Research and Teaching Statement July 2020

Jonas Hjort
Associate Professor of Economics, Columbia Business School
www.jonashjort.com

This statement gives an overview of my research and briefly describes my teaching and other service.

1. Research

I am a development economist who studies private firms and public-sector organizations. My work analyzes what drives organizational performance in economies with substantial distortions; in particular, how organizational performance interacts with three specific frictions often seen in poor countries – incomplete contracting and the resulting reliance on relationships; high information and trade costs; and limited state capacity.

The first branch of my research investigates how *relationships* – links between individuals, between firms, and between individuals and firms – shape productivity and other dimensions of firm performance. In less-developed regions of the world, formal contracts are typically hard to write and enforce. In such an economic environment, relationships often uphold or hamper economic activity. I study both relationships within and between firms, thus helping to bridge the two halves of the field of organizational economics. Some of my work supports the view that "substantially the same factors that are ultimately responsible for market failures also explain failures of internal organization" (Williamson, 1973: 316). Two of my papers on relationships for example show how ethnic divisions lead to misallocation and lower value creation both in factory production lines and stock market investment in firms in Kenya. In another paper, my coauthors and I study how manufacturers achieve export-grade output quality when input quality cannot be controlled through contracts. We show that, in Peru, they do so by changing their relationship with – vertically integrating – suppliers.

The second branch of my work examines how organizational performance evolves when globalization alters *information and trade costs*. Over the past 30 years, developing countries have become integrated in the global economy as a result of reduced trade and information barriers and opening up to foreign direct investment. These reductions in trade costs have significant implications for firms. In this branch of my work I focus mostly on labor-related consequences – and measures – of firm performance: jobs and wages. For example, I have studied how access to fast Internet affects job creation in Africa and how multinationals from richer countries set wages and organize production in poor countries.

In the third and last part of my research, I study *organizational performance in the public sector*. To grow their economies, countries need an effective state, and both the "state enterprise" as a whole and its underlying public entities are organizations. The themes I study in this part of my research – such as labor productivity in the bureaucracy and how greater access to information affects state leaders' decisions – thus often resemble public sector analogues of similar themes from my work on firms.

Using theory and experimental and from various sub-fields – including labor, organizational, and behavioral economics – I provide rigorous empirical evidence on long-standing theories of organizational performance from "natural" settings. Most of my work uses quasi-experimental methods and existing firm and administrative data that have not previously been accessed by researchers. I have also implemented large-scale randomized-controlled trials (RCTs) with and on organizations.

My research has received attention for its contributions to development economics both among academics and policy-makers. Several of my papers have won high-profile "best paper" awards, and I have raised more than USD 750,000 in grant funds from external sources. My work has been featured in media outlets such as *The Economist*, *NPR Planet Money*, *Le Monde*, and *Folha* (Brazil's biggest newspaper), and appears to have influenced priorities at major institutions such as the World Bank, USAID, and the Gates Foundation.

1.1 Relationships and organizational performance

1.1.1 Ethnic divisions in firms and in markets

My paper **"Ethnic Divisions and Production in Firms"** [1], published in the *Quarterly Journal of Economics* in 2014, addresses a longstanding question in development economics: why ethnically heterogenous countries tend to be poorer. Prior investigations had focused on politics and the public sector. I hypothesized that adverse relationships between ethnic groups might also directly lower organizational performance – productivity – in the private sector if firms or workers ethnically discriminate. The possibility of discrimination that is costly to the discriminator – animosity – goes back to Becker (1957). Many economists – most famously Arrow (1973) – expect competitive forces to eliminate such economically self-harmful behavior, but estimating the costs of discrimination had proven difficult to do outside of the lab.

To test my idea, I use data from a large flower-packing factory in Kenya. Production took place in three-person teams, wherein a "distributor" allocates inputs to two "finishers" whose output I observe. The downstream workers were paid based on their individual output, while the distributor was paid based on total team output. Distorting input allocation because of ethnic animosity will lower the distributor's own pay, but favoring coethnics may also increase output. The paper begins with a theoretical framework that distills this insight.

At the factory, work-weeks were staggered. When a worker left for her leave, a returning worker took her place. This generated quasi-random variation in team composition that allows me to establish the following. Upstream workers lower team output and own pay by misallocating inputs when one or both finishers are of a rival ethnicity. Such discrimination worsens during an early 2008 period of increased ethnic strife in Kenya. When the factory begins paying *downstream* workers based on team output, distributors stop misallocating inputs *across* the two (but continue to discriminate "vertically"). Animosity (or "taste-based") discrimination theories predict these findings, but they are hard to reconcile with alternative forms of discrimination.

This paper identifies and explains an adverse effect of ethnic divisions on productivity and incomes; provides some of the first direct evidence consistent with social preferences from a natural setting; shows how exposure to conflict shapes discrimination; and documents how incentive systems mediate the ultimate economic impact. Other researchers have continued to study both the general theme of ethnic divisions and organizational productivity, as well as a set of more specific themes that emerge in my paper. These include the output costs of horizontal input misallocation; how macro-level conflict affects workplace discrimination; and motivations underlying discrimination inferred from the discriminator's costs of discriminating.

The paper was awarded the 2013 CESifo Prize for best paper in Applied Microeconomics, and is taught in PhD Economics courses in leading departments including University of Chicago, Harvard, LSE, MIT, and U.C. Berkeley. It was cited prominently in Azulai et al.'s (2014) review article on "State Effectiveness, Growth, and Development"; Bertrand and Duflo's (2017) survey of field experiments on discrimination; Collier's (2017) review article on "Culture, Politics, and Economic Development"; DellaVigna's (2018) handbook chapter on structural behavioral economics; Kremer, Rao and Schilbach's (2019) handbook chapter on behavioral development economics; Shayo's (2019) review article on "Social Identity and Economic Policy"; and Bandiera et al.'s (2019) review article on "The State and Economic Governance". The OECD also cited the paper in its 2018 "International Diversity Forum".

My QJE 2014 paper studies discrimination within a firm. Quantifying *market*-wide economic impacts of adverse relationships between ethnic groups – the focus of Arrow's skepticism – helps us understand the consequences for society and the form and limits of market forces' disciplining potential. I attempt to do so in a new follow-up paper, **"Ethnic Investing and the Value of Firms"** [2] (revise & resubmit at the *Journal of Political Economy*), with Changcheng Song and Chris Yenkey.

We examine ethnic relationships that are external to the firm: those with small investors. To do so we analyze data on the universe of transactions on Kenya's stock exchange (the NSE) over five years. The data include investors' last names, from which investor ethnicity can be inferred. We define the ethnicity of a *firm* as that of its CEO, or alternatively the ethnic composition of its board of directors.

We first show that, in Kenya, a given investor invests significantly more in a given firm when the firm is run by a coethnic CEO/board. Exploiting changes in firms' ethnicity resulting from CEO/board turnover allows us to isolate

the effect of coethnicity itself. The existing literature on discrimination – including my earlier paper – in contrast capture responses to coethnicity combined with other ways in which coethnics tend to "match".

Next we show that investors discriminate despite earning lower risk-adjusted returns on "coethnic investments". To quantify expected value creation in counterfactual no-discrimination scenarios, we relate the observed stock market valuation of each firm to its pool of *potential* coethnic investors. We do so by exploiting abrupt changes in which particular investor group makes up a given firm's coethnic investor base. These arise from CEO (ethnicity) turnover. Our estimates imply that investors' misallocation of demand massively lowers total value creation and the size of listed Kenyan firms. This indicates that supply-side responses (such as firms switching to CEOs from a bigger ethnic group), arbitrage, and other market responses are too small in magnitude to offset the economic costs of ethnic discrimination by investors.

We have presented this paper at many leading departments and conferences. Together, my QJE 2014 paper and our follow-up paper document significant economic costs of ethnic discrimination in the private sector.

1.1.2 Vertical production chains and organizational performance

In my QJE 2014 paper I study how ethnic relationships between workers on a vertical production line influence the total quantity a Kenyan plant produces. Modern production often takes place in vertical value chains encompassing multiple firms. In a more recent paper, **"Vertical Integration, Supplier Behavior, and Quality Upgrading among Exporters"** [3] (*Journal of Political Economy*, 2020), my coauthors and I study downstream manufacturers' choice of relationship form with upstream suppliers – a classical theme in economics (Holmstrom and Milgrom 1991, Holmstrom 1999, Baker et al. 2001, 2002). We show how output quality incentives affect this choice when information frictions complicate contracting with suppliers. This paper is joint with Chris Hansman, Gianmarco León, and Matthieu Teachout.

Firms in developing countries often benefit from producing high-quality products that can be exported to quality-sensitive foreign markets. This typically requires high quality inputs, but input quality can be hard to measure and contract over. We hypothesize that, when suppliers multitask, firms choose to vertically integrate in order to produce higher quality products. We use a stylized framework to illustrate the intuition: when independent suppliers have alternative buyers that value input quantity the most, they may take quantity-increasing actions that are harmful to quality-oriented manufacturers' input quality.

The Peruvian fishmeal manufacturing sector is well-suited for testing our hypothesis. It is supplied by one of the world's largest fisheries. Unusual data on its entire chain of production – all manufacturer-supplier transactions; direct measures of output quality; and regulatory GPS tracking of fishing boats that can be used to measure supplier behavior – are available. Additionally, characteristics of the industry map directly to the seminal theoretical work we build on: fish quality is difficult to observe and contract on, and independent suppliers can sell to many manufacturers. Finally, variation in the fishing quotas of other countries that export fishmeal generate quasi-random variation in the quality premium (the relative price of high-quality fishmeal).

The paper's three main findings provide support for our hypothesis and the underlying intuition. First, manufacturers are more likely to integrate suppliers when the quality premium rises, and firms with more to gain from upgrading quality respond more. Second, a given supplier changes its behavior consistent with attempting to deliver higher-quality (but lower-quantity) inputs to a given manufacturer once integrated. Third, greater weather-induced use of integrated suppliers increases output quality.

Our paper bridges the literatures on firms' choice of organizational structure and quality upgrading for the first time, and provides a direct test of the classical theories linking organizational structure and supplier multitasking. It won the "Best Conference Paper" award at the Society of Institutional and Organizational Economics' 2018 annual conference in Montréal, where 180 papers were presented, and is cited in Atkin and Khandelwal's (2020) survey of "How Distortions Alter the Impacts of International Trade in Developing Countries" and in Ménard and Shirley's (2018) book "A Research Agenda for New Institutional Economics".

Input-output linkages in the economy are at the center also of an earlier paper titled **"Interlinked Firms and the Consequences of Piecemeal Regulation"** [4] (*Journal of the European Economic Association*, 2019) that

coauthors Chris Hansman and Gianmarco León and I wrote using data from the same setting. In this paper we focus not on information constraints facing downstream firms, but on information constraints facing *regulators* when sectors are interlinked. Similarly, the dimension of organizational "performance" we focus on is not manufacturers' output quality, but externalities they generate.

Most regulations focus on particular firms and a specific externality, ignoring the vertical and horizontal links that connect sectors in the economy. The Peruvian fishmeal manufacturing industry offers an interesting setting to investigate the consequences of such "piecemeal" regulation. It features two textbook externalities: over-extraction of fish by upstream fishing boats and air pollution from downstream fishmeal manufacturers. We study the 2009 introduction of individual property rights over fish. This is considered an "optimal" policy for preventing over-extraction, but it ignores the link between fishing boats and the manufacturing plants they supply. We first use a model to illustrate the simple but general point that targeted firms' response can increase externalities generated elsewhere in the economy. Then we show empirically that the 2009 reform, while stemming over-extraction, also shifted the time profile of production upstream and, in turn, downstream. This dramatically increased the health impact of air pollution from downstream plants, causing 55,000 additional local respiratory hospital admissions per year. This finding and the paper's auxiliary results have important implications for the regulation of firms and sectors that operate as part of a production chain.

1.1.3 Summary: Relationships and organizational performance

Section 1.1 has detailed my work on relationships – between co-workers, between investors and firms, and between firms themselves – and organizational performance. I am optimistic about the future of this line of research. The evolution of the global economy makes understanding production chains ever more important (as evidenced by the World Bank's choice of topic for the 2020 World Development Report: "Global Value Chains: Trading for Development"), and production chains fully or partly located in developing countries tend to be made up of relationships. I am continuing to develop new projects on this theme. In an early-stage project, Francesco Amodio, Mark Bamba, Nicolas de Roux, and I are estimating the substitutability of different types of foreign suppliers and customers for Colombian firms. To do so we use uniquely detailed Colombian custom and firm-level data, and worldwide data on natural disasters affecting the foreign trade partners.

1.2 Globalization, information and trade costs, and firms' labor market behavior

1.2.1 Connectivity and organizational performance

In the second branch of my research I examine how economic connections with the rest of the world and the underlying information and trade costs affect organizational performance – in particular firms' labor market behavior – in developing countries. This area of research is exciting both from a theoretical perspective – standard economic theory predicts much greater employment growth in poor countries than we observe so we need to understand why that is – and from a policy perspective, that is, because of the importance of stimulating job creation and wage growth in poor countries. The rapidly growing literature on labor issues in developing economies suggests that other researchers agree. Several themes from the first branch of my work continue through this second branch.

Like the analysis of Peruvian exporters' strategies for supplying quality-sensitive foreign markets in "Vertical Integration,…" (see section 1.1.2 above), **"The Arrival of Fast Internet and Employment in Africa"** [5] (*American Economic Review*, 2019), coauthored with Jonas Poulsen, also starts from globalization-induced changes in firms' potential "reach". Why recent globalization appears not to have benefited poor workers in developing countries – the locally abundant factor – to the extent that traditional trade theory predicts is a long-standing puzzle in economics. Before our paper, "computerization" was thought to be a key part of the explanation. ICT technologies had been shown to be skill-biased and to help explain increasing inequality in rich countries. However, there was no direct evidence on their average and distributional economic effects in poor countries' labor markets.

Our paper makes progress by exploiting the arrival on Africa's coast of 10 submarine Internet cables in the 2000s and 2010s. They reached different countries sequentially, in a geographically determined order. We estimate

the impact of access to fast Internet by comparing "connected" individuals and firms that are near the terrestrial cable network to others before versus after the submarine cables greatly increased its capacity.

Using survey data from 12 countries, we establish three findings. First, the (relative) probability that a connected individual is employed increases by 6.9 and 13.2% in two groups of countries covered by multi-country surveys, and by 3.1% in South Africa, when fast Internet becomes available. This is not due to displacement of jobs in unconnected areas. Second, the overall impact on employment is driven by increased probability of being employed in a position belonging to a skilled occupation, while the probability of holding an unskilled job is statistically unaffected. Finally, we find that *employment inequality* – the relative probability of employment across the educational attainment range – if anything falls with fast Internet in Africa.

To begin to understand these impacts, we use firm-level data. We structurally estimate how Ethiopian manufacturers' production function changes with fast Internet, finding higher firm-level but not higher labor productivity. This could be because fast Internet allows firms to produce higher quality products or secure contracts more easily. (I investigate the latter possibility in follow-up work discussed below). We also document a large increase in net firm entry in South Africa, notably in sectors that use ICT extensively. Finally, we use World Bank data on firms in six African countries to show that firms appear to export more; communicate with clients online more; and train employees more when they get access to fast Internet.

In sum, our AER 2019 paper establishes that the slower-than-expected economic progress of poor workers in Africa during the last few decades does not appear to be due to the factor bias of new technologies like fast Internet. Labor market responses of the magnitude we document point towards feasible policy options with considerable employment-creating potential in Africa, such as building more Internet infrastructure or better connecting different African countries' terrestrial cable network network.

Our paper appears to have influenced policy decisions already. It was prominently cited in World Bank Chief Economist Pinelopi Goldberg's blog-post on the bank's "Moonshot Africa" initiative to "digitally connect every individual, business and government in Africa by 2030"; in World Bank board-level budget allocation discussions (according to its Infrastructure Vice Presidency); and in the bank's yearly flagship report for 2020 on "Global Value Chains: Trading for Development". The paper was also cited first among the evidence-base that led to the Gates-funded Pathways to Prosperity Commission at Oxford University (Phillips, 2020), and as part of the evidence-base for USAID's 2020-2024 Digital Strategy and CDC Group's (the U.K. government's Development Finance Institution) investment in fiber-optic Internet cables in Africa and the Rockefeller Foundation's "Digital Jobs Africa Initiative"; in the "Financing for Sustainable Development Report 2020" of the U.N. Inter-agency Task Force on Financing for Development; in the U.N. agency UNCTAD's flagship report on "Trade and Development" in 2018; and in evidence provided to the U.S. International Trade Commission on "U.S. Trade and Investment with Sub-Saharan Africa: Recent Trends and New Developments". The paper was covered in *The Economist*, *Le Monde*, and other major media outlets, and is cited in Atkin et al.'s (2019) review article on "Firms, Trade and Productivity" and in Papaioannou and Michalopoulos's (2019) survey "Spatial Patterns of Development" for the Annual Review of Economics.

Existing research indicates that firms and workers in developing countries benefit significantly when firms export. The impact of fast Internet on exporting we document in our AER 2019 paper is thus important. It suggests that African firms whose products have sufficient "appeal" can and do succeed at selling to foreign consumers once they have the technological means to market their products. I investigate this possibility from a different angle in a new follow-up paper titled **"Informational Barriers to Market Access: Experimental Evidence from Liberian Firms"** [6], coauthored with Vinayak Iyer and Golvine de Rochambeau.

We hypothesize that many productive firms in developing countries stagnate due to informational barriers to accessing existing demand. We thus measure organizational performance not in labor markets, but in the extent to which a firm wins desirable contracts. To investigate, we gave a subset of established Liberian firms the opportunity to participate in a training program through a randomized-controlled trial. The program exclusively teaches how to bid on large buyer-contracts that are awarded through a formal procurement process. We find that, on average, the program increases the number of bids firms submit; the total number and quality of contracts won; and the number of contracts won through other channels than a formal bidding process. These impacts are much larger for firms that use the Internet at baseline. We interpret our findings through a simple

theoretical framework of auctions with asymmetric firm entry costs. In the model, a "keys-to-the-door" training program helps firms win more contracts by boosting their ability to "appeal", and firms that face lower costs of finding appropriate contracts – e.g. via the Internet – benefit more. We provide support for this interpretation by exploiting variation over time in the share of tenders for contracts that are published online. Our results suggest that helping firms overcome informational barriers to accessing demand and enhancing their access to ICT technologies may prove an especially powerful policy combination in Africa.

1.2.2 Multinationals' wage-setting and job creation poor countries

The papers discussed in section 1.2.1 examine how changes in connectivity affect organizational performance and job creation in Africa. However, the world economy is already globalized: goods can be transported across continents and information exchanged at low cost. A core tenet of traditional economic theory is that firms should then locate jobs where wages are low. The moderate extent to which firms do so suggests that wages in poor countries may be too high for job creation there to be profitable.

In a recent paper titled **"Across-Country Wage Compression in Multinationals"** [7] (revise & resubmit at the *American Economic Review*), my coauthors Xuan Li and Heather Sarsons and I hypothesize that wage-setting procedures can pull firm-wide wages in multi-establishment firms towards the level that prevails at headquarters. To investigate, we focus on a canonical example of high-wage firms with particular relevance for poor countries: multinationals. We use an unusual dataset on what 1,070 large multinationals pay workers employed in given position around the world.

We first show that changes in the wage a given multinational pays workers in a given job are highly correlated across countries the employer operates in. Multinationals also transmit *externally imposed* changes in their headquarter wages to their foreign establishments, pointing towards a causal relationship. In our analysis the sources of these "headquarter wage shocks" are changes in headquarter country minimum wage laws and appreciations/depreciations of the headquarter country's currency.

We next show that the employers that anchor their wages to the headquarter are a particular group: those headquartered in inequality-averse countries, as measured by sociologists. Lastly we use individual-level employment data from Brazil to show that multinationals with different "wage cultures" organize production differently. The multinationals that anchor-to-the-headquarter fire more low-skill workers and hire fewer new workers in Brazil after a wage increase originating in changes in wages at the headquarter.

Our analysis contributes to a recent but growing body of work documenting uniformity in multi-establishment firms' decisions across starkly different contexts. We have presented the paper at many leading departments and conferences.

The patterns we document in "Across-Country…" suggest that high wages may be an important part of the reason why most production is done by self-employed workers or in small, single-establishment firms in poor countries. In rich countries, production is instead dominated by large multi-establishment firms that delegate significant responsibility to managers, business professionals, and administrators (hereafter, "MBAs"). Recent work suggests that the owner-manager structure prevents firms in poor countries from growing (Bloom et al., 2012). Coauthors Hannes Malmberg and Todd Schoellman and I investigate this in an ongoing follow-up project titled **"The Missing Middle Managers: Labor Costs, Firm Structure, and Development"** [8]. We combine the dataset from my earlier paper with census data from a wide range of countries. Our key finding is that the level of compensation for MBAs is in line with GDP per worker in rich countries but an order of magnitude higher in poor countries. We interpret this and related findings through an appropriate technology model where firms in each country and industry choose between different firm structures. Our findings imply that reducing the relative cost of MBAs to the levels of rich countries would increase the adoption rate of modern technologies by a factor of 2 to 3.3.

1.2.3 Summary: Globalization, information and trade costs, and firms' labor market behavior

Section 1.2 has detailed the second branch of my research, which focuses on how the rapidly changing economic connections with the rest of the world affect jobs and wages in Africa and other parts of the "global South".

Several themes from the first branch of my work on relationships and organizational performance continue through this second branch of my work. These include how constrained access to information affects organizational performance and allowing for an expanded "type space" of economic agents – such as firms with "wage cultures".

I am continuing to develop new projects on globalization and firms' labor market behavior. These include several follow-up projects using granular geographical data to understand how large short-term impacts of fast Internet such as those documented in our 2019 AER paper arise.

1.3 Organizational performance in the public sector

No known episodes of sustained economic growth have occurred in the absence of an effective state. Both the state apparatus as a whole and its underlying public entities are organizations. The themes I study in the third and last part of my research, on causes and consequences of organizational performance in the public sector, thus often resemble public sector analogues of similar themes from my work on firms.

One recent paper in this branch of my work relates to both *state* and *firm* effectiveness, and how the two interact. **"Strategic or Confused Firms? Evidence from "Missing" Transactions in Uganda"** [9] is coauthored with Miguel Almunia, Justine Knebelmann, and Lin Tian. For taxing firms, most economists favor the value-added tax (VAT), which is now in use in 166 countries. Before our paper appeared, the argument for the VAT was thought to be especially strong in countries where tax enforcement capacity is low. Buyers and sellers both report their transactions under the VAT so firms expecting cross-checks to happen was thought to make the tax "self-enforcing". However, this hypothesis assumes that states have capacity to cross-check reports and that firms are sophisticated enough to infer that cross-checks can occur and to bookkeep accurately.

We use responses to the incentives created by the VAT and its enforcement as a lab for studying firm and state effectiveness. Analyzing economy-wide data from Uganda's VAT and customs records, we first show that sellers and buyers report different amounts in 79% of transactions. In 40% of these, the tax-liable seller reports a *higher* amount. We next develop a methodology that allows us to apportion discrepancies between the buyer and seller. We can then show that the majority of firms respond to ineffective enforcement in the "self-advantageous" manner that economic theory predicts; by overreporting total purchases and/or underreporting total sales so that own VAT liability decreases. However, 29% of firms make consistent, liability-increasing reporting errors. We also show that firms that are self-advantageous misreporters evade significantly less when exposed to greater enforcement capacity, while other firms do not. We do this by examining misreporting on input purchases that pass through customs, where a degree of monitoring happens automatically.

This analysis provides some of the first evidence on the economy-wide extent of strategic behavior among firms. Our estimates imply that, despite the revenue *gain* from firm errors, on net, unilateral VAT misreporting cost the Ugandan government around 4% of total tax revenue collected during 2013-2016, underscoring that the VAT's self-enforcing properties are limited in low state effectiveness settings. Drawing on our work, the Uganda Revenue Authority (URA) in 2018/19 began to develop systems that periodically cross-check firms' VAT reports against their transaction partners. The collaboration with the URA I started in 2014 is continuing.

Some of my research – including the work with URA – appears to have influenced policy practice, while some parts so far have not. This sparked my interested in how political leaders respond to new information. The last few decades have seen an explosion of policy-evaluation research; does such research actually affect the policies governments implement? This particular aspect of the organizational performance of states and polities depends on political leaders' interest in and attention to research; whether they update their beliefs in response to research; and whether they can and do ultimately act on new research findings. These are questions of fundamental importance for the science ecosystem. Coauthors Diana Moreira, Gautam Rao, Juan Francisco Santini and I investigate this in **"How Research Affects Policy: Evidence from 2,150 Brazilian Municipalities"** [10] (*American Economic Review*, conditionally accepted).

We carry out the first experiments with sitting heads of government at the polity level. Collaborating with the National Confederation of Municipalities (CNM) in Brazil allowed us to do so. In a first experiment with 657 municipalities, we show that political leaders display high demand for learning the results of policy-evaluation

research, especially larger-sample studies. We also find that leaders update their beliefs when informed of research findings. Finally, those who believe a policy to be more effective (because of randomized exposure to research findings) have higher demand (willingness-to-pay) for practical policy implementation advice.

To estimate the ultimate impact of research on policy adoption, we use a larger-scale field experiment with 1,818 Brazilian mayors. Our methodology is essentially a public sector analogue to management interventions in private firms (see e.g. Bloom et al. 2013). A randomly-selected group of mayors was invited to attend a research information session. A presenter informed the audience that a set of randomized-controlled trials had found a cheap and easy-to-implement (taxpayer reminder letter) policy to be highly effective. This increased the probability that municipalities had implemented the policy 15-24 months later by a remarkable 32%.

These results indicate that information barriers at the top of the public sector's "production chain" directly constrain policy decisions. This implies that research can help political leaders improve constituents' lives. Our findings also point towards a missing link disconnecting policy practice from research. The paper was prominently cited in Bandiera et al.'s (2019) review article on "The State and Economic Governance", in a Center for Global Development paper on how to spend the billions of pounds the U.K. allocates to "economic development R&D" every year, and in a "Science Meets Parliament" report provided to Canada's parliament by prominent researchers. It was also featured on NPR Planet Money (in an interview with Esther Duflo after her 2019 Nobel Prize), in *Folha*, Brazil's biggest newspaper, and on a World Bank blog.

Another paper of mine on state effectiveness is titled **"Individuals and Organizations as Sources of State Effectiveness"** [11] (revise & resubmit at the *American Economic Review*) and coauthored with Michael C. Best and David Szakonyi. Rather than the policy-making tier at the top of the state apparatus, we here study the effectiveness of the policy implementation tier – the bureaucracy – and the implications for policy design

The paper has two goals: to quantify the importance of the bureaucracy for public sector output and to explore the extent to which policy should be tailored to bureaucratic effectiveness. We focus on a task that is performed throughout the state – the procurement of off-the-shelf goods – and which has a quantifiable output: prices paid. We first develop a simple theoretical framework in which suppliers are more interested in bidding on public procurement contracts that are managed by effective bureaucrats. We use this model to guide our analysis of administrative data covering all public procurement in Russia during 2011-2016.

To estimate the causal impact of individual procurement officers and bureaucratic organizations on performance, we exploit thousands of quasi-experiments that arise when organizations are observed working with multiple bureaucrats and vice versa. To ensure that those being compared are buying the same type and quality of good, we adapt machine learning tools to classify purchases into homogeneous bins using the text of procurement contracts. This allows us to measure performance public sector-wide, which has been difficult to do in existing research.

We find that over 40% of the variation in performance – quality-adjusted prices – is due to the individuals and organizations that manage procurement processes, implying enormous savings from improving bureaucratic effectiveness. To provide a concrete example of the policy design implications, we study the introduction of a bid preference regime favoring domestic manufacturers that is common worldwide. We identify its impact exploiting time- and good-level variation in policy coverage. We estimate cost savings and increased likelihood of domestic producers winning contracts that are considerably larger when the policy is implemented by *less* effective bureaucrats. This is consistent with intuition developed in our model. When state effectiveness is low, baseline supplier participation is low and so is the likelihood that a local bidder who enters has to face a more efficient, foreign, bidder. Bid preferences then have a large impact on participation by locals. Additionally, foreign bidders increase their asking price to offset the bid penalty. We show that the ultimate price effect depends negatively on baseline state effectiveness.

Our paper quantifies the importance of the bureaucracy for public sector output in an apples-to-apples comparison for the first time. It also advances an emerging body of evidence on context-specific policy design – a theme also in my QJE 2014 paper, my JEEA 2019 paper, and our new work on responses to VAT in Uganda. It does so by documenting significant gains from tailoring policy to the effectiveness of the policy implementers. The paper is taught in PhD Economics courses in leading departments including MIT and NYU, and cited in

Gentzkow, Kelly and Taddy's 2019 review article "Text as data" in the *Journal of Economic Literature*. We have presented the paper at many leading departments and conferences.

1.4 Summary and other research

Sections 1.1-1.3 have summarized the three main branches of my research on *Relationships and organizational performance, Globalization and firms' labor market behavior*, and *Organizational performance in the public sector*. I have also done some work on topics other than these, most of which was started during my PhD. This include a paper for a 1st year PhD course on Economic History (on Tswana culture and Botswana's economic success – the paper was published in the *Economic History Review* in 2010); a descriptive study of changes in economic activity in Liberia during the 2014 Ebola outbreak (published in *BMJ: Journal of Epidemiology & Community Health* in 2016); and a health economics paper using Danish data (coauthored with Mikkel Sølvsten and Miriam Wüst – the paper was published in the *American Economic Journal: Applied Economics* in 2017).

I regularly present my research in seminars at leading economics departments and business schools, including Brown, Chicago, Harvard, LSE, MIT, NYU, Northwestern, Princeton, Stanford, Yale, UCLA, UCSD, and Wharton. I have been a regular presenter and discussant at the high-profile meetings of the National Bureau of Economic Research (NBER). I have also presented my research at policy-making institutions such as the IMF, the World Bank, the International Growth Centre (IGC), and the Uganda Revenue Authority.

2. Teaching and Other Service

2.1. Teaching

From 2013 to 2015 I taught the course "The Private Sector and International Development" to MBA and EMBA students at Columbia Business School. I designed the course drawing on similar other courses. In 2015 I taught a shorter version of this course, partly in Mexico City, to student participating in a joint CBS-IPADE degree. Since 2016 I have taught "Managerial Economics" to MBA students, CBS's core microeconomics course. In fall 2019, across 4 sections (each of around 55 students), my average professor rating was 4.4 and my average MBA course rating was 4.3 (each on a 5 point scale). I also teach "Global Immersion: New Growth and Business Opportunities in East Africa", a course that introduces students to East Africa's economy, and one of the most in-demand courses at CBS (as measured by the clearing prices generated by student course bidding). Since some of my own work is on East Africa, I am able to bring in the latest research on these economies and exciting guest-speakers. In spring 2019, the MBA course rating was 4.7 and my professor rating was 4.2. I have also guest-lectured in PhD Development Economics courses taught at Columbia's Economics Department, and in in 2015, I presented a summary of my research at Columbia's Program for Financial Studies.

2.2. PhD advising

I co-advised the following PhD students, most of whom completed their PhD in Economics at Columbia (first job/year of PhD in parenthesis): Jonas Poulsen (Lecturer, Dept. of Economics, Harvard University/2015), David Szakonyi (Post-doc, Harvard Univ. Academy. & A.P., Dept. of Pol. Science, GWU /2016. David turned down an A.P. offer from MIT's Political Science department), Nicolás de Roux (A.P., Dept. of Economics, Universidad de los Andes /2017), Christopher Hansman (A.P., Imperial College Business School /2017), Maria Micaela Sviatschi (A.P., Dept. of Economics, Princeton University /2017), Ashna Arora (Research Director, Crime Lab, University of Chicago), Lin Tian, (A.P., Insead/2018. Lin turned down an A.P. offer from UCSD's Economics department), Golvine de Rochambeau (A.P., Dept. of Economics, Sciences Po/2018), Xuan Li (A.P., Dept. of Economics, Hong Kong University of Science and Technology/2019), Matthieu Teachout (International Growth Centre/2019), David Alfaro-Serrano (Cornerstone Research/2020), Suanna Oh (Post-doc, briq Bonn. & A.P., Dept. of Economics, Paris School of Economics/2020), Yue Yu (A.P., Dept. of Management & Rotman School of Management, University of Toronto/2020). I also coauthored papers with eight of these PhD students.

2.3. Other service

I have served on all Columbia Business School's junior faculty microeconomics search committees during my time here. I have co-organized Columbia's Development Economics and Applied Microeconomics seminars (for external speakers) since 2013, as well as the internal microeconomics faculty lunch workshop at CBS and the Development Economics colloquium for PhD student presentations in the Economics Department most years. I also helped launch a monthly "super seminar" starting in 2019/2020 through which the Applied Microeconomics, Development Economics, Industrial & Organizational Economics, and International Trade seminars jointly host speakers.

I am an affiliated faculty member at Columbia's Economics Department and a faculty affiliate of the National Bureau of Economic Research (NBER) (Development Economics and Productivity, Innovation and Entrepreneurship programs), the Bureau for Research and Economic Analysis of Development (BREAD), the International Growth Centre (IGC), and the Center for Economic and Policy Research (CEPR). I am also an affiliated faculty member at Columbia's Center for Development Economics and Policy and CBS's Chazen Institute, and in 2016 presented my research to the Chazen Institute's board.

I have been the International Growth Centre's (IGC) Lead Academic for Liberia since 2014, and for Sierra Leone since 2018. The IGC is an organization based at the London School of Economics and Oxford University that focuses on promoting cutting-edge research that is relevant to the poorest developing countries. My role is to initiate such research on Liberia and Sierra Leone, connecting researchers and policy-makers.

I have refereed extensively for funding institutions and peer-reviewed journals, including the following (with the number of completed reports in parentheses): American Economic Review (18), Quarterly Journal of Economics (17), Review of Economic Studies (12), Journal of Political Economy (6), Econometrica (1), American Economic Review: Insights (1), Journal of the European Economic Association (10), Review of Economics and Statistics (7), American Economic Journal: Applied Economics (6), American Economic Journal: Economic Policy (4), Journal of Labor Economics (3), Journal of Public Economics (8), Journal of Development Economics (6).

The American Economic Review named me as a recipient of its Excellence in Refereeing Award in 2015.

In 2018 I was invited to present a seminar on "Firms and International Development: Examples from Africa and Latin America" to IMF staff members as part of its in-house economics training program.

3. References

My papers (with co-authors) cited in this statement:

[1] Hjort, J. (2014). Ethnic Divisions and Production in Firms. *Quarterly Journal of Economics*, vol. 129, no. 4, 1899-1946, November

[2] Hjort, J., Song, C., and Yenkey, C. (2019). Ethnic Investing and the Value of Firms. Working paper, Columbia University

[3] Hansman, C., Hjort, J., León, G., and Teachout, M. (forthcoming). Vertical Integration, Supplier Behavior, and Quality Upgrading among Exporters. NBER Working Paper No. 23949. (Forthcoming, *Journal of Political Economy*)

[4] Hansman, C., Hjort, J., and León, G. (2019). Interlinked Firms and the Consequences of Piecemeal Regulation. *Journal of the European Economic Association*, vol. 17, no. 3, June

[5] Hjort, J. and Poulsen, J. (2019). The Arrival of Fast Internet and Employment in Africa. *American Economic Review*, vol. 109, no. 3, 1032-1079, March

[6] Hjort, J., Iyer, V., and de Rochambeau, G. (2019). Informational Barriers to Market Access: Experimental Evidence from Liberian Firms. Working paper, Columbia University

[7] Hjort, J., Li, X., and Sarsons, H. (2019). Across-Country Wage Compression in Multinationals. NBER Working Paper No. 26788

[8] Hjort, J., Malmberg, H., and Schoellman, T. The Missing Middle Managers: Labor Costs, Firm Structure, and Development. Work in progress

[9] Almunia, M., Hjort, J., Knebelmann, J., and Tian, L. (2019). Strategic or Confused Firms? Evidence from "Missing" Transactions in Uganda. Working paper, Columbia University

[10] Hjort, J., Moreira, D., Rao, G., and Santini J. F. (2019). How Research Affects Policy: Experimental Evidence from 2,150 Brazilian Municipalities. NBER Working Paper No. 25941

[11] Best, M. C., Hjort, J., and Szakonyi, D. (2018). Individuals and Organizations as Sources of State Effectiveness. NBER Working Paper No. 23350

Other references:

Arrow, K. (1973). ‘‘The Theory of Discrimination,’’ in Discrimination in Labor Markets, Ashenfelter, O. and Rees. A., eds. (Princeton, NJ: Princeton University Press), 3–33

Atkin, D., Donaldson, D., Rasul, I., Teachout, M., Verhoogen, E., Woodruff, W. (2019). Firms, Trade and Productivity. IGC Evidence Paper

Atkin, D. and Khandelwal, A. (2020). “How Distortions Alter the Impacts of International Trade in Developing Countries”. *Annual Review of Economics*, 2020

Azulai, M., Bandiera, O., Blum, F., Kleven, H., La Ferrara, E., Padró-i-Miquel, G., Tejada, C. M. (2014). State Effectiveness, Growth, and Development. IGC Evidence Paper

Baker, G., Gibbons, R., and Murphy, K. J. (2001). Bringing the Market Inside the Firm? *American Economic Review*, *Papers and Proceedings*. Vol. 90, No. 2, May

Baker, G., Gibbons, R., and Murphy, K. J. (2002). Relational Contracts and the Theory of the Firm. *Quarterly Journal of Economics*. 117(1), 39–84

Bandiera, O., Callen, M., Casey, K., La Ferrara, E., Landais, C., Teachout, M. (2019). The State and Economic Governance. IGC Evidence Paper

Banerjee, A., Hanna, R., and Mullainathan, S. (2013). “Beyond Firms”, in Handbook of Organizational Economics, Gibbons, R. and Roberts, J., eds. (Princeton University Press)

Becker, G. S. (1957). The Economics of Discrimination (Chicago: University of Chicago Press)

Bertrand, M. and Duflo, E. (2017). “Field Experiments on Discrimination”, in *Handbook of Field Experiments, Vol. 1*. Banerjee, A. and Duflo, E., eds., (Elsevier)

Bloom, N., Eifert, B., Mckenzie, D., Mahajan, A., and Roberts, J. (2013). Does management matter: evidence from India. *Quarterly Journal of Economics*, 128, 1–51

Bloom, N., Sadun, R., and Van Reenen, J. (2012). “The Organization of Firms Across Countries”. *Quarterly Journal of Economics*, 127(4), 1663–1705

Card, D., Cardoso, A. R., Heining, J., and Kline, P. (2018). Firms and Labor Market Inequality: Evidence and Some Theory. *Journal of Labor Economics*. 36 (January), pp. 13-S70

Collier, P. (2017). Culture, Politics, and Economic Development. *Annual Review of Political Science*, 20:1, 111-125

DellaVigna, S. (2018). “Structural Behavioral Economics”, in *Handbook of Behavioral Economics, Vol. 1*, Bernheim, D., DellaVigna, S., and Laibson, D., eds. (Elsevier)

Holmstrom, B., and Tirole, J. (1991). Transfer Pricing and Organizational Form. *Journal of Law, Economics, and Organization*, Vol. 7, No. 2

Holmstrom, B. (1999). The Firm as a Subeconomy. *Journal of Law, Economics, and Organization*, Vol. 15, No. 1, March

Kremer, M., Schilbach, F., and Rao, G. (2019). “Behavioral Development Economics”, in *Handbook of Behavioral Economics, Vol. 2*, Bernheim, D., DellaVigna, S., and Laibson, D., eds. (Elsevier)

Ménard, C. and Shirley, M. M., eds. (2018). A Research Agenda for New Institutional Economics, (Edward Elgar Publishing)

Michalopoulos, S. and Papaioannou, E. (2018). Spatial Patterns of Development: A Meso Approach. *Annual Review of Economics*, (10): 383-410

Phillips, T. (2020). “A road-map for digital-led development”, VoxEU, February 5

Shayo, M. (2019). Social Identity and Economic Policy. Annual Review of Economics, Vol. 12

Williamson, O. (1973). “Markets and Hierarchies: Some Elementary Considerations.” American Economic Review 63: 316-25.