INVESTIGATING THE EMPIRICAL RELATIONSHIP BETWEEN MILLENNIUM CHALLENGE CORPORATION AID ELIGIBILITY CRITERIA AND DEVELOPMENT OUTCOMES

A Thesis submitted to the Faculty of the Graduate School of Arts and Sciences of Georgetown University in partial fulfillment of the requirements for the degree of Master of Public Policy

By

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ABSTRACT

Established in 2004, the Millennium Challenge Corporation (MCC) is an American bilateral aid agency that enters five-year funding agreements with countries demonstrating sufficiently high scores in seventeen eligibility measures. Limiting eligibility allows the MCC to only fund countries that possess the institutional frameworks hypothetically necessary for growth and effective use of aid money. While these indicators have a large amount of theoretical support, there has – to date – been no empirical evaluation of whether or not they (grouped in this way) actually are significantly associated with positive health and economic development outcomes. Using fixed-effects models to analyze the relationship between lagged eligibility indicators and three development outcomes (infant mortality rates, life expectancy at birth, and GDP per capita), we find that the majority of indicators in low income countries show significant correlations, while the majority in lower middle income countries do not. Assessing the appropriateness of the median-based eligibility cutoffs, we conclude that while some of the data may support slightly stricter or more relaxed standards, the indicators are generally within acceptable ranges of expected marginal effects and political considerations may outweigh statistical concerns.
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Introduction

Over the last fifty years, over two trillion dollars of aid has flowed from wealthy countries to poor countries, a tremendous investment of public resources that has improved the lives of millions. The system is far from perfect, however – aid is often poorly allocated and lost through mismanagement and corruption – diminishing the prospects of sustainable outcomes. The Millennium Challenge Corporation (MCC) was created in 2004 as a new approach to US bilateral aid, in an effort to ensure that development programs reflect local needs and that aid is disbursed to countries most likely to use it effectively.

Central to the MCC’s approach to aid is a competitive conditional model which requires recipient countries to have a demonstrated commitment to democratic governance, economic freedom, and investments in their people. This approach attempts to direct assistance to countries believed to possess the necessary policy structures for growth (but are lacking in funds and capacity). With increasing pressures domestically and internationally to deliver finite aid resources effectively, much attention is being paid to the MCC’s conditional aid model. If the MCC’s selective approach is correct, we would expect eligible countries to demonstrate stronger development outcomes over time as a result of possessing more of the purported requisites for growth. However, to date, there has been no empirical analysis evaluating the statistical relationship between the MCC’s particular set of selection criteria and development outcomes.

This report employs two types of fixed-effects models to analyze the relationship between the MCC’s fiscal year 2011 (FY2011) indicators and three development outcomes: infant mortality rates, life expectancy at birth, and GDP per capita. First, we find that 12 of the 17 indicators show significant relationships with development outcomes among low income countries (LICs) – a relatively strong showing. However, among lower middle income countries  

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1 Official development assistance (ODA) from 1960-2010 from DAC members of the OECD.
(LMICs), only five show any significance in the expected direction. Between the two income categories, only four indicators register significance in both – but two of these are in opposite directions.

Next, we find that – for a selected cohort of indicators and outcomes – the MCC’s chosen eligibility cutoff criteria appear to be reasonable. Graphing the fixed effects quadratic relationships, we find that the cutoffs generally rest within a region where the marginal effects of indicator scores have the expected impact on outcomes. The data could be used to support tightening the criteria; however, this would eliminate the eligibility of some countries.

While the analysis supports the validity of some indicators and calls into question the value of others, it is important to recognize that the analysis is limited to three outcomes, and that these measures carry significant political importance. Despite potentially questionable empirical validity, they are used to communicate aid priorities, and could still have positive correlations with aid efficiency and fewer corrupt aid practices.

**Motivation and Justification for Analysis**

There are significant policy implications for this research, beginning with the simple fact that foreign aid – while less than one half of one percent of the federal budget – represented a $28.8 billion investment of taxpayer funds in 2009. The competitive conditional aid approach promoted by the MCC consumes slightly less than $1 billion of this budget per year, and currently represents a portfolio of about $7 billion in planned, ongoing, and completed projects. There is much interest in the success (or failure) of this model; never before has an approach like this been taken on this scale. With increasing political pressures being exerted on aid agencies

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2 Latest figures available; source: [http://usoda.eads.usaidallnet.gov/data/fast_facts.html](http://usoda.eads.usaidallnet.gov/data/fast_facts.html). Figures are based on the OECD definition of foreign aid, or ODA.
worldwide to ensure strong returns on public investments, the MCC experiment in sustainable, accountable, and measurable foreign aid is being watched very closely.

Central to the MCC’s model is the competitive selection process, in which countries are compared to their peers on seventeen indicators within three areas: good governance, investments in their people, and economic freedom. The MCC believes that these independently developed indicators represent the components necessary for a country’s economic development, and that qualifying countries have the policy frameworks for growth but simply lack the necessary funding and capacity. The MCC’s goals for these indicators are twofold: first, it wants to invest its limited resources in countries most likely to use the funds efficiently and effectively; and second, the MCC wants to create a global incentive for developing countries to implement good governance policies (the “MCC effect”).

While these indicators have a large amount of theoretical support, there has – to date – been no empirical evaluation of whether or not they (grouped in this way) actually are significantly associated with positive health and economic development outcomes. The purpose of this paper is to examine this connection – whether the MCC’s indicators do effectively predict growth, and if there is a statistically significant relationship between the indicators and positive outcomes.

**Institutional Background**

With a stated mission of reducing poverty through economic growth, the MCC occupies a distinct position within the US foreign aid portfolio – targeting medium-risk, infrastructure-oriented development projects intended to catalyze long-term economic development. Unlike USAID, it does not provide any form of disaster relief, nor does it work with highly troubled nations or in post-conflict situations. And unlike the State Department, the MCC is not intended
to invest in overtly diplomatic or political ends – rather, aid is *supposed* to support only the legitimate economic development needs of qualifying recipient countries.³ In order to achieve these goals, it was deemed necessary by the Bush Administration to establish the MCC as an independent agency within the federal government – not as division of USAID or the State Department – to allow the MCC to function outside of perceived institutional constraints and focus on effective, results-driven economic development aid. The MCC is very much an experiment in bilateral aid – its approach and vision is still being tested, and its successes (and failures) are being closely watched by the global aid community.

John Hewko, a former MCC official who participated in the agency’s early development, outlined five core principles of the MCC’s operating model in a report published by The Carnegie Endowment for International Peace. First, sustainable development requires good governance, which includes: strong institutions, economic policies, investments in social programs, and attention paid to gender equality and environmental stewardship. Second, US taxpayer money will have the greatest impact on countries that have implemented these good governance principles. Third, country ownership is critical – the recipient countries must have a leadership role in identifying the focus, design, and implementation of the funded programs. Fourth, recipient countries must be held accountable for delivering agreed-upon results, or face aid suspensions or reductions for poor performance. Fifth, the assistance provided by the US government should incentivize the development of the infrastructures and institutions necessary for sustainable growth, reducing long-term dependence (Hewko 2010).

³ This is not to say that political considerations are entirely absent: any country currently barred from receiving development assistance under part 1 of the Foreign Assistance Act and other federal prohibitions cannot receive aid. For fiscal year 2012, there are 16 countries that are barred in this way. For more information, view the most recent “Candidate Country Report” at http://www.mcc.gov/pages/selection.
The focus of this paper is on the first and second components of the MCC model outlined by Hewko: the competitive conditional aid mechanism that restricts aid to countries fulfilling the MCC’s vision of good governance. The Millennium Challenge Act of 2003 – the MCC’s founding legislation – states that only countries that have demonstrated a commitment to democratic governance, economic freedom, and investment in their people can be considered. To screen potential recipients according to these principles, the MCC developed a set of 17 indicators\(^4\) culled from publicly-available datasets developed by a range of aid organizations and think tanks (see Table 1). To qualify, countries must be above the median for their income category (low income or lower middle income) for at least three indicators within each of the three categories laid out in the Act, as well have a qualifying score in “Control of Corruption” and an inflation rate below 15%.

<table>
<thead>
<tr>
<th><strong>Table 1: MCC Indicators</strong></th>
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</thead>
<tbody>
<tr>
<td>Indicator</td>
</tr>
<tr>
<td><strong>Good Governance</strong></td>
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<tr>
<td>Civil Liberties</td>
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<tr>
<td>Political Rights</td>
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<tr>
<td>Voice and Accountability</td>
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<tr>
<td>Government Effectiveness</td>
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<tr>
<td>Rule of Law</td>
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<tr>
<td>Control of Corruption</td>
</tr>
<tr>
<td><strong>Economic Freedom</strong></td>
</tr>
<tr>
<td>Inflation</td>
</tr>
<tr>
<td>Fiscal Policy</td>
</tr>
<tr>
<td>Business Start-up</td>
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<tr>
<td>Trade Policy</td>
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<tr>
<td>Regulatory Quality</td>
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<tr>
<td>Land Rights and Access</td>
</tr>
</tbody>
</table>

\(^4\) These indicators are evolving: while the main areas of focus (democracy/good governance, economic freedom, and investments in people) and sub-categories (political pluralism, human/civil rights, combating corruption, property rights, education, health, environmental sustainability, etc.) are mandated, the tools for measuring these are discretionary – and subject to change over time. As such, the indicators for FY2012 differ *slightly* from FY2011 – however, the content of what is measured has not changed.
<table>
<thead>
<tr>
<th>Investments in People</th>
<th>Corporation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Expenditures in Health</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>Public Expenditures in Primary Education</td>
<td>UNESCO</td>
</tr>
<tr>
<td>Immunization Rates</td>
<td>World Health Organization, UNICEF</td>
</tr>
<tr>
<td>Girls’ Primary Education Completion</td>
<td>UNESCO</td>
</tr>
<tr>
<td>Natural Resource Management</td>
<td>Columbia University, Yale University, University of New Hampshire</td>
</tr>
</tbody>
</table>

While all of the indicators are based on publicly available data, not all of the indicators are as “off-the-shelf” as they may initially appear. Some indicators – such as the Business Start-up and Land Rights and Access measures – are composites of multiple indices, themselves publicly available. Business Start-up combines measures of the time and money required to open a business, and Land Rights and Access is based on measures of land registration constraints and accessibility. Similarly, the Natural Resource Management measure is a custom indicator developed specifically for the MCC by the Center for International Earth Science Information Network (CIESIN) at Columbia University, which includes measures of child mortality, access to water, access to sanitation, and environmental protection drawn from sources ranging from UN agencies to CIESIN itself (CIESIN 2011). These composite measures would not have been developed without the MCC’s specific needs and funding.

As of FY2011, the MCC has funded projects (known as “compacts”) in twenty-four countries, and supported “threshold programs” (assistance directed at countries just below eligibility thresholds, administered by USAID) in twenty-three countries. By law, each compact is a five-year partnership that cannot be extended, nor can concurrent compacts be deployed in any single country. Compacts need not be limited to a single area of focus, and countries can apply for new compacts at the end of each five-year period. Compacts include projects to develop transportation, agricultural, and rural infrastructures; investments in health, water,
sanitation, and education systems; and initiatives focused on governance and corruption reduction. Impact evaluation data is collected on virtually every project; however, only several compacts have been completed and program-specific impact evaluations (peer-reviewed and developed by independent agencies) are forthcoming.

**Literature Review**

*Aid effectiveness: the motivation for a new model.*

When examining the context for the MCC and the impetus behind developing alternative approaches to foreign aid, it helps to begin with a review of the literature on overall aid effectiveness – a body of work with a long history of harsh criticisms. In their papers *Conditional Aid Effectiveness: A Meta-Study* and *The Aid Effectiveness Literature: The Sad Results of 40 Years of Research*, researchers Hristos Doucouliagos and Martin Paldam conduct comprehensive analyses of the aid effectiveness literature (AEL). Perhaps unsurprisingly, their conclusions – with regard to aid effectiveness – is rather grim. Examining more than a hundred separate papers, they find that the overall conclusion of the AEL is that foreign investments in development aid has had little to no significant measurable effect. In fact, these conclusions are supported even in published literature presenting outcomes in a positive light, leading Doucouliagos and Paldam to conclude that there is a significant “reluctance bias” – that is, researchers appear to be hesitant to report or highlight negative results, instead selecting the most positive and significant outcomes as key findings. Their conclusions – that even the most

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5 In this instance, the meaning of the term “conditional” differs from what has been used thus far in this paper. Doucouliagos and Paldam refer to “conditional” as a form of statistical analysis, where the “estimating equation [of AEL] contains a second order term, where aid is multiplied with another variable termed the ‘condition.’” The purpose of the paper was to determine if aid effectiveness literature presenting results conditioned on a certain factor – such as an intent to report findings in a favorable light – resulted in a systematic boost in the perceived effectiveness of aid. They find that study characteristics systematically influence results.
optimistic of the literature paint a picture of aid having only marginal positive significance – is particularly discouraging.

There are at least three – and by no means mutually exclusive – ways of interpreting these negative conclusions. The first is that extracting cause and effect of development aid inputs and outcomes in macroeconomic terms is extremely difficult, due to limitations in data and the often impossible task of disentangling the effects of aid from other factors. In their paper Aid Effectiveness: Opening the Black Box, Francois Bourguignon and Mark Sundberg point to challenges ranging from poorly designed and executed projects to technical statistical limitations, beginning with the often nonexistent counterfactual. They write: “[William] Easterly (2006) argues that aid is not associated with growth in Africa, whereas Paul Collier (2006) argues, in the absence of aid, growth would have been far worse. Moreover, the multidimensionality of development objectives (mean income, poverty, literacy, access to sanitation, inoculations) further complicates empirical analysis.” Establishing clear attribution – in this complex, fluid environment – is often impossible. “It is practically impossible to say whether an additional child being vaccinated is due to an immunization aid program, additional domestic public or private funding of the health system, reduced spending on other development outcomes, or possibly an improvement in health care delivery” (Bourguignon and Sundberg 2007).

The second – and perhaps most pessimistic – interpretation is that aid simply hasn’t been working, and that the problem goes beyond the simple fact that establishing causal connections between aid investments and development is difficult. There is a strong body of work in this area arguing that the connection between aid inputs and development outcomes is tenuous at best (William Easterly, Ross Levine, and David Roodman 2003; Raghuram G. Rajan and Arvind Subramanian 2005; Michael Clemens, Steven Radelet, and Rikhil Bhavnani 2005).
Perhaps some of the best-known attacks on the effects of aid come from William Easterly, whose pair of books *The Elusive Quest for Growth* (which led to his exit from the World Bank) and *The White Man’s Burden* both argue that traditional approaches to modern aid – donor countries transferring large-scale grants and concessional loans to developing countries – serve little good (and may, in fact, cause significant harms – in the form of distorted incentives). In her book *Dead Aid: Why Aid Is Not Working and How There Is a Better Way for Africa*, author Dambisa Moyo offers harsh criticism of entire donor-recipient paradigm of foreign aid, where – like Easterly – she argues that the incentives for growth are completely misaligned through the process of aid dependence. According to Moyo, when countries step in with interventions developed abroad, with little emphasis on the quality of the local governance, aid (at best) does little to address local needs and (at worst) lines the pockets of corrupt officials and removes all local incentives to design and implement relevant grassroots projects. In effect, the trillion dollars worth of development aid poured into Africa over the last fifty years has, Moyo argues, represented an offer that African governments couldn’t refuse – an offer that often overcame the much-needed local pressures to soberly assess indigenous political and technical capacities, fundraise locally (through bond issues, etc.), reduce corruption, and respond to citizens’ needs. Instead, with hundreds of millions of dollars attached to projects developed in wealthy capitals abroad, Moyo contends that the only constituents African governments systematically responded to were foreign aid officials who knew little of what the local citizenry really needed.

The third, and far more hopeful interpretation, is the one advocated by economist Jeffrey Sachs. In his book *The End of Poverty*, Sachs argues that the problem isn’t that too much aid has delivered; in fact, the problem is that *not enough* aid has been committed. Focusing on the poverty traps that keep developing countries from improving – disease, limited access to
healthcare and social services, financial and political instability, physical isolation, and environmental challenges – Sachs argues that wealthy nations can push poor countries onto the “ladder of economic development” by investing greater amounts in foreign assistance. In fact, Sachs suggests that the US increase its share of aid to 0.7% of GNP (up from .14%) – or, from a global perspective, a total of $140 billion per year from wealthy nations (about .5% of developed countries’ GNP). According to Sachs, the poor evidence of strong outcomes in development aid can be reversed simply by focusing more resources into targeted sectors (infrastructure, social services) in a measurable way.

What are the determinants of development – and can growth be predicted?

One of the longest-running questions in development economics is why some countries flourish while other languish. What factors separate wealthy nations from poor ones – and can these factors be isolated and measured? On some levels, this is very much an absurd question – to distill the essentials of human development into simple, universal factors is an almost Sisyphean task. While the desire to develop seek improved living conditions is likely universal, the reasons why some countries succeed and others fail are highly localized and fluid over time.

This hasn’t stopped many from developing theories, however, and some theories are certainly more compelling than others. Popular academics David Landes and Jared Diamond published two books often grouped together – The Wealth and Poverty of Nations (1995) and Guns, Germs, & Steel (2005), respectively. Each attempts to determine the key ingredients to growth, with Landes gravitating towards culturally-based arguments (work ethics and divergent systems of values) while Diamond focuses more on the impact of local environments (access to resources, food, and climate). While each author takes pains to emphasize their theories as being only partially explanatory, each can be (and has been) contradicted with significant historical
examples, and both have faced criticisms for Eurocentric analyses. Their arguments remain compelling in parts, though.

Somewhat more credible (in terms of applicability to aid) are theories focusing on the role of governance advanced by economists David Dollar, Jacob Svensson (1998), and Dani Rodrick (2000), focusing on the importance of institutions and governance on development. Summarizing their arguments, Carlos Santiso writes in his 2001 paper:

Well-institutionalized democracies are more likely to produce, over the long run, effective, efficient and sustainable economic and social policies, because they provide effective and stable institutional and procedural mechanisms to represent interests, arbitrate disputes, provide checks and balances, and negotiate change.

In other words, countries with effective systems of governance are better able to efficiently allocate resources and respond to the needs of citizens – an argument that is much easier advanced than substantiated.

Taking an empirical approach to this question, economist Robert Barro (1997) analyzed World Bank data over twenty to thirty years starting in 1960 to address two key questions: what factors are conducive to economic growth, and what are the necessary components of democratization? Looking at data from eighty countries, Barros finds that (unsurprisingly) rule of law, education, and life expectancies are conducive to growth, while inflation, high non-education related government expenditures, and high fertility exert negative pressures on growth. In terms of democratization, educating women is more effective than educating men, and income inequality has little effect. The effect of democracy on growth – while generally positive – becomes somewhat negative when taken to the extreme (a particularly interesting finding).

In more recently published scholarship, Benhua Yang (2011) examined the relationship between democracy and financial development – more specifically, whether there’s a causal relationship between the former on the latter. Using two measures of democracy – the Freedom
House political rights index (an indicator used by the MCC) and the Polity IV measure of political regime openness, he finds rather mixed results on his dependent variables (private credit levels and stock market capitalizations). Employing cross section and panel regression analyses, he finds that there is virtually no effect of democracy on stock market development, and that the positive relationship between democracy and private credit levels (which can also be understood as bank development) disappears when “controlling for country-specific factors.” While this may appear to contradict much theory, it may be more of a reflection of the difficulty of conducting macro-level analyses using aggregated data, particularly when partially subjective indices are involved – such as measures of democracies. This somewhat frustrating result provides additional impetus for examining the validity of MCC’s heavily subjective-measure based eligibility system.

In a similar paper, Chinn and Ito (2006) found that there is a clear positive relationship between financial openness (generally, limited capital controls fewer restrictions on borrowing) and equity market development, but that this relationship is dependent – at least in part – on the development of strong legal systems and institutions (e.g., protected property rights and general rule of law). Perhaps more interestingly, they found that there was an insignificant effect from the development of finance-related legal institutions – a finding that has clear relevance to the potential problems with measuring (and basing policy on) aggregate, systems-level indicators like those used by the MCC.

*Measuring governance and development – indicators and outcomes.*

The challenge of effectively measuring – in empirical terms – hard-to-pinpoint concepts such as governance, rule of law, freedom, or any other similar concept – cannot be overstated. In their 2008 report, researchers Daniel Kaufman and Aart Kraay outline the theory behind
governance indicators – what they measure, and who’s doing the measuring. In general, there are two approaches to measuring governance – measuring rules, or measuring outcomes:

A rules-based indicator of corruption might measure whether countries have legislation prohibiting corruption or have an anticorruption agency. An outcome-based measure could assess whether the laws are enforced or the anticorruption agency is undermined by political interference. (Kaufman & Kraay, 2008)

Examples of rules-based indicators include Polity IV and the Global Integrity Index. These indicators are based on process measures, such as the existence of certain legal institutions, anticorruption measures, regulatory regimes, etc. Outcome-based indicators – which include the Freedom House measures used by the MCC – are generally more broad, based largely on perceptions of governance drawn from a range of stakeholders. Both types of indicators, however, suffer from high levels of subjectivity in their design, data collection, and analysis – an inevitable result of efforts to convert inherently non-empirical concepts into numerical ratings (Kaufman & Kraay, 2008).

As such, there is a fair amount of criticism directed towards governance measures, including charges of measurement bias, variability in correlations between measures conducted by different agencies, and uncertainty over the accuracy of measures based so much on opinion (however well-informed). In their paper published in 2010, researchers Laura Langbein and Stephen Knack find that the World Bank’s World Governance Indicators (used extensively by the MCC) – which purport to measure six different concepts ranging from corruption to government effectiveness – actually appear to measure the same broad concept of governance. That is, distinguishing between them may not actually be very useful, as their close correlations present strong evidence against their individual distinctiveness. A paper recently published by Martin Knoll and Petra Zloczysti focusing specifically on measures used by the MCC found remarkably similar results. Despite the appearance of measuring distinct institutional
characteristics of developing countries, many of the MCC’s governance indicators (basically, all of the measures not focused on real empirical processes, like spending rates) are closely correlated, and that they measure two basic things: “perceived quality of governance” and “participatory dimension of governance” – conclusions supported by correlating these measures with additional measures of these specific phenomena.

With these issues in mind, it is clear that the use of these macro-level indicators is hardly an uncontroversial matter. Using governance indicators as a precondition for aid is not unprecedented; however, the strict manner in which the MCC employs them to determine eligibility is unique, as is the specific combination being used – thus clarifying the importance of evaluating the efficacy of this approach.

With regard to connecting governance and other institutional inputs with development outcomes, research has demonstrated the utility of using the three outcome measures chosen for this report (infant mortality, life expectancy, and GDP). Boozer et al. (2003) clearly lay out the close bi-directional relationship between economic growth and human development, showing that human development not only promotes economic growth, but that the causal relationship goes the other direction as well. Similarly, Bradley et al. (2011) demonstrate – among OECD countries – clear and statistically significant relationships between healthcare/social service inputs and a range of health-related development outcomes, including life expectancy at birth, infant mortality rates, and maternal mortality. These studies – and many like them – hint at the theoretical utility of using a criteria-based approach in predicting the growth trajectories of developing countries; however, the MCC’s specific mix of criteria – and the individual datasets used to support these theoretical conclusions – haven’t been rigorously analyzed to determine if the measures (and cutoffs) do indeed correlate with expected outcomes.
**Methodological Approach and Underlying Conceptual Model**

The purpose of this paper is to establish and analyze the statistical relationship between MCC indicators and development outcomes. Drawing on the methods described in Yang (2011), fixed effects panel regressions were employed, allowing for the analysis of within-country variations while controlling for time- and country-specific fixed effects. The independent variables are the seventeen indicators listed in Table 1, and the dependent variables are measures of development outcomes – GDP per capita, infant mortality, and life expectancy. The independent variables were all lagged by one year; further manipulations were employed and are discussed in fuller detail in the results section. The two analytical models used were:

\[
(1) \quad \text{outcome}_{it} = \beta_0 + \beta_1 \text{Indicator}_{it-1} + \delta_i + X + u_{it}
\]

\[
(2) \quad \text{outcome}_{it} = \beta_0 + \beta_1 \text{Indicator}_{it-1} + \beta_2 \text{Indicator}^2_{it-1} + \delta_i + u_{it}
\]

where \( \text{outcome} \) is GDP, life expectancy, or infant mortality rate; \( \text{Indicator} \) is one of the seventeen eligibility criteria indicator values; \( \delta_i \) is the linear time variable; and \( X \) represents controls used (if any).

For the first analytical model, “differenced” indicator values are used, which consist of the difference between the continuous value and the year’s eligibility cutoff value. This process is described in more detail in part 1 of the results section. For the second model, the continuous value of each indicator is used. More detail – and outcomes – can be found in part 2 of the results section.

**Description of Data**

The analysis contained in this paper draws upon two main sources of data, both comprised of data drawn from multiple sources. The first dataset, from which the independent variables are drawn, is the Millennium Challenge Corporation’s Fiscal Year 2011 Indicator Time...
Series data. This is a publicly available dataset containing all available MCC selection indicator scores from 1990-2010. All values contained within the dataset are drawn from published data produced by the various academic institutions and development agencies cited in Table 1. The dataset is not limited to low income and lower middle income countries – nearly every country in the world is included. There are many missing variables, although most indicators have data from 2003-2010 and much extends into the mid-1990s with variations between countries, indicators, and specific years.

The second source of data is the World Bank’s publicly-accessible World Development Indicators (WDI), from which the dependent variables are drawn. Three development indicators from the WDI were chosen: GDP per capita (in constant 2000 US$), infant mortality rate (per 1,000 live births), and life expectancy at birth (in years). Potentially illustrative alternatives were considered (including malnutrition prevalence and access to prenatal care); however, none of these options had sufficient data for analysis.

These two datasets were merged and income level categorical variables for low income countries (LIC) and lower middle income countries (LMIC) for each country and year between 1990 and 2010 were created. The calculations for establishing income level cutoffs were based on the criteria established by the MCC in its “Report on the Criteria and Methodology for Determining the Eligibility of Candidate Countries for Millennium Challenge Account Assistance for Fiscal Year 2011,” which is itself based on a combination of World Bank and International Development Association (IDA) classifications. Using 2010 US$, LICs are defined as countries with a GNI per capita below the historical ceiling for IDA eligibility, or

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6 World Bank classifications can be found here: http://data.worldbank.org/about/country-classifications. IDA’s eligibility cutoff can be found here: http://go.worldbank.org/83SUQXPXD20.
7 All GNI values for determining income categories are based on the World Bank’s Atlas method, which adjusts for exchange-rate fluctuations between countries. For more information:
$1,915. This value is based on $250 in 1960, which is a higher value than IDA’s current
operational cutoff of $1,175. LMICs are defined as having a GNI per capita above the historical
IDA ceiling and below the World Bank’s upper limit for LMICs, or between $1,915 and $3,975
(in 2010 US$). Individual cutoffs were established using values published in MCC yearly
selection reports and by using inflation-adjusted values for the years prior to MCC’s creation.

Next, yearly medians for each indicator within the two income categories were
determined, followed by the creation of a range of intermediary variables necessary for analysis.
The final dataset and annotated Stata “.do” file used in variable creation and analysis (including
calculations and variables not included in this report) can be downloaded here:

Descriptive Statistics

Descriptive statistics for the key variables to be used in the analysis can be found below in Table 2. Not included are the intermediary variables generated in the process of creating the analytical variables (which include yearly indicator medians for LICs and LMICs) and variables not central to the analysis.

Table 2: Key Continuous Variables & Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Range (min, max)</th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
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<tr>
<td>Political Rights</td>
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<td>3.49</td>
<td>3</td>
<td>2.20</td>
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<tr>
<td>Civil Rights</td>
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<td>3.49</td>
<td>3</td>
<td>1.86</td>
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<td>Control of Corruption</td>
<td>2087</td>
<td>-2.49, 2.46</td>
<td>-0.28</td>
<td>-0.26</td>
<td>1.01</td>
</tr>
<tr>
<td>Government Effectiveness</td>
<td>2084</td>
<td>-2.50, 2.27</td>
<td>-0.31</td>
<td>-0.22</td>
<td>1.01</td>
</tr>
<tr>
<td>Rule of Law</td>
<td>2125</td>
<td>-2.69, 1.96</td>
<td>-0.054</td>
<td>-0.22</td>
<td>1.00</td>
</tr>
<tr>
<td>Voice and Accountability</td>
<td>2159</td>
<td>-2.29, 1.83</td>
<td>-0.037</td>
<td>-0.044</td>
<td>1.01</td>
</tr>
<tr>
<td>Immunization Rate (%)</td>
<td>3685</td>
<td>12.5, 99.00</td>
<td>81.78</td>
<td>88.00</td>
<td>17.69</td>
</tr>
<tr>
<td>Health Expenditures</td>
<td>2836</td>
<td>.040, 19.85</td>
<td>3.69</td>
<td>3.16</td>
<td>2.32</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Range (min, max)</th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
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<tbody>
<tr>
<td>Primary Education Expenditure</td>
<td>1074</td>
<td>.00064, .070</td>
<td>.017</td>
<td>.016</td>
<td>.0091</td>
</tr>
<tr>
<td>Girls’ Primary Education Completion Rates</td>
<td>1397</td>
<td>11.04, 150.93</td>
<td>84.06</td>
<td>94.07</td>
<td>24.74</td>
</tr>
<tr>
<td>Natural Resource Management</td>
<td>824</td>
<td>22.55, 99.85</td>
<td>75.28</td>
<td>76.12</td>
<td>19.93</td>
</tr>
<tr>
<td>Regulatory Quality</td>
<td>2097</td>
<td>-2.84, 3.35</td>
<td>-.0365</td>
<td>-.127</td>
<td>1.00</td>
</tr>
<tr>
<td>Land Rights &amp; Access</td>
<td>809</td>
<td>.115, .990</td>
<td>.657</td>
<td>.675</td>
<td>.151</td>
</tr>
<tr>
<td>Access to Land</td>
<td>878</td>
<td>1.80, 5.63</td>
<td>3.71</td>
<td>3.75</td>
<td>.714</td>
</tr>
<tr>
<td>Days to Register Property</td>
<td>1205</td>
<td>1.957</td>
<td>88.75</td>
<td>47</td>
<td>129.10</td>
</tr>
<tr>
<td>Cost of Property Registration</td>
<td>1205</td>
<td>31.80</td>
<td>7.01</td>
<td>5.1</td>
<td>6.42</td>
</tr>
<tr>
<td>Business Start-up</td>
<td>1359</td>
<td>.108, 1.00</td>
<td>.926</td>
<td>.959</td>
<td>.0991</td>
</tr>
<tr>
<td>Days to Start a Business</td>
<td>1359</td>
<td>0.694</td>
<td>42.99</td>
<td>31.0</td>
<td>56.87</td>
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<td>Cost of Starting a Business</td>
<td>2359</td>
<td>0, 6375.5</td>
<td>72.81</td>
<td>20.4</td>
<td>230.17</td>
</tr>
<tr>
<td>Trade Policy</td>
<td>2543</td>
<td>0.95</td>
<td>66.04</td>
<td>69.00</td>
<td>16.85</td>
</tr>
<tr>
<td>Inflation</td>
<td>2668</td>
<td>-17.79, 4146.01</td>
<td>14.81</td>
<td>4.68</td>
<td>107.41</td>
</tr>
<tr>
<td>Fiscal Policy</td>
<td>2131</td>
<td>-352, 3.28</td>
<td>-.00823</td>
<td>-.0197</td>
<td>-.125</td>
</tr>
<tr>
<td>GDP Per Capita, Constant 2000 US$</td>
<td>3905</td>
<td>57.78, 108111.2</td>
<td>7255.06</td>
<td>1995.28</td>
<td>12026.76</td>
</tr>
<tr>
<td>Mortality Rate, Infant (per 1,000 Live Births)</td>
<td>3996</td>
<td>1.60, 162.2</td>
<td>39.23</td>
<td>26.30</td>
<td>34.69</td>
</tr>
<tr>
<td>Life Expectancy at Birth</td>
<td>3729</td>
<td>26.82, 83.00</td>
<td>66.48</td>
<td>69.65</td>
<td>10.51</td>
</tr>
</tbody>
</table>

Notes:
1. Composite of Access to Land, Days to Register Property, and Cost of Property Registration.
2. International Fund for Agricultural Development
3. International Finance Corporation
4. Composite of Days to Start a Business and Cost of Starting a Business
5. World Bank

Results

Part 1: Fixed Effects Analysis

To establish an empirical relationship between MCC selection indicators and development outcomes, a fixed effects model was employed. The dependent variables used were life expectancy at birth, infant mortality, and GDP per capita. The independent variables tested were each of the 17 eligibility indicators used by the MCC during fiscal year 2011 (Table 1).
Rather than simply using the continuous independent variables – which alone would have only provided data on the relationship between indicators and outcomes – we used “differenced” independent variables, which capture the effects of MCC eligibility cutoffs. The “differenced” independent variables were created by subtracting the actual indicator levels for each country/year from the median indicator value for each income level (LIC or LMIC). The sole exception was the inflation indicator, the cutoff for which is set at 15% for all countries and years. All independent variables were lagged by one year. The resulting values reveal the degree to which countries exceeded (or fell below) MCC cutoffs.

Tables 3 and 4 show the results of independently run fixed-effects models (each independent/dependent variable combination represents a single fixed-effect model) using the “differenced” independent variables. The fixed-effects models controlled for country- and time-related fixed effects. For life expectancy and infant mortality, GDP was used as a control.

---

8 Three-year and five-year lags were tested as well; however, neither revealed significantly different results.
9 The inclusion of GDP as a control was based on similar practices in the literature; however, its inclusion had minimal effects on the outcomes.
Table 3: Low Income Country Fixed Effects

<table>
<thead>
<tr>
<th>“Differenced” Independent Variable (X)</th>
<th>Coefficient</th>
<th>t</th>
<th>Coefficient</th>
<th>t</th>
<th>Coefficient</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Liberties¹</td>
<td>-.1072549</td>
<td>-1.25</td>
<td>.7277192</td>
<td>3.22*</td>
<td>-11.88218</td>
<td>-2.74*</td>
</tr>
<tr>
<td>Political Rights¹</td>
<td>.1226744</td>
<td>2.02</td>
<td>.1946571</td>
<td>1.04</td>
<td>-2.983507</td>
<td>-1.15</td>
</tr>
<tr>
<td>Voice and Accountability</td>
<td>.3986279</td>
<td>2.15</td>
<td>-2.064987</td>
<td>-2.79*</td>
<td>25.82034</td>
<td>1.61</td>
</tr>
<tr>
<td>Government Effectiveness</td>
<td>1.245641</td>
<td>7.09*</td>
<td>-3.202249</td>
<td>-5.19*</td>
<td>58.18965</td>
<td>4.47*</td>
</tr>
<tr>
<td>Rule of Law</td>
<td>1.404878</td>
<td>7.02*</td>
<td>-4.002893</td>
<td>-5.99*</td>
<td>42.09371</td>
<td>2.53</td>
</tr>
<tr>
<td>Control of Corruption</td>
<td>2.497892</td>
<td>1.78</td>
<td>-1.40824</td>
<td>-2.79*</td>
<td>35.42601</td>
<td>2.86*</td>
</tr>
<tr>
<td>Inflation</td>
<td>-.0002442</td>
<td>-0.74</td>
<td>.0003964</td>
<td>0.31</td>
<td>-0.0390478</td>
<td>-1.59</td>
</tr>
<tr>
<td>Fiscal Policy</td>
<td>.3419241</td>
<td>0.73</td>
<td>-2.067927</td>
<td>-0.44</td>
<td>-11.85358</td>
<td>-0.26</td>
</tr>
<tr>
<td>Business Start-up</td>
<td>.577399</td>
<td>0.53</td>
<td>-4.322308</td>
<td>-0.61</td>
<td>123.7555</td>
<td>3.12*</td>
</tr>
<tr>
<td>Trade Policy</td>
<td>.0068542</td>
<td>1.53</td>
<td>.0030536</td>
<td>0.18</td>
<td>.5378444</td>
<td>2.00</td>
</tr>
<tr>
<td>Regulatory Quality</td>
<td>.7231095</td>
<td>4.23*</td>
<td>-1.7295414</td>
<td>-1.19</td>
<td>43.24481</td>
<td>3.53*</td>
</tr>
<tr>
<td>Land Rights and Access</td>
<td>2.961798</td>
<td>2.19</td>
<td>1.604307</td>
<td>1.49</td>
<td>117.5786</td>
<td>3.15*</td>
</tr>
<tr>
<td>Public Expenditures in Health</td>
<td>.301899</td>
<td>4.33*</td>
<td>-1.397346</td>
<td>-6.57*</td>
<td>-20.64222</td>
<td>(-3.31)</td>
</tr>
<tr>
<td>Immunization Rates</td>
<td>.0540421</td>
<td>7.62*</td>
<td>-0.0710768</td>
<td>-3.78*</td>
<td>-1.839332</td>
<td>-2.08</td>
</tr>
<tr>
<td>Girls’ Primary Education Completion</td>
<td>.0174652</td>
<td>3.89*</td>
<td>-0.045259</td>
<td>-2.68*</td>
<td>-0.4760339</td>
<td>-0.42</td>
</tr>
<tr>
<td>Primary Education Expenditures</td>
<td>1.493249</td>
<td>0.02</td>
<td>3.021584</td>
<td>1.84</td>
<td>-2617.659</td>
<td>1.88</td>
</tr>
<tr>
<td>Natural Resource Management</td>
<td>.0654447</td>
<td>(-4.66)</td>
<td>.0869747</td>
<td>1.94</td>
<td>2.01605</td>
<td>3.38*</td>
</tr>
</tbody>
</table>

¹ Lower value is better score (inverse relationship expected)
² “Differenced” value calculated differently; set at x=(15-actual) rather than x=(median-actual).
* Significant value with expected sign
( ) Significant with opposite anticipated sign

In Table 3, which focuses on low income countries, we find several significant relationships between the indicators and development outcomes. Of particular note is the “government effectiveness” indicator, the only measure to reveal a significant relationship with all three outcome measures. Among other subjective governance measures, we find significant relationships among some – but not all – outcomes. For three of the objective (rather than subjective) “investments in people” indicators (public expenditures in health, immunization rates, and girls’ primary education rates), we find significant correlations with the two health outcomes in the expected direction.
The group of indicators with the weakest correlations with the three outcome measures are those in the “economic freedom” cohort – of these, only three relationships are significant: regulatory policy with life expectancy and GDP, and business start-up with GDP. This poor showing suggests that these indicators – largely composite measures with significant subjective components (with the exception of the inflation indicator) – may lack empirical validity.

It should also be noted that several indicators do not reveal any significant relationships with any of the three development outcomes, and that two relationships (noted in the table in parentheses) reveal significant relationships opposite what is expected. While it may be possible that natural resource management is correlated with shorter life expectancies, or that public expenditures in health is correlated with lower per-capita GDP, these are unexpected scenarios most likely due to problems with the data.
Table 4: Lower Middle Income Country Fixed Effects

<table>
<thead>
<tr>
<th>“Differenced” Independent Variable (X)</th>
<th>Dependent Variable (Y)</th>
<th>( \text{Model: } Y = bX_{t-1} \times \text{year} + \frac{\text{GDP}}{\text{GDP}} )</th>
<th>( \text{Coefficient} )</th>
<th>( t )</th>
<th>( \text{Coefficient} )</th>
<th>( t )</th>
<th>( \text{Coefficient} )</th>
<th>( t )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Liberties(^1)</td>
<td>Life Expectancy at Birth</td>
<td>-0.5391978</td>
<td>-4.88(^*)</td>
<td></td>
<td>0.7952475</td>
<td>3.52(^*)</td>
<td>-3.3470743</td>
<td>0.26</td>
</tr>
<tr>
<td>Political Rights(^1)</td>
<td>Infant Mortality</td>
<td>-0.234208</td>
<td>-3.23(^*)</td>
<td></td>
<td>0.6836716</td>
<td>4.26(^*)</td>
<td>2.027043</td>
<td>0.06</td>
</tr>
<tr>
<td>Voice and Accountability</td>
<td>GDP</td>
<td>0.2996992</td>
<td>1.25</td>
<td></td>
<td>-0.7987799</td>
<td>-1.06</td>
<td>-23.18844</td>
<td>-0.84</td>
</tr>
<tr>
<td>Government Effectiveness</td>
<td>GDP</td>
<td>0.702962</td>
<td>(3.41)</td>
<td></td>
<td>1.877354</td>
<td>2.29</td>
<td>22.10353</td>
<td>0.14</td>
</tr>
<tr>
<td>Rule of Law</td>
<td>GDP</td>
<td>0.72076</td>
<td>3.94(^*)</td>
<td></td>
<td>0.7136421</td>
<td>0.88</td>
<td>-45.87799</td>
<td>-1.71</td>
</tr>
<tr>
<td>Control of Corruption</td>
<td>GDP</td>
<td>0.0088809</td>
<td>0.82</td>
<td></td>
<td>0.9166506</td>
<td>0.58</td>
<td>-64.1911</td>
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</tr>
<tr>
<td>Inflation(^2)</td>
<td>GDP</td>
<td>0.0019967</td>
<td>1.47</td>
<td></td>
<td>-0.0044619</td>
<td>-1.17</td>
<td>-4931746</td>
<td>-1.89</td>
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<td>Fiscal Policy</td>
<td>GDP</td>
<td>-0.6028699</td>
<td>-2.57</td>
<td></td>
<td>13.66752</td>
<td>2.10</td>
<td>926.3557</td>
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<tr>
<td>Business Start-up</td>
<td>GDP</td>
<td>-0.8473544</td>
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<td>10.33002</td>
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<td>-1.44</td>
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<td>0.0451657</td>
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<td>-2746659</td>
<td>0.33</td>
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<tr>
<td>Regulatory Quality</td>
<td>GDP</td>
<td>-0.0551205</td>
<td>0.18</td>
<td></td>
<td>1.909798</td>
<td>(3.26)</td>
<td>1.75076</td>
<td>-0.87</td>
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<tr>
<td>Land Rights and Access</td>
<td>GDP</td>
<td>1.163814</td>
<td>-0.61</td>
<td></td>
<td>1.950597</td>
<td>1.16</td>
<td>-374.0763</td>
<td>(3.46)</td>
</tr>
<tr>
<td>Public Expenditures in Health</td>
<td>GDP</td>
<td>0.0395957</td>
<td>0.00</td>
<td></td>
<td>-0.3084522</td>
<td>-1.36</td>
<td>-18.46109</td>
<td>-1.74</td>
</tr>
<tr>
<td>Immunization Rates</td>
<td>GDP</td>
<td>-0.0094864</td>
<td>-0.82</td>
<td></td>
<td>0.0739814</td>
<td>3.83(^*)</td>
<td>-6102553</td>
<td>-1.53</td>
</tr>
<tr>
<td>Girls’ Primary Education Completion</td>
<td>GDP</td>
<td>-0.0025512</td>
<td>0.11</td>
<td></td>
<td>-0.0251873</td>
<td>-0.58</td>
<td>5.799831</td>
<td>-2.69</td>
</tr>
<tr>
<td>Primary Education Expenditures</td>
<td>GDP</td>
<td>-5.938882</td>
<td>0.59</td>
<td></td>
<td>-20.98351</td>
<td>2.55</td>
<td>-4144361</td>
<td>2.33</td>
</tr>
<tr>
<td>Natural Resource Management</td>
<td>GDP</td>
<td>0.0261539</td>
<td>0.79</td>
<td></td>
<td>0.0695721</td>
<td>-3.11(^*)</td>
<td>-5.431595</td>
<td>-1.07</td>
</tr>
</tbody>
</table>

\(^1\) Lower value is better score (inverse relationship expected)
\(^2\) “Differenced” value calculated differently; set at \( x=(15-\text{actual}) \) rather than \( x=(\text{median-actual}) \).

* Significant value with expected sign
( ) Significant with opposite anticipated sign

Table 4 reveals a markedly different results; namely, far fewer significant results. Three of the significant outcomes are opposite the expected sign. These results are somewhat counterintuitive: conventional wisdom would suggest that – in terms of data quality and availability – lower middle income countries would have more viable data. Additionally, there are more LMICs than LICs (56 vs. 35). With likely more robust data and a greater sample size, these results cast doubt on the empirical validity of these indicators – at least among LMICs, particularly when the only difference between Table 3 and 4 is the income group.
Also worth noting is the remarkably poor showing of the set of indicators within the “economic freedom” category among both LICs and LMICs. These indicators – inflation, fiscal policy, business start-up, trade policy, regulatory quality, and land rights – show some strength with the GDP outcome among LICs, but show no statistical significance (and worse, significant results in the wrong direction) among LMICs. These results call into question the utility of these measures, from a statistical perspective.

Part 2: Visualizing the relationships. Are the cutoffs too strict?

Next, we move on to test the question: are the eligibility cutoffs too strict? The MCC uses a rather simple approach for determining the eligibility cutoffs for each category: they are set as the yearly median value for each indicator for that income level (again, the exception to this rule is inflation, where the cutoff is universally set at 15%). No analysis has been conducted on whether or not these median levels have any particular significance in predicting development outcomes. As such, these cutoffs are somewhat arbitrary.

To address this question, two indicators (political rights and public expenditures in health) were chosen to be assessed against two outcome measures: infant mortality and GDP. Infant mortality was chosen because – unlike life expectancy at birth – it is a measure of actual outcomes rather than a prediction, making it more objective and empirically valid. GDP was also chosen because it is a core development measure. The explanatory variables were chosen to represent different indicator types: a subjective, political-theory-based indicator (political rights) and an objective process measure that captures actual government activities (health expenditures). Additionally, these two were chosen because of differences found in analytical significances between LICs and LMICs in part 1, providing contrasts for analysis.
In figures 1 and 2, the following quadratic fixed effects model was employed:

\[ \text{outcome}_i = \beta_0 + \beta_1 \text{Indicator}_{i-1} + \beta_2 \text{Indicator}_{i-1}^2 + \delta_i + u_{it} \]

where \text{indicator} is the continuous indicator value (not “differenced” as in part 1) and \delta is time (in years). The resulting quadratic function was graphed in Stata, with the MCC FY2011 cutoff overlaid on the function as a vertical line. The goal of this exercise is to determine if the quadratic function reveals any points at which there might be an ‘optimal’ eligibility point – that is, a tipping point at which the relationship between the indicator and outcome show a positive relationship. Analytically, the approach taken was to determine the point at which the slope of a line tangent to the curve equals zero, by taking the derivative of the quadratic function and solving for zero. It is important to note that the graphs in Figures 1 and 2 (and Appendix A) show marginal rates of change over time and relative values, not absolute values.
With the Freedom House political rights indicator, lower scores are better (indicating higher levels of political rights). The expectation is that as the political rights score increases, conditions worsen in the country, and that infant mortality rates would likely have a correlated rise. Among LICs and LMICs, the MCC eligibility cutoff for 2009 (the last year of political rights data used for FY2011) was set at the year’s median, 4 (it’s coincidental that the LIC and LMIC cutoff is the same).
In Figure 1(a), we find that the cutoff score of 4 is nearly at the bottom of the parabola. From 1→4, as the political rights score worsens, we find a diminishing rate of decreasing infant mortality. That is, when the score is 1, the rate of decreasing infant mortality is high; when the score is 2, the rate of decreasing infant mortality is slightly lower, and so on until approximately 4. At 4, the marginal rate of change in infant mortality plateaus. From 4→7, as political rights steadily worsen, the rate of change in infant mortality increases. Therefore, Figure 1(a) suggests that the current MCC cutoff of 4 is likely ideal with regard to infant mortality: a higher cutoff would grant eligibility to countries with increasing rates of infant mortality; a lower cutoff would preclude countries with diminishing infant mortality rates.

In Figure 1(b), we would expect a negative relationship between the political rights score and GDP per capita. In reality, we find a negative impact on GDP as the political rights score approaches 4.895; after that point, the trend reverses and we observe an increasingly positive relationship. These results suggest that the cutoff may be too harsh if the score’s effect on GDP is considered important: if anything, diminishing political rights seem to have a decreasing effect on GDP outcomes. This outcome highlights some of the challenges of analyzing these macro-level measures so narrowly – issues that will be discussed further in the next section.

Figures 1(c) and 1(d), which focus on LMICs, we find notably different results. In 1(c), we observe a rather steady positive relationship between infant mortality rates and increasing political rights scores. While we’d expect either decreasing or flat marginal rates of infant mortality closer to 1, the data suggests that the exact cutoff level has little impact on the marginal rate of this outcome. As such, the MCC cutoff of 4 appears reasonable. In 1(d), we find a similar situation: a consistently negative effect on GDP per capita as the political rights score increases. As with 1(c), the data indicates that any point beyond 1 is correlated with a negative
effect on GDP, with no major variation in effect within the range of possible political rights scores.

It is worth noting that while the “optimal” scores calculated for 1(c) and 1(d) are outside of the allowable range of scores, this by itself is not a problem. Rather, these outcomes are an indication that there simply may not be an empirically valid “optimal” scores, within this narrowly defined criteria. As such, the median values used by the MCC – ceteris paribus – appear reasonable.
Figure 2: Public Expenditures in Health

(a) Dependent Variable: Infant Mortality

\[ y = -1.446925x + 0.0001032x^2 + 3304.205 \]
\[ \frac{dy}{dx} = -1.446925 + 0.0002064x \]
Median (2009): 2.54
“Optimal” x: 7010.3*

(b) Dependent Variable: GDP per capita

\[ y = -19.80435x + 0.6089089x^2 - 23748.4 \]
\[ \frac{dy}{dx} = -19.80435 + 1.2178178x \]
Median (2009): 2.54
“Optimal” x: 16.262

(c) Dependent Variable: Infant Mortality

\[ y = -1.120618x + 0.0485646x^2 + 1991.666 \]
\[ \frac{dy}{dx} = -1.120618 + 0.0971292x \]
Median (2009): 2.72
“Optimal” x: 11.537

(d) Dependent Variable: GDP per capita

\[ y = 56.05429x - 3.32468x^2 - 88587.73 \]
\[ \frac{dy}{dx} = 56.05429 - 6.64936x \]
Median (2009): 2.72
“Optimal” x: 8.430

* Value outside of allowable range.

In Figure 2, we explore the relationship between public expenditures in healthcare (measured as a percentage of GDP) and the same two outcomes studied earlier. Theoretically, we’d expect a negative relationship between health expenditures and infant mortality: the more money is spent, the lower the infant mortality rate should be. With GDP per capita, the expectation would be that there is a positive relationship between GDP outcomes and health expenditures.
In 2(a), which focuses on LICs, we find a consistently negative relationship between health expenditures and infant mortality rates. This is a good finding, indicating that health expenditures have a sustained effect in reducing infant mortality, and that higher levels of spending result in lower levels of infant mortality \( (t=-3.38) \). However, this data also suggests that more money spent – by itself – does not appear to increase the *effectiveness* of infant mortality rate reduction. We do observe extremely slight diminishing returns, but not at a level of any real-world significance. Therefore, the data suggests that the MCC cutoff is likely reasonable – while requiring that LIC countries spend more would result in lower *levels* of infant mortality, it would not result in better infant mortality *rates*. In light of limited resources, it is likely unreasonable to require more of these LICs.

In 2(c), which focuses on LMICs, we find a negative marginal effect on infant mortality that diminishes until reaching approximately 11.5%. After this point, the data suggests that increased spending is correlated with increasing rates of infant mortality. This is a somewhat surprising result; however, it may be due to several factors, including situations where high spending is a result of widespread health problems and/or a limited sample size of countries in this spending category. The MCC cutoff level of 2.72 appears reasonable – while higher levels of spending may improve health outcomes, increasing the stringency would preclude many countries. Similarly – as in 2(a) – reducing the cutoff to a lower spending would likely allow countries with limited demonstrated interest in public health expenditures – a political non-starter.

In 2(b), we find a relationship that largely runs counter to expectations. The data suggests that – among LICs – increased spending on healthcare is correlated with decreasing GDP outcomes. At spending levels of approximately 16%, GDP outcomes level out before increasing. Given this evidence, it could be argued that the criteria is too harsh – because there
appears to be no positive relationship between expenditures and GDP, requiring a certain level of spending is perhaps counterproductive for GDP growth. Again, however, this analysis is limited by its narrow focus, and is easily countered by the strong health outcome of 1(a).

This relationship is different for LMICs in 2(d), where the evidence suggests that there is a positive relationship between health expenditures and GDP outcomes, reaching an optimal point at expenditures of 8.43% of GDP. After that point, increased expenditures are correlated with increasing rates of GDP decline. It could be argued that somewhat more stringent criteria might be justified; however, raising the requirements would preclude the eligibility of some countries already spending at (or above) the median. Similarly, it could be argued that the current MCC cutoff resides comfortably within the positive range of the correlation, and as such, captures countries within the policy goals of the indicator.

Appendix A (page 38) contains an additional set of graphs, showing the quadratic fixed-effects relationship between the civil liberties indicator and the same two outcomes. These graphs were included because civil liberties is one of the few indicators showing significant outcomes for both LICs and LMICs. Like political rights, a lower civil liberties score value is better. These graphs indicate that – if anything – the MCC criteria might be too lenient: for LICs and LMICs, the optimal point is closer to between two and three for infant mortality. Similarly, for GDP, the optimal is closer to two for LMICs. This would support increasing standards; however, the tradeoff would be the elimination of several potential contenders.

**Discussion: Policy Implications, Caveats, and Limitations**

First, a general caveat. The goal of the MCC’s eligibility criteria is to select countries that have put into place the policies, institutions, and practices deemed necessary for development. However, the MCC faces a sophisticated mandate, one that requires complex
political considerations. This means that certain policy decisions may be justified on political grounds, even if the empirical evidence isn’t strong. The political costs of dropping an indicator – and the statement that decision makes – likely outweigh any statistical evidence (or lack thereof).

A second general caveat is the fact that this analysis is constrained by the data used. Most importantly, it must be understood that (all standard concerns regarding data quality in developing countries aside) the conclusions supported by the data are merely reflections of the trends found in the datasets used. Any evidence that an indicator is or is not correlated with a particular outcome is only that – a reflection of the data itself, not any conclusive evidence on the purported concepts being measured themselves.

A third caveat is that this report contains no analysis of actual outcomes of countries chosen for compacts, and what happens after a country receives MCC funding. However flawed the selection process may be, there hasn’t been a study of how effectively the countries performed compared to counterfactuals, or if rates of issues like corruption and rent-seeking is different for recipient countries and non-eligible countries.

That being said, the analysis contained in this report – by no means exhaustive – supports the empirical validity of some aspects of the MCC’s approach while casting significant doubt and raising questions about other components. In part 1 of the results section, we find that while some indicators are correlated with development outcomes as expected, many are not and most of these relationships collapse within the LMIC category. In particular, some indicators (especially the “economic freedom” cohort) systematically fail to demonstrate statistically significant relationships with the chosen indicators, when controlling for time- and country-specific fixed effects. The only indicators to show significant relationships in both LICs and
LMICs are: (1) civil liberties and infant mortality, (2) government effectiveness and life expectancy – albeit in opposite directions, (3) rule of law and life expectancy, land rights/access and GDP – again, in opposite directions, and (4) immunization rates and infant mortality.

Limiting our analysis to LICs, we find that of the 17 indicators, 12 show significant relationships with at least one of the chosen outcome measures. Together, this portion of the analysis suggests that – among LMICs – the indicators are generally poor predictors of development outcomes. Among LICs, the situation is slightly better, but only when multiple potential outcomes are considered. Does the evidence suggest that, empirically, these 17 indicators are a conclusive means of choosing countries likely to demonstrate strong outcomes? Clearly, the answer is no. However – as mentioned earlier – these indicators are as much (and perhaps more) a political statement of the U.S. government’s priorities as they are a tool for predicting outcomes. As mentioned before, the analysis is limited to the chosen outcomes – the indicators may be closely correlated with other indicators. Similarly, even if the indicators are poor predictors of outcomes, they may be strong predictors of aid efficiency – that qualifying recipients are more likely to properly use the funds.

The analysis in part 2 of the results, on the other hand, generally support the MCC’s practice of setting eligibility cutoffs using median values. That is, no evidence emerged (among the values chosen for assessment) that cast any serious doubt on the validity of the cutoffs – with the exception of figure 2(b), all cutoffs fall within a range of outcomes demonstrating expected marginal effects (which might be explained by omitted variables). Appendix A suggests that a stricter civil liberties cutoff could be justified; however, the same caveats apply: the analysis is very narrow, it might eliminate too many contenders, and may not be politically justifiable. Additionally, the current cutoffs rest within the expected range of marginal outcome effects.
With these results in hand, should any changes be made in the MCC’s system? Clearly, the analysis raises critical questions about the validity of many of the indicators. At minimum, the economic freedom indicators should be closely reviewed – with their particularly dismal outcomes, it may not be fair for countries to be evaluated using these potentially flawed measures. They may not be accurately measuring the phenomena they are purportedly measuring, and may have little empirical value. Alternatively, they could be accurate, and these economic factors may simply have less impact on development outcomes as previously expected (this is less likely).

**Conclusions and Suggestions for Future Research**

The results presented in this paper demonstrate the importance of using the MCC’s selection indicators as mere guides. While they may help with the initial sorting of countries, and help communicate the political priorities of the MCC and the federal government, they should not be perceived as absolute. The selection process must be followed by deep subjective analysis – which is how the MCC currently proceeds. Using empirical indicators like these can create a false sense of accuracy and security, which can lead to unfortunate outcomes. This study reinforces many existing doubts about the validity of these macro-scale measures – particularly the measures of vague theoretical concepts – doubt that should be at the forefront of any policy decisions. The moment the MCC becomes complacent about the perceived validity of these measures, the entire selection process will become suspect.

One potential avenue of future research would be to look at actual eligibility, constructing eligibility going back several decades using instrumental variables closely correlated the current indicators. This was an area of research that was attempted here – but ultimately abandoned – due to data insufficiency. In order to construct eligibility, much more thorough historical data is
necessary – data that simply does not exist for many of these indicators. Therefore, proxy or historical instrumental variables may serve useful for reconstructing historical trends.

A second approach to consider is using alternative analytical techniques, such as regression discontinuity – to study the outcomes of countries close to the selection cutoff. To conduct this analysis will require the construction of historical eligibility variables, a process currently impossible with the existing data.

A third area to explore is actual effect of selection – whether countries receiving funds based on eligibility process their aid funds in ways that are measurably different from those that don’t qualify. This research will require collecting performance data and waiting for compacts to close out over the next several years.

Yet another option is to continue with the analysis outlined in this paper, incorporating other outcome measures to build a fuller portrait of the effects of these indicators. This will help address the narrow focus of this paper, by expanding the analysis to include important outcomes currently not included. Including new outcomes may reveal new areas of significance (or insignificance), strengthening the validity of this research.

While this report casts doubt on some components of the MCC’s selection criteria, it is important to approach these results with the previously mentioned caveats in mind. The data does not conclusively prove (or disprove) the validity of the seventeen indicators; however, they do clearly highlight the inherent weaknesses of relying on macro-level data for empirical policymaking. It is important to take a multifaceted approach, and to subject these indicators to further critical analysis. While these indicators may be a useful starting point, they should be only one (nonbinding) component in the MCC’s analytical toolkit.
Appendix A: Civil Liberties
(Fixed effects quadratic; procedure as outlined in part 2 of results)
Median (2009, LIC & LMIC): 4

(a) Dependent Variable: Infant Mortality
\[ y = 9513368x + 0.2269083x^2 + 3186.647 \]

(b) Dependent Variable: GDP per capita
\[ y = -27.66638x + 1.12652x^2 - 16989.69 \]

(c) Dependent Variable: Infant Mortality
\[ y = -2.247701x + 0.4130543x^2 + 1867.826 \]

(d) Dependent Variable: GDP per capita
\[ y = 28.05072x - 6.883277x^2 - 75595.65 \]
REFERENCES


