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Is There Moral Hazard in the Heavily Indebted Poor Countries (HIPC) Initiative Debt Relief Process?

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Abstract

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 work 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. In 2006 the country's President, a large foreign aid recipient, reportedly spent $1 million of poverty alleviation funds to sponsor popular music artists Jay-Z and Beyonce to perform at a music festival.[1] 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*. 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

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[1] In 2006, Nigeria received more than $13 billion U.S. in net official development assistance

successfully complete the HIPC Initiative's program. Second, we attempt to infer whether the HIPC Initiative suffers from moral hazard problem.

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. Alternatively, the Democratic Republic of Congo did not complete the HIPC Initiative for 84 months.

We also investigate potential moral hazard problems associated with the HIPC Initiative. In this context, the multilateral donors (organized under the auspices of the World Bank and IMF) are the principals while the HIPC Initiative participants are 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. The principals desire that interim (i.e., during participation in the HIPC Initiative) debt relief be used to promote such 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.

We investigate the moral hazard issue in the debt relief process by examining whether a country stays in the interim period due to structural reasons or just to receive more immediate interim relief. Each year, as a country remains in the interim period, it receives interim aid with the expectation that it will speed up the process of completing the final requirements to reach the completion point. 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

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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 factors impacting the interim period in the HIPC debt relief process and to assess the presence of moral hazard. The duration, measured in months, starts at the time a country reaches the decision point and ends when it reaches the completion point. By employing a rich set of explanatory variables, we find that lower corruption, better rule of law, and higher per capita official development aid (ODA) shortens the interim period. In answering whether there is a moral hazard in the HIPC debt relief process, we use control of corruption, amount of interim aid, and macroeconomic progress to identify situations under which moral hazard is likely to occur. We use macroeconomic indicators such as GDP per capita growth, inflation rate, trade openness, and net ODA per capita as control variables because they can impact a country's success in the HIPC Initiative. In our paper, 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 poor control of corruption are more likely to commit moral hazard. We infer the presence of moral hazard if higher amount of interim aid in corrupt countries is associated with longer interim period. Therefore, we use the interaction between interim debt relief and the institutional quality variable 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. There is mixed evidence on the initiative. 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). Debt overhang occurs when the expected present value of future resource transfers is less then debt (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.
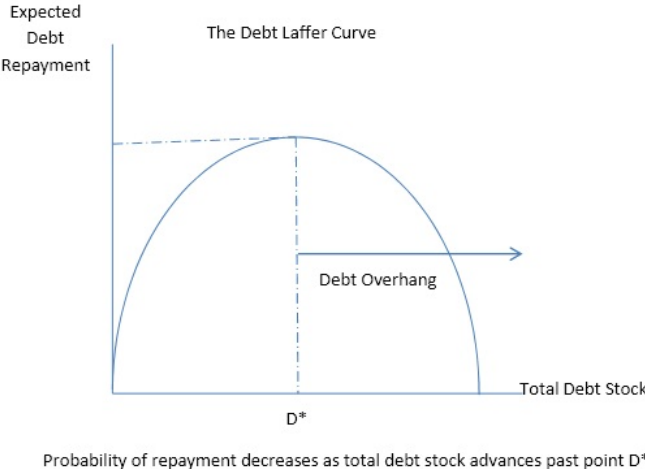
Figure 1: Illustration of the Debt Laffer Curve.

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. The Enhanced HIPC Initiative sets the debt to export ratio at 150%, which is well beyond this threshold of 85%.

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%. Based on this requirement, we include the debt to export criteria greater than 1.5 as one of the indicator variables in this study.

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) look at 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, however, which contributes to a longer interim period. Werlin (2005) argues that it is not possible to help poor countries if they do not have good gov-

ernments. 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, the Rule of Law index, and the legal origin of each country in our specifications.

3.   A Brief Introduction of 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. By the end of 2011, 32 countries reached the completion point and four countries achieved the decision point. I provide a complete list of countries and their date of admittance to the HIPC program in Table 2.

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 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.

4. Data and Variables

4.1 Dependent Variable

The World Bank and the IMF provide yearly "Status of Implementation" reports on the HIPC Initiative and the MDRI that lists 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. Due to missing data, our analysis only includes 33 countries. The omitted countries are Afghanistan, Benin, and Sao Tome Principe. 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. 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 initiative in November of 2001 and completed 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.

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 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. We multiply the original numbers from Kaufmann et al. (2011) with -1 to ease the interpretation of the results. For example, 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 coefficents 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 determines the aid flowing to each country, in millions of US dollars. HIPC Initiative participants are provided with interim aid with the goal of helping 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 inten-

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tionally longer in the interim period to maximize their interim aid.[2] *Corruption, Rule of Law* and *HIPC Aid* can 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 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 (ODA), which exceeds interim HIPC debt relief by far each year. The mean net ODA these countries receive is $74.137 millions per year. To separate the effects of ODA from HIPC interim debt relief, we include the ODA per capita (*ODA*) as a control variable.

The HIPC Initiative requires improvements in macroeconomic performance and struc-

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[2]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.

tural 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 macroeconomy 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). We also control for income levels. In particular, we include the 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 from Heston et al. (2012), and it is calculated by totaling exports and imports then dividing this total amount by the real GDP per capita, in constant prices.

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 get additional debt relief from the African Development Bank, so a categorical variable for Africa makes sense. *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 the descriptions and data sources for all the variables in Table 1.

5.   Econometric Model

We employ the semi-parametric Cox proportional hazard model, a type of duration analysis. Duration models are useful for measuring the probability of an event happening. For our analysis, reaching the completion point is the event. Our dependent variable is the time in months (*Timemo*) that it takes for a country to go from the decision point to the completion point. Hazard models have two advantages: dealing with censored data and producing hazard rates. We have right censored data with 4 out of the 36 countries not having an end spell. The hazard rate gives us an understanding of which determinants cause longer interim durations. Economics papers that have used duration models include Douglas (1998), Bruce et al. (2004), Ragusa (2010), and Fogarty et al. (2013).

In our paper, the survival time function, *S(t)*, estimates effects of various variables on the probability of a country exiting the interim period in a point in time, given that it has not exited yet. Here, t is the current time, and T is the ending time, which is the year at which a country enters the completion point. X is a vector of explanatory variables that include all control variables. Some explanatory variables are time dependent, which means they change with time. Therefore, they are time-varying.

We make full use of all countries by splitting them into one observation for each year. To adapt time-varying covariates, we split countries up. For example, Burundi entered the decision point August of 2005. At the end of the year 2005, Burundi's interim period is 5 months (August, September, October, November, December), it receives a 0 in the dummy variable *Complete* for not having completed the program. It had certain macroeconomic conditions, and it received some amount of interim aid and net ODA that year. Next year, Burundi receives a 17 for the interim period (5 from the year 2005 and another 12 months for the year 2006), and it had a different set of numbers for macroeconomic variables and aid amounts. By the time that Burundi completed the process in 2009, it receives a 1 for *complete*, and that signifies that it exited the program. For the year 2009, Burundi get a new set of macroeconomic and aid measures. Thus even though Burundi is only one country it corresponds to five different observations (2005, 2006, 2007, 2008, and 2009) in the data set.[3]

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.

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[3]Variable *Complete* is used in the survival time model. However, there is no coefficient associated with it due to the model setup.

Figure 2 shows the plot of the Schoenfeld residuals versus log(time). When the *Beta(t)* curve does not deviate far from the zero line, we have proportional hazard.

Figure 2: Proportional Hazard Test
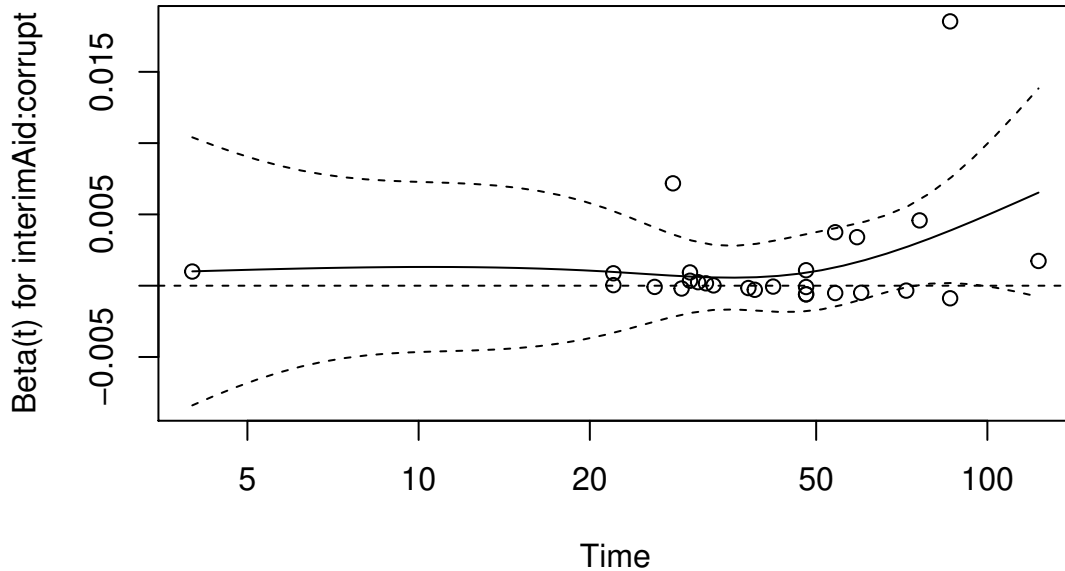
The Cox model is characterized by a hazard and a survival function.

Hazard function: $h(t) = h_o(t)^{exp(X\beta)}$

Survival function: $S(t) = S_o(t)^{exp(X\beta)}$

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≤ T≤t+Δ—t≥T)*. The failure function is *F(t)=P(T≤t)*. The probability of surviving is its complement, 1 minus the failure rate *S(t) = P(T > t)=1-F(t)*.

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.

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 *HIPC Aid Squared*, *Corruption*, *Initial GDP*, *Debt Service*, *Openness*, and *Africa* in Table 5, and *HIPC Aid Squared*, *Rule of Law*, *Initial GDP*, *Debt Service*, *Openness*, *Africa*, and *Latitude* in Table 6.

The coefficient of *HIPC Aid* is only statistically significant (at the 10% level) in one of the four regressions. 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. Similar to *HIPC Aid*, HIPC Aid Squared is also marginally significant with a negative coefficient, implying that the adverse effect of interim aid worsens at higher amounts. *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, which lengthens the interim duration. When a model include interaction variables, we need to interpret them according to their marginal effects. When we have $y = \beta_o + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_1 x_2 + \varepsilon$, the marginal effect of x_1 is $\beta_1 + \beta_2 x_2$.[4] We show their marginal effects for *Corruption* and for *HIPC Aid* in Figure 3 and Figure 4, respectively. In

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

these figure, the solid lines represent the marginal effect while the dashed lines shows their 95% confidence intervals.

Figure 3: Marginal Effects of Corruption on Interim Duration at different levels of Interim Aid
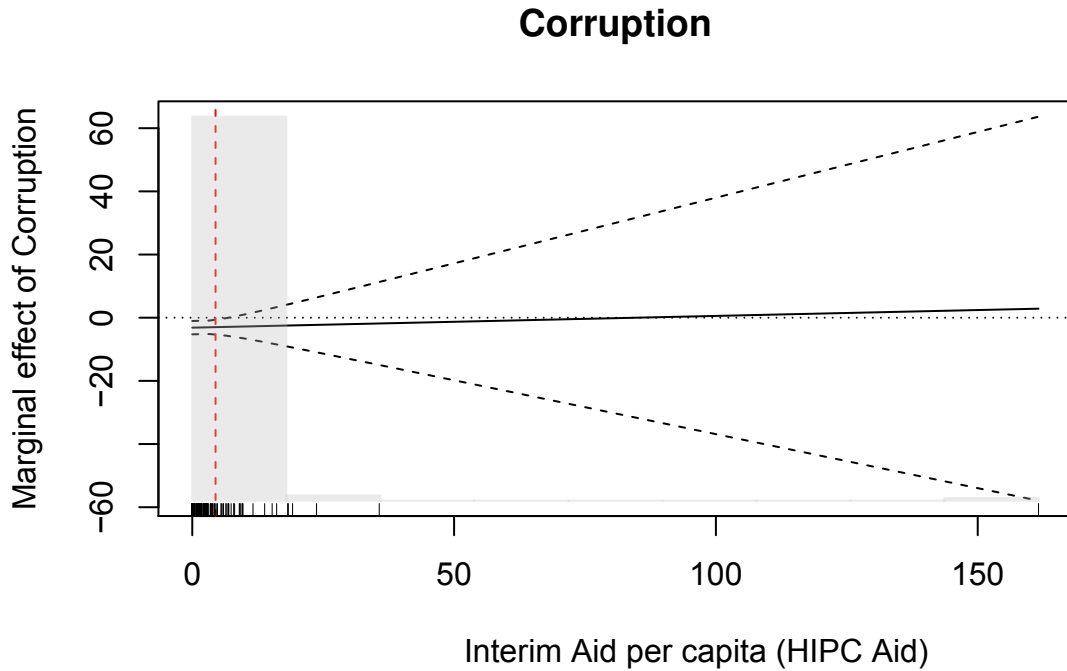
Corruption

*HIPC Aid * Corruption* has a statistically insignificant negative coefficient. Figure 5 illustrates the survival functions of two group of countries, one with higher interim aid and higher corruption vs. one with low 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 finish 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.

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*

Figure 4: Marginal Effects of Interim Aid per capita on Interim Duration at different levels of Corruption

Interim Aid per capita

Corruption Level

Marginal effect of Interim Aid per capita
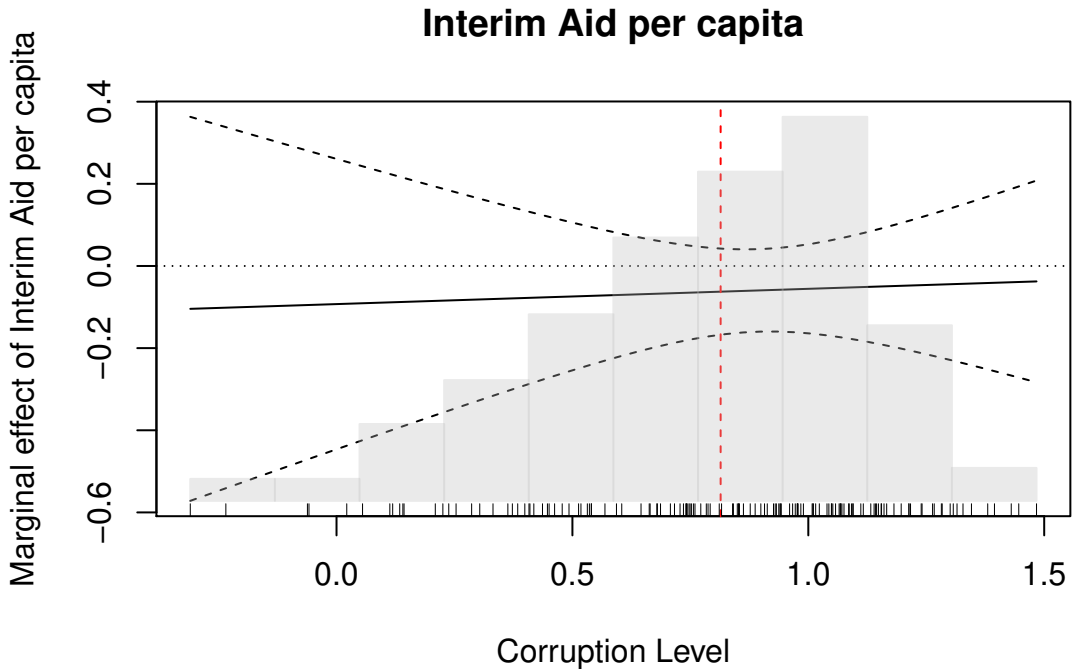
Figure 5: Kaplan-Meier Survival Function, Interaction Term of Aid and Corruption

.
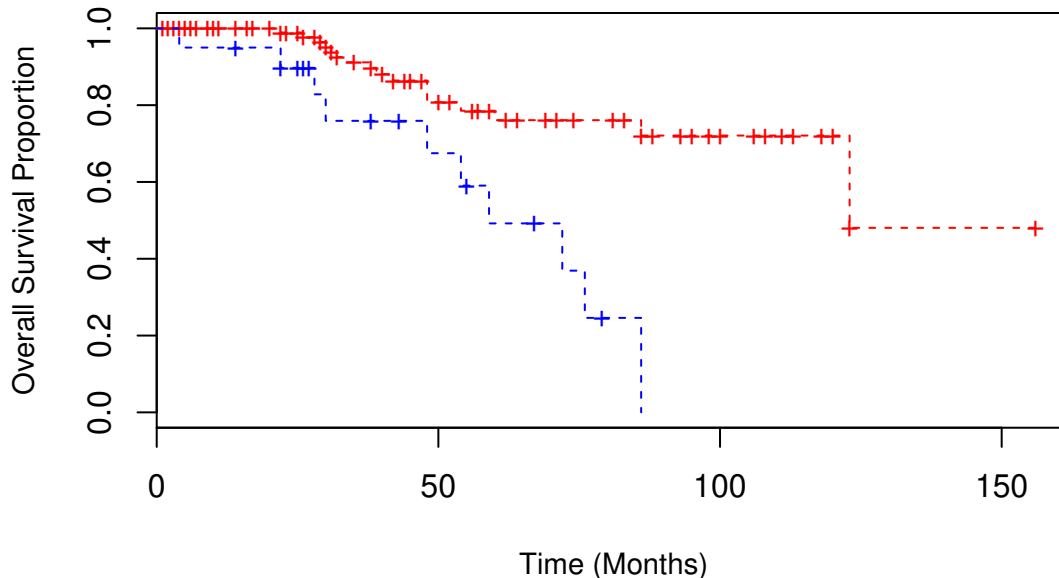
Service are associated with longer interim periods, which is in line with our expectations. Surprisingly, *Openness* is associated with longer interim period. Countries with higher engagement in international trade perform worse in term of reaching the completion point. Another surprising result is the 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 had three main objectives: (1) finding cross-country characteristics that determine HIPC interim duration, (2) connecting the institutional quality of each country with the ability to exit the HIPC program, and (3) investigating if there exists any moral hazard in the HIPC Initiative debt relief process. After testing each objective and receiving consistent result using two different policy variables, we have the three main findings.

First, higher corruption, lower rule of law, higher debt service to GNI ratio, being more open to trade, and being located in Africa consistently lead to longer interim period . Second, the ability for each country to exit the decision point is tied to institutional quality. Corruption and having a low rule of law both result in longer interim periods. Third, we do not find evidence of moral hazard due to the fact that the interaction terms between aid and institutional quality are statistically insignificant.

Our paper presents an analysis into the issue of the effectiveness of the HIPC aid and the incentives for moral hazard in the HIPC debt relief literature. The contribution of this paper is that the interim aid provided by the IMF and the World Bank does not accomplish the goal of shortening the interim period. Since higher corruption and a low rule of law are associated with a longer interim period, more attention needs to be paid to institutional reform in the process.

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Table 1: Variable Description 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)
HIPC Aid x Corruption	HIPC Interim Aid x Corruption	
Rule of Law	"The confidence that agents have confidence in and abide by the rules of society" x -1	Kaufmann et al. (2011)
HIPC Aid x Rule of Law	HIPC Interim Aid x ROL	
Additional Control Variables		
Original	Dummy variable: 1 if the country started in the original HIPC framework	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	Value of 1 if 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	Official development aid per capita	Kaufmann et al. (2011)
Openness	Exports plus imports, divided by GDP per capita (in constant prices)	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 a country	La Porta et al. (1999)
Africa	Value of 1 if country is located in Africa, 0 otherwise	Authors' calculations

Table 2: HIPC Decision and Completion Point Dates

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

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

<table>
<thead>
<tr><th>Country Name</th><th>Total Relief (millions)</th><th>Included</th></tr>
</thead>
<tbody>
<tr><td colspan="3" align="center">Table 3: Countries in the Data Set</td></tr>
</tbody>
</table>

Country Name	**Total Relief (millions)**	**Included**
Afghanistan	$ 1,319	No
Benin	$ 1,604	No
Bolivia	$ 4,889	Yes
Burkina Faso	$ 2,160	Yes
Burundi	$ 1,474	Yes
Cameroon	$ 6,209	Yes
Central African Republic	$ 1,110	Yes
Congo, Democratic Republic of	$ 16,273	Yes
Congo, Republic of	$ 1,934	Yes
Ethiopia	$ 6,584	Yes
Gambia, The	$ 498	Yes
Ghana	$ 7,405	Yes
Guinea Bissau	$ 790	Yes
Guyana	$ 2,063	Yes
Haiti	$ 1,175	Yes
Honduras	$ 3,723	Yes
Liberia	$ 4,861	Yes
Madagascar	$ 4,315	Yes
Malawi	$ 3,224	Yes
Mali	$ 2,904	Yes
Mauritania	$ 1,990	Yes
Mozambique	$ 6,347	Yes
Nicaragua	$ 6,413	Yes
Niger	$ 2,264	Yes
Rwanda	$ 1,835	Yes
Sao Tome Principe	$ 334	No
Senegal	$ 3,339	Yes
Sierra Leone	$ 1,664	Yes
Tanzania	$ 6,842	Yes
Togo	$ 360	Yes
Uganda	$ 5,474	Yes
Zambia	$ 6,670	Yes
Chad		Yes
Comoros		Yes
Cote d'Ivoire		Yes
Guinea		Yes

Table 4: Descriptive Statistics

Statistic	N	Mean	St. Dev.	Min	Median	Max
HIPC Aid	147	4.437	13.967	0.000	1.801	161.612
Corruption	147	0.814	0.374	−0.310	0.887	1.484
Rule of Law	147	0.923	0.469	−0.163	1.038	1.629
Original	147	0.224	0.419	0	0	1
Inflation	147	9.722	12.416	−20.627	6.208	95.853
ODA	147	74.137	56.777	5.899	58.955	355.337
Polity	147	2.027	4.578	−6	5	9
Openness	147	66.431	29.058	26.335	61.293	182.129
Latitude	147	0.503	0.502	0	1	1
Debt Service	147	4.161	11.161	0.552	2.356	135.247
Conflict	147	0.088	0.285	0	0	1
Africa	147	0.884	0.321	0	1	1
Initial GDP	147	1,270.801	798.763	255.748	1,028.174	3,566.994
Growth	147	1.515	4.521	−15.306	1.169	29.104

Table 5: Cox Proportional Hazard: Corruption

	Months in the Interim Period			
	time			
	(1)	(2)	(3)	(4)
HIPC Aid	−0.018	−0.093		
	(0.020)	(0.180)		
HIPC Aid Squared			0.00000	−0.00002*
			(0.00000)	(0.00001)
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	2.657***	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
Observations	147	147	147	147
R^2	0.368	0.243	0.366	0.412
Max. Possible R^2	0.766	0.766	0.766	0.766
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***

Note: *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: Rule of Law

| | Months in the Interim Period | | | |
| | time | | | |
	(1)	(2)	(3)	(4)
HIPC Aid	−0.033*	0.012		
	(0.020)	(0.146)		
HIPC Aid Squared			0.00000	−0.00003*
			(0.00001)	(0.00002)
Rule of Law	−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)		
PHazard global test	p > 0.10	p > 0.10	p > 0.10	p > 0.10
Observations	147	147	147	147
R^2	0.411	0.414	0.400	0.415
Max. Possible R^2	0.766	0.766	0.766	0.766
Log Likelihood	−67.985	−67.607	−69.322	−67.564
Wald Test	48.190***	47.300***	47.400***	44.110***
LR Test	77.846***	78.603***	75.174***	78.689***
Score (Logrank) Test	92.808***	94.335***	89.759***	93.186***

Note: *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.