Public Spending, Governance and Child Health Outcomes: Revisiting the Links

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ABSTRACT

This paper examines the empirical determinants of child health in developing countries and how public policy may interact with these. It provides a critical review of previous studies on determinants of child health, as measured by infant and child mortality in developing countries. Then it seeks to improve on previous empirical approaches by using a more comprehensive and richer panel dataset compared to earlier studies, drawing on a health database covering 136 countries over 1960-2005, as well as a broad variety of alternative indicators of governance, including data from the International Country Risk Guide (ICRG) and the Open Budget Index (OBI). The empirical results on the role of governance (and the interaction of governance with public spending) appear mixed, throwing some doubt on the conclusiveness of earlier empirical studies. The cross-section analyses cohere with earlier findings that governance does play a role in enhancing the link between public spending and child health; however, a battery of regressions covering as much variation across time as possible, and the introduction of other possible governance indicators and instruments generate mixed results. It is possible that both the public spending and the governance indicator may only imperfectly and partially capture the true amount of resources and quality of institutions, respectively, that these two variables are supposed to reflect.

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Introduction

Much of social budget work is focused on ensuring more—and more effectively channeled—public sector resources for the social sectors, with the ultimate objective of improving the welfare of children, women, poor families and other marginalized groups in society. There is some anecdotal evidence to motivate this work. In some countries where, for example, social spending and investments have increased, or monitoring of budget and policy execution has been strengthened, social outcomes, or the immediate inputs for these, have improved.[1] In addition, there is a small but growing body of empirical literature that tries to formally examine the links across public social sector resource allocations, governance and child health outcomes across countries. The literature in this area is focused on several critical questions:

- First, does more public social spending translate to better child health outcomes?
- Second, and related to the previous question, does better governance help to strengthen the link between public social spending and child health?
- Finally, a related question focuses on the role of income growth, which could provide governments with more resources to invest in the social sectors, or also lead to poverty reduction, freeing families to invest more resources in children's health. Does the income growth channel help to improve child wellbeing and health?

This paper addresses these main questions and revisits the empirical determinants of child health in developing countries and how public policy may interact with these. It contributes to the policy discussions and literature in this area in several ways. First, it provides a critical review of previous studies on determinants of child health, as measured by infant and child mortality in developing countries. Second, the paper contains an empirical analysis examining the interaction across child health, economic factors and public policies. This paper seeks to improve on previous approaches by using a more comprehensive and richer panel dataset compared to earlier studies. It draws on the Globalization-Health Nexus Database which was developed by Cornia, Rosignoli and Tiberti (2008) and covers 136 countries over 1960-2005. This study also employs a broader variety of alternative indicators of governance, including data from the International Country Risk Guide (ICRG) and the Open Budget Index (OBI) which is directly linked to more open and transparent budgets. The goal of the analysis herein is to contribute to the literature in this area and to gain insights from various indicators of governance, notably those that are most closely linked to more effective public finance management.

Over-all, the analysis in this paper points to several preliminary observations in lieu of definitive conclusions. The empirical results on the role of governance (and the interaction of governance with public spending) appear mixed, throwing some doubt on the conclusiveness of earlier empirical studies. The cross-section analyses cohere with earlier findings that governance does play a role in enhancing the link between public spending and child health; however, a battery of regressions covering as much variation

[1] For an extended discussion, see Krafchik (2008), Norton and Elson (2008), Deles, Mendoza and Vergara (2009), Robinson (2008).

across time as possible, and the introduction of other possible governance indicators and instruments generate mixed results. In addition, the income variable appears to be a consistently important explanatory variable behind improvements in child wellbeing and health. Nevertheless, we hesitate to conclude that these findings imply that poverty reduction is a stronger channel in improving child health rather than through public spending. Based on our analysis, and a careful understanding of the underlying data, our sense is that both the public spending and the governance indicator may only imperfectly and partially capture the true amount of resources and quality of institutions, respectively, that these two variables are supposed to reflect. Analyses at the national level also introduce a number of conceptual challenges, given that the "production function" for child health is not necessarily identical across countries. In our conclusion, we plan to elaborate on a few promising directions for further research which might hopefully yield more compelling and conceptually sound inference.

In what follows, section 1 provides a review of the literature. Section 2 then elaborates on the framework for the empirical analysis and the regression model, drawing on both the empirical and theoretical literature. Section 3 discusses the main results, and section 4 outlines a few areas for possible future research. The annex to this paper provides detailed information on the dataset used.

I. Review of Literature

There is a rich literature on the social and economic factors that affect child health. A strand of this literature is based on cross-country studies of the relationship between economic characteristics and health status. There are several channels through which economic conditions could be linked to health. Anand and Ravallion (1993) suggested three main ones:

- ***Growth and purchasing power.*** Economic growth could help to expand human capabilities by improving purchasing power and enhancing access to the relevant goods and services that matter for health, i.e. food, health care, medicines, basic education, etc.

- ***Growth and poverty reduction.*** Related to the previous point, economic growth could affect health through the poverty reduction channel. The relationship between individual capabilities and income could be steeper at lower income levels, only tapering off as some decent level of income is achieved. Social outcomes could thus improve dramatically if poverty is reduced.

- ***Growth and public services.*** Economic growth could also translate into stronger provision of public services, i.e. quality education and healthcare, safe drinking water, sanitation, etc, which in turn contribute to stronger health outcomes.

Anand and Ravallion examined these propositions using data on 22 developing countries with data around the year 1985.[2] Essentially, they turned to a cross-section double-log form regression of life expectancy (later replaced by infant and child mortality with much the same findings) against explanatory variables including: poverty incidence, public health spending and average income. They found that the average income variable was not significant when variables for poverty and public health spending were included. They interpreted this to mean that the importance of growth lies more in the way that its benefits are more inclusive for the poor (i.e. that growth is poverty reducing); and the degree to which growth leads to more robust public health service provision. They attributed about one-third of the explanatory power for life expectancy to the poverty-reduction channel and two-thirds to the public health services channel (ibid:142).

There are several issues with earlier methodologies, such as that used in Anand and Ravallion's 1993 study. First, they examined a very small subset of countries which provided very little comfort to extend the inference across the developing world. Indeed a casual review of their sample suggests that it was dominated by middle income countries. Second, they turned to very crude aggregated indicators on both the dependent variable as well as the independent variables. For instance, the variables for health outcomes that they used did not distinguish between rich and poor people; rather the focus was on the national aggregate indicator. The same is true for the public health spending variable, for example, since it did not reflect any information on the benefit incidence of that spending. Inequality in access to social services is a potentially important factor behind the breakdown in the link between spending and human development outcomes. So too is the potential anti-poor bias of public spending.

Later studies have tried to address these shortcomings. Bidani and Ravallion (1997), for example, built and used a slightly larger dataset on or around the year 1990 and covering 35 developing countries. They also turned to a novel technique in order to disaggregate health outcomes across rich and poor segments of the population. Using a random coefficients model, they regressed the health outcomes variables (e.g. life expectancy and infant/perinatal mortality) against data on the distribution of consumption per person, thus allowing for the estimation of subgroup mean values.[3] These authors observed that those living on less than $2 a day are likely to live 9.4 years less on average compared to the rest of the population; and that their children face a 53 percent higher likelihood of dying before their first birthday (ibid:132). Bidani and Ravallion then used the disaggregated health outcomes indicator as an additional explanatory variable and interaction term in their cross-section regression analysis which followed roughly the same model as that of Anand and Ravallion (1993).[4] Their results suggested that per capita health spending was positively related to the life expectancy of the poor, but it had

[2] We say "around the year 1985" here to reflect that the main year of focus for the cross-section regression analysis was for that year, even as some variables used were for the latest available year. This is not uncommon in the literature, given the paucity of annual data for some of these variables.

[3] As a cut-off, they used the definition of poverty as those people living on $2 a day and below (1985 purchasing power parity dollars). Roughly, this meant subdividing the population in the developing countries in their sample between the poorer two-thirds and the richer one-third.

[4] Nevertheless, they used a semi-log model whereby the dependent variables were expressed in log form, while the independent variables were expressed in levels.

no significant link to the life expectancy of the rich. They found similar results for the equation focused on infant mortality. As a robustness check, they also examined the results if a different poverty cut off point was used: $1 a day. They found evidence that public health spending had a larger impact on life expectancy and infant/perinatal mortality for those living on less than $1 a day as compared to the results focused on poor people defined using the $2 a day cut off.

While representing some progress in the empirical analysis, Bidani and Ravallion's study also faced potential critique in several areas. A key aspect, according to Filmer and Pritchett (1999), had to do with the country's degree of income inequality, which is a potential omitted variable in the model specification. The latter argued that if the non-linear specification relating income and health outcomes is used, and the assumption is that the cross-national relationship is the same as the intra-national relationship (across individuals within each country), then a variable representing the distribution of income for each country should be included. In addition, they also drew on the literature on the determinants of child health to make the case for the inclusion of additional explanatory variables that may have been omitted in earlier studies, and thus caused those to be biased in their estimates.

In their own analysis of cross-national data for about 100 developing countries, Filmer and Pritchett examined the possible relationship between infant and child mortality and variables including: GDP per capita, public expenditures on health, female education, income inequality, an indicator for the predominance of the Muslim religion, ethno-linguistic fractionalization, urbanization, a dummy for being a tropical country, and an indicator of access to safe drinking water. The first two of the abovementioned variables are reflected in earlier studies; and the rest are posited by these authors as potentially omitted variables in earlier studies.[5] Filmer and Pritchett also correctly pointed out several potential flaws in earlier basic regression models relating public spending with health outcomes. First, there was potential measurement error in public health spending, considering the different accounting systems used across countries to track public spending on health. Second, reverse causation was possible when one regressed child health outcomes against a public health spending variable. For instance, governments of countries with higher child mortality could choose to devote more resources on public health spending to address this challenge. However, more resources channeled to public health were also expected to reduce child mortality. An instrumental variables technique was therefore necessary, and Filmer and Pritchett deployed a number of instruments for public health spending, including the average public sector health and military spending (both expressed as a share of GDP) for the neighbors of the country in question. We will later critique these instrument choices in our own regression analysis, and we first turn to a brief review of Filmer and Pritchett's main results.

[5] While some of these variables are possible to justify using theoretical priors (i.e. being in a tropical country implies exposure to certain diseases; access to safe drinking water implies less risks from diarrhea), others are included by these authors with little more than an associative argument referring to earlier studies on child health and mortality (e.g. predominance of Muslim religion). We will revisit this point later when we develop our own regression analysis.

These authors found that the elasticity of child mortality with respect to income ranges from -0.51 to -0.61. Female schooling was also a significant factor behind infant mortality—the results implied that each additional year of female schooling was associated with a 10 percent reduction in child mortality. Inequality was also an important factor, with the results implying a 0.5 percent increase in mortality for each 1 percent increase in inequality. The coefficients for ethno-linguistic fractionalization and the predominance of Muslim religion were also negative, but the latter was only statistically significant for child mortality (but not for infant mortality). Urbanization, being in a tropical country and access to safe drinking water were not statistically significant.

Finally, the main coefficient of interest, the elasticity of child mortality with respect to public health spending, was negative but numerically small and statistically insignificant at conventional levels (ibid:1315). Drawing on their empirical findings, Filmer and Pritchett concluded that doubling the share of GDP devoted to public spending on health from the mean of 2.96 percent to 5.92 percent was associated with only a small improvement in child mortality of about 9 to 13 percent (ibid:1317). These authors attributed this weak effect of public spending on child health to three main reasons. First, they argued that change in health status is affected by the health production function, implying that the specific health service intervention selected could impact heavily on the health outcomes produced. Second, the net public sector impact would need to take account of the potential crowding out effect on the private sector provision of health services. Third, these authors also pointed to the efficiency of the public sector in translating resources into effective public services. Filmer and Pritchett argued that these three factors are essentially part of a chain. Each of these links could fail, and thus help explain why public sector spending does not necessarily translate into stronger improvements in child health outcomes.

An empirical study by Gupta and others (2002) provided further insights on the links across public sector spending, governance and child wellbeing. They argued that corruption diminishes the effectiveness of public sector interventions in two main ways. First, corruption could increase the cost of healthcare and education, for instance, through illicit charges on access. Second, corruption could also diminish the amount and quality of public sector services, notably through various forms of leakages including kick-backs, over-charging and outright theft of equipment and materials (e.g. vaccines, medical supplies, textbooks). Using cross-sectional data (i.e. the average of annual country-level indicators during the 1985-1997 period to the extent data is available), Gupta and others examined various indicators of education and health outcomes (e.g. child mortality, school dropout rates, etc.) using, as explanatory variables, per capita income, indicators of corruption (derived from the International Country Risk Guide and an earlier version of the World Governance Indicators), public spending (on health or education depending on the left hand side variable) as well as other control variables such as the average education among the female population, the dependency ratio and the degree of urbanization. Their general results suggest that per capita income is negatively and statistically significantly related to adverse child wellbeing indicators like mortality and school dropouts, while corruption is positively and statistically significantly related to the

same dependent variables. Public spending on education or health, as the specification warranted, was not a significant explanatory variable.

Gupta and others also acknowledged the possibility that corruption and indicators of child health or education could be either correlated with an unobserved country-specific variable or there could be reverse causality—people with poor education or health status may be more conducive to paying bribes, and at the same time, corruption potentially contributes to those very conditions of deprivation. Gupta and others turned to simultaneous equations estimates, using as instruments for corruption the predominance of the Protestant religion, being a former British colony, having higher per capita income, having a high ratio of imports to GDP, having a long exposure to democracy and having a unitary government. The magnitude and signs of their coefficient results did not vary that much.[6]

Additional studies of infant and child mortality have also tried to tap larger panel datasets as well as address other econometric issues, particularly the relationship between income and health. For instance, Pritchett and Summers (1996) examined bi-decennial child mortality statistics for 58 developing countries during the period 1960-1985. They examined the log of infant mortality as a function of the log of GDP per capita (variable of interest), other conditioning variables (e.g. schooling), plus country- and time-specific effects (e.g. time specific intercept allows over-all mortality to change due to diffusion of or improvements in health technology.) Instrumental variables were also used to address potential reverse causality issues involving growth and child health outcomes. Drawing insights from the growth literature, the authors used instruments which could help explain growth but would not necessarily be linked to health outcomes. These included variables for the terms of trade shock, investment to GDP ratio, black market premium, and deviation of official exchange rate from purchasing power parity level.[7] Their findings suggested that the long run income elasticity of infant and child mortality in developing countries lies between -0.2 and -0.4 (ibid: 850). Using these estimates, the authors calculated that about 450,000 infant deaths and over a million child deaths in the developing world in the year 1990 alone could have been averted had developing countries been able to maintain the same rate of growth in the 1980s as in the period 1960-1980 (ibid:863).

The abovementioned estimates of the income elasticity of infant and child mortality are close to those of Rajkumar and Swaroop (2008) who used annual data (1990, 1997 and 2003) for 91 countries in order to study the role of public spending, governance and income per capita in determining health outcomes. These authors used primarily the same explanatory variables for child health and education outcomes as in earlier studies (e.g. Gupta and others, 2002), with the addition of right hand side variables such as income inequality, the predominance of the Muslim religion, ethno-linguistic

[6] These authors also turned to variance weighted measures of corruption as well as panel data regressions as a robustness check for their main results. The latter approaches yielded mixed or generally weaker and not statistically significant results on the main variables of interest.

[7] Robustness tests revealed that all but the black market premium indicator appeared to be acceptable instrumental variables.

fractionalization among other conditioning variables. These authors found that a one percentage point increase in per capita GDP at the margin is associated with a 0.42 percent reduction in child mortality and an over 1 percent reduction in the school completion failure rate (Rajkumar and Swaroop, 2008: 101; 104). Hence, as in previous studies, the channel through income growth appears to be a robust one. On the other hand, the channel through public spending, and the coefficient for corruption yielded mixed results. These authors then examined the possible interaction between the corruption and public spending variables in order to try to get at the governance quality-adjusted impact of public spending. The results suggested that low governance countries do tend to have ineffective public spending in education and in health, and the connection to child education and health outcomes were weak. The public spending of better governed countries were, on the other hand, positively linked to child education and health indicators.[8]

More recently, and using a fairly extensive dataset covering 136 countries across 10 quinquennia (1960-2005), Cornia, Rosignoli and Tiberti (2008) and from here on CRT (2008), turned to a panel fixed effects model to try and examine the possible factors behind life expectancy at birth, IMR and U5MR. The explanatory variables they used included dummies for each regional grouping (i.e. helps account for region-specific effects), female literacy (i.e. expected to have positive effects on child health), inequality (i.e. signals skewed access to resources for investing in health), immunization (i.e. a measure of healthcare access), output volatility (i.e. reflecting economic and income instability) and the log of GDP per capita, the main variable of interest. They found evidence that a 1 percent increase in GDP per capita is associated with a decline in IMR and U5MR, respectively, by about 14 points and 22 points. Their empirical analysis also suggests that a reduction in average female illiteracy by 10 percentage points is linked to a reduction in IMR and U5MR, respectively, by about 5 and 8 points (ibid:23-4). [9]

Mendoza and Rees (2009) argued that it might be possible to improve further on this study in several ways. For instance, both GDP growth and income inequality could be determined by the quality of institutions, and there was no attempt to account for the latter in the empirical analysis. Furthermore, the second part of the study by CRT (2008) tried to analyze the impact of globalization on health outcomes indirectly by studying the impact of policy reform on the determinants of health, e.g. GDP per capita, income inequality and volatility. Because policies are endogenously selected, a regression of

[8] Rajkumar and Swaroop (2008) noted that public spending and social outcomes could be jointly determined. In order to address this, they turned to simultaneous equations techniques, using instruments such as the use of the common law system (mostly the United Kingdom and its former colonies) which tend to be associated with a less state-oriented approach, as well as other categories, based on the type of law system, i.e. French civil law, German civil law, Scandinavian civil law or Socialist law. Their 2SLS results broadly confirm their main results.

[9] A recent United Nations (2008) study of 30 countries in Asia tracking their progress towards achieving the Millennium Development Goals (MDGs) also found evidence that appears consistent with the abovementioned studies. This study calculated the "MDG elasticity" or the percent change in different MDG indicators for each 1 percent increase in growth. It found that–an increase in 1 percent of GDP is associated with: a) a 0.3 percent fall in maternal mortality, b) a 0.43 percent fall in under 5 mortality and c) a 0.46 percent fall in infant mortality (ibid:41).

growth or other policy outcomes on the left hand side and policy indicators on the right hand side essentially tells us nothing about the effectiveness of policies (Rodrik, 2005).[10] Mendoza and Rees also cautioned on some of the limitations of country-level data on infant mortality and other child wellbeing indicators. The IMR is typically reported in a bi-decennial manner, and in some cases, missing information is filled in using extra- or intrapolation methods.[11] The impact of shocks is also likely to be smoothed out when examining datasets of this nature precisely because of the methods of collecting and reporting (usually averaged) figures. This makes a study using this type of data less informative for examining crisis impact, though perhaps more useful for analyzing long term structural relationships involving income and child health outcomes.

II. Empirical Framework and Methodology

The present study seeks to build on past empirical analyses by drawing on an extensive panel dataset on child health indicators, as well as several potential indicators of governance. Drawing on both the empirical and theoretical literature, this section outlines the framework for the empirical analysis. It begins with a discussion of the main determinants of child health outcomes, providing guidance on the choice of the explanatory variables. The regression model is then elaborated.

Determinants of Child Health Outcomes

There have been numerous empirical studies on the determinants of child and infant mortality rates, but relatively few theoretical studies on the underlying mechanism through which the empirical determinants affect both intermediate and final child health outcomes. Cornia, Rosignoli and Tiberti (2008) offers a comprehensive review of five theoretical mortality models and a discussion on how economic determinants may relate to the factors analyzed by these models. In addition, in the literature on child survival, one of the most cited analytical frameworks of child mortality is developed by Mosley and Chen (1984), who bridge the gap between social science approach and medical science approach and model the interaction between socioeconomic determinants and proximate determinants of child mortality. Their theory could be illustrated by the following diagram.

Socio-economic status→ Proximate determinants→ Risk of disease→Mortality outcomes

Essentially, the argument follows that socio-economic status influences the proximate determinants of health and risk of disease, and these in turn directly influence health and mortality outcomes. The implication of the Mosley-Chen model of mortality

[10] A similar study of U5MR by Rajkumar and Swaroop (2008) arrives at broadly similar results.
[11] There are a few exceptions, including the database we use for this study which has been put together by compiling available information filling gaps with actual data to the extent available.

for social science studies is that child mortality should not treated as a single-cause health outcome and that it may be necessary to specify different orders of causality and study the possible interaction across the socioeconomic determinants. In the economics literature, there are at least three schools of thought on the possible determinants of child health status. First, there is an economic growth oriented view (Filmer and Pritchett 1999, 2000 for example) that macroeconomic conditions explain most of the variation in child and infant mortality rates and that public spending on health fails to have a significant positive impact on health outcomes. Alternatively, some empirical studies show that public expenditure on health does have an impact on health outcomes. For instance, Gupta, Verhoeven and Tiongson (2001) use cross-country data to show that the relationship between public spending on health and health status is significant and stronger for the poor people and argue that public health policy matters more to the poor. This view is corroborated by the empirical study by Hanmer and others (2003), who show evidence that supports the importance of public health interventions and refute the view that economic growth is the main determinant of child health outcomes. In addition, there is a third strand of literature which is represented by the more recent study by Rajkumar and Swaroop (2008), who offer an alternative explanation for the mixed evidence found on the link between public expenditure on health and health outcomes. According to the authors, it is not simply true that public health spending per se is unimportant, but government effectiveness and bureaucracy quality determine whether public spending can have a significant impact on the final health outcomes.

Choice of Explanatory Variables

- **Income**. National income may affect infant and child mortality both directly and indirectly (Hojman 1998). First, there is a direct positive association between wealth and survival chances, since the ability of households to secure food supply and meet medical needs depends on their wealth level. Second, national income may also affect survival chances indirectly through its impact upon the birth rate. The demand for children is affected either negatively or positively by the household income. Third, a higher income is usually associated with a higher degree of female participation in the labour force (Handwerker 1992), which in turn may have an indirect effect on child mortality rates. Thus the relation between income per capita and mortality rates can be complex.

- **Inequality**. A society's income distribution pattern may affect mortality rates (Waldmann 1992). Waldmann (1992) finds that inequality still has an adverse impact on mortality even if the real income of the poor is accounted for. Thus one can expect inequality to have a positive association with infant and child mortality rates. Further, Agha (2000) documents the rural- urban disparity in child health outcomes due to income inequality in Pakistan. Alesina and Rodrik (1994) provide theoretical and empirical analysis to show that inequality in land ownership and income is negatively correlated with economic development, which may have an adverse impact on child mortality rates. Cornia and others (2008) propose that given an average GDP per capita, a more egalitarian income distribution can improve health status by ensuring

that most households have access to basic resources whereas high inequality adversely affect future health status.

- **Economic and Income Volatility**. Ferreira and Schady (2009) show that aggregate macroeconomic shocks may have an adverse effect on child health outcomes. They argue that if shocks reduce investment in child health, there may be a persistent negative impact on poor children and intergenerational transmission of poverty. Their theoretical analysis indicates that the relationship between macroeconomic uncertainty and child outcomes may be ambiguous due to the interplay between substitution and income effects. Thus it remains an empirical question whether the volatility of the macroeconomic environment has a negative or positive impact on child health status.

- **Female Education**. Education for women can help mothers improve child health through providing more effective child care at home and more efficient use of health services. It may also lead to delayed child bearing and longer birth intervals as well as more work opportunities for women to generate additional household wealth. Caldwell (1979; 1986; 1994) promotes the view that female education is an important mediating variable that is an important determinant of child mortality. Boyle and others (2006) conduct a cross country study based on DHS survey data for the period between 1994 and 2003 and find that household wealth and maternal education are both significant determinants of child health status measured by height and weight. Hojman (1998) suggests that access to modern, non-traditional forms of contraception and access to advice on the appropriate health care techniques are both important factors that impact child health outcomes. Thus the education of girls may affect infant and child mortality rates. For instance, a good education teaches young women how to take better care of their children and it also reduces birth rates by increasing the opportunity costs of having children. More remarkably, Basu and Stephenson (2005) argue that even a little education for women may have a positive impact on child health outcomes. The reason is that schools may not necessarily teach women child-rearing skills but even very basic education can help them to know later in life how to acquire health care skills and how to obtain health-related information.

- **Public Spending on Health**. One of the implications derived from Mosley-Chen model of child mortality (1984) is that countries with the same income per capita will have different mortality rates if the relationship is mediated in different ways. For example, fertility choices may affect how income translates into infant or child mortality outcomes. Public health policy can reduce fertility either through promotion of reproductive health interventions or through the provision of reliable social safety programs, thus mortality rates can be decreased due to public health intervention. In our study, public expenditure on health is a proxy for public health intervention. In contrast to the above argument, Filmer and Pritchett (1999) claims that income per capital explains the majority of the variation in mortality rates across countries and that public spending is ineffective in reducing mortality rates and therefore it is a poor means of improving infant and child health status. Their argument has been criticized by Hanmer and others (2003), who find that public

health services are significant determinants of child health outcomes and that mortality reductions have been achieved independent of income growth. They believe that "health expenditure is an inefficient means of improving child health is unproven" and emphasize the importance of public health policy. An alternative reason for the weak link between public spending and health outcomes is that public spending may have a negative impact on the development of private health sector (Filmer et al 2000). However, we do not attempt to address this problem in the present study.

- **Effectiveness of Governance**. The finding that public expenditure on health services is not significantly associated with child health outcomes is not surprising, because public expenditure on health care may not necessarily translate into effective health services due to several reasons. First, the mere allocation of public resources for health services may fail to reach health service providers if budget institutions, which involve budget formulation, execution, monitoring and auditing, do not function properly. Deles, Mendoza and Vergara (2009) argue that if the budget process is characterized by more transparency and accountability, it is less likely for the public health sector to suffer from leakages and inefficiency. Second, even if the health service providers receive the allocated public resources, they may fail to supply effective services to consumers, especially poor people and children due to moral hazard problems and information asymmetry between public health regulators and service providers (World Bank 2004). It may be necessary to innovate with non-traditional delivery arrangements so as to increase citizens' participation in public service provision, which enables consumers to monitor the health service providers. Third, intra-household resource allocation may also distort the child health outcomes if the public health policies are not well-targeted in order to improve child welfare. For instance, analyzing data on a social transfer program in South Africa, Duflo (2000) finds that the identity of pension recipients affects the effect on child health outcomes and that the impact of the social program is entirely due to pensions received by women rather than men.

The effectiveness of the public sector and the quality of institutions in general may even have a direct impact on child health outcomes. Cross-country empirical studies of infant and child mortality rates reveal that governance quality in general and the presence of corruption in particular have a significant negative effect on health outcomes (Kaufmann et al 2004, Gupta et al 1999). The idea is that countries with poor quality of institutions and high corruption tend to invest more in physical capital instead of social welfare.

In our analysis, we use various governance indicators as measures for government effectiveness. First, we use the government effectiveness index in the Worldwide Governance Indicators developed by Kaufmann, Kraay and Mastruzzi (2009) as a proxy for the effectiveness of the public sector. Second, indicators for bureaucracy quality and control of corruption from the International Country Risk Guide (Political Risk Group 2009) are used as alternative measures for the quality of governance. Alternatively, another variable we also attempt to account for is the government budget transparency

and accountability measured by the Open Budget Index (the International Budget Partnership 2008). We expect this variable to capture the heterogeneity in the budgeting process across different countries and how effective public health policies translate into resource allocations for the health service sectors.

The abovementioned interaction between the quality of governance, public health spending on health and child health outcomes essentially hinges on how effectively the public sector produces key services which are inputs for child health. Deles, Mendoza and Vergara (2009) note that principal-agent problems could result in a mismatch between society's goals and preferences and the way resources are raised and allocated. Even in cases where governments have committed to increase resources for social investments, and to the extent that these are reflected in approved budgets, there is still no guarantee that all the resources will be channeled most effectively through the government bureaucracy and eventually into the spending and investment items (e.g. textbooks, medical supplies, vaccines, school and health clinic construction, teachers' and health professionals' salaries, etc.) which are needed to achieve better human development outcomes. There are numerous leakages and inefficiencies that could take place, some of which could be due to the systemic and institutional weaknesses of public policymaking in general and public finance management in particular. For instance, anti-poverty programs could become less effective due to poor planning and targeting. In addition, weak institutional capacity and corruption could also diminish the resources channeled towards public sector spending and investments.[12]

Recent studies have shown that public spending and investments in weak institutional and governance environments often do not translate into effective public services. Stronger evidence of better human development outcomes due to public sector spending is found in better governed countries (e.g. Gupta and others, 1999; Rajkumar and Swaroop, 2008). Studies of corruption also reveal that it could distort the composition of government expenditures, biasing it towards public sector investment projects that are easier to extract rents and kickbacks from, and ultimately undermining social sector investments in education and in health (e.g. Mauro, 1998; Tanzi and Davoodi, 1997).

In addition, budgeting is a highly political process. In theory, governments are thought to seek an "optimal allocation" of resources by maximizing society's welfare in a way that reflects its priorities. For instance, the education sector could receive tax breaks (on the revenue generating side) or outright subsidies (on the spending side) in order to reflect society's preferences to help strengthen this sector. Nevertheless, various competing interest groups could exert pressure to try to influence the budgeting process (both at the national and at the local government levels) in order to promote their self-

[12] Corruption is commonly defined as resulting from the use of the power of public office for personal gain in a manner that contravenes the rules of the game. Three main types of corruption are often cited, spanning grand corruption (i.e. acts of the political elite to exploit their power in order to make economic policies beneficial for themselves); bureaucratic corruption (i.e. corrupt acts by bureaucrats in their dealings with superiors and with the broader public); and c) legislative corruption (i.e. the manner and extent to which the voting behavior of legislators can be influenced). See Jain (2001) and Tanzi (1998) for comprehensive reviews of the literature in this area.

interest.[13] It is possible that those with the least "voice" are least able to organize, attain the necessary skills and resources, and have their interests represented in this process. A likely outcome would be inequitable resource allocations, benefiting those with stronger voice and better representation, and penalizing those with less voice and weaker advocacy.

Empirical Methodology

The empirical model of infant and child mortality rate determinants is specified by the following equation:

$$\ln(U5MR)_{i,t} = \beta_0 + \beta_1 \ln(GDPpc)_{i,t} + \beta_2 (PSH)_{i,t} + \beta_3 GOV_{i,t} + \beta_4 (GOV * PSH)_{i,t} + BX_{i,t} + u_i + \varepsilon_{i,t}$$

The under-five mortality rate (U5MR) is defined as the probability of a child born in a specific year or period dying before reaching the age of five, if subject to age-specific mortality rates of that period. (We first examine U5MR and later undertake the same empirical analyses on IMR, which is the country level infant mortality rate measured as the number of infants dying before reaching one year of age, per thousand live births in a given year.) GDPpc is income per capita measured in current US dollars, PSH is the public spending on health care as a share of GDP, and GOV is a measure of government effectiveness, which is a proxy for the effectiveness of the public sector. X contains other country characteristics that can affect health status, such as illiteracy rate among females and volatility of the macroeconomic environment. The *i-t* th observation refers to that of country *i,* year *t*. We control for unobserved country-specific characteristics that may affect mortality rates using country fixed effect, so that the intercept for country *i* is u_i. For now we assume that all explanatory variables are exogenous and are not systematically correlated with the error term $\varepsilon_{i,t}$.

GOV*PSH captures the interaction between governance effectiveness and public expenditure on health care. The idea is that given a level of public spending on health, a more efficient government can translate the expenditure on health into effective resource allocations for the front-line health care providers so that households could receive more health care services. In our analysis we attempt to obtain insights from the use of various proxies for governance effectiveness, such as the Worldwide Governance Indicators by Kaufmann and others (2009) , the International Country Risk Guide (Political Risk Group 2008) and the Open Budget Index (International Budget Partners 2008). We believe that the combined use of alternative governance indicators could reveal more information about possible mechanisms through which the effectiveness of the public health policies is affected by the quality of governance and institutions. In our empirical model, the impact of the public spending on health care on child health status can be expressed in terms of the sum of the impact of public spending itself and the impact through effective use of public resources by the government. Mathematically, the impact of public

[13] For a basic model elaborating on how different interest groups could exert pressure on the budget process, see for example Clark (1997).

spending on health outcomes is represented by the sum of coefficients β_1 and β_4 multiplied by an average measure of government effectiveness.

It is worth noting that there are some possible caveats as pointed out by Rodrik (2005), who warns that cross-country regressions can often be misleading due to econometric problems such as parameter heterogeneity, omitted variables, measurement errors and especially endogeneity. Since policy interventions are not random and they can be chosen in response to the unobserved country characteristics, cross-country regression analysis of the impact of public policy may be problematic.

Therefore, we address the abovementioned econometric issues by tapping a usefully extensive and rich dataset. First, we make an effort to improve on previous studies by using cross-country panel data covering as long a period as possible, so that it is possible to capture more variation across time and account for heterogeneity across countries by using country fixed effects. Second, we aim to enhance the empirical specification of the economic determinants of child health outcomes by using better explanatory variables such as more informative proxies for governance quality and better instruments for public spending on health care. Third, we attempt to address the reverse causality problem associated with the policy variable, namely, public spending on health care. If the public spending on health care is chosen in response to child health outcomes, then it is systematically correlated with the error term in equations (1) and (2) and our estimates will be biased. Thus ideally we need to find an instrumental variable that explains the variation in public spending on health, yet does not determine child health status through any other channels apart from its interaction with public spending. It is difficult to find an instrument that satisfies this criterion; and past studies have suggested instrumental variables which may be less convincing and possible to improve on. For example, Gupta and others (1999) turn to public expenditures on education as a share of GDP and the square of health spending other than primary care spending as possible instruments for public spending on healthcare. It is not very clear to what extent these variables satisfy the abovementioned conditions for good instruments. (It is also more likely that where education outcomes are poor, so too are health outcomes, thus failing to satisfy the criteria for good instruments.)

In the present study, we propose two plausible candidate instrumental variables: the government stability index and the democratic accountability index.

- ***Government stability.*** The government stability index has three components: government unit, legislative strength and popular support (Political Risk Group 2009). It is a measure of the ability of a government to carry out its declared programs and to stay in office. The higher the index, the stronger is the ability of a government to implement programs and stay in office. This variable may be a valid instrument for public spending on health care, because a government may be more willing to invest more public resources on health care if it expects to stay in office in future. In fact, previous empirical studies have found evidence to support the argument that political conditions such as legislative stability and voter volatility significantly affect taxing and public spending (Crain and Oakley 1995; Cadot et al

2006). In addition, we expect this variable to satisfy the exclusion constraint because it is reasonable to assume that government stability does not itself directly affect infant and child mortality.

- ***Democracy.*** Alternatively, the structure of the political system may also affect public spending on health care. There is empirical evidence on the positive impact of democracy on public expenditure (Stasavage 2005; Chen 2008; Careja and Emmenegger 2009). The idea is that with the introduction of multiple competitions, governments are faced with electoral pressure and thus have a better incentive to increase public expenditure in sectors such as health and education.

In our analysis, the proxy for the extent of democracy is the democratic accountability index from the International Country Risk Guide (Political Risk Group 2009). The measurement of this variable is based on the actual political structure in a given country. For example, a de-facto one-party state is distinguished from a de jure one-party state. We believe that this democracy index is a valid instrument for the spending variable since it is plausible to assume that democracy does not affect child health outcomes directly or through other unobserved factors.

III. Analysis of Empirical Results

The key empirical results for U5MR are presented in section 7 of this paper. The same regressions are implemented using IMR as the dependent variable, generating results that are similar to those reported here on U5MR. In order to confirm the robustness of the findings in the literature, we turn to both cross-section and panel data (to the extent possible while trying to maximize observations and variables). The focus here is on the results for U5MR, and over-all, several key findings emerge.

Our preliminary results on the role of governance are mixed. Model specifications using the Worldwide Governance Indicator fail to yield significant results when using panel data (see Tables 1 and 2). We hypothesize that this could be due to the more general nature of this indicator. That is, it may not necessarily reflect more specific information on the quality of the relevant institutions necessary to: a) produce an economic environment that is conducive to improvements in child wellbeing and health; and b) strengthen the link between public sector spending and final inputs necessary for improving child health. Indeed, there is a vigorous debate on the long menu of institutional changes and public capacity building initiatives deemed necessary for development, leading some to argue whether and to what extent “good enough governance” matters more for effective progress in economic and human development (Grindle, 2005).

We therefore turn to alternative indicators for governance. As noted earlier, one was the Open Budget Index, which attempts to track the nature of the budgeting process much more closely. There is emerging evidence in some developing country contexts that more open and transparent public budgeting, procurement and spending processes are associated with less leakage and possibly more effective policy interventions (Deles and

others, 2009). The empirical results using this variable, however, were also uncompelling (see Table 3). Nevertheless, we were unable to extend the data beyond 55 countries and the year 2005, which leads us to a very preliminary and inconclusive observation on this particular variable, which, at least conceptually, remains promising in our view.

Turing next to the ICRG data on governance, we break from past studies by using its sub-components which offer a stronger conceptual rationale for usage in the context of this study. The variables for the control of corruption, bureaucratic quality and democratic accountability, for example, are potentially indicative of the capacity of the public sector to effectively produce inputs for stronger child health outcomes. The measures underlying the construction of these variables, for instance, include:

1. Bureaucratic quality:
    - This is a measure of the ability of governments to minimize abrupt policy changes and interruption of public services. In countries with a higher score, the bureaucracy is relatively independent from political pressures and has an established mechanism for recruiting and training. Stronger bureaucracy serves as a shock absorber when governments change and protects the provision of public services from traumatic revisions.
2. Control of corruption:
    - The ICRG measure of corruption accounts for not only the financial corruption in terms of bribe payments, but also that in the form of excessive patronage and close ties between politics and business. This latter form of corruption imposes a threat on the efficiency of the economy.
3. Democratic accountability:
    - The scores are assigned based on the political structure of the countries. This variable is a measure of how responsive a government is to its citizens. The following types of governance structure are accounted for: alternating democracy; dominated democracy; de-facto one-party state; de-jure one-party state and autarchy.

The results using these variables as proxies for governance are reported in tables 3, 4 and 5. Tables 4 and 5 are split into “a” and “b” to reflect the exclusion of the inequality variable in tables 4a and 4b. We deem this as a necessary robustness check given the potential problems of including an inequality variable which may have effects that are difficult to disentangle from both the dependent and explanatory variables. Once again, the results appear mixed. In regressions using bureaucratic quality, control of corruption or democratic accountability, there is some evidence to support the argument that public spending on health is negatively and statistically significantly linked to child mortality (see Tables 3, 4a and 4b).

We turn next to simultaneous equations method as a robustness check for public health spending. As noted earlier, public spending on health and health outcomes could be endogenously determined. We use, as instruments, indicators of government stability and democratic accountability. The significant link disappears in these regressions (see

Tables 5a, 5b, 6a and 6b). This casts some doubt on the robustness of the link between public health spending and child mortality.

The few consistent findings so far in our various model specifications include the following. First, the indicator for income per capita is, for the most part, negatively and statistically significantly linked to child mortality. The coefficient estimates suggest that a 1 percent increase in GDP per capita results in anywhere from a 0.4 to a 0.6 percent decrease in U5MR. In addition, the indicator for female illiteracy is, for the most part, positively and statistically significantly related to child mortality. This coheres with our theoretical prior that more educated women and mothers could be a key factor behind more effective child care and stronger use of key inputs for improving child survival and health.

IV. Conclusion

This paper examines some of the empirical determinants of child health, by revisiting the links across public spending, governance and infant mortality. It first reviews the empirical literature in this area and then undertakes an extensive empirical analysis using comprehensive data on public spending and child health as well as various indicators of governance. Its main contribution to the empirical literature lies in the use of new datasets not yet tapped in the literature, e.g. the Open Budget Index (OBI) data which is used as a proxy for budget transparency and accountability.

Using a variety of data configurations and after a battery of tests, the empirical analysis in this paper points to mixed results. This in turn raises some questions about how conclusive earlier studies really are in this area. In lieu of definitive conclusions, we instead posit that future research could try to more directly address the links across public spending, governance and child health using other data and approaches. We see three promising areas for further work.

First, we recognize the limits of broader governance indicators, notably when it is possible to conceive of thresholds and non-linearities in the relationships involving governance. As one analyst has put it, it is possible that countries may achieve some progress through “good enough governance”. Clearly, it is possible to try to improve further on various measures of governance, with a focus on better capturing specific aspects of the broader governance challenge. For instance, in the context of the present analysis, governance indicators related to better public finance management might provide the most direct link between public spending and health outcomes. The Open Budget Index (OBI) and similar indicators may open the door for this type of analysis.

In addition, it might also be fruitful to try and examine the same questions addressed in this paper, by using sub-national indicators. In a growing number of countries, public service delivery has become highly decentralized, emphasizing the role of local government units. It is possible that the link between public spending and health is broken at points along the health production chain that are related more to local

government public finance. Indeed, this might be possible using some countries' datasets and the authors are seeking to extend the present study in this direction.

Finally, it would be useful to consider techniques based on household survey and other types of data to try and address the questions in this paper in an altogether different and perhaps complementary way. One novel approach, for example, is to try and evaluate the impact of interventions that create space for public deliberation and debate of the budget. A forthcoming study by the World Bank will analyze the impact of efforts to improve the quality of deliberation, social accountability and citizen participation under conditions of sharp increases in the budgets of democratic village governments. While this study focuses on outcomes linked to the impact on the quality of public goods and civic engagement, and corruption, it would be interesting to see whether such interventions also translate to stronger human development and child health outcomes.[14] These types of micro-level empirical analysis could complement studies based on more aggregate indicators such as this study.

V. Data Appendix

Globalization-Health Nexus Database (GHND)

The GHND dataset provides comprehensive statistical information required for the analysis of the relationships among country characteristics, globalization and health. It provides information on variables that measure health status, social and economic factors that may affect health outcomes as well as country characteristics that may be associated with health status.

The GHND dataset covers 136 countries, which are representative of various geographical regions around the world. The time span covered by the original GHND data consists of five-year periods from 1960 to 2005. The five years data are computed by taking the five year arithmetic mean of the variable centered around the mid- or end-decade years. Details on the calculation method are described in the documentation for the GHND dataset.

Due to data limitations, our main analysis is based on a subset of this dataset, including observations on 67 countries that cover the period from 1985 to 2000. Among these countries, 29% are OECD countries, 25.4% are African countries, 22.4% are Latin American countries, 13.4% are from Asia and 6% are transition countries. This subsample contains full information on the following variables, which are relevant for our cross-country study of the empirical determinants of health outcomes.

- Under-five Mortality Rate (per thousand live births). The under-five mortality rate measures the probability that a child will die before reaching the age five. The probability is measured by the number of children who die before the age five per

[14] Personal communication with Biju Rao and based on information posted on the World Bank website: http://go.worldbank.org/CWHAVOFB00.

thousand. The data on this variable is provided by UNICEF (2006) and the coverage is complete for 1980, 1990, 1995, 2000 and 2005. Note that missing values for year 1985 is interpolated by computing the mean between the values of the preceding period (1980) and the following period (1990).

- Infant Mortality Rate (per thousand live births). Infant mortality rate is the number of infants dying before reaching one year of age, per thousand live births in a given year. The data, which is provided by UNICEF (2006), contains complete information for all years considered.

- Normalized Gini Coefficient. The original data on income inequality which are based on different income, consumption or earnings concepts are normalized to "Gini coefficient of gross income per capita" (Cornia et al 2008).

- GDP Per Capita. GDP per capita in current US dollars at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included on the value of the products. It is calculated without deducting depreciation of fabricated assets for depletion and degradation of natural resources. Data on GDP per capita is from the World Development Indicators (World Bank 2006).

- Volatility of Economic Growth. The volatility of economic growth is measured by the five-year inter-temporal mobile standard deviation of the annual growth rate of GDP per capita at constant international prices. Details on the calculation are available in the documentation for the GHND database.

- Public Expenditure on Health. This variable is measured by the amount of public expenditure on health as a share of GDP. Information on public expenditure on health is obtained from various data sources including the OECD Health Database for OECD countries, TransMonee database 2006 for Central and Eastern European countries, World Development Indicators 2006 for remaining countries.

- Female Illiteracy. Female education status is measured by the percentage of illiterate female aged 25 and above (Barro and Lee 2000).

Descriptive Statistics

Variable		Mean	Std. Dev.	Min	Max	Observations
U5MR	overall	62.93	69.9	4	319	N = 268
	between		69.24	6	300	n = 67
	within		12.04	21.3	110.81	T = 4
IMR	overall	41.98033	40.48	2.98	182	N = 268
	between		39.99	4.39	173.75	n = 67
	within		7.51	14.73	71.73	T = 4
lngdppc	overall	7.833175	1.56	4.78	10.59	N = 268
	between		1.54	5.15	10.33	n = 67
	within		.29	6.99	8.45	T = 4
Volatility	overall	3.886275	2.36	.66	11.74	N = 268

	between		1.85	1.21	9.02	n =	67
	within		1.48	-.99	8.12	T =	4
Gini Coefficient	overall	45.2805	9.74	22.95	70.89	N =	239
	between		9.26	28.24	66.88	n =	65
	within		2.78	32.52	57.14	T-bar =	3.69
Female illiteracy	overall	30.07	29.07	0	95.2	N =	268
	between		28.77	.1	92.93	n =	67
	within		5.19	11.47	50.37	T =	4
Public Expenditure on Health	overall	3.14	2.04	.18	8.1	N =	268
	between		1.79	.57	7.02	n =	67
	within		.99	-1.85	6.28	T =	4

Sample: 67 countries; Years 1985, 1990, 1995 and 2000
Source: the Globalization and Health Nexus Database (GHND 2007)

International Country Risk Guide (ICRG) Variables

The International Country Risk Guide (ICRG) rating is based upon three categories of risk: political, financial and economic. A separate index is constructed for each of the three categories. For purposes of our analysis, we focus on the first risk group, political risks.

In the construction of the political risk rating, 12 variables covering both political and social characteristics are measured. We use four of these variables, namely, government stability, corruption, democratic accountability and bureaucracy quality in our empirical analysis of the impact of governance and public spending on social outcomes.

- Government Stability. The highest possible rating on government stability is 12 points. This is a measure of the ability of a government to carry out its declared programs and its ability to stay in office. The risk rating is the sum of three subcomponent scores, each with a maximum score of 4 points and a minimum score of 0 points. A higher score represents lower risks. The three subcomponents for the rating of government stability are government unity, legislative strength and popular support.

- Corruption. The corruption variable could take a value that ranges from 0 to 6, with 6 representing the best control of corruption and 0 standing for the worst rating. This variable is a measure of corruption within the political system. The ICRG measure of corruption takes into account not only financial corruption in the form of special payments and bribes related to trade licenses, exchange controls, tax assessment, police protection or loans, but more focused on the type of corruption in the form of excessive patronage, nepotism, job reservations, secret party funding and suspiciously close ties between politics and business. A higher score for this variable stands for lower risks and better control of corruption in the political system.

- Democratic Accountability. The possible value of this variable ranges from 0 to 6 with 6 indicating the best democratic accountability and the most responsive the government is to its people. This variable measures the extent to which the government responds to its citizens, based on the assumption that the less responsive it is, the more likely for the government to fail. The scores are assigned on the basis of the type of governance adopted by the country. The types of governance that are used to define this variable include alternating democracy, dominated democracy, de-facto one-party state and de jure one-party state and autarchy.

- Bureaucracy Quality. The range of this variable is from 0 to 4. A higher value of this variable is assigned to countries where the bureaucracy has better capabilities to govern without abrupt changes in policy or interruption in government services. The institutional strength and quality of the bureaucracy is an important determinant of risks and may minimize revisions of policy when governments change. Higher bureaucracy quality is likely to be associated with more efficient management and allocation of resources and more effective delivery of public services.

Descriptive Statistics

Variable		Mean	Std. Dev.	Min	Max	Observations	
Government stability	overall	7.117693	2.221859	1	11.58333	N =	268
	between		.9816619	4.583333	9.729167	n =	67
	within		1.995953	2.242693	12.45103	T =	4
Democratic accountability	overall	4.013993	1.531517	0	6	N =	268
	between		1.328448	1.25	6	n =	67
	within		.7749819	1.868159	6.576493	T =	4
corruption	overall	3.528296	1.369459	0	6	N =	268
	between		1.24106	1.25	6	n =	67
	within		.5937134	1.278296	5.028296	T =	4
Bureaucracy quality	overall	2.397699	1.225823	0	4	N =	268
	between		1.12955	0	4	n =	67
	within		.4910144	.897699	4.397699	T =	4

Sample: 67 countries, years 1985, 1990, 1995 and 2000
Source: International Country Risk Guide, the Political Risk Group, Inc. 2009

Worldwide Governance Indicators

The Worldwide Governance Indicators measure six dimensions of governance: voice and accountability, political stability and absence of violence or terrorism, government effectiveness, regulatory quality, rule of law and corruption. Covering 212 countries and territories for 1996, 1998 and 2000, and annually from 2002 through 2008, the indicators are based on several hundred individual variables measuring perceptions of governance, drawn from different data sources from around the world. These individual measures are

assigned to categories that capture the six dimensions of governance and are used to construct six aggregate governance indicators with an unobserved components model.

The WGI are based on subjective or perception-based data on governance reflecting the views of various informed stakeholders. Kaufmann et al (2009) show that there are several reasons for using subjective data to measure governance. First, perceptions are important because agents base their decisions on their perceptions and views. Second, in many areas of governance, there are few alternatives available to measure governance. When objective or fact-based data are available, they often capture a de jure notion of laws that differs from the de facto reality. The authors further argue that almost all measures of governance and the investment climate rely on judgment in some measure so that the distinction between subjective and objective data may not be a valid dichotomy.

- Governance is defined broadly as the traditions and institutions by which authority in a country is exercised (Kaufman et al 2009). The six corresponding dimensions of governance are:

- Voice and accountability: perceptions of the extent to which citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association and free media.

- Political stability and absence of violence: perceptions of the likelihood that the government will be destabilized or overthrown by violent means.

- Government effectiveness: perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation and the credibility of the government's commitment to such policies.

- Regulator quality: perceptions of the ability of the government to formulate and implement sound policies and regulations that permits and promotes private sector development.

- Rule of law: perceptions of the extent to which agents have confidence in and abide by the rules of society and the quality of contract enforcement, property rights, the police and the courts, as well as the likelihood of crime and violence.

- Control of corruption: perceptions of the extent to which public power is exercised for private gain.

The World Governance Indicators are constructed using 35 different sources, which consist of surveys of individuals or domestic firms, expert assessments and commercial business information providers. These data sources are provided by 33 organizations, including international organizations such as African Development Bank, Asian Development Bank, European Bank for Reconstruction and Development and

private business information providers such as Political Risk Services and the Economist Intelligence Unit.

As for the method of aggregation, individual data sources are combined to construct the six aggregate governance indicators. The underlying statistical approach assumes that each of the individual data sources provides an imperfect signal of some underlying perception of governance that is difficult to observe directly. Thus our objective is to extract the informative signal about governance from each individual data source and to optimally combine different data sources to derive the best measurement of governance in a country. Kaufmann, Kraay and Mastruzzi (2004 and 2009) adopt an unobserved components approach and argue that the advantage of this method is that the aggregate indicators are more informative about the unobserved governance than any individual data source. The identifying assumption in the unobserved components approach is that any observed correlation between two measures of a governance variable is due to their common but unobserved signal of that governance variable. By this assumption, data sources that are more correlated with each other are more informative about the underlying governance variable. The authors rescale the individual indicators from each data source so that they are comparable across sources and then construct a weighted average of each rescaled data sources to build an aggregate indicator of governance.

The authors emphasize the limitations of these measures of governance, which are shared by "all efforts to measure governance across countries and over time". The margins of error are present in "any effort to measure governance" and are due to the difficulty in measuring such a complicated variable as governance. This paper also shows that more than half of all cross-country comparisons result in highly significant differences in one of the six dimensions of governance. It is shown that the likelihood of a comparison between any given pair of countries being characterized by a significant difference in governance is about 75%. In addition, the authors show that about one third of countries have had significant changes in at least one dimension of governance between 1998 and 2008.

Descriptive Statistics

Variable		Mean	Std. Dev.	Min	Max	Observations	
Government Effectiveness	overall	.76	.99	-.96	2.6	N =	86
	between		.99	-.83	2.43	n =	43
	within		.13	.48	1.05	T =	2

Sample: 43 countries, years 1996 and 2000
Source: The Worldwide Governance Indicators Dataset, World Bank 2009

The Open Budget Index (OBI)

Developed by the International Budget Partnership (IBP), the Open Budget Initiative (OBI) dataset provides measurements of public availability of budget information and other transparent and accountable budgeting practices in 85 countries. The survey has

123 questions, of which 91 questions evaluate public access to budge information. The responses to these questions are averaged to form the open budge index. The remaining 32 questions are related to opportunities for public participation in the budget process and the ability of key oversight institutions of government to hold the executive accountable. Most questions ask about what occurs in practice, not requirements that exist in law. The OBI index is based on the 91 questions related to public availability of information on the Open Budge Questionnaire. The score reflects the quantity of publicly available information in the eight key budget documents, namely, pre-budget statement, executive's budget proposal, enacted budget, citizens' budget, in-year reports, mid-year review, year-end report and audit report. The public availability and comprehensiveness of the Executive's Budge Proposal is a key determinant of a country's OBI score, as 58 out of the 91 questions concern the executive's budge proposal.

Publicly available information about the budget documents is defined as the information that can be obtained by any and all members of the public through a request to the public authority issuing the documents. Thus it includes two types of information, one of which is available through a well-defined procedure that ensures simultaneous release of public documents to all interested parties. The other type of information is available only on request. The implicit assumption underlying this definition is that the performance on OBI of a given country is not affected by which method a government chooses to disseminate documents

Letter grade "a" or "b" is used to describe good practice regarding the subject matter of the question. "c" or "d" corresponds to poor practices. An "a" response indicates that a standard is fully met. In order to aggregate the responses, a numeric score of 100 percent is awarded for "a", 67 percent for "b", 33 percent for "c" and 0 for "d". If the response is "e" not applicable, then the question is not counted as part of the aggregate. If only three options are given by the question, then "a" is assigned 100 percent, "b" is graded as 0. "c" causes the question to be excluded in the aggregation.

A score of 81 to 100 percent indicates that the government provides extensive information to citizens on the budget process. 61 to 80 percent indicates that the government "provides significant information to citizens", country scores of 41 to 60 indicate that the government "provides some information to citizens" and scores of 21 to 40 percent indicate that the government "provides minimal information to citizens". Scores below 20 percent indicate that the government "provides scant or no information to citizens."

According the creators of the OBI, there is a worldwide transparency gap in the public financial management practices. Only five countries make extensive information publicly available. On average countries surveyed provide minimal information on their central government's budget and financial activities. In most of the countries surveyed, legislatures have very limited capabilities to review the executive's budget proposal and monitor the implementation of the budgeting process. Likewise, the supreme audit institutions do not have sufficient independence or ability to monitor the government expenditure.

Less transparent countries share similar characteristics such as geographic locations, income level, dependency on foreign aids and weak democratic institutions. In addition the survey finds that the lack of transparency undermines accountability and prevents participation by citizens.

The Open Budget Questionnaire is intended to offer an independent, non governmental view of the state of budget transparency. All researchers are non-governmental organizations and share a common interest in promoting access to information during the budget process, strengthening the power of the legislature, and in the performance of Supreme Audit Institution. The IBP staffs conduct an analysis after the questionnaires are completed and make an effort to ensure that the questions have been answered in a consistent manner. The feedbacks are also cross-checked with public information. Following this analysis and review the questionnaire is submitted to two anonymous peer reviewers who are required to be independent of both the government and the research organization. Peer reviewer feedbacks are examined by the IBP staff so that the comments are consistent with the study's methodology and help ensure the consistency of assumptions across countries in selecting answers.

Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
OBI	55	45.51	22.72	2.22	88.52

Sample: 55 countries Year 2006
Source: the Open Budget Initiative (2006)

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VII. Tables of Regression Results

Table 1. Fixed Effect Estimates: Governance Measured by World Governance Indicator

VARIABLES	(1) lnu5mr	(2) lnu5mr	(3) lnu5mr	(4) lnu5mr
lngdppc	-0.682***	-0.620***	-0.171	-0.174
	(0.0422)	(0.0430)	(0.177)	(0.200)
sd_gdp_pc_gr	-0.00231	-0.00300	0.00346	0.00372
	(0.00909)	(0.00833)	(0.0177)	(0.0186)
gininorm	-0.0150*	-0.0114	-0.0191*	-0.0191*
	(0.00814)	(0.00739)	(0.0106)	(0.0107)
phe_gdp	-0.0287**	-0.0267**	-0.0312	-0.0300
	(0.0126)	(0.0103)	(0.0291)	(0.0420)
f_ill25		0.0103**	0.0220**	0.0220**
		(0.00389)	(0.0107)	(0.0109)
gov			0.0800	0.0899
			(0.168)	(0.293)
phe_gov				-0.00234
				(0.0409)
Constant	9.594***	8.678***	4.878***	4.900***
	(0.442)	(0.465)	(1.382)	(1.547)
Observations	255	255	86	86
R-squared	0.738	0.767	0.266	0.266
Number of countries	51	51	43	43

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Dependent Variable: log of under-five child mortality rates
Explanatory Variables: log of GDP per capita, volatility of GDP growth, inequality, public expenditure on health as a share of GDP, female illiteracy at the age of 25, government effectiveness as measured by World Bank Governance Indicators, Interaction between public expenditure on health and government effectiveness.
Sample
Columns (1)-(2): 51 countries, 1985; 1990; 1995; 2000; 2005
Columns (3)-(4): 43 countries, 1995; 2000

Table 2: Fixed Effects Estimates: Governance Measured by World Governance Indicator and Open Budget Index

VARIABLES	(1) lnu5mr	(2) lnu5mr	(3) lnu5mr	(4) lnu5mr
lngdppc	-0.402***	-0.405***	-0.493***	-0.496***
	(0.114)	(0.115)	(0.0878)	(0.0897)
sd_gdp_pc_gr	0.0789*	0.0794*	0.0882**	0.0885**
	(0.0412)	(0.0439)	(0.0403)	(0.0396)
phe_gdp	-0.121*	-0.127**	-0.146**	-0.154
	(0.0627)	(0.0626)	(0.0552)	(0.124)
governance	-0.253	-0.529		
	(0.239)	(0.481)		
phe_gov		0.0527		
		(0.0552)		
obi			-0.000860	-0.00137
			(0.00618)	(0.0117)
phe_obi				0.000160
				(0.00218)
Constant	6.855***	6.815***	7.667***	7.710***
	(0.889)	(0.909)	(0.468)	(0.807)
Observations	55	55	55	55
R-squared	0.766	0.771	0.759	0.759

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Dependent Variable: log of under-five child mortality rates
Explanatory Variables
(1)-(2): log of GDP per capita, volatility of GDP growth, inequality, public expenditure on health as a share of GDP, female illiteracy at the age of 25, government effectiveness as measured by World Bank Governance Indicators, Interaction between public expenditure on health and government effectiveness.
(3)-(4): log of GDP per capita, volatility of GDP growth, inequality, public expenditure on health as a share of GDP, female illiteracy at the age of 25, governance as measured by the Open Budget Index, interaction between public expenditure on health and OBI index.
Sample: cross section of 55 countries for year 2005

Table 3. Fixed Effect Estimates: Governance Measured by ICRG Indicator of Quality of Bureaucracy

VARIABLES	(1) lnu5mr	(2) lnu5mr	(3) lnu5mr	(4) lnu5mr
lngdppc	-0.589***	-0.544***	-0.511***	-0.512***
	(0.0456)	(0.0399)	(0.0419)	(0.0440)
sd_gdp_pc_gr	0.0130	0.00751	0.00227	0.00221
	(0.00842)	(0.00741)	(0.00737)	(0.00735)
f_ill25		0.0108***	0.0110***	0.0110***
		(0.00310)	(0.00299)	(0.00307)
phe_gdp	-0.0456***	-0.0382***	-0.0371***	-0.0400
	(0.0114)	(0.00843)	(0.00788)	(0.0241)
b_quality			-0.0769***	-0.0787***
			(0.0234)	(0.0230)
phe_b_quality				0.000939
				(0.00676)
Constant	8.201***	7.522***	7.453***	7.466***
	(0.346)	(0.330)	(0.318)	(0.356)
Observations	268	268	268	268
R-squared	0.644	0.690	0.711	0.711
Number of countries	67	67	67	67

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Dependent Variable: log of under-five child mortality rates

Explanatory Variables: log of GDP per capita, volatility of GDP growth, public expenditure on health as a share of GDP, female illiteracy at the age of 25, quality of bureaucracy as measured by ICRG (i.e. higher values indicate better governance), Interaction between public expenditure on health and quality of bureaucracy.

Sample

(1): 57 countries; years 1985, 1990, 1995 and 2000
(2): 56 countries; years 1985, 1990, 1995 and 2000
(3)-(4): 53 countries; years 1985, 1990, 1995 and 2000

Table 4A. Fixed Effect Estimates of Determinants of Child Mortality
Alternative Measures of Governance Efficiency

VARIABLES	(1) lnu5mr	(2) lnu5mr	(3) lnu5mr	(4) lnu5mr	(5) lnu5mr	(6) lnu5mr
lngdppc	-0.648***	-0.603***	-0.603***	-0.583***	-0.603***	-0.605***
	(0.0445)	(0.0398)	(0.0392)	(0.0401)	(0.0417)	(0.0429)
sd_gdp_pc_gr	0.00537	0.00207	0.00209	-2.53e-05	0.00192	0.00164
	(0.00875)	(0.00807)	(0.00809)	(0.00798)	(0.00836)	(0.00838)
gininorm	-0.0183***	-0.0155***	-0.0154***	-0.0156***	-0.0152***	-0.0150***
	(0.00499)	(0.00467)	(0.00470)	(0.00484)	(0.00487)	(0.00496)
f_ill25		0.00835**	0.00835**	0.00798**	0.00835**	0.00800**
		(0.00375)	(0.00377)	(0.00377)	(0.00378)	(0.00389)
phe_gdp	-0.0207*	-0.0196**	-0.0196**	-0.0834***	-0.0196**	-0.0391
	(0.0112)	(0.00943)	(0.00940)	(0.0250)	(0.00943)	(0.0338)
corrup			0.00119	-0.0409*		
			(0.0181)	(0.0218)		
phe_corrup				0.0138***		
				(0.00499)		
demo					-0.00198	-0.0130
					(0.0157)	(0.0226)
phe_demo						0.00381
						(0.00615)
Constant	9.410***	8.707***	8.700***	8.744***	8.702***	8.774***
	(0.360)	(0.372)	(0.391)	(0.401)	(0.384)	(0.436)
Observations	212	212	212	212	212	212
R-squared	0.705	0.730	0.730	0.738	0.730	0.731
Number of countries	53	53	53	53	53	53

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Dependent Variable: log of under-five child mortality rates

Explanatory Variables:

(1)-(4) log of GDP per capita, volatility of GDP growth, inequality, public expenditure on health as a share of GDP, female illiteracy at the age of 25, control of corruption as measured by ICRG (i.e. higher values indicate better governance), Interaction between public expenditure on health and control of corruption.

(5)-(6) log of GDP per capita, volatility of GDP growth, inequality, public expenditure on health as a share of GDP, female illiteracy at the age of 25, democratic accountability measured by ICRG, Interaction between public expenditure on health and democratic accountability.

Sample

53 countries; years 1985, 1990, 1995, 2000

Table 4B. Fixed Effect Estimates of Determinants of Child Mortality
Alternative Measures of Governance Efficiency

VARIABLES	(1) lnu5mr	(2) lnu5mr	(3) lnu5mr	(4) lnu5mr	(5) lnu5mr	(6) lnu5mr
lngdppc	-0.589***	-0.544***	-0.546***	-0.530***	-0.536***	-0.540***
	(0.0456)	(0.0399)	(0.0397)	(0.0395)	(0.0411)	(0.0421)
sd_gdp_pc_gr	0.0130	0.00751	0.00726	0.00566	0.00445	0.00410
	(0.00842)	(0.00741)	(0.00738)	(0.00727)	(0.00774)	(0.00771)
f_ill25		0.0108***	0.0108***	0.0102***	0.0104***	0.00988***
		(0.00310)	(0.00312)	(0.00308)	(0.00330)	(0.00337)
phe_gdp	-0.0456***	-0.0382***	-0.0385***	-0.106***	-0.0358***	-0.0649**
	(0.0114)	(0.00843)	(0.00849)	(0.0211)	(0.00809)	(0.0299)
corrup			-0.0113	-0.0537***		
			(0.0187)	(0.0192)		
phe_corrup				0.0151***		
				(0.00421)		
demo					-0.0310**	-0.0461**
					(0.0145)	(0.0179)
phe_demo						0.00583
						(0.00555)
Constant	8.201***	7.522***	7.576***	7.642***	7.593***	7.712***
	(0.346)	(0.330)	(0.334)	(0.342)	(0.311)	(0.359)
Observations	268	268	268	268	268	268
R-squared	0.644	0.690	0.690	0.701	0.698	0.700
Number of countries	67	67	67	67	67	67

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Dependent Variable: log of under-five child mortality rates
Explanatory Variables:
(1)-(4) log of GDP per capita, volatility of GDP growth, public expenditure on health as a share of GDP, female illiteracy at the age of 25, control of corruption as measured by ICRG (i.e. higher values indicate better governance), Interaction between public expenditure on health and control of corruption.
(5)-(6) log of GDP per capita, volatility of GDP growth, public expenditure on health as a share of GDP, female illiteracy at the age of 25, democratic accountability measured by ICRG, Interaction between public expenditure on health and democratic accountability.
Sample: 67 countries; years 1985, 1990, 1995, 2000

Note: Same as Table 4a sans inequality variable.

Table 5A. 2SLS Between Estimates

VARIABLES	(1) lnu5mr	(2) lnu5mr	(3) lnu5mr	(4) lnu5mr	(5) lnu5mr	(6) lnu5mr
lngdppc	-0.367*	-0.516***	-0.487**	-0.477**	-0.448***	-0.439***
	(0.190)	(0.170)	(0.200)	(0.193)	(0.0833)	(0.0788)
sd_gdp_pc_gr	-0.0475	0.00573	5.05e-05	-0.000258	-0.00257	0.00186
	(0.0411)	(0.0405)	(0.0456)	(0.0429)	(0.0312)	(0.0335)
gininorm	0.0239***	0.0240***	0.0235***	0.0261***	0.0221***	0.0237***
	(0.00764)	(0.00534)	(0.00568)	(0.00706)	(0.00575)	(0.00639)
f_ill25		0.0114**	0.0112**	0.00990*	0.0104***	0.0103***
		(0.00510)	(0.00510)	(0.00581)	(0.00379)	(0.00362)
phe_gdp	-0.291	0.0383	0.0139	-0.139	-0.0159	-0.0994
	(0.195)	(0.238)	(0.249)	(0.419)	(0.147)	(0.205)
phe_b_quality				0.0444		
				(0.0853)		
b_quality			-0.0200	-0.153		
			(0.0870)	(0.274)		
corrup					-0.0552	-0.161
					(0.105)	(0.293)
phe_corrup						0.0252
						(0.0598)
Constant	6.336***	5.948***	5.896***	6.147***	5.928***	6.088***
	(0.933)	(0.623)	(0.654)	(0.738)	(0.606)	(0.728)
Observations	212	212	212	212	212	212
Number of countries	53	53	53	53	53	53

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

2SLS between estimates:
Instruments
(1)-(3) government stability
(4) government stability, government stability*bureaucratic quality
(5) government stability
(6) government stability, government stability*corruption score

Table 5B. 2SLS Between Estimates

VARIABLES	(1) lnu5mr	(2) lnu5mr	(3) lnu5mr	(4) lnu5mr	(5) lnu5mr	(6) lnu5mr
lngdppc	-0.477**	-0.568***	-0.509***	-0.517***	-0.458***	-0.456***
	(0.211)	(0.165)	(0.116)	(0.123)	(0.0746)	(0.0737)
sd_gdp_pc_gr	0.00832	0.0224	0.0172	0.0124	0.0187	0.0196
	(0.0348)	(0.0266)	(0.0265)	(0.0295)	(0.0255)	(0.0284)
f_ill25		0.0105***	0.0106***	0.0117***	0.0103***	0.0102***
		(0.00291)	(0.00301)	(0.00399)	(0.00276)	(0.00273)
phe_gdp	-0.268	0.0133	-0.0251	0.101	-0.0488	-0.0669
	(0.229)	(0.198)	(0.151)	(0.334)	(0.128)	(0.204)
phe_b_quality				-0.0306		
				(0.0689)		
b_quality			-0.0408	0.0295		
			(0.0764)	(0.175)		
corrup					-0.0873	-0.101
					(0.104)	(0.230)
phe_corrup						0.00414
						(0.0512)
Constant	8.034***	7.498***	7.271***	7.031***	7.162***	7.195***
	(0.972)	(0.730)	(0.610)	(0.820)	(0.529)	(0.720)
Observations	268	268	268	268	268	268
Number of countries	67	67	67	67	67	67

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

2SLS between estimates:
Instruments
(1)-(3) government stability
(4) government stability, government stability*bureaucratic quality
(5) government stability
(6) government stability, government stability*corruption score

Note: Same as Table 5a sans the inequality variable.

Table 6A. 2SLS Between Estimates: Alternative Instruments

VARIABLES	(1) lnu5mr	(2) lnu5mr	(3) lnu5mr	(4) lnu5mr	(5) lnu5mr	(6) lnu5mr
lngdppc	-0.515***	-0.560***	-0.557***	-0.198	-0.547***	-0.442**
	(0.134)	(0.128)	(0.143)	(1.725)	(0.145)	(0.207)
sd_gdp_pc_gr	-0.0327	0.0143	0.0136	-0.0411	0.0282	0.0147
	(0.0326)	(0.0356)	(0.0382)	(0.283)	(0.0504)	(0.0483)
gininorm	0.0255***	0.0243***	0.0241***	0.0470	0.0192**	0.0257**
	(0.00617)	(0.00559)	(0.00594)	(0.0904)	(0.00792)	(0.0110)
f_ill25		0.0126***	0.0128***	-0.00564	0.0153**	0.0111
		(0.00421)	(0.00410)	(0.0803)	(0.00685)	(0.00898)
phe_gdp	-0.134	0.104	0.108	-1.727	0.247	-0.190
	(0.136)	(0.171)	(0.161)	(7.711)	(0.323)	(0.696)
phe_b_quality				0.428		
				(1.714)		
b_quality			-0.00957	-1.328		
			(0.0907)	(5.330)		
corrup					-0.201	-0.364***
					(0.198)	(0.137)
phe_corrup						0.0670
						(0.0756)
Constant	6.882***	6.015***	6.006***	8.006	6.286***	6.419***
	(0.706)	(0.633)	(0.659)	(7.784)	(0.853)	(0.603)
Observations	212	212	212	212	212	212
Number of countries	53	53	53	53	53	53

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

2SLS between estimates:
Instruments used:
(1)-(3): democratic accountability
(4): democratic accountability, democratic accountability*bureaucratic quality
(5): democratic accountability
(6): democratic accountability, democratic accountability*corruption

Note: The democratic accountability variable is used as an instrument (i.e. higher values indicate more democratic accountability).

Table 6B. 2SLS Between Estimates: Alternative Instruments

VARIABLES	(1) lnu5mr	(2) lnu5mr	(3) lnu5mr	(4) lnu5mr	(5) lnu5mr	(6) lnu5mr
lngdppc	-0.577***	-0.502***	-0.494***	-0.504***	-0.494***	-0.484***
	(0.103)	(0.0901)	(0.0925)	(0.0896)	(0.0851)	(0.0903)
sd_gdp_pc_gr	0.0115	0.0196	0.0169	0.0236	0.0211	0.0259
	(0.0301)	(0.0260)	(0.0265)	(0.0284)	(0.0255)	(0.0260)
f_ill25		0.00985***	0.0104***	0.00930***	0.0114***	0.0111***
		(0.00261)	(0.00280)	(0.00349)	(0.00302)	(0.00312)
phe_gdp	-0.157	-0.0700	-0.0500	-0.184	0.0643	-0.0262
	(0.106)	(0.0948)	(0.101)	(0.262)	(0.183)	(0.262)
phe_b_quality				0.0408		
				(0.0563)		
b_quality			-0.0345	-0.137		
			(0.0713)	(0.144)		
corrup					-0.165	-0.242*
					(0.138)	(0.135)
phe_corrup						0.0221
						(0.0298)
Constant	8.463***	7.272***	7.222***	7.608***	7.318***	7.504***
	(0.545)	(0.558)	(0.570)	(0.699)	(0.558)	(0.566)
Observations	268	268	268	268	268	268
Number of countries	67	67	67	67	67	67

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

2SLS between estimates:
Instruments used:
(1)-(3): democratic accountability
(4): democratic accountability, democratic accountability*bureaucratic quality
(5): democratic accountability
(6): democratic accountability, democratic accountability*corruption

Note: Same as Table 6a sans the inequality variable.

+AMDG