-0.053*** (0.015)	-0.053*** (0.015)	-0.075*** (0.023)	-0.054*** (0.018)	-0.053*** (0.015)	-0.075*** (0.023)	-0.054*** (0.018)
MD10	-0.060*** (0.017)	-0.042*** (0.016)	-0.059*** (0.021)	-0.050*** (0.016)	-0.066*** (0.022)	-0.060*** (0.017)	-0.060*** (0.017)	-0.057*** (0.018)	-0.060*** (0.017)	-0.060*** (0.017)	-0.062*** (0.026)	-0.053*** (0.021)	-0.060*** (0.017)	-0.062*** (0.026)	-0.053*** (0.021)
MD15	-0.029 (0.018)	-0.020 (0.019)	-0.060*** (0.021)	-0.027 (0.019)	-0.064*** (0.023)	-0.029 (0.018)	-0.029 (0.018)	-0.034* (0.021)	-0.029 (0.018)	-0.029 (0.018)	-0.083*** (0.031)	-0.015 (0.024)	-0.029 (0.018)	-0.083*** (0.031)	-0.015 (0.024)
MD20	-0.009 (0.021)	-0.018 (0.022)	0.017 (0.021)	-0.009 (0.021)	0.022 (0.024)	-0.009 (0.021)	-0.009 (0.021)	-0.015 (0.022)	-0.009 (0.021)	-0.009 (0.021)	-0.043 (0.037)	-0.020 (0.027)	-0.009 (0.021)	-0.043 (0.037)	-0.020 (0.027)
MD25	-0.033 (0.021)	-0.034 (0.024)	-0.020 (0.024)	-0.044** (0.021)	-0.010 (0.027)	-0.033 (0.021)	-0.033 (0.021)	-0.047** (0.022)	-0.033 (0.021)	-0.033 (0.021)	-0.066 (0.060)	-0.080*** (0.030)	-0.033 (0.021)	-0.066 (0.060)	-0.080*** (0.030)
MD30	0.010 (0.026)	-0.009 (0.023)	0.009 (0.023)	-0.025 (0.020)	0.021 (0.025)	0.010 (0.026)	0.010 (0.026)	-0.026 (0.023)	0.010 (0.026)	0.010 (0.026)	0.003 (0.049)	-0.053 (0.048)	0.010 (0.026)	0.003 (0.049)	-0.053 (0.048)
MA0	-0.003 (0.014)	-0.008 (0.014)	0.001 (0.015)	-0.001 (0.015)	-0.004 (0.016)	-0.003 (0.014)	-0.003 (0.014)	-0.005 (0.016)	-0.003 (0.014)	-0.003 (0.014)	-0.024 (0.033)	-0.046* (0.025)	-0.003 (0.014)	-0.024 (0.033)	-0.046* (0.025)
MA5	0.024* (0.014)	0.018 (0.016)	0.033** (0.015)	0.027* (0.015)	0.028* (0.016)	0.024* (0.014)	0.024* (0.014)	0.022 (0.016)	0.024* (0.014)	0.024* (0.014)	0.032 (0.029)	-0.014 (0.026)	0.024* (0.014)	0.032 (0.029)	-0.014 (0.026)
MA10	0.040** (0.017)	0.024 (0.018)	0.045*** (0.017)	0.044** (0.017)	0.038** (0.018)	0.040** (0.017)	0.040** (0.017)	0.039** (0.018)	0.040** (0.017)	0.040** (0.017)	0.043 (0.027)	0.019 (0.032)	0.040** (0.017)	0.043 (0.027)	0.019 (0.032)
MA15	0.022 (0.017)	0.014 (0.019)	0.033* (0.019)	0.032* (0.018)	0.024 (0.019)	0.022 (0.017)	0.022 (0.017)	0.024 (0.018)	0.022 (0.017)	0.022 (0.017)	0.031 (0.027)	-0.011 (0.025)	0.022 (0.017)	0.031 (0.027)	-0.011 (0.025)
MA20	0.032* (0.017)	0.028 (0.021)	0.042** (0.019)	0.050*** (0.019)	0.028 (0.019)	0.032* (0.017)	0.032* (0.017)	0.040** (0.020)	0.032* (0.017)	0.032* (0.017)	0.051* (0.030)	0.029 (0.028)	0.032* (0.017)	0.051* (0.030)	0.029 (0.028)
MA25	0.043* (0.026)	0.025 (0.028)	0.051* (0.027)	0.056** (0.027)	0.036 (0.029)	0.043* (0.026)	0.043* (0.026)	0.045 (0.030)	0.043* (0.026)	0.043* (0.026)	0.064 (0.041)	0.060* (0.034)	0.043* (0.026)	0.064 (0.041)	0.060* (0.034)
MA30	-0.004 (0.022)	-0.020 (0.025)	-0.003 (0.022)	0.012 (0.020)	-0.020 (0.024)	-0.004 (0.022)	-0.004 (0.022)	-0.001 (0.023)	-0.004 (0.022)	-0.004 (0.022)	0.002 (0.034)	0.019 (0.028)	-0.004 (0.022)	0.002 (0.034)	0.019 (0.028)
Unemp L5															0.044***
Unemp															0.049***
GDP cap L5													0.000**		
GINI L5												-0.002**			
GINI															
Rural Pop L5															
Rural Pop															
Pop Dens L5															
Pop Dens															
Fertility L5															
Fertility															
Educ L5															
Educ															
Observations	994	994	851	927	851	994	994	927	994	994	611	659	994	611	659
Number of id	152		152	152	152	152	152	152	152	152	152	152	152	152	152
R-squared	0.12	0.55	0.11	0.11	0.12	0.12	0.12	0.11	0.12	0.12	0.10	0.09	0.12	0.10	0.09

Data: MD0, MA0 dummy for democratic transition, POLITY IV project. MD5-MD30, MA5-MA30 associated lags. GDPcap is PPP adjusted income / capita from PWT6.2. Transition dummy from POLITY IV project. Child Mortality below 5 from WDI. Educ from Barro-Lee 2000, GINI from Deninger & Squire, all other controls from WDI. All controls except GDP interpolated.

Note: Regression estimated using OLS controlling for GDP/capita and transitions. Dependent variable percentage change in child mortality MD0 MA0 dummy variable indicating major political transition (≥ 6 change in POLITY during ten or less years. Fixed country effects and time dummies included. The dummy Transition is set to one for countries experiencing exceptional political situations (other than major democratizations). Robust standard errors in parenthesis.

Legend: *significant at 10%; **significant at 5%; ***significant at 1%. L5 = lagged 5 years

Table 8 Data segmented on income, democracy and time.

	<i>Base</i>	<i>Poor</i>	<i>Rich</i>	<i>Autocratic</i>	<i>Democ1</i>	<i>Democ2</i>	<i>60-95</i>	<i>60-90</i>	<i>95-05</i>	<i>90-05</i>
MD0	-0.005 (0.013)	-0.003 (0.015)	0.005 (0.069)	-0.005 (0.016)	0.024 (0.024)	0.007 (0.024)	-0.035** (0.014)	-0.026* (0.014)	0.001 (0.021)	-0.018 (0.017)
MD5	-0.047*** (0.014)	-0.029* (0.017)	-0.092** (0.037)	-0.028* (0.017)	-0.034 (0.024)	-0.054** (0.021)	-0.053*** (0.019)	-0.033* (0.020)	-0.050** (0.024)	-0.060*** (0.019)
MD10	-0.054*** (0.016)	-0.035* (0.019)	-0.111*** (0.039)	-0.041* (0.021)	-0.024 (0.026)	-0.044** (0.021)	-0.058* (0.030)	-0.009 (0.039)	-0.040 (0.029)	-0.058** (0.023)
MD15	-0.023 (0.017)	-0.011 (0.022)	-0.026 (0.027)	-0.016 (0.021)	0.032 (0.028)	0.010 (0.022)	-0.042 (0.026)	-0.029 (0.028)	0.006 (0.032)	-0.016 (0.027)
MD20	-0.005 (0.019)	-0.005 (0.032)	0.010 (0.025)	-0.001 (0.031)	0.045* (0.025)		0.013 (0.028)	0.020 (0.026)	0.022 (0.036)	-0.017 (0.030)
MD25	-0.032 (0.020)	-0.064* (0.038)	-0.046 (0.030)	-0.046 (0.042)	0.004 (0.030)		-0.019 (0.027)	-0.015 (0.031)	-0.049 (0.041)	-0.086** (0.036)
MD30	0.007 (0.025)	0.103*** (0.036)	-0.013 (0.024)	0.031 (0.029)	0.014 (0.023)		0.004 (0.025)	-0.007 (0.024)	0.000 (0.000)	0.000 (0.000)
MA0	0.001 (0.013)	0.013 (0.013)	0.062 (0.060)	0.013 (0.015)	-0.000 (0.026)	-0.014 (0.025)	-0.002 (0.013)	-0.001 (0.012)	-0.039 (0.033)	-0.054** (0.026)
MA5	0.029** (0.014)	0.041*** (0.014)	-0.036 (0.060)	0.044*** (0.015)	0.007 (0.029)	-0.008 (0.029)	0.028* (0.015)	0.021 (0.014)	-0.025 (0.036)	-0.025 (0.026)
MA10	0.046*** (0.016)	0.055*** (0.016)	0.000 (0.000)	0.062*** (0.018)	0.004 (0.059)	-0.008 (0.061)	0.027* (0.014)	0.017 (0.014)	-0.005 (0.048)	0.020 (0.047)
MA15	0.030* (0.017)	0.043** (0.017)	0.000 (0.000)	0.048*** (0.018)	-0.093** (0.041)	-0.097** (0.043)	0.020 (0.019)	0.015 (0.018)	-0.073 (0.047)	-0.048 (0.041)
MA20	0.043** (0.017)	0.059*** (0.017)	-0.034 (0.044)	0.059*** (0.018)	0.000 (0.000)		0.026 (0.020)	0.016 (0.019)	-0.099* (0.060)	-0.008 (0.024)
MA25	0.055** (0.024)	0.069** (0.027)	0.013 (0.065)	0.062** (0.025)	0.000 (0.000)		0.021 (0.024)	0.008 (0.023)	0.051* (0.031)	0.065** (0.032)
MA30	0.009 (0.020)	0.030 (0.023)	-0.025 (0.051)	0.018 (0.022)	0.000 (0.000)		-0.041 (0.027)	-0.035 (0.027)	0.009 (0.020)	0.011 (0.024)
GDPcap	-0.002 (0.001)	-0.004 (0.009)	-0.003** (0.001)	-0.006*** (0.001)	0.005* (0.003)	0.004* (0.002)	-0.004** (0.002)	-0.000 (0.002)	0.004 (0.005)	-0.002 (0.003)
Transition	-0.019 (0.016)	-0.007 (0.016)	-0.123** (0.049)	-0.018 (0.014)	0.022 (0.075)	0.019 (0.076)	-0.015 (0.018)	0.002 (0.016)	0.000 (0.023)	-0.043** (0.020)
Observations	994	720	274	614	380	380	703	555	439	551
Number of id	152	117	52	110	77	77	149	113	151	151
R-squared	0.11	0.11	0.28	0.16	0.16	0.15	0.11	0.20	0.10	0.07

Data: MD0, MA0 dummy for democratic transition, POLITY IV project. MD5-MD30, MA5-MA30 associated lags. GDPcap is PPP adjusted income / capita from PWT6.2. Transition dummy from POLITY IV project. Child Mortality below 5 from WDI. Educ from Barro-Lee 2000, GINI from Deninger & Squire, all other controls from WDI. All controls except GDP interpolated.

Note: Regression estimated using OLS controlling for GDP/capita and transitions. Dependent variable percentage change in child mortality MD0 MA0 dummy variable indicating major political transition (≥ 6 change in POLITY during ten or less years. Fixed country effects and time dummies included. The dummy Transition is set to one for countries experiencing exceptional political situations (other than major democratizations). Robust standard errors in parenthesis.

Legend: *significant at 10%; **significant at 5%; ***significant at 1%. L5 = lagged 5 years.