Motion Without Movement: Understanding the Determinants of Public Sector Productivity

Daniel Rogger

Thesis submitted to the Department of Economics
in partial fulfilment of the requirements for the degree of

Doctor of Philosophy

University College London

London

July 2014

Declaration

I, Daniel Rogger, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Daniel Rogger

Abstract

This thesis presents an analysis of the determinants of public sector productivity in the Federal Government of Nigeria.

The first chapter introduces the thesis, with an emphasis on the creation of measurement tools and methods for, and the collection of, the data that acts as the foundation of the contribution of my thesis work.

The second chapter studies how management practices that bureaucrats in the Nigerian Civil Service operate under, correlate to the quantity and quality of public services delivered. For each of 4700 projects, I have hand coded independent engineering assessments of each project's completion rate and delivered quality. I supplement this information with a survey to elicit management practices for bureaucrats in the 63 civil service organizations responsible for these projects, following the approach of Bloom and Van Reenen [2007]. I find that management practices matter: a one standard deviation increase in autonomy for bureaucrats corresponds to significantly higher project completion rates of 18%; a one standard deviation increase in practices related to incentives and monitoring corresponds to significantly lower project completion rates of 14%. I provide evidence that the negative impacts of practices related to incentive provision/monitoring arise because bureaucrats multi-task and incentives are poorly targeted, and because these management practices capture elements of subjective performance evaluation that further leave scope for dysfunctional responses from bureaucrats. The backdrop to these results, where 38% of projects are never started, implies there are potentially large gains to marginally changing management practices for bureaucrats.

The third chapter studies the causes and consequences of interactions between politicians and bureaucrats in the Nigerian Civil Service along two key margins: which bureaucrats a politician delegates the delivery of public projects to, and the incentives that politicians provide to those bureaucrats. To investigate these issues, I combine data on the political careers of politicians and measures of their interactions with bureaucrats with the data presented in my first chapter. I find that politicians facing high levels of political competition are more likely to (1) delegate the implementation of public projects in their constituency to more autonomous organizations; and (2) provide informal incentives to bureaucrats in those organizations. Guided by a moral hazard model, I assess the separate impacts of the delegation and incentive margins using an instrumental variables strategy.

I find that delegation to more productive bureaucrats is the key channel through which politicians improve the bureaucracy's output when faced with high levels of political competition. The results have implications for the design of organizations that regulate politicians' interactions with the bureaucracy.

The final chapter presents some concluding comments.

Contents

List of Tables

List of Figures

Acknowledgements

When your thesis acknowledgements section has to have chapters, you realise your PhD is the product of assistance from a huge number of people. I feel that this may be the only place where I can truly reflect the magnitude of the debt I have to the many individuals and organisations that have supported me throughout my thesis research. I regret any omissions and am grateful to everyone who has made my PhD the wonderful adventure it has been.

My academic supervisors

My debt to my principal supervisor, **Imran Rasul**, reflects how unique a figure he has been in my development as an economics researcher. He has had a transformational impact on the way I understand empirical economics and has trained me to be a researcher in every sense of the word. Imran's commitment to my progress has been resolute. His patience, particularly during the lengthy period of data collection, balanced. He has acted as a rock when I needed it, in both the sense of a force to be reckoned with and in the sense of a support when I needed it. Our relationship will be a defining feature of my life. For all this, it is difficult to put in words my debt to him. All I can do is to work to put into action the lessons he has taught me, and make sure he knows that I think he was the best supervisor I could have had.

My second supervisor, **Orazio Attanasio**, provided the remarkable environment of the research centre he invited me to become a part of, intervened whenever his help was needed, and provided enlightened wisdom and insight. He was the perfect second supervisor, providing me with complementary perspectives and thoughtful support. He has made me a far stronger economist than I would have otherwise been, and his lessons will live on in me for the rest of my life.

Other academic guidance

A number of other academic mentors played significant roles in my development

through the PhD:

Emla Fitzsimons was a daily provider of pastoral care and a huge source of fun and laughter. An honourary advisor who shared with me the realities and pitfalls of economics from over the fence. Well, until the dice ran out.

Steve Commins was an important reality check on my research. Our irregular meetings ensured I understood how my work linked to the world of policy, and gave me a perspective on my field I wouldn't otherwise have had. Another honorary advisor, and one of the only people in the world who loves jellied eels more than me.

Wendy Carlin has been looking out for me since I was an undergraduate. She continues to be one of the wisest economists I know, and she inspires me at each important stage in my academic development.

Richard Blundell has both inspired and guided my work since I was an undergraduate. Although he still hasn't told me what the meaning of life is, I have learnt a lot from him both in the classroom, individually, and from the way he works.

Lars Nesheim said one thing at a Reading Group that I have always remembered, and has affected my view on empirical economics ever since. In response to a question about how to solve a host of econometric challenges, he simply answered, "get better data". So I did.

Nick Bloom has been hugely generous to me throughout the research period of my PhD. He was instrumental in inspiring and supporting my undertaking management surveys. This data became an important part of chapter 2 of my thesis.

I owe these members of the UCL community a significant debt for the wisdom and guidance they have shared with me. More broadly, the opportunities that have been afforded me by being a member of **University College London** enriched my thesis at every step. The interdisciplinary nature of the university ensured I could access experts on the technical complexity of capital projects through the anthropology of Nigerian communities. The school's location meant that I had access to the School of Oriental and African Studies archives, to courses and academics at the London School of Economics, and to one of the most vibrant academic quarters in the world. If any organisation has most defined me, it is UCL, and it has been a positive force at every turn.

A similar debt is owed to the **Institute for Fiscal Studies** (IFS), where I was PhD scholar for the majority of my time as a PhD student. As one visitor put it, this is one of the most generous scholarships in the world. I feel like I am surrounded by some of

the most brilliant and enthusiastic public economists in the world, and I was given the chance to regularly share an office, a seminar room, and some cake with them. This PhD would have been very different if I hadn't been at the IFS, and the quality and breadth of my research has been strengthened by my interactions here. I am hugely grateful to those members of IFS that granted me the scholarship, and to everyone at the Institute who has enriched my life academically or socially.

Funding arrangements

I received financial support from UCL and IFS that added to their contribution. At UCL, I received both the Gorman Scholarship and various other contributions from the Department of Economics, as well as a host of grants from the Graduate School. These funds allowed me to undertake research I wouldn't otherwise have been able to, and communicate my work more widely than I otherwise could. The support from UCL for this particular graduate student has been amazing.

The department, and university as a whole, supported me in my application for and award of an **Economic and Social Research Council** PhD studentship [ES/G017352/1]. This was at the centre of my capacity to do the extensive fieldwork that underlies my thesis. The studentship freed me from financial concerns, as well as funded some of my travel, such that I could develop and undertake the survey of civil servants in particular and other work.

The surveys I undertook and analysed could not have been completed on this studentship alone, and the majority of funding came from the **Federal Government of Nigeria** itself, for which I am extremely grateful. The **International Growth Centre** provided funds for coding the data [RA-2009-11-018], that turned a huge mass of paper into a concrete data set. Their support, and in particular that of **Oriana Bandiera** (my simo), gave me both the funds and confidence to process the data I had collected.

This data collection and processing effort took a significant amount of time. Towards the end of my PhD, the **Royal Economic Society** granted me a Junior Fellowship that once again gave me the freedom to focus on my thesis and the confidence that I was on the right path. It is an honour to be part of one of the oldest and most prestigious economic associations in the world.

The Federal Government of Nigeria

My thesis focuses on the determinants of productivity in the Federal Government of Nigeria. My understanding of how the public sector functions in the developing world is

therefore strongly influenced by my experience and research in Nigeria. These experiences and lessons rest on the shoulders of who I see as the true heroes of development – the public officials and private actors that support the delivery of effective public services.

I have been hugely fortunate to have worked in Nigeria since 2005, at first as an **Overseas Development Institute** (ODI) fellow. The ODI sending me to Nigeria has shaped my life and research focus considerably, and I owe them a significant debt.

They sent me to the Presidency to work for **Hajiya Amina Mohammed**. Amina is one of the most impressive and inspiring people I have ever known. She is one of the greatest development heroes in the world, and has taught me a huge amount about how development works. She encouraged me to start a PhD after I had finished the ODI fellowship, but was gracious enough to allow me to keep working with her. This allowed me to continue to learn about government in the developing world whilst partnering with her, her office, and the wider government on much of the data collection that underlies this thesis. Amina is the foundation stone on which this thesis rests.

The rich learning and research environment in Nigeria was a function of the huge number of other heroes in the Nigerian Government. I will only be able to mention a small fraction of them here, and I express my appreciation to every public servant who has supported my learning or research in Nigeria. There are some notable persons I have to mention here:

Lawal Aboki – my mallam – was an integral part of my journey in better understanding Nigeria. Lawal is a man of great wisdom that I am hugely fortunate to know. He, more than almost anyone else, has been my companion and guide through the Nigerian civil service.

Ibrahim Daudu – the professor of the civil service – is a man with sage like qualities. He is revered by those who have been fortunate enough to work with him. I am no exception. Throughout my time in Nigeria, he has helped me see more clearly into the world of the civil service.

Funke Baruwa – African Queen! – has been my closest confidant and friend throughout my time in Nigeria. She is an incredible woman, who can look after her family, her community, her church, her country, and sometimes even the world, and still laugh and sing and dance with me. She has also been at various points my teacher and my most valuable colleague. She is truly one of the greatest women I have ever known and a constant inspiration.

Dipo Baruwa – the assistant professor of the civil service – is a great man, despite his fascination with the wrong football club. He has given me insights into the subtleties of the service that strengthened my understanding of key concepts I needed in my research. He has also looked out for me and been a great friend.

More generally, I thank the **Presidency** and the **Office of the Head of the Civil Service of Nigeria** as a whole. These institutions have some of the toughest development jobs in the world. I applaud their successes and am grateful for their support in the research reflected in this thesis. Whilst I cannot mention all those individuals in these organisations I would like to, there are a few names that must be recorded here. First, the survey team that ran the civil servants surveys I managed were incredibly professional in even the most extreme circumstances and a joy to work with. I have immense respect for the following individuals and am very grateful for all of their efforts: **Habiba Lawal**, **Rebecca Kadafa**, **Jene Gillis-Harry**, **Wachiko Abdurrahman**, **Anthony Waziri**, **Ijeoma Ukaejiofo**, **Olalekan Abimbola**, **Bakori Magaji**, **Emmanuel Etin**, **Leonard Nuhu**, **Sunday Wey**, **Shakiru Shogunro**, **Ibrahim Olotu**, **Samuel Momoh** and **Mr. Adeyi**.

Second, I could not have done the civil servants survey without the support of the most senior members of the offices with which I worked. I extend warm appreciation to **Stephen Oronsaye**, the Head of the Civil Service of the Federation under whom the survey was conceptualised and commenced, **Oladapo Afolabi**, the Head of Service under whom the survey results were translated into a government report, **Abubakar Magaji** and **Oluwole Edun**, directors of Amina's office during the implementation and analysis of the survey.

Third, my fieldwork was made much easier by all of those in the Presidency who facilitated my thesis work at some stage: **Balaraba Aliyu**, **Fatima Ahmad**, **Philip Akinfemide**, **Gabriel Ola**, and **Josephine Musa**.

More broadly, I appreciate the many officials who helped us organise surveys in their organisation, played a role in the evaluations of projects, or gave me administrative data. My thanks are also extended to the private sector and civil society organisations that undertook the evaluations of public projects that make up a key element of my thesis. Special gratitude is reserved for **Nuruddeen Rafindadi**, **Omoye Iyayi** and all the staff at **Global Projects Consortium**, as well as **Jibrin Ibrahim**, **Mercy Ezehi** and all the staff at the **Centre for Democracy and Development**.

Engineering community

Part of the data I collected related to the engineering complexity of the capital projects I studied. I therefore needed to understand how to conceptualise and measure complexity. A number of academics and engineers working in this field advised me, and I am grateful to them all. I then needed to code the complexity of the projects along the margins I had identified, and I am grateful to the Nigerian engineers who helped me do this.

Civil servant, explorer, friend

A special acknowledgement must be made to **Jonathan Phillips**. Jonny spent time as an ODI fellow in the Presidency of Nigeria after me, and is now doing a PhD at Harvard. He is exactly the sort of person I hoped to meet in development when I first started working in the field. He is pragmatic but academically insightful, with the ability to make a difference, and know what that really means. He supported my academic research from the start of the PhD with the full breadth of his talents and without hesitation. We have learnt and grown together, and I owe him a lot for his contributions to my thesis and to my future as a researcher.

As part Nigerian civil servant, part intrepid explorer, and part valuable friend, he has played a unique role in my PhD.

Friends

Of course, the research reflected in this thesis would have been much more of a struggle had it not been for the friends I have had to support me. At the same time, the best non-academic gifts of my PhD are the close friends I've made on the way:

Britta Augsburg – Seven years of laughter, learning, and disappointments, and I couldn't think of a better person to go through it all with.

Silvia Espinosa – The other member of the EDePo scholar's economic and emotional think tank. We know more about each other's PhD lives than I imagine I will ever know about anyone's. And this has enriched my thesis and my life. Thank you for letting me be a part of yours and for being such a great part of mine.

Ellen Greaves – One of the most wonderful people in the world. Period.

Todd Kuffner – One of the most exceptional people in the world. Period.

Bansi Malde – My spiritual discussant, with whom I have seriously pondered both identification and the existence of God.

Ben Skrainka – A constant source of enthusiasm and stories about all the right things.

Sami Stouli – My dearest friend with whom I agree on nothing and everything.

All of you have made me think in new ways about economics and statistics, laugh like a kid, and feel better when I was down. You are literally the most awesome bunch of misfits a man could ever hope to meet on a journey like I've taken.

My cohort of PhD colleagues have been a fantastic source of friendship, as well as great colleagues to learn with:

Alex Armand – I'm still taking hair and clothing tips from you, or at least Caitlin is asking me to!

Marco Hafner – I shall never meet anyone with better stories of Swiss-Nigerian culture clashes.

Jaime Millan – No economist can mosh as well as you. I have video evidence.

Richard Murphy – The man who best understood where I was coming from when we forgot I was in development.

Anna Raute – My sister, who has taken me under her wing and opened her heart up to me.

Anna Rosso – Beautiful and talented in equal measure, and my son is marrying Ginevra!

Gemma Tetlow – Showing the rest of us how to do it in style!

A special mention is reserved for the family of **Mama Africa**, a little food truck that frequently sits behind the British Museum. They have been a little piece of Nigeria in Bloomsbury since I started the PhD.

My family

Of course, the most important people that made this PhD happen are those that were in the picture much before the start of my PhD, and will be there much after it. My family is the fundamental reason that I have academic interests and a passion for development. They are at the centre of my world, and so at the centre of my thesis. If you thought I was extravagant in my thanks so far, now we are going to hit Nigerian speech levels of gratitude!

My parents, **Josephine and Oliver Rogger**, gave me everything I have, and have continued to nourish and support me in everything that I do. They were unhesitating in their support for my taking up a PhD, and were in fact excited by the idea. Little did they know that my father would have to wait quite so long to see his little boy in a cap and gown. But as each year has gone by, they have continued to encourage me to do

whatever I felt was right, and have celebrated me and comforted me in equal measure. When I felt at my most challenged during fieldwork, they offered, quite genuinely, to fly to Nigeria to be my research assistants. That adventurous streak, combined with their academic pursuits and dogged determination are all the ingredients I drew on for this thesis. Fundamentally, they passed on to me the characteristics I needed for my thesis, and so this is as much there's as mine.

My sister and brother-in-law, **Rebecca and Nigel Lawrence**, have been equally patient and supportive, and have given me a wonderful family life that has only grown throughout the years of my PhD. They are incredible people, whose own professional lives have inspired me to keep working at my own. Rebecca's journey into the field of law has inspired me to fight hard for what I believe in. Nigel's flexibility and adaptability throughout his recent career has shown me the value of a calm and measured approach to even the most challenging of contexts.

My parents-in-law, **Mary Lou and Don Cook**, have been wonderful, living the highs and lows of a research student with me as faithfully as I could have wished for. From supporting my move to Nigeria with their daughter, through their advice at each turn of the PhD, they have been a huge source of unconditional love. Whatever happened on the PhD (and beyond), they would always be there for me and us. That is exactly what I needed from them.

My sister-in-law, **Emily Cook**, undertook another inspiring journey that fired my dedication. She fought through exams, undertook research, and graduated with flying colours. Her professionalism in becoming a nurse added to the environment I strived within. She was also universally loving; a perfect complement to her professionalism in becoming nurse and being such a wonderful sister-in-law.

Finally, we come to the most important person in my world. **Caitlin Rogger**, my wife, has been everything I could have ever needed as a collaborator on this work. She has been the greatest advisor, the greatest comforter, and the greatest partner I could have had over the last seven years. Her patience, whilst I was away on fieldwork, whilst I continued to be a student into my thirties, and as the days turned into years, was unending. She has been exactly what I needed at every moment.

Caitlin played a critical role in actually producing this thesis. She counselled me on how to move forward on the most challenging aspects of my PhD. She helped me word e-mails to enumerators when they were acting improperly. She sat with me for weekends

as we edited and proofread my job market paper. On every page of my thesis, and in every point of my data, she is there in some way.

For all this, and for everything else that my thesis work has put her through, I dedicate this thesis to her. Caitlin, you are at the centre of my truth, as much here as anywhere else. Our relationship has driven all that I am since we met over a decade ago, and so it is across my PhD research. For whatever truth is reflected in these pages, it is fragment of the truth we share. Thank you.

Chapter 1

Introduction

1.1 Understanding bureaucracy

A nation's bureaucracy is fundamental to the state's capacity to protect its people, regulate the economy and deliver public goods. Civil servants are a key link between policy and implementation. Most countries rely heavily on government bureaucracies to manage investments in social sector projects.

Bureaucracies in the developing world often fail to fulfil these duties. As World Bank (2003) put it, "too often services fail poor people". Social sector projects are produced to a low quality, or not at all. The data from Nigeria that underlies this thesis indicates that a third of all projects and programs budgeted for by Parliament are never initiated. Another quarter are not completed. At the same time, my data implies that public organisations like those in Nigeria can produce social sector projects, such as primary health centres or rural roads, effectively under the right conditions. The question this thesis aims to contribute to answering is what those conditions are.

The objective of this thesis is to expand our knowledge of the determinants of public sector productivity in a developing country setting, with implications for the public sector more widely. The particular focus of my research is the civil service, the body of officials directly employed by the government to implement the policies of the executive arm of government. Within the civil service, I concentrate on the social sectors - such as health, education and agriculture - rather than non-social sectors - such as justice, police, the foreign service and so on. Finally, I examine programmes and projects within these sectors, rather than the process of creating new regulations for the sector. Thus, my research aims to understand the productivity of civil service, social sector organisations

in delivering programmes and projects to citizens.

I provide some of the first evidence on the extent to which bureaucrats respond to formal incentives – those laid out in the laws governing an organisation – and informal ones – pressures to take actions that are outside the commonly agreed rules governing an organisation. This distinction is particularly important for the civil service, where a detailed and comprehensive set of governing rules typically creates a highly formalised structure. This rigid, formalised environment heightens the importance of both formal and informal incentives. Formal incentives through the direct application of organisational laws. And informal incentives through the need to negotiate environments that are either not optimally served by existing rules, or do not serve the interests of powerful actors within the service, such as politicians.

1.2 Data on the civil service

Despite the significance of bureaucrats, little data exists on their characteristics, beliefs and outputs. Our understanding of what drives public sector productivity has been constrained by a lack of detailed data on public sector projects and the organizations that implement them (Banerjee *et al.*, 2007).

The largest data sets on officials in the civil service arise from the United States Goverment Federal Employee Viewpoint Survey. The survey assesses federal government employees' perceptions of their organisation, its leadership, and their experience of work. The survey, however, is not compulsory, and has a non-response rate of 48%. It is not representative of the civil service as a whole. Less comprehensive surveys of public officials, with similarly high non-response rates, can be found in other developed countries, such as the United Kingdom's Civil Service Staff Surveys.

In the developing world, the largest survey of government officials to date is the World Bank's 'Public Officials Survey'. It surveyed 7,000 public officials across 15 countries. The largest of these surveys was in Bangladesh (821 respondents), and it was representative of the civil service as a whole. A similar initiative was undertaken by Miller *et al.* (2001) investigated the experience of civil servants in Eastern Europe, but on a smaller scale.

Understanding the productivity of the civil service also requires assessments of how well implemented is a representative sample of public projects. However, large-scale independent assessments of how effectively government has implemented public projects

are surprisingly rare. The United States' General Accountability Office publishes in-depth reviews of small numbers of programmes and projects funded by public funds (see www.gao.gov). Similar audit, monitoring, and evaluation commissions exist in many countries. However, large-scale surveys of public projects comparing intended versus final outputs are almost never made publicly available.

Importantly for an effective research exercise, there is no existing published data that combines a representative public officials survey with assessments of a representative sample of public projects, let alone that which includes additional important data such as project and organisational characteristics, household surveys of the communities these organisations serve, and characteristics of the politicians playing a role in the governance of these organisations.

To address this deficiency, I have created an extensive data set on public sector projects. The data comes from two years of public sector investments by the Federal Government of Nigeria. In 2006 and 2007, the Federal Government of Nigeria channelled US$1.5billion of debt relief gains to pro-poor capital expenditures through the Overview of Public Expenditure in NEEDS (OPEN) initiative. OPEN tagged debt relief funds channelled through standard institutions and processes. It then tracked, monitored, and evaluated the effectiveness of their expenditure using independent engineers and civil society groups. It therefore provides a snapshot of the productivity of public sector organisations across the Federal Government of Nigeria.

To complement this data, I undertook the largest representative survey of civil servants to be performed to date, of 5630 civil servants across the Government of Nigeria. These interviews included assessments of management at each of the organisations that had implemented OPEN projects. I also organised the collection of data on the technical complexities – the technical challenges faced by implementers – of each of the projects in the OPEN data set. Finally, I added to this a host of administrative and household survey data to produce a relatively comprehensive picture of the public service delivery chain.

Banerjee *et al.* [2007] highlight two constraints restricting research on public good provision in developing countries in particular: (i) the process of project implementation is rarely quantifiable; (ii) public good quality is difficult to measure. The data I have assembled and utilise here allows me to make progress on both issues.

I have used this data to write the following two chapters: the first on the impacts of

management on public sector outputs, and the second on the role of political interference in the bureaucracy. Chapter 3 contains a body of research equivalent to two papers. It aggregates my work on politicians' choices over the organisation that implements a public project, and their choices over the extent to personally interact with these organisations. As natural counterparts, they are most coherent as a single chapter.

1.3 Formal incentives

In chapter 2, I study how the formal management practices under which public sector bureaucrats operate correlate to the quantity and quality of public services delivered. These management practices are proxies for the provision of formal incentives by the organisation to their staff.

The study of how formal incentives impact on public sector productivity has generated a relatively large theoretical literature (recent examples include Burgess and Ratto, 2003; Besley, 2004, 2006; Besley and Ghatak, 2003, 2005). An influential review paper, Dixit [2002], outlines the varied ways in which formal incentives in the public sector may have distinct effects on worker effort compared with the private sector. For example, many public sector programmes and projects have been characterised as having significant multi-tasking components. Public sector organisations do not specialise in the same way as private sector ones, and so staff must work across tasks of varying nature. In the presence of multi-tasking, performance pay can incentivise bureaucrats to work on the more measurable aspects of their work at the detriment of the project as a whole.

Applied economic analyses of formal incentives in the public sector have largely focused either on the selection and motivation of politicians (Besley 2004, Gagliarducci and Nannicini 2013), or on the response to incentives of frontline staff such as teachers and health workers (Glewwe *et al.* 2010, Muralidharan and Sundararaman 2011, Duflo *et al.* 2012, Ashraf *et al.* 2012, Miller and Babiarz 2013). In both rich and poor country contexts, there is little evidence linking formal organisational incentives that the vital middle-tier of bureaucrats operate under, to public service delivery. Similarly, the public administration literature has also been relatively devoid of concrete evidence linking practices in civil service organizations to public goods outcomes (Goldfinch *et al.* 2012).

It is this gap I begin to fill. Chapter 2 utilises the OPEN project evaluations as measures of organisational productivity, which I supplement with a survey I conducted

to elicit information about management practices. Bureaucrats from each of the 63 civil service organizations responsible for these projects were surveyed, following the approach of Bloom and Van Reenen [2007]. It is these management measures that I use as proxies for formal incentives in the Nigerian public sector.

This is not the first time the Bloom and Van Reenen measures of management practice have been applied to the public sector. Bloom *et al.* [2013] show that management plays an important part in explaining the productivity of hospitals and McCormack *et al.* [2013] do the same for university departments in the UK. In the developing world, Horak and Sheng [2014] present evidence from a pilot study that measures management practices in Chinese Hospitals. However, my work is the first time they have been applied to the civil service more broadly.

My findings indicate that management practices matter significantly for the performance of the civil service. However, the impact of different forms of management differs from the existing literature that has arisen from Bloom and Van Reenen [2007], mainly focussed on the private sector. Whilst I find that management practices related to autonomy significantly increase project completion rates and project quality, I find that management practices related to performance-based incentives significantly decrease project completion rates and project quality. A one standard deviation increase in autonomy for bureaucrats corresponds to significantly higher project completion rates of 18%; a one standard deviation increase in management practices related to incentives and monitoring corresponds to significantly lower project completion rates of 14%.

I provide evidence that the negative impacts of incentive provision/monitoring arise because bureaucrats multi-task and incentives are poorly targeted, and because these management practices capture elements of subjective performance evaluation that leave further scope for dysfunctional responses from bureaucrats. Finally, I provide evidence on how each dimension of management practice interacts with bureaucrat characteristics, such as their tenure, intrinsic motivation and perceptions of organizational corruption. These findings are among the first evidence that quantify the potential gains to public service delivery arising from marginal changes in how civil service bureaucrats are managed.

1.4 Informal incentives

For the purposes of this thesis, I define informal incentives as 'pressures to take action that are outside the commonly agreed rules governing an organisation'. As a relatively undiscussed topic in the economics literature, there are multiple approaches that could be followed to investigate this phenomenon.

For chapter 3, these informal incentives take the form of politicians providing incentives for bureaucrats that are outside the formal system of organisational incentives. To measure the provision of these incentives, I included in my survey of civil servants measures of the intensity and nature of bureaucrat interactions with politicians. Specifically, I ask the extent to which the surveyed officials are working on projects in which either they know of political interference, or personally engage with politicians. I also investigate the nature of these interactions, asking them the extent to which politicians pressure them to change the specifications, location, or budget of a project.

This is some of the first data on the scale of political interference in the bureaucracy in the developing world. Brollo and Nannicini [2012] have studied informal political engagement with budgeting by showing how Brazilian politicians punish municipalities from opposing parties in the allocation of federal transfers. Similarly, the World Bank Public Officials Survey asked bureaucrats the extent to which corruption would fall in the budgeting process if political interference outside of the formal budgeting process was absent. Using the survey, Manning *et al.* [2000] find similar magnitudes of political interference in Bangladesh and Pakistan to my data from Nigeria, of the order of 40% of project budgets.

Callen *et al.* [2014] have looked at political interference in bureaucratic staffing, and show how patronage politics in Pakistan leads to public jobs with limited work requirements. They record how doctors are present at 42% of the health clinics they study in constituencies that are politically competitive, whilst they are present at only 13% of clinics in uncompetitive constituencies. Iyer and Mani [2012] show how Indian politicians shift staff around the civil service to serve their political ambitions.

My focus in chapter 3 is distinct from these papers in that it looks at the process of project implementation, rather than financing or staffing. I add to a nascent literature on how politicians involve themselves in bureaucratic process by looking at how politicians change the working environment in which bureaucrat's operate on a day to day basis.

The chapter investigates whether political competition causes politicians to interfere in bureaucratic decision-making along two margins: *who* implements public projects and the *incentives* under which they do so. Specifically, I assess whether politicians in closely-contested constituencies delegate to decentralized organizations of government, and interact with the bureaucracy, differently to those in less competitive constituencies. I do so under the assumption that the volume of resources channelled to a constituency is relatively fixed, and provide empirical evidence that this is so. This is in contrast to recent work by Aidt and Shvets (2012) and Aghion *et al.* (2005, 2009, 2010) that show in a US setting when and how powerful politicians move funds to their district. The results here thus provide evidence on a distinct method of political interference. Another way of viewing this, is that by political interference I mean interference in the implementation of programmes and projects, rather than interference at a policy-making stage.

Using a different sample of the OPEN projects to chapter 2 – those projects that could be delegated to a centralised or decentralised organisation – I show that political competition makes politicians more prone to delegating to decentralized organizations and interacting with the bureaucracy.

I do this by writing a simple model of moral hazard, in which politicians must weigh up the benefits of delegating a public project in their constituency to either a centralised or decentralised organisation. They face a trade-off between the benefits of delegating to higher performing, but more independent organisations and the cost of interacting with bureaucrats there to provide them with incentives.

To investigate these two margins separately, I identify two features of the institutional environment in Nigeria's Government that independently vary the ability of a politician to determine delegation decisions, and the cost of interacting with officials at the two tiers of government. The first is whether a politician is a member of a Parliamentary committee that makes budgetary decisions over the delegation of projects within a particular sector, such as health and education. The second is the distance of the organisation implementing a project to the Parliament, where politicians reside.

Using these instruments, I find that politicians in politically competitive constituencies both delegate project implementation more frequently to decentralised organisations, and also interact more frequently with these organisations. This implies that the distribution of resources across government is a function of political incentives, and the environment in which bureaucrat's work is defined by the political context of the project

they are implementing.

1.5 Interactions between formal and informal incentives

The most significant gap in the existing literature on this field is on the interaction between formal and informal incentives. To what extent do politicians or other actors in the public service respond to existing formal incentives by offering a particularly distinct set of informal incentives to bureaucrats? Very little can be found in the economics literature that attempts to answer this question, and though I have dealt with the topics separately, I have not attempted to answer this question rigorously here.

Chapters 2 and 3 are interconnected in the sense that they are both studying the determinants of productivity in the Federal Government of Nigeria. My investigation of the interaction between these two papers is partly limited by the fact that I do not have management surveys for all the projects that are decentralisable, and vice versa, and thus in the two papers I am looking at different samples. Chapter 2 utilises a sample that uses all projects for which I have management surveys. Chapter 3 looks only at those projects that are 'decentralisable' in the sense that a project could be implemented by organizations at different tiers of government, and was not inherently national in nature. The projects excluded are those projects whose scope is national or multi-jurisdictional (across many states for example). The data appendix in chapter 3 provides more information on the selection of projects.

However, I find no evidence that politicians are sorting projects across tiers of government based on the management practices there. Thus, they do not interact in the sense that management practice - the formal rules - plays a significant role in whether politicians delegate to an organisation at the centralised or decentralised tier. As shown in chapter 2, I find little evidence that management practice along the lines that I measure it varies over tiers of government.

1.6 The contribution of this thesis

Chapter 2 is co-authored with my first supervisor, Imran Rasul. To make clear to my examiners what role I played in this chapter, I detail my contribution here. I designed the survey instruments that underlie the collection of the data used in this chapter, organised and ran the surveys, and undertook the data cleaning process. Imran and I

determined the analytical work to assess this data jointly. However, I undertook all of the computation of the data analysis. We then wrote the chapter together.

The creation of the measurement tools and methods, and the collection of the data, is a significant component of the contribution of my thesis work. However, the analysis presented in the proceeding chapters provides some of the most novel evidence to date on the workings of the bureaucracy of public sector organisations. This is true for both formal rules, such as management practices, and informal interactions, such as politicians' interactions with civil servants.

First, the research I have undertaken implies that the form and incentives of the public sector play a key role in determining public sector outcomes. By bringing together data from each part of the service delivery chain, I have been able to show that incentives matter in a relatively comprehensive way relative to the previous literature. Second, both formal and informal incentives matter in defining the productivity of government. By collecting and analysing data on both formal and informal measures of incentives, I have provided quantitative evidence indicating that both play an important role in public service productivity. Finally, my thesis provides some of the first empirical evidence on the optimal nature of incentives inside public bureaucracies that has not been available to this point.

Chapter 2

Management of Bureaucrats and Public Service Delivery

2.1 Introduction

In this chapter, we combine data sources linking the outputs of government bureaucracies with details of how bureaucrats are managed so to look at how formal management practices correlate with public service delivery. On outputs, we use project level data measuring the completion, quality and complexity of over 4700 public sector projects implemented by organizations in the Nigerian civil service, including government ministries and other federal agencies. On management, we adapt the methodology set out in Bloom and Van Reenen [2007] to measure management practices for bureaucrats in each organization, along multiple dimensions. Our study sheds light on the relationship between the management practices for bureaucrats in each organization, and the quantity and quality of projects delivered by the organization.

From a macroeconomic perspective, the effective functioning of the bureaucracy is an important determinant of poverty, inequality, and economic growth as stressed by the state capabilities literature [Besley and Persson 2010]. Effective public service delivery also matters from a microeconomic perspective: program evaluations of micro-scale interventions are often partly motivated by the assumption that successful interventions can be faithfully scaled-up by governments.

However, despite the importance of government effectiveness for citizen welfare, the public administration literature is almost devoid of concrete evidence linking practices in civil service organizations to public goods outcomes [Goldfinch *et al.* 2012]. At the same

time, economic analyses of incentives in the public sector have largely focused either on the selection and motivation of *politicians* [Besley 2004, Gagliarducci and Nannicini 2013], or on the response to incentives of *frontline* staff such as teachers and health workers [Glewwe *et al.* 2010, Muralidharan and Sundararaman 2011, Duflo *et al.* 2012, Ashraf *et al.* 2012, Miller and Babiarz 2013]. In both rich and poor country contexts, there is little evidence linking the managerial practices that the vital middle-tier of *bureaucrats* operate under, to public service delivery. It is this gap we start to fill.

Banerjee *et al.* [2007] highlight two constraints restricting research on public good provision in developing countries: (i) the process of project implementation is rarely quantifiable; (ii) public good quality is difficult to measure. The data we utilize allows us to make progress on both issues. More precisely, we exploit a unique period of history in the Nigerian civil service, during which the activities of public organizations were subject to detailed and independent scrutiny. As part of this process, quantitative information was collected to measure the actual *implementation* success and *quality* of public sector projects in various social sectors. The scrutineers were independent teams of engineers and members of civil society.

We have hand coded this information to obtain potentially unbiased assessments of individual project completion rates and their quality, for over 4700 public sector projects that began in 2006/7. The bulk of project types we study are construction projects, such as boreholes, buildings, dams and roads. We have also used the technical documents available for each project, to work with engineers to construct measures of each project's *complexity*, following engineering best-practice [Remington and Pollack 2007]. The aggregate budgetary cost of the projects we study is US$800 million or 8% of all social spending in Nigeria over this period.

To measure the management practices that bureaucrats operate under, we follow the methodological approach set out in Nick Bloom and John Van Reenen's pioneering work [Bloom and Van Reenen 2007, 2010]. We adapt their management surveys to the Nigerian public sector setting, taking account of insights from the public administration literature [Rose-Ackerman 1986, Wilson 1989]. We collected data on management practices for 63 organizations of the Federal Civil Service in Nigeria, including central ministries and regional development authorities. For each organization, we derive three measures of management practices: one broadly related to the *autonomy* provided to bureaucrats; one related to the provision of *incentives* and *monitoring* of bureaucrats; and one capturing

multiple other aspects of management practices.

The autonomy index we construct captures the extent to which: (i) bureaucrats can input into policy formulation and implementation processes; (ii) the flexibility with which an agency can re-organize its bureaucrats to respond to best practice and project peculiarities. There are long-standing views in the public administration literature on the importance of autonomy. As Rose-Ackerman [1986] describes, at one extreme lies the view that public agencies ought to delegate as much decision making to bureaucrats as possible, relying on their professionalism and resolve to deliver public services [Simon 1983]. At the other extreme lies the Weberian view that, because the objectives of bureaucracies and society diverge, only an entirely rules-based system of public administration, that leaves little to the individual judgement of bureaucrats, can ensure consistent and acceptable levels of public service. The second reason to focus on autonomy stems from the economics of organizations literature. Despite the early prominence of autonomy in this literature [Simon 1951], and the recent contribution of Aghion and Tirole [1997] that has revitalized interest in discretion in organizations, little evidence exists on the causes and consequences of providing autonomy in organizations. Our analysis also starts to fill this gap.

The incentives/monitoring based management index we construct captures the extent to which an organization collects indicators of project performance, how these indicators are reviewed, and whether bureaucrats are rewarded for achievements reflected in these indicators. This is an important dimension of management practices given the literature on incentive theory stressing the positive impacts performance incentives and monitoring have on organizational performance. However, *a priori* the impacts of such incentives in *public sector* settings is uncertain because: (i) bureaucrats might need to engage multiple effort types, not all of which are measurable; (ii) the process by which inputs are converted to outputs is uncertain; (iii) there can be competing views on the right way to implement bureaucratic outputs; (iv) bureaucratic objectives are not clear cut; (v) performance incentives might crowd out the intrinsic motivation of those self-selected into the public sector [Perry and Wise 1990, Benabou and Tirole 2006, Francois and Vlassopoulos 2008].[1]

[1]Positive impacts of performance pay for teachers have been documented using randomised control trials in developing countries by Glewwe *et al.* [2010], Muralidharan and Sundararaman [2011], and Duflo *et al.* [2012], although Fryer [2013] finds zero or even negative impacts in the US. In health, a nascent literature documents positive impacts of performance pay in developing countries when provided to frontline workers [Miller and Babiarz 2013]. In line with our findings, Ashraf *et al.* [2012] document how

We probe these issues by exploiting a third data source: a survey we fielded to a representative sample to over 4100 civil servants, corresponding to 13% of the total workforce of the 63 organizations we study. This asked bureaucrats questions related to their tenure and intrinsic motivation, their perceptions of corruption in the organization, and their employment histories as bureaucrats. We use this evidence both to shed light on how the impacts of management practice vary with bureaucrat characteristics, and also to address econometric concerns related to non-random sorting of bureaucrats into organizations as a function of the management practices in place, or the endogenous determination of management practices as a function of bureaucrat characteristics.

Central to our empirical method is that, for any given project type, *multiple* organizations are observed conducting similar project activities. For example, small-scale dams are constructed by the federal ministries of water, agriculture, and environment. We therefore assess how the delivery of the *same* project type varies depending on the management practices in place for bureaucrats in the specific organization responsible, holding constant all other project characteristics, such as their complexity and scale, as well as other characteristics of the organization and bureaucrats.

We present three core findings linking civil service management practices and public service delivery in Nigeria. First, the management practices bureaucrats operate under matter. Despite the measures of management practice related to autonomy and performance incentives being positively correlated to each other, they have *opposing* correlations with the quantity of public service delivery: a one standard deviation increase in autonomy for bureaucrats corresponds to significantly *higher* project completion rates of 18%, and a one standard deviation increase in practices related to incentives/monitoring corresponds to significantly *lower* project completion rates of 14%. Moreover, we find management practices correlate to *quality-adjusted* project completion rates in similar ways as documented for project completion rates. The backdrop to these findings in Nigeria, where 38% of public projects are never even started, implies these magnitudes are of economic as well as statistical significance. If these findings reflect causal impacts, they suggest the potential gains to marginally changing management practices are huge.

At face value, the interpretation of our findings on autonomy for bureaucrats provide

non-monetary incentives elicit more effort than monetary incentives for such tasks. Perry *et al.* [2009] and Hasnain *et al.* [2012] present literature reviews suggesting a lack of evidence that incentives positively impact bureaucrat behaviors. Muralidharan [2012] provides extensive discussions of why performance related pay might be specifically suboptimal in the public sector.

support to the notion that public agencies ought to delegate some decision making to bureaucrats, relying on their professionalism and resolve to deliver public services [Simon 1983]. The evidence is less supportive of the notion that when bureaucrats have more agency or organizations are more flexibly structured, then they are more likely to pursue their own objectives that diverge from societal interests, resulting in fewer public services being delivered.

The robust *negative* correlation we document between project completion rates and management practices related to the provision of incentives and monitoring of bureaucrats, is far more surprising and counter to a large body of evidence from private sector settings. The interpretation of this result is nuanced because we measure management *practices* related to the provision of incentives and monitoring: we do not measure the use of explicit compensation schemes based on output or project completion. As such, the detrimental impacts of such practices for bureaucrats can be interpreted in at least two ways.

First, bureaucrats might operate in a classic multi-tasking environment, in which they exert multiple types of effort, only some of which generate productive outcomes such as public projects being completed [Holmstrom and Milgrom 1991]. Other efforts that bureaucrats engage in might be termed 'processing', or 'ticking boxes'. In essence, our management practice measure might then capture an incentive system that places excessive regulatory burden or 'red tape' on bureaucrats, that has long been argued to lead bureaucrats to mis-allocate effort towards such processing activities [Kelman 1990]. As management practices in bureaucracies become more overtly concerned with incentivizing and monitoring such processing efforts (perhaps because they are much less costly to specify or monitor than more productive types of bureaucrat effort), then bureaucrats will optimally reallocate effort toward such activities, *reducing* project completion rates overall.

A second interpretation of the negative impact management practices related to performance incentives and monitoring have in this bureaucratic setting is that the practices we measure pick up *subjective* performance evaluation (SPE), rather than explicit incentives based on signals of productive effort/output. While SPE has the benefit of being based on a more rounded set of assessments, it is well known that such subjective assessments also give rise to other biases and dysfunctional responses, especially the desire of agents to engage in influencing activities to curry favor with supervisors [Milgrom 1988,

Milgrom and Roberts 1988]. If so, the increased use of such mis-targeted incentives and key performance indicators can also lead to bureaucrats reallocating effort towards non-productive tasks, thus *reducing* project completion rates overall.

To understand whether the incentive/monitoring related management practices we measure capture elements of multi-tasking or SPE, our second set of results explores how the impacts of management practices vary with project and organizational characteristics. We document the negative impact of incentive based practices are even *more negative* for: (i) more complex projects (that might reflect multiple effort types needing to be exerted); (ii) for projects that organizations implement less frequently and might be less specialized in; (iii) project types that our independent engineering assessments code as being of inherently greater ambiguity or uncertainty in design and implementation. Also in line with the interpretation that incentives are mis-targeted or subjectively determined in this context we find that the negative impacts of performance-incentive practices are *ameliorated* in organizations: (i) that give more discretion to bureaucrats as measured by our index of management practices along this dimension; (ii) with better IT facilities, that might capture their greater ability to measure and target incentives towards the most productive efforts bureaucrats engage in; (iii) staffed by less experienced bureaucrats, that might reflect that bureaucrats learn how to engage in influence activities with experience.

Our third class of results shed new light on the interplay between management practices and *bureaucrat* characteristics. We first address the literature suggesting performance-based incentives might crowd out the intrinsic motivation of public sector workers. We find the negative impact of performance-based incentives is *offset* by the share of bureaucrats in the civil service organization that are intrinsically motivated. Hence, if anything, our evidence suggests crowding-in of bureaucrat effort in the presence of practices related to incentives/monitoring.

While the recent economics literature has emphasized the role of intrinsic motivation, a long-standing literature in public administration emphasizes that civil servants pursue their self-interest [Tullock 1965, Wilson 1989]. This more negative view of bureaucrats spurs our final set of results, that explore how the impacts of management practices are mediated through *perceptions of corruption* among civil service organizations, as elicited in our civil servant survey. Clearly, in the context of Nigerian bureaucracies the issue of corruption cannot be ignored, and it permeates throughout our analysis. We find a large negative levels impact on completion rates of perceptions of corruption in organizations,

but the negative impacts of performance-based incentives do *not vary* with perceptions of corruption. This suggests that corruption is certainly prevalent in this environment, but that there are few bureaucrats that are actually *prevented* from behaving corruptly because of marginal changes in management practice.

To provide support for a causal interpretation of our results linking management practices to project outcomes, we later tackle three econometric challenges: (i) projects being *assigned* to organizations based on their management practices; (ii) *unobserved* bureaucrat or organizational characteristics that are correlated to management practices and also drive project completion rates; (iii) management practices being *endogenously* determined.

The central contribution of the chapter is to provide novel evidence on how management practices for bureaucrats in civil service organizations correlate to effective public sector service delivery, and how the impacts of each dimension of management practice vary across the characteristics of projects, organizations, and bureaucrats. Our results point to new directions for theoretical research to better understand the contracting environment in public bureaucracies, as well as highlighting specific areas in which the better measurement of inputs and outputs of public sector organizations can aid our understanding of public service delivery in the developing world.

The chapter is organized as follows. Section 2.2 overviews relevant aspects of the Nigerian civil service. Section 2.3 details our data sources and empirical method. Section 2.4 presents our core results linking public service delivery and management practices for bureaucrats. Section 2.5 provides evidence to help underpin a causal interpretation of our findings. Section 2.6 concludes by discussing implications of our results for optimal management practices, and links our findings to the literature on improving public services. The Appendix presents further data description and robustness checks.

2.2 Institutional Background

Nigeria is Africa's most populous country, home to 160 million individuals, double the size of any other African country and representing 20% of the population of sub-Saharan Africa. It is a leading setting in which to understand the determinants of public service delivery in the developing world, and also shares important characteristics with other developing countries: government expenditures represent 26% of GDP, it has generally

weak institutions holding government to account, and corrupt practices in public sector organizations are commonplace. The British colonial government fashioned its Nigerian administration after the British Parliamentary Civil Service System, and this is essentially what passed to the independent government of Nigeria in 1960. Although there have been a number of periodic reforms of the civil service, and despite the fact that Nigeria has moved to a Presidential system of government, Nigeria's civil service structure still largely replicates its British colonial origins.[2]

2.2.1 Civil Service Organizations

The Nigerian civil service is organized into federal, state, and local government civil services. Our analysis relates exclusively to federal civil service organizations. Various *organizations*, including ministries, are established by statute to render specified public services.[3] Table A2.1 lists the 63 federal civil service organizations we study. These include ministries of health, education, environment, and water resources, and organizations that have regional bases (such as federal polytechnics, federal medical centres, development authorities etc.). Table A2.1 highlights how these organizations vary in their budget sizes, staffing levels, and decentralization. The federal ministries are typically the largest in terms of budget, with regional organizations typically having fewer staff and being deconcentrated from central government.[4]

Each civil service organization is tasked to provide various types of *project*. These include construction projects: boreholes, buildings, roads and canals; as well as non-construction projects such as procurement, training, and advocacy. Crucially for our analysis, for any given project type, *multiple* organizations are observed conducting

[2]The constitution adopted since 1999 has many similarities with that of the United States Constitution. Legislation is enacted by a bicameral National Assembly composed of the Senate and the House of Representatives. Each federal state has its own government headed by a Governor and a state parliament. Although the introduction of a Presidential system of government in 1979 saw initial reforms to the civil service, for example under the 1988 Civil Service Reorganization Decree No. 43, later decrees reversed some of these changes.

[3]The Civil Service is governed by a set of Public Service Rules and Financial Regulations, *ad hoc* Circular Instructions, decrees circulated across government, and Gazette Notices (decrees published in the Government's gazette). Together these outline the laws regulating the business of government, and cover service appointments and exits, discipline, salaries, management of public funds, and other major aspects of official assignments.

[4]Budget figures are averages for 2006-10. Staff numbers are taken from administrative data for 2010. Decentralized 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 they have a separate budget line to central ministries. In line with the literature, we refer to such organizations as being 'deconcentrated'. 'Concentrated' organizations have a direct line of responsibility to the President and National Assembly.

similar project activities. For example, small-scale dams are constructed by the federal ministries of water, agriculture, and environment, and by all of the river basin development authorities. We therefore assess how the delivery of the *same* project type varies depending on the incentive structures in place for bureaucrats in the specific organization responsible, holding constant other project and organizational characteristics.

Underlying our analysis is the notion that the objectives of civil service organizations do not run entirely counter to raising project completion rates. Our analysis is informative on the importance of management practices as long as organizations place *some* weight on this outcome. Anecdotal evidence suggest senior management have sometimes been removed on the basis of poor completion rates. Moreover the types of capital expenditure on projects we focus on constitutes 46% of organizational budgets in total, on average, so they undoubtedly represent an important element of what organizations are responsible for overall.

2.2.2 The Assignment of Civil Servants and Projects to Organizations

The Head of the Civil Service of the Federation organizes the postings and conditions of Nigeria's federal civil servants. Our representative survey of 4100 individual civil servants confirms this: 88% of civil servants said they had no influence over their initial posting; 60% report their current posting being 'at random', with a further 22% reporting being transferred across organizations on an impersonal basis. Hence it is unlikely that bureaucrats self-select into organizations on the basis of the management practices in place, as evidenced in greater detail later.

Once posted, civil servants enjoy job security. Our survey reveals mean tenure at the *current* organization to be almost 13 years. For senior managers (those above grade level 12) this rises to almost 16 years. The survey also reveals that movements across organizations are rare: 67% of bureaucrats report never having moved organization. This lack of mobility in the labor market for bureaucrats slows down the rate at which best practices for management spread through the bureaucracy, and might also dampen incentives for organizations to tailor management practices in order to attract certain types of bureaucrat.

Projects are assigned to organizations centrally by the National Assembly, that enacts a budget law specifying the projects to be implemented each fiscal year. The projects we study were all established in law by Budget Appropriation Bills passed in 2006 or 2007.

The passage of these bills is as follows. Having received inputs from the executive branch of government, a draft Appropriation Bill is presented to the National Assembly. The draft bill is then split into sectors (water, health etc.) and sent to sectoral committees of the House and Senate. These committees are delegated to hold hearings with relevant parties, to scrutinize the proposals, define budgets for each project and decide which organization is responsible for its implementation. These committees are staffed by politicians with qualifications or experience in the relevant sector. These sectoral committees then recommend a budget for the sector to an Appropriation Committee which merges the recommendations into a single budget. This unified budget is then voted on by both houses to form that year's Budget Appropriation Bill. This legal document defines the responsibilities of civil service organizations in terms of projects to be delivered.

2.2.3 Management of Bureaucrats

It is at this point that the *management* of civil servants becomes crucial for the transformation of government plans into public service delivery. To better understand how management practices evolve in organizations, we held structured interviews at four of the federal organizations in Table A2.1. These revealed three common themes in how management practices are determined in organizations: (i) the Public Service Rules of the Nigerian civil service provide guidelines on how bureaucrats should be incentivized, and these are common to all federal organizations; (ii) the history of senior management staff that have worked in an organization might bring their own innovations to bear; (iii) the role of external events such as demands of trade unions. Taken together, these interviews consistently emphasized the nature of management practices in the civil service organizations to be *slowly evolving* over time, and not necessarily tailored to maximize public service delivery of the types of project organizations are used to being assigned.[5]

An econometric concern is the potential reverse causality from bureaucrat effective-

[5]The structured interviews took place more than two years after the other surveys were fielded. In the Nigerian public sector, management practices are said to take the Public Service Rules as their foundation. These rules provide the framework for the running of the public service, including rules around the distribution of authority, the nature of discipline, the provision of training, and so on. In each case, these were said to be central to determining management practice. However, we were repeatedly told that a secondary influence on an organization's management practices was the history of management staff who had worked at the organization. Officials are promoted into management positions based primarily on tenure. Views on management practices are said to be aggregated by committee, with the chief executive marshalling, rather than defining, the direction of reform. This situation, we were told, leads to a relatively slow changing management environment, but one that over the years can lead to substantial divergence in management practice across organizations. Finally, external events, such as the demands of trade unions, were said to have a third-tier influence and constrain management practices.

ness driving the management practices in place. While we cannot rule this out entirely given our data, we also reiterate that such processes for how management practices were determined were not mentioned in any of the structured interviews conducted. We address this issue in detail in Section 2.5.

2.3 Data and Empirical Method

2.3.1 OPEN Data on Project Completion and Quality

The Nigerian Government began a program of sweeping reforms in the major organs of government in 2003 [Nkonjo-Iweala and Osafo-Kwaako 2007]. As a result, the Nigerian Government received cancellation of its external debt to the tune of US$18 billion from the Paris Club. At the federal level, the annual savings from debt interest were channeled into the social sectors that we study. The Presidency also saw this as an opportunity to track the effectiveness of government expenditures, and so in 2006 and 2007 the Nigerian Government undertook the Overview of Public Expenditure in NEEDS, known as the 'OPEN initiative', in which it traced, at a project level, the use and impact of 10% of *all* federal Government social sector expenditures approved between 2006 and 2007. The projects selected to be part of the OPEN initiative were designed to be representative of existing social sector expenditures, but also to be informative for those projects that were most needed to be scaled-up nationwide.

Under the OPEN initiative, visits to public projects by expert teams identified the extent to which they had been implemented as planned in the Federal Budget, and embodied in each project's technical document. The Presidency contracted national and regional teams to undertake the monitoring process outside of the institutions of the civil service. Hence the public sector projects were *not* evaluated by potentially biased civil servants, but rather by teams of independent engineers and civil society. The engineers evaluating the projects were not those working on the project sites and the civil society groups were recognized third sector organizations.[6]

We consider projects traced under the OPEN initiative that were approved in the 2006 or 2007 federal budgets. Monitoring teams visited the relevant project sites around

[6]The teams were recruited in a competitive tendering process that was regulated by the government's procurement agency. The decision to use monitoring teams independent of government was a function of the weakness of existing government systems as well as the need for impartiality [Federal Government of Nigeria 2007]. Prior to the OPEN initiative, the government had its own monitoring and evaluation systems in place (based on unannounced visits) but these were largely perceived to be ineffective.

18 months after the project was centrally approved. All the projects we study had twelve month completion schedules, so that even accounting for any delay in the disbursement of funds, it is feasible for these projects to be completed by the time of the monitoring survey.

The OPEN evaluation teams coded: (i) whether the project had started; (ii) its stage of completion; (iii) the quality of the inputs and work. Our main outcome variable is a *continuous* measure, from zero to one, of project completion rates. A recorded completion rate of zero does not imply the organization never even attempted to work on the project. Rather, the project might have been formulated and prepared, with responsibility for implementation having been delegated to a department and bureaucrats within the organization. At that point however, progress on the project halted, with funds either being returned due to lack of use, or being lost. We cannot distinguish whether this lack of implementation reflects active or passive waste [Bandiera *et al.* 2009]. A completion rate of one implies the project matched its full specification.

To maximize data coverage on project quality, we are forced to utilize the most aggregate formulation of quality reporting. A project was either of insufficient quality, satisfactory, or commended for an 'above average or high' quality level. With this definition, we obtain 2235 observations of project quality, 2206 of which also have project completion data. We then define a project quality indicator equal to one if the project is of satisfactory quality or above.

To further ensure the accuracy of monitoring reports, the Presidency put in place a system of checks and balances. First, a centralized team of technocrats monitored the evaluation teams, providing them with training and opportunities for standardization of their methods at national conferences. Second, evaluators were asked to provide material, photographic, or video evidence to support their reports. Third, the national teams and Presidency performed random checks on evaluated sites, all of which were consistent with the findings of OPEN monitors. Evaluations of the OPEN process indicate it successfully achieved its aims [Eboh 2010, Dijkstra *et al.* 2011].

The reports of OPEN evaluators describe the fate of projects budgeted for execution in the 2006 and 2007 federal budgets [Federal Government of Nigeria 2008, 2009]. We hand coded the material from all projects recorded in OPEN initiative reports from the federal civil service organizations listed in Table A2.1.[7] Taken together, the coverage of

[7]We have a relatively broad sample of federal social sector organizations. In the water and power

projects in our sample traces 8% of all Federal Government social sector expenditures in 2006/7 budget years, corresponding to 4721 projects from 63 organizations, with an aggregate budget of around US$800 million.

We also hand coded other project level characteristics such as its budget, whether it was a rehabilitation project, and, as described in mode detail below, its complexity as defined by engineer-approved measures derived from the project's technical specifications.

Table 2.1 provides descriptive evidence on each project type studied. Boreholes are the most common type, corresponding to 29% of all OPEN projects. Key to our empirical method is that most project types are implemented by a range of organizations: for example there are 18 civil service organizations that construct boreholes, as shown in Column 2. Hence we are later able to study the impact of management practices for bureaucrats, that vary across civil service organizations, on project implementation, *conditional on* project-type fixed effects.

Column 3 highlights the scale of projects by project type: most constitute the 'nuts-and-bolts' of rural infrastructure development: the median budget for dams is US$18,000, and the median budget for a building is US$120,000. It is because projects are relatively small scale that partly explains why multiple organizations are observed being tasked to implement similar project types. Columns 4 to 7 show completion rates by project type. Aggregating across all project types, 38% of projects are never started. Although this might emphasize the role that corruption or passive waste might play, it is not a complete explanation for bureaucrat behavior: 31% of projects are *fully* completed, and conditional on being started, the average project completion rate is .75. Examining the data by project type emphasizes the variation of completion rates across and within project types. Conditional on being started, most projects are more than 50% complete. The final column provides information on the percentage of projects rated to be of satisfactory quality by the team of independent engineers and civil society: here we tend to observe the majority of projects being ranked highly irrespective of project type.

Table 2.2 presents descriptive evidence on the public service delivery of the ten largest civil service organizations in our sample, as defined by the total number of projects implemented (although this maps closely to the size of organizations as measured by

sectors, we cover all the relevant federal organizations. In the health sector, we cover 28% of health organizations, with the excluded a subset of the medical service providers such as a number of Federal Medical Centres. Similarly, in education we cover 14% of education organizations, excluding a range of institutions of learning such as some Federal Colleges of Education.

total budget). This again emphasizes that, with the exception of the Federal Ministry of Power and Steel, each organization is engaged in providing multiple project types. We observe huge variation across these large organizations in the percentage of projects that are never started (11% to 95%), and that are fully completed (3% to 89%). The final column provides information on the percentage of projects rated to be of satisfactory quality: here we observe far greater variation across civil service organizations (25% to 100%) than we previously documented in Table 2.1 across project types.

These statistics suggest there might be important factors at the organization level that drive this variation in the quantity and quality of public sector projects. We next detail how we measure one such factor: the management practices civil service bureaucrats operate under.[8]

2.3.2 Measuring Management Practices

There has been a revival of research investigating the impacts of management practices on the performance of private sector firms [Ichniowski *et al.* 1997, Black and Lynch 2001, Bloom and Van Reenen 2007, 2010; Bloom *et al.* 2012, 2013]. We follow Bloom and Van Reenen's (henceforth BVR) approach to measuring management practices in organizations. We adapt their survey tool and practices to the Nigerian public sector setting, taking into account long-standing views on the importance of autonomy in public administration [Simon 1983, Rose-Ackerman 1986, Wilson 1989] as well as recent insights from the 'new performance management' and 'good governance agenda' perspectives [Francois and Vlassopoulos 2008, Goldfinch *et al.* 2012].

To obtain reliable information on management practices, we worked closely with members of the OPEN office in the Presidency, as well as members of the Office of the Head of the Civil Service of the Federation in undertaking the questionnaire development process. A number of pilots using semi-structured interviews like those in BVR were held to outline key similarities and deviations from the BVR methodology. After a number of months of collaborative questionnaire design, civil servants from each organization practised the survey with each other and identified where wording or phrasing was not suitable for the Nigerian context.

The management survey enumerators were trained together for a number of weeks

[8] Regressing project completion rates on organizational fixed effects yields an R^2 of .33, suggesting that organizational characteristics such as management practices can plausibly play an important role in determining such outcomes.

including practice interview sessions before undertaking the first few interviews together. The aim was to ensure a consistent interview engagement across sessions. To obtain information on management practices, senior management staff from the key departments of the organization, but not the chief executive officer, were brought together in a private office to discuss managerial practice at the organization in confidence. While each manager filled in their own questionnaire, the enumerator looked for a consensus and recorded that in her own questionnaire. This is the underlying information we use to construct management practice indices for each organization.[9]

From September to November 2010, our survey team held interviews at the organizations listed in Table A2.1. Following BVR, interviews were 'double blind' in that: (i) managers were not told in advance they were being scored or shown a score grid; (ii) enumerators were given no information on the performance of the organization. However, the delay between the collection of the OPEN data set in 2006/7 and the Civil Servants Survey in 2010 raises the question whether civil service structures changed significantly in between data collection periods. For example, those organizations found to have low completion rates might have instigated reforms to improve management practices for bureaucrats. However, there is little evidence from other sources of any major civil service reforms being implemented over this period, or of significant changes in the political organization of federal agencies [Alabi and Fashagba 2010, Ogundiya 2011]. In addition, we find little evidence of a spike in turnover of bureaucrats around 2007, coinciding with the Presidential election: 80% of bureaucrats employed in 2010 were at the same organization in 2007.

The BVR evaluation tool elicits management practices through a semi-structured interview covering four topics: operations, targets, incentives and monitoring. We apply the BVR approach in the context of public bureaucracies, extending the series of practices elicited to cover those more relevant for managing bureaucrats. As a result, our management survey covers nine topics: roles, flexibility, incentives, monitoring, culture, targeting, facilities, skills and staffing. We then replicate the BVR method eliciting information on

[9]In this context, conducting management surveys via telephone was judged to be far less likely to reveal true practices than conducting face-to-face group interviews. Second, given the interview format, individual manager responses on management practices are available, but we cannot link individual managers to specific projects and so do not utilize that information (each project is delivered by teams of bureaucrats across sub-departments): rather we use the consensus measure recorded by the enumerator. Managers were told their individual responses would remain confidential. Third, we checked whether recorded practices are sensitive to the number of managers present at interview (that does vary across organizations): we find no such relationship. Fourth, the mean interview time was 74 minutes, and we include this as part of our noise controls in the empirical analysis.

each of these broad topic areas from our civil service organizations, although we do so using a more limited set of underlying questions related to each topic, and some of our questions permit only yes/no replies, while others are based on a full scoring grid. Table A2.2 details the questions that come under each of the nine topic areas, and how they are aggregated into what we refer to as 'autonomy', 'incentives' and 'other practice' indices (denoted CS-autonomy, CS-incentives and CS-other respectively).[10]

The questions on 'roles' assess the extent to which bureaucrats can input into policy formulation and implementation processes. The questions on 'flexibility' aim to measure whether a bureaucratic agency is able to re-organize its bureaucrats and adapt tasks to respond to best practice and project peculiarities. We combine answers to the roles and flexibility practices to construct an index of management practices capturing bureaucrats' 'autonomy' (CS-autonomy).

The questions on 'incentives' are designed to capture more familiar notions of incentive provision for bureaucrats, both positively in terms of whether rewards are given for some dimensions of service, and negatively in terms of punishments for poor service; the questions on 'monitoring' capture practices related to the collection and use of performance indicators. We combine the answers to the incentives and monitoring practices to construct an overall index of management practices capturing the performance related 'incentives' bureaucrats operate under (CS-incentives).

The remaining topics cover the following practices: the 'facilities' questions relate to how well-functioning the organization is, for example, by collecting information on the availability of electricity and internet facilities to bureaucrats; the 'skills' questions relate to the human capital of bureaucrats, especially their IT competencies, and the trainings offered to them; the 'staffing' questions focus staff recruitment and retention, as well as how workloads are spread across bureaucrats; the 'targeting' questions relate to the existence and clarity of targets for bureaucrats, and finally, the questions related to 'culture' try to elicit information on how colleagues are collectively treated and interact

[10]Hence there are two important deviations from how we elicit management practices using the BVR method. First, we tailored the precise wording of some questions to better fit our context. Second, we did not use the same universe of questions from the BVR survey. In most cases this was because we could not identify an analogous concept in the public sector that was relevant or not covered by other questions. For example, the majority of questions on lean manufacturing in BVR (e.g. 'What kinds of lean (modern) manufacturing processes have you introduced?') were not utilized. However, those on improving manufacturing processes ('How do you go about improving the manufacturing process itself?') were translated into the redefinition of procedures in response to new needs or challenges ('Does your organization make efforts to redefine its standard procedures in response to the specific needs and peculiarities of a community?').

with others outside of the workplace. We combine the answers on all these topics to construct a third index of 'other' management practices (CS-other).

We clearly recognize there is no definitive way to solicit management practices along these various dimensions, nor a definitive way to collate them into more aggregate indices. Our approach is primarily designed to reflect two broad areas of management practice emphasized in the public administration and economics literatures as being first order determinants of bureaucrats' behavior: autonomy and performance incentives. However we later consider two extreme cases by documenting the correlation between project completion rates and: (i) a fully disaggregated specification showing the separate impact of all nine dimensions of management practice; (ii) an aggregate measure of management practice that collates all nine categories into a single index.[11] Given these indices measure *broad* practices, rather than reflecting *specific* compensation schemes or workplace policies, there might be less concern that such broad practices can rapidly endogenously respond to either past project completion rates, or to changing bureaucrat characteristics.

The responses to each practice in Table A2.2 are converted into normalized z-scores (so are continuous variables with mean zero and variance one by construction), where in all cases, variables are increasing in the commonly understood notion of 'better management'. For the CS-autonomy index, we assume greater autonomy corresponds to better management practices (our empirical analysis then assesses whether this is positively or negatively correlated to project completion rates). For our core analysis, we aggregate z-scores into the three CS- measures by taking the unweighted mean of the underlying z-scores. We later show the robustness of our results to other weighting schemes.

Two further points are of note. First, the CS-autonomy and CS-incentive management scores are *positively* correlated. Hence in the cross section of federal organizations, the provision of autonomy and performance incentives do not appear to be substitutes. Second, these correlations are not high: the CS-based measures have a correlation coefficient of .24. Combined with the underlying variation in each measure across organizations, this opens up the possibility to precisely identify the separate relationship of each measure

[11] We have also used principle components analysis to assess the importance of individual practices through factor analysis. For the matrix of all nine sub-indices, we find the first factor explains 28% of the variation.

to public service delivery.[12] The marginal impacts of these two measures can also be separately identified from that of the CS-other index: the CS-autonomy (CS-incentives) index has a correlation of .17 (.43) with the CS-other measure.

These indices, and the underlying management questions, provide us with our core explanatory variation. Following BVR, we also collected data on the interviewees for each survey, interview characteristics and the quality of the survey session. These 'noise controls' will also be conditioned on in our baseline empirical specifications as described later.

2.3.3 Project Complexity and Other Variables

When relating project outcomes to management practices for bureaucrats, it is important to condition on project complexity. To measure this we collaborated with a pair of Nigerian engineers familiar with the OPEN initiative and a group of international scholars with research interests in project complexity. The complexity indicators were based on the detailed technical specifications specified for each project, and are constructed following engineering best practice that emphasizes multiple dimensions of complexity [Remington and Pollack 2007]. The Appendix: (i) details the construction of these indices, and presents descriptive statistics for them; (ii) describes checks we put in place, using multiple engineers, to establish the validity of these complexity measures.

These complexity indicators reflect the number of inputs and methods needed for the project, the ease with which the relevant labor and capital inputs can be obtained, ambiguities in design and project implementation, and the overall difficulty in managing the project. Some of these features relate to the hallmark differences in goods supplied between public and private sectors. Our empirical approach then aims to hold constant the complexity of the project along these dimensions, including issues related to organizations needing to sub-contract project implementation to a private sector firm, for example. This allows us to focus in on the correlation between managerial practices for bureaucrats and project completion rates, all else equal.[13]

[12]Such substitution might have been observed if bureaucrats have strong career concerns, and so performance incentives are not required once autonomy is given to individuals. Alternatively, if bureaucrats are intrinsically motivated they might need only to be provided autonomy, and indeed, the provision of explicit incentives might crowd out their intrinsic motivation.

[13]Our civil servant survey also helps to shed some light on the relationship between bureaucratic organizations and such third party contractors/suppliers/consultants. For example, only 6% of civil servants agreed with the statement that, the most successful contractors "are aligned with the government in some way"; only 13% of civil servants reported having been offered a 'small present', 'money', or an

The other project level controls include the project's budget and whether it was a rehabilitation project. Finally, organizational variables we control for include administrative data on the number of employees at each organization, the proportion of staff with graduate/postgraduate qualifications, and the organization's total budget. In some specifications we also condition on controls for the state in which a given project is located. We construct these state controls using aggregated data provided by the National Bureau of Statistics.

2.3.4 Empirical Method

Our baseline empirical specification has as its unit of observation project i of type j in organization n. The project types are listed in Table 2.1, and the federal civil service organizations from which management practices have been elicited are listed in Table A2.1. We estimate the following OLS specification, where y_{ijn} corresponds to the project completion rate, or the assessment of project quality, as described in Table 2.1, and the three main indices of management practice are the CS-autonomy, CS-incentives and CS-other indicators described above,

$$y_{ijn} = \gamma_1 CS\text{-}autonomy_n + \gamma_2 CS\text{-}incentives_n + \gamma_3 CS\text{-}other_n + \beta_1 PC_{ijn} + \beta_2 OC_n + \lambda_j + \epsilon_{ijn}, \tag{2.1}$$

PC_{ijn} includes project characteristics such as the project complexity, log project budget and whether the project is a rehabilitation or not. OC_n includes organization level controls such as the log number of staff, log total organization budget, log capital budget, and the proportions of officials with a college and postgraduate degree. Following BVR, within OC_n we also condition on 'noise' controls related to the management surveys. These include 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, which is a simply a subjective assessment as to whether the interview went well.

As typically many organizations are observed implementing the same project type j, we control for project fixed effects λ_j in our baseline specification (2.1). Our parameters

'expensive present' by such contractors.

of interest are γ_1 and γ_2: as each CS- measure is a standardized z-score, these coefficients measure the effect size of a one standard deviation change in management practices along the respective margins of autonomy and performance incentives. As our main specification controls for project fixed effects, we allow the standard errors to be clustered by project type-organization. In the Appendix we demonstrate the robustness of our results to allowing standard errors to be clustered by organization (across all its project types). Our working sample is based on 4721 projects from 63 organizations on which we have data on management practices and project, organization and bureaucrat characteristics.

In specification (2.1) we are implicitly assuming that, within project type and controlling for project and organizational characteristics, the underlying production function is the same across projects. Specification (2.1) then corresponds to a reduced form representation of an underlying production function in which management practices convert the raw total of available bureaucratic labor into effective labor inputs in the completion of public projects.

To provide support for a causal interpretation of the estimated partial correlations linking management practices to project outcomes $(\widehat{\gamma}_1, \widehat{\gamma}_2)$, we need to tackle three econometric challenges: (i) projects are *non-randomly assigned* to organizations based on their management practices; (ii) *unobserved* bureaucrat or organizational characteristics that are correlated to management practices and also drive project completion rates; (iii) management practices being *endogenously* determined by bureaucrat characteristics or project outcomes. In the next section we present our OLS results on the partial correlations between various dimensions of management practice and project completion rates. Section 2.5 then provides evidence to address these econometric concerns.

2.4 Core Results

2.4.1 Project Completion Rates

Table 2.3 presents our main results on how civil service management practices correlate with project completion rates. Column 1 only controls for the three CS- measures. We find that higher levels of autonomy for bureaucrats correlate to significantly higher completion rates ($\widehat{\gamma}_1 > 0$). The impact of greater use of performance incentives/monitoring for bureaucrats on project completion is however *negative* and also significantly different from zero ($\widehat{\gamma}_2 < 0$). Columns 2 to 4 sequentially condition on noise controls and orga-

nizational characteristics, project characteristics, and project fixed effects. Throughout, we find both management practices have significant impacts on project completion rates at the 1% significance level.[14]

Our preferred specification is in Column 4 with project fixed effects. This shows that a one standard deviation increase in CS-autonomy corresponds to significantly higher project completion rates of 18%. A one standard deviation increase in CS-incentives corresponds to significantly lower project completion rates of 14%. The stability of both coefficients of interest and their standard errors across Columns helps ameliorate the concern that there likely remain other omitted controls that would cause large changes in magnitude and significance of the coefficients of interest.

The estimated coefficient on the other dimension management practice of CS-other, $\widehat{\gamma}_3$, is less stable in magnitude and significance across specifications. This might be as expected given that it is composed of the widest range of underlying components. In all specifications, better management practices on this CS-other dimension are positively correlated with project completion rates; in Column 4 the estimated coefficient is indeed significant at conventional levels, although the effect size is significantly smaller than for the two dimensions of management practice.

In Appendix Table A2.4 we show the robustness of these core findings to assuming the disturbance terms ϵ_{ijn} in (2.1) are clustered by organization (across all project types), correcting p-values for potential biases due to a small number of clusters [Cameron *et al.* 2008]. In Figure A2.2 and Appendix Table A2.5 we probe the robustness of our baseline result along eight margins: (i) defining threshold completion rates that deem the project usable and seeing how management practices relate to reaching these thresholds (especially those related to completion rates of zero and one); (ii) restricting the sample to the largest/smallest organizations; (iii) removing organizations at the tails of the CS-autonomy and CS-incentives measures; (iv) considering the impacts of managerial practices on construction and non-construction projects separately; (v) considering the impacts of managerial practices on projects implemented by centralized and decentralized organizations separately; (vi) controlling for characteristics of the state in which the

[14] Among the noise controls, neither the age, gender, or tenure of interviewees significantly impact project completion rates. Nor do whether the interviews were undertaken in the morning, their length, or the quality rating of the interview. Noise controls that are significant include whether the interviews where undertaken on a Tuesday or Saturday (negative), or during Ramadan (positive). A few of the interviewer dummies are significant. The exclusion of the noise controls does not change the qualitative nature of the main results reported.

project are located, and exploring how the results vary depending on whether projects are located in the North or South of the country that defines the principal cultural divide in Nigeria; (vii) alternative constructions of the CS- management practice indices (rather than the equal weighting procedure); (viii) using a fractional regression model rather than OLS.

One concern is that project completion rates may not be a useful outcome indicator: projects may be almost completed but to a low quality standard. We therefore construct a 'quality-adjusted' completion rate where the proportion completed is multiplied by a binary quality indicator. Where quality is unsatisfactory, whatever the level of completion, this variable is set to zero. As described in Section 2.3, the drawback of using this outcome measure is that information on project quality is only available for around half the projects for which we have project completion data, originating in 51 civil service organizations. To ease comparison of the samples used, we note that if we re-estimate our main specification with the project completion rate as the dependent variable, but for the sample in which quality data is available, the partial correlations of each CS- measure with project completion rates are not much different to our baseline specification in Column 4.

Column 5 then shows the relationship between management practices and quality-adjusted project completion rates. We find the CS- measures to quantitatively impact quality-adjusted project completion rates in a similar way to project completion rates: higher levels of CS-autonomy are associated with significantly *higher* quality projects, and higher levels of CS-incentive are associated with significantly *lower* quality projects.

2.4.2 Exploring the Negative Impact of Performance Incentives

Our results confirm that the two dimensions of management practice we focus on: autonomy and performance incentives/monitoring, do indeed correlate to the quantity and quality of public services delivered, as emphasized by the public administration and economics literatures respectively. The overall positive correlation of CS-autonomy with project completion rates provides support to the notion that public agencies ought to delegate some decision making to bureaucrats, relying on their professionalism and resolve to deliver public services [Simon 1983]. On average, the evidence is less supportive of the notion that when bureaucrats have more agency or organizations are more flexibly structured, then they are more likely to pursue their own, potentially corrupt, objectives

that diverge from societal interests, resulting in fewer public services being delivered.

The robust *negative* correlation we document between project completion rates and management practices related to the provision of incentives and monitoring of bureaucrats, is far more surprising and counter to a large body of evidence from private sector settings. As described in the introduction, the evidence on the impacts of performance-related incentives in public sector settings is mixed (often focusing on the impacts of specific compensation schemes to frontline workers).[15] Ours is among the first evidence to suggest the possibility that such management practices, *broadly* defined, have negative impacts on the vital tier of civil service *bureaucrats*.

The interpretation of the negative partial correlation is nuanced because we measure management *practices* related to the provision of incentives and monitoring: we do not necessarily measure the use of explicit compensation schemes based on project completion. As such, the detrimental impacts of such practices for bureaucrats can be interpreted in at least two ways. First, bureaucrats might operate in a classic multi-tasking environment, exerting some types of effort that can be labelled as 'processing' efforts, that do not lead to project completion rates, and also exerting other more productive types of effort that raise completion rates. Our management practice measure might then capture an incentive system that places excessive regulatory burden or 'red tape' on bureaucrats (say through the use of mis-targeted key performance indicators), that has long been argued to lead bureaucrats to mis-allocate effort towards processing activities [Kelman 1990]. Alternatively, our management practices related to performance incentives and monitoring might well pick up *subjective* performance evaluation (SPE), rather than explicit incentives based on signals of effort/output. While SPE has the benefit of being based on a more rounded set of assessments, such subjective assessments also give rise to other biases and dysfunctional responses, especially the desire of agents to engage in influencing activities to curry favor with supervisors [Milgrom 1988, Milgrom and Roberts 1988]. If so, the increased use of such mis-targeted incentives and key performance indicators can also lead to bureaucrats reallocating effort towards non-

[15] In health, two recent Cochrane reviews have come to different conclusions on the efficacy of pay for performance [Flodgren *et al.* 2011, Scott *et al.* 2011]. Perry *et al.* [2009] review 57 studies on pay for performance in the public sector and conclude 'pay-for-performance continues to be adopted but persistently fails to deliver'. Hasnain *et al.* [2012] review over 60 public sector studies, and find the vast majority are for tasks where outputs are more easily measurable such as teachers, health workers, and revenue inspectors. They argue there is simply insufficient evidence of the impact of incentives on bureaucrats.

productive tasks, thus *reducing* project completion rates overall.[16]

To begin to shed light on these possible interpretations, Column 6 of Table 2.3 interacts the two CS- measures of management practices for autonomy and performance incentives. We find evidence of an interplay between the two: the negative impacts of performance related pay on project completion rates are offset when bureaucrats are provided more autonomy and organizations are more flexible. This might be indicative of the fact that with such autonomy and flexibility, bureaucrats can, on the margin, more easily work around any poorly targeted elements of the incentive/monitoring environment they face that might otherwise lead to dysfunctional responses such as them exerting processing efforts or engaging in influence activities.[17]

To probe this further we now investigate how characteristics of projects, organizations and bureaucrats interplay with management practices. By doing so we aim to shed light on the extent to which our measured management practices might capture that multi-tasking concerns are first order for bureaucrats, or that they are subject to SPE and so might engage in influence activities.

2.4.2.1 Project and Organizational Characteristics

We first establish whether the impact of management practices related to performance incentives vary with the complexity of projects, assuming that more complex projects require more varied effort types to be exerted. If so, performance incentives/monitoring might be especially hard to design for such projects. Column 1 in Table 2.4 takes this prediction to the data by interacting the CS-incentives measure with the continuous measure of project complexity. For expositional ease, this interaction term is defined in terms of its deviation from mean, so the coefficients on CS-autonomy and CS-incentives are interpreted as the marginal effect of these practices, evaluated at the mean of project complexity. We see the negative impacts of CS-incentives related practices for bureaucrats are *exacerbated* in more complex projects, in line with a multi-tasking interpretation.

[16] Baker [2002] develops a multi-tasking model to characterize how distortion and risk affect the value and use of performance measures. The model highlights how in public bureaucracies, that cannot use stock incentives and have nebulous objective functions, this leads to a fundamental difficulty in defining 'good' performance measures. Hence the potential for dysfunctional responses when high powered incentives are utilized in such settings.

[17] Hence there are gains to organizations from coupling together good management practices along these two dimensions. Indeed as discussed in Section 2.3.2, we do observe the two CS- measures in the cross section of organizations having a correlation coefficient of .24, so better management practices along both dimensions are weakly bundled together in most cases.

To probe further the idea that it is difficult to target incentives/monitoring for bureaucrats towards those efforts that aid project completion, we examine how the impacts of this management practice vary across projects conducted by the organization. More precisely, for each organization we define the *modal* project type assigned to it. We then create a dummy equal to zero if project i is of this modal type and equal to one if it corresponds to a more atypical project that the organization is tasked to complete. Column 2 shows the impact of performance incentives to indeed be even more negative among non-modal project types (the magnitude of the impact being around 40% of that on modal project-types). This suggests management practices related to performance are better tailored to the modal project type each organization is engaged in.

Our third approach to shed light on whether incentives/monitoring for bureaucrats might be poorly targeted exploits information on the inherent riskiness/ambiguity of projects as encompassed in their technical specifications. Again we might think of project types with more inherent design ambiguity to be those for which incentives and monitoring are hardest to accurately target. To explore this, we consider projects of different types j to be of systematically different levels of ambiguity, and then proceed in two steps. First, we measure this design ambiguity using subcomponents of the complexity indicator described in Table A2.3. In particular we construct a z-score based on the design uncertainty, implementation uncertainty, design ambiguity and implementation ambiguity components of the project complexity metric. We then take the average of this over all projects of type j, denoting the average ambiguity of projects of type j by $\overline{\sigma}_j$.

Second, we estimate a specification analogous to (2.1) for a given project type j, obviously excluding project fixed effects. In our sample, there are sufficient numbers of projects implemented by enough organizations to estimate this for five project types: boreholes, buildings, dams, procurement and training. For each project type j we then obtain an estimate of the partial correlation between CS-incentives and project completion rates, $\widehat{\gamma}_{2j}$, conditional on CS-autonomy. Figure 2.1 then plots the five $(\widehat{\gamma}_{2j}, \overline{\sigma}_j)$ pairs, as well as a cubic best fit.

The evidence suggests a negative relationship across project types between inherent design ambiguities, as assessed by engineering best practice, and the marginal impact of management practices related to incentives and monitoring on project completion

rates.[18] In short, projects with the greatest ambiguities in design and implementation, might be those for which incentives/monitoring schemes are hardest to design well, and so illicit the most dysfunctional responses from bureaucrats. The heterogeneous impacts documented across project types in Figure 2.1 might also shed light on why the existing literature documents such mixed findings for the impacts of incentive provision in public sector settings. Our findings highlight such impacts might well vary with the nature of tasks/projects, such as their complexity and design ambiguity. Finally, we note that the average ambiguity of project types $\overline{\sigma}_j$ correlates with the proportions of those projects that have completion rates of zero. This mitigates against the idea that corrupt practices are entirely the reason behind low project completion rates. Rather, bureaucrats might simply shy away from implementing the most ambiguously designed projects.

Our fourth approach to understanding whether incentive/monitoring schemes might be poorly designed in this setting uses the intuition that if the negative impacts of performance incentives reflect the inability of organizations to correctly target such incentives to the relevant types of bureaucrat effort, this problem might be ameliorated in organizations with better IT facilities, who presumably have better capability to objectively measure effort types. To explore this we interact our CS-incentives measure with the practices captured in CS-facilities: as Table A2.2 shows, this relates to the availability of computing facilities at the organization. In this specification we redefine CS-other to exclude the CS-facilities component. The result in Column 3 of Table 2.4 indeed shows the impacts of CS-incentives to be significantly less negative in organizations with better IT facilities. Moreover, there is no significant *levels* impact of CS-facilities – the provision/accessibility of IT facilities for bureaucrats only seem to matter in combination with management practices related to performance incentives/monitoring.

2.4.2.2 Bureaucrat Characteristics

The remaining specifications consider how the impact of management practices related to performance incentives vary with three bureaucrat characteristics: their tenure, intrinsic motivation and perceptions of organizational corruption. To measure civil servant characteristics along each dimension we use the survey we administered to a representative sample of officials at each organization. We interviewed 4148 civil servants from the 63

[18] Given the CS-performance and CS-autonomy are positively correlated and have opposite signed impacts on project completion rates, this negative relationship between risk and incentives would be attenuated if we do not control for CS-autonomy when estimating $\widehat{\gamma}_{2j}$ [Prendergast 2002].

federal organizations studied here, corresponding to around 13% of their total workforce.

As described in Section 2.2, Nigerian bureaucrats enjoy long tenure. Tenure can interplay with the effectiveness of management practices. On the one hand, longer serving bureaucrats might learn over time how best to respond to incentives by exploiting other flexibilities. On the other hand, if bureaucrats are subject to SPE they might learn how best to engage in influence activities. To check for this, Column 4 in Table 2.4 controls for an interaction between the average tenure of bureaucrats in the organization (in deviation from mean) with the CS-incentives measure, as well as the direct impact of tenure. We find the negative impacts of performance-based incentives are even worse in organizations staffed by more experienced bureaucrats, as might be consistent with bureaucrats learning to engage in influencing activities. We also note there is no direct levels effect of tenure on project completion rates, so that it is not the case that bureaucrats naturally reduce effort over time as they become embedded within long-standing norms of poor standards in civil service organizations. Rather, there appears to be a specific interplay between bureaucrat tenure and the use of performance incentives/monitoring for bureaucrats.

A burgeoning literature suggests those attracted to public service might be relatively more *intrinsically motivated* than those working in the private sector. Performance incentives might then be detrimental if they crowd out such intrinsic motivation [Rose-Ackerman 1986, Perry and Wise 1990, Benabou and Tirole 2006, Francois and Vlassopoulos 2008]. To measure civil servant's intrinsic motivation, we asked bureaucrats which factor that had most influenced them to *originally* enter the civil service from the following options: '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'. We define those that answered, 'the chance to serve Nigeria' as being intrinsically motivated. Roughly a third of officials state that they entered the civil service to serve Nigeria (with the percentage being slightly higher among less senior bureaucrats).[19] For each organization, we then construct the fraction of intrinsically

[19] In the public administration literature, public service motivation is usually measured using the scale developed in Perry [1996], based on statements related to politics, public service and pro-social activities. This is the approach also followed in Dal Bo *et al.* [2013]. Alternative approaches employed in the economics literature include: (i) dictator games to examine how many resources an individual transfers to a pro-social task [Ashraf *et al.* 2012]; (ii) charitable contributions [Buurman *et al.* 2012]. In our civil servant survey, 'the chance to serve Nigeria' was the modal answer given. The other two most frequent reasons were 'I was interested in the type of work' and 'the stable career path that a job in the service affords', that were each given by around 20% of individuals

motivated bureaucrats.

Column 5 then shows how the impacts of CS-incentives varies by the intrinsic motivation of bureaucrats in the organization. The previously documented negative impact of providing performance incentives to bureaucrats, is significantly offset when a greater share of bureaucrats are themselves intrinsically motivated. This suggests that although on average providing performance incentives to bureaucrats has negative impacts on public service delivery, this is *less* the case when such incentives are provided to intrinsically motivated bureaucrats. Indeed, our evidence suggests incentives/monitoring crowd-in the effort of intrinsically motivated bureaucrats. If our CS-incentives measure captures SPE being in place for bureaucrats, the result highlights that intrinsically motivated bureaucrats exert more productive efforts in organizations where such SPE are utilized to a greater extent, rather than engaging in influence activities, say.[20]

While the recent economics literature has emphasized the importance of the intrinsic motivation of bureaucrats, a long-standing literature in public administration emphasizes that civil servants might pursue their own self-interest or be disinclined to exert effort [Wilson 1989]. This more negative view of bureaucrats spurs our final set of results, that explore how the impacts of incentives/monitoring are mediated through perceptions of corruption among civil service organizations. Corruption in public bureaucracies is a first order issue in Nigeria, and in many countries at similar stages of development (although the fact that 31% of projects are completed fully also suggests corruption is not all pervasive).

To elicit information on perceptions of corruption, we began by discussing vignettes with bureaucrats, then made those scenarios closer to the bureaucrat's actual situation, and finally asked individuals about their own observations and experiences of corruption. 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, that, by chance, coincides with the proportion of projects with a zero completion rate. We aggregate this to the organization level to construct the proportion of projects bureaucrats report having observed corrupt practices on.[21]

[20] Ashraf *et al.* [2012] present evidence from a field experiment in Zambia for workers hired to engage in a pro-social task that also documents how performance incentives crowd-in the effort of intrinsically motivated workers.

[21] We also asked whether officials had themselves been put under pressure to: (i) change the project

Column 6 shows how the impacts of our CS-incentives measure varies by perceptions of corruption among bureaucrats. To begin with we note the robustly negative *levels* impacts of our corruption measure on project completion rates. This affirms that our measure is indeed capturing some element of civil servant behavior that is deleterious for public service delivery. However, we see that the negative impacts of performance-based incentives do not vary with perceptions of corruption among bureaucrats. In short, the evidence suggests that corruption has a direct and quantitatively large negative impact on project completion rates, but that marginal changes in management practices have no impact on such behaviors.[22]

Finally, we note that we have also explored the heterogeneous impacts of management practices related to autonomy. However, we place less attention on these findings because economic theory is less developed to guide such an empirical analysis. For completeness we note the impacts of management practices related to autonomy appear to be generally more homogeneous than the impacts of incentives/monitoring: they do not significantly vary with project complexity, non-modal project types, bureaucratic tenure, or the prevalence of reported corrupt behavior by bureaucrats. This last result again emphasizes that corrupt practices are unlikely to be affected by marginal changes in management practice. We do however find that the positive impacts on project completion rates of practices related to autonomy are significantly stronger when a greater proportion of bureaucrats report being intrinsically motivated: providing more autonomy and flexibility to bureaucrats might be especially beneficial when bureaucrats are socially minded. We leave for future research the exploration of such heterogeneous impacts.

2.5 Econometric Concerns

To view the estimated partial correlations on our CS- measures as being informative of causal impacts, we need to tackle three econometric challenges broadly related to the

location; (ii) change project specifications; (iii) help select particular contractors/suppliers/consultants; (iv) divert some of the funds. Aggregating responses into an organizational average, officials stated that they had experienced such pressures on 19% of projects. We prefer to use the measure related to *observed* corrupt practices over this measure because officials are obviously cautious when potentially incriminating themselves.

[22]We have explored whether there exists within-sample values of the interacted variables in Table 2.4 at which the marginal impact of CS-performance becomes positive. Generally, this is not the case: even for the least complex projects or the most IT advanced organizations the marginal impact of management practices related to incentives/monitoring is negative. The one exception is bureaucratic tenure: in 8% of organizations average bureaucratic tenure is less than 7 years, and the coefficients from Column 4 then imply that the total marginal impact of CS-performance on project completion rates is positive.

following issues: (i) projects being *non-randomly assigned* to organizations based on their management practices; (ii) *unobserved* bureaucrat or organizational characteristics that are correlated to management practices and also drive project completion rates; (iii) management practices being *endogenously* determined by bureaucrat characteristics or project outcomes.

2.5.1 Project Assignment

The first class of concerns relate to the assignment of projects to organizations on the basis of management practices in place. For example, if better managed organizations are more likely to be assigned harder-to-implement projects, this creates a spurious *negative* correlation between our CS- measures and project completion rates. This suggests ($\widehat{\gamma}_1$, $\widehat{\gamma}_2$) are both biased in the *same* direction, and hence we note that a more complicated explanation is required to imply that $\widehat{\gamma}_1$ is both upwards biased and $\widehat{\gamma}_2$ is downwards biased. This issue notwithstanding, we address concerns about the non-random assignment of projects in two ways.

We first use a conditional logit model to estimate the factors determining the assignment of project i to organization n, including the management practices in place in organization n. As described in the Appendix and Table A2.6, we find no robust evidence of a correlation between the assignment of projects to an organization and any of the three CS- measures. Our second approach conducts further analysis at the organization level, estimating the following specification,

$$w_n = \theta_1 CS\text{-}autonomy_n + \theta_2 CS\text{-}incentives_n + \theta_3 CS\text{-}other_n + \pi X_n + \epsilon_n, \qquad (2.2)$$

where observations are for the 63 organizations listed in Table A2.1, w_n are measures related to the set of projects assigned to organization n by Parliament, the CS- measures are as previously described, and X_n includes the same organization level controls and noise controls as previously described. Robust standard errors are reported.

The results are presented in Table A2.7 and show that: (i) $\widehat{\theta}_1$and $\widehat{\theta}_2$ are both positive, so that better managed organizations in dimensions related to autonomy and performance incentives are assigned more projects, but neither correlation is significantly different from zero (Columns 1); (ii) the unique number of project types assigned to an organization is also not significantly related to the management practices in place (Column 2). Taken

together, the results in Tables A6 and A7 suggest that whatever the bargaining game between various stakeholders in the lengthy Parliamentary procedure that assigns projects to civil service organizations, there is not much evidence to suggest it is based on management practices in those organizations.

2.5.2 Unobservables

The second class of econometric concern is that our measures of management practice are correlated to unobserved factors captured in ϵ_{ijn} in (2.1), and these unobservables directly determine project completion rates thus biasing our coefficients of interest. To develop some intuition on the direction of bias, we consider the simplest case where we only condition on the constant term and the two CS- measures of interest in (2.1). It is then straightforward to show that the parameters of interest are functions of the variances of the two management practices, denoted $\sigma^2_{CS\text{-}a}$ and $\sigma^2_{CS\text{-}i}$, their covariance with each other ($\sigma_{CS\text{-}a,CS-i}$) and with the outcome ($\sigma_{CS\text{-}a,y}$, $\sigma_{CS\text{-}i,y}$):

$$\widehat{\gamma}_1 = \frac{\sigma_{CS\text{-}a,y}.\sigma^2_{CS\text{-}i} - \sigma_{CS\text{-}i,y}\sigma_{CS\text{-}a,CS-i}}{\sigma^2_{CS\text{-}a}.\sigma^2_{CS\text{-}i} - [\sigma_{CS\text{-}a,CS-i}]^2}. \tag{2.3}$$

$\widehat{\gamma}_2$ can be analogously defined. Given both CS- measures are standardized z-scores and their covariance is .24, the denominator in (2.3) is .9424. Substituting in for y in $\sigma_{CS\text{-}a,y}$ and $\sigma_{CS\text{-}i,y}$ in the numerator in (2.3), the bias depends on the following term:

$$\widehat{\gamma}_1 - \gamma_1 = cov(CS\text{-}a, \epsilon) - \sigma_{CS\text{-}a,CS-i} cov(CS\text{-}i, \epsilon). \tag{2.4}$$

To fix ideas we assume the unobserved factor is positively correlated with management practices. In this case the impact of CS-autonomy management practices on project completion rates is actually underestimated (so $\widehat{\gamma}_1 \leq \gamma_1$), and so in truth, even more positive than our baseline findings suggest, if $\frac{cov(CS\text{-}a,\epsilon)}{cov(CS\text{-}i,\epsilon)} \leq \sigma_{CS\text{-}a,CS-i} = .2366$. Following a similar logic, the impact of CS-incentives management practices on project completion rates is actually overestimated ($\widehat{\gamma}_2 \geq \gamma_2$), and so, in truth, even more negative than our baseline findings suggest, if $\frac{cov(CS\text{-}i,\epsilon)}{cov(CS\text{-}a,\epsilon)} \geq \sigma_{CS\text{-}a,CS-i} = .2366$. Figure A2.1 shows the parts of the ($cov(CS\text{-}i, \epsilon)$, $cov(CS\text{-}a, \epsilon)$) parameter space where each condition can be met. This makes precise that if both management practices are approximately equally positively correlated with the unobserved factor (so $cov(CS\text{-}a, \epsilon) \approx cov(CS\text{-}i, \epsilon) > 0$),

$\widehat{\gamma}_1 > \gamma_1$ and we would overestimate the positive impact of CS-autonomy, but it would still be the case that $\widehat{\gamma}_2 > \gamma_2$ so that, in reality, the impact of CS-incentives is even more negative than estimated. For the remainder of the discussion, we classify such unobserved factors as arising from other features of organizations, management practices, and bureaucrats.

2.5.2.1 Organization Features

We address this concern in Table A2.7 by continuing to probe the data at the organizational level using specification (2.2) to check whether management practices in place correlate to other organizational outcomes beyond project completion rates. Two natural checks follow. First, in Column 3 we construct the average complexity of projects assigned to organization n as our dependent variable, and then regress this against our measures of management practice and other organizational characteristics. Neither CS- measure is significantly correlated to the average complexity of projects the organization is tasked to implement. Hence it is not the case that organizations with better practices related to autonomy are assigned easier projects, and those with more performance incentives are assigned harder to implement projects. Second, in Column 4 we use the log of the organization's aggregate budget as our dependent variable: again we find no correlation between the management practices in place and the resources provided to an organization. Hence it is not the case that organizations that have better practices towards their bureaucrats also command larger budgets overall, that might otherwise have indicated it was easier for the organization to complete their assigned projects.

2.5.2.2 Management Practices

Our management survey tool elicited management practices along nine dimensions in each organization: roles, flexibility, incentives, monitoring, culture, targeting, facilities, skills and staffing. We have thus far aggregated these into three measures. We now estimate a specification analogous to (2.1) but where we condition on the nine separate dimensions of management practice. This disaggregated specification serves two purposes: (i) by breaking up the CS-other measure into its components, it highlights if there are likely to be wider aspects related to how organizations are functioning, that the CS-autonomy and CS-incentives measures might pick up; (ii) it underpins the validity of the three-way classification of management practices in our baseline specification.

To begin with in Table A2.8 we focus on estimating the impact of each dimension separately. The roles and flexibility subcomponents that formed our CS-autonomy measure are individually positive and significantly different from zero (Columns 1 and 2). Columns 3 and 4 show that each subcomponent that formed the CS-incentives index is negatively and significantly related to project completion rates. Columns 5 to 9 then split the remaining management practices that were previously subsumed within the CS-other measure. We see that most of these have no significant impact on project completion rates.

In Column 10 we simultaneously control for all nine CS- components, and find: (i) both roles and flexibility components remain positive and individually significantly correlated to project completion rates, with the impact of roles being significantly larger than for flexibility; (ii) the incentives component is negative but not significantly different from zero (the point estimate hardly changes from Column 3 but the standard error almost doubles), while the monitoring component remains negative and significantly correlated with project completion rates; (iii) the impacts of the other dimensions of management practice remain rather weak, with four out of five of these measures not being significantly different from zero.[23]

The fact that different elements of management practice have positive, zero, or negative impacts on project completion rates helps allay the concern that the CS- measures used in our core results simply pick up some unobserved element of management practice. If organizations that employed the most resourceful and skilled bureaucrats were also those best able to provide autonomy to their bureaucrats and adapt to new scenarios, then we would be concerned that the partial correlation between CS-autonomy and project completion rates was being partly confounded by these other (potentially unobserved) factors. That other dimensions of management practice related to culture or staffing are uncorrelated with project completion rates, suggests this is not the case.

In Column 11 we aggregate all nine indices into a single metric for 'good management', as considered by BVR for manufacturing firms. In our setting such aggregation leads to the wrong conclusions being drawn: we find no significant relationship between the aggregate CS-management measure and project completion rates. The reason for this is clear: the underlying components of the aggregate index do not all have the same signed

[23] Another split of practices we considered was to subdivide the practices in CS-incentives into those that refer to rewards and punishments separately: we find conditional on CS-autonomy and CS-other measures, these sub-components both have significantly negative partial correlations with project completion rates.

impacts on project completion rates. Hence management of bureaucrats does matter, but different dimensions of management practice have very different impacts on outcomes in this civil service setting.

2.5.2.3 Bureaucrat Characteristics

If bureaucrats *sort* into organizations based on management practices in place, then the impacts of management practices are confounded by any direct relation between bureaucrat characteristics and project delivery. In Section 2.2 we highlighted there are frictions in the labor market for bureaucrats that limit the scope for individuals to freely join or move across organizations, and hence this also limits the ability of organizations to use management practices to attract certain types of bureaucrat. Such selection mechanisms have been argued to be important when evaluating the impacts of compensation schemes in private sector settings.

In Table A2.10 we present additional characteristics of bureaucrats elicited in our civil servant survey to shed further light on this issue. We aggregate each response to an organizational average. Column 1 shows the mean and standard deviation of the bureaucrat characteristic for the average organization. Columns 2 and 3 then show some of the regression coefficients from a specification analogous to (2.2), so estimated at the organization level, where the dependent variable is the organizational average for the reported bureaucrat characteristic, and the reported coefficients are $(\widehat{\theta}_1, \widehat{\theta}_2)$, the implied effect sizes from the CS-autonomy and CS-incentives management practices, and their corresponding robust standard errors in parentheses.

The first batch of characteristics probe further the specific social connections bureaucrats might have with senior staff in the organization to which they are appointed: almost no bureaucrats report knowing their direct boss, or other managers, prior to their appointment. The lack of variation in this response precludes it being regressed against the CS- practices. Where there is more variation is in terms of the number of close colleagues that were known to the individual prior to their assignment: on average, bureaucrats report knowing 4.40 other colleagues. However, we find this degree of linkage across bureaucrats, when averaged to the organization level, to be uncorrelated with the management practices in place related to autonomy and performance incentives, as shown in Columns 2 and 3.

Our next question uses a more subtle means through which to elicit information

on personal connections among bureaucrats. We asked individuals whether they were the first family member to join the civil service: 48% of bureaucrats in the average organization report being the first in their family to be part of the civil service. We find no correlation between this measure of bureaucrat networks and the management practices in place.

2.5.3 Endogenous Management Practices

The final set of concerns we address relate to endogenous management practices. If for example some organization completes projects because they employ more dedicated civil servants, they might then endogenously choose to give those bureaucrats more autonomy, and be less reliant on the use of incentives/monitoring. On the other hand, in those organizations staffed by less reliable bureaucrats, the organization might choose to monitor and incentivize them along some margins (even if those turn out to be poorly targeted), and allocate them less autonomy. This is the econometric concern that most plausibly generates the pattern of positive *and* negative partial correlations in our core results. We use four strategies to make some headway on this issue.

Our first approach is to consider additional bureaucrat characteristics that might be indicative of the 'reliability' of bureaucrats, as shown in the lower half of Table A2.10. Throughout, we split bureaucrat characteristics into those of senior and low-tier bureaucrats, as these different tiers might differentially impact the management practices in place. Two points are of note: (i) there is no significant correlation between management practices related to autonomy or performance incentives and the average tenure of bureaucrats, the proportions of them that report being intrinsically motivated, or that report observing corrupt practices on projects; (ii) this is the case for characteristics of senior and lower-tier bureaucrats.[24]

A second approach to measuring bureaucrat 'types' and examining whether the distribution of types in organizations correlate to the management practices in place, is based on responses to *vignettes* on scenarios bureaucrats face in service. For example, one vignette we use relates to a bureaucrat being faced with the following scenario: an official in an organization like theirs is told by her manager to take funds from a certified

[24]These results suggest that it is not the case that organizations limit the provision of performance-based incentives to attract intrinsically motivated workers [Delfgaauw and Dur 2010], or that the matching of intrinsically motivated workers to public sector organizations limits the need to use performance-based incentives [Besley and Ghatak 2005]. Both findings are partly driven by the rigidities in the assignment of bureaucrats to organizations.

project and give them to a contractor/supplier for projects that the government has yet to complete due process on, against public service rules. The contractor then does not do the work he was paid for. We asked bureaucrats whether they agreed/disagreed with various statements related to the vignette: whether the bureaucrat acted correctly, whether the bureaucrat's manager acted correctly, whether bureaucrats should sometimes go against rules and so forth. We find little evidence of any significant relationship between the proportion of bureaucrats that agree with each such statement and the management practices in place in the organization. If such vignettes are informative of bureaucrat 'types', this evidence suggests that typically harder to observe measures of bureaucrat reliability are not much correlated with management practices in place.[25]

Our third approach identifies those organizations that have the greatest incentives to fine tune their management practices to maximize project completion rates. We think of these organizations as being those in which the completion of projects is relatively more important in the set of overall activities the organization is tasked with. We measure this using the share of the organization's total budget that is assigned to capital expenditures (such as those on OPEN-style projects). We then estimate a specification analogous to our baseline model in (2.1) and additionally interact each CS- measure with this measure of 'project importance' (for expositional ease, this interaction term is defined in terms of its deviation from mean), also conditioning on the organization's log total budget. If management practices are endogenously determined, their impacts might be attenuated for organizations in which it is more important to fine tune practices to maximize completion rates. The result in Column 1 of Table A2.10 finds no evidence of such heterogeneous impacts.

Our final approach builds on the results in Figure 2.1 and identifies those organizations that have the most similar portfolio of projects to implement, as measured by the projects ambiguity. Such organizations might have the greatest ability to set their

[25]Enumerators stressed there were no right answers to the vignettes, and the question was not an exam, but an exercise in obtaining the opinions of bureaucrats. The vignette was phrased in reference to a bureaucrat in the third person (Ngozi). Officials were asked whether they agreed or disagreed with the following statements: (i) 'Ngozi should have refused to divert the funds and paid the contractors/suppliers/consultant for the certified project' (76% agreed); (ii) 'The contractors/suppliers/consultant should not have accepted the funds given that Due Process had not been followed' (68%); (iii) 'The boss was wrong to direct Ngozi to share the funds of a project with others' (81%); (iv) 'Sometimes it is right to go against strict rules, as Ngozi did, so to make things fairer or more efficient' (28%); (v) 'Bureaucrats should be given more space to interpret what the best action to take in a given situation is' (59%). We then check whether there is a significant correlation between the proportion of bureaucrats that agree with each of the five statements and the two management practices in place: we find that nine out of ten correlations are not significantly different from zero.

management practices optimally. For each organization we construct the variance in project ambiguity over all projects the organization is tasked to implement. We then estimate whether the impacts of the two CS- measures of interest are attenuated among those organizations that have the most similar projects in terms of their design and implementation complexity. The result in Column 2 of Table A2.10 shows there to be no evidence of such heterogeneous impacts.

2.6 Discussion

We have studied whether management practices for bureaucrats correlate with effective public service delivery in an important developing country context: Nigeria.[26] We do so by combining novel project level data measuring the completion, quality and complexity of over 4700 projects implemented by various civil service organizations, with a management survey in each organization. Our primary contribution is thus to provide among the first evidence on whether and how the management of bureaucrats matters for public service delivery. The relevance of such investigations is first order, given the large number of developing countries engaged in reforming public bureaucracies along the lines of the 'good governance' agenda of the World Bank and United Nations [Goldfinch *et al.* 2012, Hasnain *et al.* 2012].

Our results confirm that the two dimensions of management practice we focus on: autonomy and performance incentives/monitoring, do indeed correlate to the quantity and quality of public services delivered, as emphasized by the public administration and economics literatures respectively. Our findings provide support to the notion that public agencies ought to delegate some decision making to bureaucrats, relying on their professionalism and resolve to deliver public services [Simon 1983]. The evidence is less supportive of the notion that when bureaucrats have more agency or organizations are more flexibly structured, then they are more likely to pursue their own objectives that diverge from societal interests, resulting in fewer public services being delivered.

The interpretation of the negative correlation of project completion rates with incentives/monitoring is more nuanced because we measure management *practices* related to the provision of incentives and monitoring: we do not necessarily measure the use of explicit compensation schemes based on project completion. Our extended results

[26] We also add to a nascent literature utilizing the BVR approach to measure management practices in non-profits including hospitals [Bloom *et al.* 2013] and universities [McCormack *et al.* 2013].

provide evidence consistent with two interpretations of why such management practices have detrimental impacts in this setting: bureaucrats operate in a multi-tasking environment, and the measured management practices capture an incentive system that places excessive regulatory burden or 'red tape' on bureaucrats (say through the use of mis-targeted key performance indicators), that has long been argued to lead bureaucrats to mis-allocate effort towards processing activities [Kelman 1990]. Alternatively, our management practices related to performance incentives and monitoring pick up elements of *subjective* performance evaluation, that lead to other dysfunctional responses among bureaucrats, especially engagement in influencing activities to curry favor with senior management.

To the extent that the day-to-day work of bureaucrats in other contexts is also characterized as multi-tasking environments in which processing and productive efforts can be exerted, our results will have some external validity to those settings. Moreover, there will nearly always be scope for the use of SPE in bureaucratic environments in which it is difficult to measure outputs, or to attribute outputs to the inputs of specific individuals. As such, our results sound a word of caution to the good governance agenda: the provision of incentives and monitoring will be effective only if such schemes are well tailored to the specific bureaucratic context. The simple import of practices from private sector settings might lead to dysfunctional responses among bureaucrats of the nature we document. Moreover, the broad design of management practices needs to be jointly considered with reforms to wider civil service practices along margins that might prevent such practices being fine tuned to their optimal designs, as discussed below.

Our results point to new directions for theoretical research to better understand the contracting environment in public bureaucracies, as well as highlighting specific areas in which better measurement of inputs and outputs can aid our understanding of public service provision in the developing world.[27] In this final Section we discuss the implications of our findings for understanding optimal management practices in public bureaucracies, and highlight two important directions for future research: on the methodology of collecting management practices for bureaucrats, and the interplay between such practices and other mechanisms to improve public service delivery.

[27] Dixit [2002] discusses that optimal management practices can differ in public and private sectors because of the existence of multiple principals, multiple tasks, a lack of competition, and motivated agents.

2.6.1 Optimal Management Practices

Our core results suggest there are potentially huge gains to be made from marginal changes in management practices. This naturally begs the question of why civil service organizations are not optimizing over management practices to begin with. In our context, a fundamental source of this inefficiency arises from organizations being tasked to implement many project types (Table 2.2). As Figure 2.1 highlights, project types have very different characteristics and so it is unlikely that there exists a unique set of optimal management practices any organization could have in place. This lack of specialization in tasks across civil service organizations is an underlying reason why management practices still matter on the margin.

A second explanation is based on a Weberian view, that organizations might well be optimizing their management practices according to whatever is their true objective, and our evidence merely suggests this objective is only weakly aligned with maximizing project completion rates. To check for this, we have investigated whether the management practices correlate to the frequency with which bureaucrats report performing other functions, such as engaging with politicians, or engaging with citizens/civil society groups, but we find no such correlations. Moreover, we have previously noted that the type of projects we study constitute almost half the total budgets of these civil service organizations, so their completion is likely to be weighted to some extent in the objectives of the organization, but it is by no means their sole objective.[28]

As discussed by BVR for private sector firms, suboptimal management practices might also persist in equilibrium despite the resultant loss of efficiency because: (i) the fixed costs of adopting better practices; (ii) best management practices might be heterogeneous across organizations. On the first point, to derive an estimate of the required fixed cost of changing management practices, we note the sum of capital expenditures for all projects from the 63 organizations studied is $3,694mn. Focusing on the impacts of management practices on those 38% of projects that never start, assuming a linear relationship between costs and completion rates, and taking the marginal impacts from Table 2.3 of a one standard deviation change in each management practice, implies there would need to be

[28] To further assess the degree of alignment in organization with project completion rates, we regressed the log of project budgets on each of the 16 subcomponents of the project complexity indicator, as shown in Table A2.3. The residuals from this regression, that might capture the rents to be gained from the project if it is completed, are found to be weakly positively correlated with actual project completion rates, with a correlation of .13.

fixed cost per organization of around $(.38 \times .32 \times 3,694)/63$ =\$7.13mn for such a move not to occur for this reason alone.[29]

The second point has been examined when we explored the heterogeneous impacts of management practices in Section 2.4.2. Those results imply the optimal performance incentives in place should partly reflect the complexity and ambiguity of projects in an organization's portfolio, the use of IT facilities, as well as the tenure and intrinsic motivation of its bureaucrats. However, in contrast to this evidence, these issues were not at the fore during the semi-structured interviews we conducted at organizations to better our understanding of what drives management practices in reality. These all highlighted how practices evolve slowly over time as a function of ground rules laid out in the Public Service Rules of the Nigerian civil service, the history of senior management staff in an organization, and external events such as trade union demands. As further discussed in BVR, inefficient management practices might also persist for dynamic reasons: learning and adjustment costs might cause best practice to diffuse over time. This is in line with the evidence discussed throughout on the frictions in the labor market for bureaucrats related to the initial assignment and immobility across organizations of bureaucrats.

Finally, a particularly acute concern is that a lack of competitive pressure enables poorly managed public sector organizations to survive. This might especially be true in developing country contexts where mechanisms are rarely in place to allow citizens to choose across alternative public providers of a given good or service. We return to this issue below when discussing alternative mechanisms through which public service delivery can be improved.[30]

2.6.2 Other Mechanisms To Improve Public Sector Delivery

Our analysis fits within a broader literature documenting mechanisms to improve public service delivery in developing countries. There are at least two additional mechanisms that can interplay with the management practices for bureaucrats within organizations. First, there remains much scope to combine and jointly test models of *selection* into, and turnover of bureaucrats *between*, public sector organizations. On selection into the civil

[29]This is a lower bound estimate because, as discussed in the Appendix, the impacts of management practice on project completion rates apply not only at the margin of ensuring projects are started, but have similar impacts at all thresholds of project completion rate.

[30]In the private sector, Bloom *et al.* [2012] provide evidence that product market competition drives innovations towards more better management practices. Bloom *et al.* [2013] find evidence that hospitals that face competition for patients from rival hospitals do indeed adopt better management practices.

service, our findings highlight there can be an interplay between the intrinsic motivation of bureaucrats and how they respond to management practices. On turnover, bureaucratic tenure is important both because longer serving bureaucrats shape the management practices in place, but they might also react differently to any given set of incentives, as highlighted in Table 2.4. A recent contribution in this direction is Dal Bo *et al.* [2013] who present evidence from Mexico, exploiting experimental variation in salaries to identify their impact on the selection of public sector officials. They find higher wages attracted more able workers, and that there are no adverse selection impacts in terms of motivation. This evidence complements our findings on the impact of management practices once bureaucrats are hired.

Second, the role of grass roots monitoring or accountability of public service providers is important and likely interplays with management practices in place. Bjorkman and Svensson [2009] present evidence from a randomised control trial in Uganda on how community based monitoring of primary health care providers led to large increases in utilization of services and improved health outcomes: in part these findings are driven by changes in the behavior of health providers themselves. Reinikka and Svensson [2011] and Duflo *et al.* [2012] provide other examples of the gains to public service delivery to be had from bottom-up monitoring of frontline public sector workers. On the other hand, such findings are not uniform: Olken [2007] finds more muted impacts of community based monitoring on reducing corruption in road infrastructure projects in Indonesia. Rather, top-down audits are effective in reducing corruption on such locally organized public works projects. Along the same lines of top-down monitoring, Besley and Burgess [2002] and Ferraz and Finan [2008] have documented the significant role that media scrutiny can play for public service provision.[31]

We view there to be a rich future agenda for understanding public service delivery – in rich and poor countries – that effectively links incentives and practices in civil service organizations, the selection and retention of bureaucrats, and public monitoring and accountability of organizations.

[31] Evidence from our civil servants survey confirms that bureaucrats do regularly engage with community groups and so such bottom-up approaches might well interplay with management practices in place. For example, 24% of surveyed bureaucrats reported personally engaging with community/religious groups; 11% reported engaging with members of the National Assembly.

Appendix

Data Appendix

DA.1 Measuring Project Complexity

Data on the complexity of government projects is not directly part of the OPEN data set. We thus worked with a pair of Nigerian engineers familiar with the OPEN projects and a number of international researchers working on technical complexity to define a relevant set of indicators based on the technical documents for each OPEN project. We followed the perspectives on complexity suggested by Remington and Pollack [2007], by asking the engineer-assessors to individually assess projects along the following five topics, each with their own set of indicators.

Structural complexity stems from the scale of different interconnected tasks and activities. The indicators associated with this topic capture structural aspects such as project size and the number of inputs required for production. They also capture issues in raw material and labour supply, and the ease with which any necessary specialized skills and equipment can be sourced. *Temporally complex* projects are those whose production involves uncertainties. Hence there are indicators for uncertainties in design and implementation. *Technically complex* projects are those whose production have ambiguous risks, namely their uncertainties are not well understood. Hence some indicators capture ambiguities in design and implementation. *Directional complexity* refers to the potential for preferences over the project to diverge. The engineer assessors are thus asked to rate the managerial complexities of the project. Finally, there is a subjective assessment as to the overall complexity of the project. This allows any unassessed aspects of complexity to be measured and provides a coherent picture of project complexity.

Two qualified and independent Nigerian engineers were then contracted to assess each project in the OPEN data set along these margins. The process of aggregation between engineers used in this project aimed to build a consensus. The first engineer coded indicators for the entire data set. The codings of the first engineer were then provided to the second engineer who then constructed his own codings with reference to the codings of the first. The aim was to anchor the coding of the second engineer in that of the first but give him freedom to disagree where he felt the coding was incorrect. Other methods would have been to have them code independently and average the two data sets or to have them work together. We decided our approach was a balance between consensus

and subjectivity.

The two engineers were provided with project details and documents and asked to code a value for each indicator. The documents only contained information available *before* implementation such that there was no bias from the coding being done after the projects were implemented.

Table A2.3 provides descriptive statistics for all 16 indicators from which the complexity index is constructed, as well as how each is correlated with the other indicators. Aggregate complexity is a subjective assessment of the overall complexity of the projects by the two engineers, that includes 'all factors that might influence the difficulty of implementing the project, not only those assessed [by the other indicators]'. We asked the engineers to take the distribution of complexity in the OPEN data set as a whole, with the least complex project in the data having an aggregate complexity of zero and the most complex project having an aggregate complexity of 100, and place each project within this distribution.

We undertook a number of measures to check the complexity of the OPEN indicators coded by the engineers. First, we inserted 200 randomly chosen repeated projects into the data set provided to the engineers. Since the project characteristics of the original and repeat projects are identical, we would expect that the codings of the two sets of projects would be similar. Reassuringly, we find that in general the original and duplicate projects are coded in similar ways. We compare the differences between these two sets by looking at group and paired means, and distributional tests for each variable. The differences are only statistically significant at conventional levels in a few cases, and the magnitude of the differences are relatively small. For example, the only variable that is statistically significantly different below the 10% level in the mean-comparison t-test relates to raw material storage. Here, despite a standard deviation of 0.2 in the originals, the difference is 0.07 between the originals and the duplicates.

Second, we looked at the similarity of the codings of the two engineers. We find that the second engineer's codings are not dramatically different from the first engineer's efforts. Whilst there are a small number of differences, they are relatively small and rarely significant, indicating that the re-coding left the overall picture relatively stable.

Finally, over a year after he had completed the prompted codings, we asked the second engineer to re-code a sub-sample of projects from scratch, this time without prompting. The differences between these independent codings and the consensus data we rely on

are again relatively minor. It seems that once he had become accustomed to the broad parameters of the coding framework, the second engineer's coding was not dissimilar to the consensus generated by the two engineers working one after the other.

We therefore have evidence of similar projects within the data set being coded in a similar way, of the two engineers coding in similar ways both when prompted and unprompted, and when there were deviations, of the deviations not being particularly quantitatively large. Taken together these checks reassure us that the complexity measures pick up meaningful variation across projects, rather than merely picking up noise that should have led to the multiple reports (either across engineers or over time) being uncorrelated.

Results Appendix

RA.1 Standard Errors

Our baseline specification assumes the disturbance term is clustered by project type-organization. This might capture best the nature of unobserved factors that relate to project completion rates, such as the quality of the sub-departments in each organization that are tasked with the same project types. In Table A2.4 we show the robustness of our results to alternative assumptions on the error structure. The table is structured to cover the same specifications as in Columns 1 to 4 of Table 2.3, but where we now report standard errors based on alternative assumptions: (i) robust standard errors; (ii) errors clustered by project-type and organization as in Table 2.3; (iii) standard errors clustered by organization. One concern with such clustered standard errors is that they may be downwards biased when the number of clusters is small (and in our specification the number of clusters corresponds to 63) [Cameron *et al.* 2008]. They propose various asymptotic refinements using bootstrap techniques, finding the wild cluster bootstrap-t technique performs particularly well in Monte Carlo simulations. We have implemented this method on our baseline specifications and show in brackets in Columns 1 to 4 the resulting p-values. This correction does not alter the significance of any of the coefficients from our preferred specification with project fixed effects shown in Column 4 of Table A2.3.

RA.2 Robustness Checks

We conduct a range of robustness checks on our core result on project completion rates, shown in Column 4 of Table 2.3. To begin with we note that the results in Table 2.3 used our continuous measure of project completion rates (from zero to one) as the dependent variable. However, an alternative approach is to define a threshold of completion that would deem the project usable. To do so we consider all potential thresholds from 1% to 100% in increments of 1% and then estimate a specification analogous to (2.1) where y_{ijn} is defined as a dummy variable equal to one if the project completion rate is above the given threshold p%, and zero otherwise. For any given threshold p the coefficients of interest are denoted γ_{1p} and γ_{2p}. Figure A2.2 then plots each pair of ($\widehat{\gamma}_{1p}$,$\widehat{\gamma}_{2p}$) estimates, for each threshold and their associated 95% confidence interval.

Two points are of note. First, at the extreme left of the figure where we consider a 1% threshold, we are essentially using a linear probability model to assess the relationship between management practices in civil service organizations and whether projects are *started* in some way. Here we find marginal impacts of each type of management practice to be qualitatively similar to those documented earlier for the average completion rate, although the point estimate on CS-autonomy seems to be lower than the baseline specification.[32] Second, we cannot reject the null that the sign and significance of the coefficients are the same for every threshold of project completion. Taken together, the results imply that managerial incentives along both margins have similar impacts on the extensive margin of public service delivery (namely whether projects are started at all) and the intensive margins of project completion (namely the extent to which projects are completed).

The checks detailed in Table A2.5 all verify the robustness of our main finding to alterative samples of organizations and projects: Column 1 excludes those projects implemented by the largest organization in terms of total expenditures. Column 2 excludes projects implemented by the largest organization in terms of total expenditures. Columns 3 and 4 remove the 10 smallest organizations by expenditures and number of projects respectively. Columns 5 and 6 exclude organizations at the top and bottom of the CS-autonomy and CS-incentives management scales respectively. In each cut of the

[32]The result needs to be interpreted carefully. There is not continuous mass in project completion rates over the [0,1] interval: hence we do not expect the marginal impact of the each management practice to be sensitive to marginal changes in threshold p where there is little mass in project completion rates. This explains why the marginal impacts shown in Figure A2.2 jump at a small number of points.

data, the core results remain stable, so that our findings do not appear to be drive by outlier or specific organizations.

The third series of robustness checks in all probe the core results in alternative subsamples of data (with the caveat that such splits of the data inevitably lead to less precise estimates). Columns 7 and 8 in Table A2.5 break down the project types listed in Table 2.1 into two groups: those related to construction projects (borehole, building, electrification, dam, road and canal) and those related to non-construction projects. We find that for construction projects, the results closely replicate the baseline findings. Indeed, for construction projects as a whole the point estimates on each management practice index is slightly larger in absolute value than the baseline result in Column 4 of Table 2.3. For non-construction projects, the results show that CS- autonomy continues to have a positive and significant impact on project completion rates; CS-incentives has a negative correlation with project completion rates that is significant at the 10% level. As suggested by Figure 2.1, this might be because non-construction projects such as training and procurement, are inherently less ambiguous in design.

The next split considered in Columns 9 and 10 is between centralized and decentralized civil service organizations, where centralized agencies correspond to government ministries. We see the impacts of CS-autonomy to be similar in both, although the CS-index only has negative impacts in the centralized agencies. This latter result is worth exploring in future work.

The next robustness check addresses the concern that different management practices might be spread across the country in a way that is correlated with characteristics of the organization's local geographies. Indeed, it is well understood that the characteristics of local populations interplay with them being able to solve collective action problems, and thus are an important driver of public goods provision [Banerjee *et al.* 2007]. To address this issue, Column 11 additionally controls for a wide variety of state-level controls for each project and finds almost no change in the coefficients of interest. In short, local area characteristics do not seem to be driving our results.[33] Columns 12 and 13 split the sample into projects that are located in the Northern and Southern regions of Nigeria respectively, that characterizes the first order cultural divide in Nigeria, and provides a relatively even split in the number of projects. We find the impacts of both management

[33]The sample drops slightly in this specification because the state in which the project is located (or should have been located for those projects that are never started) is missing for around 450 projects.

practices to remain significant in both regions. This suggests that cultural differences across regions do not much interact with responses to these management practices.

The final two robustness checks relate to methodological issues. First, we consider alternative constructions of the CS- management practice indices. As described in Section 2.3.3, following BVR, we aggregated responses to individuals questions to construct our indices of management practices giving equal weight to all questions. A natural alternative is to cluster the variables into the various management topics described in Table A2.2 and weight each *topic* (rather than each variable) equally. We re-construct our CS-autonomy and CS-incentives measures along these lines and reestimate our preferred specification (2.1). The result, in Column 14 of Table A2.5 is qualitatively in line with our baseline results, although the absolute magnitude of each measure of public sector management is *larger*: a one standard deviation increase in CS-autonomy corresponds to a significantly higher project completion rate of 23%, and a one standard deviation increase in CS-incentives corresponds to a significantly lower project completion rate of 14%.

The analysis has so far estimated (2.1) using OLS. The final robustness check estimates this specification using a fractional regression model that accounts for the dependent variable being a continuous variable between zero and one. To do so, we utilize Papke and Wooldridge's [1996] fractional logit model in which the conditional expectation function is modelled as a logistic function that can take all values in the unit interval. The interpretation of the marginal effects are the same as in the binary logit model and evaluated at sample averages, the partial effects are approximately comparable to the coefficients from a linear regression. The result in Column 15 of Table A2.5 shows our core findings to be robust to this alternative estimation model.

RA.3 The Assignment of Projects to Organizations

A central econometric concern addressed in Section 2.5.1 is that the assignment of projects to organizations might correlate to the management practices in place. For example, projects for which there is concerted political pressure to complete might be allocated to better managed organizations, all else equal. To investigate the issue we use a conditional logit model to directly estimate the likelihood of project i being assigned to organization n conditional on the management practices for bureaucrats in place in the organization, and other project and organizational characteristics exploited in our analysis.

To do so we first reshape our data as follows: for each project we created a binary variable with 63 values corresponding to our 63 organizations. The variable, denoted D_{in}, takes the value one for the organization at which that project is actually assigned, and zero otherwise. Thus, the data-set is at the project-organization pair level (in), with a total of $4721 \times 63 = 297,423$ project-organization paired observations. To each observation, we attach the relevant organization-level characteristics used in our analysis (that were denoted OC_n in (2.1)), such as our management indices, capital controls and organizational averages of bureaucrat characteristics. We then also consider whether specific project-organization interactions, denoted Z_{in}, correlate with the assignment of projects to organizations. We estimate a conditional logit specification for $\text{Prob}(D_{in} = 1)$, based on both sets of characteristics;

$$prob[D_{in} = 1] = \frac{\exp(\beta' OC_n + \gamma' Z_{in})}{\sum_n \exp(\beta' OC_n + \gamma' Z_{in})} \tag{2.5}$$

Note that in this modelling framework project characteristics play no role as these do not vary within a given project i over the organizations n it could potentially have been assigned to.

We run three sets of specifications. The first takes the perspective that each project could have been assigned to *any* of our 63 organizations. The second takes the perspective that projects can only be implemented by organizations of the same sector. Thus, health projects could only be implemented by health sector organizations for example. When we impose this restriction on the permissible project-organization pairs, we lose 847 projects as there is only one organization of that sector in our data, and there are $44,429$ potential within sector project-organization pairs. The third specification further imposes the assumption that projects can only potentially be assigned to organizations in the same sector that are observed being tasked to implement a project of the same complexity. This further reduces the sample to $33,480$ feasible project-organization pairs. In all specifications we cluster standard errors by organization as there are likely to be unobserved characteristics of organizations that determine project assignments.

Table A2.6 presents the results. Column 1 utilizes the entire set of project-organization combinations and uses only our management scores in the regression. Unconditional on other organization characteristics, neither management practice related to autonomy or performance-based incentives significantly predicts the assignment of projects to organi-

zations. When we restrict the sample so that each project can only feasibly be assigned to organizations in the same sector, Column 2 shows the coefficient on CS-autonomy to become significant at the 10% level, but this result is not robust. In Column 3 where we restrict the feasible pairs also using information on the complexity of projects, we find the probability of projects being assigned to organizations do not significantly correlate with the management practices in place in the organization.

Column 4 extends the specification to include all the organizational controls utilized in our baseline specification in Table 2.3 (capital, general and noise), as well as the full set of organizational controls that we use elsewhere in the chapter. The coefficients on the management practices remain insignificantly different from zero at the usual levels. Moreover, we find no evidence that any of these other organizational characteristics predict the assignment of a given project to that particular organization rather than other organizations it could feasibly have been assigned to.

In Column 5 we additionally control for a series of interactions between project characteristics (scale, complexity) and organizational characteristics (total staff, total budget). Some of these project-organization interactions do predict the assignment of projects. As is intuitive, we find that the interactions between the number of staff at an organization and the project budget, and the organization's total budget and the project complexity, both are positive and significant predictors of project assignment. Over and above these interactions, we continue to find no impact of management practices on project assignment even once we allow for specific matched pairs to be assigned in this way.

Overall, these results suggest our results are not reflecting the non-random selection of projects to organizations based on their management practices. While there is no doubt some complex bargaining process between Parliament, civil service organizations and other stakeholders that determined the assignment of projects to locations and organizations, on the margin, this assignment is uncorrelated with the management practices in place in implementing organizations.

Chapter 3

The Causes and Consequences of Political Interference in Bureaucratic Decision Making

3.1 Introduction

How do politicians get bureaucrats to deliver public projects that might win them votes? This chapter provides some of the first evidence of the informal channels through which politicians facing high levels of political competition increase the productivity of the bureaucracy.

Public projects are often left uncompleted or delivered to a poor quality (World Bank, 2004). Failure to deliver these projects undermines citizen welfare and leads to an estimated loss of US$150 billion per year in public resources (World Bank, 2007). The extent of these failures varies within and across countries, driving national and global inequalities (Banerjee *et al.*, 2007).

Both politicians and bureaucrats are viewed as critically important agents in the delivery of public projects. Politicians are elected by citizens to decide public policy, including the delivery of public projects, whereas bureaucrats are employed by the government to implement these policies. When faced by high levels of political competition in their constituencies, politicians may be incentivized to improve the quality of potentially vote-winning public projects. Consequently, they may seek to overcome barriers such as bureaucrats' inefficiency, inertia, or corruption.

Existing evidence suggests political competition can improve the delivery of public projects.[1] The outstanding puzzle is how politicians are able to influence the bureaucratic arm of government, and raise bureaucratic productivity, to satisfy short-term electoral concerns.[2] Typically, politicians do not undertake public projects themselves, but must delegate these tasks to bureaucrats, whom they then incentivize. Our understanding of the interactions between politicians and bureaucrats is very limited, both in terms of their causes and their consequences (Iyer and Mani, 2012). More broadly, there is a limited empirical literature on bureaucrats, despite their importance as the main producers of public projects in many countries. To understand the delivery of public projects, it is important to understand the incentive environments in which bureaucrats operate: both formal incentives in a bureaucrat's contract, and informal interactions she has with powerful actors such as politicians.

This chapter contributes to our understanding of (1) how political competition affects politicians' decisions about their interactions with the bureaucracy along two key margins: which bureaucrats a politician delegates to, and the informal incentives that politicians provide them; and (2) the consequences of these choices in terms of the delivery of public projects. The key constraint to empirical progress on these issues has been a lack of adequate data. We rarely observe whether the bureaucracy delivers what was intended, in terms of the technical specifications of a project, but rather what they did deliver. This is a first-order constraint on the empirical study of public sector productivity. A second binding constraint is that we almost never directly measure the personal interactions of politicians with bureaucrats, which is the mechanism of informal incentive provision that I study (Banerjee *et al.*, 2007). I make progress along both margins by collecting detailed data that address these constraints.

The novel data set that I have assembled follows the delivery of a representative set of public projects in the Federal Government of Nigeria, from their initiation in Congress, through the organizations that produce them, to independent evaluations of output. The

[1] See, for example, Foster and Rosenzweig (2004), Besley *et al.* (2010) and Ferraz and Finan (2011).

[2] The focus in this chapter is how politicians influence the bureaucracy within a fixed institutional environment. In what follows, I fix the policy environment, staff and resource distribution, implying that politicians lack the power to recruit, dismiss, demote or change the formal wages of appointed bureaucrats, or modify the legislation governing how their organization functions. These are reasonable assumptions in the current context. Public sector recruitment is delegated to an independent organization that fiercely guards its independence. The modification of legislation governing an organization would require the agreement of a majority of politicians who are likely to have distinct political preferences across the constituencies served by an organization.

data contains details of the politicians of Nigeria's 5th National Assembly, surveys of a representative sample of bureaucrats at each of the organizations to which politicians delegate, and evaluations of how effectively each of 3,009 public projects - roughly 7 percent of the government's budget - were delivered by these organizations. Overall, it is a detailed profile of the key actors in the delivery of public projects and how they interact.

To guide the empirical work, I develop a theoretical framework that implies that delegation and informal incentive provision are simultaneously determined. The basic intuition is that a higher cost of providing incentives at an organization discourages politicians from delegating there, and incentives can only be provided to organizations to which politicians delegate. The model maps into equations for the three variables of interest: delegation, incentive provision, and the level of delivery of public projects. Separating the impacts of delegation and incentive provision requires instruments that independently vary each.

The first instrument drives variation in delegation independently of incentive provision. It is based on a congressional procedure along the lines of Aghion *et al.* (2005, 2009, 2010) and Cohen *et al.* (2011) which varies the extent of delegation power that a politician has. The procedure allocates power to delegate projects to a subset of politicians by making them members of congressional standing committees, but excludes others. My approach indicates that politicians from closely-contested constituencies, facing high levels of political competition, are 21 percent more likely to delegate to more autonomous organizations - those at the decentralized tier of government - than politicians in safe seats. When a politician faces little political competition in her constituency, she centralizes the delivery of public projects to ministries. Thus, this chapter provides the first microeconometric evidence that the decision as to which bureaucrat should deliver a public project is a function of political incentives.

To assess the impact of political competition on a politician's choice of personal interactions with bureaucrats, I use an instrument correlated with the transaction cost of undertaking personal interactions with bureaucrats: the distance from the capital city, where politicians primarily reside, to the organization implementing the project. To ensure the instrument is not correlated with the capacity of organizations to build basic public projects, I control for the distance of the organization to the nearest state capital, where much of Nigeria's building infrastructure for producing public projects resides.

This approach indicates that politicians in closely-contested constituencies personally interact with bureaucrats roughly 13 percent more than politicians in safe seats. I take this as a proxy for their providing bureaucrats with higher informal incentives.[3]

Estimation of the full instrumental variables specification evaluates the separate impacts of delegation and incentive provision on the delivery of public projects. I find that the key margin driving positive impacts of political competition on public productivity is delegation: decentralized organizations have project completion rates that are 40 percentage points higher than those of centralized organizations. Once politicians delegate to the most effective organizations, their interactions with the bureaucrats there are of second-order importance at best.

The results highlight the importance of organizational design as a driver of public sector productivity. They suggest that in Nigeria, politicians delegate to those organizations they know to be most effective when public good provision has the highest electoral returns, which requires them to relinquish a degree of formal influence over project delivery. They then try to regain some of this influence by offering informal incentives outside of the formal contracting structure of the civil service, but this has limited effect. Providing politicians with options to delegate to organizations that can effectively deliver public projects ensures a mechanism by which political competition translates into bureaucratic output.

These results provide some of the first evidence as to how political competition impacts on the choices of politicians in their interaction with the bureaucracy. An emerging literature links political competition to improved government performance. For example, Ferraz and Finan (2011) find that re-election incentives push Brazilian mayors to reduce misappropriation of resources in their municipality of 27 percent compared to mayors without such incentives.[4] For a comparable differential in political competition

[3]Relative to the view that the executive should be independent of the legislature (Weber, 1922), the magnitudes of political interference reported here are large. My data shows that Nigerian politicians have a significant impact on the outcomes of 50 percent of public projects. Bureaucrats claim that they have *personal* interactions with members of the legislature on 14 percent of the projects they implement, with the nature of these interactions varying according to the political competition the politicians face. Comparing my findings with data from the World Bank's Public Officials Surveys (Manning *et al.*, 2000), these orders of magnitude appear relatively typical across the developing world.

[4]Similarly, Foster and Rosenzweig (2004) use panel data on governance in India to show that politicians facing greater political pressures are more responsive to the needs of their citizens in the provision of public goods. Besley *et al.* (2010) show how political competition leads state politicians across the US to adopt pro-growth policies. Martinez-Bravo *et al.* (2012) find that democratization in China leads to an increase in the provision of public goods. Persson and Tabellini (2000) and Besley (2006) review the literature on political agency models which highlights the importance of elections as a disciplining device.

in Nigeria, I find an increase in bureaucratic productivity of 16 percent. However, the key contribution of this chapter is to provide evidence of the mechanisms through which political competition impacts on bureaucratic performance. I assess the margins along which political competition alters the decisions of politicians, in ways that have subsequent impacts on the productivity of the bureaucracy.

This chapter also provides some of the first micro-level quantitative evidence on the interaction between politicians and bureaucrats. Iyer and Mani (2012) use administrative data on the careers of Indian civil servants to show how politicians affect the process of bureaucratic assignment across public organizations. I document a related margin of interaction: keeping bureaucrats in the same organizations, politicians delegate project implementation to different bureaucratic organizations. The World Bank's Public Officials Surveys (Manning *et al.*, 2000) provide descriptive evidence that political interactions with bureaucrats are significant across the developing world. I show that political competition is a key driver of this relationship, and quantify its impacts on government productivity.

The chapter is organized as follows. Section 3.2 overviews the relevant aspects of the Nigerian government that define the environment in which politicians and bureaucrats interact. Section 3.3 outlines a simple model of moral hazard that guides the empirical work. Section 3.4 then describes the data used to test the predictions of this model. Section 3.5 outlines my empirical strategy for each stage of the analysis and the corresponding results. Section 3.6 provides concluding comments and discussion. The Appendix presents derivations of the model, further data description and robustness checks.

3.2 Institutional Background

Nigeria is the most populous country in Africa, with a population of 160 million people, or 20 percent of the population of sub-Saharan Africa. United Nations (2013) predicts that Nigeria's population will be larger than that of the United States by 2050. Nigeria represents a leading setting in which to understand the determinants of public sector productivity in the developing world.

Nigeria also shares important features of its economy and polity with other developing countries. Its income per capita is roughly equivalent to that of India, or to that of

sub-Saharan Africa as a whole (World Bank, 2012). Its government makes up a similar proportion of economic activity as those of many other developing countries, representing 26 percent of gross domestic product.[5] Its political history is marked by colonial origins preceding a string of military dictatorships, much like other developing nations. Thus, Nigeria presents a window into the workings of government in the developing world.

The country returned to civilian rule with Presidential elections and a new constitution in 1999. Its constitution has many similarities to the United States, and its Congress shares many of the functional components of the United States Congress. Nigeria is a Federal Republic, with an elected two-chamber National Assembly composed of the Senate and the House of Representatives. Its three branches are the legislative, executive, and judiciary, and its three tiers are the federal, state, and local government levels. This study will focus on the House of Representatives and on public organizations at the federal government level only.

The House of Representatives is made up of 360 representatives, each with their own constituency. Each politician can therefore be associated with public projects implemented in their constituency. Representatives serve four-year terms, and there are no limits on re-election. I study the representatives of the 5th National Assembly which was elected in 2003 and lasted until 2007.

3.2.1 Role and composition of standing committees

A core feature of the House of Representatives is the use of standing committees to consider policies relevant to their sector of expertise (such as water, health, etc.). For each sector, the relevant standing committee defines the public projects to be implemented in the coming year *and determines which bureaucratic organization should implement each one*. For example, the House Committee on Health will consider all issues relevant to health in Nigeria, including how many health centers should be built within a fiscal year, and by whom.

The standing committees play a crucial role in the design of the federal budget. The projects I study were all established in law by budget appropriation bills passed in 2006 or 2007. The committees are designated to hold hearings with relevant parties, scrutinize the proposals, and define budgets for each of the organizations I study. Membership

[5] According to the International Monetary Fund World Economic Outlook Database (October 2012), government expenditures as a percentage of GDP are 21 percent in China, 27 percent in Kenya, 28 percent in India and 30 percent in South Africa.

of a standing committee provides a congressperson with significantly greater capacity to influence the details of that sector's budget than a non-member.[6] While there is a complex congressional bargaining game that defines the broad features of a sector budget, committee members have broad powers to determine which projects should be implemented and by whom, and thus are most able to influence which organization implements projects in their constituencies. This margin of delegation will be one of the key outcome variables.[7]

The delegation powers conferred by membership of House committees is the basis of one of the instrumental variables used in this chapter. I will compare the delegation decisions of committee members to those of non-members. In doing so, I aim to compare politicians with greater delegation power to those with less. This allows us to observe what politicians do with these additional powers. How members of the standing committees are selected is thus an important element of my identification strategy.

To understand the process in the Nigeria context, I gathered information from the rules governing the House, from academic and committee secretary assessments of committee composition, and from newspaper reports. The Standing Orders of the House of Representatives states that the 'Committee on Selection' is the single authority for the determination of committee composition. The Committee on Selection states that it weighs up macro-political factors, made up of a need to represent geo-political zones and parties in proportion with their size in the Congress, and a guiding principle that members should be allocated to sectors in which they have relevant qualifications or experience. This implies that politicians who qualified as doctors are placed on the health committee, educationalists on the education committee, and so on.[8] I present evidence that demonstrates that these rules are being followed in section 3.5.1.[9]

[6] The significant power of standing committees has long been recognized for the US Congress. Woodrow Wilson asserted that committees dominate congressional decision making, stating that "we are ruled by a score and a half of 'little legislatures'" (Wilson, 1887). Richard Fenno, in his magisterial book on committees in congress, states that committee decisions are usually accepted and ratified by the other members of the chamber, giving members of a committee significant influence over the sector they represent (Fenno, 1968). Shepsle and Weingast (1987) and Krehbiel *et al.* (1987) elaborate theories of why the congressional committees are so powerful.

[7] Delegation decisions for projects in a representative's constituency have limited effect on the projects in other constituencies, nor impact on the total quantum of resources available to other politicians. There is little, if any, political discourse around delegation. As such, representatives *on a standing committee* should be little constrained in their ability to delegate to their preferred organization.

[8] As the Speaker of the House has confirmed in the House Hansard, "In the composition of Membership and Leadership of Committees, special attention will be paid to the skills and relevant experiences of Members in order to achieve greater efficiency" (House Hansard, 2011).

[9] More discussion on the process used by the Committee on Selection to select committee members is provided in the Appendix.

3.2.2 Delegation to bureaucratic organizations

Members of the standing committees must decide which organizations within the bureaucracy to delegate to. Each of the projects funded by the federal budget must be assigned to an organization of the Executive. The National Assembly itself does not implement social sector public projects.

To analyze this delegation decision, I split the Executive into two 'tiers': centralized ministries and decentralized agencies.[10] This is the major categorical division of public organizations in Nigeria, and the one most closely aligned to the delegation decision faced by the politicians I study. A centralized organization is a ministry, the central organizing authority for a sector. For example, the Ministry of Health is the central organizing authority for the Health sector. It defines the long-term strategy for the sector and interacts regularly with the National Assembly, and its Standing Committee on Health, on the legislative aspects of healthcare in Nigeria. The centralized ministries are the first point of contact for politicians interested in a sector designated by the Public Service Rules, the rules that govern the public sector.

A decentralized organization is an agency, which is an independent body, established by law as a self-accounting entity with a budget line in the federal budget. Agencies are run by a chief executive with boards of long-term governors chosen by the President. Bureaucratically, they are more autonomous from the legislature than the centralized ministries are. Decentralized organizations are also geographically more distant from Parliament. Centralized organizations are all based in Abuja less than a kilometer from the politicians. The decentralized agencies are on average *hundreds of kilometers from the capital*, making personal interaction with decentralized organizations more costly for politicians.

For every project I study, politicians have a choice between a centralized ministry and a decentralized agency. Since the ministries are national in scope, they provide a centralized option for every project in their sector. There are also decentralized options for every project, since the decentralized agencies provide a contiguous coverage of Nigeria within each sector. A comparison of measures of project delivery across centralized and decentralized organizations implies that decentralized organizations are more productive

[10] In the broader literature on decentralization, such a split is known as 'bureaucratic decentralization' or 'deconcentration'. This is in contrast to political decentralization where distinct tiers are governed by distinct politicians.

than centralized ones. A key contribution of this chapter will be to assess whether this is causal or a function of politicians sorting projects across tiers.

Whilst each of the projects is implemented by a single organization, projects alike in terms of type, budget, scale and complexity, are implemented by both centralized and decentralized organizations. For example, the Federal Ministry of Water Resources implements projects in districts throughout the areas covered by the (decentralized) River Basin Development Authorities. In many districts, water projects are implemented by centralized and decentralized organizations. Similar arguments can be made for other sectors. Table 3.2 shows that whilst there are differences in the mean levels of budget and complexity across tiers, there is significant overlap in these characteristics. To ensure that I am not picking up differences in project characteristics across tiers, I use control variables that reflect the budget, existing investment, and technical complexity of a project. There is significant overlap across tiers in the nature of projects implemented: the range of project complexity is almost identical at the centralized and decentralized organizations that I study.

3.2.3 Interactions between politicians and bureaucrats

Once a project in a particular politician's constituency has been delegated to an organization, politicians must choose whether to interact with the bureaucrats there and provide them with *informal* incentives. The *formal* incentive structure in the Nigerian Civil Service are rigidly defined by the Public Service Rules. These rules are for all bureaucrats working across all political constituencies. Thus, varying the formal contracting structure for a specific constituency is difficult if not infeasible.

If a politician wants to motivate a bureaucrat on a particular project in her constituency, she would have to provide these incentives informally. This requires personal interactions between politicians and bureaucrats.[11] Politicians can then offer an incentive contract made up of both elicit transfers and coercion.

[11] In the qualitative interviews I held in conjunction with the data collection described in this chapter, bureaucrats stated personal interaction was required for informal contracts to be credible.

3.3 A Model of Delegation and Informal Incentive Provision

To understand what determines the choices of politicians across these organizations, I develop a model of delegation and informal incentive provision. The model serves two purposes. First, it delivers a series of predictions about the response of politicians to changes in political competition along the margins of delegation and the provision of informal incentives. Second, it provides a clear empirical specification that takes into account the implied simultaneous nature of delegation and informal incentive decisions by politicians.

3.3.1 Model

The polity consists of a single constituency represented by an incumbent politician A. The politician faces single-member district electoral competition in an upcoming (stochastic) election, and she prefers to stay in power than to lose the election.

The politician can increase her chance of being re-elected by providing a public project to her constituency. The legislature has provided the politician with funds, Q, to implement a public project in her constituency. She can use Q to make an investment in the public project, q, or for her own consumption, κ. The greater project output, the higher will be the politician's expected probability of winning the election.

The implementation of the project must be delegated to a bureaucrat. The politician can choose bureaucrat C or D (centralized and decentralized, respectively). To facilitate the implementation of the project, the chosen bureaucrat can exert costly effort, e. Effort can take two possible values: $e \in \{0, 1\}$. Exerting an effort of 0 or 1 implies disutility to the bureaucrat of $\psi(0) = 0$ and $\psi(1) = \psi$ respectively.

Implementation of the public project is uncertain, with effort affecting the output level as follows: if Q is invested in the project, the stochastic output level $\tilde{q}$ can only take two values, $\{\bar{q}, \underline{q}\}$ with $\bar{q} > \underline{q} = 0$, and the stochastic influence of effort on implementation is characterized by the probabilities, $pr(\tilde{q} = \bar{q} \mid e = 0) = \pi_l$ and $pr(\tilde{q} = \bar{q} \mid e = 1) = \pi_h$, with $\pi_h > \pi_l$. If $Q - \kappa$ is invested in the project, the higher output becomes $\bar{q} - \kappa$.

The politician cannot observe the effort of the bureaucrat, but she can observe the level of public project output. The politician can offer utility transfers contingent on the observed output; $\bar{t}$ if a high output, $\bar{q}$ (or $\bar{q} - \kappa$), is observed and $\underline{t}$ if a low output, $\underline{q}$, is

observed. The politician must deliver these transfers through personal interaction with the bureaucrat. The intensity of politician interaction measures the degree of reward, $t > 0$, or punishment, $t < 0$ (elicit transfers or coercion, respectively). For a politician to provide bureaucrat $k = \{C, D\}$ with transfers personally, there may be a transaction cost, represented by α^k. For example, a politician may be required to travel a large distance to personally provide those incentives. A high α implies a relatively large transaction cost in the provision of informal incentives.

Political competition determines the extent to which the politician is concerned with delivering public goods. I address the feature of a politician's utility being dependent on her probability of re-election by adding a parameter to her utility, $\gamma \in \left[\underline{\gamma}, \bar{\gamma}\right]$, the range of which strictly contains 1. γ is a reduced form way of representing the positive relationship between the provision of public projects and the winning of citizen votes.[12] It is increasing in political competition as it corresponds to the additional electoral gains to the incumbent politician from a high-level of public project output.

The residual of the project budget that is not invested in the project is utilized for personal consumption (corruption) by the politician.[13] She must decide how much of the budget to consume. The utility from consuming project funds is subject to diminishing marginal returns.

Turning to bureaucrats, I assume that they are risk neutral, and their utility is separable in the utility from informal transfers from politicians and effort. Their utility function takes the form,

$$U^k = t - \psi(e) \tag{3.1}$$

where $k = \{C, D\}$. If the politician prefers to provide no incentives, (3.1) implies that $\bar{t}^\star = \underline{t}^\star = 0$. The bureaucrat will then optimally exert no effort.

The timing of the contracting process is described in Figure 3.1. The politician determines the optimal contracts for both bureaucrats and the level of rents to consume at each tier and compares the utilities of delegating to each. She then offers the appropriate contract to the bureaucrat with whom she can realize the highest utility. The bureaucrat

[12]There is a broad literature that shows a positive link between the provision of public projects and electoral gains for the incumbent politician. For the US, see Levitt and Snyder (1997) and for Africa see Weghorst and Lindberg (2013).

[13]Since there is no incentive to increase transfers to the bureaucrat from their minimum level required to induce high effort, the politician optimally consumes whatever rents are generated.

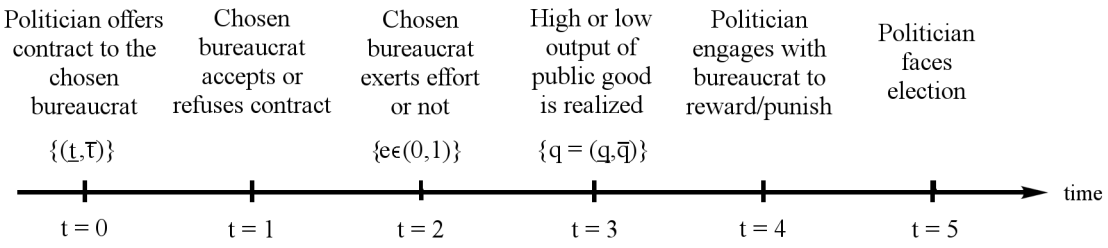


Figure 3.1: Time line for contracting under moral hazard

accepts or rejects the contract, and chooses whether or not to exert effort. The stochastic output realization occurs, which determines the nature and intensity of interaction of the politician with the bureaucrat. Finally, the politician faces the election and campaigns on the basis of the amount of public project provided.

The risk neutral politician gains an expected utility for the case of the bureaucrat exerting effort ($V_1^k \equiv V_1^k(e=1)$) and not exerting effort ($V_0^k \equiv V_0^k(e=0)$),

$$V_1^k = \pi_h^k\left(\gamma\left(\bar{q}-\kappa^k\right)-\alpha^k\bar{t}^k\right)-\left(1-\pi_h^k\right)\alpha^k\underline{t}^k+\left(\kappa^k\right)^{\frac{1}{2}} \tag{3.2}$$

$$V_0^k = \pi_l^k\gamma\left(\bar{q}-\kappa^k\right)+\left(\kappa^k\right)^{\frac{1}{2}} \tag{3.3}$$

For the case with effort, with probability π_h^k output is high, yielding $\gamma\left(\bar{q}-\kappa^k\right)$ of benefits from output and $\alpha^k\bar{t}$ of costs. With probability $\left(1-\pi_h^k\right)$ output is low, with associated costs. Both yield κ^k of rents.

I differentiate between the bureaucrats C and D in two ways, both motivated by the descriptive statistics presented in section 3.4. The decentralized bureaucrat is more productive than the centralized bureaucrat, in the sense that $\pi_h^D > \pi_h^C$, whilst $\pi_l^D = \pi_l^C$. Second, I assume that the transaction costs for politicians interacting with centralized bureaucrats are less than for interacting with the decentralized bureaucrats. I set $\alpha = 1$ for centralized organizations and $\alpha > 1$ for decentralized organizations. This assumption stems from the institutional and geographical distance that decentralized organizations have from the National Assembly.

The politician who wants bureaucrat C or D to exert effort faces the following maximization problem,

$$\max_{\{\bar{t},\underline{t},\kappa\}} \pi_h^k \left(\gamma\left(\bar{q}-\kappa^k\right)-\alpha^k\bar{t}^k\right)-\left(1-\pi_h^k\right)\alpha^k\underline{t}^k+\left(\kappa^k\right)^{\frac{1}{2}} \tag{3.4}$$

$$subject\,to \quad \pi_h^k\bar{t}^k+\left(1-\pi_h^k\right)\underline{t}^k-\psi \;\geq\; \pi_l^k\bar{t}^k+\left(1-\pi_l^k\right)\underline{t}^k \tag{3.5}$$

$$\pi_h^k\bar{t}^k+\left(1-\pi_h^k\right)\underline{t}^k-\psi \;\geq\; 0 \tag{3.6}$$

The constraints reflect incentive and participation constraints respectively. The optimal levels of politician interaction with the bureaucracy are determined by re-organizing the constraints. They are therefore (all proofs provided in the Appendix),

$$\left(\bar{t}^k\right)^\star=\frac{\left(1-\pi_l^k\right)}{\left(\pi_h^k-\pi_l^k\right)}\psi \tag{3.7}$$

$$\left(\underline{t}^k\right)^\star=-\frac{\pi_l^k}{\left(\pi_h^k-\pi_l^k\right)}\psi \tag{3.8}$$

The optimal contract is where the politician rewards the bureaucrat with a positive transfer if the output is high, and punishes her if the output is low. The politician will only induce high effort using this incentive scheme when the utility of doing so is greater than the utility from the bureaucrat exerting no effort. For the centralized and decentralized organizations respectively, the relevant condition is,

$$V_1^C\geq V_0^C \Rightarrow \left(\pi_h^C-\pi_l^C\right)\gamma\left(\bar{q}-\kappa^C\right)\geq\psi \tag{3.9}$$

$$V_1^D\geq V_0^D \Rightarrow \left(\pi_h^D-\pi_l^D\right)\gamma\left(\bar{q}-\kappa^D\right)\geq\alpha\psi \tag{3.10}$$

The politician prefers to induce a high effort when the multiplier representing the degree of political competition, γ, is high enough that the marginal benefit of public project implementation is greater than the marginal cost of incentive provision. Since the left-hand sides of (3.9) and (3.10) are increasing in γ, a politician is more likely to personally interact with a bureaucrat as political competition rises. Thus, interaction is more likely to be characterized by (3.7) and (3.8) (positive in absolute magnitude) than by the no-inducement equilibrium, $\bar{t}^\star=\underline{t}^\star=0$. The model predicts a positive

relationship between political competition and the absolute levels of incentives.

By substituting the optimal transfers into the maximization problem, and taking first order conditions with respect to κ^k, we gain the optimal levels of corruption at tier k,

$$\left(\kappa^k\right)^\star = \left(\frac{1}{2\pi_h^k\gamma}\right)^2 \tag{3.11}$$

Since $\pi_h^D > \pi_h^C$, $\left(\kappa^D\right)^\star < \left(\kappa^C\right)^\star$, and corruption is lower than at the decentralized tier. It is costlier in terms of foregone output for the politician to steal from the project implemented at the decentralized tier. Thus, the underlying performance differential leads to higher corruption at the worse performing tier, amplifying the difference in outputs.

Having determined the optimal level of incentives and corruption at each tier, I can turn to the conditions under which the politician delegates to the decentralized organization over the centralized organization,

$$V_1^D - V_1^C \geq 0 \Rightarrow \left(\pi_h^D - \pi_h^C\right)\gamma\bar{q} - (\alpha - 1)\,\psi - \frac{\pi_h^D - \pi_h^C}{4\pi_h^D\pi_h^C\gamma} \geq 0 \tag{3.12}$$

The differential of the middle expression of (3.12) is positive with respect to γ. Thus, increasing competition implies an increasingly higher utility from delegation to the decentralized agent. The model predicts a positive relationship between political competition and decentralization. This result arises from two sources. First, the reward to the politician from output, which is higher at the decentralized tier, increases. Second, the relative attractiveness of corruption falls, reducing the incentive to implement projects at the centralized tier where corruption is higher.

Equations (3.9), (3.10) and (3.12) together imply that more projects for which the politician induces high effort from the bureaucrat will be implemented by the decentralized bureaucrat. The model therefore predicts that more projects will be completed by decentralized bureaucrats than by centralized bureaucrats.[14]

[14]One way to interpret differences in $\pi_h - \pi_l$ across tiers (in the sense that $\pi_h^k - \pi_l^k > \pi_h^{k'} - \pi_l^{k'}$) is that they can be seen as one bureaucrat having superior information about project delivery than another. In this case, the model predicts that projects that are characterized by information more easily available to the decentralized (centralized) bureaucrat are more likely to be delegated to decentralized (centralized) bureaucrats. Similarly, the set of equations we describe here jointly imply that projects with lower π_h, implying a higher technical complexity, will be more likely to be centralized and to induce a lower level of interaction. We will test these additional predictions in the set of robustness checks we undertake for the analysis of delegation and incentive provision.

3.3.2 From theory to empirics

Equations (3.9), (3.10) and (3.12) describe how politicians determine their choices over which bureaucrat to delegate to and the extent to which to interact with them to provide informal incentives. Together, they imply that delegation and incentive provision are simultaneously determined. Delegation is a function of the cost of incentives, ψ, whilst incentives are a function of who has been delegated to (the choice between equations 3.9 and 3.10). At the same time, they both enter the production function for public output, $\widetilde{q}$.

This indicates a direct mapping from the theoretical model into a simultaneous equations regression model in which delegation choices and the level of informal incentives are simultaneously determined. Conditional on project characteristics (represented in the model as π), public output, $\widetilde{q}$, delegation, $\{C, D\}$, and informal incentives, ψ, make up a three equation system. The latter two variables are driven by the degree of political competition, the transaction cost of providing incentives, the cost of incentives, and the level of corruption (or conversely the productivity of the bureaucrats). These then feed into the probability of observing a high output.

To test the predictions implied by the model, I require variation that separates the delegation and informal incentives margins. In other words, I require instruments that enter into the structural equations of delegation and incentives alone. With these instruments, I can estimate equations (3.9), (3.10) and (3.12) separately.

3.4 Data

To test the causes and consequences of delegation and incentives, I require proxies for each of the components of my model from the context under study, the Nigerian public sector. This requires data from across government. I have assembled a data set that combines characteristics of politicians with their positions in the National Assembly. Based on a representative sample of projects from the Federal Government of Nigeria's 2006 and 2007 budgets, I have details of the projects that these politicians delegate to organizations, surveys of the organizations that implement these projects, and evaluations of how effectively they do so. Overall, I have a detailed profile of the delivery of public projects from initiation to implementation.

I begin by describing the core explanatory variables that relate to politicians, their

constituencies, the characteristics of projects that are implemented in those constituencies, and the bureaucratic organizations which implement them. I then describe the dependent variables in the final sub-section.

3.4.1 Politicians and Political Competition

A politician in this chapter is a Nigerian House of Representatives member. Nigeria's 5th National Assembly was inaugurated in May 2003, and consisted of 109 senators and 360 representatives. My focus will be on the House of Representatives because of the significance of standing committees and public projects in that chamber relative to the Senate.[15] The data used here covers 350 of the 360 constituencies, with 10 pairs of constituencies in this set aggregated to the local government level, leaving 345 constituencies under study.[16]

For each of the 345 representatives I study, I have assembled biographies that outline their demographic and political characteristics (such as their party affiliation), their educational qualifications and work experience, and the results of their election in 2003.[17] Tables 1 and A1 in the Appendix provide descriptive statistics for the politicians and their constituencies. The vast majority of the politicians under study are men, with a mean age of 48, and 16 years of education (equivalent to a Bachelor's degree). The average population of a constituency is 370,000. This population is split, on average, between two local governments, which is the most basic administrative unit of government in Nigeria. The local nature of congressional politics implies that local public project provision is central to the success of a representative's time in office. National Assembly politicians do not face term limits, implying they have an ongoing incentive to provide public projects

[15] Richard Fenno's famous 1973 study comparing the US Senate and House argued strongly that decision making inside the Senate is much less of a committee-dominated process than in the House. "In the House," Fenno writes, "the individual member's influence on chamber decisions is exerted, almost wholly, within and through his committees. Senators operate with no such constraints." A corollary of this is important for the current exercise. Fenno continues, "That is, a Senator's committee membership adds far less to his total potential for influence inside his chamber than a Representative's committee membership adds to his potential for influence in his chamber."

[16] I do not have evaluations of project outcomes for 10 constituencies, so I exclude these constituencies in the analysis. I describe the sampling of projects in the Appendix. The constituencies of 10 representatives are smaller than a local government area, the smallest administrative unit in my data. I therefore aggregate constituencies to their local government, leaving 345 federal constituencies to be studied. The characteristics and winning vote shares of the representatives who share local governments are very similar. I therefore allocate the constituency to that one of the two representatives who is first on the nominal roll of the election records. The core results of the chapter are qualitatively unchanged if I include or exclude the projects located in local governments with multiple representation or use the second of the two representatives.

[17] The Appendix details the construction of these biographies.

to bolster their re-election chances. A quarter of the politicians whom I study are already serving a second term.

To understand the political dynamics of the constituencies under study, I collected data from the Independent National Electoral Commission on the returns for each of the elections in 2003 (when the politicians I study were voted into power). This is data that was published as the official roll of the national elections.

My main measure of political competition (proxying γ, the weight on the provision of public projects in the politician's preferences) is a function of the margin of victory, defined as the winner's vote share minus the runner's up vote share. It represents the proximity of the runner up to the winner. My measure subtracts the margin of victory in a constituency from 1 so that it is increasing in competition. Thus, a value of 0.4 implies that the winner of the constituency election has a vote share 60 percentage points larger than that of her opponent. Such a measure is used by Besley and Burgess (2002), Lee (2008), and Da Silveira and De Mello (2011).

The political competition faced by representatives is relatively heterogeneous across constituencies. While the mean margin of victory is 0.33, there is substantial heterogeneity across the country. As Figure 3.2A shows, I observe constituencies subject to the full distribution of levels of political competition, providing sufficient variation from which to estimate parameters. This also allows for interpretations of coefficients that describe competition at very low and very high levels.[18]

The heterogeneity in competition is not concentrated in one area of Nigeria. As Figure 3.2B indicates, there are large differences in competition between proximate constituencies. The average differential in margin of victory across neighboring constituencies is 20 percentage points. Thus, political incentives vary substantially across constituencies with similar geographic characteristics. This implies that competition is not pre-determined by geographic or socio-economic characteristics.

To further characterize a representative's constituency, I use the largest household survey ever undertaken in Nigeria, the 2005 Core Welfare Indicators Questionnaire (CWIQ).

[18]The distribution of political competition across constituencies in other countries is similarly diverse. For the US, the most recent election data is surprisingly similar to that of Nigeria. The average margin of victory for House elections in 2012 was 0.32, and constituency contests spanned the full distribution of political competition. For the UK, the margin of victory varies continuously between 0.01 and 0.58, with a mean of 0.19. There is substantial heterogeneity across neighboring constituencies, as in my data. Comparing this context to other developing country democracies, India is closer to the UK context, with the margin of victory spanning 0.01 to 0.61, with a mean of 0.12. Ethiopia, the second largest democracy in Africa after Nigeria, has an average margin of victory of 0.5 and varies between 0.01 and 0.96. (All figures are authors calculations based on election statistics from relevant election bodies).

This was a cluster-randomized household survey run by Nigeria's National Bureau of Statistics, representative at the local government level. The CWIQ survey was implemented at the end of 2005, at the same time as politicians were making delegation decisions in the first round of standing committees, and it therefore provides a baseline profile of the constituencies that I study. Using this survey, I create constituency-level averages for indicators of poverty, access to existing public projects and local economic dynamics. These will be used as controls in the core specifications and are described in detail in the Appendix.

Table 3.1 describes the constituencies under study in terms of the socio-economic characteristics for which I control. Nigeria's citizens are generally poor, with a high proportion of the population in extreme or relative poverty. The average years of education is five years, equivalent to less than primary school completion. Only 48 percent of Nigerians have potable water, and the average number of hours of electricity available per day is 4.5. There are plenty of opportunities for public projects to have significant welfare impacts across the constituencies that I study. These potential impacts support the direct link between public project provision and the votes that a representative receives.

Table 3.1 also compares the characteristics of politicians and their constituencies at the top and bottom 10 percent of competitive constituencies as defined by my measure of political competition. The table implies that the politicians are not particularly different. However, there are a small number of statistically significant differences to note. Politicians in the most competitive constituencies have roughly half a year more education. Similarly, there are no clear patterns of difference between the constituencies in terms of deprivation, although the most competitive constituencies seem to have a little *less* access to water and a slightly *longer* walk to the nearest primary school. I control for all of these variables in the main specifications to take account of any impacts of these differences.

The bottom of Table 3.1 looks at the difference in OPEN funds allocated to the top and bottom 10 percent of constituencies in terms of political competition. It shows that in this context, politicians faced by significant competition are not able to realize significantly higher levels of public funding for their constituencies. For the full distribution of constituencies, the correlation between the volume of OPEN funds (number of projects a constituency receives) and political competition is 0.02 (0.06).[19]

[19]One concern in Nigeria is that politicians of the ruling party have very different behaviors to those

Table 3.1 does imply that political competition is positively associated with the completion of projects. It shows that projects in the most competitive 10 percent of constituencies have a significantly higher level of progress than those in the bottom 10 percent. In the full data, a standard deviation increase in political competition is unconditionally correlated with a six percent increase in the proportion of public projects delivered. Together, these simple correlations support the approach of this chapter, which fixes the distribution of resources across constituencies and looks for the mechanisms through which political competition impacts on bureaucratic output.

From the set of politicians voted into power in 2003, the Committee on Selection chose members for the standing committees that provided politicians with delegation power (giving them the powers of politician A in the model). For each of the relevant committees of the 5th National Assembly, I coded the membership of the committee using data from Nigerian Congress, a web site that provided details of all the House Committees set up in 2003. I also gained information on membership for the relevant period from secretaries of the appropriate committees. The committees I study are agriculture, appropriation, education, environment, Federal Capital Territory (city building), finance, health, housing, power, water, women, and youth. I then matched each representative to the committee membership records, and noted their position as member, chair, or vice-chair.[20] The mean and median number of committees under study that a representative sits on is one. All representatives in the House are expected to serve on a committee. We now turn to those projects that the committees made decisions over.

of other parties. Roughly two-thirds of constituencies are governed by a politician of the ruling party. I investigated the extent to which politicians of the ruling party have very different outcomes to members of other parties. The correlations imply that they are not able to secure higher funds per constituency or more projects. Overall, ruling party politicians are not operating in a substantially different context to other politicians.

[20]The US literature on standing committees I take as the guide for this study (Aghion *et al.* (2005, 2009, 2010) and Cohen *et al.* (2011)) conditions quantitative regression specifications on the 'grade' of the standing committee. Congressional committees are typically seen as having a hierarchy of importance, and the grade of the committee reflects the standing of the committee within that hierarchy. The rationale for following this practice is that in politically important committees, the dynamics of delegation may be distinct from other committees. I follow this practice by including a binary indicator of the grade of the committee under which the project falls in all specifications. This is a dummy that takes the value 1 if the committee is perceived to be of high political weight or 0 otherwise. I follow Ojeifo's (2007) delineation of grade A (agriculture, water, education, power, housing, environment, Federal Capital Territory) and grade B (health and women) committees. The core results are all qualitatively the same when I do not include this variable.

3.4.2 Public projects

In 2006 and 2007, the 5th National Assembly legislated a Federal Budget of US$12.7 billion and US$15.1 billion respectively, or US$27.8 billion in total over the two years. The focus in this chapter is social sector capital projects, which account for roughly 35 percent of the total, or 73 percent of capital expenditures.

In both of these years, Nigeria's Presidency undertook a unique monitoring and evaluation initiative that tracked the implementation of a representative sample of social sector projects. The 'Overview of Public Expenditure in NEEDS' (OPEN) monitoring initiative arose out of Nigeria's receipt of debt relief in 2005. As a result of sweeping reforms across major organs of government (for an overview see Nkonjo-Iweala and Osafo-Kwaako, 2007), Nigeria received cancellation of its external debt to the tune of US$18 billion from the Paris Club. At the federal level, the annual savings from debt interest were channeled into the social sectors (health, education, water etc.) that are the focus here. The Presidency viewed this as an opportunity to track the effectiveness of government expenditures, and so in 2006 and 2007 the Nigerian Government traced, at a project level, the use and impact of 10 percent of all Federal Government social sector expenditures.

The OPEN projects were designed to be a representative set of government social sector expenditures, providing me with data on a representative sub-set of the federal social sector budget.[21] Since I am investigating delegation, I am only interested in those projects that can be feasibly delegated to either tier of government. In other words, I studied only those projects that could be implemented by either centralized ministries or decentralized agencies. I therefore exclude all projects from the full set of OPEN expenditures that have national or inter-jurisdictonal scope, such that a single decentralized organization does not have the mandate to implement such a project. Examples of these projects are those that require engagement with international organizations or that are implemented nationwide. This leaves us with a representative set of social sector projects that could be delegated to both centralized and decentralized organizations. All projects therefore have an organization at the centralized and decentralized tier that could implement them, and that implement comparable projects in terms of budget and

[21] In the survey of bureaucrats I use in this chapter, I was not able to undertake a survey at the decentralized organization to which electrification projects can be delegated. I therefore have to exclude all electrification projects for this analysis. This means that I have a representative set of delegatable projects for social sector projects that are not electrification infrastructure.

technical complexity.

These projects are typically small-scale infrastructure projects (84 percent), with some procurement and other programmatic projects (16 percent). Descriptive statistics for the projects across constituencies are provided in the bottom half of Table A3.1. Note that constituencies typically have multiple projects, of multiple project types, covered by multiple sectoral committees. The projects are small in terms of budget, with a mean budget of US$130,000, and complexity, with a mean of 27 percent on the index of complexity spanning the distribution of projects observed in the wider OPEN data set. They can be thought of as the 'nuts and bolts' of village economies. There is heterogeneity across project types (boreholes, buildings, dams, procurement, roads, financial projects, canals, training, advocacy, and research) in terms of the quality of output. I therefore control for project type fixed effects throughout the analysis.

For each of the projects studied here, I have evaluations of how effectively they were implemented (proxies of $\tilde{q}$, the level of output in the model). Under the OPEN initiative, expert teams were sent to visit the selected projects and identify the extent to which they had been implemented as planned in the Federal Budget, and embodied in each project's technical documentation. The Presidency contracted national and regional teams to undertake the monitoring process outside of the institutions of the civil service. Thus, the public sector projects were not evaluated by potentially biased civil servants, but rather by teams of independent engineers and civil society representatives. The engineers evaluating the projects were not those working on the project sites, and the civil society groups were recognized third sector organizations.

Evaluations of the OPEN process indicate it successfully achieved its aims (Eboh 2010, Dijkstra *et al.* 2011). To ensure the accuracy of monitoring reports, the Presidency put in place a system of checks and balances. First, a centralized team of technocrats monitored the evaluation teams, providing them with training and opportunities for standardization of their methods at national conferences. Second, evaluators were asked to provide material, photographic, or video evidence to support their reports. Third, the national teams and Presidency performed random checks on evaluated sites, all of which were consistent with the findings of OPEN monitors.

The reports of OPEN evaluators describe the fate of projects budgeted for execution in the 2006 and 2007 federal budgets (Federal Government of Nigeria 2008a, 2009a). I

hand-coded the material from all projects recorded in OPEN initiative reports.[22] Taken together, the coverage of projects in the sample I study traces 7 percent of all Federal Government social sector expenditures in 2006/7 budget years, corresponding to 3,009 projects from 54 organizations, with an aggregate budget of around US$560 million.[23]

The OPEN evaluation teams coded: (i) whether the project had started; (ii) its stage of completion; (iii) the quality of the inputs and work. The main outcome variable is a continuous measure, from zero to one, of project completion rates: zero refers to the project never having been started, one corresponds to the project being completed as specified in the original project description, and intermediate scores reflect part completion. I have this 'proportion completed' variable for all of the 3,009 projects I study, and that will be my proxy for organizational productivity.

Table A3.1 provides a summary of my proxy of $\tilde{q}$, the proportion completion rate, across constituencies. Roughly 40 percent of projects are never started, while a third are completed.[24] Conditional on being started, therefore, a project has a 53 percent chance of being completed.

A politician's delegation decision may be a function of a project's characteristics. In my model, politicians' decisions were sensitive to π_h and π_l, the technical uncertainties of public projects. I therefore hand-coded data on project-level characteristics such as the budget allocated to the project, whether it was a rehabilitation project, and a brief summary of its technical specifications from project documentation. I also coded which of 10 project types the projects fell into, with categories in both construction (water wells, buildings, and so on) and non-construction fields (procurement, financial projects, and so on). The project technical specifications were used to form engineer-approved measures of the technical complexity of each project and informational characteristics, in the sense of whether centralized or decentralized tiers had an informational advantage

[22]The OPEN reports comprised of roughly 21,000 evaluation reports, photo and video files, and recipient testimonies. I personally reviewed each of these documents and entered the appropriate evaluations into a single database according to a set of specified benchmarks agreed by the OPEN engineers and civil society teams.

[23]I consider projects traced under the OPEN initiative that were approved in either the 2006 or 2007 federal budgets. For projects funded in the 2006 (2007) federal budget, monitoring teams visited the relevant project sites around June 2007 (2008). Therefore, project implementers were given roughly 18 months from the time the project was centrally approved until when it could be used by the community. All the projects I study had twelve month completion schedules, so that even accounting for any delay in the disbursement of funds, it is feasible for these projects to be completed by the time of the monitoring survey.

[24]It is not possible for me to distinguish between whether projects were not started due to active or passive waste (Bandiera *et al.*, 2009). Rather, the focus of this chapter is on whether the decisions and actions of politicians can overcome bureaucratic inefficiency, whatever its nature.

in project delivery. The Appendix: (i) details the construction of these indices, and presents descriptive statistics for them; (ii) describes checks I put in place, using multiple engineers, to establish the validity of these complexity measures.

3.4.3 Bureaucrats

A bureaucrat in this chapter is a civil servant of the Federal Government of Nigeria. The 3,009 projects I study in this chapter were implemented by one of 54 bureaucratic organizations. These are split into 7 centralized ministries (represented by bureaucrat C in the model) and 47 decentralized agencies (represented by bureaucrat D). For each project I study, the politician always has a choice between a centralized and a decentralized organization.

For all of these organizations I collected data on their budgets, staffing, and location. Table 3.2 provides descriptives for the organizations under study. On all the margins presented, centralized organizations differ from decentralized ones. They are larger in terms of budget, staffing, and the number of federal constituencies they serve. The key difference for the current setting is the difference in productivity. The bottom half of Table 3.2 describes how along multiple margins, centralized organizations seem less productive than decentralized ones. Whilst I aim to better understand whether this correlation is an artifact of political sorting across tiers (as modeled above) or a reflection of underlying productivity differences, it is this that motivates me to set the likelihood of high output of the effort-exerting decentralized bureaucrats above that of centralized bureaucrats.

To gain measures of the utility transfer that arises from interactions between politicians and bureaucrats, t in the model, I undertook surveys of a representative sample of roughly 10 percent of the staff at each of the organizations I study.[25] As part of this survey, I collected some of the first systematic measurements of interactions between politicians and bureaucrats. Such interactions are typically not observed. My main measure of politicians' incentive provision is a question from this survey that proxies the degree to which a politician was involved in project implementation. Each of the officers I surveyed was asked the following question, which I use as the core measure of politician-bureaucrat interactions, "Rate the influence you think [members of the National

[25] There is an emerging literature in political science on informal politics, such as the research described in Helmke and Levitsky (2006). This chapter adds to that literature by providing large-scale and detailed measures of informal political pressures, embedded in a model that relates those measures to output.

Assembly] have on the success of a typical project implemented by your organisation", where responses were categorical and divided into 'Most influence', 'Significant influence', 'Some influence', 'Less influence' and 'Least influence'. For each bureaucrat, I determine a binary variable that takes the value 1 if they responded 'Most influence' or 'Significant influence', and 0 otherwise.

Table 3.3 describes means and standard deviations for the average answers to this question. To gain reflections of the *intensity* of politician interactions, I weight the averages by the number of projects implemented at an organization. On average, roughly 50 percent of officials state that politicians have significant or most influence over the projects they implement. There is significant heterogeneity across organizations, with only 26 percent of officials stating such influence at the least influenced organization and 84 percent stating such influence at the most influenced. As predicted by the model, I find higher levels of interaction with bureaucrats at the decentralized tier, and the difference is significant at the 1 percent level.

I present descriptive statistics separately for managers and non-managers. The pattern of interactions across seniority of bureaucrat differs across centralized and decentralized organizations. In centralized organizations, managers state that politicians have a higher influence on the projects at the organization than non-managers. However, at decentralized organizations, this pattern is reversed. Non-managers state politicians have a more significant impact on the success of projects at their organization than managers.

I also asked bureaucrats, "Think about recent projects and/or programs you worked on for this organisation. How often, if at all, do you *personally* engage with [member(s) of the National Assembly] in the work that you do?" [italics in original]. I present descriptive statistics for the answers to this question in Table 3.3. They imply that members of the National Assembly *personally* engage with bureaucrats on the implementation of 14 percent of public projects. I again find significantly higher levels of interaction between politicians and decentralized bureaucrats. Both of these measures are organizational averages, which take the approach that projects are impacted on equally by politicians at an organization.[26]

[26]Survey data on politician interaction with bureaucrats around project implementation is rare. The closest numbers I have for comparison to my research come from the World Bank's 'Public Officials' Surveys' (Manning *et al.*, 2000). These surveys covered 16 countries, and there is significant heterogeneity in the average level of bureaucrat's perception of politicians' interference. Evidence from Bangladesh shows that when politicians stop interfering in day-to-day decisions, the perception of corruption in that organization will fall by 31 percent (Mukherjee *et al.*, 2001). A similar impact of political interference was found for Bolivia (Manning *et al.*, 2000). In Guyana, 42 percent of officials interviewed stated that

3.5 Empirics

I begin by examining what determines whether a project is delegated to a decentralized organization. I then turn to the determinants of politicians' interactions with bureaucrats. Finally, I look at the consequences of these decisions on project output.

3.5.1 Causes of delegation

To assess the drivers of political delegation separately from those of incentive provision, I exploit a congressional procedure that provides exogenous delegation power to a subset of politicians. Membership of a sectoral standing committee in the Nigerian House of Representatives provides its members with significantly greater power to delegate projects *in that sector* than non-members. For each project, I construct a membership dummy that takes the value 1 if the project is in a constituency in which the representative is on the sectoral committee of the same sector as the project.

Using committee membership as a binary indicator of additional delegation power, I interact this dummy with my measure of political competition to test whether members are more prone to delegating to decentralized organizations of government when they face political competition. The levels effect of the membership variable measures the impact of membership for constituencies with zero political competition. The interaction measures the impact of membership for higher levels of political competition.

In summary, I use the following specification:

$$\begin{aligned} decentralization_{icn} &= \gamma_1 membership_{ic} + \gamma_2 competition_c + \gamma_3 membership_{ic} * competition_c \\ &+ \gamma_4 PC_{ij} + \gamma_5 CC_c + \lambda_j + \epsilon_{icn} \end{aligned} \tag{3.13}$$

where I estimate for the ith project, implemented in constituency c by organization n.

$Decentralization_{icn}$ is a dummy variable that takes the value 1 if the project is implemented by a decentralized organization and 0 otherwise. $Membership_{ic}$ is a dummy variable indicating whether the congressperson of the constituency in which the project is

politicians' interference is frequently or very frequently a "significant problem" (Gokcekus *et al.*, 2001). Thus, whilst these figures reflect varying contexts and survey questions, they are indicative that the magnitude of the issues studied here are of widespread significance.

implemented is a member of the sectoral committee relevant to the project; $competition_c$ is a continuous measure on the unit interval of one minus the margin of victory in the constituency; $membership_{ic} * competition_c$ is an interaction between membership and competition and thus also measured on the unit interval; project controls (PC_{ij}) are the key project characteristics described above; constituency controls (CC_{ij}) are the key congressperson characteristics and socio-economic characteristics of the constituency described above; and, project type fixed effects (λ_j) absorb 10 project type level effects.

My strategy relies on the membership variable being uncorrelated with constituency-level factors that might determine which organization the politician delegates to. Particularly, it should be uncorrelated with factors that might influence how effectively an organization is able to implement the project. I therefore investigate how membership of sectoral committees is determined, to assess the validity of its exogeneity.

Both the politician members of the Committee on Selection and their administrative secretaries state that selection decisions are based on the geo-political factors and qualifications I have described in section 3.2.1.[27] To empirically test these claims, I can assess the factors that determine the sector/s in which a politician has been selected to serve. Table A3.2 provides motivating evidence that politicians are similar across committees. It reports regressions of characteristics of politicians and their constituencies, including the political competition they face, on dummies for each of the sectoral committees we study. I find no evidence of sorting across committees on politicians' observed characteristics, such as the level of political competition they face, sex, age, years of education, or the extent of poverty in their constituency.

A formal test of which observable characteristics explain selection into committee membership is reported in Table A3.3. I estimate a seemingly unrelated regression (SUR) model across indicators of committee membership. For each constituency-level regression in the SUR system, the dependent variable is a binary variable reflecting whether a representative is a member of the committee for the named sector. I regress these indicator variables on the politician and constituency controls described above, and a series of dummy variables that indicate the politician's geo-political region. I then display the coefficients for those variables relevant to all the sectors. Table A3.3 indicates

[27] For example, the vice chairman of the Committee on Selection states, as reported in This Day newspaper, "The Selection Committee ... considered cognate experience, areas of specialization and zonal representation in order to ensure that the chairman and vice chairman of a committee do not come from the same geopolitical zone." (This Day, 2007)

that for all bar one of the committees, there is strong evidence that qualifications play the major role in determining which politicians are allocated to a particular committee. There is also little correlation in error structure, implying there is no evidence of underlying unobservables selecting politicians across sectors. There is evidence that other factors play a role in the membership of the agriculture committee, and I will check the robustness of the results for this deviation.

One concern is that constituency characteristics indirectly influence committee membership by determining the sector of a representative's qualifications and experience.[28] For example, a politician from an arid region of Nigeria may enter into the water sector. It may then be more challenging to implement water projects in that region, and so the politician experienced in the water sector delegates to decentralized organizations, who better understand her constituency's needs. Table A3.4 investigates the determinants of a politician's sector of qualifications and experience by estimating a SUR model of sector expertise on constituency characteristics. I create dummies for each of the sectors into which a politician could have specialized. These take the value 1 when the politician has specialized in that sector, and zero otherwise. I present coefficients on variables relevant to all sectors, as well as those variables most relevant to each sector from within the set of controls used in my core specifications. I find that there is almost no evidence that constituency characteristics determine the sector into which a politician specializes. Almost none of the coefficients are significant at the usual levels.[29]

Another quantitative check comes from comparison between the Senate and House. If constituency-level characteristics determined the sectors into which representatives

[28] As complementary to the formal tests of this, I note that Nigeria only became a democracy in 1999, such that almost all of the qualifications on which the Selection Committee made their decisions were gained well before the standing orders were even conceptualized. When they made their career decisions, politicians would not have known how the House standing orders would be designed or perhaps whether Nigeria would have a National Assembly at all.

[29] Another perspective on this test is that it may be of greater interest to assess the extent to which past constituency characteristics explain the sector of politician qualifications and experience. They act as a secondary check on whether constituency characteristics determine the context of implementation today as well as politician's career sector, and link the analysis to the context in which politicians made their career decisions. Table 3.1 states that the mean politician is 48 years of age in 2006, implying that they made primary career decisions during the late 1970s. In 1980, Nigeria undertook its first systematic household survey, the National Integrated Survey of Households. I therefore coded state-level averages from this survey for the variables closest to those in the core analysis. I then associated them with the corresponding politician in the data set. Where new administrative units have formed, I matched the politician to the data that most closely corresponded to their constituency. Using this data, I re-estimated the regressions described here to assess how constituency characteristics in 1980 impacted on the sector decisions of the politicians I study. They had little explanatory power, mirroring the findings in Table A3.4. The 1980 variables are, however, strong predictors of contemporary constituency characteristics, providing a validation of both sets of household data, collected a quarter of a century apart.

selected, I should find that senators from the same areas have selected into the same sectors. I find this is rare. Only 13 percent of representatives are on a committee of the same sector as their senator. For any particular committee, that figure is at most 3 percent.

The totality of the evidence points towards the House Selection Committee determining committee membership based on factors that are exogenous to constituency-level characteristics that might have significant impacts on project implementation or the choice of organisation delivering public projects.[30] Thus, as Payne (2001) finds substantial evidence for arbitrariness in the makeup of US congressional committees, I find a similar phenomenon in Nigeria with respect to local political conditions. Relative to local factors that determine project implementation, the granting of committee membership for a particular sector is an arbitrary allocation of additional power to delegate public projects within that sector. Having identified a feature of the chain of public project implementation that is plausibly exogenous, I can observe what committee members do with the projects under their remit versus projects in the constituencies of non-members.

I can therefore turn to estimating specification (3.13). Table 3.4 presents the baseline results on how politicians delegate to the two tiers of government under study. The dependent variable in all specifications is a binary variable reflecting whether a project is decentralized or not, which takes the value 1 when the project is implemented by a decentralized organization. Thus, a positive coefficient implies a greater likelihood to delegate a project to a decentralized organization. The baseline proportion of projects in the data used here that are decentralized is 0.73. Throughout I will control for project characteristics, as motivated by the model, and to keep the focus on political incentives.

Column 1 includes the 'relevant committee' dummy, project characteristics, and project type fixed effects only, and none of the other controls. The relevant committee dummy takes the value 1 when a project from a particular sector is implemented in a constituency in which the politician is on the relevant sectoral committee. For example, it would take the value 1 for a health project in the constituency of a member of the health committee, and 0 for health projects in other constituencies.

[30]To what extent would unobservable factors not picked up in the tests be able to play a significant role in the analysis? I can explore the potential for unobservable factors to reduce the estimates in this section to 0 using the correction for unobserved heterogeneity described by Altonji *et al.* (2005) and Oster (2013). Based on an intended R-squared of 0.8, I find that explanatory variation in unobserved factors would have to be roughly 4 times as large as the observed variation in the controls. Given that we see almost no evidence of sorting in the observables, this provides additional assurance that membership is a valid instrument in this setting.

The coefficient on committee membership is a precisely estimated zero. This implies that the mean effect of committee membership on delegation is zero. Since I have motivated my analysis by the differential effects of levels of political competition, this is not unexpected. Politicians' electoral concerns imply that politicians facing low and high levels of competition will make opposing delegation decisions.

I test this idea in column 2 by including a measure of political competition and an interaction of this measure with the indicator of committee membership. The interaction variable is centered at zero competition, so the coefficient on committee membership describes the behavior of committee members faced by zero political competition.

The coefficient on committee membership is significantly negative ($\gamma_1 < 0$), implying that when competition is low in a constituency, politicians centralize projects. In contrast, the coefficient on the interaction term is significantly positive ($\gamma_3 > 0$), implying that when a politician faces strong competition in her constituency, she is more prone to decentralization. The coefficients on committee membership and the interaction with political competition are both significant at the 1 percent level.

These findings imply that the distribution of projects across government is determined in part by political factors. The tendency to decentralize in response to pressures of political competition seems to be of a similar magnitude to the tendency to centralize when faced with limited political competition. A test of the null that the coefficient on committee membership, γ_1, is of equal and opposite magnitude to the sum of the coefficients on political competition and on the interaction term, $\gamma_2 + \gamma_3$, has a p-value of 0.18. This fits with the finding of a zero coefficient in column 1. Columns 3 and 4 test the robustness of these specifications to controlling for politician and constituency characteristics.

The analysis in this chapter focuses on the delegation and informal incentive decisions of politicians, keeping constant the resources available to each constituency. I can test the validity of this assumption by undertaking a similar analysis as that undertaken in this section on the volume of resources a representative is able to secure for her constituency. Columns 6 and 7 of Table 3.4 provide results of constituency-level regressions of total resources and number of projects similar to the analysis in the baseline specification. Specifically, I regress the sum of project budgets in a constituency or the number of projects I observe, on the proportion of projects for which the congressperson is a member of the relevant committee, political competition, and their interaction, as well as project,

politician and constituency controls.

I find that in both specifications there is little evidence that a congressperson is able to secure greater resources for their constituency by being a member of a standing committee. Neither of the coefficients corresponding to γ_1 or γ_3 are significant at the usual levels. In contrast to Aghion *et al.* (2005, 2009, 2010), I find that members of the Nigerian House of Representatives have influence over delegation, rather than resource control, when they are members of a standing committee. These findings support the approach taken in this chapter.

The implication of the results in Table 3.4 is that if you are a member of a standing committee and you face zero political competition in your constituency, you are 11 percentage points more likely to centralize a project than a non-member. On the other hand, if you are a member of a committee and you face significant political competition in your constituency, you are more likely to decentralize a project. A 1 percentage point increase in political competition leads to a 0.15 percentage point increase in the probability of decentralization. Together, these coefficients imply that members in marginal constituencies will decentralize 21 percent more projects than those in constituencies with 100 percent of the vote. I observe the full distribution of competition levels in my data, and so this is a valid comparison. For the projects that I study, this implies an average shift of resources across tiers of government of US$231,000 per constituency.

To assess the robustness of the baseline results in column 4 of Table 3.4, I undertake a number of checks of the preferred specification in Table A3.6. These are described in the Appendix. The checks probe the robustness of the results along the following margins: (i) clustering at the politician level; (ii) including organization-level controls thought to be of significance to the delegation decision; (iii) including a dummy variable that absorbs the impact of the committee chair; (iv) excluding projects implemented in the constituencies of committee chairs; (v) including a dummy variable that absorbs the impact of two-term politicians; (vii) excluding projects implemented in constituencies governed by two-term politicians; (viii) excluding projects implemented in constituencies where a politician does not have relevant qualifications or experience in the agriculture sector; and, (ix) whether the results fit the information-oriented predictions of the model of the model of moral hazard presented in section 3.3. The results are robust to each of these checks.

3.5.2 Causes of informal incentive provision

To assess the drivers of informal incentive provision by politicians separately from those of delegation, I need to observe differences amongst politicians in terms of the costs they face in interacting with bureaucrats. The distance to the National Assembly in the capital city of Nigeria, Abuja, to the organization, where bureaucrats can be interacted with, is a proxy for the costs of interaction. Using distance to organization as a proxy for the cost of interaction with bureaucrats, I can interact this dummy with my measure of political competition to test whether members are more prone to interacting with - and providing informal incentives to - bureaucrats who are further from Abuja when they face political competition.

The perspective taken here is that politicians face higher transaction costs when interacting with bureaucrats a greater distance from the capital city. Whilst politicians spend part of their time in their constituencies, closer to the organizations that may be far from Abuja, they are based in Abuja. The assumption here is that the monitoring process requires sufficient personal interaction that their residence in Abuja creates costs to interacting with organizations a greater distance from the capital.

However, for this variable to be a valid instrument, it should not be correlated with other factors that determine project implementation or the necessity to provide additional incentives. I therefore condition this variable on the distance of the implementing organization to the local state capital. The majority of building capacity (such as markets specializing in building materials) are based in state capitals distributed across Nigeria. Therefore, once I control for distance to the nearest state capital, distance from the organization to the National Assembly is only a measure of the transaction cost to the politician of providing informal incentives there. To create the relevant variable, I undertake an unconditional regression at the organization level of distance to Abuja on distance to the nearest state capital. I then take the residuals of this regression to be the new variable reflecting distance to Abuja net of the variation explained by distance to the local state capital. It is a demeaned variable in the spirit of a z-score.

In summary, I use the following specification:

$$\begin{aligned} Informal\,incentives_{icn} &= \gamma_1 distance_n + \gamma_2 competition_c + \gamma_3 distance_n * competition_c \\ &+ \gamma_4 PC_{ij} + \gamma_5 CC_c + \lambda_j + \epsilon_{icn} \end{aligned} \tag{3.14}$$

where I estimate for the ith project, implemented in constituency c by organization n.

$Informal\,incentives_{icn}$ is a continuous measure of the proportion of officials at an organization who state that politicians have a significant influence on their implementation of public projects. $Distance_n$ is a continuous variable, centered at zero that signifies the extent of transaction costs faced by the politician as defined above; $competition_c$ is a continuous measure on the unit interval of one minus the margin of victory in the constituency; $distance_n * competition_c$ is an interaction between my distance measure and competition; project controls (PC_{ij}) are the key project characteristics described above; constituency controls (CC_{ij}) are the key congressperson characteristics and socio-economic characteristics of the constituency described above; and, project type fixed effects (λ_j) absorb 10 project type level effects.

My strategy relies on the distance to the capital net of distance to the local state capital being uncorrelated with constituency-level factors that might determine which organization the politician interacts with. Particularly, it should be uncorrelated with factors that might influence how effectively an organization is able to implement the project. I therefore investigate how the distance variable I create varies with constituency characteristics to assess the validity of its exogeneity.

Abuja was an artificial creation of a Nigerian military dictator who designated it the capital in 1991. The decision to situate Nigeria in its present day location (the geographic center of the country) was based precisely on its lack of any significant pre-existing population or economic institutions. There are therefore no historical institutions that relate Abuja to the capacity to produce small scale infrastructure projects like those I study.

Figure 3.3 displays this argument graphically. It is a map of Nigeria's local governments, each colored by the extent to which building markets locate there. The deeper the color, the higher the index. The capital city, Abuja, is highlighted by stripes. As can be seen, centers of building capacity are located across Nigeria in a way uncorrelated with their distance to Abuja. Abuja continues to be a political rather than an economic capital for Nigeria. Whilst building infrastructure has grown up around the capital, the historical locations for building infrastructure are in the state capitals, which defines my choice of distance to local state capital as measures of building capacity access for an organization.

I can empirically test these claims by creating an index of building capacity across the country. Using data on Nigeria's market infrastructure, I aggregate the number of building markets in each local government (the basic administrative unit in my data) to create an index of 'building capacity'. I can regress this variable on distance to Abuja net of distance to state capital, and as one might expect from a visual inspection of Figure 3.3, it is not significant at the usual levels.

I also generate an aggregate index for each organization from this building capacity index by averaging the building capacity of all the local governments in which they are implementing an OPEN project. I then regress this on my distance variable, and again see that an organization's distance to Abuja does not predict this index.

The evidence therefore points towards the distance to Abuja net of distance to state capital being uncorrelated with constituency-level characteristics that might have significant impacts on project implementation. Relative to local factors that determine project implementation, the variation in an organization's distance to Abuja not explained by the distance to the local state capital reflects the transaction cost of a politician interacting with a bureaucrat at that organization.

I can therefore turn to estimating specification (3.13). Table 3.5 estimates specifications similar to those in Table 3.4, but with the core measure of political influence over the bureaucracy as the dependent variable and distance as my instrument of interest. The dependent variable is a continuous proportion varying between 0 and 1 representing the organization-level average of bureaucrat's responses to the extent of influence politicians have over projects in the organization. I am therefore estimating the likelihood of a project being implemented by an organization with high levels of politician influence. On average, 54 percent of bureaucrats state that politicians have significant or most influence on their implementation of projects.

Since a zero value of the competition measure in the interaction corresponds to zero competition, γ_1 estimates the interaction decisions of politicians who face low levels of competition in their constituency. γ_3 estimates the interaction decisions of members who face high levels of competition in their constituency. These are the core coefficients of interest for specification (3.13).

Column 1 of Table 3.5 estimates the impact of distance to organization on politician's likelihood of interacting with a bureaucrat implementing a project, conditional on project characteristics and project type fixed effects. I find that organizations far from Abuja

have higher levels of interaction, summarizing the finding in the model that decentralized organizations, distant from Abuja, will have generally higher levels of interaction with politicians, despite the transaction costs they must face.

However, the main interest here is whether interaction varies with the degree of political competition that a politician faces. In column 2, I introduce the measure of political competition and an interaction of this measure with an indicator of my transaction cost variable. The interaction variable is centered at zero competition, so the coefficient on committee membership describes the behavior of committee members faced by zero political competition.

The coefficient on the measure of political competition is positive ($\gamma_2 > 0$), indicating that at higher levels of political competition, politicians are more likely to engage with bureaucrats, as the model predicts. Secondly, the coefficient on the interaction term is positive ($\gamma_3 > 0$), implying that when a politician faces strong competition in her constituency, she is more prone to engaging with bureaucrats on projects, even when the cost to doing so is higher. The coefficient is again significant at the 1 percent level.

I find similar results when controlling for politician characteristics (column 3) and constituency controls (column 4). All coefficients on the interaction are significant at the 1 percent level. The results in column 5 undertakes a specification with all controls for the decentralized tier only. Here, at low levels of political competition, transaction costs do indeed reduce the likelihood of interaction. At high levels of political competition, political interaction increases.

Together, the results in Table 3.5 indicate that political competition also affects a politician's interaction with bureaucrats on public projects. Taking politicians as motivated by electoral concerns, a natural interpretation of these findings is that in closely-contested constituencies, politicians are incentivized to personally interact with bureaucrats to ensure that projects are delivered. Whether this interpretation finds support in project implementation data will be assessed in the next section.

Before that, I note a similar set of robustness checks on the results on interaction as those described for delegation. Taking a similar approach to Table A3.6, Table A3.7 provides specifications that assess potential drivers of the baseline results. These extended specifications are described in the Appendix. They probe the robustness of the results along the following margins: (i) clustering at the politician level; (ii) including organization-level controls that may be important determinants of the cost

of interaction; (iii) including a dummy variable that absorbs the impact of the committee chair; (iv) excluding projects implemented in the constituencies of committee chairs; (v) including a dummy variable that absorbs the impact of two-term politicians; (vi) excluding projects implemented in constituencies governed by two-term politicians; and, (vii) excluding projects implemented in constituencies where a politician does not have relevant qualifications or experience in the agriculture sector; and, (viii) whether the results fit the information-oriented predictions of the model of moral hazard presented in section 3.3. The checks are again supportive of the results in Table 3.5.

3.5.3 Consequences of delegation and incentive provision

Sections 3.5.1 and 3.5.2 provide evidence that the distribution of public projects across tiers of government, and the political pressures faced by bureaucrats implementing them, is a function of the political competition faced by politicians. I now turn to how these two margins of politician-bureaucrat interaction impact on the outputs of public organizations.

The analysis continues to be at the project level, and the dependent variable is now the proportion of project completion, a continuous variable that takes values between 0 and 1. A project that never started has a completion level of 1, one that was half-way completed of 0.5, and one that is fully completed of 1.[31] This is my proxy of public output. The mean level of completion in the data is 0.5.

Given the simultaneity between delegation and incentives implied by the model of section 3.3, we require independent variation in our proxies of these margins to evaluate their independent effects. The instruments described in sections 3.5.1 and 3.5.2 provide such independent variation. To explain the variation in project completion, I therefore include the decentralization dummy I used to assess delegation, the continuous measure of political interaction I used in (3.13), my measure of political competition, as well as the battery of project and constituency controls I describe above. In summary, I use the following specification:

[31]The utility of a project at various degrees of completion will vary across project types. To check the robustness of the following analysis to the stage of project completion, I performed the following specifications. For all potential thresholds from 1 percent to 100 percent in increments of 1 percent, I define a dummy variable equal to one if the project completion rate is above the given threshold p percent, and zero otherwise. I then re-estimate the core instrumental variables regression used in this section for each of these thresholds. Across the full distribution of project completion rates, I find the results very similar to the baseline results.

$$proportion\,completed_{icn} = \theta_1 \widehat{decentralization}_n + \theta_2 \widehat{informal\,incentives}_n + \theta_3 competition_c + \tag{3.15}$$

$$+ \theta_4 PC_i + \theta_5 CC_c + \lambda_i + \epsilon_{icn}$$

where I again estimate for the ith project, implemented in constituency c by organization n.

$Proportion\,completed_{icn}$ is the proportion completed of the public project. $\widehat{Decentralization}$ is the instrumented projection of a dummy variable that takes the value 1 if the project is implemented by a decentralized organization and 0 otherwise; $\widehat{informal\,incentives}$ is the instrumented projection of a continuous measure on the unit interval that signifies the extent of politician interaction at the organization in which the project is implemented; *competition* is a measure of one minus the margin of victory in the constituency; project controls (PC_{ij}) are key project characteristics; constituency controls (CC_{ij}) are key congressperson characteristics and socio-economic characteristics of the constituency; and, project type fixed effects (λ_j) absorb project type level effects.

The instrumented projections of decentralization and informal incentives arise from estimating equations (3.13) and (3.14) with both sets of instruments. The results of these reduced form equations are provided in column 5 of Table 3.4 and column 6 of Table 3.5 respectively. In both cases, the reduced form equations reflect the qualitative patterns of the baseline specifications in those tables.

Before I build up to the full estimation of (3.15), I motivate the analysis by looking at the direct impact of the (uninstrumented) proxies for delegation and incentive provision. Table 3.6 presents OLS estimates of the impact of decentralization and political interaction with bureaucrats, conditional on the level of political competition. Column 1 estimates a regression of project completion rates on a decentralization dummy reflecting the tier of the organization implementing the project. In all specifications I include project, politician, and constituency controls, and project type fixed effects. The coefficient on the decentralization dummy, θ_1, is positive, implying that decentralization increases project completion rates. It is large, explaining roughly a quarter of project completion rates, and significant, at the 1 percent level.

In column 2, I introduce the core measure of politician interaction, the proportion

of projects at an organization in which bureaucrats state politicians have significant influence. The coefficient on this variable, θ_2, is 0.51, and is significant at the 1 percent level. Since the mean level of politician influence is roughly 50 percent, this implies the average impact of politician interaction with bureaucrats implementing a project is an increase in that project's completion rate of 25 percentage points, a very similar figure to the impact of decentralization.

Column 3 then looks at the two variables together. The coefficients on decentralization and political interaction are still positive, but the coefficient on politician-bureaucrat interactions has now fallen significantly to 0.17. The coefficients imply that if the OLS results are correct, the impact of delegation is on average three times more significant for government productivity than incentive provision. Moreover, one interpretation of the fall is that politicians are interacting with decentralized organizations when they want to increase project completion rates, and the variable is simply a noisy proxy for decentralization.

To investigate this possibility, I require independent variation in both delegation and incentives. I therefore turn to the instrumental variables results. I estimate the full instrumental variables specification described by (3.13), (3.14), and (3.15) by two stage least squares. Column 4 of Table 3.6 presents this specification using my core proxy for politician interactions with the bureaucracy, the proportion of bureaucrats at an organization who state politicians have a significant impact on the success of a typical project at that organization. As a robustness check, I also estimate the full IV specification using a second proxy for politician interactions, the proportion of projects on which bureaucrats state they personally engage with politicians at an organization. This specification is presented in column 5.

I see that the two columns present similar estimates of the separate impacts of decentralization and the provision of informal incentives. I begin with the coefficient on decentralization, which in both cases is positive, significant, and large. The coefficient implies that for a project of a particular type, and of a given budget and complexity, the impact of being implemented by a decentralized organization rather than a centralized one is an increase in the completion rate of at least 40 percentage points.

These results provide estimates of the impact of decentralization conditional on political sorting leading to the non-random distribution of projects across tiers. To assess the plausibility of the findings, I can compare this figure to the existing literature on

decentralization. Fisman and Gatti (2002) study decentralization across countries, defining it as the ratio of local government expenditures over total government expenditures. They find that a one standard deviation in their measure of decentralization leads to a 30 percent reduction in corruption. Galasso and Ravallion (2005) study a Bangladeshi transfer program and find that the maximum targeting differential between tiers of government is 20 percent. Both of these figures are of a similar order of magnitude as the impacts I find here, despite measuring quite distinct concepts of decentralization in distinct contexts.

Second, I can look at the impact of the provision of informal incentives by politicians, using both measures of political interaction. By comparing columns 4 and 5 of Table 3.6, I see that once I take account of the impact of decentralization, the impact of politician interference falls to basically zero. Once a politician chooses the more productive decentralized bureaucrat, marginal changes in incentives have limited effects.

Taking broad interpretations of these coefficients, the delegation decision is explaining the response of bureaucratic productivity to political competition. In terms of magnitude, I can relate these findings to the literature that motivated this chapter. Ferraz and Finan (2011) estimate the impact of Brazilian mayors facing election incentives, and show how such incentives lead to a reduction in the share of resources found to involve corruption of roughly 27 percent. For a similar differential in political competition in Nigeria, I find an increase in bureaucratic productivity of 10 percent. In contrast to the existing literature however, this chapter has documented changes in politicians decisions that explain this relationship.

The model of section 3.3 also allows us to explain the pattern of bias in the OLS coefficients: a *downwards* bias in the decentralization coefficient and an *upwards* bias in the coefficient on my proxies for informal incentive provision. The system of equations requires us to understand the biases within the context of the system as a whole. The model shows how political competition drives politicians *both* to delegate public projects to decentralized organizations and to provide greater informal incentives simultaneously. The OLS coefficient on incentive provision therefore absorbs some of the impact of decentralization on project output, and is therefore upwards biased.

At the same time, I do not observe an appropriate counterfactual for projects in more competitive constituencies implemented at the centralized tier when estimating by OLS. The separation of the delegation and incentive provision decisions indicates that

projects in closely-contested constituencies at the centralized tier still induce politicians to provide some degree of informal incentives. The proper counterfactual within the estimated system is a project from a close-constituency at the centralized tier without politicians providing informal incentives. In this case, my model implies, and my results support, that centralized organizations would deliver even more inferior project outputs in such constituencies. Based on an incorrect counterfactual, the OLS coefficient on decentralization is downwards biased.

The interpretation of these results suggested by the model is the following. Politicians are interacting with decentralized organizations most intensively when they are incentivized by political competition to deliver public projects in their constituency.[32] However, since decentralized organizations are more effective than centralized ones, it is the delegation margin along which political competition is having the most significant impacts on project completion. Once the politician has delegated to the decentralized organization, her efforts to provide incentives there are of second-order importance at best. It is that political competition drives politicians to delegate the implementation of public projects to more effective organizations of government that is driving improved completion rates in politically competitive constituencies.

An obvious question implied by this line of reasoning is why politicians continue to provide incentives when they are ineffective? It is quite plausible that politicians face the same identification problem as the econometrician. The model of section 3.3 implies that higher levels of political competition induce politicians to simultaneously delegate to decentralized organizations and increase their incentive provision there. In equilibrium, they do not observe the counterfactual of more delegation without an increase in incentive provision. Unless they can effectively separate the impacts of delegation and incentive provision, they interpret the impact of their efforts using a form of OLS, along the lines of column 3 of Table 3.6. They may mistakenly interpret their efforts as having positive impacts and thus undertake ineffective incentive provision.

To conclude this section, I turn to the question of why it is that decentralized organizations are more productive than centralized ones. First I look at whether the

[32] As the results in section 3.5.1 show, politicians are centralizing to centralized organizations when they face limited political competition. Given the formal influence politicians have over the centralized tier, centralization may reflect politicians affecting the provision of public projects for personal consumption. For example, Besley *et al.* (2004) find that politicians in charge of distributing fiscal transfer programs and public projects are prone to directing resources towards themselves or their ethnic group. Pande (2008) provides an overview of the determinants of political corruption in low income countries.

formal rules governing the two sets of organizations are distinct. A natural counterpart to the informal interactions politicians engage in with bureaucrats, is the formal rules bureaucrats work under. In chapter 2, I formulate measures of the management practices that make up the formal rules of some of the organizations studied here. Extending the analysis there to the current setting, I do not find significant differences in the indices of management across tiers of government.

Second, the literature on decentralization has argued that the staff of organizations across tiers may differ. Using data from the survey of bureaucrats used in this chapter, I can compare characteristics of officials in both centralized and decentralized organizations. Again, I find limited differences in basic characteristics. This is supported by my findings in tables A6 and A7 that my results are robust to a basic set of organization-level controls.

A classic claim in the decentralization literature is that bureaucrats at decentralized organizations are closer, and therefore more accessible, to citizens. This may enable citizens to better hold bureaucrats to account. I find significant support for this claim amongst the organizations I study. In the survey of bureaucrats I undertook, I asked officials the nature of interactions they had with citizens on the projects they implemented. Table A3.8 provides evidence that citizens are in fact more frequently holding decentralized bureaucrats to account. Whilst both centralized and decentralized bureaucrats engage with citizens in some way on roughly 40% of projects, the nature of those interactions differ across tiers. Citizens are 57% more likely to threaten a decentralized bureaucrat, 49% more likely to report the bureaucrat to her manager, and almost 90% more likely to report her to an elected official than a centralized bureaucrat. These differences provide support to the notion that decentralized bureaucrats are more frequently held to account by citizens. Given that this difference is more significant than other key margins I have investigated, it may be an important determinant of their increased productivity.

3.6 Discussion and conclusions

This chapter aims to provide evidence on how politicians get bureaucrats to deliver public projects that might win them votes. It establishes the extent to which politicians influence the productivity of the bureaucracy along two specific margins: which bureaucrats they

delegate the implementation of public projects to, and the incentives they provide those bureaucrats. Using data from across the Federal Government of Nigeria, I find that political competition motivates politicians to delegate the implementation of small-scale public projects to more autonomous, decentralized organizations. A politician in a closely-contested constituency is 21 percent more likely to delegate to decentralized organizations than a politician in a completely safe seat. Political competition also motivates politicians to interact more intensively with the bureaucrats to whom they have delegated, so to provide them with informal incentives to deliver public projects. A politician in a closely-contested constituency interacts with organizations 13 percent more often than a politician in a completely safe seat.

These findings provide some of the first evidence on the causes and consequences of political interference in the bureaucracy. A growing literature identifies the positive impacts of political competition on government performance (Foster and Rosenzweig, 2004; Besley *et al.*, 2010; Ferraz and Finan, 2011). However, the mechanisms through which political competition affects bureaucratic implementation has largely remained a puzzle. I show that politicians' delegation decisions are the key margin by which politicians improve the productivity of the bureaucracy. The 10% increase in bureaucratic productivity attributable to political competition is primarily due to politicians choosing more effective bureaucrats. Providing those bureaucrats with additional incentives has second-order effects at best.

Understanding the determinants of the resource distribution across government, and the drivers of public project completion, is essential for our ability to improve government effectiveness. The findings of this chapter suggest that electoral accountability acts as a powerful mechanism to align politicians' decisions over public resources with citizen welfare. By tying politicians' electoral incentives to the effective delivery of public projects, citizens may influence them to delegate to the most productive public organizations.[33] A clear next step on this research agenda is to map out other margins of politicians' preferences that would lead to decisions that improve the bureaucracy's productivity. Are there aspects of politicians' relationships to their political parties, for example, that influence their interactions with the bureaucracy?

Assessing politicians' interactions with bureaucrats allows us to better understand

[33]For example, Banerjee *et al.* (2010) assess the provision of newspaper reports on legislator performance in India. They find that access to such reports increases turnout, reduces cash-based vote buying, and increases electoral gains for better-performing incumbents.

the incentives under which bureaucrats work.[34] I provide some of the first quantitative evidence of the scale of political interference in the bureaucracy. The evidence from Nigeria is that politicians personally engage with bureaucrats on over 10 percent of public projects. This provides us with novel detail on the informal incentives under which bureaucrats work. There is substantial scope for more clearly outlining the nature and intensity of politicians' interactions with the bureaucracy. Along which margins do these interactions have significant impacts on government output, or as I find in this chapter, more limited impacts?

That question can partly be addressed by identifying the features of organizations within the public sector that manage the relationship between politicians and bureaucrats. In my data, decentralized organizations are characterized by a higher intensity of interaction with politicians and a higher level of productivity. My results imply that building effective bureaucratic organizations within the public sector gives politicians the opportunity to support public project delivery when they face the appropriate incentives. Political competition in itself may be a necessary, but not sufficient, condition for improved public project delivery. The availability of effective public organizations for politicians to delegate to is an important determinant of the responsiveness of politicians to political competition.

When and how political competition improves the way government works has been at the research frontier for many years. New efforts to collect novel data, like that used in this chapter, will allow us to answer those questions with increasing clarity and depth. Given the key role politicians and bureaucrats play in the public service, their interactions will be central to this analysis.

Appendix

Model Appendix

The full derivation of the model is as follows. The preferences of politician A are:

[34]Incentives for bureaucrats instituted by politicians can be said to be 'top-down' in nature. The literature on 'bottom-up' incentives for bureaucrats could be seen as a natural counterpart, for which there is a more extensive literature. Examples of this literature are Besley and Burgess (2002) which documents the benefits of media development on Indian local government performance, Reinikka and Svensson (2005), which studies a newspaper campaign that empowered Ugandan citizens to monitor local officials, and Olken (2007), which contrasted the impacts of community and audit monitoring efforts on the quality of rural road implementation in Indonesia.

$$V_1^C = \pi_h^C \left(\gamma \left(\bar{q} - \kappa^C\right) - \bar{t}^C\right) - \left(1 - \pi_h^C\right) \underline{t}^C + \left(\kappa^C\right)^{\frac{1}{2}}$$

$$V_0^C = \pi_l^C \gamma \left(\bar{q} - \kappa^C\right) + \left(\kappa^C\right)^{\frac{1}{2}}$$

$$V_1^D = \pi_h^D \left(\gamma \left(\bar{q} - \kappa^D\right) - \alpha \bar{t}^D\right) - \left(1 - \pi_h^D\right) \alpha \underline{t}^D + \left(\kappa^D\right)^{\frac{1}{2}}$$

$$V_0^D = \pi_l^D \gamma \left(\bar{q} - \kappa^D\right) + \left(\kappa^D\right)^{\frac{1}{2}}$$

This leads to the following maximization problem for the politician,

$$\max_{\{\bar{t}, \underline{t}, \kappa\}} \pi_h^k \left(\gamma \left(\bar{q} - \kappa^k\right) - \alpha^k \bar{t}^k\right) - \left(1 - \pi_h^k\right) \alpha^k \underline{t}^k + \left(\kappa^k\right)^{\frac{1}{2}}$$

$$\textit{subject to} \quad \pi_h^k \bar{t}^k + \left(1 - \pi_h^k\right) \underline{t}^k - \psi \quad \geq \quad \pi_l^k \bar{t}^k + \left(1 - \pi_l^k\right) \underline{t}^k$$

$$\pi_h^k \bar{t}^k + \left(1 - \pi_h^k\right) \underline{t}^k - \psi \quad \geq \quad 0$$

Solving these constraints with equalities yields,

$$\left(\bar{t}^k\right)^\star = \frac{\left(1 - \pi_l^k\right)}{\left(\pi_h^k - \pi_l^k\right)} \psi$$

$$\left(\underline{t}^k\right)^\star = -\frac{\pi_l^k}{\left(\pi_h^k - \pi_l^k\right)} \psi$$

Given this, I can calculate the expected intensity of interaction to which the politician exposes the bureaucrat,

$$\begin{aligned} E\left[t^k\right] &= \pi_h^k \left(\bar{t}^k\right)^\star + \left(1 - \pi_h\right) \left(\underline{t}^k\right)^\star \\ &= \pi_h^k \left(\frac{\left(1 - \pi_l^k\right)}{\left(\pi_h^k - \pi_l^k\right)} \psi\right) + \left(1 - \pi_h^k\right) \left(-\frac{\pi_l^k}{\left(\pi_h^k - \pi_l^k\right)} \psi\right) \\ &= \psi \end{aligned}$$

I can use these facts to determine when the politician is incentivized to induce high effort at the centralized tier,

$$V_1^C \geq V_0^C$$

$$\pi_h^C \left(\gamma\left(\bar{q} - \kappa^C\right) - \bar{t}^C\right) - \left(1 - \pi_h^C\right)\underline{t}^C + \left(\kappa^C\right)^{\frac{1}{2}} \geq \pi_l^C \gamma\left(\bar{q} - \kappa^C\right) + \left(\kappa^C\right)^{\frac{1}{2}}$$

$$\left(\pi_h^C - \pi_l^C\right)\gamma\left(\bar{q} - \kappa^C\right) \geq \psi$$

And at the decentralized tier,

$$V_1^D \geq V_0^D$$

$$\pi_h^D \left(\gamma\left(\bar{q} - \kappa^D\right) - \alpha\bar{t}^D\right) - \left(1 - \pi_h^D\right)\alpha\underline{t}^D + \left(\kappa^D\right)^{\frac{1}{2}} \geq \pi_l^D \gamma\left(\bar{q} - \kappa^D\right) + \left(\kappa^D\right)^{\frac{1}{2}}$$

$$\left(\pi_h^D - \pi_l^D\right)\gamma\left(\bar{q} - \kappa^D\right) \geq \alpha\psi$$

Under what conditions in each of the effort settings would the politician delegate to the decentralized organization over the centralized organization? For the high effort equilibrium,

$$V_1^D - V_1^C \geq 0$$

$$\pi_h^D \left(\gamma\left(\bar{q} - \kappa^D\right) - \alpha\bar{t}^D\right) - \left(1 - \pi_h^D\right)\alpha\underline{t}^D + \left(\kappa^D\right)^{\frac{1}{2}} - \pi_h^D \left(\gamma\left(\bar{q} - \kappa^D\right) - \alpha\bar{t}^D\right) + \left(1 - \pi_h^D\right)\alpha\underline{t}^D - \left(\kappa^D\right)^{\frac{1}{2}}$$
$$\left(\pi_h^D - \pi_h^C\right)\gamma\bar{q} - (\alpha - 1)\psi - \pi_h^D\gamma\kappa^D + \left(\kappa^D\right)^{\frac{1}{2}} + \pi_h^C\gamma\kappa^C - \left(\kappa^C\right)^{\frac{1}{2}}$$

Substitute in the optimal levels of corruption and simplify,

$$\left(\pi_h^D - \pi_h^C\right)\gamma\bar{q} - (\alpha - 1)\,\psi - \pi_h^D\gamma\left(\tfrac{1}{2\pi_h^D\gamma}\right)^2 + \left(\tfrac{1}{2\pi_h^D\gamma}\right) + \pi_h^C\gamma\left(\tfrac{1}{2\pi_h^C\gamma}\right)^2 - \left(\tfrac{1}{2\pi_h^k\gamma}\right) \quad \geq 0$$

$$\left(\pi_h^D - \pi_h^C\right)\gamma\bar{q} - (\alpha - 1)\,\psi - \frac{\pi_h^D - \pi_h^C}{4\pi_h^D\pi_h^C\gamma} \geq 0$$

Data Appendix

DA.1 Sample of projects

The Overview of Public Expenditure in NEEDS (OPEN) monitoring and evaluation process forms the basis of the sample of projects selected for this study. The OPEN evaluation was set up in 2006 and "was adopted as the mechanism to monitor and evaluate public expenditure" (Federal Government of Nigeria, 2009a). The scheme intended to monitor the implementation of projects to be funded by debt relief savings and evaluate their outcomes. The evaluation reports from the first two rounds of this process act as the basis for the data used in this chapter.

The President created an 'OPEN office' with a Presidential mandate to track and report on the expenditure of the debt relief gains. Rather than set up a parallel organization to spend debt relief savings, as had been done elsewhere, OPEN was seen as an opportunity to "find out where the most significant barriers to public expenditure lay" (Federal Government of Nigeria, 2007a). Thus, it was decided to channel the funds through standard institutions of government: the ministries, departments, and agencies of the Federal Government. This enables us to use the OPEN evaluation as a window into the workings of Nigeria's government.

As background, it is worth understanding a little about the context in which the OPEN initiative was started. In 1999, Nigeria transited to a democratic government under President Olusegun Obasanjo after more than a decade and a half of military dictatorship. The new administration inherited a huge external debt portfolio.[35] Partially motivated by the promise of debt relief, the newly-elected President began his second term aiming to strengthen Nigeria's economic position. A fiscal rule was introduced to de-link public expenditures from volatility in oil-revenues, state institutions were privatized, and

[35] Nigeria's Debt Management Office estimated that the nation owed external creditors US$36billion at the end of 2004, which was roughly twice the value of annual government expenditures (Debt Management Office, 2005).

a number of sectors deregulated to encourage private sector participation. Based on the thrust of the government's reform agenda, the Paris Club granted Nigeria debt relief of about US$18billion in September 2005. This translated to annual debt-service savings of roughly US$1billion, US$750 million of which would accrue to the Federal Government. The OPEN evaluation reports evaluate the effectiveness of the federal portion of these savings.

The President directed that debt relief expenditures go to "core projects and programs in the social sector" (Federal Government of Nigeria, 2007a). A comparison of the distribution of funds in the OPEN program with that in the Federal Government budget as a whole indicates that the sample is representative across sectors. The OPEN office helped direct funds to a relatively representative sample of the nation's small-scale social-sector projects. All were suppose to take roughly 12 months to complete. This implies they are not representative of the entire budget, which includes much recurrent expenditure (salaries, materials and supplies, and so on) and the funding of large scale dams, oil refineries and so on. However, they are representative of social-sector capital expenditures.

In the survey of bureaucrats I use in this chapter, I was not able to undertake a survey at the decentralized organization to which electrification projects can be delegated. I therefore have to exclude all electrification projects for this analysis.

I hand-coded the information from the 21,000 documents and project files that made up the monitoring and evaluation report of the OPEN initiative for 2006/7. This makes up the set of representative evaluations of Federal Government public projects on which I draw.

From this representative set, I defined a dummy variable that indicated whether a project was inherently national in nature, or could be implemented by organizations at different tiers of government. The analysis in this chapter focuses on projects that are delegatable, rather than being specialized so that they could only be implemented at a single tier of government. The projects excluded are those projects whose scope is national or multi-jurisdictional (across many states for example).

The guidelines for excluding projects on the basis that they were not able to be decentralized were the following. A project cannot be decentralized if: (i) it contains components that require access to international policy inputs; (ii) it contains components that require engagement with stakeholders at the national or international level; or, (iii)

the scope of the project crosses multiple jurisdictions beyond the mandate of any single decentralized organization.

An example of a project that was not delegatable or decentralizable is from the Ministry of Women Affairs. It was entered into the budget as 'Development and production of 2000 copies of a National Gender Policy (NGP) and 2000 copies of its Strategic Implementation Framework for the sustenance of gender equality perspective in all sectors'. This project requires international-level technical assistance, inputs from multiple sectors, and national-level engagement with international donors and Nigerian stakeholders. Thus, given the constraints on national and international engagements in the Public Service Rules, it is infeasible that this would be implemented by any organization but the Ministry of Women Affairs.

On the other hand, a borehole to be provided in Borno state could equally be implemented by the Ministry of Water Resources or the Chad Basin River Basin Development Authority. Such a project is specific to a single jurisdiction, has technical specifications that can be handled by either organization, and is permissible for implementation at either tier of government in the Public Service Rules.

DA.2 Politician characteristics

To effectively characterize the politicians studied in this chapter, I constructed biographies of each of the 360 representatives in the 5th (2003-7) National Assembly. I undertook the following process.

I drew the list of winning politicians from the Independent National Electoral Commission's 'Compendium of Results of the 2003 General Elections: Vol.1: Presidential and National Assembly Elections'. Where there were electoral tribunals, I followed the judicial process for each and noted where there was a change of representative and the date on which the successful petitioner took up office. I also used National Assembly web site records to identify any deaths amongst the congresspersons. This defined a complete set of representatives relevant to the 2006 and 2007 budget processes.

For each politician, I then hand-coded basic demographic information (sex, age and education) from the National Assembly's 'Nigeria Legislature 1861-2011: Compendium of Members and Officials'. In the very small number of places where age was missing, I either confirmed this using other sources or replaced their age with the mean of all representatives and include a dummy indicating that age was missing in all specifications

that include representative age.

I then built up a profile of the career of each representative and coded their relevant experience into the sectors of the standing committees in the data. These represent all the major social sectors. Only substantive experience in a sector over a sustained period of time was counted as relevant experience. To give a brief overview of how I sorted candidates into sectors, those with a training in finance or who had been a financial officer at a large private firm or public organization were coded as having experience in finance. Doctors or other health professionals such as nurses, pharmacists, or affiliates of medical institutions were coded as having experience in health. Electrical or other relevant engineers and those involved in contracting power facilities were coded as having experience in the power sector. Mechanical engineers or those with experience in river basins management were coded as having experience in the water sector. Farmers and those involved in the agro-processing industry were coded as having experience in the agriculture sector. Women and those who have engaged with gender-focused organizations were coded as having experience in the women's sector. Civil engineers or those with experience in building large-scale urban infrastructure were coded as having experience relevant to to the Committee on the Federal Capital Territory. Anyone who had qualifications in environmental management or worked for an organization with experience implementing environmental projects was coded as having experience relevant to the environment sector. Architects and those involved in small-scale urban development projects were coded as having experience in the housing sector.

The information for the biographies came first from the National Assembly web site, and where relevant from the publication, 'Nigeria's 4th Republic Handbook 1999-2003'. Where these did not yield sufficient detail, a comprehensive search of the AllAfrica archive of all newspaper articles from major Nigerian newspapers was used to collect biographical information. Finally, when this was insufficient, simple Google searches yielded biographical details. In roughly 15 percent of cases this did not yield an appropriate biography of the individual. In such cases, I took the most conservative approach and coded that individual as having no relevant experience.

I then used education regulations from Nigeria's education sector to define years of education variables from the collection of qualifications that each representative had earned. For the very small number of representatives for which educational qualifications were not available, I replaced their years of education with the mean of all other representatives

and include a dummy indicating that years of education is missing in all specifications that include representative years of education.

DA.3 Process of defining committee membership

The Selection Committee of the House of Representatives selects those politicians they deem fit to be members of the standing committees. Section XVII of the House Standing Orders states that, "There shall be a Committee to be known as the Committee on Selection appointed at the commencement of every Assembly ... The Committee's jurisdiction shall cover nominating Members to serve on Standing and Special Committees" amongst other duties.

The Selection Committee is required to select committee members such that each committee is representative of Nigeria in terms of its six geo-political regions (North Central, North East, North West, South East, South South, South Central) and the strength of the parties in the House. For example, Order XIV of the House Standing Orders states, "Members of Committees shall be nominated by the various political parties and appointed by the Committee on Selection in accordance with their strength in the House."

The Selection Committee has a guiding principle to match representative's qualifications with the committees on which they sit. For example, the vice chairman of the Committee on Selection states, as reported in This Day newspaper, "The Selection Committee ... considered cognate experience, areas of specialization and zonal representation in order to ensure that the chairman and vice chairman of a committee do not come from the same geopolitical zone." (This Day, 2007).

For each committee, the House Standing Orders outline the list of topics to which the House delegates oversight responsibility. For example, the Health Committee's jurisdiction covers specialist hospitals, teaching hospitals, medical research, federal medical centers, and a host of other topics including 'health matters generally'. The Selection Committee therefore determine, for each committee, those members who have relevant qualifications to provide appropriate oversight of the sector. They then choose individuals from this set within each geo-political zone, and within the appropriate proportions of the relative weights of the parties in the House.

Since I have only coded the committees relevant to the social sectors, I observe some politicians sitting on no committees. They are likely to sit on a committee outside of

the social sectors. Some representatives serve on multiple committees, and the maximum number of committees a representative sits on is 4. To understand how this reconciles with the need for sectoral knowledge, some politicians have qualifications/experience in multiple sectors. For example, they may be a qualified doctor who is a professor of medicine at a university. This individual would likely serve on both the health and education committees. Where there are small changes to the committees over time, I use the membership relevant to the 2006 and 2007 budgets.

As was seen in section 3.5.1 of the main text, there is strong evidence that the Selection Committee does this based on the three factors of geo-political and party representation and relevant qualifications and experience. In a number of fora, members of the Selection Committee have stated that once they must find a doctor within the North-East zone from the ruling party, there is typically very little room for other factors to play a role. This was confirmed by interviews with the secretaries of the standing committees and with external academics.

DA.4 Project controls

To control for a range of constituency-level characteristics, I use data from the largest household survey ever undertaken in Nigeria, the 2005 Core Welfare Indicators Questionnaire (CWIQ). The CWIQ survey targeted 77,400 households, 100 in each local government area. I define a battery of controls from the CWIQ survey along the following lines. One might expect politicians to delegate to areas of need, where deprivation is highest or where there are significant degrees of inequality. I therefore construct constituency-level means and standard deviations of the following indices: the proportion of poor in the constituency, measured by a national poverty index, the average years of education of the household head, the proportion of constituents with access to potable water, the average time in minutes to the nearest primary school, and the average journey time in minutes to the nearest secondary school. These indices reflect the sectors under which the majority of the projects in my data fall.

One may also expect politicians to respond to recent investments in their constituency. For example, a politician may feel less inclined to invest in an area that has recently received substantial public projects investments. To reflect the frequency with which constituents have benefited from a public project of the named type in the five years preceding the survey, I also construct indices of whether constituents have received:

construction of electrification infrastructure, rehabilitation of electrification infrastructure, a well/borehole, construction of piped water infrastructure, rehabilitation of piped water infrastructure, sanitation, school construction project, school rehabilitation, health facility construction, health facility rehabilitation, road construction, tarring/grading of roads, transportation services, and agricultural-inputs schemes. Again, these indices correspond to the sectors of the projects I study.

Finally, there may be complementarities between the economic environment and public investments. For example, greater access to credit may lead citizens to demand public projects that will facilitate their use of that credit. Politicians may therefore respond to the economic dynamics of a constituency in their delegation decisions, and so I create indicators of changes in opportunities for employment, the availability of agricultural inputs, number of buyers of agriculture produce, the availability of extension services, the availability of credit facilities, and the availability of consumer goods.

DA.5 Defining complexity indicators

Data on the complexity of government projects is not collected by the Nigerian Government, nor is it a part of the OPEN data set. To create this data, I worked with a pair of Nigerian engineers familiar with the OPEN projects and a number of international researchers working on project technical complexity to define a relevant set of indicators. I followed the perspectives on complexity suggested by Remington and Pollack (2007), by asking the engineer-assessors to individually assess projects along the following five topics, each with its own set of indicators.

Structural complexity stems from the scale of different interconnected tasks and activities. The indicators associated with this topic capture structural aspects such as project size and the number of inputs required for production. They also capture issues in raw material and labor supply, and the ease with which any necessary specialized skills and equipment can be sourced. *Temporally complex* projects are those in which production involves uncertainties. Hence there are indicators for uncertainties in design and implementation. *Technically complex* projects are those in which production have ambiguous risks, namely their uncertainties are not well understood. Hence some indicators capture ambiguities in design and implementation. *Directional complexity* refers to the potential for preferences over the project to diverge. The engineer assessors were thus asked to rate the managerial complexities of the project. Finally, there is a subjective assessment as to

the overall complexity of the project. This allows any unassessed aspects of complexity to be measured and provides a coherent picture of project complexity.

Two qualified and independent Nigerian engineers were then contracted to assess each project in the OPEN data set along these margins. The process of aggregation between engineers used in this project aimed to build a consensus. The first engineer coded indicators for the entire data set. The codings of the first engineer were then provided to the second engineer, who then constructed his own codings with reference to the codings of the first. The aim was to anchor the coding of the second engineer in that of the first, but give him freedom to disagree where he felt the coding was incorrect. Other methods would have been to have them code independently and average the two data sets or to have them work together. I decided that this approach was a balance between consensus and subjectivity.

The two engineers were provided with project details and documents, and asked to code a value for each indicator. The documents only contained information available *before* implementation, such that there was no bias from the coding being done after the projects were implemented.

Table A3.5 provides descriptive statistics for all 16 indicators from which the complexity index is constructed, as well as how each is correlated with the other indicators. Aggregate complexity is a subjective assessment of the overall complexity of the projects by the two engineers, that includes 'all factors that might influence the difficulty of implementing the project, not only those assessed [by the other indicators]'. I asked the engineers to take the distribution of complexity in the OPEN data set as a whole, with the least complex project in the data having an aggregate complexity of zero and the most complex project having an aggregate complexity of 100, and place each project within this distribution.

I undertook a number of measures to check the complexity of the OPEN indicators coded by the engineers. First, I inserted 200 randomly chosen repeated projects into the data set provided to the engineers. Since the project characteristics of the original and repeat projects are identical, I would expect that the codings of the two sets of projects would be similar. Reassuringly, I find that in general the original and duplicate projects are coded in similar ways. I compare the differences between these two sets by looking at group and paired means, and distributional tests for each variable. The differences are only statistically significant at conventional levels in a few cases, and the magnitude

of the differences are relatively small. For example, the only variable that is statistically significantly different below the 10 percent level in the mean-comparison t-test relates to raw material storage. Here, despite a standard deviation of 0.2 in the originals, the difference is 0.07 between the originals and the duplicates.

Second, I looked at the similarity of the codings of the two engineers. I find that the second engineer's codings are not dramatically different from the first engineer's efforts. Whilst there is a small number of differences, they are limited and rarely significant at the usual levels, indicating that the re-coding left the overall picture relatively stable.

Finally, more than a year after he had completed the prompted codings, I asked the second engineer to re-code a sub-sample of projects from scratch, this time without prompting by the first engineer's coding choices. The differences between these independent codings and the consensus data on which I rely are again relatively minor. It seems that once he had become accustomed to the broad parameters of the coding framework, the second engineer's coding was not dissimilar to the consensus generated by the two engineers working one after the other.

There is therefore evidence of similar projects within the data set being coded in a similar way; of the two engineers coding in similar ways both when prompted and unprompted; and when there were deviations, of the deviations being quantitatively small. Taken together, these checks reassure us that the complexity measures pick up meaningful variation across projects, rather than merely picking up noise that should have led to the multiple reports (either across engineers or over time) being uncorrelated.

These measures of complexity allow me to condition all the specifications on the aggregate complexity of the project, which are likely to be important determinants of project completion. They also allow me to define indices of local and national information needs (akin to measures of whether a particular tier k has a higher increase in the probability of project delivery when bureaucrats exert high effort; $\pi_h^k - \pi_l^k > \pi_h^{k'} - \pi_l^{k'}$). Given how important information has been to the study of delegation (Moe, 2005; Mookherjee, 2006), it is important to understand how I am controlling for the informational demands of each project. The literature on delegation emphasizes the possible importance of superior information at a tier of government as a rationale for delegation. Some projects require a lot of local information to be implemented. For example, they may require sourcing of materials from the local area or be characterized by a high degree of uncertainty that requires local information to respond to. Similarly,

some projects may require a lot of information more readily available at the national level. For instance, sourcing international expertise is something national organizations are likely to be better at procuring than local organizations.

I asked one of the engineers with whom I'd worked to define the complexity data to allocate the complexity variables to one of three indices: (i) indicative of the project requiring local information for successful implementation; (ii) indicative of the project requiring national information for successful implementation; or, (iii) indicative of neither. This process led to three complexity indices being generated using z-scores of the underlying variables. These indices were: (i) localized information index (containing the variables 'Storage of raw materials','Requires local labor','Access to construction equipment','Design uncertainty','Implementation uncertainty','Design ambiguity' and 'Implementation ambiguity'); (ii) national information index (containing the variables 'Access to raw materials' and 'Requires skilled labor'); and (iii) neither information index (containing the variables 'Project size', 'Number of inputs', 'Number of methods', 'Interdependencies', 'Difficulty to manage' and 'Number of agencies involved').

Results Appendix

RA.1 Robustness of delegation results

To assess the robustness of the baseline results in column 4 of Table 3.4, I undertake a number of checks of this preferred specification in Table A3.6. I include the baseline specification in column 1 of Table A3.6 for reference.

First, one may believe that decisions made by a politician relating to her constituency are correlated. I am therefore motivated to cluster the results at the politician level. Column 2 of Table A3.6 reruns the preferred specification clustering the standard errors at the politician level. The core coefficients are both still significant at the 5 percent level.

Second, I may be concerned that characteristics of the organization are driving the decision to delegate projects across tiers. While I do not seek to explain the difference in performance across tiers of government here, it is informative to understand whether my results are robust to a number of basic controls that are said to be of first order importance to delegation decisions. First, the decentralization literature has stated that centralized organizations may have more highly educated bureaucrats. I therefore include the average

years of education of officials at each organization. Second, I may be concerned that officials at different tiers of government have different incentives to be in government. In particular, the literature on decentralization emphasizes that bureaucrats may differ in how intrinsically, rather than extrinsically, motivated they are. To proxy the degree of intrinsic motivation of the bureaucrats I study, I use a question from the representative survey of bureaucrats I undertook. To measure civil servant's intrinsic motivation, I asked bureaucrats which factor had most influenced them to originally enter the civil service, and those that stated 'the chance to serve Nigeria' are coded as being intrinsically motivated.[36] Third, I include a proxy for the extent of sorting of bureaucrats across tiers. The most closely related paper to the work in this chapter, Iyer and Mani (2012), shows how Indian politicians move bureaucrats around the civil service for their own ends. This does not seem to be feasible in Nigeria, due to the independence of the civil service commission that defines bureaucratic postings. However, I include a variable from the survey of bureaucrats to control for this. The variable I use is the proportion of officials at the organization who state that their placement was 'random'. Note that well over 90 percent of bureaucrats state that influence was not involved in their posting, and over 60 percent believe their posting was random. When I include these variables, the core coefficients are still significant at the 5 percent level.

Now I turn to a concern that arises from a reading of another related economics literature. In their studies of standing committees in the US Congress, Aghion *et al.* (2005, 2009, 2010) and Cohen *et al.* (2011) emphasize the importance of the chair to the decisions of a committee. They argue that a chair has additional power to implement her political agenda through the committee. I can assess the extent to which this is true in the context of this study, as well as whether the chairs of the committees are driving the results.

First, I can include a chair dummy, which takes the value 1 when a project is implemented in the constituency of a chair of the relevant sectoral committee. I include such a dummy in column 4 of Table A3.6. I find evidence that the chair centralizes

[36]The question used to determine intrinsic motivation asked bureaucrats which factor had most influenced them to originally enter the service from the following options: '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'. Roughly 40 percent stated, 'the chance to serve Nigeria', and it is the modal answer. I then construct the fraction of intrinsically motivated bureaucrats for each organization. The other two most frequent reasons were 'I was interested in the type of work' and 'the stable career path that a job in the service affords', that were each given by around 20 percent of individuals.

even more projects than other members of the committee. Comparing the coefficients on the core variables to those in column 1, I find that the core coefficients do not change substantially when I include a chair dummy.

I can also test for the impact of the chair by excluding projects from constituencies in which the politician is chair of the relevant sectoral committee. Column 5 of Table A3.6 repeats the core specification excluding all projects in which the constituency politician is chair of the committee corresponding to that project's sector. I find that there is little change in the coefficients of interest.

An aspect of congress that is often studied in economics and political science is politician power. I therefore assess whether the results are driven by the most powerful politicians in the House of Representatives. Following the political economy literature for the US, and echoing similar work for Nigeria, an often used proxy for the relative power of a congressperson is the number of terms she has served. Given that democracy was instated in Nigeria in 1999, I can observe at most two-term representatives in the National Assembly in 2006/7.[37] I therefore define a dummy for projects implemented in constituencies of two-term representatives.

Adding this dummy to the baseline specification in column 6 of Table A3.6, I find that being a two-term politician does not impact on the pattern of delegation. The coefficient on this variable is close to zero. I can also exclude projects in constituencies of two-term politicians, as I do in column 7 of Table A3.6. I find the coefficients on the core variables are similar to the baseline specification, although slightly larger.

Finally, I return to the discrepancy identified in the analysis of the determinants of committee membership. It was seen in section 3.4.1 that constituency-level characteristics had limited impact on committee selection for all sectors bar agriculture. However, there seemed to be indications of selection for the agriculture committee. I therefore exclude from the analysis agriculture projects in all constituencies where a member of the Agriculture Committee does not have relevant qualifications or experience in the agriculture sector. The results of this regression are reported in column 8 of Table A3.6. I find that the core coefficients are very similar to the baseline specification and continue to be significant at the 1 percent level.

Another way of checking the robustness of the approach taken in this chapter is

[37] Nigerian congresspersons serve 4 year terms and there are no term limits on the number of times a politician can serve.

to test other predictions of the moral hazard model. As described in section 3.4.2, I had engineers code, for each project, the aggregate complexity of each project and its informational demands at the national and local levels. These are proxies for π_h and $\pi_h^k - \pi_l^k$ respectively, implying I can test the comparative statics of equation (3.12) with respect to these quantities. I see that an increase in complexity (a reduction in π_h) leads to greater centralization. One interpretation of the model I present is that different $\pi_h^k - \pi_l^k$ across tiers implies national (local) information requirements induce politicians to delegate projects to the centralized (decentralized) tiers. In column 1 of Table A3.6, I include the coefficients on the complexity and information indices estimated in the baseline specification. I see that both the complexity and information indices display the correct signs and are all significant at the 1 percent level, as predicted by the model.

RA.2 Robustness of informal incentive provision results

To assess the robustness of the baseline results in column 4 of Table 3.5, I undertake a number of checks of this preferred specification in Table A3.7. Column 1 repeats the preferred specification of Table 3.5 for comparison.

In column 2, I check whether the results are robust to clustering at the politician level. The coefficient on the interaction continues to be significant at the 1 percent level, but the coefficient on the distance variable itself is no longer significant.

Column 3 checks whether the results are robust to a number of key organization controls: the average years of education of officials at each organization, the degree of intrinsic motivation of the bureaucrats, and the degree to which officials were posted to the organization under influence of politicians. Once I include these variables in the baseline specification, the coefficients change slightly, but they are similar in magnitude to the baseline specification and still significant at the 1 percent level.

I now turn to the potential impact of the most powerful members of the legislature. As described above, committee chairs are said to be powerful members of the US Congress, and thus I introduce a dummy to the baseline specification in column 4 of Table A3.7 that indicates whether the project is in the constituency of the relevant chair to the project. Chairs may have additional authority to engage bureaucrats that other members may not, and it may be important to understand their role in the observed patterns. The coefficient on the dummy is significant at the 10 percent level, indicating that chairs do in fact interact more intensively with the bureaucracy. However, the core coefficients are

the same as in the baseline specification, indicating that chairs do not play a significant role in explaining the patterns of engagement I observe. This interpretation is supported by the finding in column 5 that excludes projects in the constituencies of chairs. I see that the core coefficients are similar to those of the baseline.

Politicians with experience in the National Assembly may better understand how to work with the bureaucracy and affect the change they desire. I therefore test whether the results are driven by those politicians who have more experience by defining a dummy for projects implemented in constituencies of two-term representatives. Adding this dummy to the baseline specification in column 6 of Table A3.7, I find that being a two-term politician is associated with a slightly higher level of engagement with the bureaucracy. However, again the core coefficients are unchanged. Excluding projects in constituencies of two-term politicians, as I do in column 7 of Table A3.7, I find a similar pattern of coefficients to the baseline specification.

Finally, I return again to the discrepancy identified in the analysis of the determinants of committee membership. It was seen in section 3.4.1 that constituency-level characteristics had limited impact on committee selection for all sectors bar agriculture. In case the agriculture sector is distinct in ways that impact on engagements between politicians and bureaucrats, I test the robustness of the baseline specification to the exclusion of projects in constituencies where a member of the Agriculture Committee does not have relevant qualifications or experience for the agriculture sector but is on the committee. The results of this regression are reported in column 8 of Table A3.7, and the results are similar to the baseline specification.

I can also run a similar set of checks on the engagement specifications using other predictions of the moral hazard model as I did for the delegation specification. From the model, I see that complexity decreases the degree of incentive provision, and thus interaction, while greater tier-related information leads to greater interaction due to the higher returns to providing incentives. Column 1 of Table A3.7 reports the coefficients corresponding to the complexity and information indices for the baseline specification. I see that they are all of the correct sign and significant at the 1 percent level.

Chapter 4

Conclusions

This thesis has investigated the determinants of public sector productivity in a developing country setting, Nigeria. Its lessons could be interpreted as being broader than that context given the limited empirical understanding we have of this topic across the world.

The research I have undertaken implies that **the form and incentives of the public sector play a key role in determining public sector outcomes**. The measurements of public sector effectiveness I have collected across communities and organisations show that there is significant variation in public sector productivity. In some organisations and communities, the Nigerian Government provide basic public goods to a high quality. In others, they initiate none of the projects they have been legislated to implement. The analysis of public organisations in my thesis papers indicates that economic incentives explain a significant proportion of the variance in these measures of public sector effectiveness. Both organisational design and politically-motivated incentives matter for the bureaucracy's productivity.

Second, **both formal and informal incentives matter in defining the productivity of government**. The chapter on management implies that formal rules create constraints on bureaucratic behaviour. These constraints influence the efficacy with which bureaucrats go about implementing the public projects over which they have responsibility. The chapter on political interference also has implications for the incentives under which bureaucrats implement public projects. Politicians use their capacity for informal influence to change the organisations that implement projects in their constituencies. I study how politicians move projects across centralised organisations with a direct line of responsibility to the National Assembly and decentralised, mainly regional, organisations with their own board of directors and budget line. As a project is moved from one

organisation type to another, the incentives under which it is implemented vary. Thus, the incentives under which a project is implemented are determined by the formal rules the organisation that implements a project and the informal actions of politicians that sort projects across organisations.

Finally, **my thesis provides some of the first empirical evidence on the optimal nature of incentives inside public bureaucracies**. The results of chapter 2 indicate that bureaucrats in public sector settings may have distinct responses to economic incentives than their private sector counterparts. For example, the finding that public sector productivity is negatively correlated with the use of performance management is distinct from the bulk of findings on performance management in private sector settings. The results are in line with existing theories of the public sector, but provide some of the first evidence on the empirical validity of these theories. Similarly, the economics literature has little discussion of how informal influences in bureaucracies (public or private) may impact on organisational performance. I document how political competition incentivises politicians to improve the productivity of the bureaucracy using their informal powers. The exploration of incentives in public sector bureaucracies provides a distinct institutional framework from most existing applied work on organisations. It expands our understanding of how agents respond to incentives across distinct organisational settings. Understanding how the civil service works is also crucial for strengthening the state's capacity to service citizens in both the developing and developed worlds.

Bibliography

[1] ASHRAF.N, O.BANDIERA AND K.JACK (2012) "No Margin, No mission? A Field Experiment on Incentives for Pro-social Tasks," mimeo, London School of Economics.

[2] AGHION.P AND J.TIROLE (1997) "Real and Formal Authority in Organizations," Journal of Political Economy 105: 1-29.

[3] AGHION.P, L.BOUSTAN, C.HOXBY, AND J.VANDENBUSSCHE (2005) "Exploiting States' Mistakes to Identify the Causal Impact of Higher Education on Growth," Harvard University Working Paper.

[4] AGHION.P, L.BOUSTAN, C.HOXBY, AND J.VANDENBUSSCHE (2009) "The Causal Impact of Education on Economic Growth: Evidence from US," Harvard University Working Paper.

[5] AGHION.P, M.DEWATRIPONT, C.HOXBY, A.MAS-COLELL, AND A.SAPIR (2010) "The Governance and Performance of Universities: Evidence from Europe and the US," Economic Policy, 25(61): 7-59.

[6] AIDT.T, M.GOLDEN, AND D.TIWARI (2011) "Incumbents and Criminals in the Indian National Legislature," Cambridge Working Papers in Economics 1157.

[7] AIDT.T AND J.SHVETS (2012) "Distributive Politics and Electoral Incentives: Evidence from Seven US State Legislatures," American Economic Journal: Economic Policy 4: 1-29.

[8] ALABI.M.O.A AND J.Y.FASHAGBA (2010) "The Legislature and Anti-corruption Crusade under the Fourth Republic of Nigeria: Constitutional

Imperatives and Practical Realities," International Journal of Politics and Good Governance 1.

[9] ALTONJI.J., T.ELDER AND C.TABER (2005) "Selection on Observed and Unobserved Variables: Assessing the Eectiveness of Catholic Schools," Journal of Political Economy, 113 (1): 151-184.

[10] BAKER.G.P (2002) "Distortion and Risk in Optimal Incentive Contracts," Journal of Human Resources 37: 728-51.

[11] BANDIERA.O, A.PRAT AND T.VALLETTI (2009) "Active and Passive Waste in Government Spending: Evidence from a Policy Experiment," American Economic Review 99: 1278-308.

[12] BANDIERA.O, A.PRAT, AND T.VALLETTI (2009) "Active and Passive Waste in Government Spending; Evidence from a Policy Experiment," American Economic Review, 99(4): 1278-1308.

[13] BANERJEE.A AND L. IYER (2005) "History, Institutions, and Economic Performance: The Legacy of Colonial Land Tenure Systems in India." American Economic Review, 95(4): 1190-1213.

[14] BANERJEE.A, L. IYER AND R. SOMANTHAN (2007) "Public Action for Public Goods," in Handbook of Development Economics Vol. 4, T.P.Schultz and J.Strauss (eds.), Amsterdam: Elsevier.

[15] BANERJEE.A, L.IYER AND R.SOMANATHAN (2007) "Public Action for Public Goods," in Handbook of Development Economics Vol. 4, T.P.Schultz and J.Strauss (eds.), Amsterdam: Elsevier.

[16] BANERJEE.A, S.KUMAR, R.PANDE AND F.SU (2010) "Do Informed Voters Make Better Choices? Experimental Evidence from Urban India," Massachusetts Institute of Technology Working Paper.

[17] BARDHAN.P AND D.MOOKHERJEE (2000) "Capture and Governance at Local and National Levels," The American Economic Review, 90(2): 135-139.

[18] BENABOU.R AND J.TIROLE (2006) "Intrinsic and Extrinsic Motivation," Review of Economic Studies 70: 489-520.

[19] BESLEY.T (2004) "Paying Politicians: Theory and Evidence," Journal of the European Economic Association 2: 193-215.

[20] BESLEY.T (2006) Principled Agents? The Political Economy of Good Government. Oxford: Oxford University Press.

[21] BESLEY.T AND M.GHATAK (2003) "Incentives, Choice, and Accountability in the Provision of Public Services," Oxford Review of Economic Policy 19: 235-249.

[22] BESLEY.T AND M.GHATAK (2005) "Competition and Incentives with Motivated Agents," American Economic Review 95: 616-36.

[23] BESLEY.T AND R.BURGESS (2002) "The Political Economy of Government Responsiveness: Theory and Evidence from India," Quarterly Journal of Economics 117: 1415-52.

[24] BESLEY.T AND R.BURGESS (2002) "The Political Economy of Government Responsiveness: Theory and Evidence from India," Quarterly Journal of Economics, 117(4): 1415-52.

[25] BESLEY.T AND T.PERSSON (2010) "State Capacity, Conflict and Development," Econometrica 78: 1-34.

[26] BESLEY.T, R.PANDE, L.RAHMAN AND V.RAO (2004) "The Politics Of Public Good Provision: Evidence From Indian Local Governments," Journal of the European Economic Association 2(2-3): 416–426.

[27] BESLEY.T, T.PERSSON AND D.STURM (2010) "Political Competition, Policy and Growth: Theory and Evidence from the US," The Review of Economic Studies, 77(4): 1329-1352.

[28] BJORKMAN.M AND SVENSSON.J (2009) "Power to the People: Evidence from a Randomized Field Experiment of a Community-Based Monitoring Project in Uganda", Quarterly Journal of Economics 124: 735-69.

[29] BLACK.S AND L.LYNCH (2001) "How to Compete: The Impact of Workplace Practices and Information Technology on Productivity," Review of Economics and Statistics 88: 434-45.

[30] BLOOM.N AND J.VAN REENEN (2007) "Measuring and Explaining Management Practices Across Firms and Countries," Quarterly Journal of Economics 122: 1351-1408.

[31] BLOOM.N AND J.VAN REENEN (2010) "New Approaches to Surveying Organizations," American Economic Review 100: 105-9.

[32] BLOOM.N, B.EIFERT, A.MAHAJAN, D.MCKENZIE AND J.ROBERTS (2013) "Does Management Matter: Evidence from India," Quarterly Journal of Economics 128: 1-51.

[33] BLOOM.N, C.PROPPER, S.SEILER AND J.VAN REENEN (2013) "The Impact of Competition on Management Practices in Public Hospitals," mimeo, Stanford University.

[34] BLOOM.N, R.SADUN AND J.VAN REENEN (2012) "The Organization of Firms Across Countries," Quarterly Journal of Economics 127: 1663-1705.

[35] BRAMBOR.T AND R.CENEVIVA (2011) "Incumbency Advantage in Brazilian Mayoral Elections," presented at the Annual Meeting of the American Political Science Association, Seattle, Sept 1-4.

[36] BROLLO.F AND T.NANNICINI (2012) "Tying Your Enemy's Hands in Close Races: The Politics of Federal Transfers in Brazil," American Political Science Review 106: 742-761

[37] BURGESS.S AND M.RATTO (2003) "The Role of Incentives in the Public Sector: Issues and Evidence," Oxford Review of Economic Policy 19: 285-300.

[38] BUURMAN.M, J.DELFGAAUW, R.DUR AND S.VAN DEN BOSSCHE (2012) "Public Sector Employees: Risk Averse and Altruistic?," Journal of Economic Behavior and Organization 83: 279-91.

[39] CALLEN.M, G.SAAD, A.HASANAIN AND Y.KHAN (2014) "The Political Economy of Public Employee Absence: Experimental Evidence from Pakistan," SSRN Working Paper.

[40] CAMERON.C, J.GELBACH AND D.MILLER (2008) "Bootstrap-Based Improvements for Inference with Clustered Errors", Review of Economics and Statistics 90: 414-27.

[41] COHEN.L, J.COVAL, C.MALLOY (2011) "Do Powerful Politicians Cause Corporate Downsizing?," Journal of Political Economy, 119: 1015-1060.

[42] DA SILVEIRA.B AND J.DE MELLO (2011) "Campaign Advertising and Election Outcomes: Quasi-natural Experiment Evidence from Gubernatorial Elections in Brazil," The Review of Economics Studies, 78(2): 590-612.

[43] DAL BO.E, F.FINAN AND M.ROSSI (2013) "Strengthening State Capabilities: The Role of Financial Incentives in the Call to Public Service," Quarterly Journal of Economics, 128: 1169-1218.

[44] DE JANVRY.A, F.FINAN, E.SADOULET (2012) "Local Electoral Incentives and Decentralized Program Performance," The Review of Economics and Statistics, 94: 672-685.

[45] DEBT MANAGEMENT OFFICE (2005) Debt Management Office Annual Report 2005, Abuja: Federal Government of Nigeria.

[46] DELFGAAUW.J AND R.DUR (2010) "Managerial Talent, Motivation, and Self-Selection into Public Management," Journal of Public Economics 94: 654-60.

[47] DIJKSTRA.G, B.AKANJI, C.HIDDINK, S.SANGARABALAN AND F.DE MEVIUS (2011) Mutual Interests - Mutual Benefits: Evaluation of the 2005 Debt Relief Agreement Between the Paris Club and Nigeria, The Hague: Ministry of Foreign Affairs of the Kingdom of the Netherlands.

[48] DIRECTORATE OF STATE OPERATIONS AND MARKETING OF THE NATIONAL TELEVISION AUTHORITY (2003) "Nigeria's 4th Republic Handbook 1999-2003," Lagos: Jiccon Resources Ltd.

[49] DIXIT.A (2002) "Incentives and Organizations in the Public Sector: An Interpretive Review," Journal of Human Resources 37: 696-727.

[50] DUFLO.E, R.HANNA AND S.P.RYAN (2012) "Incentives Work: Getting Teachers to Come to School," American Economic Review 102: 1241-78.

[51] EBOH.E (2010) MDGs-based Planning in Africa: Lesson, Experiences and Challenges: A Case Study of Nigeria, Addis Ababa: United Nations Economic Commission for Africa.

[52] FEDERAL GOVERNMENT OF NIGERIA (2007) The Story of OPEN, Federal Government of Nigeria.

[53] FEDERAL GOVERNMENT OF NIGERIA (2009) Monitoring and Evaluation Report of the DRG-Funded MDG Projects and Programmes in Nigeria 2007, Federal Government of Nigeria.

[54] FEDERAL GOVERNMENT OF NIGERIA (2006) 2006 Budget Appropriation, Abuja: Budget Office of the Federation.

[55] FEDERAL GOVERNMENT OF NIGERIA (2007b) 2007 Budget Appropriation, Abuja: Budget Office of the Federation.

[56] FEDERAL GOVERNMENT OF NIGERIA (2008a) Monitoring and Evaluation Report of the DRG-Funded MDG Projects and Programmes in Nigeria 2007, Abuja: Federal Government of Nigeria.

[57] FEDERAL GOVERNMENT OF NIGERIA (2008b) 2008 Budget Appropriation, Abuja: Budget Office of the Federation.

[58] FEDERAL GOVERNMENT OF NIGERIA (2011), Voices from the Service: Official Report of the Civil Servants Survey, Abuja: Federal Government of Nigeria.

[59] FENNO, R. (1973) Congressmen in Committees, Boston: Little, Brown & Co.

[60] FERRAZ.C AND F.FINAN (2008) "Exposing Corrupt Politicians: The Effects of Brazil's Publicly Released Audits on Electoral Outcomes," Quarterly Journal of Economics 123: 703-45.

[61] FERRAZ.C AND F.FINAN (2011) "Electoral Accountability and Corruption: Evidence from the Audit Reports of Local Governments," American Economic Review, 101: 1274-1311.

[62] FISMAN.R AND R.GATTI (2002) "Decentralization and Corruption: Evidence across Countries," Journal of Public Economics, 83:3: 325-345.

[63] FLODGREN.G, M.P.ECCLES, S.SHEPPERD, A.SCOTT, E.PARMELLI AND F.R.BEYER (2011) "An Overview of Reviews Evaluating the Effectiveness of Financial Incentives in Changing Healthcare Professional Behaviours and Patient Outcomes," Cochrane Database of Systematic Reviews Issue 7, Art. No.: CD009255.

[64] FOSTER.A AND M.ROSENZWEIG (2004) "Democratization and the Distribution of Local Public Goods in a Poor Rural Economy," Penn Institute for Economic Research Working Paper.

[65] FRANCOIS.P AND M.VLASSOPOULOS (2008) "Pro-social Motivation and the Delivery of Social Services," CESifo Economic Studies 54: 1-33.

[66] FRYER.R.G (2013) "Teacher Incentives and Student Achievement from New York Public Schools," Journal of Labor Economics 31: 373-407.

[67] GAGLIARDUCCI.S AND T.NANNICINI (2013) "Do Better Paid Politicians Perform Better? Disentangling Incentives from Selection," Journal of the European Economic Association 11: 369-98.

[68] GALASSO.E AND M.RAVALLION (2004) "Decentralized Targeting of an Antipoverty Program," Journal of Public Economics, 89: 705-727.

[69] GLEWWE.P, N.ILIAS AND M.KREMER (2010) "Teacher Incentives," American Economic Journal: Applied Economics 2: 205-27.

[70] GOKCEKUS.O, N.MANNING, R.MUKHERJEE AND R.NALLARI (2001) "Institutional Environment and Public Officials' Performance in Guyana," World Bank Publications No.13944.

[71] GOLDFINCH.S, K.DEROUEN AND P.POSPIESZNA (2012) "Flying Blind? Evidence for Good Governance Public Management Reform

Agendas, Implementation and Outcomes in Low Income Countries," Public Administration and Development 33: 50-61.

[72] HASNAIN.Z, N.MANNING AND J.H.PIERSKALLA (2012) Performance-related Pay in the Public Sector, World Bank Policy Research Working Paper 6043.

[73] HELMKE.G AND S.LEVITSKY (eds) (2006), Informal Institutions and Democracy: Lessons from Latin America, Baltimore: The John Hopkins University Press.

[74] HOLMSTROM.B AND P.MILGROM (1991) "Multitask Principal-Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design", Journal of Law, Economics and Organization 7: 24-52.

[75] HORAK.P AND G.SHENG (2014) "Global Hospital Management Survey - China," mimeo, Peking University.

[76] HOUSE OF COMMONS (2011) "General Election 2010 - Commons Library Research Paper," London: House of Commons.

[77] HOUSE OF REPRESENTATIVES (2007) Standing Orders, Abuja: House of Representatives.

[78] HOUSE OF REPRESENTATIVES (2011) "Hansard, Tuesday 28th June 2011," Abuja: House of Representatives.

[79] HOUSE OF REPRESENTATIVES (2012) "Statistics of the Presidential and Congressional Election of November 6, 2012," Washington: House of Representatives.

[80] ICHNIOWSKI.C, K.SHAW AND G.PRENNUSHI (1993) "Effects of Human Resource Management Practices," American Economic Review 87: 291-313.

[81] INTERNATIONAL MONETARY FUND (2012), World Economic Outlook Database (Edition: October 2012). Mimas, University of Manchester. DOI: [http://www.imf.org/weo].

[82] IYER.L AND A.MANI (2012) "Traveling Agents: Political Change and Bureaucratic Turnover in India," The Review of Economics and Statistics, 94(3): 723-739.

[83] KELMAN.S (1990) Procurement and Public Management: The Fear of Discretion and the Quality of Public Performance, Washington DC: American Enterprise Initiative.

[84] KREHBIEL.K, K.A.SHEPSLE, AND B.R.WEINGAST (1987). "Why Are Congressional Committees Powerful?," The American Political Science Review, 81: 929-945.

[85] LEE.D (2008) "Randomized Experiments from Non-random Selection in U.S. House Elections," Journal of Econometrics, 142(2): 675-697.

[86] LEVITT.S AND J.SNYDER (1997) "The Impact of Federal Spending on House Election Outcomes," Journal of Political Economy, 105(1): 30-53.

[87] MAHONEY.J AND K.THELEN (2010) "A Gradual Theory of Institutional Change," in MAHONEY.J AND K.THELEN (eds.), Explaining Institutional Change: Ambiguity, Agency, and Power, Cambridge: Cambridge University Press.

[88] MANNING.N, R.MUKERJEE AND O.GOKCEKUS (2000) Public Officials and their Institutional Environment: An Analytical Model for Assessing the Impact of Institutional Change on Public Sector Performance, Washington, D.C.: World Bank Publications.

[89] MARTINEZ-BRAVO.M, G.PADRO I MIQUEL, N.QIAN AND Y.YAO (2012) "The Effects of Democratization on Public Goods and Redistribution: Evidence from China" NBER Working Paper No. 18101.

[90] MCCORMACK.J, S.SMITH AND C.PROPPER (2014) "Herding Cats? Management and University Performance," forthcoming, The Economic Journal.

[91] MILGROM.P.R (1988) "Employment Contracts, Influence Activities, and Efficient Organization Design", Journal of Political Economy 96: 42–60.

[92] MILGROM.P.R AND J.ROBERTS (1988) "An Economic Approach to Influence in Organizations", American Journal of Sociology 94: S154-79.

[93] MILLER.G AND K.S.BABIARZ (2013) "Pay-For-Performance Incentives in Low- and Middle-Income Country Health Programs," NBER WP 18932.

[94] MOE.T (2005) "Political Control and the Power of the Agent," The Journal of Law, Economics, & Organization, 22(1): 1-29.

[95] MOOKHERJEE.D (2006): "Decentralization, Hierarchies, and Incentives: A Mechanism Design Perspective," Journal of Economic Literature, 44(2): 367-390.

[96] MUKHERJEE.R, O.GOKCEKUS, N.MANNING AND P.LANDELL-MILLS (2001) "Bangladesh: The Experience and Perceptions of Public Officials," World Bank Technical Paper 507, Washington DC: World Bank.

[97] MURALIDHARAN.K (2012) "Long-Term Effects of Teacher Performance Pay: Experimental Evidence from India," mimeo UCSD.

[98] MURALIDHARAN.K AND V.SUNDARARAMAN (2011) "Teacher Performance Pay: Experimental Evidence from India," Journal of Political Economy 119: 39-77.

[99] NIGERIAN CONGRESS (2006) Membership of the Sectoral Committees of the House of Representatives (Edition: October 2006) [http://www.nigeriancongress.org/assembly/committees1_2003.htm].

[100] NKONJO-IWEALA.N AND P.OSAFO-KWAAKO (2007) Nigeria's Economic Reforms: Progress and Challenges, Brookings Institute Global Working Papers Washington: Brookings Institute.

[101] OGUNDIYA.I.S (2011) "Anti-corruption Reforms in Nigeria: Challenges and Failures," in I.S.Ogundiya, S.Ilufoye, A.Olanrewaju Olutayo and J.Amzat (eds.) Assessment Of Democratic Trends In Nigeria, Delhi: Gyan Publishing House.

[102] OHMAN.M (2006) "Incumbency versus Change: The Influence of Candidate Selection on the Turnover of MPs in Emerging Democracies," presented at the IPSA 20th World Congress, Fukuoka, Japan, July 2006.

[103] OJEIFO.S (2007) "Nigeria: Waiting for Senate Committees' Composition," This Day Newspaper, 1 July 2007.

[104] OLKEN.B (2007) "Monitoring Corruption: Evidence from a Field Experiment in Indonesia," Journal of Political Economy 115: 200-49.

[105] OSTER.E (2013) "Unobservable Selection and Coefficient Stability: Theory and Validation," Mimeo, University of Chicaago.

[106] PANDE.R (2008) "Understanding Political Corruption in Low Income Countries," Handbook of Development Economics, Elsevier.

[107] PAPKE.L.E AND J.M.WOOLDRIDGE (1996) "Econometric Methods for Fractional Response Variables with an Application to 401(k) Plan Participation Rates," Journal of Applied Econometrics 11: 619-32.

[108] PAYNE.A (2003) "The Effects of Congressional Appropriation Committee Membership on the Distribution of Federal Research Funding to Universities," Economic Inquiry, 41(2): 325-345.

[109] PERRY.J.L (1996) "Measuring Public Service Motivation: An Assessment of Construct Reliability and Validity," Journal of Public Administration Research and Theory 6: 5-2.

[110] PERRY.J.L AND L.R.WISE (1990) "The Motivational Basis of Public Service," Public Administration Review 50: 367-73.

[111] PERRY.J.L, T.A.ENGERS AND S.Y.JUN (2009) "Back to the Future? Performance-related Pay, Empirical Research, and the Perils of Persistence," Public Administration Review 69: 39-51.

[112] PERSSON.T AND G.TABELLINI (2000), Political Economics: Explaining Economic Policy, Cambridge, Massachusetts: MIT Press.

[113] POPULATION DIVISION OF THE DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS OF THE UNITED NATIONS SECRETARIAT

(2013) "World Population Prospects: The 2012 Revision," New York: United Nations, [http://esa.un.org/unpd/wpp/index.htm].

[114] PRENDERGAST.C (2002) "The Tenuous Trade-Off between Risk and Incentives", Journal of Political Economy 110: 1071-102.

[115] REINIKKA.R AND J.SVENSSON (2011) "The Power of Information in Public Services: Evidence from Education in Uganda," Journal of Public Economics 95: 956-66.

[116] REMINGTON.K AND J.POLLACK (2007) Tools for Complex Projects, Aldershot: Gower.

[117] ROSE-ACKERMAN.S (1986) "Reforming Public Bureaucracy Through Economic Incentives?," Journal of Law, Economics and Organization 2: 131-61.

[118] SCOTT.A, P.SIVEY, D.AIT OUAKRIM, L.WILLENBERG, L.NACCARELLA, J.FURLER AND D.YOUNG (2011) "The Effect of Financial Incentives on the Quality of Health Care Provided by Primary Care Physicians," Cochrane Database of Systematic Reviews Issue 9. Art.No.: CD008451.

[119] SHEPSLE.K AND B.WEINGAST (1981) "Structure-induced Equilibrium and Legislative Choice," Public Choice, 37: 503-519.

[120] SHEPSLE.K AND B.WEINGAST (1987) "The Institutional Foundations of Committee Power," The American Political Science Review, 81(1): 85-104.

[121] SHERLOCK.S (2007) "The Indonesian Parliament after Two Elections: What Has Really Changed?," Canberra: Centre for Democratic Institutions Policy Paper no. 2.

[122] SIMON.H (1951) "A Formal Theory of the Employment Relation," Econometrica 19: 293-305.

[123] SIMON.W (1983) "Legality, Bureaucracy, and Class in the Welfare System," Yale Law Journal 92: 1198-269.

[124] THIS DAY (2007) "Nigeria: Senate Committees - Mark Scaled the Hurdle, But...," This Day Newspaper, 2 August 2007.

[125] TITIUNIK.R (2011) "Incumbency Disadvantage in Brazil: Evidence from Municipal Mayor Elections," University of Michigan Working Paper.

[126] TULLOCK.G (1965) The Politics of Bureaucracy, Washington: Public Affairs Press.

[127] WEBER.M (1922) 1978. Economy and Society: An Outline of Interpretive Sociology. Berkley, CA: University of California Press.

[128] WEGHORST.K AND S.LINDBERG (2013) "What Drives the Swing Voter in Africa?," American Journal of Political Science, 57(3): 717-734.

[129] WILSON.J (1989) Bureaucracy: What Government Agencies Do and Why They Do It, Basic Books: New York.

[130] WILSON.W (1887) "The Study of Administration," Political Science Quarterly (July).

[131] WORLD BANK (2004) "World Development Report 2004 – Making Services Work for the Poor," Washington, D.C.: World Bank Publications.

[132] WORLD BANK (2007) "Stolen Asset Recovery (StAR) Initiative: Challenges, Opportunities, and Action Plan," Washington, D.C.: World Bank Publications.

[133] WORLD BANK (2012) "World Development Indicators," Washington, D.C.: World Bank Publications, [http://data.worldbank.org/data-catalog/world-development-indicators].

Tables and Figures

Table 2.1: 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	(5) Average Completion Rate	(6) Proportion Completed Conditional on Being Started	(7) Proportion Fully Completed	(8) Proportion With Satisfactory Quality
Borehole	1348 [0.29]	18	29	0.44	0.47	0.84	0.37	0.85
Building	806 [0.17]	32	120	0.37	0.50	0.79	0.34	0.81
Electrification	751 [0.16]	2	93	0.14	0.56	0.65	0.25	0.87
Dam	624 [0.13]	14	18	0.79	0.15	0.74	0.10	0.50
Procurement	345 [0.07]	41	87	0.30	0.58	0.83	0.47	0.85
Road	217 [0.05]	4	167	0.12	0.52	0.59	0.22	0.79
Training	189 [0.04]	26	80	0.20	0.60	0.74	0.42	0.84
Financial project	157 [0.03]	8	17	0.38	0.49	0.79	0.35	0.84
Research	122 [0.03]	21	67	0.11	0.63	0.72	0.52	0.99
Advocacy	86 [0.02]	23	49	0.24	0.61	0.80	0.47	0.94
Canal	76 [0.02]	12	347	0.70	0.14	0.45	0.05	0.92

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 2.2: Descriptive Evidence on Largest Civil Service Implementing Organizations

Civil Service Organization	(1) Number of Projects	(2) Number of Unique Project Types	(3) Budget Allocation (US$mn)	(4) Proportion Never Started	(5) Proportion Completed	(6) Proportion Completed Conditional on Being Started	(7) Proportion Fully Completed	(8) Proportion With Satisfactory Quality
Federal Ministry of Agriculture and Rural Development	797	9	144	0.54	0.29	0.63	0.14	0.76
Federal Ministry of Power and Steel	750	1	490	0.14	0.56	0.25	0.65	0.87
Federal Ministry of Water Resources	520	4	426	0.95	0.04	0.77	0.03	0.69
National Primary Health Care Development	447	4	56	0.19	0.64	0.79	0.42	0.75
Sokoto Rima River Basin Development Authority	277	2	23	0.22	0.66	0.85	0.51	0.76
Upper Benue River Basin Development Authority	169	3	13	0.11	0.89	1.00	0.89	0.25
Ogun/Oshun River Basin Development Authority	165	4	22	0.55	0.32	0.71	0.24	0.89
Chad Basin River Basin Development Authority	148	3	16	0.43	0.56	1.00	0.56	1.00
Lower Benue River Basin Development Authority	143	3	16	0.45	0.42	0.77	0.17	0.86
Nigerian Agricultural Cooperative and Rural Development Bank	133	2	8	0.42	0.46	0.80	0.34	0.81

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.

Table 2.3: 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) Quality-Adjusted Completion Rate**	**(6) Interaction**
CS-Autonomy	0.11**	0.18***	0.17***	0.18***	0.11**	0.23***
	(0.05)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)
CS-Incentives	-0.06*	-0.11***	-0.11***	-0.14***	-0.08***	-0.15***
	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
CS-Other	0.10***	0.05	0.05	0.08***	0.08***	0.08***
	(0.04)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)
CS-Autonomy x CS-Incentives						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)	2206 (144)	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 4 and 6 is the proportion of the project completed (that is a continuous measure between zero and one). The dependent variable in Column 5 is the product of the proportion completed variable and the dummy variable for quality. The sample of projects in Column 5 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 Column 5. Total and capital budget figures are an average of organization budget figures for the years 2006-10. Figures are rounded to two decimal places.

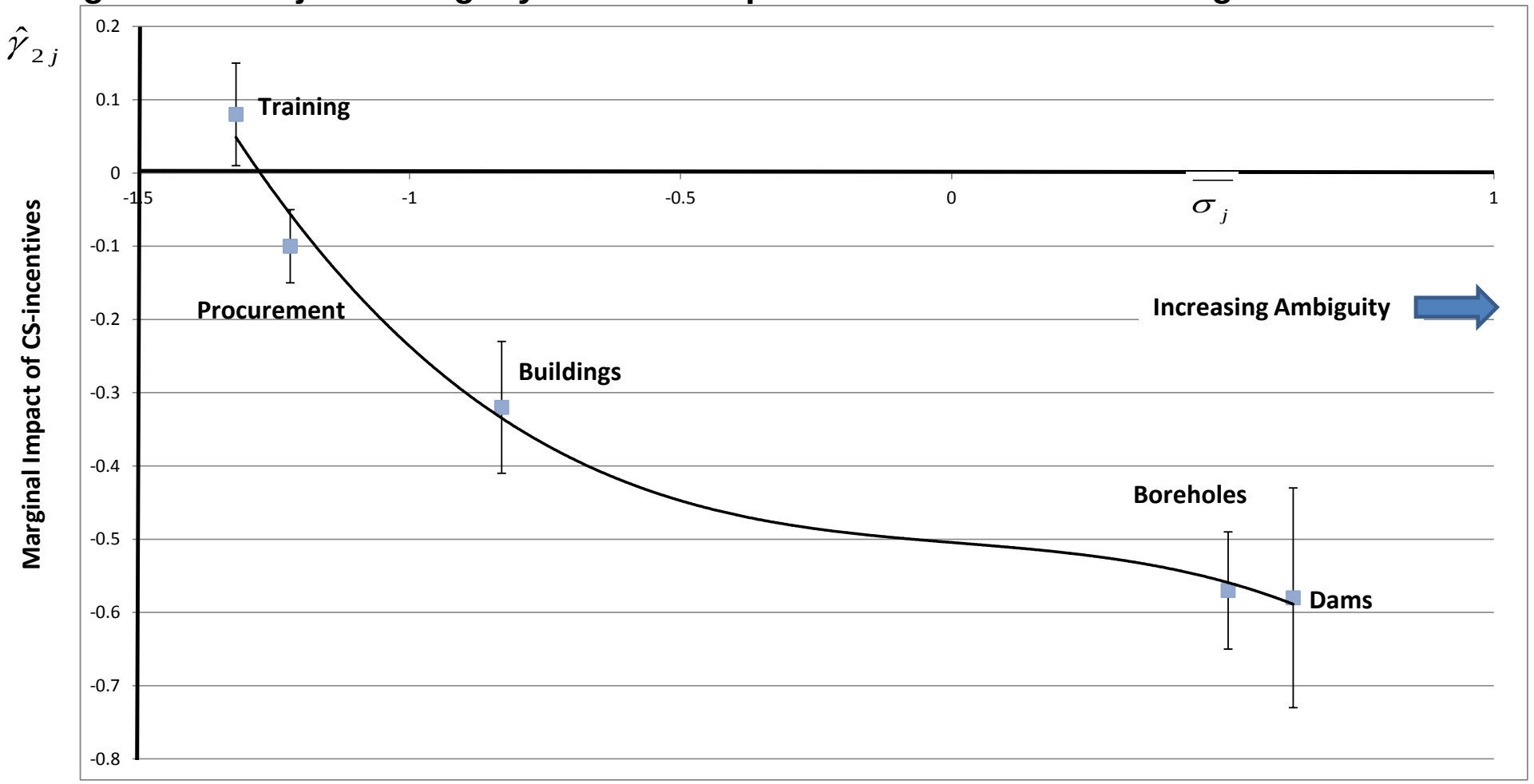
Table 2.4: Heterogeneous Impacts of Management Practices Related to Incentives and Monitoring

Dependent Variable: Project Completion Rate
Standard Errors: Clustered by Project Type Within Organization
Interactions in Deviation from Mean in Columns 1, 3, 4, 5 and 6
OLS Estimates

	(1) Project Complexity	(2) Non-modal Project	(3) Facilities	(4) Tenure	(5) Intrinsic Motivation	(6) Observe Corrupt Practices
CS-Autonomy	0.19***	0.19***	0.20***	0.20***	0.21***	0.16***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
CS-Incentives	-0.16***	-0.13***	-0.14***	-0.11***	-0.17***	-0.17***
	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)
CS-Other	0.08***	0.08***		0.06**	0.07***	0.07***
	(0.02)	(0.02)		(0.03)	(0.02)	(0.03)
CS-Incentives x Project Complexity	-0.19***					
	(0.06)					
CS-Incentives x Non-modal Project Type		-0.05*				
		(0.03)				
CS-Incentives x CS-Facilities			0.03*			
			(0.02)			
CS-Other (Without Facilities)			0.09***			
			(0.03)			
CS-Facilities			0.01			
			(0.02)			
CS-Incentives x Average Tenure of Bureaucrats				-0.02***		
				(0.004)		
CS-Incentives x Proportion of Bureaucrats Intrinsically Motivated					0.54**	
					(0.22)	
CS-Incentives x Proportion of Projects that Bureaucrats Report Observing Corrupt Practices On						0.25
						(0.28)
Project Complexity	-0.01	0.05				
	(0.11)	(0.12)				
Project of Non-modal Type for Organization		-0.04				
		(0.03)				
Average Tenure of Bureaucrats				-0.01		
				(0.01)		
Proportion of Bureaucrats Intrinsically Motivated					-0.47	
					(0.33)	
Proportion of Projects that Bureaucrats Report Observing Corrupt Practices On						-1.09***
						(0.37)
Organization Controls (capital, general, noise)	Yes	Yes	Yes	Yes	Yes	Yes
Project Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type
Observations (clusters)	4721 (201)	4721 (201)	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 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. In Column 1, the aggregate complexity is a project-level subjective assessment by Nigerian engineers of the relative difficulty of the project within the population of OPEN projects. In Column 2, the non-modal project type is a binary indicator as to whether the project is of a different project type (as defined above) as the modal project type at the organisation. In Column 4, tenure is an organization-level average for the number of years officials have worked at the implementing organization. In Column 5, intrinsic motivation is an organization-level proportion of employees at an organization that answered 'The chance to serve Nigeria' to the question 'What most influenced you to take up a career in the service?' in the Civil Servants Survey. In Column 6, observation of corrupt practices is an organization-level average of the proportion of projects officials at an organization stated on which 'I observed others breaking the service rules for their own benefit' in the Civil Servants Survey. Figures are rounded to two decimal places.

Figure 2.1: Project Ambiguity and the Response to CS-Incentive Management Practices



Notes: The horizontal axis measures the ambiguity of projects of a given type. We measure this design ambiguity using subcomponents of the complexity indictor described in Table A3. In particular we construct a z-score based on the design uncertainty, implementation uncertainty, design ambiguity and implementation ambiguity components of the project complexity metric. We then take the average of this over all projects of type j, denoting the average ambiguity of projects of type j by σ_j. We then estimate a specification analogous to our baseline regression model for a given project type j (excluding project fixed effects). We do so for five project types: boreholes, buildings, dams, procurement and training. For each project type j we then obtain an estimate of the partial correlation between CS-incentives and project completion rates, γ_{2j}, conditional on CS-autonomy. Figure 1 then plots the five (γ_{2j},σ_j) pairs, as well as a cubic best fit.

Table A2.1: 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, Abeokuta	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 A2.2: Defining Management Practices Using the CS Indices

Management Practice	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?
CS-Incentives	**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 *workers* were rewarded when targets were met?
		What percentage of *managers/directors* 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?
CS-Other	**Facilities**	During a typical working day (8 hours from 8am to 4pm), how many hours is there electricity (PHCN or generator)?
		Out of the five [5] working days, how many days is the network (GSM) coverage working for 50% of calls or more?
		Out of the five [5] working days, how many hours is their internet access good enough to check e-mail?
		Out of every ten [10] officers above SGL 7, how many have access to a computer (desktop or laptop)?
		Out of every ten [10] officers above SGL 7, how many have access to a vehicle (privately owned or otherwise) that can be used for work?
	Skills	Out of every ten [10] officers above SGL 7, how many can use a computer to write a memo?
		Out of every ten [10] officers above SGL 7, how many can use a computer to create a PowerPoint presentation?
		Out of every ten [10] officers above SGL 7, how many can use a computer to create an Excel spreadsheet?
		On which topics have trainings been performed at your organization in the last five [5] years? Technical trainings.
		On which topics have trainings been performed at your organization in the last five [5] years? Laws and regulations.
		On which topics have trainings been performed at your organization in the last five [5] years? Legal rights of the public.
		On which topics have trainings been performed at your organization in the last five [5] years? Good relations with the public.
		On which topics have trainings been performed at your organization in the last five [5] years? Ethics.
		On which topics have trainings been performed at your organization in the last five [5] years? What to do with presents.
		Out of every ten [10] officers above SGL 7 at your organization, how many have had some form of training over the last five [5] years?
	Staffing	Do you think the most senior staff of your organization talk about attracting and developing talented people?
		Do you think the most senior staff of your organization then actually goes about attracting and developing talented people?
		If two people both joined your organization five years ago and one was much better at their work than the other, would he/she be promoted through the service faster?
		Given past experience, if there is a 'top performing' civil servant, does your organization do their best to keep him/her?
		Is the burden of achieving the organization's targets evenly distributed across its different departments, or do some groups consistently shoulder a greater burden than others?
		How do you feel the number of staff in your organization relates to the activities undertaken there?
		What percentage of staff is doing most of the work at your organization?
		Thinking about all the projects that your organization has been involved in since your appointment here, would you say that senior staff try to use the right staff for the right job?
	Targeting	Does your organization have a clear set of targets derived from its mission and goals?
		How tough are the targets of the organization?
		When you arrive at work each day, do you and your colleagues know what your organization is trying to achieve on that particular day?
	Culture	How effectively would you say your organization is in making the bulk of its staff feel valued?
		To what extent would you say employees of your organization trust each other?
		If you think about the way that employees of this organization respond to a standard work challenge, would you say that there is a set of 'shared values' amongst all the staff?
		Out of every ten [10] officers above SGL 7, how many people from this organization participate in groups, committees and activities with other people from this organization outside of the formal structure of government (for example, in community or social organizations)?

Table A2.3: Correlation of Subcomponents of the Project Complexity Indicator

	Mean	Standard deviation	Project size	Number of inputs	Number of methods	Interdependencies	Access to raw materials	Storage of raw materials	Requires local labor	Requires skilled labor	Access to construction equipment	Design uncertainty	Implementation uncertainty	Design ambiguity	Implementation ambiguity	Difficulty to manage	Number of agencies involved	Aggregate complexity
Project size	0.27	0.45	1.00															
Number of inputs	6.82	4.13	0.06	1.00														
Number of methods	5.04	2.29	0.33	0.61	1.00													
Interdependencies	0.65	0.48	-0.03	0.13	0.07	1.00												
Access to raw materials	0.25	0.43	-0.11	-0.24	-0.09	0.04	1.00											
Storage of raw materials	0.04	0.21	0.19	-0.05	0.07	0.07	-0.05	1.00										
Requires local labor	0.45	0.50	0.31	-0.03	0.48	0.04	0.23	0.14	1.00									
Requires skilled labor	0.45	0.50	-0.16	-0.02	-0.21	0.53	0.21	-0.03	0.00	1.00								
Access to construction equipment	0.21	0.41	-0.01	-0.24	0.06	0.36	0.62	0.12	0.53	0.53	1.00							
Design uncertainty	0.70	0.46	0.10	0.18	0.12	0.77	-0.08	0.02	0.26	0.45	0.31	1.00						
Implementation uncertainty	0.78	0.41	0.06	0.26	0.20	0.58	-0.16	-0.01	0.35	0.42	0.24	0.78	1.00					
Design ambiguity	0.66	0.47	-0.08	0.08	-0.01	0.84	-0.01	0.08	0.04	0.60	0.35	0.73	0.63	1.00				
Implementation ambiguity	0.65	0.48	0.00	0.06	0.02	0.85	0.02	0.11	0.07	0.56	0.36	0.75	0.58	0.89	1.00			
Difficulty to manage	0.28	0.45	0.15	-0.16	0.24	0.38	0.47	0.19	0.64	0.37	0.81	0.36	0.27	0.43	0.43	1.00		
Number of agencies involved	3.54	0.51	-0.01	0.12	-0.05	0.21	0.11	-0.02	0.25	0.55	0.21	0.39	0.54	0.30	0.26	0.22	1.00	
Aggregate complexity	24.98	17.92	0.36	0.24	0.50	0.25	-0.21	0.16	0.39	-0.09	0.03	0.35	0.37	0.29	0.32	0.33	-0.05	1.00
Observations (projects)	4721	4721	4721	4721	4721	4721	4721	4721	4721	4721	4721	4721	4721	4721	4721	4721	4721	4721

Notes: The sample used is those projects in our core analysis for which we have complexity and project completion data. 'Project size' is a binary variable that aims to gauge the physical size of the project. It takes the value 1 if it is classified as equivalent to a medium scale build or larger. 'Number of inputs' counts the number of distinct product classes the finished project contains. 'Number of methods' counts the number of distinct disciplines or methods involved in implementing the project. 'Interdependencies' is a binary variable reflecting the extent of interdependencies between the activities involved in the project. It takes a value of 1 if the project is classified as highly interdependent. 'Access to raw materials' is a binary variable that takes the value 1 if raw materials could not be sourced within the state of implementation. 'Storage of raw materials' is a binary variable that takes the value 1 if some of the raw materials could not be easily stored or transported. 'Requires local labor' is a binary variable that takes the value 1 if local labor was useful or critical. 'Requires skilled labor' is a binary variable that takes the value 1 if specialized skills were necessary and difficult to obtain. 'Access to construction equipment' is a binary variable that takes the value 1 if the equipment required is difficult to obtain, heavy duty, or difficult to transport to the site. 'Design uncertainty' is a binary variable that takes on the value 1 if the design of the project is context specific. 'Implementation uncertainty' is a binary variable that takes on the value 1 if there are substantial risks involved in implementation. 'Design ambiguity' is a binary variable that takes on the value 1 if there is a risk of redesign late on in the project. 'Implementation ambiguity' is a binary variable that takes on the value 1 if the technical risks of the project cannot be fully understood at implementation. 'Difficulty to manage' is a binary variable that takes the value 1 if the project is seen have elements that require project management skills of above average level. 'Number of agencies involved' is simply a count of the estimated number of agencies involved in the project cycle. 'Aggregate complexity' is a subjective assessment as to the overall complexity of the project by the coding engineers. This variable is an assessment of the interaction of the other variables as well as any unassessed aspects of complexity and provides a coherent picture of the complexity of the projects by a specialist. Figures are rounded to two decimal places.

Table A2.4: 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
Robust standard errors	(0.01)	(0.01)	(0.01)	(0.01)
Errors clustered by project type within organisation level	(0.05)	(0.03)	(0.03)	(0.03)
Errors clustered by organisation	(0.06)	(0.03)	(0.03)	(0.03)
P-value of clustered coefficients	[0.07]	[0.00]	[0.00]	[0.00]
Wild cluster bootstrap p-value of clustered coefficients	[0.08]	[0.02]	[0.02]	[0.00]
CS-Incentives	-0.06	-0.11	-0.11	-0.14
Robust standard errors	(0.01)	(0.01)	(0.01)	(0.01)
Errors clustered by project type within organisation level	(0.03)	(0.02)	(0.02)	(0.02)
Errors clustered by organisation	(0.03)	(0.03)	(0.03)	(0.02)
P-value of clustered coefficients	[0.08]	[0.00]	[0.00]	[0.00]
Wild cluster bootstrap p-value of clustered coefficients	[0.20]	[0.00]	[0.00]	[0.00]
CS-Other	0.10	0.05	0.05	0.08
Robust standard errors	(0.01)	(0.02)	(0.02)	(0.02)
Errors clustered by project type within organisation level	(0.04)	(0.03)	(0.03)	(0.02)
Errors clustered by organisation	(0.03)	(0.04)	(0.03)	(0.03)
P-value of clustered coefficients	[0.00]	[0.20]	[0.17]	[0.00]
Wild cluster bootstrap p-value of clustered coefficients	[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 A2.5: 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***	0.17***	0.19***	0.19***	0.23***	0.20***	0.23***	0.16***	0.17***	0.14***	0.17***	0.19***	0.22***	0.23***	1.02***
	(0.02)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)	(0.05)	(0.05)	(0.03)	(0.03)	(0.03)	(0.06)	(0.05)	(0.03)	(0.17)
CS-Incentives	-0.15***	-0.13***	-0.15***	-0.14***	-0.24***	-0.18***	-0.21***	-0.06*	-0.24***	-0.01	-0.14***	-0.12**	-0.30***	-0.14***	-0.96***
	(0.02)	(0.03)	(0.02)	(0.02)	(0.04)	(0.03)	(0.05)	(0.03)	(0.04)	(0.03)	(0.02)	(0.06)	(0.10)	(0.02)	(0.16)
CS-Other	0.09***	0.05	0.09***	0.08***	0.09***	0.06**	0.11**	0.06*	0.18***	-0.03	0.08***	-0.03	0.10*	0.08***	0.49***
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.05)	(0.03)	(0.05)	(0.04)	(0.03)	(0.08)	(0.05)	(0.02)	(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 (clusters)	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)

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 bar 15 report OLS estimates. Column 15 reports estimates from a fractional regression model. The dependent variable is the proportion of the project completed (that is a continuous measure between zero and one). Column 1 excludes those projects implemented by the largest organization in terms of total expenditures. Column 2 excludes projects implemented by the largest organization in terms of number of projects. Columns 3 and 4 remove the 10 smallest organizations by expenditures and number of projects respectively. Columns 5 and 6 exclude organizations at the top and bottom of the CS-autonomy and CS-performance management scales respectively. Column 7 includes only construction projects (borehole, building, electrification, dam, road and canal) and Column 8 includes only non-construction projects. Column 9 restricts our specification to those projects implemented by centralized ministries. Column 10 restricts our specification to those projects implemented by decentralized agencies. In Column 11, "State-level Controls" comprise 'poverty controls', the proportion of households in a state who have difficulty meeting their food needs and the proportion of households that self-classify as poor; 'educational controls', literacy rates for adults and youth, and primary and secondary net enrolment and completion rates; and 'infrastructure controls', indicators of access to secure tenure, safe water, safe sanitation, improved waste disposal, medical services, vaccinations, electricity, computers, mobile phones and credit facilities, as well as the unemployment rate for over 15s. Column 3 restricts our specification to those projects for which we have location data and that are implemented in Northern Nigeria, where we exclude the Saturday dummy. Column 4 restricts our specification to those projects for which we have location data and that are implemented in Southern Nigeria. In Column 14 we construct CS-Autonomy and CS-Performance measures by weighting each topic (rather than each variable) equally. 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 A2.6: 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	0.53*	0.37	0.35	0.40
	(0.22)	(0.27)	(0.24)	(0.29)	(0.31)
CS-Incentives	-0.17	-0.33	-0.26	-0.26	-0.34
	(0.26)	(0.33)	(0.36)	(0.45)	(0.45)
CS-Other	-0.36	-0.02	0.37	0.57	0.63
	(0.30)	(0.23)	(0.31)	(0.45)	(0.48)
Senior Bureaucrat's Span of Control				-0.22	-0.34
				(0.35)	(0.40)
Tenure of Senior Bureaucrats				0.03	0.05
				(0.17)	(0.18)
Tenure of Low-tier Bureaucrats				-0.03	-0.04
				(0.09)	(0.09)
Proportion of Senior Bureaucrats That Report Being Intrinsically Motivated				-4.82	-4.6
				(4.17)	(4.37)
Proportion of Low-tier Bureaucrats That Report Being Intrinsically Motivated				-0.35	0.06
				(3.49)	(3.22)
Proportion of Projects that Senior Bureaucrats that Report Observing Corrupt Practices On				-0.01	0.00
				(0.04)	(0.04)
Proportion of Projects that Low-tier Bureaucrats that Report Observing Corrupt Practices On				0.02	0.02
				(0.03)	(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)

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 conditional logit estimates. The data is set up as follows. For each project, we associate a binary variable with 63 values corresponding to the 63 organizations in the core analysis of the paper. This variable takes the value one if the project is implemented at that organization, and zero otherwise. Thus, for each of our 4721 projects, we have 63 'project-organization' observations. These 297,423 observations are what makes up the 'unrestricted pairs' specification in Column 1. The 'feasible pairs' specification in Column 2 restricts the set of organizations associated with a project to only those in the same sector. Those 847 projects implemented at the only organization in the sector drop out in this specification, leaving us with 44,429 project-organization observations. In Columns 4 and 5 as we do not have data for one organization on the proportion of senior bureaucrats that report observing corrupt practices, this organization drops out, leaving 33,370 project-organization pairs. In Column 5 we restrict the feasible pairs further by assuming projects can only potentially be assigned to organizations in the same sector that are observed being tasked to implement at least one project of similar or greater complexity. 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. We follow the grading system of the Federal Government by defining senior bureaucrats as those on grade level 12 and above. The proportion of staff intrinsically motivated refers to the fraction of employees at an organization that answered 'The chance to serve Nigeria' to the question 'What most influenced you to take up a career in the service?' in the Civil Servants Survey. The percentage of staff who observed corruption refers to the average proportion of projects officials at an organization stated on which 'I observed others breaking the service rules for their own benefit' in the Civil Servants Survey. Figures are rounded to two decimal places.

Table A2.7: 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	0.21	1.56	0.03
	(19.57)	(0.27)	(1.89)	(0.05)
CS-Incentives	10.07	-0.01	-0.47	0.05
	(24.87)	(0.40)	(1.53)	(0.07)
CS-Other	-19.92	-0.01	-2.10	0.03
	(28.30)	(0.37)	(1.66)	(0.05)
Organization Controls (capital, general, noise)	Yes	Yes	Yes	Yes
Observations	63	63	63	63

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Robust standard errors are in parentheses. All columns report OLS estimates. The dependent variable in Column 1 is a count measure of the number of projects assigned to an organization. In Column 2 it a count variable of the number of unique project types assigned to the organization, where the projects are assigned a primary classification of the following type: a financial, training, advocacy, procurement, research, electrification, borehole, dam, building, canal or road project. The dependent variable in Column 3 is the average complexity of projects assigned to the organization. The dependent variable in Column 4 is the log of the average total organizational budget, averaged over 2006 to 2010. In Columns 1 to 3, capital controls comprise organization-level controls for the logs of number of employees, total budget, and capital budget. In Column 4, we drop total organizational budget as a control as the log of organizational budget is the dependent variable. 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 A2.8: Decomposing the Impacts of Management Practices

Dependent Variable: Proportion Project Completed
Standard Errors: Clustered by Project Type Within Organization
OLS Estimates

	(1) Roles	(2) Flexibility	(3) Performance incentives	(4) Monitoring	(5) Culture	(6) Targeting	(7) Facilities	(8) Skills	(9) Staffing	(10) All	(11) Management
CS-Roles	0.27***									0.33***	
	(0.06)									(0.04)	
CS-Flexibility		0.18***								0.11**	
		(0.05)								(0.04)	
CS-Performance Incentives			-0.08*							-0.07	
			(0.04)							(0.06)	
CS-Monitoring				-0.21***						-0.28***	
				(0.05)						(0.06)	
CS-Culture					0.02					0.01	
					(0.04)					(0.03)	
CS-Targeting						0.03				0.07	
						(0.04)				(0.05)	
CS-Facilities							0.13***			0.06	
							(0.04)			(0.04)	
CS-Skills								0.08		0.14**	
								(0.07)		(0.06)	
CS-Staffing									-0.06	0.08	
									(0.07)	(0.06)	
CS-Management											0.03
											(0.03)
H_0: CS-Autonomy Components Equal [p-value]										[0.00]	
H_0: CS-Incentives Components Equal [p-value]										[0.06]	
Organization Controls (capital, general, noise)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Project Controls	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
Observations (clusters)	4721 (201)	4721 (201)	4721 (201)	4721 (201)	4721 (201)	4721 (201)	4721 (201)	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 all columns is the proportion of the project completed (that is a continuous measure between zero and one). All of the index component variables in the table are z-scores which are centered at 0. The variable 'facilities' measures the quality of infrastructure at an organization and the equipment available to staff. The variable 'skills' measures the skills and training opportunities embodied in the staff body. The variable 'staffing' measures the effective utilization of that body of staff. The variable 'targeting' examines the extent of use of targets. The variable 'flexibility' measures the extent to which the organization is able to respond to best practice and project peculiarities. The variable 'roles' measures the extent to which staff can play a role in defining the direction of the organization. The variable 'culture' measures whether the organization inculcates a productive work culture. Together these components make up our autonomy variable. The variable 'monitoring' focuses on the tracking of performance of individuals and projects. The variable 'performance' examines the use of incentives both to reward success and punish failure. 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. At the foot of the table we report the p-value on the null that the coefficients in Column 10 on the variables that make up the CS-Autonomy measure (those associated with roles and flexibility) are of equal magnitude. We also report the p-value on the null that the coefficients in Column 10 on the variables that make up the CS-Incentives measure (those associated with performance incentives and monitoring) are of equal magnitude. Figures are rounded to two decimal places.

Table A2.9: 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-Incentives
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	-0.06	-0.04
	(3.18)	(0.42)	(0.42)
Proportion of Bureaucrats Being the First Family Member to Join Service	0.48	0.02	-0.01
	(0.1)	(0.01)	(0.01)
Tenure of Senior Bureaucrats	15	0.42	-0.49
	(5)	(0.65)	(0.65)
Tenure of Low-tier Bureaucrats	10	0.00	-0.48
	(4)	(0.59)	(0.59)
Proportion of Senior Bureaucrats Intrinsically Motivated	0.31	0.00	-0.02
	(0.12)	(0.02)	(0.02)
Proportion of Low-tier Bureaucrats Intrinsically Motivated	0.39	0.01	-0.02
	(0.13)	(0.02)	(0.02)
Proportion of Projects that Senior Bureaucrats that Report Observing Corrupt Practices On	0.35	-0.02	0.01
	(0.10)	(0.01)	(0.01)
Proportion of Projects that Low-tier Bureaucrats that Report Observing Corrupt Practices On	0.41	-0.02	-0.01
	(0.11)	(0.01)	(0.01)

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Columns 2 to 3 report OLS estimates. In Column 1, standard deviations are in parentheses. In all other columns, standard errors are in parentheses. Proportion of bureaucrats who knew their direct boss before starting their posting is an organization-level average of those bureaucrats who answered positively to a question outlining possible connections to the officials boss before they came to work at the organization. Proportion of bureaucrats who knew their managers before starting their posting is an organization-level average of those bureaucrats who answered positively to a question outlining possible connections to the officials' managers before they came to work at the organization. Average number of close colleagues known before starting their posting is an organization-level average of the number of colleagues an official stated that they had connections with before they came to work at the organization. Proportion of bureaucrats being the first family member to join service is an organization-level average of those bureaucrats who answered 'Yes' to the question 'Are you the first member of your family to enter the Federal service'. Tenure of bureaucrats refers to the number of years they have served in the organization for. The proportion of staff intrinsically motivated refers to the fraction of employees at an organization that answered 'The chance to serve Nigeria' to the question 'What most influenced you to take up a career in the service?'. The percentage of staff who observed corruption refers to the average proportion of projects officials at an organization stated on which 'I observed others breaking the service rules for their own benefit'. These variables are all elicited from the Civil Servants Survey we conducted. When we control for the proportion of projects that senior bureaucrats that report observing corrupt practices on, we lose one organization (that implemented a single project) in which no senior bureaucrat answered the question. Figures are rounded to two decimal places.

Table A2.10: 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 Ambiguity in Portfolio of Projects
CS-Autonomy	0.17***	0.20***
	(0.04)	(0.03)
CS-Incentives	-0.17***	-0.17***
	(0.04)	(0.04)
CS-Other	0.07***	0.04
	(0.02)	(0.04)
CS-Autonomy x Capital to Total Budget Ratio	0.07	
	(0.10)	
CS-Incentives x Capital to Total Budget Ratio	0.10	
	(0.12)	
CS-Autonomy x Var (Project Ambiguity)		0.00
		(0.02)
CS-Incentives x Var (Project Ambiguity)		-0.04
		(0.03)
Capital to Total Budget Ratio	0.70	
	(0.54)	
Var (Project Ambiguity)		-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)

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 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, the share of the workforce with postgraduate qualifications, and the span of control at the organization. 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. The capital to total budget Ratio is a variable that divides an organization's capital budget by its total budget. Figures are rounded to two decimal places.

Fig. A2.1: Area of Covariances in Which Coefficients are Underestimated in Absolute Terms

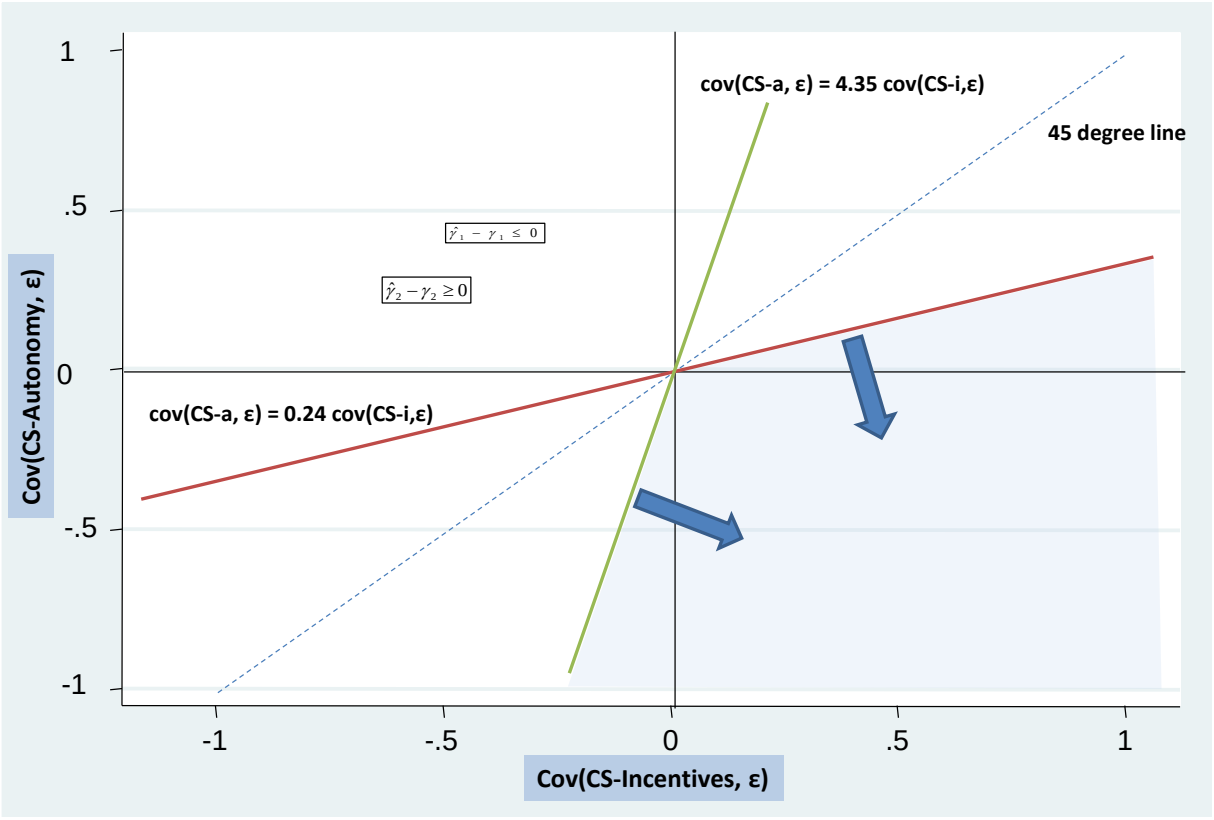
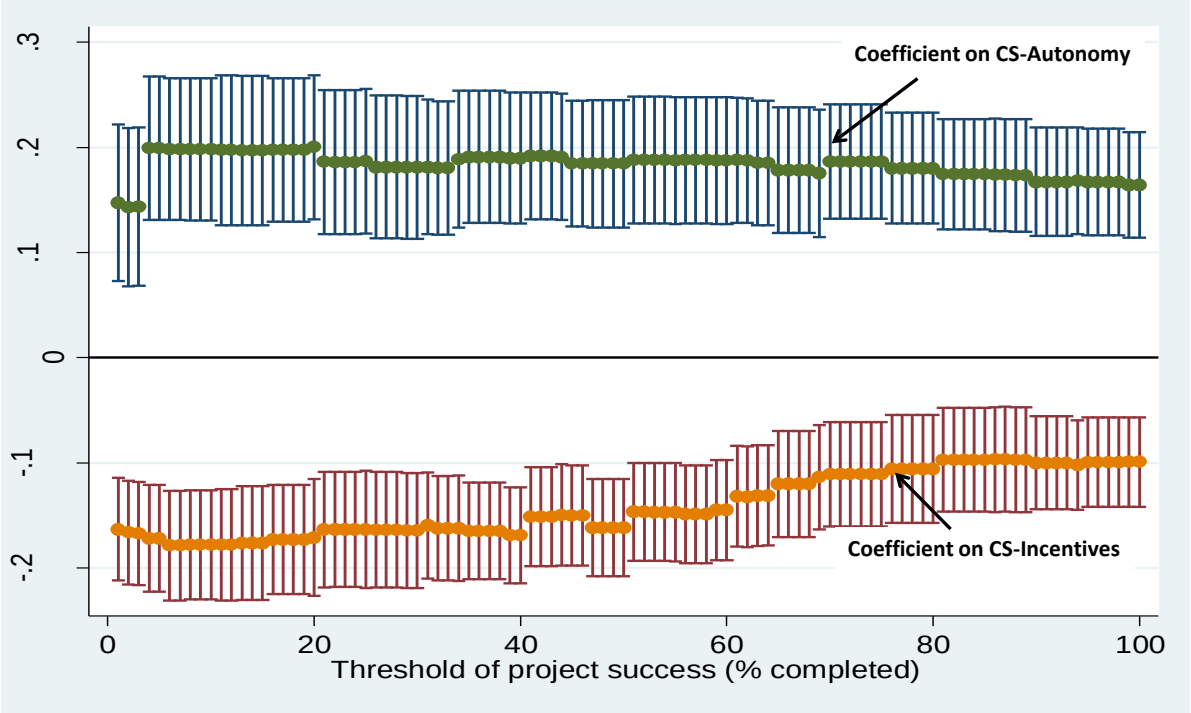


Fig. A2.2: Impact of Management Practices For Different Thresholds of Project Success



Notes: We define a threshold completion rate of p% and then consider all potential thresholds from 1% to 100% in increments of 1%. We then use this to define a dummy variable for our main empirical specification, where the outcome is a dummy variable equal to one if the project completion rate is above the threshold p%, and zero otherwise. For any given threshold p the coefficients of interest on CS-Autonomy and CS-Incentives are shown above and their associated 95% confidence interval.

Table 3.1: Investigating Differences in Constituency Characteristics by Level of Competition

Means, standard deviations and p-values of differences

	(1) All constituencies	(2) 10% most competitive constituencies	(3) 10% least competitive constituencies	(4) p-value of difference between 2/3
Politician characteristics				
Sex [female=1]	0.06	0.06	0.12	0.38
	(0.23)	(0.24)	(0.33)	
Politician age	47.70	46.71	49.17	0.13
	(6.93)	(4.34)	(8.13)	
Politician years of education	16.17	16.26	15.62	0.06
	(1.58)	(1.09)	(1.61)	
Tenure in house [second term=1]	0.27	0.23	0.15	0.39
	(0.44)	(0.43)	(0.36)	
Constituency characteristics				
Proportion of constituency population in extreme poverty	0.23	0.26	0.23	0.47
	(0.15)	(0.14)	(0.15)	
Standard deviation of poverty index	0.38	0.41	0.38	0.22
	(0.1)	(0.08)	(0.11)	
Proportion of constituents with access to potable water	0.48	0.37	0.52	0.01
	(0.27)	(0.24)	(0.24)	
Standard deviation of access to potable water	0.41	0.41	0.44	0.17
	(0.1)	(0.09)	(0.07)	
Average hours of electricity in a day	4.46	3.69	4.80	0.21
	(3.89)	(3.03)	(4.19)	
Standard deviation of hours of electricity	5.37	5.50	5.48	0.98
	(2.25)	(2.5)	(2.49)	
Time in minutes to nearest primary school	20.33	22.25	19.43	0.07
	(7.27)	(5.86)	(6.6)	
Standard deviation of time to nearest primary school	14.39	14.88	14.78	0.92
	(4.26)	(3.6)	(4.53)	
Time in minutes to nearest secondary school	33.43	35.05	33.15	0.40
	(10.04)	(7.66)	(10.71)	
Standard deviation of time to nearest secondary school	16.63	16.95	17.21	0.72
	(3.37)	(2.41)	(3.43)	
OPEN projects				
OPEN funds allocated per constituency (US$)	1,100,000	1,500,000	1,100,000	0.28
	(1,900,000)	(1,600,000)	(1,000,000)	
Average level of progress of constituency projects	0.46	0.50	0.38	0.03
	(0.25)	(0.23)	(0.24)	
Observations	345	35	35	

Notes: Standard deviations are in parentheses. Politician characteristics are a dummy variable indicating the sex of a politician, which takes the value 1 when the poltician is female, the age in years and years of education of the relevant politician, and whether they were in congress in the 1999-2003 National Assembly (before which Nigeria was ruled by a military government). In the very small number of cases in which age or years of education are missing, I replace the missing value with the mean of the rest of the politicians and include a dummy variable to indicate the missing data. Constituency characteristics are comprised of the means and standard deviations of the following indices: the proportion of poor in the constituency, measured by a national poverty index, the average years of education of the household head, the proportion of constituents with access to potable water, the average time in minutes to the nearest primary school, and the average time in minutes to the nearest secondary school. T-tests are performed under the assumption of equal variances when the chi-squared test statistic is less than or equal to 3.84, and under the assumption of unequal variances otherwise. Figures are rounded to two decimal places or significant figures where relevant. I have weighted constituencies equally.

Table 3.2: Descriptive Statistics of Nigeria's Federal Organizations, by Tier

Means, standard deviations, and p-values of differences with centralized organizations

	(1) Centralized	(2) Decentralized	p-value of difference between (1)/(2)
Organization characteristics			
Number of organizations	7	47	-
	-	-	
Total budget (millions of US$)	190	11	0.05
	(187)	(11)	
Capital budget (millions of US$)	130	7	0.07
	(150)	(11)	
Personnel budget (millions of US$)	17	3.6	0.04
	(13)	(2.8)	
Overheads budget (millions of US$)	11	0.41	0.16
	(17)	(0.26)	
Number of staff at organization	5,700	720	0.09
	(6,400)	(480)	
Distance to Abuja (km)	0	310	0.00
	(0)	(170)	
Federal constituencies served in OPEN data	48	15	0.08
	(88)	(38)	
OPEN projects			
Number of projects	822	2,187	-
	-	-	
Average project budget (millions of US$)	0.18	0.11	0.00
	(0.53)	(0.48)	
Average project complexity	0.40	0.23	0.00
	(0.24)	(0.17)	
Proportion focused on rehabilitation	0.27	0.18	0.00
	[0.14]	[0.19]	
Proportion focused on construction	0.82	0.85	0.07
	[0.56]	[0.57]	
Proportion never started	0.50	0.31	0.00
	[0.36]	[0.30]	
Average level of progress of organization projects	0.34	0.57	0.00
	[0.49]	[0.56]	
Proportion completed conditional on being started	0.68	0.83	0.00
	[0.49]	[0.56]	
Proportion fully completed	0.20	0.44	0.00
	[0.34]	[0.39]	
Proportion started with satisfactory quality	0.73	0.83	0.00
	[0.37]	[0.56]	

Notes: Standard deviations are in round parentheses. In square parentheses are corresponding averages for the variable in question weighted by the project budget. Abuja is the capital city of Nigeria. Organization budget data are an average of organization budget figures for the years 2006-7. Data on number of staff are mainly from administrative data. In the few cases where I do not have the staff numbers explicitly, I estimate them from the personnel expenditures, which are correlated with staff numbers with a magnitude of over 0.9. Centralized organizations are main ministries which act as the central organizing authority for the sector. Decentralized organizations are 'parastatals', with day-to-day running largely independent of the central authority. Figures are rounded to two decimal places. T-tests are performed under the assumption of equal variances when the chi-squared test statistic is less than or equal to 3.84, and under the assumption of unequal variances otherwise. I have weighted organizations equally.

Table 3.3: Descriptive Statistics of Political Interactions with Bureaucrats, by Tier

Means, standard deviations, and p-values of differences with centralized organizations

	(1) All organizations	(2) Centralized	(3) Decentralized	(4) p-value of difference between (2)/(3)
Proportion of bureaucrats who state politicians impact projects significantly	0.54	0.38	0.60	0.00
	(0.16)	(0.08)	(0.13)	
Proportion of managers who state politicians impact projects significantly	0.52	0.40	0.57	0.00
	(0.16)	(0.04)	(0.16)	
Proportion of non-managers who state politicians impact projects significantly	0.53	0.27	0.63	0.00
	(0.24)	(0.15)	(0.18)	
Proportion of projects involving personal engagement of member of National Assembly	0.14	0.08	0.16	0.00
	(0.07)	(0.05)	(0.07)	
Organizations	54	7	47	

Notes: Standard deviations are in parentheses. Decentralized organizations are 'parastatals', with day-to-day running largely independent of the central authority. Figures are rounded to two decimal places. T-tests are performed under the assumption of equal variances when the chi-squared test statistic is less than or equal to 3.84, and under the assumption of unequal variances otherwise. I have weighted organizations by the number of projects they implement in the OPEN data set so to reflect the intensity of interaction between politicians and bureaucrats.

Table 3.4: Delegation by Politicians to Centralized and Decentralized Organizations

Dependent Variable Columns 1-4: Indicator of decentralization [decentralization=1]; Column 5: Sum of project budgets within relevant federal constituency (in millions of Naira); Column 6: Count of projects within relevant federal constituency

Robust Standard Errors

OLS Estimates

	(1) No interaction	(2) Interaction	(3) Politician controls	(4) Constituency controls	(5) Reduced form	(6) Total constituency resources	(7) Number of projects in constituency
Politician member of relevant committee [yes=1]	0.00	-0.12***	-0.13***	-0.11***	-0.06***	-52.3	3.29
	(0.01)	(0.03)	(0.03)	(0.03)	(0.02)	(96.10)	(2.23)
Level of political competition	0.02	-0.04	-0.04	-0.03	0.01	-5.86	2.21
	(0.02)	(0.03)	(0.03)	(0.03)	(0.02)	(94.20)	(1.51)
Politician member of relevant committee x level of political competition		0.18***	0.19***	0.18***	0.08***	138	-3.48
		(0.04)	(0.04)	(0.04)	(0.03)	(145)	(3.02)
Project controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Politician controls	No	No	Yes	Yes	Yes	Yes	Yes
Constituency controls	No	No	No	Yes	Yes	Yes	Yes
Mean of dependent variable	0.73	0.73	0.73	0.73	0.73	173	9
Adjusted R-squared	0.59	0.59	0.59	0.61	0.81	0.31	0.27
Observations	3,009	3,009	3,009	3,009	3,009	345	345

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Robust standard errors are in parentheses. All columns report OLS estimates. The analysis in columns 1-5 is at the project level. The dependent variable in columns 1-4 is a binary variable reflecting whether a project is decentralized or not, which takes the value 1 when the project is implemented by a decentralized organization. Decentralization refers to whether the organization is an agency, with day-to-day running largely independent of the central authority, rather than a centralized ministry, the central organizing authority for the sector. The dependent variable in column 5 is the total resources allocated to a constituency in the OPEN data in millions of Nigerian Naira. The level of political competition is measured as one minus the difference between the winner's vote share and the runner's up vote share. Project controls are comprised of project-level controls for the log of the project budget; binary variables indicating whether the project is new or a rehabilitation, and whether it was implemented in 2006 or 2007; assessments of its aggregate complexity, national and local information requirements by Nigerian engineers; and project type fixed effects. Project type fixed effects relate to whether the primary classification of the project is as an advocacy, building, borehole, canal, dam, financial, procurement, research, road or training project. The analysis in columns 5 and 6 is at the constituency level. In column 6, the dependent variable is the total number of projects allocated to a constituency in the OPEN data. The committee membership variable is defined as that proportion of projects within the constituency where the politician sits on the relevant committee. Project controls are comprised of constituency-level averages for the log of the project budget, binary variables indicating whether the project is new or a rehabilitation, and whether it was implemented in 2006 or 2007, assessments of its aggregate complexity, national and local information requirements by Nigerian engineers, and the fraction of projects in the constituency classed as an advocacy, building, borehole, canal, dam, financial, procurement, research, road or training project. For both sets of specifications, politician controls are comprised of constituency-level controls for the sex, age, years of education and tenure in congress of the relevant politician. In the very small number of cases in which age or years of education are missing, I replace the missing value with the mean of the rest of the politicians and include a dummy variable to indicate the missing data. Constituency characteristics are comprised of the means and standard deviations of the following indices: the proportion of poor in the constituency measured by a national poverty index, the average years of education of the household head, the proportion of constituents with access to potable water, the average time in minutes to the nearest primary school, and the average time in minutes to the nearest secondary school. Means and standard deviations of the following indices are also included to reflect the frequency with which constituents benefit from a public project of the named type in the five years preceding 2006: construction of electrification infrastructure, rehabilitation of electrification infrastructure, well/borehole, construction of piped water infrastructure, rehabilitation of piped water infrastructure, sanitation, school construction project, school rehabilitation, health facility construction, health facility rehabilitation, road construction, tarring/grading of roads, transportation services, and agricultural-inputs schemes. Finally, constituency characteristics include a set of indicators of the economic dynamics of the constituency, comprised of indicators of improvements in opportunities for employment, the availability of agricultural inputs, number of buyers of agriculture produce, the availability of extension services, the availability of credit facilities, and the availability of consumer goods. All specifications include an indicator of the 'grade' of the committee under which the project falls, which is a dummy that takes the value 1 if the committee is perceived to be of high political weight or 0 otherwise. Figures are rounded to two decimal places.

Table 3.5: Interactions between Politicians and Bureaucrats

Dependent Variable: Proportion of implementing organization bureaucrats who state politicians impact projects significantly
Robust Standard Errors
OLS Estimates

	(1) No interaction	(2) Interaction	(3) Politician controls	(4) Constituency controls	(5) Decentralized organizations	(6) Reduced form
Distance to Abuja (net of distance to state capital)	0.028***	0.010**	0.009*	0.010**	-0.057***	0.010**
	(0.003)	(0.005)	(0.005)	(0.004)	(0.005)	(0.004)
Level of political competition	0.045***	0.051***	0.049***	0.041***	0.027***	0.030***
	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)	(0.010)
Distance to Abuja x level of political competition		0.026***	0.027***	0.031***	0.038***	0.031***
		(0.006)	(0.006)	(0.005)	(0.005)	(0.005)
Project controls	Yes	Yes	Yes	Yes	Yes	Yes
Politician controls	No	No	Yes	Yes	Yes	Yes
Constituency controls	No	No	No	Yes	Yes	Yes
Mean of dependent variable	0.54	0.54	0.54	0.54	0.60	0.54
Adjusted R-squared	0.58	0.58	0.58	0.68	0.66	0.68
Observations	3,009	3,009	3,009	3,009	2,187	3,009

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Robust standard errors are in parentheses. All columns report OLS estimates. The dependant variable in all specifications is a continuous variable on the unit interval that reflects the proportion of bureaucrats at the organization in which the project is implemented who state that politicians have a significant impact on the implementation of projects there. The distance to Abuja is a variable constructed as follows: I measure the geodesic distance between the organization and the capital city of Nigeria, Abuja, where the Parliament sits. I then regress this on the geodesic distance between the organization implementing the project and the capital city of the state in which the organization sits, and take the residuals of that regression as the measure used here. The level of political competition is measured as one minus the difference between the winner's vote share and the runner's up vote share. Project controls are comprised of project-level controls for the log of the project budget; binary variables indicating whether the project is new or a rehabilitation, and whether it was implemented in 2006 or 2007; assessments of its aggregate complexity; national and local information requirements by Nigerian engineers; and project type fixed effects. Project type fixed effects relate to whether the primary classification of the project is as an advocacy, building, borehole, canal, dam, financial, procurement, research, road or training project. Politician controls are comprised of constituency-level controls for the sex, age, years of education and tenure in congress of the relevant politician. In the very small number of cases in which age or years of education are missing, I replace the missing value with the mean of the rest of the politicians and include a dummy variable to indicate the missing data. Constituency characteristics are comprised of the means and standard deviations of the following indices: the proportion of poor in the constituency, measured by a national poverty index, the average years of education of the household head, the proportion of constituents with access to potable water, the average time in minutes to the nearest primary school, and the average time in minutes to the nearest secondary school. Means and standard deviations of the following indices are also included to reflect the frequency with which constituents benefit from a public project of the named type in the five years preceding 2006: construction of electrification infrastructure, rehabilitation of electrification infrastructure, well/borehole, construction of piped water infrastructure, rehabilitation of piped water infrastructure, sanitation, school construction project, school rehabilitation, health facility construction, health facility rehabilitation, road construction, tarring/grading of roads, transportation services, and agricultural-inputs schemes. Finally, constituency characteristics include a set of indicators of the economic dynamics of the constituency, comprised of indicators of improvements in opportunities for employment, the availability of agricultural inputs, number of buyers of agriculture produce, the availability of extension services, the availability of credit facilities, and the availability of consumer goods. Columns 1 to 4 utilize the full sample of projects in my data, whilst column 5 restricts the sample to those projects implemented by decentralized organizations only. Figures are rounded to two decimal places.

Table 3.6: Consequences of Delegation and Engagement at Different Levels of Political Competition

Dependent Variable: Proportion of Project Completed

Robust Standard Errors

OLS Estimates in Columns 1 to 3; IV Estimates in Columns 4 and 5

	(1) Decentralized	(2) Incentives	(3) Both (OLS)	(4) IV (influence)	(5) IV (engage)
Decentralization [decentralized=1]	0.27***		0.24***	0.40***	0.48***
	(0.03)		(0.03)	(0.09)	(0.09)
Degree of politician influence on project implementation		0.51***	0.17**	-0.08	-0.01
		(0.07)	(0.08)	(0.66)	(0.01)
Level of political competition	-0.01	-0.02	-0.02	-0.02	-0.01
	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)
Project, politician and constituency controls	Yes	Yes	Yes	Yes	Yes
Mean of dependent variable	0.50	0.50	0.50	0.50	0.50
Adjusted R-squared	0.34	0.32	0.34	0.33	0.33
F-statistic	-	-	-	140	328
Observations	3,009	3,009	3,009	3,009	3,009

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Robust standard errors are in parentheses. The dependant variable in all specifications is the proportion of the project completed (that is a continuous measure between zero and one). Decentralization refers to whether the organization is a 'parastatal', with day-to-day running largely independent of the central authority, rather than a centralized ministry, the central organizing authority for the sector. The degree of politician influence on project implementation is an organizational-average of the bureaucrat responses to the question 'Rate the influence you think [member(s) of the National Assembly] have on the success of a typical project implemented by your organization' where I code a bureaucrat's response as 1 if they answer 'Significant influence' or 'Most influence' and 0 otherwise. The level of political competition is measured as one minus the difference between the winner's vote share and the runner's up vote share. Project controls are comprised of project-level controls for the log of the project budget; binary variables indicating whether the project is new or a rehabilitation, and whether it was implemented in 2006 or 2007; assessments of its aggregate complexity; national and local information requirements by Nigerian engineers; and project type fixed effects. Project type fixed effects relate to whether the primary classification of the project is as an advocacy, building, borehole, canal, dam, financial, procurement, research, road or training project. Politician controls are comprised of constituency-level controls for the sex, age, years of education and tenure in congress of the relevant politician. In the very small number of cases in which age or years of education are missing, I replace the missing value with the mean of the rest of the politicians and include a dummy variable to indicate the missing data. Constituency characteristics are comprised of the means and standard deviations of the following indices: the proportion of poor in the constituency, measured by a national poverty index, the average years of education of the household head, the proportion of constituents with access to potable water, the average time in minutes to the nearest primary school, and the average time in minutes to the nearest secondary school. Means and standard deviations of the following indices are also included to reflect the frequency with which constituents benefit from a public project of the named type in the five years preceding 2006: construction of electrification infrastructure, rehabilitation of electrification infrastructure, well/borehole, construction of piped water infrastructure, rehabilitation of piped water infrastructure, sanitation, school construction project, school rehabilitation, health facility construction, health facility rehabilitation, road construction, tarring/grading of roads, transportation services, and agricultural-inputs schemes. Finally, constituency characteristics include a set of indicators of the economic dynamics of the constituency, comprised of indicators of improvements in opportunities for employment, the availability of agricultural inputs, number of buyers of agriculture produce, the availability of extension services, the availability of credit facilities, and the availability of consumer goods. All specifications include an indicator of the 'grade' of the committee under which the project falls, which is a dummy that takes the value 1 if the committee is perceived to be of high political weight or 0 otherwise. The F-statistics reported for the instrumental variables specifications in columns 4 and 5 is the lower of the two first stage regressions corresponding to the two endogenous variables. Figures are rounded to two decimal places.

Table A3.1: Descriptive Statistics of Nigeria's Political Constituencies

Means and standard deviations

Constituencies	
Number of constituencies	345
	-
Number of local governments in a constituency	2.03
	(0.79)
Population (2006)	370,000
	(130,000)
Winning vote share (2003 elections)	0.62
	(0.15)
Runner's up vote share (2003 elections)	0.29
	(0.12)
Proportion of constituencies run by ruling party	0.63
	-
Proportion of constituencies ruling party is runner up	0.34
	-
OPEN projects	
OPEN funds per constituency (US$)	1,100,000
	(1,900,000)
Number of OPEN projects by constituency	9
	(7.1)
Number of OPEN project types by constituency	3
	(1.5)
Number of sectors in constituency	3
	(0.9)
Average project budget (US$)	130,000
	(150,000)
Average project complexity (proportion)	0.29
	(0.10)
Proportion of constituency projects never started	0.41
	(0.25)
Average level of progress of constituency projects	0.46
	(0.25)
Level of progress conditional on being started	0.76
	(0.22)
Proportion of constituency projects fully completed	0.32
	(0.28)
Proportion started with satisfactory quality	0.78
	(0.31)
Proportion implemented by decentralized organizations	0.73
	(0.24)

Notes: Standard deviations are in parentheses. In the OPEN data, I do not observe projects in 15 of Nigeria's 360 federal constituencies, so the descriptives provided here are for the restricted set of 345 constituencies only. Population data is from the 2006 Census. Election data is from the Independent National Electoral Commission official record for the 2003 election. Centralized organizations are ministries which act as the central organizing authority for the sector. Decentralized organizations are agencies whose day-to-day running is largely independent of the central authority. Budget figures originally in Nigerian Naira are converted to US dollars at a rate of US$1:N150. Figures are rounded to two decimal places where relevant. I have weighted constituencies equally.

Table A3.2: Politician Characteristics across Committees

OLS Estimates

	(1) Age of politician	(2) Sex of politician [female=1]	(3) Years of education	(4) Political competition in constituency	(5) Index of poverty in constituency
Constant	47.35***	0.03**	16.22***	0.69***	0.23***
	(0.61)	(0.01)	(0.14)	(0.02)	(0.01)
Finance Committee	-0.37	-0.03	0.01	0.04	-0.01
	(1.21)	(0.03)	(0.28)	(0.04)	(0.03)
Appropriation Committee	0.12	-0.05*	0.29	-0.01	0.00
	(1.16)	(0.03)	(0.27)	(0.04)	(0.02)
Water Committee	1.50	-0.02	-0.07	0.00	0.01
	(1.11)	(0.03)	(0.25)	(0.04)	(0.02)
Agriculture Committee	1.28	0.02	-0.42	-0.05	-0.01
	(1.19)	(0.03)	(0.27)	(0.04)	(0.03)
Health Committee	-0.79	0.02	-0.13	0.04	0.02
	(1.23)	(0.03)	(0.28)	(0.05)	(0.03)
Education Committee	2.83**	0.00	0.31	0.01	-0.02
	(1.19)	(0.03)	(0.27)	(0.04)	(0.03)
Environment Committee	0.21	-0.03	0.29	-0.09**	0.01
	(1.2)	(0.03)	(0.27)	(0.04)	(0.03)
Housing Committee	-0.24	-0.04	0.08	-0.07*	-0.03
	(1.11)	(0.03)	(0.26)	(0.04)	(0.02)
Women and Youth Committee	0.22	0.63***	-0.53	0.05	-0.04
	(1.46)	(0.04)	(0.33)	(0.05)	(0.03)
FCT Committee	-1.69	-0.01	-0.41	0.03	0.00
	(1.2)	(0.03)	(0.28)	(0.04)	(0.03)
H_0: All coefficients equal [p-value]	0.27	0.00	0.28	0.34	0.91
H_0: All coefficients bar Women and Youth equal [p-value]	-	0.51	-	-	-
Observations	345	345	345	345	345

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Robust standard errors are in parentheses. All columns report OLS estimates. The dependent variable in column 1 is the age of the politician. In column 2, it is a binary variable reflecting the sex of the politician, which takes the value 1 if the politician is female. In column 3, the dependent variable is the years of education of the politician. In column 4, it is my measure of political competition (one minus the difference between the winner and runner up vote shares) in the constituency that the politician represents. In column 5, it is the proportion of poor in the politician's constituency, measured by a national poverty index. The 'FCT Committee' refers to the Federal Capital Territory Committee that has jurisdiction over the building of infrastructure within the Federal Capital Territory, the municipal area in which the capital, Abuja, sits. At the foot of the table, I report the p-value on the null that the coefficients in each column are of equal magnitude. I also report the p-value on the null that the coefficients in column 2, excluding that on the Women Affairs and Youth committee, are of equal magnitude. Figures are rounded to two decimal places.

Table A3.3: Investigating the Determinants of Committee Membership

Dependent Variable: System of Ten Equations in Membership of Sectoral Committees
Robust Standard Errors
Estimates by Maximum Likelihood to Fit a SUR Model

	Member of Finance Committee	Member of Appropriation Committee	Member of Water Committee	Member of Agriculture Committee	Member of Health Committee	Member of Education Committee	Member of Environment Committee	Member of Housing Committee	Member of Women/Youth Committee	Member of FCT Committee
Politician has relevant qualifications/experience [yes=1]	0.30***	0.36***	0.50***	0.54***	0.77***	0.54***	0.69***	0.65***	0.17**	0.79***
	(0.06)	(0.05)	(0.09)	(0.06)	(0.08)	(0.07)	(0.08)	(0.07)	(0.08)	(0.08)
Level of political competition	0.09	0.02	-0.04	-0.20***	0.06	-0.03	0.05	-0.10	0.07	0.06
	(0.08)	(0.09)	(0.09)	(0.07)	(0.08)	(0.08)	(0.09)	(0.07)	(0.05)	(0.05)
Index of poverty	0.35	-0.15	0.02	-0.55***	-0.26	-0.24	-0.21	0.22	0.17	-0.01
	(0.29)	(0.26)	(0.33)	(0.2)	(0.23)	(0.22)	(0.22)	(0.3)	(0.21)	(0.21)
Politician and constituency controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Correlation of residuals in SUR system:										
Appropriation	-0.22									
Water	-0.01	0.07								
Agriculture	-0.11	0.02	-0.10							
Health	-0.04	-0.09	0.01	-0.07						
Education	0.02	-0.05	-0.13	-0.21	-0.04					
Environment	0.04	0.03	0.04	-0.02	0.09	0.06				
Housing	0.00	0.00	0.01	-0.04	0.05	-0.01	-0.02			
Women/Youth	-0.02	0.18	0.06	-0.01	0.01	-0.05	0.15	-0.14		
FCT	0.02	-0.07	-0.04	-0.06	0.02	0.00	0.00	0.14	0.00	
Observations	345	345	345	345	345	345	345	345	345	345

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Robust standard errors are in parentheses. Columns report maximum likelihood estimates to fit a SUR model for the ten sectoral committees. The dependent variable in all specifications is a binary variable reflecting whether a politician is a member of the committee for the named sector, taking the value 1 when the politician is a member. The 'FCT Committee' refers to the Federal Capital Territory Committee that has jurisdiction over the building of infrastructure within the Federal Capital Territory, the municipal area in which the capital, Abuja, sits. Politician controls are comprised of constituency-level controls for the sex, age, years of education and tenure in congress of the relevant politician. In the very small number of cases in which age or years of education are missing, I replace the missing value with the mean of the rest of the politicians and include a dummy variable to indicate the missing data. Constituency characteristics are comprised of the means and standard deviations of the following indices: the proportion of poor in the constituency, measured by a national poverty index, the average years of education of the household head, the proportion of constituents with access to potable water, the average time in minutes to the nearest primary school, and the average time in minutes to the nearest secondary school. Means and standard deviations of the following indices are also included to reflect the frequency with which constituents benefit from a public project of the named type in the five years preceding 2006: construction of electrification infrastructure, rehabilitation of electrification infrastructure, well/borehole, construction of piped water infrastructure, rehabilitation of piped water infrastructure, sanitation, school construction project, school rehabilitation, health facility construction, health facility rehabilitation, road construction, tarring/grading of roads, transportation services, and agricultural-inputs schemes. Finally, constituency characteristics include a set of indicators of the economic dynamics of the constituency, comprising indicators of improvements in opportunities for employment, the availability of agricultural inputs, number of buyers of agriculture produce, the availability of extension services, the availability of credit facilities, and the availability of consumer goods. All specifications include dummies for five of the six geo-political zones and an indicator of the 'grade' of the committee under which the project falls, which is a dummy that takes the value 1 if the committee is perceived to be of high political weight or 0 otherwise. Figures are rounded to two decimal places.

Table A3.4: Investigating the Determinants of Politicians' Qualifications and Experience

Dependent Variable: System of Nine Equations in Sector of Politician's Qualifications and Experience
Robust Standard Errors
Estimates by Maximum Likelihood to Fit a SUR Model

	Finance Sector	Water Sector	Agriculture Sector	Health Sector	Education Sector	Environment Sector	Housing Sector	Women/Youth Sector	FCT (city building) Sector
Level of political competition	0.04	-0.02	-0.02	-0.04	-0.11	-0.10	-0.23***	-0.03	0.03
	(0.12)	(0.08)	(0.09)	(0.07)	(0.08)	(0.08)	(0.08)	(0.03)	(0.08)
Index of poverty	-0.44	0.23	0.08	0.46	-0.26	-0.05	0.14	-0.03	0.31
	(0.35)	(0.29)	(0.08)	(0.31)	(0.25)	(0.17)	(0.29)	(0.03)	(0.29)
Proportion of constituents with access to potable water		0.19	-0.04	-0.02		-0.10			
		(0.14)	(0.11)	(0.08)		(0.06)			
Time in minutes to nearest secondary school					0.01			0.00	
					(0.00)			(0.00)	
Existing tarred road infrastructure investments							0.08		-0.01
							(0.28)		(0.22)
Politician and constituency controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Correlation of residuals in SUR system:									
Water	0.13								
Agriculture	-0.12	0.11							
Health	-0.12	-0.05	-0.08						
Education	0.10	-0.03	-0.09	-0.06					
Environment	-0.02	0.17	0.24	-0.15	-0.04				
Housing	0.06	0.31	0.09	-0.04	-0.05	0.12			
Women/Youth	0.13	-0.02	-0.03	-0.05	-0.03	-0.06	-0.05		
FCT	0.09	0.28	0.06	-0.03	-0.05	0.07	0.23	-0.02	
Observations	345	345	345	345	345	345	345	345	345

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Robust standard errors are in parentheses. Columns report maximum likelihood estimates to fit a SUR model for the nine sectors. The dependent variable in all specifications is a binary variable reflecting whether a politician has qualifications and/or experience in the named sector, taking the value 1 when the politician has relevant qualifications and/or experience. The 'FCT Committee' refers to the Federal Capital Territory Committee that has jurisdiction over the building of infrastructure within the Federal Capital Territory, the municipal area in which the capital, Abuja, sits. Politician controls are comprised of constituency-level controls for the sex, age and years of education of the relevant politician. In the very small number of cases in which age or years of education are missing, I replace the missing value with the mean of the rest of the politicians and include a dummy variable to indicate the missing data. Constituency characteristics are comprised of the means and standard deviations of the following indices: the proportion of poor in the constituency, measured by a national poverty index, the average years of education of the household head, the proportion of constituents with access to potable water, the average time in minutes to the nearest primary school, and the average time in minutes to the nearest secondary school. Means and standard deviations of the following indices are also included to reflect the frequency with which constituents benefit from a public project of the named type in the five years preceding 2006: construction of electrification infrastructure, rehabilitation of electrification infrastructure, well/borehole, construction of piped water infrastructure, rehabilitation of piped water infrastructure, sanitation, school construction project, school rehabilitation, health facility construction, health facility rehabilitation, road construction, tarring/grading of roads, transportation services, and agricultural-inputs schemes. Finally, constituency characteristics include a set of indicators of the economic dynamics of the constituency, comprising indicators of improvements in opportunities for employment, the availability of agricultural inputs, number of buyers of agriculture produce, the availability of extension services, the availability of credit facilities, and the availability of consumer goods. Figures are rounded to two decimal places.

Table A3.5: Correlation of Subcomponents of the Project Complexity Indicator

	Mean	Standard deviation	Project size	Number of inputs	Number of methods	Interdependencies	Access to raw materials	Storage of raw materials	Requires local labor	Requires skilled labor	Access to construction equipment	Design uncertainty	Implementation uncertainty	Design ambiguity	Implementation ambiguity	Difficulty to manage	Number of agencies involved
Project size	0.32	0.46															
Number of inputs	7.48	4.71	0.08														
Number of methods	5.27	2.63	0.38	0.62													
Interdependencies	0.58	0.49	0.06	0.14	0.08												
Access to raw materials	0.08	0.27	-0.17	-0.11	-0.13	-0.30											
Storage of raw materials	0.06	0.23	0.16	-0.10	0.04	0.13	0.00										
Requires local labor	0.42	0.49	0.47	0.06	0.56	-0.11	-0.23	0.22									
Requires skilled labor	0.45	0.50	-0.22	0.04	-0.36	0.59	-0.27	0.00	-0.48								
Access to construction equipment	0.08	0.27	0.12	-0.19	0.10	0.23	-0.08	0.33	0.29	0.26							
Design uncertainty	0.68	0.46	0.30	0.18	0.15	0.75	-0.43	0.11	0.19	0.42	0.18						
Implementation uncertainty	0.79	0.41	0.19	0.29	0.24	0.52	-0.54	0.03	0.34	0.39	0.14	0.72					
Design ambiguity	0.61	0.49	0.02	0.05	-0.03	0.82	-0.36	0.14	-0.14	0.67	0.21	0.64	0.55				
Implementation ambiguity	0.59	0.49	0.11	0.05	0.03	0.85	-0.35	0.17	-0.10	0.62	0.23	0.69	0.47	0.89			
Difficulty to manage	0.18	0.38	0.35	-0.07	0.34	0.27	-0.13	0.41	0.49	-0.04	0.60	0.26	0.13	0.36	0.37		
Number of agencies involved	3.58	0.50	-0.03	0.21	-0.16	0.16	-0.34	-0.07	-0.09	0.35	-0.34	0.35	0.57	0.28	0.19	-0.22	
Aggregate complexity	27.48	20.33	0.49	0.18	0.56	0.26	-0.09	0.20	0.56	-0.13	0.27	0.30	0.33	0.29	0.32	0.61	-0.10
Observations (projects)	3,009	3,009	3,009	3,009	3,009	3,009	3,009	3,009	3,009	3,009	3,009	3,009	3,009	3,009	3,009	3,009	3,009

Notes: 'Project size' is a binary variable that aims to gauge the physical size of the project. It takes the value 1 if it is classified as equivalent to a medium scale build or larger. 'Number of inputs' counts the number of distinct product classes the finished project contains. 'Number of methods' counts the number of distinct disciplines or methods involved in implementing the project. 'Interdependencies' is a binary variable reflecting the extent of interdependencies between the activities involved in the project. It takes a value of 1 if the project is classified as highly interdependent. 'Access to raw materials' is a binary variable that takes the value 1 if raw materials could not be sourced within the state of implementation. 'Storage of raw materials' is a binary variable that takes the value 1 if some of the raw materials could not be easily stored or transported. 'Requires local labor' is a binary variable that takes the value 1 if local labor was useful or critical. 'Requires skilled labor' is a binary variable that takes the value 1 if specialized skills were necessary and difficult to obtain. 'Access to construction equipment' is a binary variable that takes the value 1 if the equipment required is difficult to obtain, heavy duty, or difficult to transport to the site. 'Design uncertainty' is a binary variable that takes on the value 1 if the design of the project is context specific. 'Implementation uncertainty' is a binary variable that takes on the value 1 if there are substantial risks involved in implementation. 'Design ambiguity' is a binary variable that takes on the value 1 if there is a risk of redesign late on in the project. 'Implementation ambiguity' is a binary variable that takes on the value 1 if the technical risks of the project cannot be fully understood at implementation. 'Difficulty to manage' is a binary variable that takes the value 1 if the project is seen to have elements that require project management skills of above-average level. 'Number of agencies involved' is simply a count of the estimated number of agencies involved in the project cycle. 'Aggregate complexity' is a subjective assessment as to the overall complexity of the project by the coding engineers. This variable is an assessment of the interaction of the other variables as well as any unassessed aspects of complexity, and provides a coherent picture of the complexity of the projects by a specialist. The variables 'interdependencies', 'access to raw materials', 'requires local labor', 'requires skilled labor', 'access to construction equipment', 'design uncertainty', 'implementation uncertainty', 'design ambiguity', 'implementation ambiguity' and 'difficulty to manage' are binary variables reflecting the variation in these previously categorical variables. Figures are rounded to two decimal places.

Table A3.6: Robustness of Delegation Findings

Dependent Variable: Indicator of decentralization [decentralization=1]
Robust Standard Errors in All Columns Bar 2 and Clustered at the Politician Level in Column 2
OLS Estimates

	(1) Baseline specification	(2) Clustering at politician level	(3) Organization controls	(4) Chairperson dummy	(5) Excluding chairperson projects	(6) Two-term dummy	(7) Excluding two-term projects	(8) Excluding unqualified agriculture
Politician member of relevant committee [yes=1]	-0.11***	-0.11**	-0.05**	-0.11***	-0.12***	-0.11***	-0.17***	-0.09***
	(0.03)	(0.05)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)
Level of political competition	-0.03	-0.03	0.04	-0.03	-0.03	-0.03	-0.03	-0.02
	(0.03)	(0.06)	(0.06)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)
Politician member of relevant committee x level of political competition	0.18***	0.18**	0.08**	0.20***	0.20***	0.18***	0.25***	0.17***
	(0.04)	(0.07)	(0.04)	(0.04)	(0.04)	(0.04)	(0.06)	(0.04)
Chairpersons [yes=1]				-0.14***				
				(0.04)				
Politician in second term at congress [yes=1]						0.01		
						(0.01)		
Aggregate complexity index	-0.46***							
	(0.06)							
National information index	-0.08***							
	(0.01)							
Local information index	0.08***							
	(0.02)							
Project, politician and constituency controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.61	0.61	0.71	0.61	0.60	0.61	0.62	0.60
Observations (clusters)	3,009	3,009 (345)	3,009	3,009	2,962	3,009	2,161	2,980

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Standard errors are in parentheses. They are robust in all columns bar 2 and clustered by politicians in Column 2. The dependent variable in all specifications is a binary variable reflecting whether a project is decentralized or not, which takes the value 1 when the project is implemented by a decentralized organization. Decentralization refers to whether the organization is a 'parastatal', with day-to-day running largely independent of the central authority, rather than a centralized ministry, the central organizing authority for the sector. The level of political competition is measured as one minus the difference between the winner's vote share and the runner's up vote share. In Column 3 we include organizational-level variables that measure the average years of education of bureaucrats, a proxy for their intrinsic motivation, and a measure of what determined their posting at the organization that implements the project. In Column 4, we include a dummy for whether the project is located in a constituency represented by the chair of the relevant sectoral committee for that project. Column 5 restricts our specification to those projects that are not implemented in constituencies in which the politician is the chair of the relevant sectoral committee. In Column 6 we include a dummy for whether the project is located in a constituency in which the politician is in their second term at congress. Column 7 restricts our specification to those projects that are not implemented in constituencies in which the politician is in their second term of congress. Column 8 restricts our specification to those projects that are not implemented in constituencies in which the politician did not have relevant qualifications or experience in agriculture, but was a member of the agriculture committee. Project controls are comprised of project-level controls for the log of the project budget, binary variables indicating whether the project is new or a rehabilitation, and whether it was implemented in 2006 or 2007, assessments of its aggregate complexity, national and local information requirements by Nigerian engineers, and project type fixed effects. Project type fixed effects relate to whether the primary classification of the project is as an advocacy, building, borehole, canal, dam, financial, procurement, research, road or training project. Politician controls comprise constituency-level controls for the sex, age, years of education and tenure in congress of the relevant politician. In the very small number of cases in which age or years of education are missing, I replace the missing value with the mean of the rest of the politicians and include a dummy variable to indicate the missing data. Constituency characteristics are comprised of the means and standard deviations of the following indices: the proportion of poor in the constituency, measured by a national poverty index, the average years of education of the household head, the proportion of constituents with access to potable water, the average time in minutes to the nearest primary school, and the average time in minutes to the nearest secondary school. Means and standard deviations of the following indices are also included to reflect the frequency with which constituents benefit from a public project of the named type in the five years preceding 2006: construction of electrification infrastructure, rehabilitation of electrification infrastructure, well/borehole, construction of piped water infrastructure, rehabilitation of piped water infrastructure, sanitation, school construction project, school rehabilitation, health facility construction, health facility rehabilitation, road construction, tarring/grading of roads, transportation services, and agricultural-inputs schemes. Finally, constituency characteristics include a set of indicators of the economic dynamics of the constituency, comprised of indicators of improvements in opportunities for employment, the availability of agricultural inputs, number of buyers of agriculture produce, the availability of extension services, the availability of credit facilities, and the availability of consumer goods. All specifications include an indicator of the 'grade' of the committee under which the project falls, which is a dummy that takes the value 1 if the committee is perceived to be of high political weight or 0 otherwise. Figures are rounded to two decimal places.

Table A3.7: Robustness of Engagement Findings

Dependent Variable: Proportion of implementing organization bureaucrats who state politicians impact projects significantly
Robust Standard Errors in All Columns Bar 2 and Clustered at the Politician Level in Column 2
OLS Estimates

	(1) Baseline specification	(2) Clustering at politician level	(3) Organization controls	(4) Chairperson dummy	(5) Excluding chairperson projects	(6) Two-term dummy	(7) Excluding two-term projects	(8) Excluding unqualified agriculture
Distance to Abuja (net of distance to state capital)	0.010**	0.01	0.012***	0.010**	0.010**	0.010**	0.019***	0.009**
	(0.004)	(0.009)	(0.005)	(0.004)	(0.004)	(0.004)	(0.006)	(0.004)
Level of political competition	0.041***	0.041***	0.043***	0.040***	0.039***	0.041***	0.022**	0.041***
	(0.008)	(0.016)	(0.008)	(0.008)	(0.008)	(0.008)	(0.011)	(0.008)
Distance to capital city x level of political competition	0.031***	0.031***	0.023***	0.031***	0.031***	0.031***	0.022***	0.033***
	(0.005)	(0.011)	(0.005)	(0.005)	(0.005)	(0.005)	(0.007)	(0.005)
Chairpersons [yes=1]				0.023*				
				(0.013)				
Politician in second term at congress [yes=1]						0.009**		
						(0.004)		
Aggregate complexity index	-0.042***							
	(0.015)							
National information index	0.034***							
	(0.004)							
Local information index	0.023***							
	(0.004)							
Project, politician and constituency controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.68	0.68	0.72	0.68	0.68	0.68	0.70	0.68
Observations (clusters)	3,009	3,009 (345)	3,009	3,009	2,962	3,009	2,161	2,980

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Standard errors are in parentheses. They are robust in all columns bar 2 and clustered by sectors within each constituency in Column 2. The dependent variable in all specifications is a continuous variable on the unit interval that reflects the proportion of bureaucrats at the organization in which the project is implemented who state that politicians have a significant impact on the implementation of projects there. The distance to Abuja is a variable constructed as follows: I measure the geodesic distance between the organization and the capital city of Nigeria, Abuja, where the Parliament sits. I then regress this on the geodesic distance between the organization implementing the project and the capital city of the state in which the organization lies and take the residuals of that regression as the measure used here. In Column 3 we include organizational-level variables that measure the average years of education of bureaucrats, a proxy for their intrinsic motivation, and a measure of what determined their posting at the organization that implements the project. In Column 4, we include a dummy for whether the project is located in a constituency represented by the chair of the relevant sectoral committee for that project. Column 5 restricts our specification to those projects that are not implemented in constituencies in which the politician is the chair of the relevant sectoral committee. In Column 6 we include a dummy for whether the project is located in a constituency in which the politician is in their second term at congress. Column 7 restricts our specification to those projects that are not implemented in constituencies in which the politician is in their second term of congress. Column 8 restricts our specification to those projects that are not implemented in constituencies in which the politician did not have relevant qualifications or experience in agriculture but was a member of the agriculture committee. Project controls are comprised of project-level controls for the log of the project budget, binary variables indicating whether the project is new or a rehabilitation, and whether it was implemented in 2006 or 2007, assessments of its aggregate complexity, national and local information requirements by Nigerian engineers, and project type fixed effects. Project type fixed effects relate to whether the primary classification of the project is as an advocacy, building, borehole, canal, dam, financial, procurement, research, road or training project. Politician controls are comprised of constituency-level controls for the sex, age, years of education and tenure in congress of the relevant politician. In the very small number of cases in which age or years of education are missing, I replace the missing value with the mean of the rest of the politicians and include a dummy variable to indicate the missing data. Constituency characteristics are comprised of the means and standard deviations of the following indices: the proportion of poor in the constituency, measured by a national poverty index, the average years of education of the household head, the proportion of constituents with access to potable water, the average time in minutes to the nearest primary school, and the average time in minutes to the nearest secondary school. Means and standard deviations of the following indices are also included to reflect the frequency with which constituents benefit from a public project of the named type in the five years preceding 2006: construction of electrification infrastructure, rehabilitation of electrification infrastructure, well/borehole, construction of piped water infrastructure, rehabilitation of piped water infrastructure, sanitation, school construction project, school rehabilitation, health facility construction, health facility rehabilitation, road construction, tarring/grading of roads, transportation services, and agricultural-inputs schemes. Finally, constituency characteristics include a set of indicators of the economic dynamics of the constituency, comprised of indicators of improvements in opportunities for employment, the availability of agricultural inputs, number of buyers of agriculture produce, the availability of extension services, the availability of credit facilities, and the availability of consumer goods. All specifications include an indicator of the 'grade' of the committee under which the project falls, which is a dummy that takes the value 1 if the committee is perceived to be of high political weight or 0 otherwise. Figures are rounded to two decimal places.

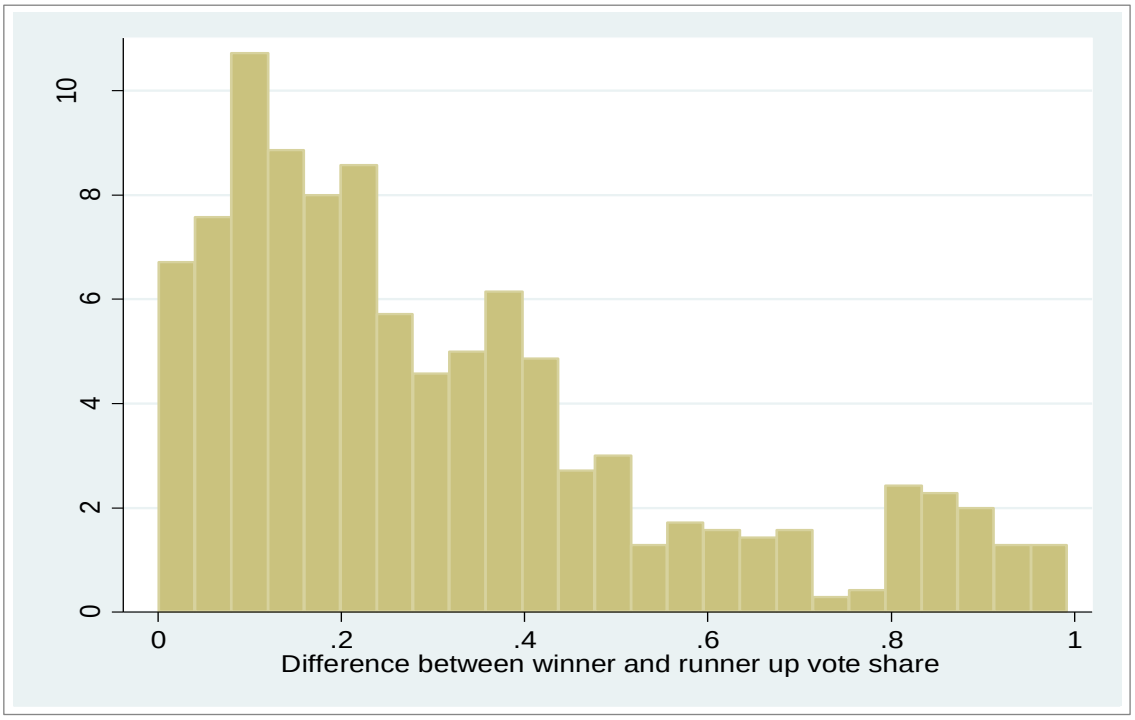
Table A3.8: Descriptive Statistics of Organizational Characteristics, by Tier

Means, standard deviations, and p-values of differences with centralized organizations

	(1) All organizations	(2) Centralized	(3) Decentralized	(4) p-value of difference between (2)/(3)
How often, if at all, do you personally engage with project communities?	0.41	0.42	0.41	0.72
	(0.12)	(0.08)	(0.13)	
Proportion of citizens who threaten bureaucrat	8.66	5.81	9.10	0.05
	(4.15)	(2.47)	(4.20)	
Proportion of citizens who report bureaucrat to manager	10.16	7.13	10.62	0.02
	(3.81)	(1.88)	(3.83)	
Proportion of citizens who report bureaucrat to elected official	6.44	3.66	6.87	0.04
	(3.94)	(1.98)	(4.00)	
Organizations	54	7	47	

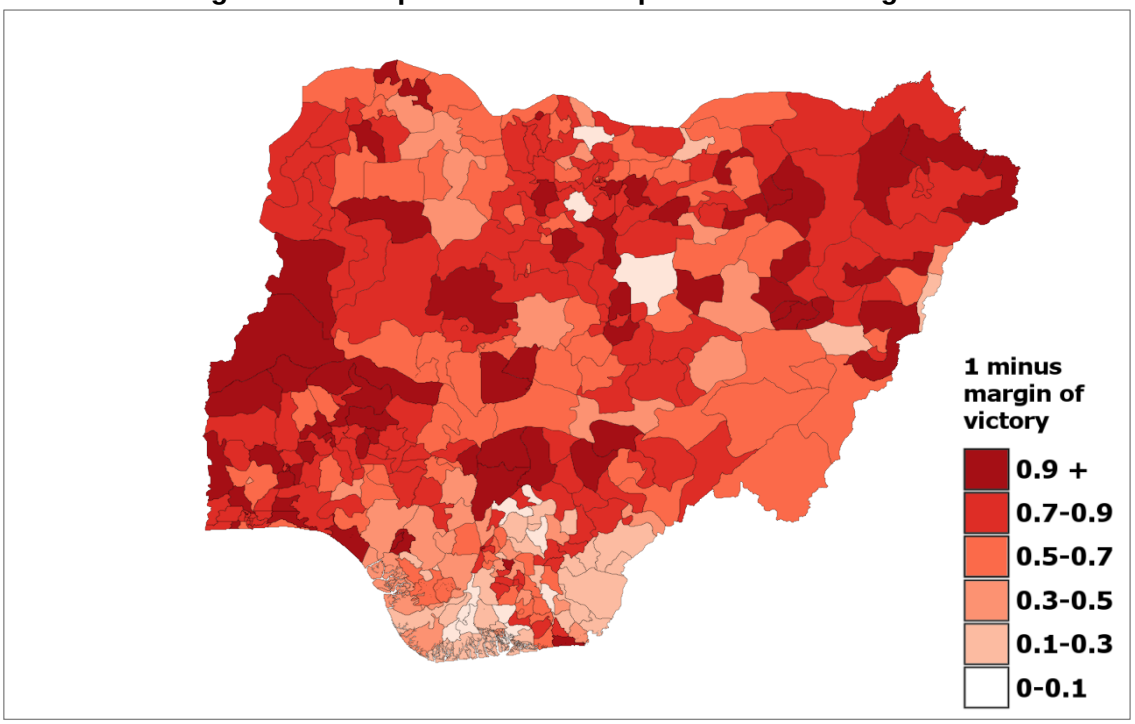
Notes: Standard deviations are in parentheses. Decentralized organizations are 'parastatals', with day-to-day running largely independent of the central authority. Figures are rounded to two decimal places. T-tests are performed under the assumption of equal variances when the chi-squared test statistic is less than or equal to 3.84, and under the assumption of unequal variances otherwise. I have weighted organizations equally.

Fig. 3.2A: Histogram of Difference Between Winner and Runner Up Vote Share



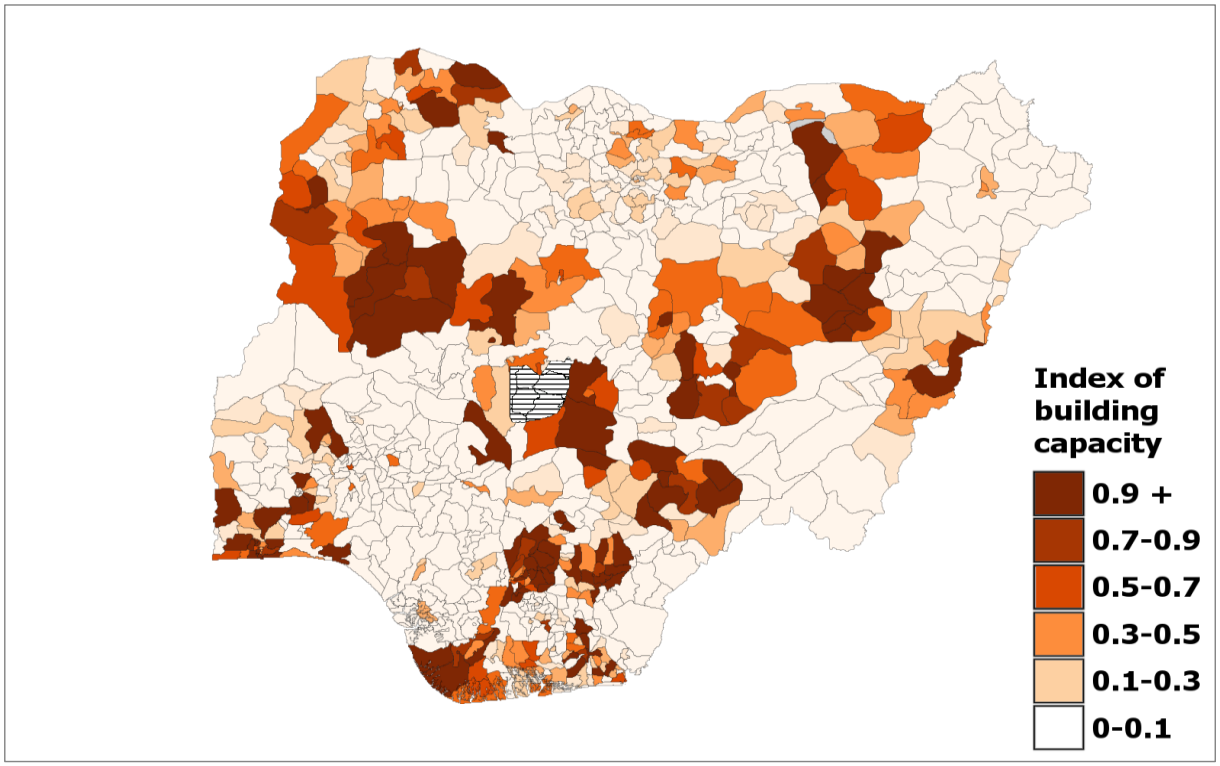
Notes: This is a histogram of the difference between the winning vote share in a constituency and that of the runner up. The sample used to construct the histogram is those constituencies for which I observe the implementation of public projects.

Figure 3.2B: Map of Political Competition Across Nigeria



Notes: This is a choropleth map of one minus the difference between the winning vote share in a constituency and that of the runner up. The choropleth map is colored such that the deeper the intensity of shading, the higher the level of political competition.

Figure 3.3: Map of Building Capacity Across Nigeria



Notes: This is a choropleth map of an index of the intensity of building capacity across Nigeria. The index is a function of the number of building materials markets in a local government. The striped section indicates the Federal Capital Territory, in which the capital city, Abuja, sits. The choropleth map is colored such that the deeper the intensity of shading, the higher the number of building materials markets.