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Financial Development and the MDGs for Education, Gender Equality, and Health

Benjamin N. Rosner
Princeton University, bnrosner@gmail.com

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Financial Development and the MDGs for Education, Gender Equality, and Health

Abstract

Recent research has found that financial development reduces poverty in developing countries. This paper shows that it also improves education, gender equality, and health. Specifically it has 3 key findings. First, financial development helps achieve the Millennium Development Goals (MDGs) for education, gender equality, and health by increasing the amount of private credit, money, and deposits in the economy. Second, increasing opportunities to deposit savings is the most significant way that financial development affects the MDGs. Third, the least financially developed countries benefit the most from financial development. These results are robust to omitted variable and reverse causation biases.

Keywords

Financial Development, Millennium Development Goals, Education, Gender Equality, Health

Cover Page Footnote

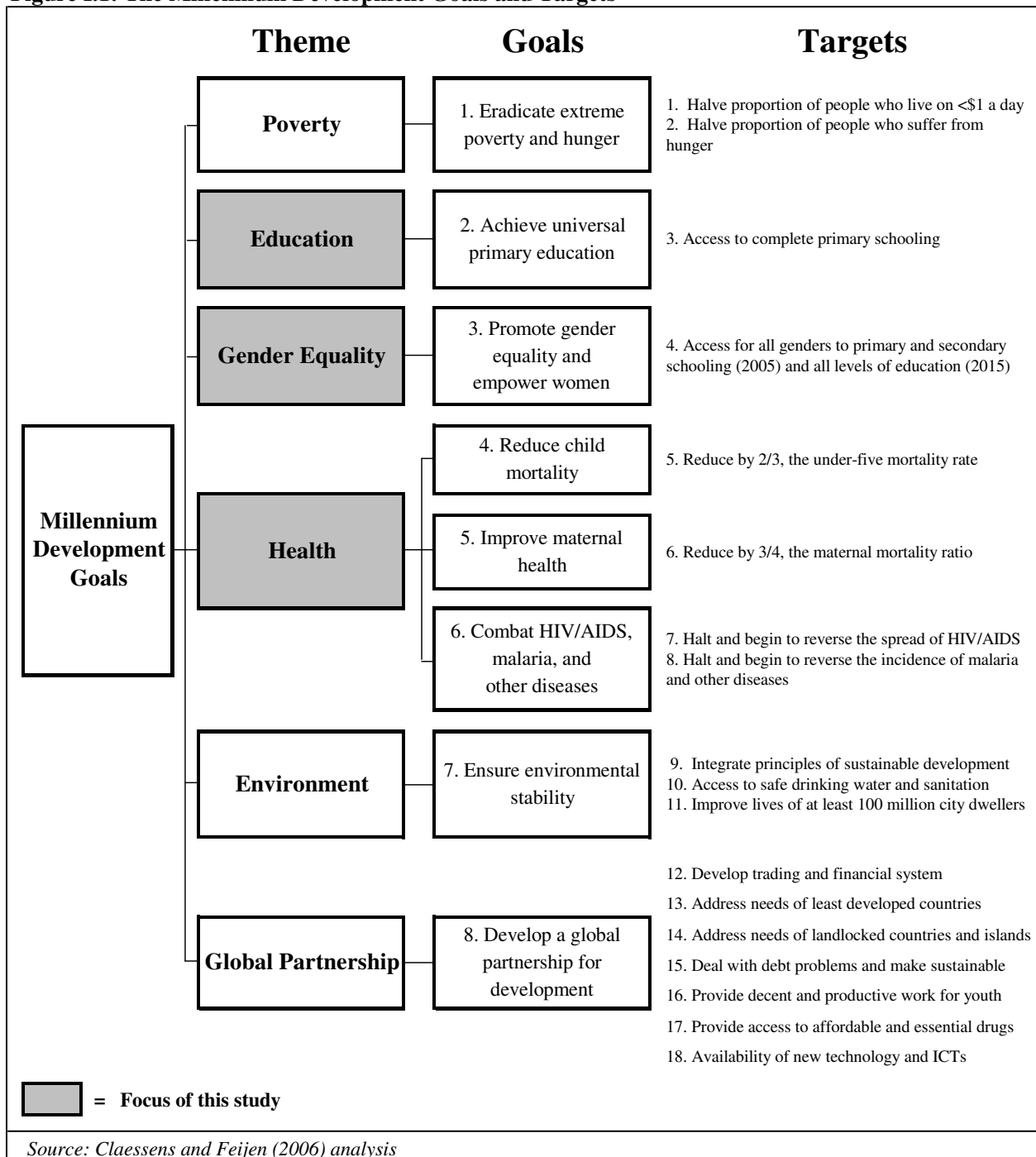
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Introduction

Many people in the world lack basic education and health. In 2007, an estimated 72 million children were not enrolled in school. In 2009, over 8 million children died before the age of five. These statistics are especially striking in regions with many developing countries. Half of all children not enrolled in school are from Sub-Saharan Africa (The World Bank, 2010). Also in Sub-Saharan Africa, approximately 1 out of 8 children dies before the age of five, around 20 times the average of 1 out of 167 children in developed countries (UNICEF et al., 2010).

In order to address these problems, the 192 United Nations member states signed the Millennium Declaration in 2000. The Millennium Declaration created 8 Millennium Development Goals (MDGs) for nations to meet by 2015. The MDGs are targets to reduce poverty while promoting education, gender equality, health, environmental stability, and a global partnership. They are also part of a broader “human development” effort for every person in the world to have basic human rights as set out by the Universal Declaration of Human Rights (The UN Millennium Project, 2005). Figure I.1 presents the MDGs and their specific targets.

Figure I.1: The Millennium Development Goals and Targets



The Millennium Project, an advisory body to the United Nations, has stated that the MDGs are attainable. It estimates that the goals could be reached if developed countries invested 0.7 percent of their gross national product, rather than the current average of 0.47 percent, to

development efforts (The UN Millennium Project, 2006). The important issue for policy makers is to determine which development projects to invest in.

Policies that promote economic growth are needed to achieve the MDGs. Evidence shows that economic growth reduces poverty (Bourguignon, 2004). Economic growth also improves education by promoting school participation, gender equality by enabling women to control more of their own income, and health by increasing life expectancies and reducing child mortality rates (Barro and Lee, 2001; The World Bank, 1993). However not all growth initiatives are linked to improvements in poverty, education, gender equality, and health (Bourguignon et al., 2008). Policies that create growth yet do not directly benefit the poor or improve education, gender equality, and health in a country may not help attain the MDGs.

One possible development strategy is “financial development”. Financial development improves the financial sector in a country so that it more efficiently allocates capital between lenders and borrowers. A more developed financial sector promotes economic growth (Levine, 2004). Therefore financial development may indirectly help achieve the MDGs by stimulating growth. Recent research has also shown that financial development directly reduces poverty without increasing income inequality (Beck et al., 2004; Rosner, 2010). Therefore financial development is a significant policy option to achieve the first MDG of poverty reduction. However there has been little empirical research on financial development’s impact on the other MDGs for education, gender equality, and health. It may be that an improved financial sector does not have an impact on these MDGs beyond its effect on growth.

It is important to recognize that financial development is not microfinance. Microfinance is focused on organizations that extend credit to the poor who are excluded from the formal banking sector (Morduch, 1999). Initially promising as loan repayment exceeded 95%,

microfinance grew to serve over 150 million customers by 2007 (Gine et al., 2010). However microfinance faces many problems today. There is a microfinance crisis in India as almost all of the borrowers in Andhra Pradesh, one of the largest states, have stopped repaying their loans (Polgreen and Bajaj, 2010). While microfinance has recently been unsuccessful, financial development is different. Instead of focusing on those outside of the formal banking sector, financial development builds up the financial sector. A larger formal banking sector may include those who were formerly excluded and provide them services more efficiently and successfully than does microfinance.

This paper empirically tests the impact of financial development on the MDGs for education, gender equality, and health in developing countries. Using data from 1980 through 2007, I find that financial development improves education, gender equality, and health by increasing the availability of private credit, money, and deposits in the economy. Increasing opportunities to deposit savings is the most significant way that financial development affects the MDGs. The least financially developed countries benefit the most from financial development. These results are robust to omitted variable and reverse causation biases.

The remainder of this paper is organized as follows. Section 1 presents the theory on how financial development can achieve the MDGs for education, gender equality, and health. Section 2 reviews the current empirical research on the subject. Section 3 presents the data and methodology. Section 4 presents the results and a discussion.

1. Theory

This section presents the theoretical explanations for how an improved financial sector may help achieve the MDGs for education, gender equality, and health. First it explains how financial

development can reduce poverty. Then it explains how financial development can promote education, gender equality, and health. Next it presents a possible nonlinear relationship between financial development and the MDGs. Finally it explains the problems of microfinance and how financial development is different.

1.1 How Might Financial Development Reduce Poverty?

To understand how financial development may improve education, gender equality, and health, it is important to first consider how it may reduce poverty. As explained in Rosner (2010), financial development can reduce poverty in 3 ways. First, it can enable more people to access credit. In developing countries, financial market imperfections hinder people with profitable projects from obtaining the credit to fund them. Information asymmetries make it difficult for banks to determine the risks of different projects. Borrowers need to provide collateral in order to convince banks to lend to them. The poor do not have the assets to put down as collateral and thus cannot access credit to invest in profitable projects. Financial development may help the poor by reducing market imperfections that constrain credit. Second, financial development can reduce transaction costs in the economy by increasing the amount of money in the economy. Trading real goods for each other in barter systems is costly because of the need to find trading partners and to store and transport goods. A system of exchange based on money is more efficient as it reduces these costs and promotes trade. Therefore financial development may help the poor by reducing transaction costs in the economy. Third, financial development can enable more people to deposit their savings. McKinnon's "conduit effect" (1973) states that if the poor could deposit their savings in financial institutions and earn interest, they would be able to accumulate wealth to invest in profitable projects. Therefore financial development may also

reduce poverty by enabling people to save their income in deposit accounts.

1.2 How Might Financial Development Improve Education, Gender Equality, and Health?

Financial development may enable more people to invest in their education and health and women to gain more influence in society. Financial development reduces poverty and may enable households to afford education. Since many households in developing countries work in agriculture, they are vulnerable to economic shocks such as droughts. Financial services could help protect against such negative shocks that often require children to drop out of school to help their families. People could also access credit in the financial system to borrow and pay for tuition and school supplies. As financial development reduces poverty, people may also be able to pay for health expenses. They could save in order to be prepared for unexpected health costs. They also could access credit markets to invest in health treatment and living conditions that minimize accidents or diseases. Women could also benefit from financial development. They could manage their own income, invest in productive projects, and assert themselves in society (Claessens and Feijen, 2006).

Education, gender equality, and health are all interconnected. Improving one of them may also have an impact on the others. As families become healthier, children are more able to participate in school. Children do not have to drop out of school in order to spend time at home to help sick family members. Parents who are more educated also place a greater value on health. Healthier and more educated women are more successful in owning assets and determining their own income (The World Bank, 1993). As financial development helps achieve one of the MDGs, it may consequently help achieve the others.

1.3 Does Financial Development Have a Diminishing Marginal Impact on the MDGs?

It is plausible that financial development helps achieve the MDGs at a diminishing rate. Recent finance and growth literature has found that financial development has a diminishing marginal impact on economic growth. Rioja and Valev (2003) show that financial development promotes more growth for countries with intermediate levels of financial development than for countries with high levels of financial development. They also find that a more developed financial sector does not affect economic growth for countries with low levels of financial development. Hung (2009) explains that financial development promotes growth only when information asymmetries and costs are below a threshold level. Once past this threshold, financial development affects growth at a diminishing rate. Similar to its effect on economic growth, financial development may only improve education, gender equality, and health when a country's financial development is above a certain level. Once past this level, the impact of financial development on the MDGs may diminish.

1.4 Credit Rationing and the Problems of Microfinance

Even though the poor demand credit services, there is a lack of supply. In most markets, prices adjust so that supply equals demand. However the formal banking sector does not increase the prices of its services to clear the market. Stiglitz and Weiss (1981) explain that credit rationing occurs in equilibrium because banks are concerned not only with the price they charge borrowers but also the probability that the borrowers will repay the loans. In order to lend to the poor, banks need to charge a higher interest rate to compensate for risk. However at a higher interest rate, the poor need even larger returns from their projects to pay off the loans. The poor change their behavior to pursue riskier projects with low probabilities of success but high

payouts if successful. Banks need to charge an even higher interest rate to compensate for this anticipated change in behavior, yet a higher interest rate would only make borrowers take more risks. Therefore the formal financial sector decides not to loan to the poor.

Microfinance institutions (MFIs) were developed in order to address this market failure in the formal banking system. They provide loans to people who are excluded from formal financial services. However MFIs today are in trouble because many of their loans are not being repaid. Indeed they are experiencing the problems of loaning to the poor that were predicted by Stiglitz and Weiss (1981). Therefore microfinance does not seem to be an effective way to provide financial services to the poor. Rather financial development, by expanding the size and reach of the formal banking sector, may avoid the problems of microfinance. According to Stiglitz and Weiss (1981), the formal banking sector may only extend credit when the risk is appropriate.

2. Literature Review

This section reviews the current empirical literature on the impact of financial development on the MDGs. It first presents the Beck et al. (2004) study. Next it presents the Claessens and Feijen (2006) study. Then it presents the Rosner (2010) study and finally my original contribution to the current literature.

2.1 Beck et al. (2004)

Beck et al. (2004) of the World Bank were the first to empirically study the relationship between financial development and poverty and inequality. They performed ordinary least squares (OLS) regressions of measurements of a country's poverty and inequality over time on its average level of financial development over that time. They used the ratio of private credit to

GDP to measure financial development. Private credit is defined as claims on the private sector by deposit money banks and other financial institutions (Beck et al., May 2009). It is a measure of the access to credit in a country since it is the credit transferred from lenders to private projects. They found that more private credit in the economy is related to larger decreases in poverty and income inequality. They also used instrumental variables (IV) regressions to control for omitted variable and reverse causation biases in the OLS regressions. They concluded that increasing private credit reduces poverty and income inequality. Beck et al. (2004) developed an appropriate methodology to test for causation rather than just correlation.

2.2 Claessens and Feijen (2006)

The only empirical study on the relationship between financial development and education, gender equality, and health was the cross-country analysis by Claessens and Feijen (2006) of the World Bank. They performed OLS regressions of measurements of a country's education, gender equality, and health over time on its average level of financial development over that time. To measure financial development, they used the ratio of private credit to GDP. They also included both developed and developing countries in their sample. They found that the ratio of private credit to GDP is positively associated with enrollment in primary and tertiary school, persistence to stay in school, female participation in the labor force, and growth in life expectancy.

The Claessens and Feijen (2006) study is limited in a few ways. First, it did not show that financial development causes improved education, gender equality, and health. Second, it did not analyze the specific MDG targets for gender equality and health. Third, it only analyzed one avenue through which people might benefit from a country's financial system. It did not examine whether more money supply or deposits in the financial system improves education, gender

equality, and health. Fourth, it included both developed and developing countries in its sample. Developed countries have more developed financial sectors than do developing countries. Financial development may only improve education, gender equality, and health for countries with more developed financial sectors. Therefore the large number of developed countries in their sample may have skewed their results. It is possible that financial development does not help achieve the MDGs in countries with financial development below some threshold level. Fifth, the study only used data up until the year 2004. Recent data may provide different results.

2.3 Rosner (2010)

Rosner (2010) provides guidance on how to improve the Claessens and Feijen (2006) study. It expands on the Beck et al. (2004) study by specifically examining the long run effect of financial development on income inequality and poverty in developing countries. In addition to the ratio of private credit to GDP, it included the ratios of M3 to GDP and deposits to GDP as financial development variables. M3 is defined as currency plus demand and interest-bearing liabilities of banks and other financial intermediaries (Beck et al., May 2009). It is a measure of the availability of money and currency in each country. This variable was used to test whether the poor benefit from increased access to money. Deposits is defined as the value of all checking, savings, and time deposits in banks and bank-like financial institutions (Beck et al., May 2009). This variable was used to test whether the poor benefit from more savings opportunities in each country. Rosner (2010) also used new data and a sample limited to developing countries.

While Beck et al. (2004) found that financial development reduces poverty in countries by increasing the availability of private credit in the economy, Rosner (2010) showed that financial development helps the poor in other ways. Specifically, increasing the availability of money and

deposit opportunities, rather than private credit, reduces poverty. By including new financial development variables, more recent data, and a sample limited to developing countries, Rosner (2010) found significantly different results. Therefore Rosner (2010) indicates improvements that can be made to the Beck et al. (2004) methodology. This updated methodology can be used to analyze financial development's impact on education, gender equality, and health.

2.4 Original Contribution to Current Literature

This paper contributes to the current literature by specifically examining the long run effect of financial development on the MDGs for education, gender equality, and health in developing countries. Beck et al. (2004) and Rosner (2010) developed an appropriate methodology to examine this long run impact. I use this methodology to contribute to the Claessens and Feijen (2006) analysis in 4 key ways. First, I include additional financial development variables to determine if greater access to money or deposits in the financial system improves the MDG measures. Second, I use different variables for gender equality and health in order to appropriately measure the specific MDG targets. Third, I use new data and a sample limited to developing countries. Fourth, I control for omitted variable and reverse causation biases and determine if there is a nonlinear relationship between financial development and the MDGs.

3. Data, Descriptive Statistics, and Methodologies

This section describes the variables, provides descriptive statistics, and presents the econometric methodologies used to analyze the impact of financial development on the MDGs for education, gender equality, and health. The variables are averaged over the period of 1980 – 2007. Appendix A presents the formulas used to calculate the variables.

3.1 Data

3.1.1 Financial Development

To measure financial development, I would ideally like indicators that capture how efficiently a financial system is allocating capital between lenders and borrowers over time. Since the financial system allows people to access credit, use money, and deposit savings, I look at variables that measure the extent of these three processes in each country.

Private Credit equals the value of claims on the private sector by deposit money banks and other financial institutions as a proportion of GDP. I use this variable to measure the amount of credit in each country. This is consistent with Beck et al. (2004), Claessens and Feijen (2006), and Rosner (2010). Increases in this variable suggest that more people are able to access credit. There is wide variation in Private Credit, ranging from less than 5% in Guinea-Bissau, Sierra Leone, and Uganda to more than 85% in Malaysia, South Africa, and Thailand.

M3 equals the value of currency plus demand and interest-bearing liabilities of banks and other financial intermediaries as a proportion of GDP. I use this variable as a measure of the money supply in each country. This is consistent with Rosner (2010). To my knowledge, this is the first paper in the literature that uses M3 in an analysis of financial development and education, gender equality, and health. Increases in this variable suggest that more money is becoming available and transaction costs are decreasing. There is wide variation in M3, ranging from less than 15% in Equatorial Guinea, Niger, and Uganda to more than 99% in Jordan, Malaysia, and St. Kitts and Nevis.

Deposits equals the value of all checking, savings, and time deposits in banks and bank-like financial institutions as a proportion of GDP. I use this variable to measure the quantity of savings opportunities in each country. This is consistent with Rosner (2010). To my knowledge,

this is the first paper in the literature that uses financial system deposits in an analysis of financial development and education, gender equality, and health. Increases in this variable suggest that savings opportunities are becoming more available. There is wide variation in Deposits, ranging from less than 10% in the Central African Republic, Chad, and Equatorial Guinea to more than 90% in Malaysia, St. Kitts and Nevis, and Vanuatu.

The data for the private credit, M3, and deposits ratios comes from the Beck et al. Financial Development and Structure Database (May 2009).¹ The database contains data for developing and developed countries for years within the time period of 1960 – 2007.

3.1.2 Education, Gender Equality, and Health

To analyze education, gender equality, and health, I focus on variables that measure the different MDG targets in each country.

Primary Enrollment equals the ratio of children of primary school age who are enrolled in primary school to the population of the corresponding primary school age.² I use this variable to measure the education MDG target for access to complete primary schooling. It varies from less than 50% in Burkina Faso, Ethiopia, and Niger to more than 97% in Argentina, Bahrain, and Mexico.

Persistence to Grade 5 equals the share of children enrolled in the first grade of primary school who eventually reach the fifth grade. I use this variable as an additional measure of education. It varies from less than 50% in Madagascar, Malawi, and Rwanda to more than 95% in Algeria, Bahrain, and Mauritius.

Female Primary Enrollment equals the ratio of females of primary school age who are

¹ Database can be accessed at <http://go.worldbank.org/X23UD9QUX0>

² Based on the International Standard Classification of Education 1997.

enrolled in primary school to the population of females of the corresponding primary school age. I use this variable to measure the gender equality MDG target for access to primary schooling for all genders. It varies from less than 40% in Burkina Faso, Mali, and Niger to more than 96% in Malaysia, Mexico, and St. Kitts and Nevis.

Female Persistence to Grade 5 equals the share of females enrolled in the first grade of primary school who eventually reach the fifth grade. I use this variable as an additional measure of gender equality. It varies from less than 40% in Chad, Madagascar, and Malawi to more than 96% in Estonia, Sri Lanka, and Turkey.

Under-5 Mortality equals the proportion of children who die before reaching the age of five. I use this variable to measure the health MDG target for a 2/3rds reduction in the under-5 mortality rate. It varies from more than 20% in Mali, Niger, and Sierra Leone to less than 1% in Croatia, Estonia, and Lithuania.

Infant Mortality equals the proportion of infants who die before reaching the age of one. I use this variable as an additional measure of health. It varies from more than 12.5% in the Democratic Republic of the Congo, Guinea-Bissau, and Sierra Leone to less than 1% in Croatia, Estonia, and Lithuania.

Maternal Mortality equals the proportion of women who die during pregnancy and childbirth. I use this variable to measure the health MDG target for a 3/4ths reduction in the maternal mortality ratio. It varies from more than 1.1% in Chad, Sierra Leone, and Niger to less than 0.02% in Kuwait, Macedonia, and Poland.

HIV equals the share of people between the ages of 15 and 49 who are infected with HIV. I use this variable to measure the health MDG target for the halt and reversal of the spread of HIV/AIDS. It varies from more than 15% in Botswana, Lesotho, and Swaziland to 0.1% in

Pakistan, Poland, and Romania.

The data for the education, gender equality, and health variables comes from the World Bank's World Development Indicators.

3.1.3 Control Variables

I include control variables to isolate the impact of financial development on the MDG measures.

Population Density equals the number of people per square kilometer in a country. I use this variable to control for the possibility that countries with denser populations may benefit more from financial development since its people live closer to each other and may better exchange goods and information.

Inflation equals the annual growth of the GDP deflator. I use this variable to control for changes in the economic environment in countries.

GDP Growth equals the annual growth of GDP per capita. Financial development may indirectly improve education, gender equality, and health by promoting economic growth. I use this variable to control for GDP growth in order to investigate the direct effect of financial development on the MDGs.

The data for the control variables comes from the World Bank's World Development Indicators.

3.2 Summary Statistics and Correlations

3.2.1 Summary Statistics

Table 3.1 presents the summary statistics for the variables.

Table 3.1: MDG, Financial Development, and Control Variable Summary Statistics

Variable	Mean	Std. Dev.	Min	Max
Primary Enrollment	80.5715	16.1306	34.8798	97.5881
Persistence to Grade 5	77.9134	15.5368	41.4147	98.6855
Female Primary Enrollment	79.6715	18.7636	25.9906	97.6910
Female Persistence to Grade 5	74.3138	16.5900	33.3550	97.0524
Under-5 Mortality	7.6058	6.3524	0.7500	25.8125
Infant Mortality	5.1382	3.6015	0.7445	15.3850
Maternal Mortality	0.3450	0.3522	0.0090	1.2750
HIV	2.6928	4.3586	0.1000	20.5056
Private Credit	27.0499	19.3076	1.3600	98.7003
M3	38.4159	21.5388	6.4840	108.0910
Deposits	31.4866	20.5569	3.2895	98.4575
Population Density	92.3956	119.8520	1.5625	736.6595
Inflation	11.2908	10.5834	1.9078	78.0409
GDP Growth	2.0391	2.4459	-2.3165	14.6658

On average, 80% of children and females are enrolled in primary school and 75% stay in school to the fifth grade. The average under-5 mortality rate of 7.6% is slightly higher than the average infant mortality rate of 5.1%. Both child mortality rates are greater than the average maternal mortality rate of 0.3%. Also an average of 2.7% of a country's population between the ages of 15 and 49 are infected with HIV. On average, there is more money supply (38% of GDP) than deposits (31% of GDP) or private credit (27% of GDP) in the economy. Economic growth is low at an average of 2% per year while inflation is high at an average of 11% per year.

3.2.2 Correlations

Table 3.2 presents the correlations among the education, gender equality, and health variables.

Table 3.2: Correlations Among Education, Gender Equality, and Health

	Primary Enrollment	Persistence to Grade 5	Female Primary Enrollment	Female Persistence to Grade 5	Under-5 Mortality	Infant Mortality	Maternal Mortality	HIV
Primary Enrollment	1							
Persistence to Grade 5	0.4920***	1						
Female Primary Enrollment	0.9749***	0.4840***	1					
Female Persistence to Grade 5	0.5763***	0.9446***	0.6400***	1				
Under-5 Mortality	-0.8556***	-0.6627***	-0.8896***	-0.7252***	1			
Infant Mortality	-0.8387***	-0.6598***	-0.8468***	-0.7191***	0.9803***	1		
Maternal Mortality	-0.7959***	-0.6555***	-0.8205***	-0.7299***	0.9528***	0.9347***	1	
HIV	-0.0715	-0.1058	-0.0798	0.0108	0.2616**	0.3333***	0.1761	1

***, **, and * represent significance at 1, 5 and 10% levels respectively.

Enrollment and persistence to stay in primary school are significantly and positively correlated with each other. Countries with more children enrolled in school also have more children who stay in school and more females who participate in school. Under-5 mortality, infant mortality, and maternal mortality are all positively and significantly correlated with each other. Countries with more children who die before their fifth birthday also have more infants who die before their first birthday and mothers who die during pregnancy and childbirth. Of particular note is that the education and gender equality variables are significantly and negatively correlated with the mortality variables. Countries with greater school participation have lower mortality rates. Perhaps as schooling increases, people are better able to take care of their health. It may also be that as health increases, children are more able to participate in school. HIV is not significantly correlated with the other variables except for under-5 mortality and infant mortality.

Table 3.3 presents the correlations of the financial development and control variables with the education, gender equality, and health variables.

Table 3.3: Correlations of Financial Development and Control Variables with the MDGs

	Primary Enrollment	Persistence to Grade 5	Female Primary Enrollment	Female Persistence to Grade 5	Under-5 Mortality	Infant Mortality	Maternal Mortality	HIV
Private Credit	0.4770***	0.4775***	0.4346***	0.4236***	-0.5432***	-0.5512***	-0.4499***	-0.1254
M3	0.4794***	0.5215***	0.4231***	0.4116***	-0.5282***	-0.5212***	-0.4785***	-0.2104*
Deposits	0.5252***	0.5344***	0.4604***	0.4250***	-0.5617***	-0.5584***	-0.5157***	-0.1583
Population Density	0.2317*	0.1371	0.0520	0.0400	-0.1898**	-0.1886**	-0.0666	-0.1171
Inflation	0.1059	0.0638	0.1857	0.0789	0.1730*	0.1632*	0.0910	0.0180
GDP Growth	0.1924	0.1623	0.2670**	0.2653**	-0.3133***	-0.3150***	-0.2856***	-0.1167

***, **, and * represent significance at 1, 5 and 10% levels respectively.

Financial development is significantly and positively correlated with primary enrollment, female primary enrollment, persistence to grade 5, and female persistence to grade 5. Countries with more developed financial systems have more children and females enrolling and staying in school. Financial development is significantly and negatively correlated with under-5 mortality, infant mortality, and maternal mortality. Countries with more developed financial systems have lower child and maternal mortality rates. Financial development is insignificantly correlated with HIV, which may suggest that financial services are not related to the incidence of HIV in the adult population.

Table 3.4 presents the correlations among the financial development and control variables.

Table 3.4: Correlations Among the Financial Development and Control Variables

	Private Credit	M3	Deposits	Population Density	Inflation	GDP Growth
Private Credit	1					
M3	0.7563***	1				
Deposits	0.8018***	0.9784***	1			
Population Density	0.1880*	0.2837***	0.3209***	1		
Inflation	-0.3495***	-0.3240***	-0.3170***	-0.1719*	1	
GDP Growth	0.0605	0.0444	0.0776	0.0232	0.0019	1

***, **, and * represent significance at 1, 5 and 10% levels respectively.

All of the financial development measures are strongly correlated with each other.

Countries with more private credit also have more money supply and deposits in financial institutions. Countries with denser populations have more financial development, while those with more inflation have less financial development. GDP growth does not seem to be significantly correlated with financial development.

3.3 Econometric Methodologies

This sub section explains the regressions used to analyze the relationship between financial development and the MDGs for education, gender equality, and health. I first describe the basic regression methodology. Then I describe how I control for potential omitted variable and reverse causation biases.

3.3.1 Ordinary Least Squares

I use ordinary least squares regressions similar to Beck et al. (2004) and Rosner (2010). The dependent variables are the average values of the education, gender equality, and health MDG variables over the longest available time period. The independent variables are the average values of the financial development variables over that same time period. In order to abstract out of business cycles and smooth out volatility, I use the longest available time period of at least 10 years. This enables me to examine the long run relationships between the variables. Unlike Beck et al. (2004) and Rosner (2010), I add population density as a control variable to account for the possibility that people living closer together may better communicate with each other and take advantage of financial services. I also include the growth of the GDP deflator to control for inflation. Because financial development may indirectly improve education, gender equality, and health by promoting economic growth, I include the growth of GDP per capita as a control

variable in the regressions. The regressions are then able to investigate the direct effect of financial development on the MDGs beyond any impact of economic growth. I limit my observations to the time span of 1980 – 2007. This is because in the 1980s, many financial systems in developing countries were freed from government regulations and started to develop (Pill and Pradhan, 1995).

All of the financial development variables are very correlated with each other (See Table 3.4). Therefore I may run into problems of multicollinearity if I include them all as independent variables in the same regression. The OLS estimates of the financial development coefficients may become imprecise if there is multicollinearity. It may be difficult to separate the impact of one financial development variable on the MDGs from the impact of the other two financial development variables. I include one financial development variable at a time in each regression to avoid multicollinearity and thus obtain more precise estimates of the impact of each of the financial development variables. I also include a quadratic financial development term to test if financial development has a diminishing effect on the education, gender equality, and health MDGs. The OLS specification is as follows.

$$MDG_i = \beta_0 + \beta_1 PrivateCredit_i + \beta_2 PrivateCredit_i^2 + \beta_3 PopulationDensity_i + \beta_4 Inflation_i + \beta_5 GDPGrowth_i + \varepsilon_i, \quad (1)$$

$$MDG_i = \beta_0 + \beta_1 M3_i + \beta_2 M3_i^2 + \beta_3 PopulationDensity_i + \beta_4 Inflation_i + \beta_5 GDPGrowth_i + \varepsilon_i, \quad (2)$$

$$MDG_i = \beta_0 + \beta_1 Deposits_i + \beta_2 Deposits_i^2 + \beta_3 PopulationDensity_i + \beta_4 Inflation_i + \beta_5 GDPGrowth_i + \varepsilon_i, \quad (3)$$

where i = country index, MDG = Millennium Development Goal Measure.

The coefficient β_1 indicates whether financial development has any effect on the MDG variable, while β_2 tests for nonlinearity. By taking the derivative of MDG with respect to financial development, I can estimate the general impact of each financial development variable

on the MDG variable. This derivative is $\beta_1 + 2\beta_2 FinDev$, where *FinDev* is the level of Private Credit, M3, or Deposits in the country. Therefore the coefficient β_1 measures the impact of financial development for a country with no financial development. For the education and gender equality MDG regressions, a positive β_1 suggests that financial development increases schooling beyond its impact on economic growth. If β_2 is also negative, then this suggests that financial development improves education or gender equality at a diminishing rate. For the health MDG regressions, a negative β_1 suggests that financial development decreases mortality or HIV infection beyond its impact on economic growth. If β_2 is also positive, then this suggests that financial development improves health at a diminishing rate.

3.3.2 *Instrumental Variables*

To control for omitted variable and reverse causation biases in the OLS regressions, I use instrumental variables regressions. Even though countries with higher levels of financial development may have more education, gender equality, and health, financial development may not be causing these results. There could be an omitted variable that is driving both financial development and the MDG variables. Also it is possible that a more educated, gender equal, and healthy population promotes financial development as more people demand financial services. IV regressions help me to determine if financial development is causing the improved MDG measures.

In order to implement IV regressions, I need instruments that are uncorrelated with the error term of the OLS regression yet are correlated with financial development. Since Beck et al. (2004) and Rosner (2010) successfully implemented IV regressions in their analyses, I use the same instruments that they used in my IV regressions.

3.3.2.1 Instruments

The legal origin of countries is the first instrument. La Porta et al. (1997) show that there is greater protection of property rights in countries with English common law legal systems than in those with French civil law systems or communist based systems. The legal origin of a country is correlated with the country's level of financial development since consumer and investor protection facilitates the development of financial institutions. I use two dummy variables for the instruments. Specifically *English* and *French* equal 1 for countries with English common law systems and French civil law systems respectively and 0 otherwise. The legal origin data comes from the CIA World Fact Book.

The absolute value of the latitude of the capital city in each country is the second instrument. Specifically *Latitude* is normalized between 0 and 1 for each country. It is used as an estimate for natural resource endowments that affect the development of financial institutions. The latitude data comes from La Porta et al. (1998).

3.3.2.2 Instrument Relevance

The legal origin and latitude of the capital city of countries need to be relevant to be valid instruments. They are relevant if financial development is significantly related to them. If it is, then the instruments can estimate financial development in the process of executing IV regressions. I run the 1st stage of the 2SLS regression to determine whether the instruments are relevant. This is the regression of financial development on the instruments and the control variables of population density, inflation, and GDP growth. Table 3.5 presents the regression results. The dependent variable in each regression is presented at the top of each column, while the independent variables are presented at the beginning of each row.

Table 3.5: Instrument Relevance for Financial Development

	Private Credit	M3	Deposits	Private Credit ²	M3 ²	Deposits ²
Population Density	0.0143 (0.0100)	0.0336*** (0.0127)	0.0372*** (0.0116)	0.1007 (0.8917)	2.3185* (1.3494)	2.3778** (1.1145)
Inflation	-0.7177*** (0.1719)	-0.6842*** (0.2166)	-0.6099*** (0.1995)	-51.3416*** (12.9336)	-69.6965*** (21.4481)	-55.7467*** (55.7467)
GDP Growth	0.3826 (0.7376)	0.4193 (0.8753)	0.7478 (0.8774)	49.4681 (64.1176)	85.2553 (86.5733)	91.9847 (72.4654)
English	16.9272** (6.6715)	22.2008*** (6.8256)	21.9582*** (6.4510)	1505.7140*** (552.5169)	2090.5360*** (664.5706)	1749.8580*** (545.0407)
French	8.0747 (5.3959)	12.1334* (6.3820)	10.8178* (5.7575)	602.3993 (375.0057)	1081.3840* (593.2244)	742.6988* (437.7286)
Latitude	25.5704* (13.2207)	28.3585* (15.2807)	22.8545* (13.5636)	1471.5010 (1141.1880)	1791.6530 (1485.0100)	987.6328 (1094.2540)
Constant	16.7663** (6.6864)	21.2956*** (7.5774)	14.5140** (7.1661)	357.3855 (501.1073)	584.571 (715.6546)	365.6306 (573.8102)
Estimation Procedure:	OLS	OLS	OLS	OLS	OLS	OLS
F(3, 102)	2.60	4.23	4.52	2.52	3.47	3.59
Prob > F	0.0563	0.0074	0.0051	0.0618	0.0188	0.0162
Observations	109	109	109	109	109	109
R-squared	0.2140	0.2418	0.2699	0.1708	0.1913	0.2294
***, **, and * represent significance at 1, 5, and 10% levels respectively Robust standard errors in parentheses						

I test the null hypothesis that the instruments are not relevant. This is the hypothesis that the coefficients on the instruments are equal to zero. I provide the P-values of this test and refer to them as “Prob > F” (See Table 3.5). The P-values are all less than 0.10 so I reject the null hypothesis at the 10% significance level for each regression and therefore conclude that the instruments are relevant.

3.3.2.3 Instrument Exogeneity

The legal origin and latitude of the capital city of countries also need to be exogenous to be valid instruments. If the instruments are not significantly related to the error term of the OLS regression, then they are exogenous. To test the null hypothesis that the instruments are exogenous, I use the Hansen J-test of overidentifying restrictions. For each IV regression, I fail to reject the null hypothesis and therefore conclude that the instruments are exogenous. I provide the P-values of this overidentifying restrictions test and refer to them as the “OIR Test” (See Appendix B). The instruments are valid since they are both relevant and exogenous and therefore the conditions for IV regressions are satisfied.

3.3.3 Lagged Regressions

I also implement lagged regressions to help eliminate omitted variable and reverse causation biases in the OLS regressions. For each country, I have data within the years of 1980 – 2007. I split this time period in half to create an earlier and later time period. Financial development and control variables from the earlier time period are used to estimate MDG variables from the later time period. For example, if I have data for a country for the years 1995 – 2006, I calculate the financial development and control variables from 1995 – 2000 and the MDG variable from 2001 – 2006. Since financial development occurs in time before the MDG variable, the lagged regressions eliminate the possibility of an omitted factor simultaneously driving financial development and the MDG variable. They also eliminate the possibility that increases in the MDG variable cause more financial development. This is because future levels of education, gender equality, and health cannot influence past levels of financial development. The lagged regressions also enable me to determine if financial development continues to promote the MDGs in the future. The lagged regression specification is as follows.

$$MDG_{i,1} = \beta_0 + \beta_1 PrivateCredit_{i,0} + \beta_2 PrivateCredit^2_{i,0} + \beta_3 PopulationDensity_{i,0} + \beta_4 Inflation_{i,0} + \beta_5 GDPGrowth_{i,0} + \varepsilon_i, \quad (4)$$

$$MDG_{i,1} = \beta_0 + \beta_1 M3_{i,0} + \beta_2 M3^2_{i,0} + \beta_3 PopulationDensity_{i,0} + \beta_4 Inflation_{i,0} + \beta_5 GDPGrowth_{i,0} + \varepsilon_i, \quad (5)$$

$$MDG_{i,1} = \beta_0 + \beta_1 Deposits_{i,0} + \beta_2 Deposits^2_{i,0} + \beta_3 PopulationDensity_{i,0} + \beta_4 Inflation_{i,0} + \beta_5 GDPGrowth_{i,0} + \varepsilon_i, \quad (6)$$

where i = country index, MDG = Millennium Development Goal Measure,

4. Empirical Results

This section presents the regression results and a discussion. The OLS results are presented

first, followed by the IV results and then the lagged results. Only the results for the financial development variables are presented. See Appendix B for complete regression results for all of the variables. In each table, the dependent variable in the regression is presented at the top of each column while the independent variables are presented at the beginning of each row.

4.1 Ordinary Least Squares Regression Results

I first consider OLS regressions to conduct a preliminary analysis of the direct relationship between financial development and the MDGs for education, gender equality, and health. Table 4.1 presents the financial development variable coefficients and robust standard errors from the OLS regressions.

Table 4.1: Financial Development and MDG OLS Regression Results

	Primary Enrollment	Persistence to Grade 5	Female Primary Enrollment	Female Persistence to Grade 5	Under-5 Mortality	Infant Mortality	Maternal Mortality	HIV
Private Credit	0.9726*** (0.1638)	0.8964*** (0.2083)	0.9705*** (0.1992)	0.9235*** (0.2096)	-0.5482*** (0.0691)	-0.3110*** (0.0388)	-0.0257*** (0.0034)	-0.1836*** (0.0465)
M3	0.8900*** (0.2211)	1.0969*** (0.2746)	1.0498*** (0.2678)	0.9576*** (0.2537)	-0.5382*** (0.0765)	-0.2893*** (0.0423)	-0.0274*** (0.0043)	-0.1195* (0.0646)
Deposits	1.0519*** (0.1759)	1.0781*** (0.2496)	1.1898*** (0.2269)	1.0852*** (0.2391)	-0.5501*** (0.0707)	-0.2960*** (0.0387)	-0.0302*** (0.0043)	-0.0621 (0.0611)

***, **, and * represent significance at 1, 5, and 10% levels respectively
Robust standard errors in parentheses

The coefficients on Private Credit, M3, and Deposits are significant at the 1% significance level for each of the education, gender equality, and mortality regressions. They are positive for the education and gender equality regressions and negative for the mortality regressions. This shows that more financial development is related to greater enrollment and persistence to stay in school for children and females and lower child and maternal mortality. Private Credit is the only significant variable for the HIV regression. More private credit, rather than money supply or deposits, is related to lower HIV infection. *The OLS regression results suggest that financial development improves education, gender equality, and health.*

The coefficient on Deposits is larger in magnitude than the coefficients on Private Credit and M3 for each education, gender equality, and mortality regression.³ *Increasing deposits, rather than private credit or money supply, seems to have the largest impact on improving education, gender equality, and health.*

The coefficients on the quadratic financial development variables are also significant at the 5% significance level and opposite in sign to their corresponding coefficients on the non-quadratic financial development variables (See Appendix B). This suggests that financial development has a diminishing effect on the MDGs. For a country with no financial development, I predict an increase in financial system deposits to 1% of GDP to increase primary enrollment by 1.05%, persistence to grade 5 by 1.08%, female primary enrollment by 1.19%, and female persistence to grade 5 by 1.09%. I also predict it to decrease under-5 mortality by 0.55%, infant mortality by 0.30%, and maternal mortality by 0.03%. For a 1% increase in the ratio of private credit to GDP, I predict HIV infection to decrease by 0.18%. The impact of financial development seems to diminish as countries develop their financial sectors. For example, I predict a 1% increase in the ratio of deposits to GDP to increase primary enrollment by only 0.63% for a country with average financial development, rather than the 1.05% for a country with no financial development.⁴ *The OLS regression results suggest that financial development has the greatest impact for the least financially developed countries.*

The impact of financial development seems greater for education and gender equality than for health. However mortality and HIV infection rates are low and cannot decrease as much as

³ Except for the infant mortality regression, for which the coefficient on Deposits is smaller than the coefficient on Private Credit, and the persistence to grade 5 regression, for which the coefficient on Deposits is smaller than the coefficient on M3.

⁴ The estimated marginal impact of financial development on the MDG variable is $\beta_1 + 2\beta_2 FinDev$. For the primary enrollment regression, $\beta_1 = 1.0519$ and $\beta_2 = -0.0067$ (See Table B.1 in Appendix B). With Deposits as the financial development variable, $FinDev = 31.4866$ (average level of Deposits from Table 3.1) for a country with average financial development. Therefore the marginal impact of increasing deposits on primary enrollment for a country with average financial development is $1.0519 + 2(-0.0067)(31.4866) = 0.63$.

schooling rates can increase. A better comparison would be to evaluate the impact of financial development as a percentage of the average possible improvement in each of the MDGs. The lowest level that mortality and HIV infection can reach is 0%, while the highest level that enrollment and persistence to stay in school can be reached is 100%. Therefore the average values for the health MDG variables represent how much health can possibly improve, while the difference between 100% and the average values for the education and gender equality MDG variables represents how much education and gender equality can possibly improve.

For example, average primary enrollment is 80.6% (See Table 3.1). Therefore primary enrollment can improve on average by 19.4% to reach 100% enrollment. For a country with no financial development, I predict a 1% increase in the ratio of financial system deposits to GDP to increase primary enrollment by 1.05%. This change is $1.05/19.4 = 5.4\%$ of the possible improvement in primary enrollment. Similarly for a country with no financial development, the effect of a 1% increase in the ratio of deposits to GDP on the other MDG variables as a proportion of average possible MDG improvement is approximately 4.9% for persistence to grade 5, 5.9% for female primary enrollment, 4.2% for female persistence to grade 5, 7.2% for under-5 mortality, 5.8% for infant mortality, and 8.8% for maternal mortality. The impact of a 1% increase in the ratio of private credit to GDP on HIV as a proportion of possible HIV improvement is 6.8%. *The impact of financial development as a proportion of possible MDG improvement seems similar for each of the MDG measures.*

4.2 Instrumental Variables Regression Results

I use IV regressions to control for the reverse causation and omitted variable biases of the OLS regressions. Table 4.2 presents the financial development variable coefficients and robust

standard errors from the IV regressions.

Table 4.2: Financial Development and MDG IV Regression Results

	Primary Enrollment	Persistence to Grade 5	Female Primary Enrollment	Female Persistence to Grade 5	Under-5 Mortality	Infant Mortality	Maternal Mortality	HIV
Private Credit	1.5369** (0.7696)	1.9709** (0.8798)	0.9857 (0.7329)	2.9838** (1.2976)	-1.0614** (0.4814)	-0.5788** (0.2672)	-0.0651** (0.0297)	0.0005 (0.3302)
M3	1.4297* (0.7855)	1.4390** (0.6621)	1.4199 (1.1828)	3.6161* (1.8733)	-1.0782** (0.4883)	-0.6290** (0.3003)	-0.0818 (0.0521)	0.1043 (0.3457)
Deposits	1.3431** (0.6691)	1.5330** (0.6034)	1.3952 (0.8498)	3.2167*** (1.2216)	-0.7978** (0.3865)	-0.4542* (0.2375)	-0.0703 (0.0431)	0.1074 (0.3018)

***, **, and * represent significance at 1, 5, and 10% levels respectively
Robust standard errors in parentheses

The coefficients on Private Credit, M3, and Deposits remain significant at the 10% significance level for the primary enrollment, persistence to grade 5, female persistence to grade 5, under-5 mortality, and infant mortality regressions. Private Credit is the only significant financial development variable for the maternal mortality regressions. Therefore financial development remains related to the MDGs after accounting for the possibility that an omitted variable is driving both of the variables or that improved education, gender equality, and health is promoting financial development. *The IV regression results show that increasing private credit, money supply, and deposits in the economy promotes primary enrollment, persistence to grade 5, and female persistence to grade 5. It also reduces under-5 mortality and infant mortality. Increasing private credit, rather than money supply or deposits, reduces maternal mortality.*

4.3 Lagged Regression Results

I also consider lagged regressions to control for the reverse causation and omitted variable biases of the OLS regressions and to determine if financial development continues to affect the MDGs in the future. Table 4.3 presents the financial development variable coefficients and robust standard errors from the lagged regressions.

Table 4.3: Financial Development and MDG Lagged Regression Results

	Primary Enrollment	Persistence to Grade 5	Female Primary Enrollment	Female Persistence to Grade 5	Under-5 Mortality	Infant Mortality	Maternal Mortality	HIV
Private Credit	1.0341*** (0.1994)	0.8618*** (0.1993)	0.7281*** (0.1965)	0.8253*** (0.1949)	-0.2088*** (0.0314)	-0.2343*** (0.0478)	-0.0214*** (0.0035)	-0.1314** (0.0511)
M3	0.9825*** (0.2510)	1.1926*** (0.2606)	0.8448*** (0.2773)	1.0945*** (0.2380)	-0.0970*** (0.0241)	-0.1844*** (0.0475)	-0.0233*** (0.0047)	-0.0574 (0.0965)
Deposits	1.1862*** (0.2145)	1.1669*** (0.2332)	0.9776*** (0.2628)	1.2462*** (0.2340)	-0.1536*** (0.0309)	-0.2063*** (0.0453)	-0.0267*** (0.0050)	0.0033 (0.0958)

***, **, and * represent significance at 1, 5, and 10% levels respectively
Robust standard errors in parentheses

As in the OLS regression results, the coefficients on Private Credit, M3, and Deposits are significant at the 1% significance level for each of the education, gender equality, and mortality regressions. Greater amounts of private credit, money, and deposits in the financial system are related to improved future measures of school enrollment, persistence to stay in school, child mortality, and maternal mortality. Private Credit is the only significant financial development variable for the HIV regression. Greater amounts of private credit are related to lower future HIV infection rates. Since the level of financial development occurs in time before the MDG measures, an omitted factor is not simultaneously driving both variables. Education, gender equality, and health in the future also cannot affect the level of financial development in the past. Furthermore the coefficients on the quadratic financial development variables are significant at the 5% significance level and opposite in sign to their corresponding coefficients on the non-quadratic financial development variables (See Appendix B).⁵ *The lagged regressions support the conclusion from the IV regressions that increasing private credit, money supply, and deposits in the economy improves primary enrollment, persistence to grade 5, female persistence to grade 5, under-5 mortality, and infant mortality. They also support the conclusions that financial development improves female primary enrollment and maternal mortality, more private credit reduces HIV infection, and the least financially developed countries benefit the most from*

⁵ Except for the under-5 mortality lagged regression, for which the coefficient on $M3^2$ is only significant at the 10% significance level while the coefficient on $Deposits^2$ is not significant.

financial development.

The lagged regressions also enable me to examine how the impact of financial development on the MDGs changes over time. The coefficients on M3 and Deposits are larger in the lagged regressions for primary enrollment, persistence to grade 5, and female persistence to grade 5 than in the corresponding OLS regressions. *This suggests that the impact of increasing money supply and deposits on education and gender equality increases over time.* While increasing deposits has the largest contemporaneous effect on the education and gender equality MDGs, it also seems to have an even larger future impact on achieving these MDGs. The coefficient on Private Credit is smaller in the lagged regressions for persistence to grade 5, female primary enrollment, and female persistence to grade 5 than in the corresponding OLS regressions. *This suggests that the impact of increasing private credit on education and gender equality decreases over time.* The coefficients on the financial development variables are smaller in the lagged health regressions than in the OLS health regressions. *This suggests that the impact of financial development on health decreases over time.*

4.4 Lagged Instrumental Variables Regression Results

The previous regression results show that financial development has an immediate impact on improving education, gender equality, and health. The lagged regression results also suggest that financial development continues to improve the MDG measures in the future. However the relationship between financial development and future education, gender equality, and health may result from an omitted factor that is driving both of the variables. Therefore financial development may only have an immediate impact on the MDGs, not one that continues into the future. I use instrumental variables regressions on the lagged data in order to control for the

possibility that an omitted variable increases financial development immediately and also promotes education, gender equality, and health in the future. Table 4.4 presents the financial development variable coefficients and robust standard errors from the lagged IV regressions.

Table 4.4: Financial Development and MDG Lagged IV Regression Results

	Primary Enrollment	Persistence to Grade 5	Female Primary Enrollment	Female Persistence to Grade 5	Under-5 Mortality	Infant Mortality	Maternal Mortality	HIV
Private Credit	1.9298* (1.0529)	2.3201 (1.6166)	1.3589 (0.8580)	2.5330*** (0.9468)	0.9116 (1.1103)	0.8604 (1.2475)	0.0993 (0.1143)	0.3054 (0.3921)
M3	1.5450* (0.7931)	1.4866** (0.6780)	1.3524 (0.9920)	3.5747 (3.1942)	0.5465 (0.5141)	0.7401 (1.1440)	0.2057 (0.6875)	0.4246 (0.5065)
Deposits	1.5933** (0.7208)	1.5840** (0.6447)	1.4353* (0.8072)	3.1387** (1.3252)	0.6029 (0.5083)	0.5530 (0.5498)	0.1405 (0.2286)	0.4036 (0.4493)

***, **, and * represent significance at 1, 5, and 10% levels respectively
Robust standard errors in parentheses

The coefficient on Deposits remains positive and significant at the 10% significance level for each of the education and gender equality regressions. The coefficient on Private Credit is also significant at the 10% significance level for one education and one gender equality regression. The coefficient on M3 is significant at the 10% significance level for both education regressions. Therefore financial development remains related to future MDG measures for education and gender equality after accounting for the possibility that an omitted factor is driving both of the variables. *The lagged IV regression results show that financial development continues to improve education and gender equality in the future.* However the coefficients on financial development are insignificant for the health regressions. *The lagged IV regression results are unable to show that financial development continues to improve health in the future.*

4.5 Discussion

So far, my results show that increasing private credit, money supply, and deposits in the economy helps achieve the MDGs for education, gender equality, and health. Claessens and Feijen (2006) show a positive association between private credit and school participation. My

results show that this is a causal relationship, not just an association.

Furthermore my results show that financial development continues to improve education and gender equality in the future. As financial services enable more children to go to school, these children will grow up better educated and may further recognize the value education. They may decide to invest in younger relatives to attend school, so the impact of financial development on education and gender equality persists over time.

My results also suggest that the impact of financial development on health persists over time. However unlike for education and gender equality, I am unable to show a causal relationship between financial development and future health. Perhaps the lag between the variables in the lagged regressions is not long enough to show this causal relationship. As financial development reduces mortality for the current generation of children, these children will grow into adults and may further invest in their own and their children's health. Therefore the lag should be large enough to measure health once the children have grown into adults. As data for more recent years becomes available, one may be able to extend the lag to show that the impact of financial development on health indeed persists over time. A longer lag is not needed for the education and gender equality regressions since children can encourage younger family members to enroll and stay in school. These children do not have to wait until they are adults and have children of their own to affect schooling measures.

My results also indicate that increasing deposits in the economy, rather than private credit or money supply, has the largest immediate impact on promoting education, gender equality, and health. This impact is also large relative to the impact of GDP growth. According to the OLS regression results, increasing financial system deposits has approximately 60% of the impact of GDP growth on primary enrollment, 50% of the impact of GDP growth on female primary

enrollment, 80% of the impact of GDP growth on under-5 mortality, and 70% of the impact of GDP growth on maternal mortality for a country with no financial development. Moreover the benefits from increasing deposits seem to build up over time.

These results show that policy makers should focus on increasing the amount of private credit, money, and deposits in developing countries. Out of these financial development policies, increasing opportunities to deposit savings in financial institutions has the largest immediate and future benefits.

Conclusion

This paper has important economic significance for policy makers who are working to help developing countries achieve the MDGs for education, gender equality, and health. It establishes that a well functioning financial system is an important goal for developing countries to achieve. A more developed financial sector directly improves education, gender equality, and health beyond its impact on economic growth. My results are consistent with the theory that financial development helps achieve the MDGs by improving access to credit, reducing transaction costs in the economy, and allowing more people to deposit their savings.

Furthermore this paper emphasizes that increasing opportunities to deposit savings in financial institutions, rather than to access credit, has the largest impact on the MDGs. This is consistent with Rosner (2010), which found that more deposits, rather than credit, in the economy reduces poverty. For the poorest countries, it seems that people first need a way to deposit savings to benefit from the financial system. Many people in developing countries are poor and have never used formal financial services. Depositing savings and earning a safe rate of return, rather than taking the risk of paying back a loan, seems like a natural first step for these

people to access the financial sector. As people go to physical banking locations to use basic deposit services, they may interact with other people, share information, and learn more about financial services. They will be exposed to the world of finance and business and may learn to be more responsible and to keep track of their income and expenses. Increasing opportunities to deposit savings may therefore have a more lasting impact on people by making them focus on balancing their personal budgets.

My results also show that financial development has the greatest impact on achieving the MDGs for the least financially developed countries. Prior finance and economic growth literature has found that a more developed financial sector does not promote economic growth for countries with low levels of financial development. Since their actions might not promote growth, policy makers might have previously had little incentive to spend resources on developing the financial sector for the poorest countries. However with my research, policy makers may decide to focus on financial development opportunities because of the direct impact on achieving the MDGs for the poorest countries.

APPENDIX A: VARIABLE CALCULATIONS

For each country, the variables are calculated for the available years within the time frame of 1980 – 2007. Private Credit is the value of the claims on the private sector by deposit money banks and other financial institutions as a proportion of GDP. M3 is the value of currency plus demand and interest-bearing liabilities of banks and other financial intermediaries as a proportion of GDP. Deposits is the value of all checking, savings, and time deposits in banks and bank-like financial institutions as a proportion of GDP. Primary Enrollment equals the ratio of children of primary school age who are enrolled in primary school to the population of the corresponding primary school age. Persistence to Grade 5 equals the share of children enrolled in the first grade of primary school who eventually reach grade 5. Female Primary Enrollment equals the ratio of females of primary school age who are enrolled in primary school to the population of females of the corresponding primary school age. Female Persistence to Grade 5 equals the share of females enrolled in the first grade of primary school who eventually reach grade 5. Under-5 Mortality equals the proportion of newborn babies who die before reaching the age of five. Infant Mortality equals the proportion of infants who die before reaching one year of age. Maternal Mortality equals the proportion of women who die during pregnancy and childbirth. HIV equals the share of people between the ages of 15 and 49 who are infected with HIV. Population Density equals the number of people per square kilometer. Inflation is the annual growth rate of the GDP deflator. GDP Growth is the annual growth rate of GDP per capita. Bank Concentration is the ratio of the three largest banks' assets to total banking sector assets.

$$\text{Private Credit}_i = \sum_{m=t-n}^t (\text{Private Credit/GDP})_{i,m} / (n+1),$$

$$\text{M3}_i = \sum_{m=t-n}^t (\text{M3/GDP})_{i,m} / (n+1),$$

$$\text{Deposits}_i = \sum_{m=t-n}^t (\text{Deposits/GDP})_{i,m} / (n+1),$$

$$\text{Primary Enrollment}_i = \sum_{m=t-n}^t (\text{Primary Enrollment})_{i,m} / (n+1),$$

$$\text{Persistence to Grade 5}_i = \sum_{m=t-n}^t (\text{Persistence to Grade 5})_{i,m} / (n+1),$$

$$\text{Female Primary Enrollment}_i = \sum_{m=t-n}^t (\text{Female Primary Enrollment})_{i,m} / (n+1),$$

$$\text{Female Persistence to Grade 5}_i = \sum_{m=t-n}^t (\text{Female Persistence to Grade 5})_{i,m} / (n+1),$$

$$\text{Under-5 Mortality}_i = \sum_{m=t-n}^t (\text{Under-5 Mortality})_{i,m} / (n+1),$$

$$\text{Infant Mortality}_i = \sum_{m=t-n}^t (\text{Infant Mortality})_{i,m} / (n+1),$$

$$\text{Maternal Mortality}_i = \sum_{m=t-n}^t (\text{Maternal Mortality})_{i,m} / (n+1),$$

$$\text{HIV}_i = \sum_{m=t-n}^t (\text{HIV})_{i,m} / (n+1),$$

$$\text{Population Density}_i = \sum_{m=t-n}^t (\text{Population Density})_{i,m} / (n+1),$$

$$\text{Inflation}_i = (\log(\text{GDP Deflator}_{i,t}) - \log(\text{GDP Deflator}_{i,t-n})) / n,$$

$$\text{GDP Growth}_i = (\log(\text{GDP per capita}_{i,t}) - \log(\text{GDP per capita}_{i,t-n})) / n,$$

$$\text{Bank Concentration}_i = \sum_{m=t-n}^t (\text{Bank Concentration})_{i,m} / (n+1),$$

where i = country index, t = year of most recent observation, n = number of years between first and last observations.

APPENDIX B: FINANCIAL DEVELOPMENT REGRESSION RESULTS

Table B.1: Primary Enrollment Regression Results

	Primary Enrollment	Primary Enrollment	Primary Enrollment	Primary Enrollment	Primary Enrollment	Primary Enrollment
Private Credit	0.9726*** (0.1638)	1.5369** (0.7696)				
Private Credit^2	-0.0060*** (0.0013)	-0.0136* (0.0078)				
M3			0.8900*** (0.2211)	1.4297* (0.7855)		
M3^2			-0.0049*** (0.0017)	-0.0142 (0.0097)		
Deposits					1.0519*** (0.1759)	1.3431** (0.6691)
Deposits^2					-0.0067*** (0.0015)	-0.0149 (0.0091)
Population Density	0.0034 (0.0072)	-0.0035 (0.0177)	0.0036 (0.0074)	0.0199 (0.0170)	-0.0020 (0.0070)	0.0242 (0.0205)
Inflation	1.4448*** (0.3304)	1.3089** (0.5744)	1.0995*** (0.3455)	0.1596 (0.7225)	1.0651*** (0.3115)	0.1121 (0.6393)
GDP Growth	1.9838* (1.1042)	2.4447** (1.2428)	2.2937** (0.9826)	3.4554* (1.8329)	1.8036** (0.8105)	2.8131* (1.5788)
Constant	52.8575*** (5.2334)	48.0781*** (12.7101)	48.7165*** (6.8315)	48.9059*** (13.7635)	50.7165*** (5.1084)	55.6372*** (10.2310)
Estimation Procedure:	OLS	IV	OLS	IV	OLS	IV
OIR Test		0.5285		0.7474		0.9911
Observations	69	69	69	69	69	69
R-squared	0.4302		0.3766		0.4525	
***, **, and * represent significance at 1, 5, and 10% levels respectively Robust standard errors in parentheses						

Table B.2: Primary Enrollment Lagged Regression Results

	Primary Enrollment	Primary Enrollment	Primary Enrollment	Primary Enrollment	Primary Enrollment	Primary Enrollment
Private Credit	1.0341*** (0.1994)	1.9298* (1.0529)				
Private Credit^2	-0.0071*** (0.0018)	-0.0164* (0.0093)				
M3			0.9825*** (0.2510)	1.5450* (0.7931)		
M3^2			-0.0060*** (0.0020)	-0.0150 (0.0097)		
Deposits					1.1862*** (0.2145)	1.5933** (0.7208)
Deposits^2					-0.0085*** (0.0019)	-0.0171* (0.0094)
Population Density	0.0069 (0.0080)	-0.0072 (0.0215)	0.0056 (0.0081)	0.0133 (0.0153)	-0.0002 (0.0080)	0.0154 (0.0199)
Inflation	1.0032*** (0.2357)	1.2434*** (0.4745)	0.7584*** (0.2484)	0.3959 (0.3821)	0.7573*** (0.2219)	0.3773 (0.3384)
GDP Growth	2.2003 (1.7661)	2.4647 (1.5351)	2.1137* (1.2057)	3.2714 (2.0288)	1.8705* (1.0189)	2.8253* (1.7048)
Constant	55.0177*** (5.5829)	41.7199*** (17.2684)	50.4055*** (7.2683)	47.1450*** (14.4763)	51.8418*** (5.7584)	51.9160*** (11.6061)
Estimation Procedure:	OLS	IV	OLS	IV	OLS	IV
OIR Test		0.4270		0.5309		0.5685
Observations	64	64	64	64	64	64
R-squared	0.4065		0.3585		0.4335	
***, **, and * represent significance at 1, 5, and 10% levels respectively Robust standard errors in parentheses						

Table B.3: Persistence to Grade 5 Regression Results⁶

	Persistence to Grade 5	Persistence to Grade 5	Persistence to Grade 5	Persistence to Grade 5	Persistence to Grade 5	Persistence to Grade 5
Private Credit	0.8964*** (0.2083)	1.9709** (0.8798)				
Private Credit ²	-0.0052*** (0.0017)	-0.0124 (0.0089)				
M3			1.0969*** (0.2746)	1.4390** (0.6621)		
M3 ²			-0.0064** (0.0024)	-0.0098 (0.0090)		
Deposits					1.0781*** (0.2496)	1.5330** (0.6034)
Deposits ²					-0.0067*** (0.0025)	-0.0115 (0.0089)
Population Density	-0.0042 (0.0110)	-0.0261 (0.0204)	-0.0060 (0.0107)	-0.0074 (0.0133)	-0.0097 (0.0106)	-0.0116 (0.0187)
Inflation	0.6459*** (0.1979)	1.1399** (0.5141)	0.5620*** (0.1925)	0.5627 (0.3700)	0.5069** (0.2035)	0.5197 (0.3693)
GDP Growth	1.4809 (1.1716)	1.6606 (1.5541)	1.0339 (1.1042)	1.2255 (1.4101)	0.7601 (1.1075)	0.8570 (1.3592)
Constant	51.9538*** (5.6723)	29.2441* (16.7860)	42.9475*** (6.2956)	36.4125*** (10.3085)	49.3719*** (5.0753)	42.0135*** (8.6703)
Estimation Procedure:	OLS	IV	OLS	IV	OLS	IV
OIR Test		0.2544		0.3795		0.3125
Observations	51	51	51	51	51	51
R-squared	0.3770		0.4111		0.4176	

***, **, and * represent significance at 1, 5, and 10% levels respectively
Robust standard errors in parentheses

Table B.4: Persistence to Grade 5 Lagged Regression Results⁶

	Persistence to Grade 5	Persistence to Grade 5	Persistence to Grade 5	Persistence to Grade 5	Persistence to Grade 5	Persistence to Grade 5
Private Credit	0.8618*** (0.1993)	2.3201 (1.6166)				
Private Credit ²	-0.0055*** (0.0016)	-0.0137 (0.0101)				
M3			1.1926*** (0.2606)	1.4866** (0.6780)		
M3 ²			-0.0079*** (0.0023)	-0.0125 (0.0103)		
Deposits					1.1669*** (0.2332)	1.5840** (0.6447)
Deposits ²					-0.0085*** (0.0024)	-0.0148 (0.0098)
Population Density	-0.0010 (0.0110)	-0.0309 (0.0396)	-0.0037 (0.0109)	-0.0007 (0.0174)	-0.0062 (0.0110)	-0.0012 (0.0234)
Inflation	0.3944*** (0.1281)	0.9179 (0.8361)	0.3318*** (0.1135)	0.2570 (0.2880)	0.3005** (0.1131)	0.2392 (0.2590)
GDP Growth	2.4595** (1.0853)	1.7323 (2.7102)	1.6932* (0.9078)	2.1379 (1.6531)	1.4560 (0.9127)	1.6978 (1.4210)
Constant	55.0595*** (5.0812)	25.3074 (37.3142)	44.6568*** (5.6107)	41.8238*** (11.1939)	51.1261*** (4.4784)	46.9014*** (9.8815)
Estimation Procedure:	OLS	IV	OLS	IV	OLS	IV
OIR Test		0.1235		0.2863		0.1953
Observations	51	51	51	51	51	51
R-squared	0.3938		0.4585		0.4687	

***, **, and * represent significance at 1, 5, and 10% levels respectively
Robust standard errors in parentheses

⁶ Financial development and financial development² are instrumented on English and Latitude. French is collinear with English since each country in this sample has either English or French legal origin. I cannot use the OIR Test when instrumenting financial development and financial development² on English and Latitude since they will be exactly identified. Rather I determine the OIR Test from instrumenting financial development on English and Latitude.

Table B.5: Female Primary Enrollment Regression Results

	Female Primary Enrollment	Female Primary Enrollment	Female Primary Enrollment	Female Primary Enrollment	Female Primary Enrollment	Female Primary Enrollment
Private Credit	0.9705*** (0.1992)	0.9857 (0.7329)				
Private Credit ²	-0.0054*** (0.0014)	-0.0055 (0.0071)				
M3			1.0498*** (0.2678)	1.4199 (1.1828)		
M3 ²			-0.0058*** (0.0020)	-0.0096 (0.0123)		
Deposits					1.1898*** (0.2269)	1.3952 (0.8498)
Deposits ²					-0.0075*** (0.0019)	-0.0108 (0.0098)
Population Density	-0.0012*** (0.0003)	-0.0012** (0.0006)	-0.0003 (0.0007)	0.0018 (0.0069)	0.0005 (0.0008)	0.0028 (0.0058)
Inflation	0.9460*** (0.2980)	0.9493*** (0.3627)	0.5654** (0.2813)	0.4324 (0.4998)	0.5840** (0.2648)	0.4297 (0.3822)
GDP Growth	2.0545** (0.8524)	2.0514** (0.8280)	2.7155*** (0.7708)	2.9556*** (0.9739)	2.4913*** (0.7948)	2.7083*** (0.8202)
Constant	49.5733*** (6.4398)	49.2834*** (13.7152)	42.1997*** (8.4252)	35.8782 (22.7163)	44.4310*** (6.4683)	43.2493*** (14.5284)
Estimation Procedure:	OLS	IV	OLS	IV	OLS	IV
OIR Test		0.9894		0.9491		0.8686
Observations	66	66	66	66	66	66
R-squared	0.4006		0.3859		0.4584	
***, **, and * represent significance at 1, 5, and 10% levels respectively Robust standard errors in parentheses						

Table B.6: Female Primary Enrollment Lagged Regression Results

	Female Primary Enrollment	Female Primary Enrollment	Female Primary Enrollment	Female Primary Enrollment	Female Primary Enrollment	Female Primary Enrollment
Private Credit	0.7281*** (0.1965)	1.3589 (0.8580)				
Private Credit ²	-0.0041*** (0.0014)	-0.0102 (0.0084)				
M3			0.8448*** (0.2773)	1.3524 (0.9920)		
M3 ²			-0.0049** (0.0021)	-0.0107 (0.0114)		
Deposits					0.9776*** (0.2628)	1.4353* (0.8072)
Deposits ²					-0.0067*** (0.0023)	-0.0128 (0.0098)
Population Density	-0.0007*** (0.0002)	-0.0009 (0.0007)	0.0004 (0.0007)	0.0035 (0.0067)	0.0011 (0.0009)	0.0049 (0.0059)
Inflation	0.4157** (0.1726)	0.4825** (0.2452)	0.2486* (0.1474)	0.1699 (0.2162)	0.2573* (0.1431)	0.1747 (0.1755)
GDP Growth	1.8714*** (0.6492)	2.2685*** (0.8643)	2.1245*** (0.7026)	2.4254*** (0.8510)	2.0192*** (0.6884)	2.3191*** (0.8001)
Constant	62.6933*** (6.4394)	51.7738*** (16.6501)	56.0638*** (8.8589)	47.8589*** (18.2873)	57.6941*** (7.3559)	52.0078*** (14.2668)
Estimation Procedure:	OLS	IV	OLS	IV	OLS	IV
OIR Test		0.3266		0.4365		0.3892
Observations	64	64	64	64	64	64
R-squared	0.2704		0.2821		0.3312	
***, **, and * represent significance at 1, 5, and 10% levels respectively Robust standard errors in parentheses						

Table B.7: Female Persistence to Grade 5 Regression Results

	Female Persistence to Grade 5	Female Persistence to Grade 5	Female Persistence to Grade 5	Female Persistence to Grade 5	Female Persistence to Grade 5	Female Persistence to Grade 5
Private Credit	0.9235*** (0.2096)	2.9838** (1.2976)				
Private Credit ²	-0.0058*** (0.0017)	-0.0228 (0.0139)				
M3			0.9576*** (0.2537)	3.6161* (1.8733)		
M3 ²			-0.0053*** (0.0019)	-0.0334 (0.0232)		
Deposits					1.0852*** (0.2391)	3.2167*** (1.2216)
Deposits ²					-0.0070** (0.0021)	-0.0314** (0.0160)
Population Density	-0.0007*** (0.0000)	-0.0022 (0.0014)	0.0004 (0.0008)	0.0172 (0.0167)	0.0012 (0.0010)	0.0161 (0.0120)
Inflation	0.6693*** (0.2423)	1.3008** (0.4966)	0.5617** (0.2440)	-0.0813 (0.8683)	0.4963** (0.2420)	0.0145 (0.5436)
GDP Growth	1.8635** (0.9069)	0.7842 (1.3467)	1.4911 (1.0123)	0.7784 (1.7146)	1.2131 (1.0095)	0.1796 (1.5477)
Constant	46.6370*** (5.0151)	8.0874 (21.1244)	40.3494*** (6.3802)	1.4739 (23.0044)	43.3714*** (5.0689)	17.8084 (15.5712)
Estimation Procedure:	OLS	IV	OLS	IV	OLS	IV
OIR Test		0.7112		0.9336		0.7199
Observations	67	67	67	67	67	67
R-squared	0.3564		0.3565		0.3940	
***, **, and * represent significance at 1, 5, and 10% levels respectively Robust standard errors in parentheses						

Table B.8: Female Persistence to Grade 5 Lagged Regression Results

	Female Persistence to Grade 5	Female Persistence to Grade 5	Female Persistence to Grade 5	Female Persistence to Grade 5	Female Persistence to Grade 5	Female Persistence to Grade 5
Private Credit	0.8253*** (0.1949)	2.5330*** (0.9468)				
Private Credit ²	-0.0055*** (0.0017)	-0.0174 (0.0113)				
M3			1.0945*** (0.2380)	3.5747 (3.1942)		
M3 ²			-0.0071*** (0.0021)	-0.0376 (0.0474)		
Deposits					1.2462*** (0.2340)	3.1387** (1.3252)
Deposits ²					-0.0098** (0.0023)	-0.0346 (0.0222)
Population Density	-0.0005** (0.0002)	-0.0027* (0.0016)	0.0006 (0.0007)	0.0149 (0.0271)	0.0017** (0.0007)	0.0134 (0.0139)
Inflation	0.3403** (0.1683)	0.7591* (0.4034)	0.2646 (0.1659)	-0.2549 (1.1379)	0.1878 (0.1659)	-0.1523 (0.4615)
GDP Growth	2.0090** (0.8571)	1.8211 (1.3182)	1.0803 (0.8449)	1.1476 (1.7269)	1.0209 (0.8353)	0.6366 (1.2846)
Constant	57.8359*** (4.8934)	23.2303 (17.8432)	48.4580*** (5.3802)	16.8038 (27.4552)	51.9593*** (4.3359)	30.9158** (13.5480)
Estimation Procedure:	OLS	IV	OLS	IV	OLS	IV
OIR Test		0.8128		0.7047		0.7888
Observations	66	66	66	66	66	66
R-squared	0.3098		0.3595		0.3900	
***, **, and * represent significance at 1, 5, and 10% levels respectively Robust standard errors in parentheses						

Table B.9: Under-5 Mortality Regression⁷ Results

	Under-5 Mortality	Under-5 Mortality	Under-5 Mortality	Under-5 Mortality	Under-5 Mortality	Under-5 Mortality
Private Credit	-0.5482***	-1.0614**				
	(0.0691)	(0.4814)				
Private Credit ²	0.0045***	0.0110**				
	(0.0007)	(0.0052)				
M3			-0.5382***	-1.0782**		
			(0.0765)	(0.4883)		
M3 ²			0.0037***	0.0114**		
			(0.0006)	(0.0057)		
Deposits					-0.5501***	-0.7978**
					(0.0707)	(0.3865)
Deposits ²					0.0043**	0.0098**
					(0.0007)	(0.0050)
Population Density	-0.0010	0.0040	0.0018	-0.0009	0.0028	-0.0043
	(0.0023)	(0.0057)	(0.0026)	(0.0064)	(0.0026)	(0.0060)
Inflation	-0.0830*	-0.1297	-0.0556	0.0419	-0.0392	0.0705
	(0.0490)	(0.1089)	(0.0397)	(0.0798)	(0.0373)	(0.0601)
GDP Growth	-0.7213**	-0.7531**	-0.8037***	-1.0196***	-0.7133**	-0.8770***
	(0.3397)	(0.3388)	(0.2971)	(0.2986)	(0.2902)	(0.3191)
Constant	19.9756***	26.7872***	23.2157***	28.7254***	20.5120***	20.2875***
	(1.6362)	(8.0220)	(2.0266)	(8.4432)	(1.5478)	(5.7239)
Estimation Procedure:	OLS	IV	OLS	IV	OLS	IV
OIR Test		0.1517		0.2032		0.1380
Observations	110	110	110	110	110	110
R-squared	0.5214		0.4783		0.5199	
***, **, and * represent significance at 1, 5, and 10% levels respectively						
Robust standard errors in parentheses						

Table B.10: Infant Mortality Regression Results⁷

	Infant Mortality	Infant Mortality	Infant Mortality	Infant Mortality	Infant Mortality	Infant Mortality
Private Credit	-0.3110***	-0.5788**				
	(0.0388)	(0.2672)				
Private Credit ²	0.0025***	0.0062**				
	(0.0004)	(0.0029)				
M3			-0.2893***	-0.6290**		
			(0.0423)	(0.3003)		
M3 ²			0.0020***	0.0068*		
			(0.0004)	(0.0035)		
Deposits					-0.2960***	-0.4542*
					(0.0387)	(0.2375)
Deposits ²					0.0023**	0.0057*
					(0.0004)	(0.0031)
Population Density	-0.0004	0.0019	0.0009	-0.0007	0.0015	-0.0029
	(0.0014)	(0.0032)	(0.0017)	(0.0039)	(0.0017)	(0.0037)
Inflation	-0.0460*	-0.0577	-0.0280	0.0331	-0.0213	0.0469
	(0.0275)	(0.0578)	(0.0221)	(0.0440)	(0.0221)	(0.0342)
GDP Growth	-0.4079**	-0.4289**	-0.4525***	-0.5863***	-0.4051**	-0.5094***
	(0.1856)	(0.1901)	(0.1655)	(0.1682)	(0.1623)	(0.1817)
Constant	12.1720***	15.3152***	13.6286***	17.1161***	12.2094***	12.1078***
	(0.8316)	(15.3152)	(1.0285)	(5.0865)	(0.7612)	(3.4907)
Estimation Procedure:	OLS	IV	OLS	IV	OLS	IV
OIR Test		0.1193		0.2457		0.1773
Observations	110	110	110	110	110	110
R-squared	0.5294		0.4582		0.4997	
***, **, and * represent significance at 1, 5, and 10% levels respectively						
Robust standard errors in parentheses						

⁷ I create an additional instrument, Latitude², to use in the IV regressions. I instrument financial development and financial development² on English, French, Latitude, and Latitude². The instruments remain relevant and exogenous.

Table B.11: Under-5 Mortality Lagged Regression Results

	Under-5 Mortality	Under-5 Mortality	Under-5 Mortality	Under-5 Mortality	Under-5 Mortality	Under-5 Mortality
Private Credit	-0.2088*** (0.0314)	0.9116 (1.1103)				
Private Credit ²	0.0067*** (0.0023)	0.0000 (0.0000)				
M3			-0.0970*** (0.0241)	0.5465 (0.5141)		
M3 ²			-0.0009* (0.0005)	-0.0066 (0.0119)		
Deposits					-0.1536*** (0.0309)	0.6029 (0.5083)
Deposits ²					0.0004 (0.0009)	0.0000 (0.0000)
Population Density	-0.0067** (0.0029)	-0.0259 (0.0278)	-0.0063** (0.0030)	-0.0260 (0.0166)	-0.0041 (0.0032)	-0.0355 (0.0254)
Inflation	-0.0815** (0.0393)	0.2191 (0.2511)	-0.0624 (0.0421)	0.0031 (0.1479)	-0.0509 (0.0417)	-0.0037 (0.1347)
GDP Growth	-0.9024*** (0.1818)	-0.5009 (0.9817)	-0.8009*** (0.1886)	-1.1113** (0.4532)	-0.7371*** (0.1937)	-1.1567** (0.4895)
Constant	14.1284*** (1.3173)	-14.1482 (25.3809)	12.9923*** (1.3380)	-3.5651 (7.3066)	12.5891*** (1.3118)	-2.1923 (7.0757)
Estimation Procedure:	OLS	IV	OLS	IV	OLS	IV
OIR Test		0.4278		0.4858		0.3107
Observations	109	109	109	109	109	109
R-squared	0.3971		0.3593		0.3546	
***, **, and * represent significance at 1, 5, and 10% levels respectively Robust standard errors in parentheses						

Table B.12: Infant Mortality Lagged Regression Results

	Infant Mortality	Infant Mortality	Infant Mortality	Infant Mortality	Infant Mortality	Infant Mortality
Private Credit	-0.2343*** (0.0478)	0.8604 (1.2475)				
Private Credit ²	0.0021*** (0.0006)	-0.0080 (0.0156)				
M3			-0.1844*** (0.0475)	0.7401 (1.1440)		
M3 ²			0.0012*** (0.0004)	-0.0073 (0.0141)		
Deposits					-0.2063*** (0.0453)	0.5530 (0.5498)
Deposits ²					0.0015*** (0.0005)	-0.0057 (0.0075)
Population Density	-0.0034* (0.0018)	-0.0134 (0.0123)	-0.0017 (0.0019)	-0.0159 (0.0117)	-0.0011 (0.0019)	-0.0145* (0.0075)
Inflation	-0.0480** (0.0203)	0.1351 (0.1501)	-0.0281 (0.0217)	0.0085 (0.0918)	-0.0242 (0.0213)	0.0069 (0.0687)
GDP Growth	-0.4910*** (0.1041)	-0.3860 (0.3750)	-0.4177*** (0.1106)	-0.5634** (0.2346)	-0.3795*** (0.1122)	-0.6273*** (0.2360)
Constant	9.8914*** (0.8615)	-9.9919 (18.5513)	10.0309*** (1.1256)	-7.8738 (15.9632)	9.3235*** (0.8978)	-2.7992 (6.4216)
Estimation Procedure:	OLS	IV	OLS	IV	OLS	IV
OIR Test		0.4500		0.5287		0.3476
Observations	109	109	109	109	109	109
R-squared	0.4049		0.3580		0.3821	
***, **, and * represent significance at 1, 5, and 10% levels respectively Robust standard errors in parentheses						

⁸ Financial development and financial development² are instrumented on English and French. Latitude is not exogenous. I cannot use the OIR Test when instrumenting financial development and financial development² on English and French since they will be exactly identified. Rather I determine the OIR Test from instrumenting financial development on English and French.

Table B.13: Maternal Mortality Regression Results

	Maternal Mortality	Maternal Mortality	Maternal Mortality	Maternal Mortality	Maternal Mortality	Maternal Mortality
Private Credit	-0.0257*** (0.0034)	-0.0651** (0.0297)				
Private Credit^2	0.0002*** (0.0000)	0.0006** (0.0002)				
M3			-0.0274*** (0.0043)	-0.0818 (0.0521)		
M3^2			0.0002*** (0.0000)	0.0010 (0.0007)		
Deposits					-0.0302*** (0.0043)	-0.0703 (0.0431)
Deposits^2					0.0002*** (0.0000)	0.0010 (0.0007)
Population Density	0.0002* (0.0001)	0.0006* (0.0003)	0.0003** (0.0001)	0.0002 (0.0005)	0.0003*** (0.0001)	-0.0002 (0.0007)
Inflation	-0.0055** (0.0025)	-0.0123 (0.0076)	-0.0042** (0.0018)	0.0031 (0.0072)	-0.0037** (0.0016)	0.0042 (0.0067)
GDP Growth	-0.0410** (0.0195)	-0.0444** (0.0195)	-0.0469*** (0.0171)	-0.0636*** (0.0187)	-0.0433*** (0.0161)	-0.0539*** (0.0171)
Constant	0.9237*** (0.0904)	1.5604*** (0.5479)	1.1319*** (0.1218)	1.6943** (0.7289)	1.0362*** (0.0954)	1.2442*** (0.4587)
Estimation Procedure:	OLS	IV	OLS	IV	OLS	IV
OIR Test		0.0811		0.9383		0.7028
Observations	103	103	103	103	103	103
R-squared	0.4390		0.4215		0.4787	
***, **, and * represent significance at 1, 5, and 10% levels respectively						
Robust standard errors in parentheses						

Table B.14: Maternal Mortality Lagged Regression Results

	Maternal Mortality	Maternal Mortality	Maternal Mortality	Maternal Mortality	Maternal Mortality	Maternal Mortality
Private Credit	-0.0214*** (0.0035)	0.0993 (0.1143)				
Private Credit^2	0.0002*** (0.0000)	-0.0006 (0.0009)				
M3			-0.0233*** (0.0047)	0.2057 (0.6875)		
M3^2			0.0002*** (0.0000)	-0.0023 (0.0089)		
Deposits					-0.0267*** (0.0050)	0.1405 (0.2286)
Deposits^2					0.0002*** (0.0001)	-0.0017 (0.0033)
Population Density	0.0000 (0.0001)	-0.0011 (0.0013)	0.0001 (0.0001)	-0.0011 (0.0016)	0.0002* (0.0001)	-0.0007 (0.0010)
Inflation	-0.0042** (0.0018)	0.0202 (0.0218)	-0.0033* (0.0019)	-0.0041 (0.0538)	-0.0031* (0.0018)	0.0001 (0.0180)
GDP Growth	-0.0225 (0.0167)	-0.0100 (0.0411)	-0.0217 (0.0153)	-0.0094 (0.0486)	-0.0206 (0.0139)	-0.0207 (0.0419)
Constant	0.7519*** (0.0865)	-1.6261 (2.0607)	0.9202*** (0.1230)	-2.9590 (8.9295)	0.8538*** (0.1014)	-1.5922 (2.5360)
Estimation Procedure:	OLS	IV	OLS	IV	OLS	IV
OIR Test		0.1579		0.5870		0.4172
Observations	102	102	102	102	102	102
R-squared	0.3502		0.3585		0.4091	
***, **, and * represent significance at 1, 5, and 10% levels respectively						
Robust standard errors in parentheses						

⁹ Financial development and financial development^2 are instrumented on English and French. Latitude is not exogenous. I cannot use the OIR Test when instrumenting financial development and financial development^2 on English and French since they will be exactly identified. Rather I determine the OIR Test from instrumenting financial development on English and French.

Table B.15: HIV Regression Results

	HIV	HIV	HIV	HIV	HIV	HIV
Private Credit	-0.1836*** (0.0465)	0.0005 (0.3302)				
Private Credit^2	0.0016*** (0.0005)	0.0020 (0.0031)				
M3			-0.1195* (0.0646)	0.1043 (0.3457)		
M3^2			0.0008 (0.0006)	0.0014 (0.0039)		
Deposits					-0.0621 (0.0611)	0.1074 (0.3018)
Deposits^2					0.0004 (0.0006)	0.0016 (0.0040)
Population Density	-0.0021 (0.0028)	-0.0047 (0.0066)	-0.0016 (0.0033)	-0.0164 (0.0112)	-0.0031 (0.0036)	-0.0147 (0.0100)
Inflation	-0.0247 (0.0353)	0.1002 (0.0990)	-0.0105 (0.0338)	0.0950 (0.0766)	-0.0047 (0.0352)	0.0875 (0.0716)
GDP Growth	-0.1060 (0.1055)	-0.3552 (0.3511)	-0.1841* (0.1103)	-0.3096 (0.2557)	-0.1677 (0.1146)	-0.3184 (0.2527)
Constant	6.1986*** (1.3298)	0.3412 (5.3296)	6.2551*** (1.5328)	-2.0149 (6.4423)	4.6892*** (1.0611)	-1.0731 (4.3348)
Estimation Procedure:	OLS	IV	OLS	IV	OLS	IV
OIR Test		0.6547		0.4308		0.4161
Observations	75	75	75	75	75	75
R-squared	0.1259		0.0705		0.0446	
***, **, and * represent significance at 1, 5, and 10% levels respectively Robust standard errors in parentheses						

Table B.16: HIV Lagged Regression Results

	HIV	HIV	HIV	HIV	HIV	HIV
Private Credit	-0.1314** (0.0511)	0.3054 (0.3921)				
Private Credit^2	0.0012** (0.0005)	-0.0004 (0.0039)				
M3			-0.0574 (0.0965)	0.4246 (0.5065)		
M3^2			0.0002 (0.0009)	-0.0014 (0.0057)		
Deposits					0.0033 (0.0958)	0.4036 (0.4493)
Deposits^2					-0.0003 (0.0011)	-0.0014 (0.0060)
Population Density	-0.0068* (0.0040)	-0.0100 (0.0072)	-0.0060 (0.0045)	-0.0231* (0.0128)	-0.0072 (0.0046)	-0.0209* (0.0114)
Inflation	-0.0216 (0.0210)	0.0486 (0.0499)	-0.0191 (0.0199)	0.0324 (0.0426)	-0.0166 (0.0207)	0.0260 (0.0414)
GDP Growth	-0.1889 (0.1892)	-0.6028 (0.3747)	-0.2342 (0.1761)	-0.3872 (0.2875)	-0.2325 (0.1785)	-0.4427 (0.2963)
Constant	6.2572*** (1.5573)	-2.4446 (5.1631)	5.8806*** (1.8442)	-6.2306 (8.6964)	4.6560*** (1.2467)	-3.5286 (5.8439)
Estimation Procedure:	OLS	IV	OLS	IV	OLS	IV
OIR Test		0.6052		0.5604		0.5041
Observations	75	75	75	75	75	75
R-squared	0.0634		0.0470		0.0389	
***, **, and * represent significance at 1, 5, and 10% levels respectively Robust standard errors in parentheses						

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