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Abstract

There is considerable debate regarding the effectiveness of World Bank reproductive health investment lending. We examine the impact of this type of lending on maternal mortality from 1990 to 2010 for a sample of thirty-five Sub-Saharan African nations using two-way fixed effects regression models. We find support for the hypothesis that World Bank investment lending for reproductive health is associated with decreased maternal mortality. However, we find also find that World Bank structural adjustment lending is associated with increased maternal mortality. A number of other factors are also related to maternal mortality including education attainment, public health expenditures, caloric intake, and female human immunodeficiency virus prevalence.
Introduction

The World Bank has invested more than $11 billion in the reproductive health sector from 1990 to 2005. The majority of the funds, approximately $5.3 billion, financed projects in Sub-Saharan Africa. In Table 1, we present the World Bank’s reproductive health investment health lending by region with corresponding maternal mortality ratios. The projects include building of maternity wards, training of health professionals in obstetrics and gynecology, financing family planning efforts, purchasing of essential drugs, and providing medical equipment (World Bank 2014). However, Sub-Saharan Africa has the highest maternal mortality ratios in the world with more than 500 women dying during pregnancy annually for every 100,000 live births (United Nations 2005). This has contributed to slower than expected economic growth and rising income inequality in Sub-Saharan Africa (Amiri and Gerdtham 2013).

(Table 1 goes about here.)

Thus, the effectiveness of the World Bank reproductive health lending has been called into question for a variety of reasons. These reasons include its reproductive health lending being too small-scale (Lauterback and Zukerman 2013), implementing user fees (Parsitau 2008), promoting privatization (Turshen 1999). Therefore, we seek to evaluate the effectiveness of World Bank reproductive health investment lending here.

We do so by analyzing cross-national data using two-way fixed effects models for a sample of thirty-five Sub-Saharan African nations from 1990 to 2010. We now turn to a discussion of World Bank investment lending for reproductive health with an emphasis on why such loans may be associated with lower maternal mortality. We also review the reasons why they may not be effective and, therefore, would not impact on maternal mortality. We go on to describe the variables used in the analysis, our methodology, and findings. We conclude by discussing the findings, theoretical implications, policy suggestions, and possible directions for future research.

The World Bank, Reproductive Health Investment Lending, and Maternal Mortality

The World Bank earliest investments in reproductive health supported “vertically” managed efforts that sought to increase access to care through the construction and rehabilitation of infrastructure along with the training of doctors. There was also a focus on improving of planning and management of health facilities by improving administrator training (Measham 1986). In terms of reproductive health, the World Bank emphasized the building and maintenance of maternity wards. For example, a loan in Comoros funded the construction of two new maternity wards along with the renovation of thirty other facilities. The loan also financed fellowships to train doctors and nurses, especially in obstetrics and gynecology, to staff the facilities (World Bank 2014). In Uganda, the World Bank again financed the rehabilitation of hospitals and clinics. However, this investment loan also ensured that maternity wards throughout the country had appropriate obstetric equipment including blood pressure gauges,
weighing scales, delivery kits, delivery beds, autoclaves, examination lamps, and incubators (World Bank 2014).

In 1987, the World Bank drafted its first Health Sector Policy Paper. This document formally committed it to the lending for the health sector (World Bank 1997). According to Fair (2008), the World Bank would assist governments in ensuring a more equitable distribution of health services that tended to be caused by market failures and economic shocks (i.e., implementation of structural adjustment loans). To accomplish this goal, the World Bank sought to move away from lending funds to build and rehabilitate infrastructure like hospitals and maternity wards, which tend to be located in urban areas and provide expensive services, which, as a result, make them inaccessible to the majority of a country's population (Measham 1986). Rather, it would emphasize increasing access to services for poor and rural residents. This included projects like setting up clinics in rural areas, training community health workers, expanding the use of midwives, and improving primary care for mothers and children (Fair 2008).

The World Bank remained committed to funding reproductive health projects at this time (World Bank 1997). However, the rationale for such projects shifted from them returning a “demographic dividend” (i.e., reducing population growth in order to reduce poverty) to being far more comprehensive (World Bank 1999). The World Bank acknowledged that it should not only fund family planning services in an effort to bring down fertility and improve women's health but also support projects that influence use of such services like expanding girls' access to education and increasing opportunities for women to earn an income outside of the home (Fair 2008). Further, the World Bank sought to invest in projects that integrated basic health services with family planning and nutrition efforts in an attempt to simultaneously address multiple reproductive health issues faced by women (e.g., maternal mortality, fertility, contraceptive use) (Berg 1987).

For instance, Zimbabwe received a reproductive health investment loan totaling $39.5 million from the World Bank in 1992 (World Bank 2014). The loan sought to improve maternal and child health in the sixteen worst served districts, which are located in predominantly rural parts of the country. The project financed the training of midwives to staff clinics in the sixteen districts along with housing and ambulances. There would also be funding for maternity equipment, growth monitoring, and micronutrient supplementation. A final aspect of the loan would be an educational campaign regarding family planning choices for girls in secondary schools along with programs to allow women to engage in supplementary food production (World Bank 2014).

Beginning in the early 1990s, the World Bank became concerned with the long-term viability of projects it was financing, especially in Sub-Saharan Africa (World Bank 1993). Thus, it prioritized improving health financing within a country by making it more efficient via reforms. Fair writes, “Whereas the early 1980s less than one fifth of health projects included explicit reforms or systematic objectives, this number quickly multiplied to approximately one third of all health projects in the late 1980s and continued to grow to nearly one half of all health projects by the late 1990s” (2008: 9). This was the result of several factors including the emergence of
the HIV as a public health issue, debates surrounding the ability of governments to deliver health services, disappointment with the progress of specific investments in bringing about systemic change, and a rising trend of health sector reform in rich nations (World Bank 1999). Put simply, there were systematic constraints and new health challenges that needed to be addressed in order to provide access to services to the greatest number of people over the longest period of time (World Bank 1993).

In a report entitled *Financing Health Services in Developing Countries: An Agenda for Reform*, the World Bank sought to accomplish these goals via the implementation of user fees at public health facilities, the privatization of public health facilities, decentralizing purchasing of essential drugs and medical equipment, and the promotion of private insurance schemes to manage risk (World Bank 1987). The World Bank contended that the changes would improve service delivery and generate revenue to improve quality of care (Fair 2008). It would simultaneously keep costs down and foster diversity by putting decision-making as to when to seek care into the hands of individuals and households and by creating competition among providers and suppliers of goods and services (World Bank 1993).

During this period, the World Bank's reproductive health lending became even more comprehensive and integrated with lending from other sectors (World Bank 1999). This was largely a response to the international community's adoption of several major objectives following the International Conference on Population and Development (ICPD) in Cairo held during 1994 (White, Merrick, and Yazbeck 2006). The World Bank committed to funding projects that sought to reduce fertility and maternal mortality by providing universal access to reproductive health services, reducing the gender gap in education, and promoting equality for women more broadly (World Bank 1997). It would seek to accomplish these objectives by following the health sector reforms discussed above while ensuring the poor have access to a set of basic health services (World Bank 1994).

Shortly after taking the helm at the World Bank, President James Wolfensohn outlined three priorities for lending in the health sector laid out in the publication of the World Bank's (1997) *Health, Nutrition, and Population Sector Strategy Paper*. The priorities included increasing investment lending for health projects that improve the health of the poorest segments of a country's population, enhancing the performance of health systems, and ensuring financing for projects over the long term (World Bank 1997). The World Bank sought to accomplish the first priority via greater use of targeting or the funding of projects that affect the poorest individuals, households, or regions within a country. The projects tend to include women's reproductive health, especially the objectives laid out during ICPD, because women tend to be among the poorest segments of a population in many Sub-Saharan African nations (World Bank 1997). In order to achieve the second priority, the World Bank prioritized projects that utilized non-governmental organizations to deliver services in order to increase diversity and competition among providers. The third priority would happen via continued promotion of user fees, copayments, and private insurance (World Bank 1997).

One example of this can be seen in a World Bank-financed reproductive health program
in the western part of Uganda. The program sold “vouchers” via an international non-
governmental organization to women for a variety of services. The vouchers were put into place
to ensure financing for the project into the future (World Bank 2012). The services included pre-
natal and post-natal care along with delivery services and treatment of sexually transmitted
diseases (World Bank 2012). The World Bank (2012) contends that the program provided services
to 136,000 people including 46,000 safe delivery kits and 32,000 treatments of sexually
transmitted diseases.

At the turn of the century, the World Bank remained committed to the priorities laid out
in its Health, Nutrition, and Population Sector Strategy Paper three years earlier. However, the
World Bank increased its lending to help nations deal with the spread and treatment of the
HIV/AIDS. The World Bank's commitments for HIV/AIDS went from under $25 million in 1998 to
over $350 in 1999. It remained above this level annually throughout most of the 2000s (Fair
2008). There were also more resources available to deal with malaria and tuberculosis. It has
supported projects that seek to increase access to anti-retroviral drugs, providing rapid testing
to diagnose the disease, making contraception more widely available, and establishing safer
blood transfusion systems (World Bank 2005). Further, the World Bank stressed that women are
uniquely and disproportionately affected by HIV/AIDS because they are more biologically
susceptible than men and experience various forms of gender inequality that reinforce this
susceptibility (Burroway 2010). Thus, World Bank health projects also tend to include efforts to
address how gender inequality (e.g., unequal access to land, loans, and property) impacts spread
of HIV/AIDS. This last observation corresponds with the World Bank's use of integrated and
comprehensive interventions to address women's reproductive health.

For example, Burkina Faso received a $34.5 million loan from the World Bank to deal with
HIV/AIDS epidemic in the country. The loan was used to fund family planning efforts including
increasing access of modern contraception especially for women in order to slow the spread of
the diseases along with increased distribution of anti-retroviral drugs among pregnant women
(World Bank 2014). The money would also support information campaigns regarding women's
rights in family planning in schools (World Bank 2014). The loan also established a fund to
support reproductive health, educational, water, and sanitation projects operated by non-
governmental organizations in conjunction with local women, who plan, implement, and monitor
the projects (World Bank 2014). Similarly, the World Bank funded community-determined
projects in Togo that were designed to reduce the spread of HIV/AIDS. The projects included
efforts to promote female primary school enrollments, increase access and choice in modern
contraception techniques, and establish micro-finance opportunities to fund women led projects
(World Bank 2014). The World Bank also coordinated additional funding by bilateral donors, non-
governmental organizations, and private foundations to allow for a “scaling up” of the efforts
(World Bank 2014).

There are other features that many World Bank investment loans in the health sector
shared at this time. First, the World Bank formalized its “sector-wide” approach (i.e., donor
harmonization) (Fair 2008). This approach seeks to eliminate the fragmentary nature of multiple
donors funding ad hoc and even duplicate projects in the same country in favor of improving
donor coordination to finance an entire sector (Gottret and Schieber 2006). It was brought about by the World Bank’s commitment to help nations meet Millennium Development Goals. In doing so, the World Bank emphasized increased policy dialogue with borrowing nations to set health priorities (Abassi 1999). While donors give up the right to select projects that correspond with their priority funding areas, they gain a voice in the process of setting national health policy and decision making regarding not only how external but also internal resources are allocated (Cassels and Janovsky 1998).

The sector-wide lending approach is based on increased partnerships with other multilateral organizations, bilateral aid agencies, non-governmental organizations, and private foundations (Fair 2008). In some instances, the partnerships may involve working with the World Health Organization, which provides technical assistance for improving the design, supervision, and evaluation of World Bank health projects (Ruger 2005). In other instances, the World Bank may work with a non-governmental organizations or private foundation to fund the purchasing and delivery of pharmaceuticals, medical equipment, and immunizations (Abassi 1999).

This discussion leads us to hypothesize that World Bank reproductive health investment lending should correspond with decreased maternal mortality in Sub-Saharan Africa.

Potential Limitations of World Bank Reproductive Health Investment Lending

We describe the World Bank reproductive health investment lending above and why it may be associated with lower levels of maternal mortality in Sub-Saharan Africa. However, numerous factors exist that may limit the effectiveness of its lending in the sector. We four of most common limitations below.

First, World Bank reproductive health investment lending may have no impact on maternal mortality in Sub-Saharan Africa because the projects financed tend to be too small, ad hoc, or limited in geographical scope. For instance, Lauterbach and Zuckerman (2013) estimate that the World Bank invested $4.6 billion in reproductive health between 1990 and 2010. This amount represents 0.8 percent of the World Bank’s total commitments during this period (Lauterbach and Zuckerman 2013). Similarly, Dennis and Zuckerman (2008) estimate that World Bank reproductive health lending averaged around one percent of total World Bank commitments from 1990 to 2005. The World Bank magnified this problem by increasing partnerships with other donors that support efforts to target specific diseases like malaria and tuberculosis and reproductive health projects becoming small and marginalized components of other investments (Conly and Epp 1997). Thus, Princen (1994) may be correct about reproductive health investment lending in concluding, “Without a strong multiplier effect, they are unlikely to add up to significant society change” (32).

Second, the World Bank has been criticized for its emphasis cost recovery mechanisms like user fees in the health sector (McPake 1993). The World Bank argues that user fees would improve service delivery and generate revenue to improve quality of care (World Bank 1987). However, Ismi (2004) argues that this cost recovery tool has inadvertently created a “two-tier”
system in which the poor, especially women, are denied access to care because they cannot afford to pay the fees. For instance, Parsitau (2008) finds that the implementation of user fees has forced women to skip visits or altogether abandon pre-natal and family planning visits in Kenya. Further, the quality of care declines with user fees. For instance, women at Kenya’s Nakuru District Hospital are required to buy gloves, surgical blades, syringes, and disinfectants for use during birth, which puts women who cannot afford such essential items at higher risk for infections and other complications during pregnancy (Parsitau 2008). Similarly, Dennis and Zuckerman (2008) find that the World Bank implemented user fees for anti-retroviral drugs as part of a reproductive health loan to Ghana. This translated into the drugs being unaffordable to the poorest segments of the country especially women. Thus, Creese (1997) may be correct when noting, “Increases in maternal mortality and in the incidence of communicable diseases can be attributed to such policies. As an instrument of health and policy, user fees have proved to be blunt and of limited success” (202).

Third, Turshen (1999) describes issues that often arise as the result of the World Bank promotes privatization in the health. While the sell off public health facilities generates cash for governments to pay off their debt in the short term, it often decreases access to services for a much of a country’s population. This is because private investors often raise user fees in order to generate a profit or close unprofitable facilities (Ruger 2003). For instance, Buckley and Baker (2009) find that the private sector became the largest provider of reproductive health services in Tanzania during the 1990s following a World Bank loan. However, clinics closed in many rural parts of the country where people could not pay and reopened in densely populated urban centers where more patients could afford to pay for services (Buckley and Baker 2009).

Fourth, the World Bank has given funding priority to projects that utilized non-governmental organizations and foundations to deliver services (World Bank 1997). This is an effort to increase diversity and competition among providers (World Bank 1997). However, it may produce some adverse consequences for pregnant mothers. For instance, Cliff (1991) argues that Mozambique has become highly dependent on foreign aid to fund health care during the late 1980s and into the 1990s. Consequently, donors have become increasingly influential in health care policy. While this has been partially addressed in the World Bank’s focus on sector wide lending, early reproductive loans have put into place an emphasis on regional projects rather than national programs (Buchman 1996). There also tends to be a focus on treating specific diseases (e.g., malaria, tuberculosis) rather than essential reproductive health services for women. Accordingly, Cliff (1991) suggests that this “fragmented” or “patchwork” approach has delayed the establishment of national services in Mozambique imperative to reducing maternal mortality including prenatal care, nutrition counseling, and family planning (Cliff 1991).

The preceding discussion describes several reasons that call into question the effectiveness of World Bank reproductive health investment lending in reducing maternal mortality. These include loans being small-scale, emphasizing user fees, promoting privatization, not taking gender seriously into implementation of projects, and not being evidence based. We test the contentions associated with the debate regarding the effectiveness of World Bank reproductive health lending below. However, we now turn to a discussion of the dependent
variable and other theoretically relevant factors that should be included in a model estimating maternal mortality in Sub-Saharan Africa along with the methodology we use to carry out the analysis.

Data and Methodology

Dependent Variable

Maternal Mortality Ratio

The dependent variable in our study is the maternal mortality ratio for a Sub-Saharan African nation\(^1\). This variable measures the annual number of deaths from pregnancy-related causes per 100,000 live births. A maternal death is defined as the death of a woman while pregnant or with 42 days of the termination of a pregnancy from any cause related to or aggravated by pregnancy (World Health Organization 2012). We take the square root of the variable to correct for its skewed distribution. All data are available for 1995, 2000, 2005, and 2010. We obtain the maternal mortality data online from the United Nation’s Millennium Development Goals portal. All other data may be obtained online from the World Bank’s World Development Indicators unless otherwise noted. The descriptive statistics for the variables used in this analysis are contained in Table 2.

It can be difficult to obtain comparable estimates of maternal mortality across nations due to issues with underreporting and misclassification (World Health Organization 2012). This may occur for several reasons. For instance, deaths of reproductive aged women might not be recorded at all because governments do not require such reporting by law. Even if such deaths are recorded, the pregnancy status or cause of death may not be known and the deaths would, therefore, not have been reported as maternal deaths. Further, in most Sub-Saharan African nations where medical certification of cause of death does not exist, accurate attribution of a female death as a maternal death is difficult (World Health Organization 2012). These issues may by complicated by inadequate understanding of reporting rules for maternal deaths, the desire to avoid litigation, and the desire to suppress information, especially regarding abortion-related deaths (World Health Organization 2012). At the same time, there are complications with measuring adjusted maternal mortality over time. This is because different adjustment protocols are often used by different nations to estimate the maternal mortality ratio in different years, thereby rendering the data unsuitable for analysis across years (World Health Organization 2012).

Thus, we use the newly available data on maternal mortality from the United Nations Maternal Mortality Estimation Inter-Agency Group (i.e., World Health Organization, United Nations Children’s Fund, United Nations Population Fund, and World Bank) as our dependent variable. This group has developed adjusted estimates of maternal mortality that are comparable across nations and time (World Health Organization 2012). The estimates have been developed to monitor a country’s progress toward meeting Millennium Development Goal Five, reducing maternal deaths by three-quarters between 1990 and 2015.
The adjusted maternal mortality estimates are derived using the following procedure (World Health Organization 2012). First, the consortium obtains data on maternal deaths for each nation for an available time point during the period of investigation (i.e., 1990 to 2005). Second, it classifies the source of the data (e.g., civil registrations, household survey, censuses, reproductive age mortality study, or verbal autopsy) for each country and year. Third, it adjusts the estimates for underreporting and misclassification depending on the data source. The adjustment factors are derived from meta-analysis of the scholarly literature and weighting suggested by governments. Fourth, using the adjusted data, estimates are derived for remaining years using information on a country’s total fertility rate and percentage of births attended to by a skilled attendant. Please see the World Health Organization (2010) for a more detailed discussion of the methodology used to calculate the estimates.

(Table 2 goes about here.)

Independent Variables

**World Bank Reproductive Health Investment Loan**

The main independent variable of interest is the amount of money allocated to a Sub-Saharan African nation by the World Bank as part of investment loan in the reproductive health sector. We divide this amount by a country’s population in a specific year in order to standardize the measure across nations. The lending data may be obtained from the World Bank’s Project and Operations database online. The population data come from the World Bank’s World Development Indicators database online. The data for all independent variables are measured in 1990, 1995, 2000, and 2005. We build this temporal lag into our models because it takes time for the World Bank to disburse an investment loan and for projects to be completed.

**World Bank Structural Adjustment Loan**

We also include the amount of money allocated by the World Bank to support a structural adjustment loan in the health sector. We again divide the loan amount by a country’s population in millions. The lending data may be obtained from World Bank’s Projects and Operations database online. We hypothesize that World Bank structural adjustment should increase maternal mortality. This is because the World Bank often requires governments that receive such a structural adjustment loan to implement a variety of macro-economic policy reforms including the cutting of government spending for health, implementing cost recovery mechanism for health services, privatizing hospitals, and reducing the size of the public sector labor force (Pandolfelli, Tyagi, and Shandra 2014).

**Debt Service Ratio**

In addition to the pressure to adopt macro-economic policy reforms under structural adjustment, poor nations must continually service their foreign debts. Clearly, it is also important
to control for debt service as well as structural adjustment (Bradshaw and Schafer 2000). Thus, we include the repayment of all long-term public debt to multilateral lenders. The data are measured as a percentage of exports of goods and services. This variable is logged to correct its skewed distribution. We hypothesize that higher levels of debt service should be associated with increased maternal mortality within Sub-Saharan African nations because it removes resources available for governmental investment in health, family planning, and reproductive services.

**Gross Domestic Product**

We include gross domestic product per capita at purchasing power parity to control for the level of wealth in a nation. We log this variable because of its highly skewed distribution. We expect that higher levels of gross domestic product per capita should correspond with decreased maternal mortality in Sub-Saharan Africa. This is because higher levels of wealth tend to bring higher standards of living, advanced medical technology, and demographic changes that lower maternal mortality (Shen and Williamson 1999). Buor and Bream (2004) find support for this line of reasoning in their cross-national research.

**Secondary School Enrollment**

We include gross secondary school enrollments in the models to examine the impact of education on maternal mortality. It is generally thought that education results in higher earnings in the wage labor market, thereby increasing economic growth (Shen and Williamson 1999). The economic growth augments standards of living and access to advanced medical technology, leading to lower levels of maternal mortality. Thus, we expect that higher levels of gross secondary school enrollments should be associated with lower maternal mortality in Sub-Saharan Africa.

**Female Secondary School Enrollment**

We also include female secondary school enrollments in the models as an alternative indicator of education attainment. We hypothesize that higher levels of female secondary school enrollment should be related to decreased maternal mortality within Sub-Saharan African nations. This may well be because female education is associated not only with the higher rates of economic growth but also other factors that may limit maternal mortality like the wider use of health services, especially prenatal and postnatal care (Shen and Williamson 1999). It also tends to improve access to information about nutrition, birth spacing, reproductive health, and immunizations (Filmer and Pritchett 1999). Shiffman (2004) finds support for this hypothesis.

**Democracy**

We use the average of Freedom House’s (2005) political rights and civil liberties scales to measure democracy. According to Freedom House (2005), political rights refer to the degree to which a nation is governed by democratically elected representatives and has fair, open, and inclusive elections. The civil liberties scale measures the level of freedom of press, freedom of
assembly, general personal freedom, freedom of private organizations, and freedom of private property within a nation. The variables have the following coding: free (1-2), partially free (3-5), and not free (6-7). We multiply the index by negative one so that high scores correspond with high levels of democracy. We hypothesize that higher levels of democracy should correspond with decreased maternal mortality within Sub-Saharan Africa. This is most likely the case because freely elected and open governments respond to popular demands for health services due to political activism and electoral accountability (Wickrama and Mulford 1996).

Public Health Expenditures

We include public health expenditures as a percentage of gross national product in the models to account for a government’s investment in the sector. This measure includes all current expenditures by all levels of government for the provision of medical services. We expect higher levels of public health expenditures to be associated with decreased maternal mortality within Sub-Saharan African nations. This is because government investment in hospitals and primary care (e.g., immunizations, family planning, prenatal care, postnatal care, and nutrition counseling) should improve maternal mortality (Moon and Dixon 1985). Rice (2008) finds support for this idea.

Access to an Improved Water Source

This variable measures the percentage of the country’s population who has access to an improved water source. According to the United Nations (2010), an improved water source includes any of the following types of water sources: household connections, public standpipes, boreholes, protected dug wells, protected springs, and rainwater collection. An unimproved water source may include an unprotected well, surface water, vendor provided water, tanker provided water, and bottled water. We hypothesize that higher levels of access to an improved drinking water source should be related to lowered maternal mortality because diarrheal diseases that often complicate pregnancies and lead to more maternal deaths (Rice 2008).

Access to an Improved Sanitation Source

As an alternative indicator that considers that impact of the environment on maternal mortality, we include the percentage of a population who has access to an improved sanitation facility. The United Nations (2010) considers an improved sanitation facility to be a connection to a public sewer, connection to a septic tank, pour flush latrine, simple pit latrine, ventilated pit latrine, pit latrine with slab, and composting toilet. An unimproved sanitation facility includes an open pit latrine, public latrines, buckets, latrines, hanging latrines, flush to elsewhere (e.g., street, yard, river, ditch, etc.), and no facility (United Nations 2010). We expect that higher levels of access to an improved sanitation facility should correspond to decreased maternal mortality within a Sub-Saharan African nation. This is because a poor sanitation system can lead to a number of diseases in children including diarrhea, intestinal worms, and cholera among many others (Rice 2008).
Caloric Intake

We account for the impact of nutritional level within a country by including calories consumed daily within a nation per person. We expect that higher levels calorie intake should correspond with less maternal mortality. This is because hunger increases the incidence of anemia in pregnant women, which women's susceptibility to illness, pregnancy complications, and maternal deaths (Shen and Williamson 1999).

Female Human Immunodeficiency Virus Prevalence

We also include the prevalence of the HIV for each Sub-Saharan African nation. This variable measures the percentage of a country’s female population ages fifteen to forty-nine that are infected with HIV, whether or not they have developed symptoms of acquired immune deficiency syndrome, alive at the end of the year specified. We hypothesize that higher levels of female HIV prevalence should be associated with increased maternal mortality. This is because mothers may experience complications during pregnancy or birth as a result of opportunistic infections (e.g., tuberculosis, pneumonia, and malaria) due to a weakened immune system (Foster and Williamson 2000).

Methodology

We estimate a two-way fixed effects regression model with robust standard errors clustered by country to examine the effect of World Bank reproductive health lending on maternal mortality within Sub-Saharan African nations. This is one of the most commonly models used by social scientists to deal with potential problems of heterogeneity bias (Halaby 2004). The issue of heterogeneity bias refers to the impact of unmeasured time-invariant variables that are omitted from a regression model. To deal with heterogeneity bias, fixed-effects models control for omitted variables that are time invariant but do not vary across cases. This is done by estimating unit-specific intercepts, which are the fixed effects for each case. This approach is appropriate for cross-national analysis because time-invariant unmeasured factors (e.g., climate, geography) can affect maternal mortality in Sub-Saharan Africa. Thus, a fixed-effects approach should provide a stringent assessment of the relationship between World Bank lending and maternal mortality because the associations between the variables are estimated net of unmeasured between-country effects (Brady, Kaya, and Beckfield 2007). Generally, this modeling strategy is robust against missing control variables (Hsiao 2003).

The notation for the two-way fixed-effects model is as follows:

\[ y_{it} = \alpha + B_1 x_{i1t} + B_2 x_{i2t} + \ldots + B_k x_{ikt} + u_i + w_t + e_{it}, \]

where

\( i \) = each country in the analysis,
$t$ = each time period in the analysis,

$y_{it}$ = dependent variable for each country at each time period,

$a$ = the constant,

$B_1$ to $B_k$ = coefficients for each independent variables,

$x_{itk}$ = independent variables for each country at each time point,

$u_i$ = country-specific disturbance terms that are constant over time,

$w_t$ = period-specific disturbance terms that are constant across all countries,

and

$e_{it}$ = disturbance terms specific to each country at each time point.

To determine if the two-way fixed effects model is more appropriate than the random effects estimator, we calculate Sargan-Hansen test statistics for each model. We present these results in Table 3. The Sargan-Hansen test is asymptotically equivalent to the Hausman test of fixed versus random effects. However, it extends the Hausman by allowing the incorporation of clustered robust standard errors that are employed to deal with heteroskedasticity often present in the analysis panel data due to nations being nested within time (Baum 2006). The null hypothesis of the test follows a $\chi^2$ distribution if the random effects estimator is more efficient. In our models, the test statistic reaches a level of statistically significance for every model, indicating that the fixed effects estimator is more efficient than the random effects estimator because the country-specific error terms are correlated with the independent variables included in the models (Baum 2006).

**Findings**

In Table 3, we present the two-way fixed effects regression estimates of maternal mortality in Sub-Saharan Africa.\(^1\) In every equation, we include reproductive health lending, structural adjustment health lending, debt service, gross domestic product, female secondary school enrollment, democracy, domestic conflict, public health expenditures, caloric intake, and female HIV prevalence. In equation (3.1), we include gross secondary school enrollments. In equation (3.2), we include female secondary school enrollments. In odd-numbered equations, we examine access to an improved water source. In even-numbered equations, we include access to an improved sanitation facility.

(Table 3 goes about here.)

Let us begin with a discussion of the World Bank lending variables. We find that World Bank reproductive health lending is associated with less maternal mortality in Sub-Saharan Africa.
The coefficients for this variable are negative and significant in every equation. This finding contradicts the arguments regarding World Bank reproductive health being ineffective for a variety of reasons and, therefore, having no impact on maternal mortality. Put simply, World Bank reproductive health lending is associated with lower maternal mortality in Sub-Saharan Africa.

However, we also find that World Bank structural adjustment lending for health is associated with increased maternal mortality. The coefficients for this variable are positive and significant in every model. When we consider the findings regarding the World Bank together, it appears that the World Bank is eroding any gains in improving maternal mortality via its reproductive health investments by requiring Sub-Saharan African nations to implement structural adjustment loans.

It is important to note that there are other factors that explain maternal mortality in Sub-Saharan African nations across our models. First, we find that secondary school enrollments and female secondary school enrollments are associated with less maternal mortality. The coefficients are negative and significant for each variable. Second, we find that public health expenditures are associated with decreased maternal mortality. The coefficients for this variable are negative and significant in three of four models. Third, we find that higher levels of caloric intake are associated with decreased maternal mortality. The coefficients for this measure are negative and significant across Table 2. Fourth, we find that higher levels of female HIV prevalence are associated with increased maternal mortality. The coefficients are positive and significant in all four equations.

There are some non-significant findings that should be mentioned as well. First, there are a few economic factors that do not predict significant variation in maternal mortality. These include debt repayment and gross domestic product. Second, some political factors that are also not related to maternal mortality in Sub-Saharan Africa. These are democracy and presence of a domestic conflict. Third, we do not find that either of our measures of environmental quality are related to maternal mortality. The coefficients for access to an improved water source and sanitation facility are not statistically significant in Table 3.

Discussion and Conclusion

There is a debate regarding the impact World Bank reproductive health lending on maternal mortality in Sub-Saharan Africa. We evaluate this debate here and find that World Bank reproductive health investment lending decreases maternal mortality. The coefficients for the World Bank reproductive health lending variable are negative and significant in Table 3. This finding appears to contradict claims of the ineffectiveness of World Bank reproductive health investment lending described above. However, we also find that World Bank structural adjustment lending for health is associated with increased maternal mortality in Sub-Saharan Africa. The coefficients for this variable are positive and significant in all the models. Taken together, the findings suggest that the World Bank may be eroding any gains in maternal
mortality via its reproductive health investment lending by implementing structural adjustment
lending in Sub-Saharan Africa.

Thus, one criticism remains salient. We argue the World Bank should be criticized for
promoting "reformist" solutions to women's reproductive health issues because it does not
fundamentally address the causes of maternal mortality—structural adjustment lending in the
health sector. As a result, we reiterate conclusions reached over two decades ago by Oxfam
(1993) that the World Bank's reproductive health investment lending is “probably serving more
of a political purpose in giving adjustment the appearance of a human face rather than a genuine
compensatory purpose” (Oxfam 1993: 25).

How may we explain the contradictory findings? In answering this question, we arrive at
the theoretical implications of this study. The results embody ideas put forth by Weaver (2008)
in “Hypocrisy Trap: The World Bank and the Poverty of Reform.” The author draws on the theory
of “organized hypocrisy” from the sociology of organization literature to argue that the World
Bank does not pursue a single and coherent agenda but rather different and contradictory
agendas when it implements reforms in response to external pressures that threaten its
legitimacy and resources.

On the one hand, the United States Treasury (and, most likely, private capital markets),
which the World Bank depends for capital replenishments, drives it to adopt a “finance ministry”
agenda (Weaver 2008). This involves the World Bank implementing lending programs based on
market-oriented principles associated with structural adjustment even if it means worsening
health in borrowing nations. These principles serve the interests of capital markets, United States
and European multinational corporations, and the United States Treasury, by opening the
economies of Sub-Saharan African to trade and financial flows from donor nations (Weaver
2008).

On the other hand, the World Bank must also be deferential to issues being raised by the
United Nations agencies, non-governmental organizations, and lawmakers from donor
governments especially the United States Congress (Weaver 2008). These groups are pushing
the World Bank to adopt a “civil society” agenda based upon more socially oriented lending,
conceptualized here as investment lending for health, that tends not to correspond with the
“finance ministry” agenda (Weaver 2008). Thus, the World Bank ends up facing “the necessity
of appearing responsive to both sets of demands, reacts by embracing both sets of agendas in its
broad policy paradigms, leaving the inconsistencies and contradictions to be worked out in its
daily operations” (2008: 32).

From this insight, we argue that cross-national research should not consider how factors
promoting either a finance ministry or civil society agenda affect health. It is only when
researchers consider both sets of factors in tandem that social scientists will arrive at the most
comprehensive understanding of how the World Bank impacts well-being.
There is a methodological implication of the study too. We demonstrate the importance of examining how different types of World Bank lending have divergent impacts on forests. It is only by using newly available sector specific information on lending that we are able to clarify the various ways that the World Bank impacts the health.

We can suggest some policy recommendations that correspond with the main findings and take the reformist criticism of the World Bank seriously. First, non-governmental organizations, social movements, and concerned citizens should lobby World Bank officials to abandon structural adjustment lending altogether. This is especially true with both World Bank structural adjustment and debt repayment contributing to maternal mortality. Given that the World Bank receives a large portion of its money from the United States, attention should be given to lawmakers in the United States Congress to bring about such changes. The elimination of structural adjustment needs to be coupled with more debt forgiveness and moving toward grants rather than loans to fund reproductive health investment in Sub-Saharan Africa. The grants could support projects that seek to limit female HIV prevalence and increase good availability (Burroway 2012). The use of grants rather than loans would allow Sub-Saharan African nations to avoid accumulating more debt, thereby reducing the need of governments to enter into structural adjustment agreements in the first place. The may be best accomplished by expanding eligibility for the World Bank's Enhanced Highly Indebted Poor Countries and Multilateral Debt Relief Initiatives. These programs offer debt forgiveness to reduce debt repayment amounts to "sustainable" levels while providing grants to ensure that health services remain funded (McMichael 2001).

The policy recommendations point to some potential directions for future research along with the limitations of the study. The findings highlight the contradictory nature of World Bank lending in Sub-Saharan Africa. A similar pattern of findings may be playing out in other sectors that the World Bank provides loans like environmental protection and nutrition. It is important to identify if this is the case in order for the World Bank to invest its resources in the projects that deliver the greatest impacts. Further, we call for greater debt forgiveness via the World Bank's Highly Indebted Poor Countries and Multilateral Debt Relief Initiatives as a way to reduce maternal mortality in Sub-Saharan Africa. However, governments must meet a range of economic management and performance targets to qualify for the debt relief (Babb 2009). The economic management and performance targets usually involve liberalization of trade and fiscal policy (e.g., tax holidays, firing workers at will, and weakening of government regulations) that can be quite similar to structural adjustment loan reforms (Peet 2003). Thus, research should consider if the debt relief provided by this program are associated with lower levels of maternal mortality or if the economic management and performance targets that governments must meet in order to qualify for the aid are related to higher levels of maternal mortality. Finally, we use cross-national data to examine the impacts of World Bank lending on maternal mortality in Sub-Saharan Africa over a twenty year period. This is due to data availability for several variables (e.g., maternal mortality, female secondary school enrollment, access to an improved water source, and access to an improved sanitation facility) (World Bank 2010). Nevertheless, there needs to be research that examines how the World Bank's lending affects specific countries over longer periods of time.
References


Table 1. Cumulative World Bank Reproductive Health Lending (1990-2005) and Maternal Mortality (2005) by Region

<table>
<thead>
<tr>
<th>Geographical Region</th>
<th>Maternal Mortality Ratio</th>
<th>Reproductive Health Investment Lending</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Saharan Africa</td>
<td>510</td>
<td>5,304</td>
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<tr>
<td>Latin America</td>
<td>85</td>
<td>2,101</td>
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<tr>
<td>Asia</td>
<td>121</td>
<td>1,178</td>
</tr>
<tr>
<td>North Africa and Middle East</td>
<td>69</td>
<td>816</td>
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<tr>
<td>Central Europe</td>
<td>39</td>
<td>1,766</td>
</tr>
</tbody>
</table>

Notes:

a. The data for World Bank lending are measured in millions of U.S. Dollars. They may be obtained from the World Bank's Project and Operations Database.

b. The data on maternal mortality are measured in deaths during pregnancy per 100,000 live births. They may be obtained from from the United Nations Children's Fund (2005).
Table 2. Univariate descriptive statistics and bivariate correlations for variables in the analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Mean</th>
<th>S.D</th>
<th>Min</th>
<th>Max</th>
<th>Correlation (1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
<th>(11)</th>
<th>(12)</th>
<th>(13)</th>
<th>(14)</th>
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</thead>
<tbody>
<tr>
<td>Maternal mortality (per 100,000 live births)†</td>
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<td>6.18</td>
<td>.62</td>
<td>3.33</td>
<td>7.00</td>
<td>1.00</td>
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<td>WB Reproductive Health Loan Recipient (1=yes)</td>
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<td>1.64</td>
<td>2.99</td>
<td>0</td>
<td>18</td>
<td>.07</td>
<td>1.00</td>
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<tr>
<td>WB Str. Adj. Loan Recipient (1=yes)</td>
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<td>7.02</td>
<td>0</td>
<td>42.19</td>
<td>-.12</td>
<td>-.05</td>
<td>1.00</td>
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<tr>
<td>Multilateral Debt Service†</td>
<td>102</td>
<td>1.98</td>
<td>1.23</td>
<td>0</td>
<td>3.77</td>
<td>.15</td>
<td>-.11</td>
<td>.03</td>
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<tr>
<td>Gross Domestic Product†</td>
<td>102</td>
<td>5.89</td>
<td>.95</td>
<td>4.65</td>
<td>8.39</td>
<td>-.62</td>
<td>-.16</td>
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<td>-.09</td>
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<tr>
<td>Secondary School Enrollments†</td>
<td>102</td>
<td>3.09</td>
<td>.72</td>
<td>1.61</td>
<td>4.53</td>
<td>-.60</td>
<td>-.02</td>
<td>.01</td>
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<tr>
<td>Female Secondary School Enrollments†</td>
<td>102</td>
<td>2.86</td>
<td>.85</td>
<td>1.10</td>
<td>4.55</td>
<td>-.63</td>
<td>-.07</td>
<td>-.01</td>
<td>-.21</td>
<td>.74</td>
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<tr>
<td>Democracy</td>
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<td>4.46</td>
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<td>-.30</td>
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<tr>
<td>Conflict (1=yes)</td>
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<td>.40</td>
<td>0</td>
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<td>.13</td>
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<tr>
<td>Public Health Expenditures†</td>
<td>102</td>
<td>2.26</td>
<td>1.13</td>
<td>.46</td>
<td>8.70</td>
<td>-.24</td>
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<tr>
<td>Caloric Intake†</td>
<td>102</td>
<td>7.70</td>
<td>1.47</td>
<td>7.33</td>
<td>8.00</td>
<td>-.40</td>
<td>-.17</td>
<td>.07</td>
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<td>.59</td>
<td>.45</td>
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<tr>
<td>Access to Improved Water Source†</td>
<td>102</td>
<td>4.07</td>
<td>.30</td>
<td>3.00</td>
<td>4.61</td>
<td>-.49</td>
<td>.00</td>
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<td>.25</td>
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<td>Access to Improved Sanitation†</td>
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<td>3.16</td>
<td>.77</td>
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<td>4.54</td>
<td>-.28</td>
<td>-.13</td>
<td>.06</td>
<td>.11</td>
<td>.53</td>
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<td>.47</td>
<td>-.21</td>
<td>-.06</td>
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<td>Female Human Immunodeficiency Virus Prevalence</td>
<td>102</td>
<td>3.05</td>
<td>3.94</td>
<td>.10</td>
<td>18.30</td>
<td>-.09</td>
<td>-.16</td>
<td>-.06</td>
<td>.39</td>
<td>.32</td>
<td>.36</td>
<td>-.17</td>
<td>-.08</td>
<td>.43</td>
<td>.13</td>
<td>.14</td>
<td>.36</td>
<td>1.00</td>
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</tr>
</tbody>
</table>

Notes: † indicates data transformed using the natural logarithm.
<table>
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<tr>
<th></th>
<th>Eq. (3.1)</th>
<th>Eq. (3.2)</th>
<th>Eq. (3.3)</th>
<th>Eq. (3.4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WB Reproductive Health Loan</td>
<td>-.009** (.004)</td>
<td>-.011** (.003)</td>
<td>-.010* (.004)</td>
<td>-.012** (.004)</td>
</tr>
<tr>
<td>WB Structural Adjustment Loan</td>
<td>.012* (.007)</td>
<td>.012* (.007)</td>
<td>.012* (.007)</td>
<td>.012* (.007)</td>
</tr>
<tr>
<td>Total Debt Service</td>
<td>-.005 (.016)</td>
<td>-.017 (.016)</td>
<td>-.004 (.016)</td>
<td>-.015 (.016)</td>
</tr>
<tr>
<td>Gross Domestic Product</td>
<td>.311 (.203)</td>
<td>.311 (.204)</td>
<td>.305 (.097)</td>
<td>.311 (.210)</td>
</tr>
<tr>
<td>Secondary School Enrollment</td>
<td>-.317*** (.074)</td>
<td>-.305** (.097)</td>
<td></td>
<td></td>
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<tr>
<td>Democracy</td>
<td>.003 (.011)</td>
<td>.000 (.012)</td>
<td>.004 (.013)</td>
<td>.001 (.012)</td>
</tr>
<tr>
<td>Domestic Conflict (1 = Yes)</td>
<td>-.121 (.088)</td>
<td>-.106 (.099)</td>
<td>-.120 (.101)</td>
<td>-.106 (.109)</td>
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<tr>
<td>Public Health Expenditures</td>
<td>-.029** (.013)</td>
<td>-.027* (.015)</td>
<td>-.023 (.015)</td>
<td>-.022 (.017)</td>
</tr>
<tr>
<td>Caloric Intake (ln)</td>
<td>-.1.019*** (.351)</td>
<td>-.999** (.364)</td>
<td>-.871* (.370)</td>
<td>-.880** (.370)</td>
</tr>
<tr>
<td>Access to Improved Water Source</td>
<td>.260 (.157)</td>
<td>.217 (.170)</td>
<td>.079 (.008)</td>
<td>.058 (.128)</td>
</tr>
<tr>
<td>Access to Improved Sanitation Source</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Female HIV Prevalence</td>
<td>.030*** (.008)</td>
<td>.029*** (.008)</td>
<td>.028*** (.008)</td>
<td>.027*** (.008)</td>
</tr>
<tr>
<td>Year = 1995</td>
<td>-.1.03** (.039)</td>
<td>-.098* (.040)</td>
<td>-.1.07** (.044)</td>
<td>-.099** (.044)</td>
</tr>
<tr>
<td>Year = 2000</td>
<td>-.1.54*** (.053)</td>
<td>-.1.33* (.059)</td>
<td>-.1.43** (.051)</td>
<td>-.1.321** (.056)</td>
</tr>
<tr>
<td>Year = 2005</td>
<td>-.3.13*** (.079)</td>
<td>-.3.04*** (.082)</td>
<td>-.2.95*** (.073)</td>
<td>-.2.83*** (.075)</td>
</tr>
<tr>
<td>Constant</td>
<td>12.209*** (2.483)</td>
<td>12.108*** (2.564)</td>
<td>11.857*** (2.511)</td>
<td>11.856*** (2.540)</td>
</tr>
</tbody>
</table>

Notes:
- a) * indicates p < .05, ** indicates p < .01, and *** indicates p < .001 for a one-tailed test.
- b) The first number is the unstandardized regression coefficient and the second number in parentheses is the robust standard error.
- c) The null hypothesis for the Sargan-Hansen test is that the random effects estimator is more efficient than the fixed effects estimator.
- d) The reference category for the year dummy variables is 1990. The maternal mortality ratio is measured as the square root of pregnancy related deaths per 100,000 live births.