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IS THERE MORAL HAZARD IN THE HEAVILY INDEBTED POOR COUNTRIES (HIPC) INITIATIVE DEBT RELIEF PROCESS?

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The Heavily Indebted Poor Countries (HIPC) Initiative and the Multilateral Debt Relief Initiative (MDRI) were created by the IMF and World Bank to help low-income countries reduce their debt burden and to facilitate reaching the Millennium Development Goals. After entering the decision point of the HIPC Initiative stage, countries receive interim aid while following a strategic path to improve their macroeconomic stability via structural reforms. Many countries reached the completion point of the HIPC Initiative stage within a few years, receiving a substantial amount of debt relief. Other countries remained in the interim period for almost a decade. We explore the relationship between the level of corruption in HIPC countries and the length of time between the decision and the completion point. We use survival-time models to estimate the effect of various characteristics of the countries on the probability that each country will exit the interim period. The results show that countries with lower corruption and better rule of law complete the HIPC process faster.

Keywords: Debt Relief, HIPC, Moral Hazard, Survival Time Model, Foreign Aid
JEL Classification: F34, F35, C41

1. INTRODUCTION

Foreign aid is a widely-researched topic in the economic development literature. It is of great interest to answer questions such as "What determines aid flows?", "Does foreign aid achieve its intended goals?", and "Are aid funds misused?" The delivery, utilization, and success of foreign aid are conditional on a number of factors. For example, donor intent and recipients' utilization of the funds can be incongruent. Consider the case of Nigeria, which is a large foreign aid recipient. For example, in 2006 Nigeria received more than $13 billion US dollars in net official development assistance. In 2006, the country's President reportedly spent $1 million of poverty alleviation funds to sponsor popular music artists Jay-Z and Beyonce to perform at a music festival (Ward, 2013). Then in February of 2013, Nigeria spent another $500,000 inviting tabloid

celebrity Kim Kardashian to co-host an event called Love Like A Movie (Ward, 2013). Such events clearly do not help the poor or reduce hunger, which are among the main objectives of foreign aid. However such events highlight the need for further studies on understanding when and how foreign aid works. The misuse of funds suggest that there could be a mismatch between donors' intent and the recipients' use of foreign aid.

In this study we focus on debt relief as a form of foreign aid and investigate the factors contributing to its success. According to Cassimon and Van Campenhout (2008), debt relief is a type of multilateral aid that outperforms other modes of aid delivery. To make debt relief more effective, the IMF and the World Bank created two debt relief programs to help countries that have exceedingly high levels of debt. These programs are the Heavily Indebted Poor Countries (HIPC) Initiative and the Multilateral Debt Relief Initiative (MDRI). The IMF and World Bank monitor countries that participate in these programs. Participants are required to submit reports on their macroeconomic conditions and their spending on poverty reduction programs. By the end of 2010, the HIPC Initiative and the MDRI provided $76 billion and $38 billion, respectively, in debt relief in the end-2010 present value (PV) terms.

In this study, we address two issues with respect to the HIPC Initiative's debt relief efforts. First, we seek to identify the determinants of the length of the time that it takes a country to successfully complete the HIPC Initiative's program. The HIPC Initiative involves two stages: the decision point and the completion point. The time it takes for a country to pass from the decision point into the completion point is called the interim period. The average interim period for a country participating in the HIPC Initiative is approximately 45 months. However, there is a wide variation in the length of the interim period across countries. It is not well understood why it takes so little time for some countries to complete the HIPC Initiative while it takes so long for others. For example, Uganda reached the completion point in only 3 months. On the other hand, the Democratic Republic of Congo did not complete the HIPC Initiative for 84 months.

The second issue that we address in this study is whether the HIPC Initiative suffers from moral hazard. In this context, we consider the multilateral donors (organized under the auspices of the World Bank and IMF) as the principals and the HIPC Initiative participants as agents. The principals not only want to lower the debt burden of these member countries but they also aim to make that outcome sustainable by insisting on structural reforms. Each year, as a country remains in the interim period, it receives interim debt relief (i.e., debt relief awarded during the interim period). The principals desire that interim debt relief be used to promote structural reforms. However, the agents may not desire such reforms, even while desiring forgiveness of their debts. Agents instead might prefer to use the interim funds for other purposes. Indeed, to the extent that the donors have an ultimate interest in reforms, the agents may have an incentive to delay reforms so that interim aid is provided for a longer time. The longer a country delays reforms, the longer it stays in the interim period and ultimately receives more cumulative interim aid. Moral hazard occurs when a country stays in the interim period longer to maximize its interim aid, even though this cumulative amount is subtracted

from the final sum payment at the completion point.

We use survival time analysis to document the variables impacting the interim period length in the HIPC debt relief process and to assess the presence of moral hazard. We measure the duration of the interim period in months, starting at the time a country reaches the decision point and ending when it reaches the completion point. By employing a rich set of explanatory variables, we find that factors such as lower corruption, better rule of law, and higher per capita official development aid shortens the interim period. Variables capturing corruption and rule of law serve as the measures of institutional quality in this study. These variables are also known as policy variables.

In answering whether there is a moral hazard in the HIPC debt relief process, we use measures of institutional quality, amount of interim aid, and macroeconomic variables to identify situations under which moral hazard is likely to occur. We incorporate macroeconomic indicators such as GDP per capita growth, inflation rate, and trade openness as control variables into our models because they can impact a country's success in the HIPC Initiative. It is important to note that moral hazard is not directly observed. Since we cannot observe the decision to intentionally stay longer in the interim period, we argue that countries that receive higher level of interim aid (but still remain in the interim period) and have low institutional quality are more likely to commit moral hazard. We infer the presence of moral hazard if higher amounts of interim aid in low institutional quality countries are associated with a longer interim period. Therefore, we use the interaction between interim debt relief and the institutional quality variables (corruption and rule of law) as the proxy for moral hazard. We find no evidence in favor of moral hazard.

This paper contributes to the literature the following ways. First, to the best of our knowledge, it is the first study documenting the underlying factors contributing to the success of the HIPC debt relief effort. Given the size of these debt relief programs, it is critical to understand why some countries succeed and why some fail. The results in this study offer a guide to policing the debt relief process more effectively. Second, this paper sheds light on the moral hazard issue in the debt relief process. Third, it incorporates a duration modeling methodology from health economics and thus offers new tools for evaluating the different dimensions of the debt relief efforts.

The rest of our paper proceeds as follows. Section 2 provides a literature review on low-income countries and compares traditional debt relief and the HIPC Initiative. This section also contains a discussion of debt overhang, the debt Laffer curve, the geography of the HIPCs, and the importance of institutions and HIPCs. This literature review highlights the reasoning behind the HIPC and the MDRI. Section 3 discusses the HIPC and MDRI processes by emphasizing all of the requirements a country must meet in order to pass each point. Section 4 introduces and describes the data. Section 5 outlines the empirical model, and Section 6 discusses the results. Section 7 concludes the paper and provides policy implications.

2. LITERATURE REVIEW

The HIPC Initiative was established with the goal of helping member countries get out of unsustainable debt levels. This goal is in line with the Millennium Development Goals spearheaded by the United Nations. There are eight specific Millennium Development Goals: "(1) to eradicate extreme poverty and hunger, (2) to achieve universal primary education, (3) to promote gender equality and empower women, (4) to reduce child mortality, (5) to improve maternal health, (6) to combat HIV/AIDS, malaria, and other diseases, (7) to ensure environmental sustainability, and (8) to develop a global partnership for development" (Attaran, 2005). The management of developing countries' debt falls specifically under the eight goal. However, all the goals are assumed to be interdependent where success in one area is expected to lead to success in another.

There is mixed evidence on the success of the HIPC Initiative within the Millennium Development Goals framework. Nwachukwu (2008) finds that HIPC debt reliefs' impact is only marginal and that the countries will not be able to meet the Millennium Development Goals by 2015. Fonchamnyo (2009) examines HIPCs that completed the program and finds that on average, they had improved in terms of education and investment. However, those improvements may not be sufficient for meeting the Millennium Development Goals.

Having a high debt level can slow down economic growth and thus make it difficult for countries with heavy debt burden to reach the Millennium Development Goals. Excess external debt accumulation can cause problems such as large debt overhang (Krugman, 1988; Sachs, 1989; Dooley et al., 1989). For a given country, debt overhang occurs when the discounted value of its future resource transfers is below its debt stock (Krugman, 1988). Krugman (1988) argues that excessive debt overhang distorts the value of external debt and discourages new investments. Cohen (1997) and Elbadawi et al. (1997) find that debt overhang causes weak economic performance. Sachs (2002) suggests that debt overhang can cause poor countries to fall into a poverty trap. With debtors in a poverty trap, creditors are unlikely to get repaid. Hence, for a better chance of getting part of their money back, creditors forgive some debt so that the debtor countries do not slide over to the wrong side of the debt Laffer curve.

Figure 1 illustrates the debt Laffer curve and the debt overhang problem. To a certain point (let that point be D*), funds borrowed can be repaid. After point D*, however, the probability of default increases. Kumar and Woo (2010) study a panel of 38 countries from 1970 to 2007 and find an inverse relationship between initial public debt and long run growth. Koeda (2008) finds that there is an important link between a country's initial economic condition and the effectiveness of debt relief, near the threshold of having debt overhang. She provides empirical evidence for growth stagnation near this threshold area. Cecchetti and Zampolli (2011) study a panel of 18 countries from 1980 to 2010 and find that economic growth starts to decline when countries reach the threshold level of 85% of GDP.

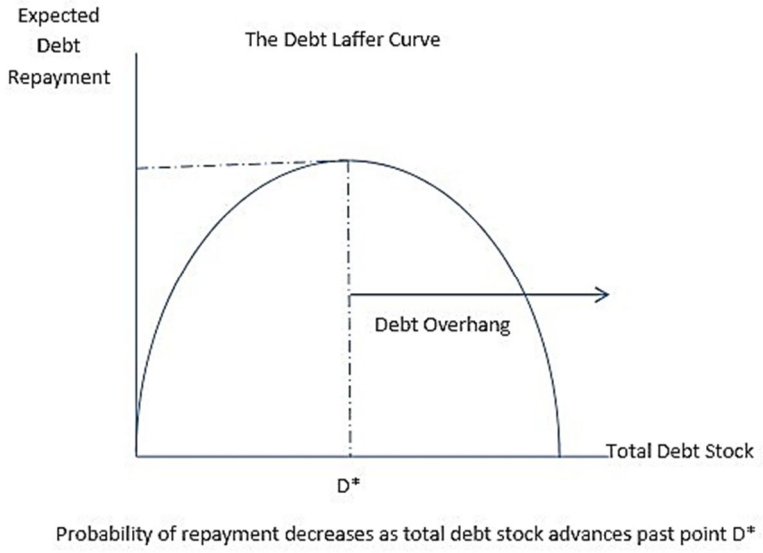

Figure 1. The Debt Laffer Curve

Claessens (1990) uses the debt Laffer curve to argue that across the board debt cancellations will not be beneficial to creditors. Debt forgiveness only helps the countries whose debt stocks are on the right side of D*. Hence, canceling those debts for the countries with D less than D* will not help creditors. Therefore, it makes sense for the HIPC Initiative to place a ratio of debt to exports as a requirement for qualification. The HIPC condition of debt unsustainability is that the debt to exports ratio must be greater than 150%.

On the moral hazard side, Jeanne and Zettelmeyer (2001) argue that financial safety nets create moral hazard. They also claim that the cost of international bailouts are not high for the international community. They suggest that the size of the bailouts should be conditional on government policies. Ndikumana (2004) presents evidence that countries that received more aid also received more debt relief compared to those that did not qualify for debt relief. This leads to the idea that international foreign aid provides incentives for moral hazard to its recipient countries such that these countries borrow more with the expectation of being forgiven later.

Isopi and Mattesini (2010) examine the issue of monitoring; they find that donors give aid without assessing previous performance and continually give more aid without verifying those results. The lack of a perfect monitoring system in place can be a breeding ground for moral hazard. Amegashie et al. (2013) propose the use of tied aid as a method of reducing moral hazard. In summary, foreign assistance can be ineffective if the recipient country either lacks the appropriate level of rule of law or if a monitoring

system is not put in place. As a way to address these concerns, the HIPC Initiative follows the status of recipient countries' macroeconomic conditions and gives assistance only to those that improve.

To have any meaningful improvements, good institutions are necessary (North, 1990). Burnside and Dollar (2000) document that aid is only effective if a country has a low budget deficit, low inflation, and is open to trade. The countries that qualify for HIPC assistance do not have low inflation, which can contribute to a longer interim period. Werlin (2005) argues that it is not possible to help poor countries if they do not have good governments. Easterly (2002) studies countries with high debt stocks and finds that despite repeated deliveries of external aid, they continually need more help. Easterly argues that these results are due to the irresponsibility of the recipient countries' governments. They keep on borrowing because they did not feel threatened from the consequences of not performing adequate reforms. Alesina and Weder (2002) find that aid is not given conditional on governance quality. In fact, more corrupt governments get more aid.

Knack (2001) documents that aid dependent countries, such as HIPCs, have low institutional quality. Bräutigam and Knack (2004) conclude that high level of foreign aid can deteriorate the quality of governance by increasing incentives for corrupt activities. In this study, following the key findings in the literature, we include institutional variables such as the Control of Corruption index and the Rule of Law index in our specifications.

3. A BRIEF INTRODUCTION TO THE DEBT RELIEF INITIATIVES

The main debt relief initiatives discussed in this paper are the Heavily Indebted Poor Countries (HIPC) Initiative and the Multilateral Debt Relief Initiative (MDRI). The HIPC Initiative was launched in 1996 by the International Monetary Fund (IMF) and the World Bank. The MDRI was launched in 2006 with the goal of providing additional support to countries participating in the HIPC Initiative. Both the HIPC Initiative and the MDRI provide debt relief to assist countries towards attainment of the Millennium Development Goals (MDGs).

The HIPC Initiative calls for the voluntary provision of debt relief by creditors, who can be multilateral, bilateral, or commercial. In 1999, to help more countries qualify into the program, an enhanced HIPC Initiative was formed. The enhanced HIPC Initiative lowered the qualification criteria. For example, the debt-to-exports ratio is now 1.5 instead of 2.0 and the debt-to-fiscal revenue percent is 250% instead of 280%. These downward adjustments helped more countries become eligible to seek debt relief via the HIPC Initiative.

The HIPC Initiative debt relief differs from normal official development aid in that the former places numerous criteria for candidate countries to qualify for the HIPC program. Candidate countries must satisfy a certain level of indebtedness to enter the

program and must demonstrate a firm commitment to reforms before they pass from the decision point into the completion point. For example, requirements that Togo had to fulfill to reach the completion point included developing a mechanism to track public expenditures, appointing judges to the Court of Accounts, and publishing reports auditing government's expenditures and revenues. Bolivia passed the decision point by implementing custom reforms, approving a new tax procedures code, and creating a single treasury account with enhanced transparency and expenditure control.

The HIPC Initiative funding process is divided into two stages: decision and completion point. To potentially be eligible for HIPC Initiative debt relief, a country must satisfy the following conditions: (1) it is International Development Association-only (IDA) and Poverty Reduction and Growth Facility-eligible (PRGF), (2) the debt burden by end-December 2004 must be above the threshold of 150% for the present value of debt to exports of goods and services ratio, and 250% for the ratio of present value of debt to fiscal revenue. For (1), the countries must be the ones that are eligible for loans from the IDA and for the Enhanced Structural Adjustment Facility. This means that, if left on their own, they will not be able to get to a sustainable debt level. For (2), the country must have the ratio of exports of goods and services to GDP, and the ratio of fiscal revenue to GDP above 30% and 15%, respectively. In addition to these two requirements, the country must begin a reform program supported by the IMF and IDA. After passing this stage, the country reaches the decision point.

The completion point entry is determined by the Executive Board of IDA and IMF. To pass, a country must have (a) debt burden indicators above the HIPC threshold for the year prior, (b) established a satisfactory track record of policy performance under the IMF and IDA supported programs, and (c) put together a Poverty Reduction Strategy Paper (PRSP). The PRSP is the document that lays out the actions that these countries will take to reduce poverty and implement policy reform. It is developed based on each country's specific situation. The HIPC participants must have their strategies endorsed by the IMF and the World Bank board. If a country satisfies all of these conditions, it will receive irrevocable debt relief. It is eligible for 100% debt relief owed to the AfDB, IDA, and the IMF under the MDRI. We present the total debt relief received by the countries that completed the program (i.e., exited the interim period) in Table 1. Democratic Republic of Congo tops the list with the highest amount of debt relief, which exceeds $ 16 billion. It is followed by Ghana (at $ 7.4 billion) and Tanzania (at $6.8 billion). Even though these figures are related to a given country's initial debt stock, they are helpful in illustrating the range of debt relief packages awarded within the HIPC Initiative to those that exited the program.

4. DATA AND VARIABLES

The World Bank and the IMF provide yearly "Status of Implementation" reports on the HIPC Initiative and the MDRI that list the dates when a given country is admitted to

the decision point stage, and when it reaches the completion point. The duration passed between the decision point and the completion point is called the interim period. As of December 2010, there were 36 HIPC countries, 32 of which passed the interim period and four of which were still in the interim period. We provide a complete list of countries and the date of their admittance to and the date of their exit from the HIPC program in Table 2. Due to missing data, our analysis only includes 33 countries. The omitted countries are Afghanistan, Benin, and Sao Tome Principe.

Table 1. Total Debt Relief Awarded

Country Name	Total Relief (millions)	Country Name	Total Relief (millions)
Afghanistan	$ 1,319	Liberia	$ 4,861
Benin	$ 1,604	Madagascar	$ 4,315
Bolivia	$ 4,889	Malawi	$ 3,224
Burkina Faso	$ 2,160	Mali	$ 2,904
Burundi	$ 1,474	Mauritania	$ 1,990
Cameroon	$ 6,209	Mozambique	$ 6,347
C. African Republic	$ 1,110	Nicaragua	$ 6,413
Congo, Dem. Rep.	$ 16,273	Niger	$ 2,264
Congo, Rep.	$ 1,934	Rwanda	$ 1,835
Ethiopia	$ 6,584	Sao Tome Principe	$ 334
Gambia, The	$ 498	Senegal	$ 3,339
Ghana	$ 7,405	Sierra Leone	$ 1,664
Guinea Bissau	$ 790	Tanzania	$ 6,842
Guyana	$ 2,063	Togo	$ 360
Haiti	$ 1,175	Uganda	$ 5,474
Honduras	$ 3,723	Zambia	$ 6,670

Table 2. HIPC Decision and Completion Point Dates

Country	Decision Point Date	Completion Point Date	Country	Decision Point Date	Completion Point Date
Countries that passed the Completion Point					
Afghanistan	Jul-07	Jan-10	Liberia	Mar-08	Jun-10
Benin	Jul-00	Mar-03	Madagascar	Dec-00	Oct-04
Bolivia	Feb-00	Jun-01	Malawi	Dec-00	Oct-04
Burkina Faso	Jul-00	Apr-02	Mali	Sep-00	Mar-03
Burundi	Aug-05	Jun-09	Mauritania	Feb-00	Jun-02
Cameroon	Oct-00	Jul-10	Mozambique	Apr-00	Sep-01
C. African Republic	Sep-07	Jun-09	Nicaragua	Dec-00	Jan-04
Congo, Dem. Rep.	Jul-03	Jul-10	Niger	Dec-00	Apr-04
Congo, Rep. of	Mar-06	Jan-10	Rwanda	Dec-00	Apr-05
Ethiopia	Nov-01	Apr-04	Sao Tome and Principe	Dec-00	Mar-07
Gambia, The	Dec-00	Dec-07	Senegal	Jun-00	Apr-04
Ghana	Feb-02	Jul-04	Sierra Leone	Mar-02	Dec-06
Guinea-Bissau	Dec-00	Dec-10	Tanzania	Apr-00	Nov-01
Guyana	Nov-00	Dec-03	Togo	Nov-08	Dec-10
Haiti	Nov-06	Jun-09	Uganda	Feb-00	May-00
Honduras	Jun-00	Apr-05	Zambia	Dec-00	Apr-05
Countries in the Interim Period					
Chad	May-01		Cote d'Ivoire	Mar-09	
Comoros	Jun-10		Guinea	Dec-00	

Source: International Development Association and International Monetary Fund (2011).

4.1. Dependent Variable

Our dependent variable is the length of the interim period in months, Timemo, which we measure as the distance between the decision point and the completion point. Because we include time varying covariates in our regressions, Timemo also changes through time for a given country; thus it is in panel data format. In particular, we calculate each country's individual Timemo in cumulative months by taking the difference between the end year t and its date of entry into the program. For example, Ethiopia entered the HIPC Initiative in November of 2001 and completed it in April of 2004, then for the year 2001 Timemo is 2 (November and December), for the year 2002 it is 14, for 2003, it is 26, and for 2004, it is 30. Calculating the distance between the decision point and the completion point in cumulative months allows us to have a panel data setup. Similar to the covariates that change at annual frequency for each country, Timemo also changes for each country at annual frequency.

We use right censoring when we determine the annual values of Timemo for a given country. We do this because there are countries whose ending date (i.e., completion date of the program) we do not know by the end of a given year. For example, Zambia entered the decision point in December 2000 and the completion point in April 2005. At the end of year 2000, we do not know when Zambia will finish the program. Therefore, we have to right censor it. By the end of year 2001, Zambia still did not finish the program, and we still do not known when it will finish the program. Therefore, we continue use right censoring. We perform the same procedure for 2002, 2003, and 2004. However, by the end of year 2005, we know that Zambia finished the program in April 2005. Therefore, we do not censor Zambia in 2005. Overall, our paper has 147 country-year observations from 33 countries. And 29 of the 33 countries completed the program. Therefore, 118 observations in total are censored.

4.2. Main Explanatory Variables and Presence of Moral Hazard

The main explanatory variables in this study are the interim amount of debt relief per capita that each country receives (HIPC Aid) and two policy variables (Corruption and Rule of Law). Similar to Timemo, the data for the interim aid also come from yearly "Status of Implementation" reports released by the World Bank and the IMF. These reports include yearly debt relief amounts to each recipient country. We obtain the policy variables (i.e., institutional quality variables or measures of institutional quality) from Kaufmann et al. (2011) and use them in our analysis to estimate the effect of institutions on a country's success in the HIPC Initiative. Kaufmann et al. (2011) refer to these variables as Control of Corruption index, which measures how prevalent the public perceives the use of official power for enhancing private gains, and the Rule of Law index, which measures the quality of contract enforcement, property rights, the police, the courts, and the possibility of crime and violence. Originally, these institutional variables are constructed such that higher numbers indicate better institutional quality

and lower numbers indicate worse institutional quality (ranging from 2.5 to -2.5). We multiply the original numbers from Kaufmann et al. (2011) with -1 to ease the interpretation of the results. As a result, in our analysis, higher values of Corruption and Rule of Law both indicate poorer institutional quality.

We also interact the policy variables with HIPC Aid, which creates HIPC Aid×Corruption and HIPC Aid×Rule of Law. The coefficients on these interaction variables help assess the presence of moral hazard. In order to qualify as a HIPC recipient, a country must show signs of improvement. At the decision point, countries are assessed, and debt relief is provided on a case-by-case basis. The Executive Board of IDA and IMF determines the aid flowing to each country, in millions of US dollars. HIPC Initiative participants are provided with interim aid to help them successfully reach the completion point. Once a country gets past the HIPC decision point then it may have an incentive to try and remain in the interim period longer to maximize the amount of interim debt relief that it receives. In the context of the HIPC Initiative participants, moral hazard occurs when countries stay intentionally longer in the interim period to maximize their interim aid.[1] The possibility exists that Corruption, Rule of Law and HIPC Aid independently affect the duration of the interim period. For example, corruption and poor governance may cause country to fail to fulfill the HIPC completion requirements due to possible misuse of funds. However, the interaction variables combine information about institutional quality and aid flows to help us determine whether higher aid in countries with high corruption or poor rule of law is associated with a longer duration.

4.3. Additional Control Variables

Some countries started the HIPC process before the Enhanced HIPC Initiative relaxed the criteria for entry, which we refer as the original countries. We include a variable (Original) to capture the advantage that a country may have received from entering the initiative early. Original takes the value of 1 for the original countries and 0 for others. These original countries re-entered the new initiative, (i.e., the Enhanced HIPC Initiative) at the decision point, and some of their previous accomplishments may

[1] Incentives for moral hazard can arise from the receipt of interim relief. However, there are actually two ways moral hazard can happen: from the provision of (1) interim assistance and (2) topping up aid. For example, Ethiopia, Sao Tome and Principe, and Niger received topping up aid from the HIPC Initiative. For (1) when a HIPC participant stays longer in the interim period, it receives more interim aid cumulatively. For (2), a longer interim duration can change the amount of aid needed by the HIPC member due to extraordinary circumstances that arise. The HIPC Initiative agrees on the amount of the debt relief package at the decision point. However, on its path to complete the HIPC program, if unforeseen circumstances cause a country to need more aid, the HIPC Initiative will give “topping up” aid. Hence, by lengthening the interim period, opportunities to receive topping up aid increases. Unfortunately due to data limitations, we can only focus on interim aid in this paper.

help them reach the completion point faster. The ten original HIPCs are Benin, Bolivia, Burkina Faso, Honduras, Mali, Mauritania, Mozambique, Senegal, Tanzania, and Uganda. It is important to bear in mind that yearly interim aid is not the single source of financial assistance for the HIPC participants. Countries also receive net official development aid, which exceeds interim HIPC debt relief by far each year. To separate the effects of net official development aid from HIPC interim debt relief, we include the net official development aid per capita (ODA) as a control variable.

The HIPC Initiative requires improvements in macroeconomic performance and structural reforms on the part of participants, attesting to the importance of these variables for a country's prosperity. However, the current macroeconomic status of a country in the HIPC program can affect its ability to satisfy the demands of the HIPC Initiative and to exit the interim period. To account for the effect of the economy on a country's successful completion of the HIPC Initiative, we control for a variety of macroeconomic variables from debt payments to inflation.

We anticipate a negative relationship between a country's debt burden and its odds of succeeding in the HIPC Initiative. This is because a country spending most of its revenue on repaying accumulated debt may not have the resources to put towards into implementing its PRSP. To capture the size of the debt burden, we create a new variable called Debt Service, which is the debt service of a country as a proportion of its gross national income (GNI).

Table 3. Variable Descriptions and Sources

Variable	Description	Source
	Dependent Variable	
Timemo	Months in the Interim Period. Running total number of months country i has been in the Decision Point of the HIPC Program	International Development Association and International Monetary Fund (2011)
	Main Variables of Interest	
HIPC Aid	Yearly HIPC interim aid per capita	Authors' calculations from World Bank and IMF annual reports
Corruption	"Using public power for private gain" x -1	Kaufmann et al. (2011)
Rule of Law	"The confidence that agents have confidence in and abide by the rules of society" x -1	Kaufmann et al. (2011)
	Additional Control Variables	
Original	1 if the country started in the original HIPC framework, 0 otherwise	Authors' calculations from World Bank documents
Initial GDP	Real GDP per capita of country I during the first year it enters the Decision Phase	World Bank Group (2012)
Conflict	1 if the country is in an armed conflict, 0 otherwise	Pettersson and Wallensteen (2015)
Inflation	Growth rate of GDP deflator	Kaufmann et al. (2011)
Debt Service	Total debt service as a percentage of GNI	Kaufmann et al. (2011)
ODA	Net official development aid per capita	Kaufmann et al. (2011)
Openness	Exports plus imports, divided by GDP per capita	Heston et al. (2012)
Growth	Per capita GDP growth	World Bank Group (2012)
Polity	Polity IV Score with +10 being more democratic and -10 being autocratic	Marshall et al. (2016)
Latitude	Absolute latitude of country centroid.	La Porta et al. (1999)
Africa	1 if country is in Africa, 0 otherwise	Authors' calculations.

We also control for income levels. In particular, we include real GDP per capita growth (Growth) and the initial value of real GDP per capita (Initial GDP) in our regressions. We expect that a country starting out with a lower GDP per capita may need more time to complete the requirements of the HIPC Initiative. Our empirical analysis also use the inflation rate (Inflation), calculated as the growth rate of GDP deflator, as a measure of overall macroeconomic stability. International trade may also have an effect on the successful completion of the HIPC Initiative. Therefore, we control for the openness of a country to international trade (Openness). This variable comes from Heston et al. (2012). We provide the descriptions and data sources for all non-interaction variables in Table 3.

Political regime may also matter for the HIPC Initiative. To address this possibility, we use a measure of democracy. In particular, we use the Combined Polity score (Polity) from the Polity IV Project Data set (Marshall et al., 2016). The combined polity score shows how autocratic or democratic a country is. The measure ranges from +10, which is strongly democratic, to -10, which is strongly autocratic. It is essential to include this control variable because a more autocratic government may be able to move resources more quickly, or restructure government expenditure patterns better to meet the requirements of the HIPC Initiative. However, autocratic regimes may also be more susceptible to corruption.

Other non-economic factors may also affect the successful completion of the HIPC Initiative. For example, a country in conflict will be less likely to exit the HIPC program because of social unrest. To address this possibility, we use the armed conflict data from Pettersson and Wallensteen (2015) to identify countries experiencing an armed conflict during year t.

Conflict equals 1 for a country in conflict and 0 otherwise. Finally, we follow Gallup et al. (1999) and include two geographic characteristics of HIPC countries: absolute latitude (Latitude) and African continent dummy (Africa). Africa for a given country takes a value of 1 if this country is located in the African continent and 0 otherwise. African countries receive additional debt relief from the African Development Bank, justifying a dummy variable for Africa. Latitude comes from La Porta et al. (1999) and this variable measures how close a country is to the equator. The values for this measure range between zero and one. The lower the value, the closer the country is to the equator.

We provide descriptive statistics on the explanatory variables in Table 4. The HIPC Aid per capita is $4.40 on average, but this variable shows a wide variation ranging from no aid at all to $161.61 for some country-year observations. Net official development aid represents a larger source of funding for the countries in our sample with an average per capita value of $74.14.

For the countries in our sample, there is evidence of macroeconomic instability based on the inflation figures. The annual inflation has a standard deviation of 12.42% and in some cases it reaches to 95.85%. Debt service accounts for a non-negligible share of gross national income on average (4.16%), but the maximum value of this share

(135.25%) shows the extent to which debt payments take a toll on a country's income. The real GDP per capita (when the countries first took part in the HIPC Initiative) is as low as $255.75, which highlights the poverty of the countries in the HIPC Initiative. The average growth rate is not particularly high (1.52%) either; however it shows a wide dispersion, ranging from -15.31% to 29.10%.

Table 4. Descriptive Statistics

Variable	Mean	St. Dev.	Min	Median	Max
HIPC Aid	4.43	13.97	0.00	1.80	161.61
Corruption	0.81	0.37	−0.31	0.89	1.48
Rule of Law	0.92	0.47	−0.16	1.04	1.63
Original	0.22	0.42	0.00	0.00	1.00
Inflation	9.72	12.42	−20.63	6.21	95.85
ODA	74.14	56.78	5.90	58.95	355.34
Polity	2.03	4.58	−6.00	5.00	9.00
Openness	66.43	29.06	26.34	61.29	182.13
Latitude	0.50	0.50	0.00	1.00	1.00
Debt Service	4.16	11.16	0.55	2.36	135.25
Conflict	0.09	0.28	0.00	0.00	1.00
Africa	0.88	0.321	0.00	1.00	1.00
Initial GDP	1,270.80	798.76	255.75	1,028.17	3,567.00
Growth	1.52	4.52	−15.31	1.17	29.10

Note: N=147.

5. ECONOMETRIC MODEL

Our empirical framework uses duration analysis. Duration models (survival time models) are useful for measuring the probability of an event happening, and they are used in economics (e.g., see Douglas, 1998; Bruce et al., 2004; Ragusa, 2010; and Fogarty et al., 2013) as well as in medical studies. Duration models have two advantages: dealing with censored data and producing hazard rates. We have right censored data with 4 out of the 33 countries not having an end spell. The hazard rate gives us an understanding of which determinants cause longer interim durations. Overall, the duration analysis helps us estimate the effects of various variables on the probability of a country exiting the interim period in a point in time (i.e., our event), given that it has not exited the interim period yet.

In our empirical specifications, the dependent variable is the time in months (Timemo) that it takes for a country to go from the decision point to the completion point (i.e., exit the interim period). We use both time-invariant and time-varying (annual) explanatory variables (see Sections 4.2 and 4.3) to determine why some countries exit the interim period earlier than others. We also create a new variable to indicate the country status in the HIPC Initiative (Complete) so that we can fit a survival model to our panel data.

In constructing the panel dataset, we ensure that the dependent variable and the timevarying covariates draw their data from the same year. For example, Burundi entered the decision point in August of 2005 and the completion point in June of 2009. At the end of the year 2005, Burundi's interim period (Timemo) takes the value of 5 months (August, September, October, November, December), it receives a 0 in the dummy variable Complete for not having completed the program. We further append the time-varying covariates such as HIPC Aid and Inflation from 2005 to the dataset. As a result, the values for all these variables in 2005 constitute the data points for Burundi in 2005 within the panel data. The following year, Burundi receives a 17 for the interim period (5 from the year 2005 and another 12 months for the year 2006), and it has a new set of values for the time-varying coefficients, which collectively constitute the data points for Burundi for the year of 2006. For the year 2009, Burundi's Timemo is 47, and it receives a 1 for Complete, indicating that the country exited the program. Burundi also gets a new set of macroeconomic and aid measures for 2009. Thus, even though Burundi is only one country, it corresponds to five different observations (2005, 2006, 2007, 2008, and 2009) in the data set.[2]

There are two options when using survival time model: proportional hazard and accelerated failure time model. The accelerated failure time model assumes that the hazard will accelerate or decelerate. The proportional hazard model assumes that the baseline hazard rate is the same for all countries, but can vary with time. To indicate whether a proportional hazard or an accelerated failure time survival model should be used, we run proportional hazard tests for all model specifications. The results show no evidence against the assumption of proportionality of hazards. Therefore, we use the Cox proportional hazard model.

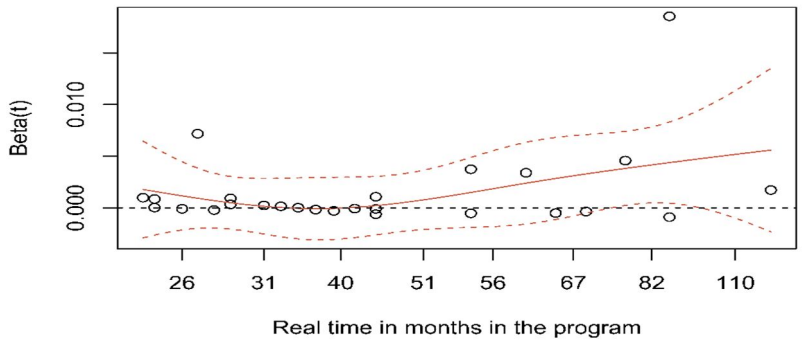

Figure 2. Proportional Hazard Test

[2] Variable Complete is employed in the survival time model as a censor indicator, which informs whether a given country has exited the interim period. However, there is no coefficient associated with it due to the model setup.

Figure 2 shows the plot of the Schoenfeld residuals versus real time tests for proportional hazard. In this figure, the dashed lines represent the 95% confidence interval. In general, when the $\beta(t)$ curve does not deviate far from the zero line, we have proportional hazard. Here, our $\beta(t)$ curve hovers around the zero line, does not cross it, and stays between 0 and approximately 0.005, indicating the appropriateness of proportional hazards for empirical investigation.

The hazard model takes $h(t) = h_0(t)exp(X\beta)$ as the general form. Here, it takes the following specific form for our main model:

$$h(t) = h_0(t)exp(\beta_1 HIPCAid_{i.t} + \beta_2 Institutions_{i,t} + \beta_3 IntialGDP_i + \beta_4 Growth_{i,t} + \beta_5 Inflation_{i,t} + \beta_6 DebtService_{i,t} + \beta_7 ODA_{i,t} + \beta_8 Polity_{i,t} + \beta_9 Openness_{i,t} + \beta_{10} Original_i + \beta_{11} Conflict_{i,t} + \beta_{12} Africa_i + \beta_{13} Latitude_i),$$

where i is an index for countries, and t corresponds to the years in the panel setup. Institutions is either Corruption or Rule of Law. We further expand this specification by including HIPC Aid Squared and interaction terms between aid variables and Institutions. It is important to note that the survival time study use hazard rates as an output. The hazard rate depends on the conditional probability of exiting the interim period at a given time. In other words, the hazard function, $h(t)$, is the instantaneous failure rate. Given that country i has not exited the interim period, the probability that it would happen the next period is $P(t \leq T \leq t + \Delta | t \geq T)$ where t is the current time, and T is the ending time (i.e., the year at which a country enters the completion point).[3]

6. RESULTS

We provide the survival time regression results associated with Corruption in Table 5 and those associated with Rule of Law in Table 6. We convert our results to coefficients instead of hazard probabilities for ease of interpretation. The Cox proportional hazard model coefficients are explained by their signs. Negative coefficients indicate increased survival time; hence, increased interim period. Positive coefficients means decreased survival time and lessened duration.

Under our main specification laid out in Section 5, the covariates with statistically significant positive coefficients (i.e., the ones decreasing the interim period) are ODA and Original in Table 5, and ODA, Original, and Conflict in Table 6. The covariates with statistically significant negative coefficients (i.e., the ones increasing the interim period) are Corruption, Initial GDP, Debt Service, and Africa in Table 5, and HIPC Aid, Rule of Law, Initial GDP, Debt Service, Africa, and Latitude in Table 6.

[3] The Cox model is also characterized by a survival function, $S(t) = S_0(t)exp(X\beta)$, which is related to the failure function $F(t) = P(T \leq t)$. The probability of surviving is its complement, 1 minus the failure rate: $S(t) = P(T > t) = 1 - F(t)$.

Table 5. Cox Proportional Hazard Model-Corruption

Variable	Months In the Interim Period			
	(1)	(2)	(3)	(4)
HIPC Aid	-0.018	-0.093		
	(0.020)	(0.180)		
HIPC Aid Squared			0.000	-0.000*
			(0.000)	(0.000)
Corruption	-2.406***	-3.155***	-2.602***	-5.427***
	(0.860)	(1.076)	(0.861)	(1.330)
Initial GDP	-0.003***	-0.002***	-0.002***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)
Growth	-0.008	0.003	-0.014	-0.078
	(0.079)	(0.064)	(0.084)	(0.092)
Inflation	-0.001	-0.006	0.006	-0.018
	(0.027)	(0.023)	(0.023)	(0.030)
Debt Service	-0.316*	-0.121	-0.273	-0.363*
	(0.185)	(0.141)	(0.179)	(0.214)
ODA	0.026***	0.010	0.019***	0.016**
	(0.008)	(0.009)	(0.006)	(0.008)
Polity	-0.016	-0.110	-0.026	-0.068
	(0.057)	(0.072)	(0.057)	(0.064)
Openness	-0.016	-0.001	-0.028**	-0.010
	(0.013)	(0.012)	(0.013)	(0.015)
Original	2.65***	1.974***	2.635***	2.926***
	(0.823)	(0.719)	(0.818)	(0.866)
Conflict	1.246	0.486	1.200	1.286
	(0.861)	(0.832)	(0.857)	(0.889)
Africa	-3.443***	-2.695***	-3.967***	-3.903***
	(1.191)	(0.880)	(1.121)	(0.923)
Latitude	-0.892	-0.314	-0.628	-0.961
	(0.582)	(0.495)	(0.553)	(0.669)
HIPC Aid×Corruption		0.037		
		(0.194)		
PHazard global test	p > 0.10	p > 0.10	p > 0.10	p > 0.10
R^2	0.368	0.243	0.366	0.412
Log Likelihood	-73.134	-86.424	-73.391	-67.818
Wald Test	46.350***	33.770***	46.120***	41.900***
LR Test	67.549***	40.969***	67.035***	78.181***
Score (Logrank) Test	94.153***	94.575***	90.724***	93.791***

Notes: N=147 in all specifications. p<0.1; ** p<0.05; *** p<0.01. Standard errors are in parentheses. Negative coefficients mean lower hazard. Lower hazard implies a longer duration.

Table 6. Cox Proportional Hazard Model-Rule of Laws

Variable	Months In the Interim Period			
	(1)	(2)	(3)	(4)
HIPC Aid	-0.033*	0.012		
	(0.020)	(0.146)		
HIPC Aid Squared			0.000	-0.000*
			(0.000)	(0.000)
Corruption	-2.942***	-3.422***	-2.831***	-3.839***
	(0.746)	(1.198)	(0.731)	(1.193)
Initial GDP	-0.003***	-0.003***	-0.002***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)
Growth	-0.055	-0.047	-0.050	-0.077
	(0.088)	(0.091)	(0.092)	(0.096)
Inflation	-0.010	-0.014	0.007	-0.011
	(0.030)	(0.031)	(0.021)	(0.029)
Debt Service	-0.386**	-0.346*	-0.370*	-0.408*
	(0.195)	(0.202)	(0.198)	(0.214)
ODA	0.036***	0.029**	0.026***	0.026**
	(0.008)	(0.012)	(0.006)	(0.012)
Polity	-0.077	-0.069	-0.076	-0.091
	(0.060)	(0.068)	(0.060)	(0.060)
Openness	-0.013	-0.013	-0.031**	-0.018
	(0.013)	(0.013)	(0.014)	(0.016)
Original	2.636***	2.823***	2.854***	2.811***
	(0.768)	(0.821)	(0.784)	(0.827)
Conflict	1.854**	1.731*	1.721*	1.814*
	(0.898)	(0.916)	(0.894)	(0.926)
Africa	-3.948***	-3.888***	-4.574***	-4.127***
	(1.117)	(1.078)	(1.176)	(1.071)
Latitude	-1.543**	-1.528**	-1.060*	-1.387**
	(0.656)	(0.652)	(0.583)	(0.646)
HIPC Aid×Rule of Law		-0.051		
		(0.148)		
HIPC Aid Squared×Rule of Law				0.000*
				(0.000)
Rule of Law×ODA		0.011		0.010
		(0.013)		(0.013)
PHazard global test	p > 0.10	p > 0.10	p > 0.10	p > 0.10
R^2	0.411	0.414	0.400	0.415
Log Likelihood	0.766	0.766	0.766	0.766
Wald Test	-67.985***	-67.607***	-69.322***	-67.564***
LR Test	77.846***	78.603***	75.174***	78.689***
Score (Logrank) Test	92.806***	94.335***	89.759***	93.186***

Notes: N=147 in all specifications. p<0.1; ** p<0.05; *** p<0.01. Standard errors are in parentheses. Negative coefficients mean lower hazard. Lower hazard implies a longer duration.

We extend Model (1) by adding an interaction term between the measures of institutional quality and HIPC Aid and present the results under Model (2). The coefficient of the interaction term is not significant (see HIPC Aid×Corruption in Table 5 and HIPC Aid×Rule of Law in Table 6). Furthermore, after adding these interaction terms, the coefficient of ODA is no longer significant in Table 5. In Table 6, the coefficient of HIPC Aid is also no longer significant after adding the interaction term.

The coefficient of HIPC Aid, one of the main variables of interest, is only statistically significant (at the 10% level) under Model (1) in Table 6. Furthermore, when the coefficient is statistically significant, it is negative, indicating HIPC Aid contributes to a lengthening of the duration period. This result is surprising given that a major purpose of interim aid provision is to reduce the length of the interim period. Corruption and Rule of Law are both associated with longer interim durations. This result is not surprising because lower institutional quality can lead to inefficient use of time, capital, interim aid, contributing to a longer interim duration.

We also provide information on the magnitudes of the coefficients on Corruption and Rule of Law by resorting to hazard ratios. The coefficient of Corruption is -2.406 under Model (1) in Table 5. In hazard ratios, this corresponds to a hazard ratio of 0.090 (exp(-2.406)), indicating a 91% reduction in the hazard in response to a one-unit increase in Corruption. Hazard here refers to a country exiting the interim period (whereas, in a typical medical study, hazard may refer to a person dying). Hence, an increase in Corruption makes a country less likely to exit the interim period (i.e., less likely to incur the hazard). The coefficient of Rule of Law -2.942 under Model (1) in Table 6, which translates to a hazard ratio of 0.053 (exp(-2.942)). This suggests that one unit increase in Rule of Law (implying a reduction in the institutional quality) corresponds to 94.70% reduction in the hazard. We acknowledge that countries do not often experience a full one-unit change in Corruption and Rule of Law. Nevertheless, these magnitudes suggest that the institutional variables significantly affect whether a country will exit the interim period sooner or later.

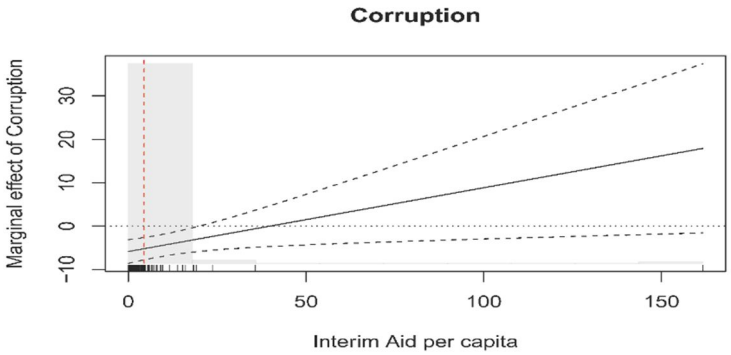

Figure 3. Marginal Effects of Corruption on Interim Duration at Different Levels of Interim Aid per Capita

When a model includes interaction variables, we need to interpret them according to their marginal effects. For example, when we have $y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_1 x_2 + \varepsilon$, the marginal effect of x_1 is $\beta_1 + \beta_2 x_2$.[4] We show the marginal effects for Corruption and for HIPC Aid in Figure 3 and Figure 4, respectively. In these figure, the solid lines represent the marginal effect while the dashed lines show their 95% confidence intervals. Furthermore, the shaded area illustrates the distribution of the variable on the horizontal axis. In particular, for Figure 3, the solid line illustrates the marginal effect of corruption on the duration, at different level of interim aid per capita. The vertical dashed line is the average value of interim per capita aid, where the marginal effect is below zero (a negative effect implies longer interim duration). We also observe that at higher levels of interim aid per capita (HIPC Aid), the marginal effect of Corruption increases, and turning positive for some values of HIPC Aid.

To complement this picture, we illustrate the marginal effect of per capita interim aid on duration (the solid line) at different level of corruption in Figure 4. The vertical dashed line is the average value of corruption, where the marginal effect of aid on duration is negative. Similar to what we observe in Figure 3, at higher values of Corruption, the marginal effect of HIPC Aid increases and takes on positive values. Both of these figures provide visual interpretation for an interaction term that has a statistically insignificant coefficient. Nevertheless, we still find the noted positive relationships (indicating a shorter interim period) puzzling.

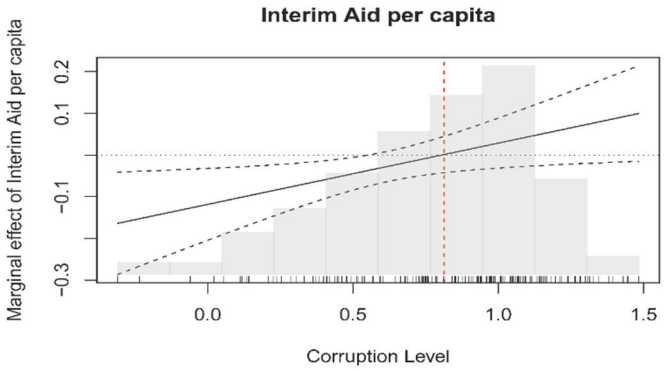

Figure 4. Marginal Effects of Interim Aid per Capita on Interim Duration at Different Levels of Corruption

We further enrich the interpretation of the interaction term using Kaplan-Meier Survival functions. Figure 5 illustrates the survival functions of two group of countries,

[4] For more information, see Understanding Interaction Models: Improving Empirical Analyses by Brambor, Clark, and Golder. 2006. Political Analysis 14, 63-82.

one with higher interim aid and higher corruption versus one with lower interim aid and lower corruption. The location of the curves suggest that countries with relatively higher aid and corruption survive longer. This indicates that countries with lower corruption completes the HIPC Initiative more quickly. However, since the interaction term is not statistically significant, we do not find any evidence in favor of moral hazard. Similarly, the coefficient of HIPC Aid×Rule of Law is also statistically insignificant, further weakening the moral hazard argument.

Under Model (3) in Tables 5 and 6, we examine the effect of HIPC Aid Squared on the length of the interim period. We further expand Model (3) to Model (4) by adding interaction terms between the measures of institutional quality and HIPC Aid Squared and also ODA. Similar to HIPC Aid, HIPC Aid Squared is also marginally significant with a negative coefficient at the 10% level (only under Model (4)), implying that the adverse effect of interim aid worsens at higher amounts. The coefficients of HIPC Aid Squared×Corruption and HIPC Aid Squared×Rule of Law are both positive and statistically significant. This indicates that at higher levels of HIPC Aid, poor institutional quality and HIPC Aid contribute to a shorter interim period, which is in line with our observations in Figures 3 and 4. We do not have an explanation for this puzzling relationship. We also observe a positive coefficient on Corruption×ODA.

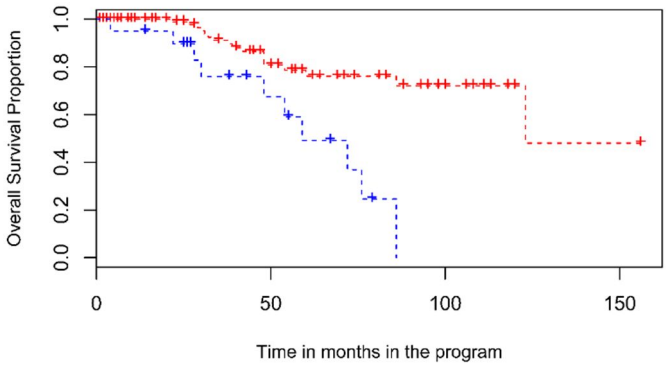

Figure 5. Kaplan-Meier Survival Function, Interaction Term of Aid Per Capita and Corruption

In Table 5, across all the four models, the coefficients of Corruption, Initial GDP, Original, and Africa remain consistently significant. The significance of the coefficients on Debt Service, ODA, and Openness is model-dependent. In Table 6, the coefficients of Rule of Law, Initial GDP, Debt Service, ODA, Original, Conflict, Africa, and Latitude are consistently significant across all four models. On the other hand, the coefficient of Openness is only significant under Model (3).

Overall, higher amounts of ODA are associated with shorter interim periods. Initial GDP is consistently associated with a longer interim period, which is contrary to our expectations. Growth, Inflation, and Polity have no effect on the interim period. Higher values of Debt Service are associated with longer interim periods, which is in line with our expectations. Surprisingly, Openness is associated with longer interim period. Countries with higher engagement in international trade perform worse in term of reaching the completion point. Another surprising result is the coefficient on Conflict. Conflict does not affect the interim period in Table 5, and it actually contributes to a shorter interim period based on the results in Table 6. Countries that joined the HIPC program under the original framework also reach the completion point faster based on the sign of Original, suggesting that these countries had more time to implement their PRSP strategies. Geography does not have a consistent effect on interim duration. Latitude contributes to a longer interim period in Table 6, but it has no effect on the interim period in Table 5. However, Africa is consistently associated with longer interim periods.

7. CONCLUSION

This paper has two main objectives: (1) finding cross-country characteristics that determine HIPC interim duration, and (2) investigating if there exists any moral hazard in the HIPC Initiative's debt relief process. After testing each objective and receiving consistent results using two different policy variables, we have three main findings. First, higher corruption, lower rule of law, a higher initial GDP per capita, not being in the original HIPC Initiative, and being located in Africa consistently lead to longer interim period. Second, the ability of a country to exit the interim period is tied to its institutional quality as higher corruption and lower rule of law both result in longer interim periods. Third, we do not find evidence of moral hazard in the HIPC Initiative, which we infer from the insignificant coefficients on the interaction terms between HIPC aid and the measures of institutional quality.

Our paper presents an analysis into the effectiveness of the HIPC aid and the presence of moral hazard in the HIPC debt relief efforts. We contribute to the literature showing that the interim aid provided by the IMF and the World Bank does not accomplish the goal of shortening the interim period. Since lower institutional quality is associated with a longer interim period, more attention needs to be paid to institutional reform in the process.

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