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Essays on the Allocation, Coordination, and Selection of Workers

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This thesis studies the determinants and consequences of workers' allocation, coordination, and selection within organizations in countries at different levels of economic development.

The first chapter provides evidence of the critical role of managers in matching workers to jobs within the firm using the universe of personnel records on 200,000 employees over ten years of a multinational firm. Leveraging exogenous variation induced by the rotation of managers across teams, I find that successful managers cause workers to reallocate within the firm through lateral and vertical transfers. This leads to large and persistent gains in workers' career progression and productivity. The results imply that the visible hands of managers match workers' specific skills to specialized jobs, leading to an improvement in the productivity of existing workers that outlasts the managers' time at the firm.

The second chapter continues the study of leadership in a very different context: Myanmar's labor movement. We conduct multiple field experiments by collaborating with a confederation of labor unions as it mobilizes garment workers in the run-up to a national minimum wage negotiation. First, we document that union leaders differ from the other workers along several traits that psychologists and sociologists have associated with the ability to influence collective outcomes. Second, by randomly embedding leaders in group discussions, we find that they help coordinate workers' views to build consensus around the unions' preferred minimum wage levels. Third, by conducting a mobilization experiment that features collective action problems, we show that leaders play a coordinating role also for workers' actions.

The third chapter starts with the fact that women's labor force participation varies widely across countries at every level of development. We ask how this affects gender diversity among employees, gender gaps, and firm productivity using five years of personnel records on over 100,000 employees of a multinational firm combined with the female to male labor force participation rate in the 101 countries where the firm operates. Structural estimates show that in a counterfactual world with no gender-specific barriers to labor force participation, firm productivity would be 32% higher for the same level of employment and the same wage bill. The findings suggest that selection is a powerful lens to understand the link between diversity and productivity.

Chapter 1. Making the Invisible Hand Visible: Managers and the Allocation of Workers to Jobs

Economics studies how to allocate scarce resources. Traditionally, labor economics focused on the labor market, rather than looking inside the "black box" of firms, within which most workers are allocated to jobs. In firms, managers take the place of the price mechanism in directing the allocation of resources (Coase, 1937). In particular, they shape the allocation of workers to jobs through *internal labor markets* (Doeringer and Piore, 1971). Understanding the managers' role in the allocation of workers to jobs is key to understanding why differences in management across and within firms explain an important share of the persistent differences in productivity (Gibbons and Henderson, 2012).

The idea that there are gains from the division of labor with people specializing their efforts across tasks is an old one and among the cornerstones of economics (Smith, 1937). Yet, the matching of workers to jobs as a way to reach an organization's objectives has received little attention. Managers, acting as gatekeepers in internal labor markets (the *bosses*), can play an essential role in facilitating the discovery of workers' unique skills and hence their effective utilization through job allocation.

Studying the role of managers within internal labor markets requires tackling three steps. The first is access to "insider" firm data, which also combines cross-sectional granularity with a sufficiently long time dimension. Second, estimating the added value of managers has proven challenging as measures that identify good managers independently of workers' outcomes are hard to come by. Third, to analyze the impact of managers on workers, one needs to pin down the manager's contribution to the worker's outcomes, which necessitates plausibly exogenous assignment of managers to workers.

With respect to the data, I bring together a rich collection of high-granularity administrative records from a multi-billion euro multinational firm. The data reveal the organization's inner workings over several years and cover the universe of managers and workers in the MNE: more than 200,000 workers and 30,000 managers over the span of 10 years in 100 countries.

To address the first identification step, I advance a new method to identify successful managers based on managers' own promotion speed, as a revealed preference measure of the firm. I refer to them as "high-flyers" to capture those who climb the corporate ladder faster. Specifically, I consider the earliest age a worker is promoted to manager and define a binary measure to classify managers as high-flyers and low-flyers. This results in 29% of managers being singled out as high-flyers.[1]

I tackle the second identification step by leveraging a *natural experiment* created by managers' lateral rotations across teams that are outside of the control of the worker and adopt an event study strategy. These rotations are part of the requirement for the managers' career progression, and anecdotal evidence and empirical tests indicate that they are orthogonal to workers' characteristics. This type of rotation policy is also not peculiar to this firm but rather

[1]The high-flyer status is significantly positively correlated with other measures of ex-post performance such as managers' own performance appraisals as well as workers' upward feedback on the managers' leadership.

common managerial practice among large firms. I conduct an event-study analysis exploiting the workers' first manager rotation and comparing different types of transitions. The results can be summarized in the effects of (i) *gaining a good manager*, i.e., switching from a low- to a high-flyer manager, and (ii) *losing a good manager*, i.e., switching from a high- to a low-flyer manager, relative to switching manager but without changing manager type. I can compare the outcomes of the employees each month leading up to the manager transition date and each month after the transition.

I show that good managers achieve a more productive workforce by creating better matches between the present labor pool and specialized jobs in the firm. In so doing, they have a long-lasting impact on workers' trajectories that outlives their time overseeing the worker.[2] My findings suggest that considerable gains in worker performance stem from efficiently allocating *existing* workers to jobs and that managers' role is crucial in creating more productive worker-job matches, all potentially at little additional cost for the organization.[3] As the managers' influences propagate inside the organization through their subordinates' careers, I demonstrate that they significantly impact firm-level productivity, thus linking individual-level effects to the productivity of an entire establishment.

First, gaining a good manager causes significant worker reallocation to different jobs inside the firm, through lateral transfers (30% higher) and also vertical transfers (40% higher). Examples of lateral moves are transfers from customer service to logistics, from merchandising to sales, or from product development to quality. Moreover, I isolate task-distant transfers as those which represent a major horizontal change in tasks to be fulfilled and find that they increase by 20%. I find no systematic pattern among the moves; they are scattered throughout the organization. The results on the lateral transfers cannot be reconciled with high-flyer managers mainly teaching workers on how to become more productive on-the-job, as that would lead to the opposite prediction on workers' lateral moves.[4]

Second, gaining a good manager also results in an improvement in worker performance and long-run career progression. Seven years after the manager transition, the number of salary grade increases is 0.25 points higher, corresponding to a 30% higher salary. Combining the results on the lateral reallocation with those on pay progression suggests that high-flyer managers facilitate the discovery of workers' aptitudes and spur workers to a higher rate of job changes, which results in workers finding positions that are better matched to their skills. A mediation analysis reveals that 62% of the higher salary grade increases are explained by lateral job changes. This is likely an underestimate of the managers' matching channel since it excludes vertical transfers (as by definition they involve a salary raise) and it also does not consider the gains due to a worker remaining in the current job because it is a good match.

Third, using objective productivity data from sales bonuses on a sub-sample, I show that good managers boost worker performance, rather than inflating pay for the same performance.

[2]Having panel data over several years is essential to be able to evaluate the returns of a worker-job match as they may not manifest immediately.

[3]Matching can be considered a resource-neutral policy when contrasted to the more resource-intense alternatives such as hiring, firing, and training.

[4]I show this formally with a conceptual framework that captures task-specific human capital and learning about innate talents.

I find that workers' sales performance increases by 27% up to 4 years after gaining a high-flyer manager. Additional empirical checks that compare the productivity gains among job moves initiated by a high-flyer with those from job moves initiated by a low-flyer indicate that the performance gains cannot be explained by a treatment effect of transfers by themselves, but rather by good managers causing more productive transfers (i.e., choosing the *right* transfer for the *right* worker in terms of the worker's skill set).

These effects are *asymmetric*. Gaining a good manager has positive effects while losing one has no corresponding negative effects. This indicates that there are long-term benefits of a one-time exposure to a good manager: the gains from a high-flyer manager persist even after a downgrade in a manager's capacity. The asymmetric effects together with the persistence of the results help rule out alternative contemporaneous channels of managers such as monitoring or motivation and support the interpretation of the matching channel as the gains of a good worker-job match do not rely on the co-presence of a good manager. In terms of organizational design, the asymmetries in the results also indicate that it suffices to expose each worker to a high-flyer once as a low-flyer manager cannot spoil away the benefits of a good match created by a high-flyer manager.

I conclude by showing that the good managers' effects are increasing overall profits at the establishment level. I integrate the worker-level records with establishment-level productivity data (output per worker) and cost data (costs per ton), connecting the paths of individual workers to the overall productivity of the establishment. I estimate that the semi-elasticity of output per worker to workers' past exposure to high-flyer managers is 2.03—that is, increasing the exposure to high-flyers by 10 percentage points is associated with an increase in output per worker by 20%. The same semi-elasticity is -1.4 for costs per ton. Taking the price level as given and combining together these two results, the analysis suggests that the high-flyers' effects are increasing profits.

A major question in labor economics is how workers match to jobs and how that determines wages and their evolution over time. Extensive research on labor markets has studied job mobility *between* firms (e.g., Jovanovic (1979); Rosen (1986); Moscarini (2005); Acemoglu and Autor (2011); Bagger et al. (2014); Chade et al. (2017); Card et al. (2018); Lise and Postel-Vinay (2020)). Yet, wage growth and job mobility also happen *within* firms as examined by a literature on internal labor markets, largely theoretical and descriptive (Waldman (1984); Baker et al. (1994a); Baker et al. (1994b); Baker and Holmstrom (1995); Gibbons and Waldman (1999); Kahn and Lange (2014); Pastorino (2019); Huitfeldt et al. (2023); Coraggio et al. (2023)). This is the first paper to study the role of managers in the allocation of workers to jobs within internal labor markets and to show that manager quality is the crucial ingredient needed to create more productive matches between workers and jobs.

My findings also advance our understanding of the impact of individual managers on firm and worker outcomes (Bertrand and Schoar (2003); Bandiera et al. (2007); Lazear et al. (2015); Bandiera et al. (2020); Frederiksen et al. (2020); Hoffman and Tadelis (2021); Metcalfe et al. (2022); Adhvaryu et al. (2022a); Adhvaryu et al. (2022b)). I contribute to this growing strand of research by uncovering the matching of workers to jobs as an important mechanism that determines managers' long-run impacts on workers' careers and overall firm productivity. In so doing, I also bring forth new evidence on the micro-level processes that link individual managers at lower levels of the firm hierarchy to firm-level outcomes. In terms of management practices, this study puts the emphasis on managerial policies governing the allocation of workers to jobs within firms, which have been overlooked by previous research.[5]

More broadly, by providing micro-level evidence on the role of managers in the efficient assignment of workers to jobs, this study speaks to the research on the misallocation of productive inputs and growth: (i) on the mismatch between workers and jobs and its consequences for workers' careers and aggregate output (Hsieh et al. (2019); Guvenen et al. (2020)), and (ii) on the misallocation of productive resources across firms in the economy and the role that the reallocation of factors of production can play in driving productivity growth (Bhagat et al. (1990); Bartelsman et al. (2009); Hsieh and Klenow (2009); Foster et al. (2001); Davis et al. (2014)).

Chapter 2. Union Leaders: Experimental Evidence from Myanmar (with Laura Boudreau, Rocco Macchiavello, and Mari Tanaka)

Social movements have been catalysts for many institutional changes: In the 19th century, the eight-hour day movement, in the early 1900s, the suffragettes, in the 1950s, the civil rights movements, and in this century, the green movement (Della Porta and Diani, 2020), to name but a few. To succeed, social movements must coordinate their members' views and collective actions. Coordinating views requires building *consensus* around common objectives and tactics among diverse members. Once a consensus is built, coordinating actions requires *mobilizing* members to participate in activities that have high private costs and uncertain public benefits (Ganz, 2010). But unlike in more commonly studied organizations, such as firms and bureaucracies, monetary incentives, contracts, and hierarchies are often unavailable to align views and to motivate members in social movements.

In the absence of these organizational tools, *leaders* may play critical roles.[6] Economic theory suggests that leaders may act as coordinators in both consensus building and mobilization (Hermalin, 1998; Caillaud and Tirole, 2007; Dewan and Myatt, 2008; Loeper et al., 2014). To date, however, empirical evidence on leaders' roles in consensus building and in mobilization outside the lab remains scarce due to measurement and identification challenges. On the measurement side, it is difficult to observe many leaders performing the same task. On the identification side, it is difficult to distinguish if a given individual influences others (i.e., is in fact a leader) or if their behavior is simply a more visible emblem of the underlying group

[5] The managerial practices analyzed by previous literature focus on workers' incentives via pay for performance, promotions, and monitoring (Bloom and Van Reenen, 2011). The tools of monetary and career incentives have also been widely examined theoretically and empirically by a prominent strand of research in organizational economics (Holmström (1979); Lazear and Rosen (1981); Lazear (2000); Bandiera et al. (2007); Bandiera et al. (2013); Bertrand et al. (2020)).

[6] We follow Hermalin (2012) and think of leadership as "...the ability to induce others to follow absent the power to compel or to provide formal contractual incentives...A leader is someone with followers, who follow voluntarily."

dynamics—a version of the well-known "reflection problem" (Manski, 1993).

This paper provides the first experimental evidence of leaders' roles as coordinators in both members' views (consensus building) and actions (mobilization) using the burgeoning labor movement in Myanmar as our setting. The movement is broadly representative of the struggles in organizing labor in newly industrializing countries (see, e.g., Visser et al. (2019)). We collaborate with the Confederation of Trade Unions in Myanmar (CTUM), the largest confederation of labor unions at the national level, during the months preceding the revision of the national minimum wage. CTUM represented workers' interests in the national minimum wage setting process. In the run-up to the planned May 2020 negotiations, the CTUM organized weekend sessions with workers employed in 17 garment factories with CTUM-affiliated unions to discuss the minimum wage and to gather systematic information on workers' skills and living costs. We helped the CTUM to organize the discussions and to conduct the surveys, which allowed us to embed multiple experiments to examine (1) whether and how union leaders build consensus around the minimum wage level, and (2) whether and how they mobilize workers to participate in privately costly activities for the common good. In each factory, the union leadership is structured around an elected union president and executive committee that negotiates with the factory management and coordinates activities with the confederation. Below these formal roles, several typically non-elected line leaders (LLs) organize and voice the concerns of other union members. This allowed us to overcome the measurement challenge by observing several union leaders within the same context. We tackled the identification challenge by implementing multiple experimental designs.

The sessions also provided a unique opportunity to characterize the types of individuals who emerge as leaders in labor movements, adding to our scant understanding of selection into leadership roles in social movements. Further, they enabled us to study leaders' roles in the context of a high-stakes, real-world collective action to influence a policy choice with uncertainty about its success—the CTUM's effort to influence the national minimum-wage level—while avoiding many of the risks associated with mobilization around, for example, factory strikes or street protests.

We present three sets of empirical results. We first document that union leaders are distinct from union members and non-members along key traits that psychologists and organizational sociologists associate with the ability to influence collective outcomes (Judge et al., 2002), but that have been less examined within economics. We also find that union leaders stand out on other traits that economists identify as relevant for political selection (Caselli and Morelli, 2004; Dal Bó et al., 2017). Both presidents and LLs are more extroverted, less neurotic, and more conscientious compared to workers. They have greater grit and locus of control; they also have more work experience. In addition, both presidents and LLs are more altruistic, and presidents have higher Raven Scores. Both presidents and LLs earn substantially less, however, compared to workers, both unconditionally and even more so after controlling for demographics, ability, skills, and personality traits. This suggests that, in this context, leadership roles in the union movement come at significant private costs—a view echoed in workers' and leaders' surveys.

We then present results from two field experiments where we focus on understanding how LLs influence workers' behavior. In experiment (1) on consensus building, we randomly embedded leaders in group discussions about workers' preferred and expected minimum wage levels. In groups with leaders, we randomized whether the leader was from the workers' own or a different factory. This allows us to examine the importance of leaders' *social connections* (Bandiera et al., 2009) or their *formal role* (Aghion and Tirole, 1997) in the union in determining their effects. Motivated by the political science literature, we test whether leaders aggregate workers' views and build consensus around the median worker's view (Black, 1958) or whether they align workers' views and build consensus around their unions' views (Lenz, 2012). We find evidence of the latter: leaders increase consensus around their unions' preferred minimum wage levels by 20%. We cannot reject that the effects are the same for own versus external leaders, indicating that leaders' social ties or formal role alone cannot explain the results. We use textual data from discussion transcripts to understand how leaders increase convergence in views among workers and how they impact group dynamics. We find that leaders introduce information to the discussions that helps align workers' views with those of the union. In doing so, they partially crowd out workers' speech. However, we also find that groups with leaders are rated as more active by the field team, and, following the discussions, workers self-reported higher engagement and perception that the group achieved consensus.

In experiment (2) on mobilization, we invited workers to participate in an unannounced survey on living costs. Participation in the survey was a privately costly action that conveyed a public benefit. It was privately costly because it required workers to sacrifice the remainder of their one and only weekend day. It conveyed a public benefit since the CTUM planned to use the data to campaign for its preferred minimum wage level. To mimic the incentives faced by workers when deciding whether to participate in collective actions such as street demonstrations in support of the CTUM's proposed minimum wage level, we induced a strategic complementarity in turnout at the discussion group level. We randomly varied whether workers (i) were invited to the survey by a leader, (ii) were informed about how many discussion group members were invited by a leader, or (iii) were told that a leader would observe their decision to participate.

Again, we find that leaders play a coordinating role: Moving from being informed that a leader would invite one group member to being informed that they would invite all but one group member increases attendance by 38%. This indicates that leaders can be key in selecting and communicating the equilibrium to be played, which involves, in this case, all workers participating in the survey. In contrast, being invited by a leader alone does not increase attendance. Finally, we find suggestive evidence that observation of the workers' choice by a leader increases attendance, and our results are consistent with a signaling channel of leaders as opposed to a sanctioning one.

Finally, bringing together the two experiments, we explore the potentially important link between coordinating views and coordinating collective actions in the context of social movements. We ask: Does conveying the unions' preferences—making clear what the unions are fighting for—and building consensus around these preferences matter for leaders' ability to mobilize workers? We find that it does, supporting the interpretation that achieving consensus by aligning followers' preferences with those of the movement is instrumental for mobilization.

This research contributes to three strands of literature. First, it contributes to an emerging empirical literature on the determinants of social movements' formation and growth (Enikolopov et al., 2020; Manacorda and Tesei, 2020; González, 2020; Dippel and Heblich, 2021; Cagé et al., 2022). We contribute experimental evidence that leaders are an important mechanism to enhance coordination in social movements, both for coordinating members' views and their collective actions; we also provide the first evidence that achieving consensus may be instrumental for mobilization.

Second, it contributes to the literature on leaders' roles in group decision-making and in overcoming collective action problems. A sizable theoretical literature focuses on forms of information provision by leaders who serve to coordinate beliefs and actions (Hermalin, 1998; Caillaud and Tirole, 2007; Dewan and Myatt, 2008; Bolton et al., 2012; Loeper et al., 2014; Akerlof and Holden, 2016). Empirically, the literature is primarily composed of lab experiments (Potters et al., 2007; Komai et al., 2010; Sahin et al., 2015). More recently, a limited number of field experiments have studied leadership in real-world settings (Jack and Recalde, 2015; Englmaier et al., 2022; Antonakis et al., 2022). We contribute by providing evidence on leaders' personal traits and roles in group decision-making and in overcoming collective action problems from experiments with many different real-world leaders. Our experimental designs and data enable us to provide novel micro-evidence on the mechanisms through which leaders influence outcomes in the context of a burgeoning labor movement's effort to influence a high-stakes policy-setting process.

Third, this paper contributes to a growing literature on industrial relations and labor unions in developing countries (Freeman (2010); Tanaka (2020); Boudreau (2021); Macchiavello et al. (2020); Breza et al. (2022); Akerlof et al. (2020); Lin et al. (2019); Corradini et al. (2023)). We provide the first evidence of union leaders' characteristics and how they compare to workers in the context of Myanmar. We contribute experimental evidence that union leaders play important roles in shaping unions' effectiveness in achieving their objectives.

Chapter 3. Gender and the Misallocation of Labor across Countries (with Nava Ashraf, Oriana Bandiera and Victor Quintas-Martinez)

The division of labor inside and outside the home varies across countries and time, but it is always within the confines of norms that assign the largest share of housework to women (Jayachandran (2015); Fernández et al. (2021); Bursztyn et al. (2023)). This under-representation of women in spheres of influence and employment has led to significant efforts in both the private and public sectors to address the gap through extensive diversity initiatives (Bertrand (2011); Olivetti and Petrongolo (2016); Bertrand (2020)). Critics of these initiatives argue that this can encourage a lower-quality bar for minority candidates and, in the corporate world, ultimately be worse for business by hiring or promoting lower productivity candidates. Supporters argue that diversity per se could be beneficial for productivity and profits due, for example, to the nature of the production function or role model effects (Lazear (1999); Athey et al. (2000); Hong and Page (2001)).

In this paper, we examine the relationship between gender diversity and performance in the workplace through the lens of selection. To do so, we combine micro-level variation in earnings and career paths of approximately 100,000 employees at a large multinational company operating in 101 countries, with variation in the barriers that current employees faced when deciding whether to work outside the home. We proxy these barriers with the ratio of women to men in the labor force (henceforth LFPR) in the decade when the choice was made. Since we observe employees of different ages in the firm, we can exploit both cross-country and cross-cohort variation in barriers. Importantly, and as is well known, we observe variation in LFPR even among countries with similar levels of income, thus our measure of barriers does not solely capture the level of economic development.

A simple Roy model of occupational choice illustrates what the correlation between performance in the firm and LFPR at the point of entry into the labor market tells us about selection (Lazear, 2021). The model shows that when gender roles are strong so that women face a high cost to leave the home, only women whose returns are high enough will do so. This implies that the marginal, and hence the average, productivity of female employees is decreasing in the share of women working outside the home. The empirical counterpart of this result is that a negative correlation between women's performance in the firm and LFPR is evidence of positive selection, under the assumption that the relationship between performance (which we do not observe) and pay and promotion (which we do) is orthogonal to LFPR. This assumption is supported by the accounts of the firm's HR managers and is consistent with similarly centralized policies in the sample of 1,213 multinationals analyzed by Hjort et al. (2020).

We establish three facts. First, the variation in the LFPR is correlated with the female share of employees in the firm. In other words, in countries and cohorts with low LFPR, the firm hires fewer women. This is in line with the firm using the same selection process in all countries; that is, they do not employ more pro-women policies in countries where norms keep women inside the home (or vice versa). Second, in low LFPR countries and cohorts, women are over-represented in the highest rungs of the hierarchy and are more likely to be promoted relative to their counterparts in high LFPR countries and cohorts. Relatedly, women are over-represented in the top decile of the wage distribution, and under-represented in the bottom decile, when LFPR is low. This suggests that the women who we observe in the firm in low LFPR countries had the ability to overcome higher barriers, and are thus positively selected. Third, there is a negative correlation between women's average performance and the LFPR. Moreover, it comes from the bottom percentiles of the wage distribution: the wages of the women at the bottom decile of the wage distribution decrease as the LFPR increases, while the wages of the women at the top decile remain constant. We interpret this as evidence that, as the LFPR increases, the ability of the marginal female employees falls, in line with the existence of an ability threshold below which women work inside the home. It also rules out the argument that women's performance increases relative to men's because men in low LFPR countries have better outside options.

In the second part of the paper, we use the Roy model to estimate individual-level ability as well as the parameters of the firm's pay policy and the utility of working in the home. The structural estimates leverage the significant advantage of our data: we observe several employees in each country, gender, tenure, and cohort, allowing us to estimate both a fixed parameter common to all employees in the same cell (e.g., discrimination based on gender) and, using the variation in wages within cell, differences in individual productivity. Individual-level data allow us to separately identify gender differences in fixed pay from differences in pay due to differences in productivity. Moreover, this allows us to quantify the productivity cost of barriers faced by women in different countries and to study policy counterfactuals.

Three findings are of note. First, the ability of the average female employee ranges from 0.9 SD when LFPR is at its lowest to 0.3 at its highest. The estimate is larger in countries with weaker gender equity labor laws and with more conservative gender norms. Men's ability, in contrast, does not change with LFPR. This is important for the interpretation of our results because it rules out that men are differentially selected, for instance, because in low LFPR countries their outside option is higher outside the MNE. Second, we can relax the assumption of equal preferences for work in and outside the home across genders, and use the model to back out the difference in preferences that would make the current LFPR gap optimal. The implied preference gap is several orders of magnitude larger than any other gender gap in preferences estimated in the literature to date. Third, we show that our estimated gender productivity gap in the MNE is correlated with the productivity of other firms in the economy, and more so with those that operate in the same sector as the MNE. To do this, we extract balance sheet data from ORBIS to cover all manufacturing firms in the same countries where the MNE operates, yielding a sample of 2 million firms in 158 SIC3 sectors.

Finally, we draw implications for the firm and for policy. We first show that, given the productivity differences between men and women, the firm could increase productivity for the same wage bill if they were to change the terms of the wage contract to attract more women. We find that the optimal contract has a lower base pay and a steeper performance gradient than the observed contract. This brings the firm's gender ratio close to one and increases productivity by 22%. However, we note that such a contract would significantly increase inequality within and between genders; most notably, the difference in pay between women and men would go up by 78%. This captures both differences in performance for the same job and differences in jobs as more able women climb the corporate ladder faster. Thus, whilst it is theoretically possible for the firm to adopt policies that compensate for societal norms, such a steep performance gradient would create a high level of inequality among employees, especially in places with the most restrictive gender norms. It may quite possibly also be unsustainable for the firm: in order to hire more women without excessively increasing inequality, they would have to increase women's pay without decreasing men's pay.

A direct implication of these results is that the MNE would benefit from the elimination of gender norms. Indeed, we show that equalizing barriers between genders would bring the pay gap to zero and would increase productivity by 32%, while keeping the wage bill and employment constant. The productivity gains result from both high-productivity women joining and low-productivity men leaving. This echoes the results in Hsieh et al. (2019), which find that reducing misallocation by lowering barriers across gender and race groups accounted for 41.5% of the increase in GDP per capita in the United States between 1960 and 2010. We note that the mirror image of the gender tax that women have to pay to work outside the home is the tax that men have to pay to work inside the home, independent of their skills and preferences. Thus, eliminating gender norms will also eliminate misallocation in work inside the home, by allowing the men who wish to do so to specialize in home production.

In terms of the implications for public policy, the results cast new light on pro-worker labor policies and the gender earnings gap. We show that more stringent labor regulations may hurt women more than men, especially when the barriers to female work outside the home are higher. Intuitively, most pro-worker measures, such as restrictions on hiring and firing, make it harder to link pay to performance, and this leads to a larger intake of lower-productivity workers (Propper and van Reenen, 2010) who, by selection, are more likely to be male in places with more restrictive gender norms. Second, policies that aim to close the gender earnings gap are not sufficient to restore gender equality, due to the fact that the measures of earnings gaps do not account for differential selection. This is especially true when barriers to women's work outside the home are high because women's productivity is higher in these cases. In line with this, we find that the gap between female and male earnings monotonically decreases as LFPR increases. Like Olivetti and Petrongolo (2008), we show a similar pattern in aggregate wage data from the International Labor Organization. We use our estimates to "correct" the gap for differences in ability and show that the ability-adjusted gap is always larger and up to four times than what is reported in official statistics. Restoring equality based on merit would result in an inverted gender pay gap in most countries.

Our findings show that selection creates a link between the size of a group and the productivity of its members, thus connecting the literature on the barriers to female labor force participation (Goldin (1995); Fernández et al. (2004); Jayachandran (2015); Olivetti and Petrongolo (2016)) to the literature on the impact of diversity for firm productivity (Alesina and La Ferrara (2005); Hamilton et al. (2012); Hjort (2014); Bertrand and Duflo (2017); Marx et al. (2021)). Seen through the lens of selection, the link between diversity and productivity is underpinned by the traits of the minority due to the barriers they had to overcome rather than a direct "treatment" effect of diversity on productivity through, for instance, role model effects or changes in culture. Via selection, the productivity of the firm increases when there are more women in the applicant pool because the firm does not need to hire from the left tail of the distribution of men; a similar pattern is seen in the selection of political candidates in Sweden following the introduction of a gender quota (Besley et al., 2017).

Our results also inform the literature on the evolution of the gender earnings gap (Goldin, 1990; Blau, 2012; Olivetti and Petrongolo, 2017). A key advantage of our data is that we observe women and men with the same education, same tenure, and working in the same function in the same firm. Hence the earnings gap is not influenced by differences in occupational choices that make comparisons between genders difficult (e.g., Blau (1977); Goldin (2014); Card et al. (2015); Wiswall and Zafar (2017); Andrew et al. (2021)). We can thus use it to study whether differential labor force participation rates lead to underlying differences in ability across genders in the working population.

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