

# Pre-Analysis Plan: Arrested Development: The Inefficiencies of Electoral Cycles in Infrastructure Projects

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## Abstract

This study will examine how election processes in developing countries affect the provision of public goods. We will analyze a data set of local development projects in Ghana to investigate whether election cycles in infrastructure spending cause fiscal waste. Specifically, this study will test whether a greater number of projects are initiated in the months leading up to an election, whether projects begun in this pre-election period have a lower completion rate, and whether existing projects are completed at a higher rate as elections approach. Our data set will be both more detailed and at higher frequency than previous work in the literature, enabling us to better detect election cycle dynamics.

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# 1 Introduction

Many developing countries suffer from chronic infrastructure deficiencies in crucial sectors such as sanitation, water, roads, and electricity – not to mention financial infrastructure or ICT services. For example, over 40% of people in Sub-Saharan Africa do not have access to basic water services and nearly three quarters do not have access to improved sanitation facilities (World Health Organization and the United Nations Children’s Fund 2017). Low tax mobilization leaves limited funds for governments to spend on public goods, and is therefore often cited as a key policy concern. However, there are many instances where the precious little public funds available for investment are wasted on projects that are never carried to completion. Why are so many projects left unfinished?

In one of the first micro-level quantitative investigations of this type of fiscal waste, Williams (2017) examines official records from over ten thousand local development projects in Ghana. He estimates that roughly one-third of projects are never completed, letting nearly one-fifth of all local government investment funds go to waste. For resource-scarce developing-country governments, this fiscal waste and misallocation may weaken long-term development outcomes. According to Williams, this stems from imperfect commitment between political actors over time: a politician may ask his colleague to vote for his project this year and promise to vote for hers the next, but has little incentive to follow-through on his promise when the time comes because he has already gotten what he wanted.

An alternative explanation for the observed patterns of abandoned development projects is electorally-motivated investments. A substantial literature in political economy studies political business cycles, where electoral pressure leads politicians to manipulate public policy in order to increase their chances of re-election (Nordhaus 1975, e.g.). But these studies have mostly identified electoral cycles in macro-level policies and their effects, with relatively few studies of how local-level policy implementation can be affected by elections. In South Korea, Kwon (2005) finds that pre-election spending is targeted towards swing provinces.

In a developing-country context, Drazen and Eslava (2010) find that local governments in Colombia increase their proportion of voter-targeted spending relative to other types of expenditures prior to elections. Their research design is somewhat atypical of the political business cycle literature, which to date has primarily focused on central government behavior, presumably due to the lack of sub-national data in many countries. Many studies in this literature also use yearly or quarterly data, which may obscure the dynamics within an election year. Our data set will be both more detailed and at higher frequency than previous work, enabling us to better detect election cycle dynamics.

Despite this broad existing literature on politically-motivated government spending, little research has sought to explain spending that is not intended to directly benefit voters. One exception is Robinson and Torvik (2005), who study development projects that have negative social net benefits. The authors argue that wasteful projects can increase support among core voters when targeted towards geographic strongholds because the opposition cannot credibly commit to continuing them. However, the “white elephants” they examine were generally completed projects that were poorly planned from an economic perspective. By contrast, many incomplete development projects in our data set may have been destined to remain incomplete from the outset.

We argue that these development projects are not intended solely to benefit voters, but also to send a costly signal which demonstrates incumbent competence. Competence here can be interpreted as the ability to secure resources for a constituency. In contrast with campaign promises, which may simply be cheap talk, incumbents may choose to initiate spending on a project to show that they are not just making empty promises. A deserted project may also leave voters who favor its completion with a difficult choice: support the incumbent and potentially see the project completed or vote for the challenger and see it left unfinished with near certainty. This would hold if newly-elected challengers expect that voters will assign credit for completed projects to the administration which started it no

matter who finishes it.<sup>1</sup>

Nevertheless, the fact that starting projects sends a costly signal about incumbent competence does not fully explain why such a large share of projects are left unfinished. Surely a completed project would be a more effective campaign tactic than an uncompleted one. However, this does not take into account the budget constraint faced by local governments. Incumbent governments may face constraints in the amounts that they can pay contractors in a given year, forcing them to choose between completing a small number of projects or starting more projects than they can realistically complete. Starting more projects allows them to signal an ability to deliver resources to more communities than if they focused on completing a smaller number of projects.

The closest study to our proposed project is Labonne (2016), who uses data from municipalities in the Philippines to demonstrate that election cycles distort the labor market around elections. However, the study cannot explain the mechanisms behind how local politicians manipulate employment rates in practice, rendering the mechanisms and policy implications somewhat unclear. Further, the study cannot quantify the losses or waste implied by election cycles. We believe that we will be able to obtain an estimate of the financial inefficiencies attributable to election cycles since our data is more granular over time and we have detailed data at the project level.

## 2 Data

Our development project data spans the years of 2011 to 2013, and come from Williams (2017), who extracted and coded it based on annual progress reports put together yearly by Ghanaian district authorities. Along with budgetary and other administrative information, these reports list all individual development projects being undertaken by the district. For most projects, the reports also include type/sector, location, start date, funding source,

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<sup>1</sup>This is a similar mechanism to that outlined in Robinson and Torvik (2005), and one that enjoys anecdotal support in Ghana.

contractor, completion status/date (if applicable), and cost. An example of project data from one district’s annual progress report is provided in Figure 5 in the Appendix.

Williams’ (2017) data contains 479 reports out of a potential maximum of 602,<sup>2</sup> yielding 14,246 project-year observations. Using this data, he estimates that about one-third of local development projects that are started in Ghana do not get completed. Our data cleaning process will link projects across years to ensure that each project only appears once in the data set. Williams also restricts the sample to projects funded from the three main project sources, since his main hypothesis centers on the impact of funding source restrictions. We will include projects from all the possible funding sources, which will add thousands of projects back into the sample.

## 2.1 Data access and pre-analysis plan

We have access to the replication data from Williams (2017), but that data set does not include the detailed project start or completion dates that we need for our study. Some projects in the Williams data have information on start and completion *year*, but none of the observations record the month of start or completion. Electoral cycle processes may be obscured in data at the annual level (see for example Labonne 2016).

Crucially for the credibility of this pre-analysis plan, a third party research assistant (Lauren Sorensen) has carried out all the coding of project dates for the projects in the Williams (2017) data set. Following a careful protocol, she has manually appended months for all projects for which she could identify dates in the underlying reports. She has been the only one with access to this project date data. She will not share the data with us until she verifies that we have submitted this pre-analysis plan to the EGAP registry.<sup>3</sup> We will further corroborate this fact with time stamps of all access to the drive where she is storing the data, verifying that we have not accessed the drive prior to the pre-registration.

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<sup>2</sup>Based on one report per district for each of three years. Some districts were created in 2012, however, so they only have two years of data available.

<sup>3</sup>She has signed a statement to this effect, which we include in the upload to the EGAP registry.

## 2.2 Outcome variables

We have three main outcome variables, each of which allows us to test distinct hypotheses related to electoral cycles in public investment: First, for some hypotheses, we will use a continuous variable that equals the number of projects started in a given district-month. This will allow us to test whether more projects are started in the pre-election period. Second, we will examine a project-level indicator variable that equals one if the project was completed within one year of its commencement date. We will use this variable to test whether projects initiated in the pre-election period are less likely to be completed.<sup>4</sup> Third, we will construct a variable that equals the number of projects completed in a given district-month observation. This will allow us to examine whether districts signal their “type” by completing already started projects in the pre-election period. We describe their use in more detail in section 3.

## 2.3 Independent Variables

### Pre-election period start date

The project data available in the district annual reports includes several important variables. For most projects, the reports record the award date (i.e. when the decision to fund the project is approved), the start date (i.e., when work on the project actually starts), and project completion date. Project start month is one of our key variables. If the project start date is missing, we will use the award month or the award month plus the average gap between award and completion. We will report results from both in the final paper if results differ.

Based on project start dates, we will be able to create indicator variables for whether or not a project was initiated in the pre-election period. There is no obvious theoretical rationale for *ex ante* guessing the length of the pre-election period. We will therefore estimate models

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<sup>4</sup>We use a one year cutoff because we do not observe whether the more recent projects in our sample are eventually completed. Williams (2017) finds that the majority of projects that are ever finished get completed within one year, so this cutoff should accurately capture the eventual completion status of the majority of projects.

and report results using different definitions of the pre-election period. In the regression equations described below, we preliminarily define it as the six months before an election. We will also construct a continuous variable that equals the number of months until the election. We primarily plan to use this to graphically display project completion rates over time, which may better demonstrate the electoral cycle dynamics we are anticipating.

### **Swing districts**

We will additionally examine whether any electoral budget cycle effects are larger in swing districts. Since swing districts are potentially winnable by both parties and are relatively easily identifiable, parties may try to focus their signaling in districts that they believe are more competitive. We will use election data to create a variable that captures the electoral competitiveness of a given district. Specifically, we will use an indicator variable that equals 1 if the district is a swing district in a given year. We define a swing district as one in which either of Ghana’s two major parties could conceivably win a plurality of votes in the presidential election. These districts are ones in which the vote margin between the two major parties was close in the previous election.<sup>5</sup> There is not an agreed-upon vote margin in the literature below which a district or constituency becomes “swing.” Therefore, we will test (and report) multiple cutoffs of 1%, 5%, and 10%.<sup>6</sup>

Although there is no formal reward for winning districts since Ghana has a single, national constituency presidential election, close elections at the presidential proxy for closely-fought district assembly elections.<sup>7</sup> Further, parliamentary constituencies are either contiguous with, or nested within, districts and MP seats are valuable.

### **Project funding source**

We will also examine whether any electoral budget cycle effects are limited by various restric-

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<sup>5</sup>Following the literature on elections in the US, the vote margin is the percentage of the two party vote that separates the candidates from the two major parties.

<sup>6</sup>While we believe that 10% may be too large to be considered a swing district, then-presidential candidate Nana Akufo-Addo used the 10% margin as a criteria for targeting constituencies in the 2016 election (Opong 2015).

<sup>7</sup>Data on district assembly elections is not well preserved.

tions on funding sources. The annual reports indicate the source of funding for each project. We anticipate that the primary sources of funding will be central government transfers (the District Assemblies Common Fund) and the (mostly) donor-funded District Development Facility (DDF). Williams (2018) exploits a rule imposed by the DDF, which required districts to budget for project completion of existing projects before they could start new projects. We will also examine differences between funding sources, since the DDF rule may have reduced the amount of projects that get initiated and never finished. We will therefore construct an indicator variable that equals 1 when the project was funded by the DDF and 0 otherwise.

### 3 Hypotheses and estimating equations

Below, we present several hypotheses related to the electoral effects on project inception and completion. Because voters have been shown to have relatively short attention spans (see for example Cole, Healy, and Werker 2012), we expect politicians to concentrate their vote-seeking activities in the pre-election period. We hypothesize that incumbents in this setting can use development projects in two main ways to try to win votes as elections approach. Both of these approaches could plausibly signal to voters that the incumbent government is competent or otherwise worthy of re-election. First, they can start new projects, which may be a more visible action than simply continuing work on existing projects. Groundbreaking ceremonies<sup>8</sup> are often held and publicized when a district commences work on a new project, whereas such ceremonies are unlikely to be held when simply re-starting a stalled project. Second, they could also devote resources to pushing existing projects (i.e., those that had been started before the pre-election period) towards completion.

We present several hypotheses related to how incumbents may use new projects to win votes. We will test these in a difference-in-difference framework to test whether project inception increases in the pre-election period.

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<sup>8</sup>Known as “sod-cutting ceremonies” in Ghana.

**Hypothesis 1a:** The number of development projects started in a given district is higher in the pre-election period.<sup>9</sup> This follows directly from the political business cycles literature, which has demonstrated an increase in public investment before elections in various contexts. To test this hypothesis, we will estimate the following equation:

$$y_{jt} = \beta_1 E_t + \gamma_1 R_t + \delta_1 E_t \cdot R_t + \alpha_{1j} + \epsilon_{1jt} \quad (1)$$

where  $j$  indexes districts and  $t$  indexes months.  $y_{jt}$  denotes the number of projects started in a given district-month. We consider a district-month to be “treated” when it is in the pre-election period in an election year. We use a difference-in-differences framework to control for the fact that there may exist within-annual variation in project inception. The D-D estimation allows us to compare treatment months in election years to their non-election year counterparts in the same district.  $E_t = 1$  denotes the treatment months, i.e. those in the period Jun. 7–Dec. 7 (since Ghana’s 2012 election was held on Dec. 7). Treatment occurs in the election year (so the election year is the “post” period in standard D-D terminology), and is denoted by  $R_t$  equalling one for all months in the election year. The coefficient  $\delta_1$  on the interaction term therefore captures the effect of a month being a treatment month in the “post” (election) year.  $\alpha_j$  denotes district fixed effects, and  $\epsilon_{jt}$  is the error term. We will cluster our standard errors at the district level. The main hypothesis here is that  $\delta_1 > 0$ , i.e. that more projects will be started in the pre-election period of election years.

**Hypothesis 1b:** As alluded to in Section 2, we also expect the electoral cycle effects described above to depend on the electoral characteristics of the districts themselves. We hypothesize that the pre-electoral effects on project inception will be stronger in swing districts. Swing districts are those where the vote margin in previous presidential elections was narrow, proxying for close district assembly and parliamentary elections.<sup>10</sup> Close dis-

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<sup>9</sup>As noted above, the length of the pre-election period is not clear *ex ante*, but six months appears to be long enough to cover the majority of the election campaign without losing too much detail. However, we will also estimate models with other thresholds as robustness checks.

<sup>10</sup>Because independent parliamentary candidates are often partisan primary losers, parliamentary results

tricts should attract more spending from the incumbent party (which controls government policy). Although the most important race in Ghana is the presidential election, which is a single-district national election, individual seats in parliament are still valuable to help in passing legislation. Another benefit of parliamentary seats is that members of parliament control constituency development funds with which they can fund infrastructure projects in their constituencies (and presumably use to increase or maintain support for them and their party).

To test this hypothesis, we will estimate the following triple diff-in-diff equation:

$$y_{jt} = \beta_2 E_t + \gamma_2 R_t + \nu_2 S_j + \delta_2 E_t \cdot R_t + \theta_2 E_t \cdot S_j + \omega_2 R_t \cdot S_j + \sigma_2 E_t \cdot R_t \cdot S_j + \epsilon_{2jt} \quad (2)$$

where  $E_t$  and  $R_t$  are defined as above, and  $S_j$  is an indicator variable that takes the value one for swing districts. Here, we cannot include district fixed effects since it would be perfectly collinear with the swing district variable. We will cluster our standard errors at the district level.

***Hypothesis 2a:*** We also believe that our hypothesized increase in project commencement during the pre-election period will lead to a decrease in the completion rate of the projects that were initiated due to pure signaling. This may indicate that incumbents had an incentive to start more projects than they have funds to complete in order to win more votes. We test this by examining whether the probability of completion is lower for development projects that were started in the pre-election period. Our main hypothesis here is that  $\sigma_2 > 0$ , i.e. that the election cycle effects will be accentuated in swing districts.

To test this hypothesis, we will estimate a project-level equation of the form:

$$C_{ij} = \zeta_3 P_{ij} + \eta_3 L_{ij} + \kappa_3 P_{ij} \cdot L_{ij} + \alpha_{3j} + \epsilon_{3ij} \quad (3)$$

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are less ideal in measuring close districts.

where  $C$  is an indicator variable that takes the value one if project  $i$  in district  $j$  was completed within one year of inception and zero otherwise.  $P = 1$  for projects started June 7–December 7 of any year.  $L = 1$  denotes that a project was started in an election year. The interaction term  $\kappa_3$  captures the effect of a project being started June 7–December 7 of an election year. We will cluster our standard errors at the district level. Our main hypothesis is that  $\kappa_3 < 0$ , i.e. that projects that were started in the pre-election period of an election year will be less likely to get completed.

**Hypothesis 2b:** Similarly to hypothesis 1b, we believe that the effect described in Hypothesis 2a will be greater in swing districts.

We will test this hypothesis with an equation of the form:

$$C_{ij} = \zeta_4 P_{ij} + \eta_4 L_{ij} + v_4 S_j + \psi_4 P_i \cdot S_j + \tau_4 L_i \cdot S_j + \kappa_4 P_{ij} \cdot L_{ij} + \phi_4 P_i \cdot L_i \cdot S_j + \epsilon_{4ij} \quad (4)$$

**Hypothesis 3:** We also anticipate that the funding source of a project will affect its probability of being completed, thereby possibly reducing the project non-completion described in hypotheses 2a and 2b. Williams (2017) finds that projects funded through the (mainly) donor-funded District Development Facility (DDF) are completed at a higher rate than those funded by the central government. This is apparently due to a DDF rule that restricts the funding of new projects until existing ones are budgeted to completion. We also expect that project funding source will condition the effect of an approaching election on project completion rates. If incumbent governments are concerned about being disqualified for the next round of DDF funds, they are less likely to start more projects than they can finish in the pre-election period.

We will test this hypothesis with an equation of the form:

$$C_{ij} = \zeta_5 P_{ij} + \eta_5 L_{ij} + \iota_5 G_i + \chi_5 P_i \cdot G_i + \rho_5 L_i \cdot G_i + \kappa_5 P_{ij} \cdot L_{ij} + \pi_5 P_i \cdot L_i \cdot G_i + \alpha_{5j} + \epsilon_{5ij} \quad (5)$$

where  $G$  is an indicator variable that equals one if the project was funded by the DDF and zero otherwise.<sup>11</sup> All other variables are as defined above. Our main hypothesis here is  $\pi_5 > 0$ , i.e. that the negative effect of the pre-election period on project completion rates will be weaker for projects funded by the DDF.

**Hypothesis 4:** Incumbent governments may also increase their effort on existing projects as elections approach. This should lead to a higher completion rate during the pre-election period for existing projects. Development projects that were started prior to the pre-election period may get completed at a *higher* rate during the pre-election period in election years.

To test this hypothesis, we will estimate an equation of the form:

$$F_{jt} = \beta_5 E_t + \gamma_5 R_t + \delta_5 E_t \cdot R_t + \alpha_{5j} + \epsilon_{5jt} \quad (6)$$

where  $F_{jt}$  is the number of projects completed in district  $j$  in month  $t$ . If districts increase their effort on existing projects as elections approach, resulting in more completed projects during the pre-election period,  $\delta_5$  should be positive. The district-specific intercept  $\alpha_{5j}$  controls for time-invariant characteristics of districts that could lead to different completion rates. We will restrict the sample for this specification to projects that were started outside of the pre-election period. This allows us to test the specific hypothesis that work increases on existing projects as elections approach, which is distinct from the hypothesis that more projects are started as elections approach.

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<sup>11</sup>While Williams (2017) restricts his sample to projects of the three main funding types (donor funded/locally implemented, central government funded/locally implemented, and centrally funded/centrally implemented), we will keep all projects in the sample.

## 4 Inference

To test the robustness of the results that we obtain from the above estimations, we will conduct randomization inference to obtain exact p-values. Randomization inference has the advantage of not relying on assumptions about distributions or asymptotics, as traditional regression does (Athey and Imbens 2017).

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## 5 Appendix

**SUNYANI MUNICIPAL ASSEMBLY**  
**ANNUAL PROGRESS REPORT DEVELOPMENT PROJECTS AS AT 31<sup>ST</sup>**  
**DECEMBER, 2013**

NO.	PROJECT TITLE	LOCATION	SECTOR	CONTRACTOR/ SUPPLIER	CLIENT	FUNDING	COMMENCEMENT DATE	EXPECTED COMPLETION DATE	INITIAL COST (GHC)	AMOUNT DISBURSED TO-DATE	OUTSTANDING BALANCE	PRESENT STATUS
1	Construction of Additional Offices to Municipal Education Offices	Sunyani	Education	JasusaEnt	SMA	DACF	Jan 2006	Aug. 2006	29,043.03	16,871.20	12,171.80	80% complete
2	Construction of Slaughter House	Kotokrom	Sanitation	Steph holding Ltd	SMA	DACF	Jun. 2006	Sept, 2006	75,000.00	44,964.01	30,035.99	75% complete
3	Renovation of one(1) No six (6) unit classroom block	Atronie Methodist Primary School	Education	McRichard son Comp. Ltd	SMA	DACF	09/10/09	09/04/10	31,807.65 (reviewed to 60,306.75)	44,065.75	16,241.00	85% complete
4	Construction of one(1) No Semi Detached Staff Quarters	Baakoniaba	Administration	Direct Labour	SMA	DACF	Dec., 2010	2011	60,000.00	18,061.00	41,939.00	60% Complete
	Construction of Social Center	Victoria Park	Administration	J. Adom Ltd,	SMA	DACF	18/02/11	18/08/11	199,954.00	Nil	199,954.00	Site cleared
6	Construction of one(1) No Six (6)unit classroom block and ancillary facilities	Darul Hadith Islamic School, Kotokrom	Education	AB-ZIKO LTD	SMA	GETFUND	August ,2011	March,2012	163,091.78	Nil	163,091.78	60% Complete
7	Construction of one(1) No Six (6)unit classroom block	Garrison Prim. School	Education	Marydon Ltd	SMA	GETFUND	August ,2011	March,2012	161,024.92	Nil	161,024.92	75% Complete

Figure 1: Project status taken from the Sunyani Municipal Assembly's 2013 annual progress report