

Management of Bureaucrats and Public Service Delivery:
Evidence from the Nigerian Civil Service

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Motivation

- the effectiveness of government bureaucracy matters:
 - from a macro perspective:
 - large share of total economic activity [25-35% of GDP in LICs]
 - quality of the bureaucracy is an important driver of growth, welfare and equality
 - from a micro perspective:
 - presumption behind many program evaluations is that successful ones can be scaled-up and delivered by government
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Filling the Evidence Gap

- despite the importance of government effectiveness for citizen welfare:
 - **public administration** literature is devoid of good evidence linking practices in civil service organizations to public good outcomes [Goldfinch et al. 2012]
 - **economic** analyses of incentives in the public sector have largely focused on:
 - selection/motivation of **politicians** [Besley 2004, Gagliarducci and Nannicini 2013...]
 - response to incentives of **frontline** staff (teachers/health workers) [Glewwe et al. 2010, Muralidharan and Sundararaman 2011, Duflo et al. 2012, Ashraf et al. 2012...]
 - little evidence linking the managerial practices that the vital middle-tier of **bureaucrats** operate under, to public services delivered
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Challenges for Understanding Public Service Delivery in LDCs

- Banerjee *et al.* [2007] suggest two constraints restricting the supply of evidence on public service provision:
 - the process of project implementation is almost never directly quantifiable
 - differences in public good quality are difficult to measure
 - this paper makes progress on both measurement issues...
 - ...and measurement issues related to:
 - project complexity [hired engineers]
 - management practices [BVR style survey]
 - bureaucrat characteristics [civil servant survey fielded to 4100 individuals]
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Management Matters

- measure management practices bureaucrats operate under following Nick Bloom and John Van Reenen's pioneering approach
 - adapt their management surveys to our setting, account for insights from public administration [Rose-Ackerman 1986, Wilson 1989]
 - for each civil service organization, we derive three indices of management practices:
 - provision of **autonomy/flexibility** to bureaucrats
 - provision of performance-based **incentives/monitoring** to bureaucrats
 - composite index of other practices (staff training, culture etc.)
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Why Autonomy?

- autonomy long emphasized in public administration literature:
 - full delegation: rely on bureaucrats professionalism and resolve to deliver public services [Simon 1983]
 - Weberian view: *misalignment of objectives* of bureaucracies and society implies entirely rules-based system ensures consistent and acceptable levels of public service delivery
 - in organizational economics, despite its early prominence [Simon 1951, Harsanyi 1978], field evidence of the impact of autonomy on performance is scarce
 - resurgent theoretical literature following Aghion-Tirole [1997] on authority/delegation
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Why Performance-based Incentives?

- vast contract theory literature emphasizing key trade-off between **incentives** and **risk** [Prendergast 1999]
 - body of evidence suggesting monetary incentives in private sector settings are effective
 - use of performance incentives are a central part of 'Public Sector Management' agenda
 - evidence from (frontline) public sector is scarce and mixed:
 - positive [Glewwe et al. 2010, Muralidharan and Sundararaman 2011...]
 - zero/negative: Perry et al. [2009], Ashraf et al. 2012, Fryer [2013], two CRs...
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Outline

- institutional background and three data sources
 - baseline results: estimated partial correlations
 - margins over which impacts are homogeneous
 - margins over which impacts are heterogeneous
 - econometric concerns: sample selection; unobservables; endogeneity
 - discussion: methodology/optimalty/related mechanisms to improve public service delivery
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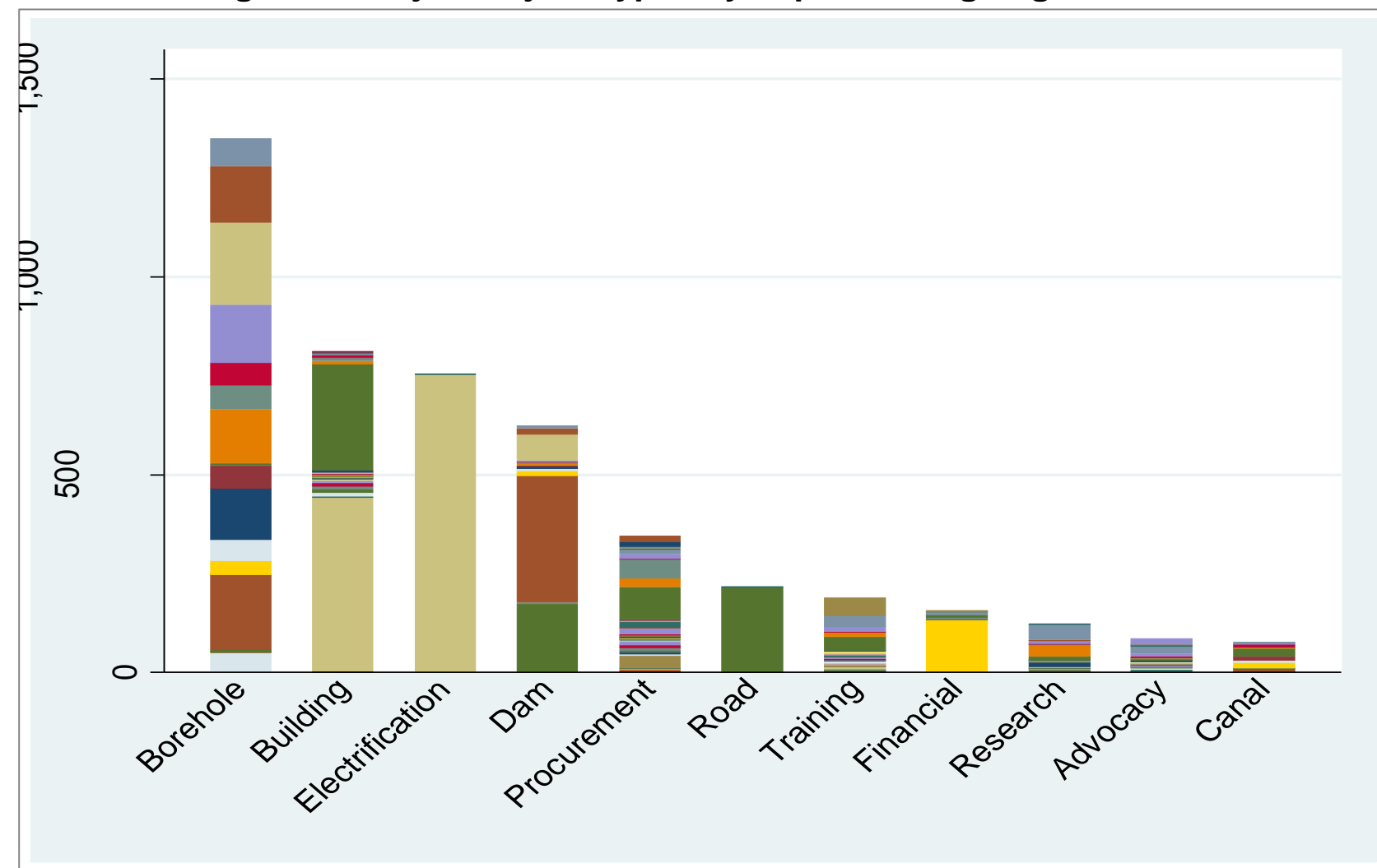
Institutional Background

- Nigeria is home to 160mn individuals, 20% of the population of SSA
 - government expenditures correspond to 26% of GDP
 - British colonial legacy: civil service structures
 - ministries are the central coordinating authority [data: 10 ministries + 53 other federal civil service orgs]
 - Minister → Permanent Secretary → bureaucrats
 - bureaucratic appointments made centrally (Head of the Civil Service)
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Projects

- projects assigned to organizations are also decided centrally (National Assembly)
 - 11 project types (road, borehole, training etc.) [construction vs. non-construction]
 - same project type implemented by **multiple** organizations
 - e.g. small-scale dams are constructed by the federal ministries of water, agriculture, and environment, and by all the river basin development authorities
 - each organization implementing **multiple** project types
 - identify impact of management on public service delivery within project type
 - [Figure A]
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Figure A: Major Project Types by Implementing Organization



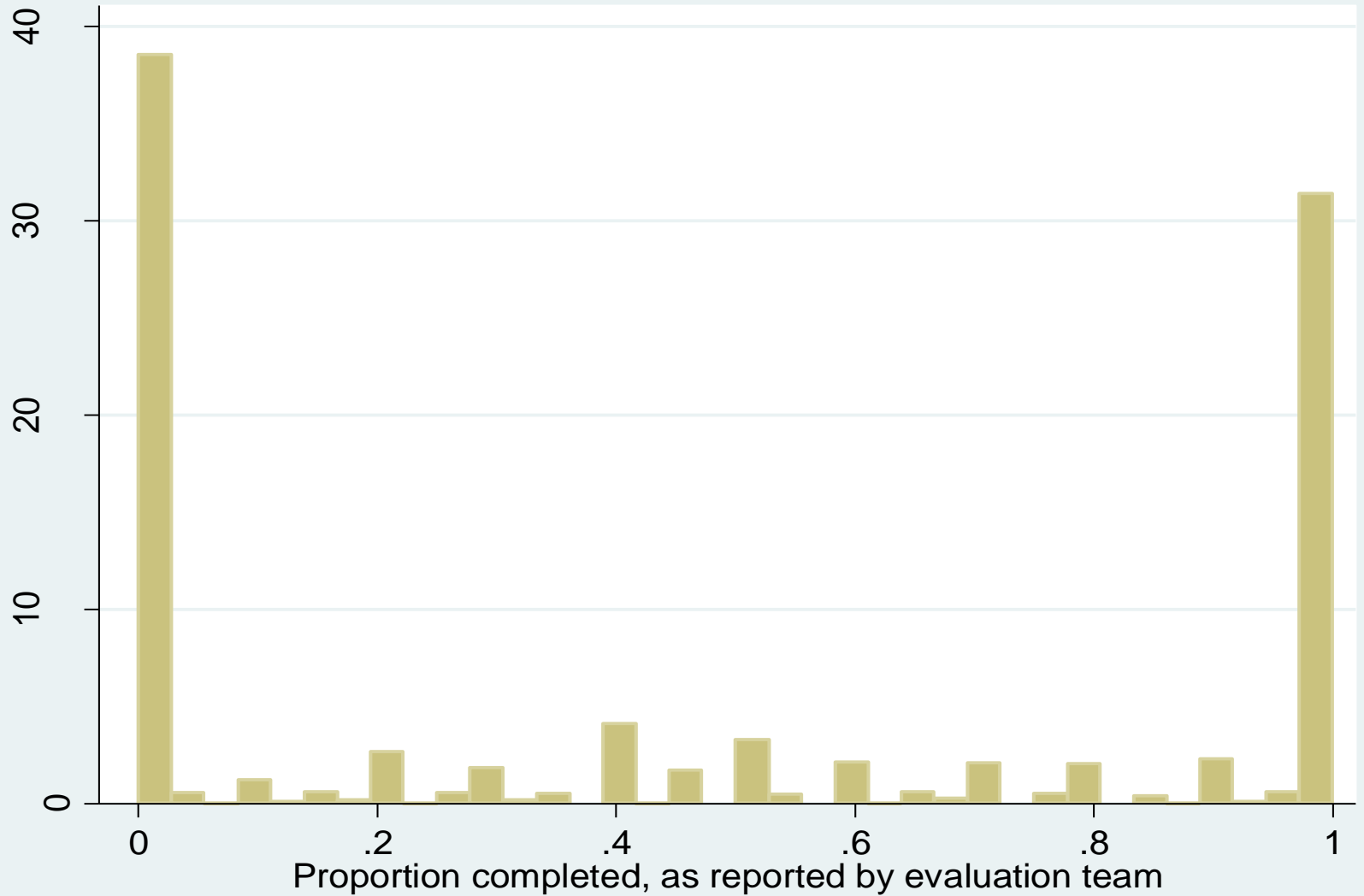
OPEN

- Nigerian government began a program of sweeping reforms in 2003 [Nkonjo-Iweala and Osafo 2007]
 - as a result, Paris Club canceled its external debt to the tune of US\$18bn
 - Presidency saw this as an opportunity to track the effectiveness of government expenditures
 - 2006/7 started the OPEN initiative: to trace, by project, the use and impact of around 10% of all Federal Government social sector expenditures
 - we focus on projects with a 12 month completion schedule
 - projects evaluated by independent teams of engineers:
(i) completion rate [0-1]; (ii) quality {0,1}
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Checks and Balances in OPEN

- centralized team of technocrats monitored the evaluation teams, providing them with training and opportunities for standardization of their methods
 - evaluators were asked to provide material, photographic, or video evidence to support their reports
 - the national teams and Presidency performed random checks on evaluated sites (all of which were found to be consistent with OPEN monitors)
 - hand coded the material from all projects recorded in OPEN initiative reports from 63 organizations:
 - 4721 projects, aggregate budget of US\$800 million
 - [Figure B; Tables 1, 2]
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Figure B: Proportion Projects Completed



Notes: This is a histogram of the proportion of project completed variable. The sample used to construct the histogram is those projects for which proportion completed evaluation variable and management scores are available.

Table 1: Descriptive Evidence on Project Types

Project Type	(1) Number of Projects [Proportion]	(2) Number of Implementing Organizations	(3) Median Budget Allocation (US\$000s)	(4) Proportion Never Started	(6) Proportion Completed Conditional on Being Started
Borehole	1348 [0.29]	18	29	0.44	0.84
Building	806 [0.17]	32	120	0.37	0.79
Electrification	751 [0.16]	2	93	0.14	0.65
Dam	624 [0.13]	14	18	0.79	0.74
Procurement	345 [0.07]	41	87	0.30	0.83
Road	217 [0.05]	4	167	0.12	0.59
Training	189 [0.04]	26	80	0.20	0.74
Financial project	157 [0.03]	8	17	0.38	0.79
Research	122 [0.03]	21	67	0.11	0.72
Advocacy	86 [0.02]	23	49	0.24	0.80
Canal	76 [0.02]	12	347	0.70	0.45

Notes: The “project type” classification refers to the primary classification for each project. Other project classifications exist. The median budget allocation in Column 3 is in thousands of US Dollar (assuming an exchange rate of US\$1: Naira 150). The sample of projects covers those which have a positive budget allocation and for which the proportion completed evaluation variable and management scores are available. The project quality variable in Column 8 is not available for all projects. Standard deviations are in parentheses. Figures are rounded to two decimal places where relevant.

Table 2: Descriptive Evidence on Largest Civil Service Implementing Organizations

Civil Service Organization	(1) Number of Projects	(2) Number of Unique Project Types	(4) Proportion Never Started	(6) Proportion Completed Conditional on Being Started
Federal Ministry of Agriculture and Rural Development	797	9	0.54	0.63
Federal Ministry of Power and Steel	750	1	0.14	0.25
Federal Ministry of Water Resources	520	4	0.95	0.77
National Primary Health Care Development	447	4	0.19	0.79
Sokoto Rima River Basin Development Authority	277	2	0.22	0.85
Upper Benue River Basin Development Authority	169	3	0.11	1.00
Ogun/Oshun River Basin Development Authority	165	4	0.55	0.71
Chad Basin River Basin Development Authority	148	3	0.43	1.00
Lower Benue River Basin Development Authority	143	3	0.45	0.77
Nigerian Agricultural Cooperative and Rural Development Bank	133	2	0.42	0.80

Notes: The sample covers the ten largest civil service organizations ranked by number of projects from our overall sample of projects. The “project type” classification refers to the primary classification for each project. Other project classifications exist. The budget allocation in Column 3 is in millions of US Dollars (assuming an exchange rate of US\$1: Naira 150). The sample of projects covers those which have a positive budget allocation and for which the proportion completed evaluation variable and management scores are available. The project quality variable in Column 8 is not available for all projects. Standard deviations are in parentheses. Figures are rounded to two decimal places where relevant.

Management Practices

- revival of research investigating the impacts (and origins) of management practices on productivity and performance of private sector firms
 - follow BVR's methodology to measure management practices in civil service organizations
 - adapt their survey tool to the Nigerian public sector setting:
 - measured practices are informed by the public sector management literature
 - double blind face-to-face group interviews with senior managers, consensus reported
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Management Practice Topics

- BVR scores management practices in four topics: operations, targets, incentives and monitoring
 - we use nine topics: roles, flexibility, incentives, monitoring, facilities, skills, staffing, targets and culture
 - rank each answer 1 to 5, increasing in common notion of good practice
 - derive three measures of management practice: CS-autonomy, CS-performance, CS-other
 - construct z-score for each management practice
 - [Table A2]
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Table A2: Defining Management Practices Using the CS Indices

Management P	Topic	Specific Questions Related to this Topic
CS-Autonomy	Roles	Can most staff above SGL 7 in your organization make substantive contributions to the policy formulation and implementation process?
		Can most staff above SGL 15 in your organization make substantive contributions to the policy formulation and implementation process?
		To what extent do the employees in this organization have the ability to determine how they carry out the assignments in their daily work?
	Flexibility	Does your organization make efforts to redefine its standard procedures in response to the specific needs and peculiarities of a community?
		How flexible would you say your organization is in terms of responding to new practices, new techniques, and regulations?
		At your organization, how efficiently is best practice shared between departments?
		Given past experience, how effectively would a conflict within your organization be dealt with?

Table A2: Defining Management Practices Using the CS Indices

Management Practice	Topic	Specific Questions Related to this Topic
CS-Performance	Incentives	Given past experience, how would under-performance be tolerated?
		Given past experience, what happens if there is a part of your organization that isn't achieving agreed results?
		What percentage of <i>workers</i> were rewarded when targets were met?
		What percentage of <i>managers/directors</i> were rewarded when targets were met?
		Given past experience, are members of this organization disciplined for breaking the Public Service Rules?
		Given past experience, what would most likely happen to a person in this organization who accepted money or a present from someone who came to them with a problem?
	Monitoring	In what kind of ways does your organization track how well it is delivering services?
		If have performance indicators, how often are these indicators collected?
		If have performance indicators, how often are these indicators reviewed by Minister or Permanent Secretary?
		If have performance indicators, how often are these indicators reviewed by non managerial staff?
		Does the organization use performance or quality indicators for tracking the performance of its employees?
		At your organization, how highly regarded is the collection and use of data in planning and implementing projects?

Variation in Management Practices Across Organizations

- management scores are *positively* correlated with each other → *not* the case that the provision of autonomy and performance incentives are substitutes [$\rho = .24$]
 - not so highly correlated that we cannot measure the impacts of both separately
 - Note: labor market rigidities for bureaucrats
 - initial postings are centrally decided
 - long tenure, little mobility across organizations
 - such frictions reduce pace of organizations learning best practices
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What Determines Management Practices?

- semi-structured interviews in four organizations to better understand how management practices evolve
 - Public Service Rules of the Nigerian Civil Service → history of management staff → external events
 - emphasis is on **slow moving** changes
 - not driven by CEO of organization: distinct from managerial style [Bertrand and Schoar 2003]
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Other Variables

- identification is within project type: important to condition on project complexity
 - collaborated with a pair of Nigerian engineers familiar with OPEN projects
 - complexity indicators constructed from OPEN technical reports, following engineering best practice [Remington and Pollack 2007]
 - *structural; temporal; technical; directional*
 - later use 4 out of 13 sub-components to define project risk/ambiguity
 - multiple checks put in place to validate complexity measures
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Empirical Method

- unit of observation: project i of type j in organization n :

$$y_{ijn} = \gamma_1 CS-autonomy_n + \gamma_2 CS-performance_n + \gamma_3 CS-other_n \\ + \beta_1 PC_{ijn} + \beta_2 OC_n + \lambda_j + \epsilon_{ijn}$$

- y_{ijn} corresponds to the project completion rate, or assessment of project quality
 - CS- measures are normalized z-scores
 - PC_{ijn} are project characteristics (complexity, scale...)
 - OC_n are organization characteristics (noise controls, size, budget, staff-education...)
 - project fixed effects λ_j
 - standard errors clustered by project type-organization
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Objectives of Bureaucracies

- implicit assumptions:
 - projects are indeed socially beneficial
 - *some weight* is placed on project completion by bureaucracies
 - anecdotal evidence of senior management being removed on the basis of poor completion rates; 74% of bureaucrats report they “expect to be held accountable for breaking the Public Service Rules”
 - 49% of total organization’s budget is on capital expenditures for OPEN-type projects
 - residual variation in project budgets $|PC_{ijn}|$ is positively correlated to completion rates
 - return to the issue when discussing optimality
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Baseline Results 1

- CS-autonomy is robustly **positively** correlated with project completion rates
 - CS-performance is robustly **negatively** correlated with project completion rates
 - recall the underlying management practices are positively correlated to each other ($\rho = .24$)
 - $\hat{\gamma}_2$ is attenuated if CS-autonomy omitted
 - effect sizes: CS-autonomy 18%; CS-performance 14%
 - backdrop: 38% of projects never started; 31% are fully completed
 - [Table 3, Cols 1-4]
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Table 3: Management Practices and Public Sector Service Delivery

Standard Errors: Clustered by Project Type Within Organization

OLS Estimates

	Project Completion Rates			
	(1) Unconditional	(2) Organization Controls	(3) Project Controls	(4) Project Type Fixed Effects
CS-Autonomy	0.11** (0.05)	0.18*** (0.03)	0.17*** (0.03)	0.18*** (0.03)
CS-Performance	-0.06* (0.03)	-0.11*** (0.02)	-0.11*** (0.02)	-0.14*** (0.02)
CS-Other	0.10*** (0.04)	0.05 (0.03)	0.05 (0.03)	0.08*** (0.02)
Organization Controls (capital, general, noise)	No	Yes	Yes	Yes
Project Controls	No	No	Yes	Yes
Fixed Effects	None	None	None	Project Type
Observations (clusters)	4721 (201)	4721 (201)	4721 (201)	4721 (201)

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Standard errors are in parentheses, and are clustered by project type within organization throughout. All columns report OLS estimates. The dependent variable in Columns 1 to 6 is the proportion of the project completed (that is a continuous measure between zero and one). Project Type fixed effects relate to whether the primary classification of the project is as a financial, training, advocacy, procurement, research, electrification, borehole, dam, building, canal or road project. Project controls comprise project-level controls for the project budget, whether the project is new or a rehabilitation, and an assessment of its aggregate complexity by Nigerian engineers. Capital controls comprise organization-level controls for the logs of number of employees, total budget, and capital budget. General controls comprise organization-level controls for the share of the workforce with degrees, and the share of the workforce with postgraduate qualifications. Noise controls are four interviewer dummies, indicators of the seniority, gender, and tenure of the managers who responded, the day of the week the interview was conducted, the time of day the interview was conducted, a dummy variable indicating whether the interview was conducted during Ramadan, the duration of the interview, and an indicator of the reliability of the information as coded by the interviewer. Total and capital budget figures are an average of organization budget figures for the years 2006-10. Figures are rounded to two decimal places.

Baseline Results 2

- two dimensions of management practice are complementary
 - negative impacts of CS-perf ameliorated by bureaucrats having more autonomy/flexibility
 - suggestive of poorly targeted incentives/monitoring?
 - qualitatively similar impacts of management practices on *quality-adjusted* completion rates
 - [Table 3, Cols 5/8]
 - [Tables A4: se's; Table A5: homogeneity]
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Table 3: Management Practices and Public Sector Service Delivery

Standard Errors: Clustered by Project Type Within Organization
OLS Estimates

	Project Completion Rates					
	(1) Unconditional	(2) Organization Controls	(3) Project Controls	(4) Project Type Fixed Effects	(5) Interaction	(8) Quality-Adjusted Completion Rate
CS-Autonomy	0.11** (0.05)	0.18*** (0.03)	0.17*** (0.03)	0.18*** (0.03)	0.23*** (0.03)	0.11** (0.04)
CS-Performance	-0.06* (0.03)	-0.11*** (0.02)	-0.11*** (0.02)	-0.14*** (0.02)	-0.15*** (0.02)	-0.08*** (0.02)
CS-Other	0.10*** (0.04)	0.05 (0.03)	0.05 (0.03)	0.08*** (0.02)	0.08*** (0.02)	0.08*** (0.02)
CS-Autonomy x CS-Performance					0.06** (0.02)	
Organization Controls (capital, general, noise)	No	Yes	Yes	Yes	Yes	Yes
Project Controls	No	No	Yes	Yes	Yes	Yes
Fixed Effects	None	None	None	Project Type	Project Type	Project Type
Observations (clusters)	4721 (201)	4721 (201)	4721 (201)	4721 (201)	4721 (201)	2206 (144)

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Standard errors are in parentheses, and are clustered by project type within organization throughout. All columns report OLS estimates. The dependent variable in Columns 1 to 6 is the proportion of the project completed (that is a continuous measure between zero and one). The dependent variable in Column 7 is a dummy variable that takes the value one if project quality is reported as satisfactory or higher, and zero otherwise. The dependent variable in Columns 8 and 9 is a product of the proportion completed variable and the dummy variable for quality. The sample of projects in Columns 6 to 9 is limited to those for which project completion and quality data is available. Project Type fixed effects relate to whether the primary classification of the project is as a financial, training, advocacy, procurement, research, electrification, borehole, dam, building, canal or road project. Project controls comprise project-level controls for the project budget, whether the project is new or a rehabilitation, and an assessment of its aggregate complexity by Nigerian engineers. Capital controls comprise organization-level controls for the logs of number of employees, total budget, and capital budget. General controls comprise organization-level controls for the share of the workforce with degrees, and the share of the workforce with postgraduate qualifications. Noise controls are four interviewer dummies, indicators of the seniority, gender, and tenure of the managers who responded, the day of the week the interview was conducted, the time of day the interview was conducted, a dummy variable indicating whether the interview was conducted during Ramadan, the duration of the interview, and an indicator of the reliability of the information as coded by the interviewer. Note that no quality information is available for organizations surveyed on a Saturday, and thus the dummy variable indicating a survey took place on a Saturday is omitted in Columns 7, 8 and 9. Total and capital budget figures are an average of organization budget figures for the years 2006-10. Figures are rounded to two decimal places.

Interpretation

- autonomy: divesting authority/flexibility to bureaucrats is beneficial, against Weberian/rules-based view
 - performance pay: negative partial correlation, contrary to good governance agenda
 - multiple explanations of why performance incentives can correlate negatively with output:
 - project characteristics: multi-tasking, riskiness
 - bureaucrat characteristics: motivated agents...
 - [Table 4, Cols 1-3]
-

Table 4: Heterogeneous Impacts of Management Practices Related to Performance-Based Incentives

Dependent Variable: Project Completion Rate

Standard Errors: Clustered by Project Type Within Organization

Interactions in Deviation from Mean in Columns 1 and 3

OLS Estimates

	(1) Project Complexity	(2) Non-modal Project	(3) Facilities
CS-Autonomy	0.19*** (0.03)	0.19*** (0.03)	0.20*** (0.03)
CS-Performance	-0.16*** (0.03)	-0.13*** (0.03)	-0.14*** (0.02)
CS-Other	0.08*** (0.02)	0.08*** (0.02)	
CS-Performance x Project Complexity	-0.19*** (0.06)		
CS-Performance x Non-modal Project Type		-0.05* (0.03)	
CS-Performance x CS-Facilities			0.03* (0.02)
CS-Other (Without Facilities)			0.09*** (0.03)
CS-Facilities			0.01 (0.02)
Organization Controls (capital, general, noise)	Yes	Yes	Yes
Project Controls	Yes	Yes	Yes
Fixed Effects	Project Type	Project Type	Project Type
Observations (clusters)	4721 (201)	4721 (201)	4721 (201)

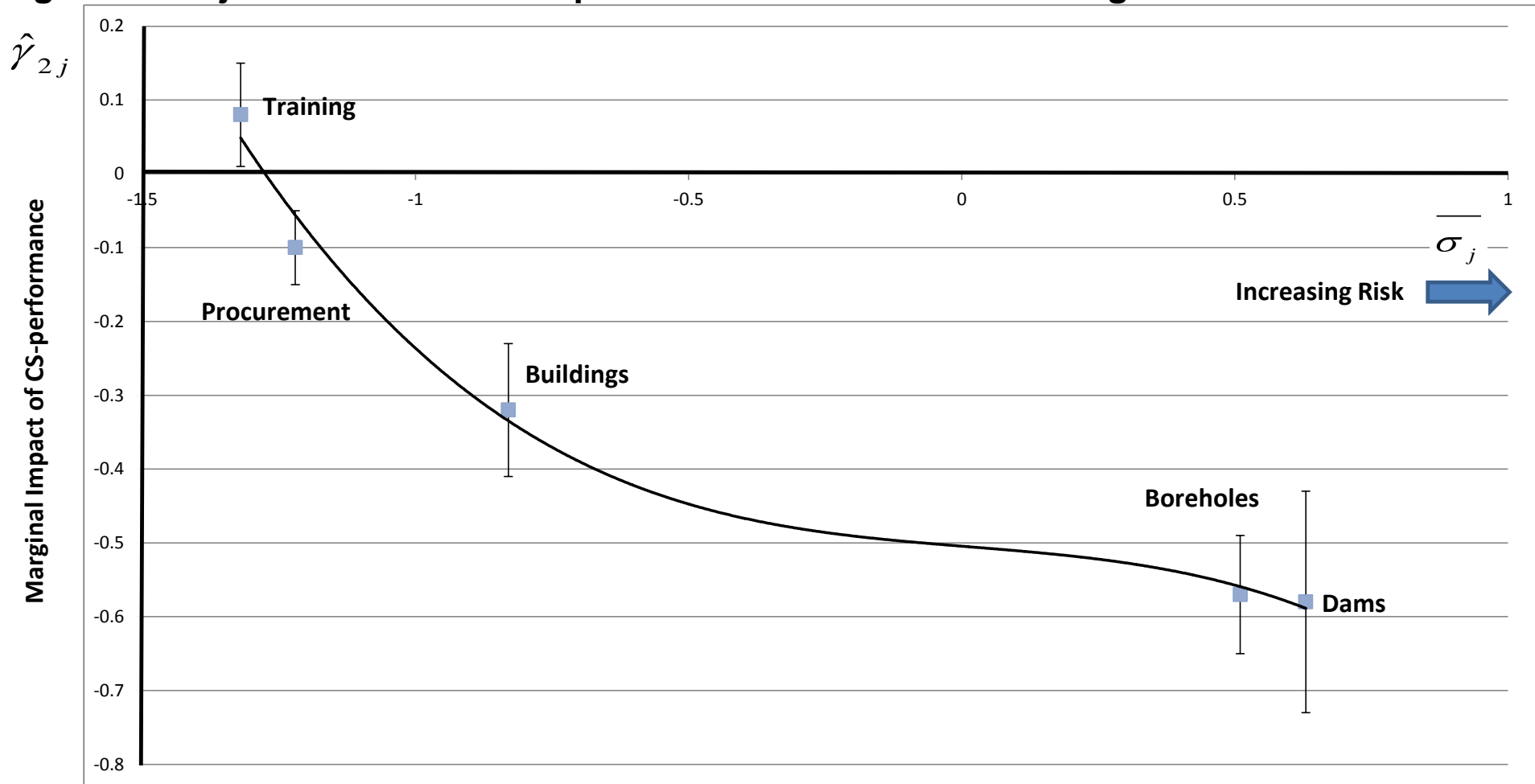
Project Risk

- contract theory highlights key trade-off between agent bearing risk and incentive provision [Prendergast 1999]
 - use sub-components of complexity indicator to construct measure of project risk
 - average within project type j ($\bar{\sigma}_j$: z-score)
 - estimate baseline specification for a **given** project type j : boreholes, buildings, dams, procurement and training
 - [Table A3: complexity subcomponents related to risk/ambiguity/uncertainty]
 - [Figure 1: plot ($\hat{\gamma}_{2j}, \bar{\sigma}_j$)]
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Table A3: Subcomponents of the Project Complexity Indicator

	Mean	Standard deviation
Project size	0.27	0.45
Number of inputs	6.82	4.13
Number of methods	5.04	2.29
Interdependencies	0.65	0.48
Access to raw materials	0.25	0.43
Storage of raw materials	0.04	0.21
Requires local labor	0.45	0.50
Requires skilled labor	0.45	0.50
Access to construction equipment	0.21	0.41
Design uncertainty	0.70	0.46
Implementation uncertainty	0.78	0.41
Design ambiguity	0.66	0.47
Implementation ambiguity	0.65	0.48
Difficulty to manage	0.28	0.45
Number of agencies involved	3.54	0.51
Aggregate complexity	24.98	17.92
Observations (projects)	4721	4721

Figure 1: Project Risk and the Response to CS-Performance Management Practices



Implications

- tenuous trade-off between risk and incentives hard to find in empirical evidence because of lack of controls for autonomy granted to agents [Prendergast 2002]
 - in our setting, not conditioning on CS-autonomy causes $\hat{\gamma}_{2j}$ to be attenuated [$\rho = .24$]
 - are training projects ($\hat{\gamma}_{2j} > 0$) more reflective of human capital investments in frontline workers?
 - as organizations are tasked to implement **multiple** project types that vary in risk, no single optimal incentive
 - insufficient degree of specialization in bureaucracies?
-

Bureaucrat Characteristics

- **tenure:** bureaucrats enjoy long tenure, might be better able to exploit flexibilities to act on performance incentives, or become gradually demotivated by constant monitoring
 - **intrinsic motivation:** performance incentives might crowd out intrinsic motivation of workers attracted to the public sector [Rose-Ackerman 1986, Perry and Wise 1990, Benabou and Tirole 2006]
 - perceptions of organizational **corruption:** performance-based incentives counteract corrupt motives?
 - measure bureaucrat characteristics using the survey we administered to a representative sample of officials at each organization
-

Measuring Intrinsic Motivation

- we asked bureaucrats what had most influenced them to originally enter the civil service: 'I was interested in the type of work', 'income prospects', 'the prestige associated with such a job', 'the stable career path that a job in the service affords', 'the chance to serve Nigeria', 'it was the only employment I could get', 'educational opportunities', 'other'
 - use the proportion of staff that answered 'the chance to serve Nigeria' as a measure of the intrinsic motivation within the organization
 - around 33% of officials defined as intrinsically motivated
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Measuring Perceptions of Corruption

- Nigeria is one of the most corrupt countries in the world [recall 38% of projects are never started]
 - we asked on what proportion of recent projects the official had worked on did they observe 'others breaking service rules for their own benefit'
 - on average, officials stated that on 38% of projects such observations of corrupt practice had been made
 - quantitatively large direct negative impact on project completion rates
 - [Table 4, Cols 4-6]
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Table 4: Heterogeneous Impacts of Management Practices Related to Performance-Based Incentives

Dependent Variable: Project Completion Rate
Standard Errors: Clustered by Project Type Within Organization
Interactions in Deviation from Mean in Columns 4, 5 and 6
OLS Estimates

	(4) Tenure	(5) Intrinsic Motivation	(6) Observe Corrupt Practices
CS-Autonomy	0.20*** (0.03)	0.21*** (0.03)	0.16*** (0.03)
CS-Performance	-0.11*** (0.03)	-0.17*** (0.03)	-0.17*** (0.03)
CS-Other	0.06** (0.03)	0.07*** (0.02)	0.07*** (0.03)
CS-Performance x Average Tenure of Bureaucrats	-0.02*** (0.004)		
CS-Performance x Proportion of Bureaucrats Intrinsically Motivated		0.54** (0.22)	
CS-Performance x Proportion of Projects that Bureaucrats Report Observing Corrupt Practices On			0.25 (0.28)
Average Tenure of Bureaucrats	-0.01 (0.01)		
Proportion of Bureaucrats Intrinsically Motivated		-0.47 (0.33)	
Proportion of Projects that Bureaucrats That Report Observing Corrupt Practices On			-1.09*** (0.37)
Organization Controls (capital, general, noise)	Yes	Yes	Yes
Project Controls	Yes	Yes	Yes
Fixed Effects	Project Type	Project Type	Project Type
Observations (clusters)	4721 (201)	4721 (201)	4721 (201)

Econometric Concerns

- to underpin a causal interpretation of these partial correlations, we need to tackle three econometric challenges:
 - projects being *non-randomly assigned* to organizations based on their management practices
 - *unobserved* bureaucrat or organizational characteristics that are correlated to management practices and also drive project completion rates
 - management practices being *endogenously* determined by bureaucrat characteristics or project outcomes
-

Non-Random Assignment of Projects

- better managed organizations more likely to be assigned harder-to-implement projects
 - creates a spurious *negative* correlation between our CS- measures and project completion rates, biasing $(\hat{\gamma}_1, \hat{\gamma}_2)$ in the *same* direction
 - use a conditional logit model to estimate the factors determining the assignment of project i to organization n
 - complement with analysis at organizational level on number and types of project assigned
 - [Tables A6, A7]
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Table A6: Management Practices and the Assignment of Projects to Organizations

Dependent Variable: Binary Variable Indicating Organization Implementing Project

Standard Errors: Clustered by Project Type Within Organization

Conditional Logit Model

	(1) Unconstrained Pairs	(2) Feasible Pairs by Sector	(3) Feasible Pairs by Complexity	(4) Organization Controls	(5) Project Interactions
CS-Autonomy	0.35 (0.22)	0.53* (0.27)	0.37 (0.24)	0.35 (0.29)	0.40 (0.31)
CS-Performance	-0.17 (0.26)	-0.33 (0.33)	-0.26 (0.36)	-0.26 (0.45)	-0.34 (0.45)
CS-Other	-0.36 (0.30)	-0.02 (0.23)	0.37 (0.31)	0.57 (0.45)	0.63 (0.48)
Senior Bureaucrat's Span of Control				-0.22 (0.35)	-0.34 (0.40)
Tenure of Senior Bureaucrats				0.03 (0.17)	0.05 (0.18)
Tenure of Low-tier Bureaucrats				-0.03 (0.09)	-0.04 (0.09)
Proportion of Senior Bureaucrats That Report Being Intrinsically Motivated				-4.82 (4.17)	-4.6 (4.37)
Proportion of Low-tier Bureaucrats That Report Being Intrinsically Motivated				-0.35 (3.49)	0.06 (3.22)
Proportion of Projects that Senior Bureaucrats that Report Observing Corrupt Practices On				-0.01 (0.04)	0.00 (0.04)
Proportion of Projects that Low-tier Bureaucrats that Report Observing Corrupt Practices On				0.02 (0.03)	0.02 (0.04)
Organization Controls (capital, general, noise)	No	No	No	Yes	Yes
Interactions of Project and Organizational Characteristics	No	No	No	No	Yes
Project-Organization Paired Observations (clusters)	297423 (63)	44429 (59)	33480 (59)	33370 (58)	33370 (58)

Table A7: Management Practices and Public Sector Service Delivery at the Organization Level

Robust Standard Errors
OLS Estimates

	(1) Number of Projects Assigned to Organization	(2) Number of Unique Project Types Assigned to Organization	(3) Project Complexity	(4) Log Organizational Budget
CS-Autonomy	22.17 (19.57)	0.21 (0.27)	1.56 (1.89)	0.03 (0.05)
CS-Performance	10.07 (24.87)	-0.01 (0.40)	-0.47 (1.53)	0.05 (0.07)
CS-Other	-19.92 (28.30)	-0.01 (0.37)	-2.10 (1.66)	0.03 (0.05)
Organization Controls (capital, general, noise)	Yes	Yes	Yes	Yes
Observations	63	63	63	63

Unobservables

- our measures of management practice are correlated to the unobserved factors captured in ϵ_{ijn} that directly determine completion rates
 - akin to a selection on unobservables problem [Altonji *et al.* 2005]
 - three potential sources of unobservable:
 - organizational features (ability to lobby for resources)
 - undocumented management practices
 - unobserved bureaucrat characteristics (sorting)
 - [Figure A1; Tables A7, A9, A10]
-

Figure A1: Area of Covariances in Which Coefficients are Underestimated in Absolute Terms

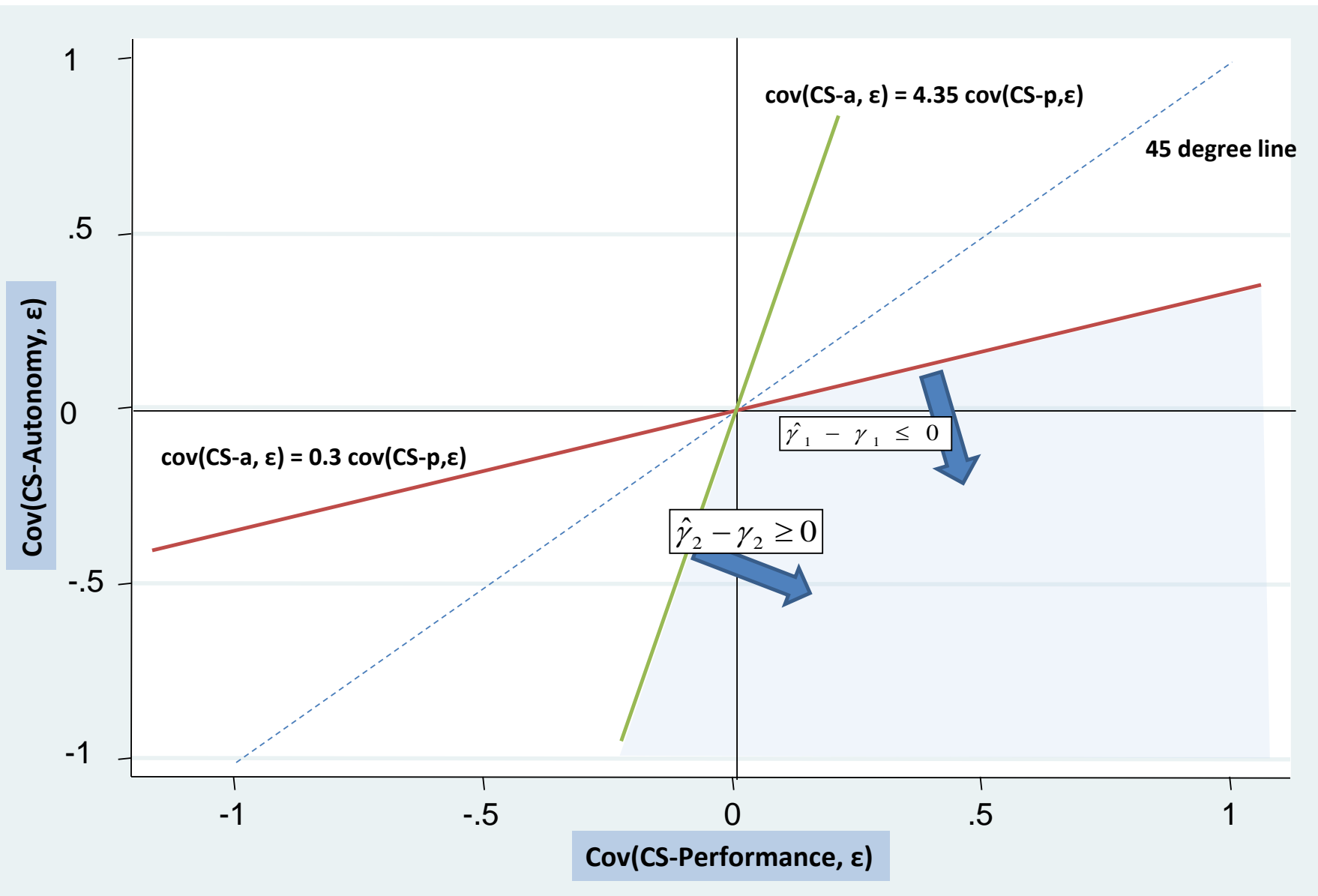


Table A10: Bureaucrat Characteristics and Management Practices
Means, standard deviations and regression coefficients

	Joint Regression Coefficients		
	(1) Mean (s.d.)	(2) Coefficient on CS- Autonomy	(3) Coefficient on CS- Performance
Proportion of Bureaucrats Who Knew Direct Boss Before Starting Posting	0.00 (0.01)	-	-
Proportion of Bureaucrats Who Knew Managers Before Starting Posting	0.00 (0.01)	-	-
Average Number of Close Colleagues Known Before Starting Posting	4.40 (3.18)	-0.06 (0.42)	-0.04 (0.42)
Proportion of Bureaucrats Being the First Family Member to Join Service	0.48 (0.1)	0.02 (0.01)	-0.01 (0.01)
Tenure of Senior Bureaucrats	15 (5)	0.42 (0.65)	-0.49 (0.65)
Tenure of Low-tier Bureaucrats	10 (4)	0.00 (0.59)	-0.48 (0.59)
Proportion of Senior Bureaucrats Intrinsically Motivated	0.31 (0.12)	0.00 (0.02)	-0.02 (0.02)
Proportion of Low-tier Bureaucrats Intrinsically Motivated	0.39 (0.13)	0.01 (0.02)	-0.02 (0.02)
Proportion of Projects that Senior Bureaucrats that Report Observing Corrupt Practices On	0.35 (0.10)	-0.02 (0.01)	0.01 (0.01)
Proportion of Projects that Low-tier Bureaucrats that Report Observing Corrupt Practices On	0.41 (0.11)	-0.02 (0.01)	-0.01 (0.01)

Endogeneity 1

- some organization complete projects because they employ more dedicated civil servants → endogenously give those bureaucrats more autonomy, rely less on explicit performance incentives
 - organizations staffed by less reliable bureaucrats → endogenously choose to monitor them more intensively, incentivize them through explicit performance incentives, and allocate them less autonomy
 - organizations objective places positive weight on project completion rates
 - unlikely to find credible instruments for CS- practices along multiple dimensions
 - LATE: given documented heterogeneous impacts, IV estimates likely to be sensitive to instrument set
-

Endogeneity 2

- our approach: build proxies for an organization's **motives/ability** to adjust management practices in response to bureaucrat characteristics or past completion rates
 - explore whether impacts of management practice vary with these proxies:
 - motives/importance: ratio of capital budget to total budget of organization (K_n/Y_n)
 - ability: variance in project risk/ambiguity over organization's projects ($\text{var}(\sigma_j)_n$)
 - [Table A11]
-

Table A11: Endogenous Management Practices		
Dependent Variable: Project Completion Rate		
Standard Errors: Clustered by Project Type Within Organization		
Interactions in Deviation from Mean		
OLS Estimates		
	(1) Capital to Total Budget Ratio	(2) Variance of Risk in Portfolio of Projects
CS-Autonomy	0.17*** (0.04)	0.20*** (0.03)
CS-Performance	-0.17*** (0.04)	-0.17*** (0.04)
CS-Other	0.07*** (0.02)	0.04 (0.04)
CS-Autonomy x Capital to Total Budget Ratio	0.07 (0.10)	
CS-Performance x Capital to Total Budget Ratio	0.10 (0.12)	
CS-Autonomy x Var (Project Risk)		0.00 (0.02)
CS-Performance x Var (Project Risk)		-0.04 (0.03)
Capital to Total Budget Ratio	0.70 (0.54)	
Var (Project Risk)		-0.01 (0.03)
Organization Controls (capital, general, noise)	Yes	Yes
Project Controls	Yes	Yes
Fixed Effects	Project Type	Project Type
Observations	4721 (201)	4721 (201)

Contributions

- provide widescale evidence linking practices in civil service organizations to public services delivered
 - management practices matter
 - one sd adjustments in CS-autonomy and CS-performance → 32% increase in project implementation rates
 - 38% of projects not started
 - \$1.4bn total value of not-started projects across 63 organizations
-

Why Are Organizations Not Optimizing Management Practices?

- labor market frictions/learning/adjustment costs cause best practice to diffuse over time
 - the fixed costs of adopting better practices? $\approx \$7.13\text{mn}$ per org
 - lack of specialization by organizations in project types
 - current portfolios ask same organization to implement projects with systematic degrees of design risk/ambiguity ($\bar{\sigma}_j$)
 - Weberian view: agency problems cause divergence between objectives of society and bureaucracies [objective \neq max completion rates]
 - lack of competition/price signals between public agencies
-

Wider Future Agenda: Improving Public Service Delivery

- this paper: management practices for bureaucrats **within** public sector
 - interplay with other channels documented to raise public service delivery:
 - selection of workers **into** public sector [Dal Bo et al. 2013 use experimental variation in wage offers]
 - public accountability/top-down auditing [Besley and Burgess 2002, media; Olken 2007, roads]
 - grassroots monitoring [Bjorkman and Svensson 2010, health]
 - provision of information to users [Reinikka and Svensson 2011, health; Andrabi et al. 2013, education]
 - rich agenda to study these multiple margins together
-

Project Funders: ESRC, IGC, Federal Government of Nigeria and the Institute for Fiscal Studies

Table A1: Federal Civil Service Organizations Under Study

Civil Service Organization	Sector	Annual Budget (US\$)	Number of Staff	Level of Centralization
Anambra/Imo River Basin Development Authority	Water	26,651,696	324	Deconcentrated
Benin Owena River Basin Development Authority	Water	17,637,829	333	Deconcentrated
Chad Basin River Basin Development Authority	Water	15,781,353	399	Deconcentrated
Cross River River Basin Development Authority	Water	18,823,211	318	Deconcentrated
Citizenship and Leadership Training Centre	Youth	3,510,409	601	Deconcentrated
Federal College of Education, Gombe	Education	5,319,472	608	Deconcentrated
Federal College of Education, Gusau	Education	4,665,009	379	Deconcentrated
Federal College of Education, Omuku	Education	5,887,740	699	Deconcentrated
Federal Government Girls College, Gboko	Education	1,233,030	161	Deconcentrated
Federal Government Girls College, Lejja	Education	1,325,661	122	Deconcentrated
Federal Medical Centre, Abokuta	Health	6,459,959	1,646	Deconcentrated
Federal Medical Centre, Asaba	Health	4,957,423	777	Deconcentrated
Federal Medical Centre, Bayelsa State	Health	5,026,215	725	Deconcentrated
Federal Medical Centre, Bida	Health	4,135,214	709	Deconcentrated
Federal Medical Centre, Ebute Metta	Health	5,358,665	958	Deconcentrated
Federal Medical Centre, Gombe	Health	5,640,897	1,518	Deconcentrated
Federal Medical Centre, Kebbi State	Health	3,560,097	528	Deconcentrated
Federal Medical Centre, Makurdi	Health	7,120,460	955	Deconcentrated
Federal Medical Centre, Nasarawa State	Health	4,572,968	785	Deconcentrated
Federal Medical Centre, Owerri	Health	8,709,623	1,722	Deconcentrated
Federal Medical Centre, Owo	Health	8,219,773	1,119	Deconcentrated
Federal Medical Centre, Umuahia	Health	7,157,419	1,306	Deconcentrated
Federal Ministry of Agriculture and Rural Development	Agriculture	144,055,160	5,789	Concentrated
Federal Ministry of Education	Education	44,055,244	2,776	Concentrated
Federal Ministry of Environment	Environment	20,324,048	2,093	Concentrated
Federal Ministry of Federal Capital Territory Administration	Education	473,280,702	18,987	Concentrated
Federal Ministry of Health	Health	170,406,214	3,871	Concentrated
Federal Ministry of Housing and Urban Development	Housing	58,610,300	7,837	Concentrated
Federal Ministry of Intergovernmental Affairs, Youth Development and Special Duties	Youth	11,233,012	392	Concentrated
Federal Ministry of Power and Steel	Power	490,123,985	580	Concentrated
Federal Ministry of Water Resources	Water	425,805,770	740	Concentrated
Federal Ministry of Women Affairs	Women	14,934,361	577	Concentrated
Federal Polytechnic, Bida	Education	4,766,557	1,025	Deconcentrated
Federal Polytechnic, Ede	Education	5,111,209	706	Deconcentrated
Federal Polytechnic, Idah	Education	7,643,274	987	Deconcentrated
Federal Polytechnic, Nasarawa	Education	6,431,211	810	Deconcentrated
Federal Polytechnic, Nekede	Education	9,104,663	1,282	Deconcentrated
Federal Polytechnic, Offa	Education	5,397,664	673	Deconcentrated
Federal Polytechnic, Oko	Education	11,266,398	1,627	Deconcentrated
Federal Staff Hospital, Apo-Abuja	Health	2,439,537	471	Deconcentrated
Hadejia-Jama'are River Basin Development Authority	Water	32,758,143	589	Deconcentrated
Jos University Teaching Hospital	Health	19,008,930	2,261	Deconcentrated
Lower Benue River Basin Development Authority	Water	16,307,146	347	Deconcentrated
Lower Niger River Basin Development Authority	Water	18,954,248	436	Deconcentrated
Mass Literacy Commission	Education	6,706,812	154	Deconcentrated
National Action Committee on Aids	Health	12,554,883	243	Deconcentrated
National Arbovirus and Vector Research	Health	301,502	207	Deconcentrated
National Board for Technical Education	Education	10,956,835	460	Deconcentrated
National Centre for Women Development	Women	1,430,538	135	Deconcentrated
National Commission for Colleges of Education	Education	5,633,851	222	Deconcentrated
National Commission for Nomadic Education	Education	4,159,863	195	Deconcentrated
National Primary Health Care Development	Health	56,036,340	646	Deconcentrated
National Tuberculosis and Leprosy Referred Hospital and Training Centre, Zaria	Health	3,000,639	153	Deconcentrated
National Teachers Institute	Education	33,613,921	728	Deconcentrated
National Youth Service Corps	Youth	121,389,773	103,686	Deconcentrated
Niger Delta River Basin Development Authority	Water	18,600,953	406	Deconcentrated
Nigerian Agricultural Cooperative and Rural Development Bank	Agriculture	7,798,094	474	Deconcentrated
Ogun/Oshun River Basin Development Authority	Water	22,259,121	285	Deconcentrated
Sokoto Rima River Basin Development Authority	Water	23,430,400	566	Deconcentrated
Specialist Hospital, Gwagwalada	Health	10,953,476	1,275	Deconcentrated
Universal Basic Education Commission	Education	50,549,049	393	Deconcentrated
Upper Benue River Basin Development Authority	Water	12,822,263	272	Deconcentrated
Upper Niger River Basin Development Authority	Water	21,951,907	239	Deconcentrated

Notes: The budget figures are averages for 2006 to 2010. They are in US Dollars exchanged at a rate of US\$1: Naira 150. Staff numbers come from administrative data for 2010. In the few cases we do not have the staff numbers explicitly, we estimate them from the personnel expenditures, which have are correlated with staff numbers with a coefficient of over 0.9. Concentrated organizations refer to the central organizing authority for the sector, with a direct line of responsibility to the President and the National Assembly. Deconcentrated organizations refer to those whose day-to-day running is largely independent of the central authority. They have boards of governors that make decisions over policy and operation and a separate budget line to the central ministries.

Table A4: Standard Errors
Dependent Variable: Project Completion Rate
OLS Estimates

	(1) Unconditional	(2) Organization Controls	(3) Project Controls	(4) Project Type Fixed Effects
CS-Autonomy	0.11	0.18	0.17	0.18
<i>Robust standard errors</i>	(0.01)	(0.01)	(0.01)	(0.01)
<i>Errors clustered by project type within organisation level</i>	(0.05)	(0.03)	(0.03)	(0.03)
<i>Errors clustered by organisation</i>	(0.06)	(0.03)	(0.03)	(0.03)
<i>P-value of clustered coefficients</i>	[0.07]	[0.00]	[0.00]	[0.00]
<i>Wild cluster bootstrap p-value of clustered coefficients</i>	[0.08]	[0.02]	[0.02]	[0.00]
CS-Performance	-0.06	-0.11	-0.11	-0.14
<i>Robust standard errors</i>	(0.01)	(0.01)	(0.01)	(0.01)
<i>Errors clustered by project type within organisation level</i>	(0.03)	(0.02)	(0.02)	(0.02)
<i>Errors clustered by organisation</i>	(0.03)	(0.03)	(0.03)	(0.02)
<i>P-value of clustered coefficients</i>	[0.08]	[0.00]	[0.00]	[0.00]
<i>Wild cluster bootstrap p-value of clustered coefficients</i>	[0.20]	[0.00]	[0.00]	[0.00]
CS-Other	0.10	0.05	0.05	0.08
<i>Robust standard errors</i>	(0.01)	(0.02)	(0.02)	(0.02)
<i>Errors clustered by project type within organisation level</i>	(0.04)	(0.03)	(0.03)	(0.02)
<i>Errors clustered by organisation</i>	(0.03)	(0.04)	(0.03)	(0.03)
<i>P-value of clustered coefficients</i>	[0.00]	[0.20]	[0.17]	[0.00]
<i>Wild cluster bootstrap p-value of clustered coefficients</i>	[0.01]	[0.28]	[0.26]	[0.01]
Organization Controls (capital, general, noise)	No	Yes	Yes	Yes
Project Controls	No	No	Yes	Yes
Fixed Effects	None	None	None	Project Type
Observations	4721	4721	4721	4721

Notes: Standard errors are in round parentheses, and are robust, clustered by project type within organization, and by organization respectively under the coefficients corresponding to a management index. Standard p-values and wild cluster bootstrap p-values are in square parentheses below these. All columns report OLS estimates. The dependent variable is the proportion of the project completed (that is a continuous measure between zero and one). Project Type fixed effects relate to whether the primary classification of the project is as a financial, training, advocacy, procurement, research, electrification, borehole, dam, building, canal or road project. Project controls comprise project-level controls for the project budget, whether the project is new or a rehabilitation, and an assessment of its aggregate complexity by Nigerian engineers. Capital controls comprise organization-level controls for the logs of number of employees, total budget, and capital budget. General controls comprise organization-level controls for the share of the workforce with degrees, and the share of the workforce with postgraduate qualifications. Noise controls are four interviewer dummies, indicators of the seniority, gender, and tenure of the managers who responded, the day of the week the interview was conducted, the time of day the interview was conducted, a dummy variable indicating whether the interview was conducted during Ramadan, the duration of the interview, and an indicator of the reliability of the information as coded by the interviewer. Total and capital budget figures are an average of organization budget figures for the years 2006-10. Figures are rounded to two decimal places.

Table A5: Robustness Checks

Dependent Variable: Project Completion Rate
 Standard Errors: Clustered by Project Type Within Organization
 OLS Estimates

	(1) Largest Org. by Total Exp.	(2) Org. With Most Projects	(3) Ten Orgs. with Smallest Total Exp.	(4) Ten Orgs. with Smallest No. of Projects	(5) Orgs. Below 5% or Above 95% of CS-Autonomy Scale	(6) Orgs. Below 5% or Above 95% of CS- Performance Scale	(7) Construction Projects	(8) Non- Construction Projects	(9) Centralized	(10) Decentralized	(11) State- level Controls	(12) Northern Projects	(13) Southern Projects	(14) Weighted Topics in CS Indices	(15) Fractional Regression
CS-Autonomy	0.17*** (0.02)	0.17*** (0.03)	0.19*** (0.03)	0.19*** (0.03)	0.23*** (0.04)	0.20*** (0.03)	0.23*** (0.05)	0.16*** (0.05)	0.17*** (0.03)	0.14*** (0.03)	0.17*** (0.03)	0.19*** (0.06)	0.22*** (0.05)	0.23*** (0.03)	1.02*** (0.17)
CS-Performance	-0.15*** (0.02)	-0.13*** (0.03)	-0.15*** (0.02)	-0.14*** (0.02)	-0.24*** (0.04)	-0.18*** (0.03)	-0.21*** (0.05)	-0.06* (0.03)	-0.24*** (0.04)	-0.01 (0.03)	-0.14*** (0.02)	-0.12** (0.06)	-0.30*** (0.10)	-0.14*** (0.02)	-0.96*** (0.16)
CS-Other	0.09*** (0.02)	0.05 (0.03)	0.09*** (0.03)	0.08*** (0.03)	0.09*** (0.03)	0.06** (0.03)	0.11** (0.05)	0.06* (0.03)	0.18*** (0.05)	-0.03 (0.04)	0.08*** (0.03)	-0.03 (0.08)	0.10* (0.05)	0.08*** (0.02)	0.49*** (0.15)
Organization Controls (capital, general, noise)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Project Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type
Observations	4201 (197)	3924 (192)	4601 (176)	4711 (191)	3810 (145)	4209 (181)	3822 (82)	899 (119)	2434 (53)	2287 (148)	4269 (63)	2049 (91)	1895 (104)	4721 (201)	4721 (201)

Table A8: Management Practices and the Provision of Boreholes

Dependent Variable: Project Completion Rate for Borehole Projects

Standard Errors: Clustered by Organization

OLS Estimates

	(1) Unconditional	(2) Organization Controls	(3) Project Controls	(4) Interaction
CS-Autonomy	0.24*** (0.08)	0.19*** (0.00)	0.22*** (0.04)	0.50*** (0.03)
CS-Performance	0.02 (0.07)	-0.12*** (0.00)	-0.19*** (0.03)	-0.52*** (0.05)
CS-Other	-0.09 (0.11)	-0.05*** (0.00)	-0.02 (0.02)	0.37*** (0.04)
CS-Autonomy x CS-Performance				0.27*** (0.02)
Proportion Never Started		0.44		
Proportion Fully Completed		0.37		
Organization Controls (capital, general, noise)	No	Yes	Yes	Yes
Project Controls	No	No	Yes	Yes
Observations (clusters)	1348 (18)	1348 (18)	1348 (18)	1348 (18)

Figure A2: Impact of Management Practices For Different Thresholds of Project Success

