I study how low-income countries can design and deliver more effective social policies, particularly in the provision of education and social safety nets. Governments in low-income countries face significant challenges in public service provision, both in their internal management of human resources and in the interaction of their policies with citizen preferences and market failures. To study these issues, I use the tools of applied microeconomics, most prominently the application of randomized, controlled trials of social policies, as well as behavioral laboratory experiments and observational methods. My work grows out of a deep engagement with government and civil society organizations, particularly in East Africa, and draws theoretical insights from labor, public, and behavioral economics to devise and test social policy innovations that can both inform policy and contribute to broader social-scientific understanding.

I have published six papers in leading general-interest and field journals in economics. These include publications in the *American Economic Review*, one of the leading general-interest economics journals, and two publications in the *Journal of Development Economics*, the top journal in my field of economic development. Papers published in the *Journal of Human Resources* and *Journal of Public Economics*, leading journals in the fields of labor and public economics, respectively, demonstrate the engagement of my research with these fields. And my work in the *Journal of African Economies* is a testament to my view that careful descriptive work can reveal phenomena that re-frame theoretical perspectives and motivate policy intervention. As of this writing, my research has received over 1,000 citations on Google Scholar, where I have an h-index of 18.

My track record of fundraising reflects the assessment of my work by my scientific peers and indicates an active pipeline of projects with high potential for scholarly and policy impact. As a Principal or Co-Principal Investigator, I have been awarded more than $14 million in grant funding. Working with a growing network of collaborators within and outside the discipline of economics, and often working with government partners over extended periods, I have used this funding to build and execute cutting-edge field experiments. These large-scale randomized, controlled trials offer a unique opportunity to confront economic and organizational theory with the preferences and constraints of policymakers, bureaucrats, and citizens.

Investments in long-running relationships with policymakers and civil society organizations have been foundational to my research, and have been instrumental in creating opportunities for this to influence policy alongside social scientific understanding. As part of this engagement, I have frequently met and presented to cabinet-level government officials, as well as bilateral and multilateral donors in Washington, DC, and around the world. My work has received press attention from news outlets that include the Boston Globe, the New York Times, National Public Radio, Vox, and the Washington Post. At the same time, I have built close working relationships with technical counterparts in government. Over the past two years, I have co-led the development of

an embedded research "lab" in the Rwanda Ministry of Education, jointly with the government, Georgetown's gui^2de research institute, and Innovations for Poverty Action. This lab has embedded technical staff in the Ministry and will provide the institutional framework for two new studies: a large-scale adaptive experiment evaluating a path to national scale for my previously published work on teacher performance pay, and a study of the mechanism design and consequences in the Ministry's newly adopted centralized assignment of teachers. I also meet weekly with the data science team at the National Bank of Rwanda, whom I have supported in their Covid-19 response and with whom I am currently working on a research project leveraging the National Bank's "big data" to better understand the design, incidence, and impacts of its flagship Covid-response policy. Looking ahead to the next phase of my research, I am excited to leverage these unique collaborative relationships and this newly built research infrastructure to further advance our understanding of the drivers of state effectiveness.

Below, I describe the leading themes of my research in greater detail. First, I discuss my work on personnel management in public service delivery. Second, I summarize my work on the design of effective social safety nets, and their interaction with the external realities of citizen preferences and market failures. I conclude by discussing my newest research projects and the future directions of my work.

1   Personnel management in the public sector

How can developing countries recruit, motivate, and retain effective civil servants?

The capacity of states to effectively implement policies evolves hand-in-hand with the process of economic growth. Nowhere is this more evident than in the education sector, where frequent teacher absenteeism and limited teacher knowledge in many low-income contexts mean that too little learning is produced for the investment in public-sector budgets. Salary expenditures comprise the largest share of developing-country education budgets, and yet there remains much uncertainty regarding how this investment in human resources can be leveraged to improve the skills and motivation of public servants and the outcomes they deliver. This question has motivated my work on personnel management in the public sector, and in education in particular.

My work to date in this area is best represented by a paper on the "Recruitment, effort, and retention effects of performance contracts for civil servants," published in the *American Economic Review* (Leaver et al., 2021). This paper uses a novel experimental design to address a key, under-studied dimension of the use of pay-for-performance contracts in public-sector personnel policies: namely, that these will affect not only the effort levels of existing employees but also affect the composition of the civil service. Academic and policy views have long been divided on this issue. Labor economists have suggested that performance pay might attract more skilled workers, whereas a behavioral-economics perspective emphasizes that such extrinsic incentives might "crowd out" the selection and effort of potential civil servants who are intrinsically motivated to deliver good outcomes. In part because randomized, controlled trials are most naturally applied to study the

impacts of policy variation on the outcomes of a fixed set of individuals, these compositional effects have received relatively little attention since the experimental turn of the "credibility revolution."

I led the design, management, and analysis of a large-scale, two-stage trial to provide the first experimental evidence of these compositional effects of performance pay for civil servants. The opportunity to do so was born out of my sustained engagement as Lead Academic for the International Growth Centre's Rwanda Program—a process that included a white paper written for the Office of the Presidency, a resolution in the National Leadership Retreat, and a pilot year of implementation. Our study first assigned *labor markets* accounting for 60 percent of Rwanda's nationwide teacher recruitment to either advertised pay-for-performance or fixed-wage contracts. We then traced new teachers to the schools in which they were posted, where a second, incentive-compatible randomization reassigned the contracts under which teachers worked. This design allowed us to estimate a policy-relevant total effect of performance pay systems on the learning value teachers add in the classroom, as well as to decompose this into its compositional and effort-margin components. The total effects of performance pay turned out to be substantial—equivalent to approximately an extra year of status-quo learning. And even though teachers recruited under performance pay contracts behave more selfishly in lab-in-the-field measures conducted at the beginning of their placements, the compositional effects we identify account for a quarter of the total, positive effect of performance pay on student learning. This provides strong evidence against the concerns that the selection of less intrinsically motivated teachers would undermine the learning impacts of performance pay systems.

My descriptive work on "Teacher turnover in Rwanda" (Zeitlin, 2021) surfaces an issue that receives little attention relative to its potential importance for the functioning of personnel systems in civil service bureaucracies. Building a matched, administrative dataset that enables for the first time the trajectories of Rwanda's teachers nationwide to be traced over three years, I document key features of teacher turnover. Rates of turnover are high: 20 percent of teachers separate from their jobs annually, with 11 percent leaving the public sector altogether, while slow replacement processes leave schools scrambling to hold together a patchwork of teaching assignments. And yet, to indicate just how understudied this phenomenon is, the World Bank's flagship 2018 *World Development Report*, a 216-page compendium on education policy in low-income countries, does not discuss the turnover of teachers at all. This work raises the importance of teachers' connections to their jobs as a policy concern in Rwanda, and as a determinant of civil service effectiveness more generally. This has laid the foundation for a theme of my forward-looking research agenda on human resource systems in that country and beyond, as described below.

The effectiveness of accountability reforms hinges on policy design tradeoffs made when these reforms are taken to scale. Paralleling my experimental work in Rwanda, my work on the "Big Results Now" nationwide education reform in Tanzania speaks to these challenges (Cilliers et al., 2021). My coauthors and I studied the impacts of a school ranking system that attached reputational incentives to schools' test scores. We show that even such 'soft' incentives can improve school performance for those schools that it exposed as under-performing, particularly those at the

bottom of the published ranking in their districts. But such incentives come at a cost. The same under-performing schools obtained improvements in average test scores, in part, by inducing the exit of low-performing students. Public accountability is a double-edged sword.

While my recent work has focused on *top-down* systems of accountability, two previous papers, based on successive field experiments in Uganda, examine how systems of accountability may be strengthened locally, from the *bottom up.* These papers were inspired by a collaboration I developed with the Economic and Policy Research Centre in Uganda. In a paper published in the *Journal of Public Economics* (Cilliers et al., 2018), I studied a pilot program that uses mobile technology to link head teacher reports of their teachers' absenteeism to bonus payments for those teachers. We find that relative to unincentivized local monitoring, financial incentives reduce the accuracy of head teachers' reports. Nevertheless, teacher presence does improve in response to the incentives, with students' likelihood of proceeding to the next grade improving as a result. The projected future earning gains of these students arising from increased student attainment mean that financial incentives are fiscally neutral, as they could be paid for by the future tax revenue they induce.

That paper builds in turn on an earlier experiment that uses only community pressure to address absenteeism and other barriers to learning (Barr et al., 2012). Here we combine a field experiment with lab-experimental measures of mechanisms to show that such bottom-up accountability measures rise or fall based on the extent to which they overcome collective action problems among local stakeholders. Taken together, these papers challenge a simplistic principal-agent lens for understanding learning failures, emphasizing the mechanisms of strategic interaction between the preferences and incentives of teachers, administrators, and schools.

2   Designing effective social safety nets

> *How should developing countries design policies to support the livelihoods of the poorest among them?*

To deliver inclusive growth, low-income countries must not only build capable bureaucracies but must also design effective social safety-net programs. How to do so, and in particular the extent to which such programs can rely on markets to serve the poor, is the second substantive theme of my research.

In two related projects, I have developed the idea of using unconditional cash transfers as a benchmark against which to gauge the cost-effectiveness of social safety net programs. It is an elementary premise in economics that, in the absence of market failures, behavioral biases, or intra-household conflict, there is no better way to improve welfare than a cash transfer, and the recent technological advance of low-cost mobile money in many developing countries makes this a real policy option. At the same time, such market failures are characteristic of many low-income economies. This leaves it an open question whether the overhead-heavy, bundled, in-kind programs that are typical of much foreign aid will deliver better value for the poor than cash transfers, which rely on the ability of the poor to use markets to achieve welfare gains. Comparing the

outcomes of these two modalities not only provides a standard against which in-kind programs can be benchmarked, but also informs us about the nature of the constraints faced by the poor.

In McIntosh and Zeitlin (2022), published in the *Journal of Development Economics*, we compare a USAID-financed employment program for unemployed youth with low-cost cash transfers delivered by mobile phone. The combination of a young population and high youth unemployment rate, together with the fact that programs like the one we study receive more than a billion dollars in donor funding across the developing world each year but deliver uncertain returns, make this an important applied-science question. Furthermore, from a basic science perspective, this study tests two hypothesized constraints to productive employment in a low-income setting: money versus knowledge. To do so, we develop a methodology for comparing these alternative programs at equivalent costs. We find that, in spite of substantial impacts of the in-kind program, cash transfers deliver superior outcomes across a range of measures of economic standing and psychological well-being.

That project follows a parallel earlier benchmarking trial, also in Rwanda, which looked at the benefits of cash relative to a USAID flagship program of in-kind support for child and maternal nutrition and health (McIntosh and Zeitlin, 2021). This was an interesting case for comparison, both because the in-kind program we study and cash transfers have demonstrated, plausible paths to impacts on shared outcomes such as child nutrition and growth, and because of the scale of resources—approximately 400 million dollars annually at USAID alone—invested in this type of programming. Understanding whether market failures justify such bundled, overhead-heavy programs that constrain recipient choices has substantial policy implications, over and above the social-scientific questions it raises. These projects have challenged prevailing approaches to the delivery of aid in two of its core domains, receiving substantial attention in national media outlets[1] and fostering an active policy discussion around the scope of cash transfers as a standard for the efficacy of programs in the USAID portfolio.[2]

The effectiveness of cash transfers relative to in-kind interventions depends on the effectiveness of markets. In two other papers, I have studied the institutional foundations of markets that serve the poorest. In Dercon et al. (2019), we investigate a puzzle: low take-up of health insurance precisely among the vulnerable and risk-averse populations who would seem to need it the most. Combining a theoretical model with data from a field experiment and a behavioral lab experiment conducted among tea farmers in Kenya, we argue that limited trust in the enforceability of these insurance contracts constrains insurance demand. A structural model allows us to estimate the welfare losses associated with foregone insurance. We find the costs of limited trust to be substantial.

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[1]"A new study from Rwanda is the latest evidence for just giving people money", *Vox*, September 15, 2020." "Is cash better for poor people than conventional foreign aid?" *New York Times*, September 11, 2018; "Researchers tested conventional foreign aid against cash in Rwanda. Cash won." *Quartz*, September 13, 2018. "Which foreign aid programs work? The U.S. runs a test—but won't talk about it." NPR *All Things Considered*, September 14, 2018. "Google-funded study finds cash beats typical development aid." *WIRED*, September 14, 2018; "The small study in Rwanda that could change the way that the US does foreign aid." *Vox.com*, September 23, 2018; "Foreign aid as a cash-only transaction? It's worth a try." *Washington Post*, September 26, 2018.

[2]See USAID's description of this research program here: https://www.usaid.gov/evaluation/cash-benchmarking-new-approach-aid-effectiveness.

In a study published in the *Journal of Development Economics* (Ayalew et al., 2016), I study another barrier to making markets work for the poor: the lack of effective property rights. We show that when states resolve the coordination problem of land planning, residents of unplanned settlements are willing to pay for land titles. Moreover, we find that even small price incentives encourage co-titling arrangements that provide legal protection for women's rights to land. Taken together, these studies suggest that state investments in the basic institutional underpinnings of the market may have high returns for the poor.

3   Research directions and pipeline

In ongoing and future work, I am building on my investments in relationships and research infrastructure to further study the broader determinants of public servant productivity and the design of effective social safety nets for the vulnerable in low-income countries.

Personnel economics and state capacity at scale

Two streams of ongoing work on this theme build on my investments in relationships in Rwanda's education sector, which, jointly with Innovations for Poverty Action, has led to the inauguration of a policy "lab" that will leverage administrative data to learn about the impacts of personnel policies. Going forward, my work in this area will investigate the consequences of personnel policies at scale, and the design of placement mechanisms to harness broader drivers of teacher motivation to improve learning outcomes.

First, I have recently led successful "Transition to Scale" funding proposals at France's Fund for Innovation in Development and USAID's Development Innovation Ventures (with Leaver, Ozier, and Serneels). These will support a series of adaptive experiments to address the question of how teacher incentive contracts can be scaled within government systems. This three-year program of research will generate new insights into how contractual designs shape the response of actors within public education systems.

Second, with Allende, Athey, and Neilson, I am beginning a program of study on the centralized assignment of teachers in Rwanda. This builds on technical advice that I have been providing to that government over the past two years as they implement a new centralized assignment policy. This work will shed light on how public servant preferences not just over salary terms, but over the full range of job features, shape their decisions to accept, work hard at, and remain in positions. By collaborating with the Government of Rwanda on the design and implementation of its hiring policies, and taking advantage of investments that create rich administrative data, this work will examine how the mechanisms of teacher placement can be leveraged to improve job attachment, intrinsic motivation, and learning outcomes.

Methodologically, this interest in impacts at scale is informed by ongoing work on the fiscal capacity of the state. With Eissa and Gerard, I have undertaken a randomized, controlled trial of tax enforcement policies implemented in the retail sector by the Rwanda Revenue Authority. A novel feature of this study, which speaks to questions of incentives and scale more generally, has been

to build experimental variation in the saturation of treatments among a network of interconnected retail firms. This design will allow us to speak to the extent to which policy-induced incentives for individual firms interact with the conditions faced by competitors in their network.

Social safety nets for the vulnerable

In the next phase of my research, I will extend my work on the design of social safety nets to focus increasingly on those that serve the most vulnerable populations, and on those displaced by conflict or climatic change in particular. Three ongoing projects exemplify this research direction.

First, this year I have launched a five-year, multi-country collaboration with the International Rescue Committee and author teams that span several institutions and disciplines to study interventions seeking to improve refugee social and economic integration. The Uganda trial is joint with co-investigators Baseler, Ginn, and Kasirye; the Kenya trial is joint with Khan and Levy Paluck. These parallel projects will draw insights from both economic theory and social psychology to shed light on how to alleviate both economic and social barriers to refugee integration. Second, in work with Cilliers and Jack, I am studying how agricultural insurance contracts may be designed and marketed to protect small farmers against weather risk in a context affected by climate change. Third, a collaboration with the Data Science team at the National Bank of Rwanda is using large-scale administrative datasets and machine learning techniques to analyze the impacts of the Government of Rwanda's leading Covid recovery policy, the Economic Recovery Fund. This latter project embodies an institutional partnership to use the increasingly rich administrative data available in developing countries, together with cutting-edge econometric and machine-learning techniques, to shed light on policy impacts.

Taken together, my research program reflects a track record of using field-experimental methods to gain new insight into questions of state capacity and social protection in low-income settings. To do so, I have built relationships with government and civil society partners that enabled randomized controlled trials to shed light on accountability systems in the delivery of education and on the design of social safety nets in contexts of market imperfections. Going forward, these investments will allow me to address questions of continued policy urgency and scientific importance: how can developing-country governments manage their most valuable resources to invest in human capital and to protect the vulnerable against shocks.

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