Authoritarian Bargaining and Economic Sabotage in the Arabian Gulf

by

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ABSTRACT

Authoritarian Bargaining and Economic Sabotage in the Arabian Gulf

by

Trevor T. Johnston

This dissertation explores bargaining dynamics and distributive conflict across the Arabian Gulf. Welfare outcomes vary widely for marginalized groups in the region, motivating a simple but previously unexplored question: why provide benefits to the marginalized? Few autocrats today rely exclusively, or even principally, on repression to survive. Beyond more traditional coercive measures, autocrats use various distributive goods and policy concessions to coopt elites and build mass support. Some autocrats even go so far as to provide targeted benefits to religious minorities, disenfranchised migrants and other marginalized groups. This targeting is inexplicable for existing theory, which suggests that authoritarian rule is predicated on the exclusion of such groups. Having been systematically marginalized, we should not expect these otherwise repressed groups to receive targeted benefits. In explaining this puzzling behavior, my dissertation explores the role of marginalized groups in the Arabian Gulf, offering a formal theory of authoritarian bargaining under the threat of sabotage. All autocrats must solicit the support of various groups in society. Whether purchased or coerced, this support does not come cheap, making autocrats dependent on constant production and growth. When marginalized groups are critical to such production, they have the capacity to threaten costly economic sabotage. This threat provides these

groups with a potential bargaining power that is simply nonexistent in traditional theories of authoritarianism. My model generates a series of testable implications, predicting when sabotage occurs and the conditions under which marginalized groups should receive targeted goods and services. To test these hypotheses, I draw on extensive fieldwork, surveys and spatial data from the Gulf. In the first empirical paper, I focus on the regime-level and consider how Qatar has responded to such pressures. I show how the regime has largely prevented sabotage through distributive policies and spatial planning. The second empirical paper then considers the micro-level, exploring bargaining between firms and migrants. All told, contracts and credible exit options appear to provide even the most vulnerable workers a means of protection within authoritarian states.

CHAPTER I

The Political Economy of Sabotage: Distributive Conflict in Resource-Rich States

I.1 Introduction

During the Arab Spring, protest spread rapidly across the Middle East and North Africa. With seemingly stable regimes suddenly on the brink of revolution, many observers believed that democratization had finally come to the region. Yet despite this wave, the Arabian Gulf remained largely insulated from these pressures. Such stability is often attributed to the rentier system (Luciani, 1970; Mahdavy, 1970), though scholars disagree over how resource wealth prevents the emergence of an organized opposition (Crystal, 1989; Okruhlik, 1999; Yom, 2011). Whatever the source of their stability, the Gulf states appear immune to the same pressures challenging the region.

And yet however popular this view, even before the Arab Spring the Gulf had not been the island of calm that many scholars and regional observers suggested. The region's history of conflict has been far more varied and complicated, marked by protests, strikes and even violent clashes (Gengler, 2013; Kareem, 2013; Omran, 2013). These events have revealed an underlying instability and fragility within these regimes, whose longtime rentier strategies have failed to prevent new

challenges and distributive conflict from arising (Ayub, 2013). This conflict derives from the region's structural dependence on foreign workers, which has made these regimes vulnerable to a new and urgent threat: economic *sabotage.* By threatening production, sabotage can compromise these states' economic development, and thus their longterm political stability. The growing threat of sabotage has forced these regimes to reevaluate their traditional rentier strategies and consider how to best respond to these new pressures. The following paper takes up this question, asking: *when does sabotage occur and how do regimes respond to this threat?*

In answering this question, I develop a formal model of rentier distribution under the threat of sabotage. The model includes and an autocrat and a set of groups within society. These groups differ in their respective endowments, which results in varying political and economic value to the regime. The game begins with the autocrat's distributive choice, allocating resources between groups. This distributive choice resembles Luciani's "allocative state" (1990): the autocrat does not tax society, but instead decides how to allocate resources across groups. Groups then decide how to deploy their effort between production or sabotage, and whether to support the autocrat. Depending on how much support he receives, the autocrat survives or falls, and the game ends.

In the game, the autocrat uses distributive policy to buy the support of important social and political groups within society. But to purchase this support, the autocrat must continuously raise revenues. Support-buying does not exist within a vacuum; it is financed by economic growth, and thus depends on the actors critical to production. The autocrat's optimal distributive choice must consider both political supporters and vital economic actors. To the extent these groups overlap, there is little conflict. But as they become more disjoint, the autocrat must trade-off between maximizing his personal rents, buying political support, and inducing economic production.

In equilibrium, sabotage can take one of two forms: obstruction or destruction. Obstructive acts of sabotage (e.g., peaceful labor strikes or factory slowdowns) obtain over a large parameter space. Unless provided sufficient incentives (i.e., a large enough share of the pie), marginalized groups may withhold their labor and obstruct production. The cost of obstruction varies widely, depending on its scale and the economic sectors affected. Other acts of sabotage may be outright destructive (e.g., violent protests or riots), which are often more costly but far less common in equilibrium. Such sabotage not only destroys capital, but also scares off firms and investors. No matter the type of sabotage, the autocrat must worry about the downstream implications for his survival. As production declines, the opportunity cost of mass revolt decreases and the autocrat's support base may erode. Although rare, if sabotage is sufficiently costly, it may even lead to regime collapse.

The rest of the paper proceeds as follows. Section 2 describes the rentier system and the structural changes that have begun to compromise it. These changes have made the current system unsustainable and produced an environment ripe for sabotage. Section 3 presents the model. I begin with a simple allocation game, which formalizes the classic assumptions of the rentier system. I then incorporate group production and evaluate the effects of sabotage on distributive policies. Section 4 concludes with a discussion of possible extensions and speculates on future trajectories in the Gulf.

I.2 Sabotage in Resource-Rich States

For decades, the Gulf's exceptional stability has been predicated on a simple exchange between rulers and citizens, trading goods for loyalty. This exchange underlies the entire rentier system, and is at the core of these regimes' survival. Rentier theory comes from a rich intellectual tradition, starting with Mahdavy (1970), Beblawi (1987), and Luciani (1990), who defined many of the early concepts

that remain integral to theoretical work today (Ross, 2001, 2004; Smith, 2004; Herb, 2005; Ulfelder, 2007).

In its simplest form, rentier theory suggests that rulers provide their citizens with goods and services to avoid democratization and suppress demands for representation. These benefits substitute for more meaningful reform while buying the political quiescence of the population (Crystal, 1989). In the rentier Gulf, the scope of these welfare services has grown dramatically over the years and often include subsidized energy and water, housing allotments, massive spending on healthcare and education, and access to public sector sinecures. In exchange for these various services, the citizens of the Gulf are expected to remain loyal to their rulers, recognizing their authority and providing these regimes with legitimacy.

The basic rentier system has adapted over time but remained remarkably robust (Gray, 2011; Ehteshami, 2003; Nonneman, 2006; Hertog, 2010; Yom, 2011). The Gulf states developed rapidly while avoiding many of the social and political pressures often concomitant with such profound economic change (Crystal, 1989; Fargues, 2011). This stability has not come cheap, however. The rentier system depends on a constant and, in some cases, increasing provision of goods and services to citizens. As demands for representation grow, these regimes find themselves under greater pressure to increase benefits in lieu of institutional reform.

To meet these growing costs, the rentier states must continuously raise revenues and maintain high levels of production. Without such production, the Gulf states could not afford the distributive payments that sustain their regimes. Although often overlooked, the question of production is thus integral to the rentier system and its stability. Studies on the rentier system typically take for granted this production, assuming that a steady flow of oil and gas should ensure relatively constant revenues. The economic reality is, of course, much more complicated. Revenue is highly dependent on economic shocks, both to commodity prices and,

crucially, the cost and supply of labor.

For decades, the Gulf economies have relied on a labor force made up largely of non-citizens (Baldwin-Edwards, 2011; Shah, 2012). The size and composition of this population has changed dramatically over time. Before the 1970s oil boom, many of these workers came from resource-poor Arab states (e.g., Egypt, Yemen, and Palestine), or were natives who never received citizenship.[1] Today's system primarily depends on the millions of foreign workers coming from Asia each year (Shah, 2013). Although many Western, African and Arab expats remain vital throughout the Gulf, they have become greatly outnumbered by workers from countries like Nepal, India, Bangladesh, Pakistan, the Philippines, and Indonesia. Table 1.1 reports recent estimates of the total foreign population in the Gulf.[2] Non-citizens represent a majority of the workforce in every Gulf state, reaching highs of over 90 percent in Qatar and the UAE. The quality of life that Gulf citizens have come to enjoy is as much a product of their states' incredible resource wealth as it is the labor of these workers. Non-citizens hold positions both banal and critical throughout the Gulf. Without these workers, oil and gas would be left in the ground, floors would remain unswept, and construction sites found vacant.

Yet despite this profound economic importance, these workers have traditionally had little leverage to negotiate with or extract concessions. And in the past, the dependence on foreign labor has not represented a major challenge to these regimes' long-term stability. An economic and social problem, perhaps, but hardly a source of political threat. Until recently, foreign workers rarely, if ever, challenged these regimes outright. Asian migrants have been particularly dismissed, even described as "more efficient, obedient, and manageable" (Kapiszewski, 2006, 7).

[1] Until the 1991 Gulf War, Kuwait relied heavily on the *bidoon* to fill many public sector jobs (Kapiszewski, 2001). The *bidoon* are descendants of native, disenfranchised people who did not gain citizenship at the founding of the state, and thus have little access to the rentier benefits offered to full Kuwaiti citizens.

[2] Unfortunately, the Gulf states do not typically release data on the exact breakdown of foreign workers in their countries. For a broader discussion on the limits of these data, see (Shah, 2013).

Table 1.1: Non-Citizens as a Share of Population and Workforce Across the Gulf

Country	Total Size of Population	% Non-Citizen of Population	% Non-Citizen of Workforce
Bahrain	1,234,571	54.0	74.8
Kuwait	3,965,144	68.7	82.9
Oman	3,855,206	43.7	79.9
Qatar	1,699,435	85.7	93.9
Saudi Arabia	29,994,272	32.4	56.0
United Arab Emirates	8,264,070	88.5	92.9

Note: Table reproduced with permission from the Gulf Labor Markets and Migration website. These estimates have been taken from individual country data from 2010 to 2014. See GLMM Website for updated data and country years.

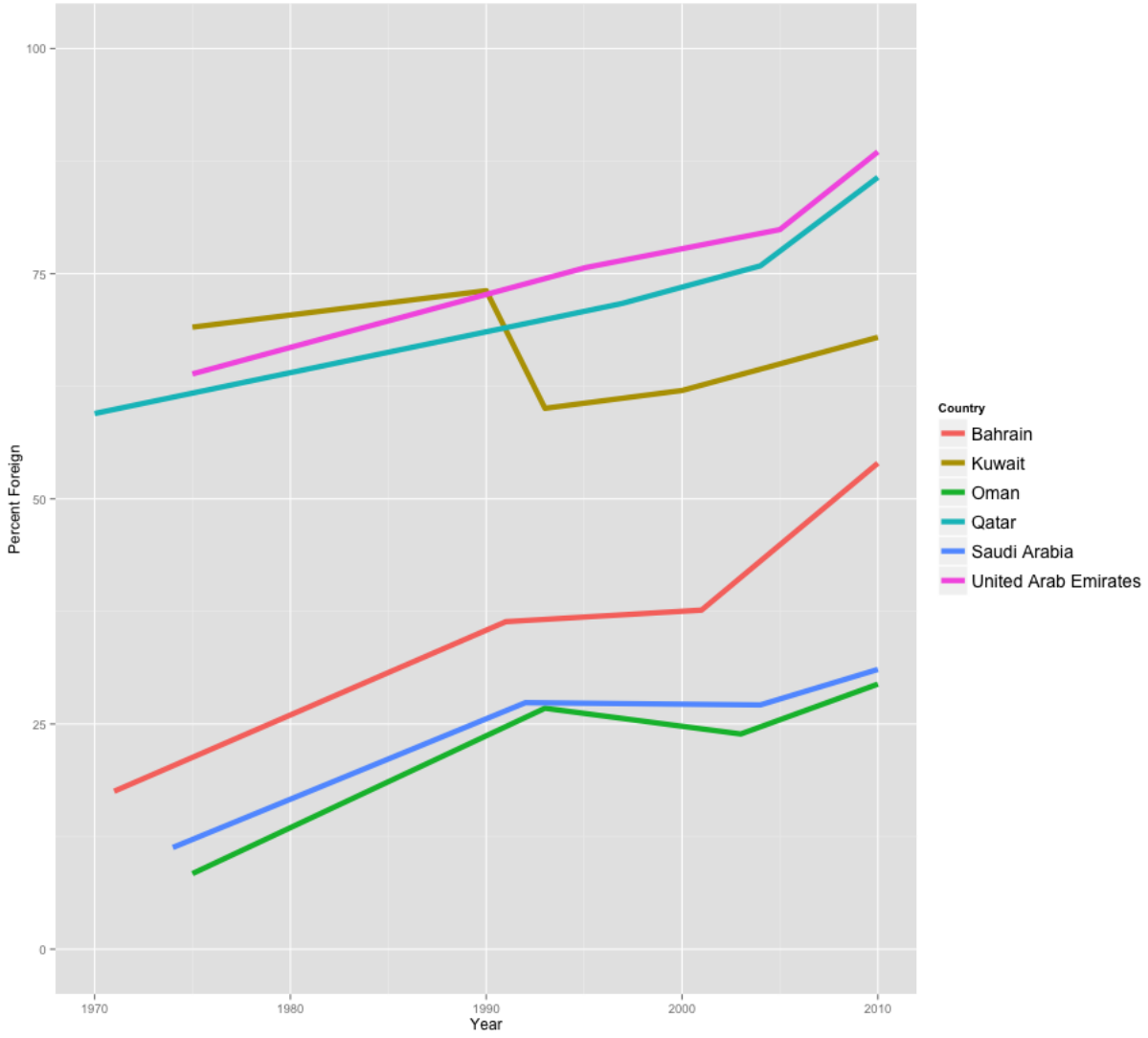
This control has not been an accident: the Gulf regimes have carefully designed their immigration law, known as the *kafala*, to maximize control over migrants. With limited exit options or access to institutions of redress (Gardner et. al. , 2013), workers' vulnerability is structural, leaving this population an easy target for exploitation and abuse. Given their vulnerability within this system, non-citizens have traditionally accepted the status quo and their treatment under it.

Growing structural changes, however, have begun to alter this dynamic, compromising the rentier system and opening up new avenues for resistance. The biggest change is demographic. Despite efforts to reduce their dependence on foreign labor, the number of migrants in the Gulf has continued to increase, as seen in Figure 1.1 below. Compounding this demographic problem, resource-poor states, like Bahrain and Oman, face ever tightening budget constraints.[3] With their resource wealth quickly depleting, these countries have recognized their unsustainable trajectories, making great effort to diversify and transition into knowledge economies built around tourism, trade, and finance (Saif, 2009). Ironically though, even these investments rely on cheap foreign labor, undercutting any efforts to reduce their

[3]And although rich in oil, Saudi Arabia is in some ways closer to these resource-poor states than it is to Qatar and the UAE. Saudi Arabia has a much larger population than the other Gulf states, making it harder to fully buy off the potential opposition.

dependence on such groups.[4]

Figure 1.1: Percent Foreign Population in the Gulf (1970-2010)



As this dependence grows, so too does the bargaining power these marginalized groups wield. Under such strains, these states have begun to face a new threat to their survival: economic sabotage. From work slowdowns, to labor strikes and even violent protests, the Gulf has recently seen a series of acts of sabotage. Sabotage can be defined as any act that destroys capital or obstructs its creation. Generally,

[4]April 15, 2014. "Oman extends curbs on foreign workers in construction, housekeeping." Reuters.

we can think of two modes of sabotage: obstruction and destruction. Obstructive sabotage slows down or interrupts production by withholding some vital input (e.g., labor) or increasing transaction costs. Over the past decade, we have seen many examples of such sabotage across the Gulf. Strikes erupted throughout Oman in 2011,[5] and again in 2012, when large strikes among oil and gas workers decreased production.[6] Beyond striking, Omanis interrupted production by seizing vehicles, slowing traffic and blocking key intersections.[7] Obstruction has been especially common in the UAE, where thousands of construction workers refused to report to their job sites in the summer of 2013.[8] Similar strikes have disrupted projects in 2007 and 2011.[9]

In other cases, sabotage may be far more destructive. Since the early 2000s, Dubai has faced increasing pressure from migrant workers, whose living and working conditions have become intolerable (Kapiszewski, 2006). Demanding better treatment and wages, protests escalated into full-blown riots in March 2006. Oman has similarly seen such violence, with protestors looting markets and attacking banks in 2011.[10] Bahrain has suffered more violence and destructive acts of sabotage than any other Gulf state. After pulling back from the brink of revolution, Bahrain's regime remains fragile and sabotage a regular threat. The disenfranchised Shia population have used homemade explosives and other violent tactics, which are often targeted to coincide with the Bahrain's annual Formula One race.[11] Along with more banal attacks throughout the country, these high-profile acts of sabotage have helped shame the regime and deter investment.

[5]Sunil Vaidya. March 9, 2011. "Employees of three companies join Oman protests." GulfNews.com.
May 14, 2011. "Omani forces arrest protesters after clashes." Reuters.

[6]June 1, 2012. "Oman's Shura Council to discuss labour unrest tomorrow." GulfNews.com.

[7]Sunil Vaidya. March 4, 2011. "Protesters reiterate loyalty to Oman's ruler." GulfNews.com

[8]May 21, 2013. "Dubai's Arabtec says projects unaffected by strike." Reuters.

[9]Preeti Kannan. May 20, 2013. "Arabtec workers in UAE strike over wage dispute." The National.

[10]Sunil Vaidya. February 28, 2011. "One more dead as looting continues in Sohar." GulfNews.com

[11]Alexander Dziadosz. April 21, 2013. "Bahrain stages F1 race amid protests, heavy security." Reuters.

Across the Gulf, these acts of sabotage disrupt manufacturing, construction, and even tourism. They not only cost firms and investors, but also the regimes that depend on this production to finance their rentier systems. Incorporating non-citizens into this system, however, is simply infeasible, and would bankrupt even the richest Gulf states. Instead, these regimes have responded more deliberately. Rather than provide universal benefits, they have begun to target marginalized groups with goods and services, hoping to prevent sabotage altogether or, at the very least, contain the threat.

How these regimes make this distributive allocation remains unclear. The potential threat of sabotage not only varies between groups, but also across regimes. Given sabotage's many forms and its varying intensity, there is not a single best policy. Each regime must consider its own costs and constraints when determining the optimal response. This response depends on a series of related questions: Under what conditions are regimes vulnerable to sabotage? How does the mode of sabotage vary across groups and regimes? And, finally, when does this threat lead to regime concessions and benefits for these groups? In the next section, I offer a formal model that can help resolve each of these questions.

I.3 Modeling Allocation and Sabotage

Rentier systems depend on the exchange of goods for political support. I formalize this exchange as one of simple support-buying: the autocrat provides selective benefits to purchase support from various groups in society. Most support-buying models are redistributive, and tend to focus on the autocrat's choice over taxation (Acemoglu and Robinson, 2001, 2005). In rentier systems, however, taxation is often negligible, at least for citizens. For these regimes, the basic question is distributive, or as Luciani (1990) famously described it, allocative.

To fully tease out the effects of sabotage on distributive policies, I begin with

a simple allocation game. This baseline model roughly captures the conventional wisdom on the rentier system. Focusing on the political logic underlying rentierism, I first show how resource rich states allocate wealth among citizens. I then move on to the main focus of the paper: sabotage. By incorporating production and labor choices, I show how the threat of sabotage provides marginalized groups a bargaining power to extract distributive concessions from the autocrat.

I.3.1 Simple Allocation Game

The quintessential rentier economy depends entirely on resource rents, which may be volatile but state-controlled. To survive, the autocrat must buy support from society by allocating resources across groups. Depending on this allocation, groups then choose whether to support the autocrat. For this simple allocation game, the marginalized are assumed to be politically powerless. This assumption effectively renders these groups as non-actors, lacking any real agency or means of influencing distributive outcomes.

Players and Actions The game consists of N+1 players. There are N groups in society and one Autocrat. I denote the population of N groups by the set $\mathcal{N}$.[12] The game consists of three stages. In the first stage, the Autocrat decides on a distributive allocation of Ω, which is the total wealth produced in the economy. This allocation is an N+1 vector, specifying a non-negative share for each group in the population (i.e., $x_i \geq 0 \ \forall i \in \mathcal{N}$) and the Autocrat (i.e., $x_A \geq 0$). Formally, the Autocrat makes a distributive allocation, $\mathbf{x} = \{x_i \dots x_N; x_A\}$, where the ith element represents group i's private share and the N+1 element is the Autocrat's personal share. Since the benefits accrue only to the targeted group, we can think of these

[12] A brief comment on notation: Greek letters are used for fixed parameters (i.e., terms for which I will later do comparative statics) and are all bounded, some naturally (e.g., probabilities) and others by assumption; Roman letters are reserved for choice variables and countable elements of a set; bold face indicates a vector; and calligraphic font represents a set.

shares as private goods.

The Autocrat makes this allocation conditional on his expectation of the economy.[13] Total economic production is a function of some fixed capital stock Γ, and a scalar for total factor productivity ω.

$$\Omega = \omega\Gamma \tag{1.1}$$

The Γ term can be thought of as a natural resource (e.g., oil fields) that provide state revenues. These revenues are often volatile over time because of price fluctuations or supply problems, forcing the Autocrat to account for these shocks in his distributive calculus. The ω scalar captures this uncertainty. For simplicity, suppose $\omega \in \{\omega^l, \omega^h\}$ and without loss of generality let $\omega^h = 1$ and $0 < \omega^l < 1$. Further assume that the probability $\omega = \omega^l$ is q, with the complementary probability $1 - q$ for ω^h. Incorporating all of these terms, we can re-write the production function as $\Omega = q\omega^l\Gamma + (1 - q)\Gamma$.

After ω is revealed, each group decides simultaneously whether (and how much) to support the Autocrat. Each group i chooses a level of support, s_i, to give the ruler, where $0 \leq s_i \leq 1$. The Autocrat's probability of survival π is increasing in this support as follows

$$\pi = \frac{\sum s_i^{\psi_i}}{n} \qquad \forall i \in \mathcal{S} \tag{1.2}$$

The parameter ψ_i captures the relative political importance of each group to the Autocrat's survival.[14] Note that in Expression (1.2), I have introduced the new set

[13] If this allocation is not enforced or the Autocrat could revoke or amend it, the allocation would lead to a potential commitment problem. For many redistribution papers, this commitment problem is a central dynamic driving the model and results (e.g., Acemoglu and Robinson (2001)). Although a potential extension, commitment problems are not the focus here and are beyond the scope of this model.

[14] To ensure the probability of survival is not greater than one, and that the support choice is mononotonic in x_i, I assume that ψ_i is bounded but relatively large (i.e., $1/2 < \psi_i < 1 \ \forall i \in \mathcal{S}$).

$\mathcal{S}$, and that the summation is over n (not the full population of N groups). The set $\mathcal{S}$ helps distinguish politically valuable groups (e.g., elites and citizens) from the marginalized (e.g., migrants and religious minorities), who do not matter to the Autocrat's legitimacy or survival. Conceptually, we can think of $\mathcal{S}$ as the potential support base or selectorate for the Autocrat. And depending on the relative value of ψ_i, some groups will be more or less valuable than others within $\mathcal{S}$. Among the population of N groups, let n belong to set $\mathcal{S}$ (i.e., have some political support to offer). The remaining N-n groups comprise the marginalized, and are denoted by the set $\mathcal{M}$.[15] Having no political value, these groups are not included in the survival function from Expression (1.2).

After each group in $\mathcal{S}$ makes its support choice, the game ends with the Autocrat either surviving (with probability π) or falling (with probability $1-\pi$). In either case, final payoffs are realized given the decisions above. First consider the Autocrat's utility,

$$u_A = \begin{cases} x_A\Omega & \text{if the Autocrat survives} \\ 0 & \text{if the Autocrat falls} \end{cases}$$

The Autocrat's payoff, conditional on falling, has been normalized to 0. We can re-express u_A in terms of expected utility,[16]

$$u_A = \pi x_A \Omega \tag{1.3}$$

The Autocrat's expected utility is simply the probability he survives, times his share of the total wealth produced. Implicit in this equation is the central problematic underlying authoritarian rule: the trade-off between rent-maximization and survival. If π is at least weakly increasing in the distributive goods provided to

[15]Therefore, the union of sets $\mathcal{S}$ and $\mathcal{M}$ recovers the total population $\mathcal{N}$.

[16]This expression is a slight abuse of notation. Properly speaking, the right-hand side should include an expectation operator (i.e., $\mathbf{E}[\pi x_A \Omega]$). For notational simplicity and readability, I leave out this operator in the discussion below.

other groups, then the Autocrat must trade-off between private rents and the odds of survival.

Next, consider the groups' utility captured below,

$$u_i = \begin{cases} x_i\Omega - s_i & \text{if the Autocrat survives} \\ r_i\Omega - s_i & \text{if the Autocrat falls} \end{cases}$$

Note that this expression includes the new term r_i. This term represents group i's share of redistribution if the Autocrat falls, where $0 \leq r_i \leq 1 \ \forall i \in \mathcal{N}$. Authoritarian transitions, whether through a coup, revolution, or even natural leader death, involve significant costs for the system. In practice, these costs can take a myriad of forms from actual destruction of capital to financial divestment. To capture such costs, I assume that $\sum r_i = R$, where $R < 1$. This assumption implies that the total wealth redistributed after collapse is strictly less than the resources produced (i.e., some of Ω is wasted). How much wealth exactly is destroyed depends on the parameter R.

Crucially though, note that this statement only implies a net or aggregate loss. I do not impose any structure on the distribution of r_i among groups. For any given group i, r_i may exceed x_i. It is only when we consider the net payments can we say that there is loss. Of course, this further implies that at least some group must suffer from transition since $R < 1$. Beyond that, I do not make any assumptions about how costly transition is, nor for that matter, who most benefits or loses.[17] In the sabotage game later, I return to this parameter, which proves crucial in helping explain why different forms of sabotage obtain across regimes. For now, however, this term simply helps capture the expected benefits groups may enjoy from regime transition.

[17] It is not obvious ex ante that r_i should be greater for elites than marginalized groups or vice versa. Practically speaking, such a distribution depends on what a post-transition regime looks like (i.e., who comes to power if the Autocrat falls).

As before, we can use these payoffs to set up the expected utility

$$u_i = \pi(x_i\Omega) + (1-\pi)(r_i\Omega) - s_i \tag{1.4}$$

All told, the groups' expected utility is an additive function of the following: the probability the autocrat survives, times the group's share from the economy; plus the probability the autocrat falls, times the transition-scaled redistributive payment; minus the support costs incurred during the course of the game (for the groups in set $\mathcal{S}$).

Equilibrium Strategies and Analysis To summarize, the game's overall sequence of play is as follows:

(i) Allocation: The Autocrat proposes some allocation of shares $\mathbf{x} = \{x_i \dots x_N; x_A\}$ that exhaustively divides Ω.

(ii) Production: The random productivity factor ω is revealed; Ω is realized.

(iii) Support Choice: Each group in $\mathcal{S}$ decides how much support s_i to provide.

(iv) Survival and Payoffs: The Autocrat survives (with probability π) or falls (with probability $1-\pi$); payoffs are realized and the game ends.

The Autocrat's optimal strategy is simply an N+1-tupple, allocating shares to maximize his expected utility, which trades off between increasing his odds of survival and the private benefit conditional on surviving. For groups in $\mathcal{S}$, strategies will follow a cutpoint or switching logic: a group will only provide support to the Autocrat conditional on receiving some minimal share of Ω, at which point they will choose a level of support that optimally balances the cost of providing this support and their expected return. By construction, groups in $\mathcal{M}$ do not matter for survival. As such, I further assume that they do not make a support choice. We could allow

the marginalized to make a support choice but since they offer no value to the Autocrat, this choice is dominated. I solve by backwards induction, characterizing the Subgame Perfect Nash Equilibrium. All proofs are left to Appendix A.

We can characterize optimal play by beginning at the terminal period of the game and working backwards. In the support period, groups face a simple utility maximization problem. Using the expected utility from Expression (1.4), we have the following unconstrained optimization problem:

$$\max_{s_i} \left\{ \pi(x_i\Omega) + (1-\pi)(r_i\Omega) - s_i \right\} \tag{1.5}$$

At this point in the game, each group in $\mathcal{S}$ decides simultaneously whether and how much support to give the Autocrat. Support increases the probability that the Autocrat survives but it is costly to each group. The optimal choice follows a basic threshold logic and leads to the following cutpoint[18]

$$\bar{x} = r_i \tag{1.6}$$

At the cutpoint, a group is indifferent to Autocrat survival and has no incentive to provide support. Group i will offer support *if and only if* $x_i > \bar{x}$. Under this condition, the benefits from Autocrat survival (x_i) outweigh the potential redistribution (r_i) from regime collapse.

Having met this threshold, the exact amount of support provided in equilibrium will vary across groups. The optimal level of support will solve the maximization problem from Expression (1.5). I begin by substituting in the contest function that defines π from above, and then take the first-order conditions. After rearranging

[18]Note that the cutpoint drops the subscript i. Formally, $\bar{x} = x_i$.

terms and simplifying, we reach the following expression

$$s^* = \left[\frac{1}{n}\psi_i\Omega(x_i - r_i)\right]^{\frac{1}{1-\psi_i}} \tag{1.7}$$

The optimal level of support s^* depends on several parameters and group characteristics. Before considering each of these parameters in turn, note the similarity between Expression (1.7) and the cutpoint from above. Specifically, we see that the parenthetical $(x_i - r_i)$ effectively recovers the support threshold: if this term is negative (and thus the cutpoint not reached), then s^* would have to be negative, which is impossible. If Expression (1.6) is satisfied, Ω and n are simple scalars on the optimal level of support. These scale effects are straightforward: groups provide more support when the pie is large (i.e., a greater Ω) but are less supportive when their political contribution is less valuable in the presence of many groups and can free-ride on others (i.e., a larger n). As for ψ_i, we not only see positive scale effects (like those for Ω), but also an exponential term, which influences the rate at which support grows. The relative benefit from support is increasing as a group's political value grows, since its support has a greater effect on the Autocrat's survival.

Beyond these parameters, support crucially depends on the group-specific payments x_i and r_i. Support is increasing with a group's share (i.e., a higher x_i) but decreasing with redistribution (i.e., a higher r_i). Greater allocative shares imply a larger benefit from Autocrat survival, thus inducing greater support. Conversely, groups will have less of an incentive to support the Autocrat if their expected share from redistribution is high. Combining Expressions (1.6) and (1.7), the following lemma summarizes the groups' cutpoint strategy.[19]

Lemma 1. *In equilibrium, each group i ($\forall i \in \mathcal{S}$) selects an optimal level of support*

[19]The proof for Lemma 1 and corresponding comparative statics can be found in Appendix A.

according to the following cutpoint strategy:

$$s_i^* = \begin{cases} 0 & \text{if } x_i \leq \bar{x} \\ s^* & \text{if } x_i > \bar{x} \end{cases}$$

where $\bar{x}$ and s^* are defined in Expressions (1.6) and (1.7), respectively.

Having solved the groups' equilibrium strategy, I now consider the Autocrat's choice problem. The Autocrat makes a distributive allocation $\mathbf{x} = \{x_i \dots x_N; x_A\}$ to maximize his expected utility from Expression (1.3). Unlike the groups, who choose their level of support after observing Ω, the Autocrat has to decide on this allocation conditional on his expectation of ω. Formally, he faces the following optimization problem

$$\max_{\mathbf{x}} \left\{ \pi x_A \Omega \right\} \tag{1.8}$$

In equilibrium, the optimal allocation balances the trade-off between increasing the probability of survival and decreasing the Autocrat's rents. The Autocrat's allocation $\mathbf{x}$ is an N+1 vector, subject to a series of mixed constraints. In addition to the simple non-negativity constraints (i.e., $x_A \geq 0$ and $x_i \geq 0 \; \forall i \in \mathcal{N}$), the Autocrat has the binding budget constraint $\sum x_i + x_A = 1$.

While these conditions are straightforward given the Autocrat's choice problem, an additional constraint emerges from equilibrium play. Specifically, the Autocrat should not allocate a positive share to any group from whom he does not expect to receive support. This condition immediately applies to the marginalized (i.e., groups in $\mathcal{M}$), who have no support to offer. In this simple allocation game, distributive shares are solely used to purchase political support and increase the Autocrat's odds of survival. Since these groups have no support to offer, any

allocation would be a waste. This logic further extends to any groups for whom a positive share would not exceed the support cutpoint. If the Autocrat provides a non-zero share to group j, and that share does not satisfy Expression (6), then group j will not provide support. Thus, the groups' cutpoint strategy implies an additional constraint on the Autocrat: for any group receiving a positive share, this share must exceed the threshold $\bar{x}$.

To formalize this constraint and help solve, let $\mathcal{C}$ be the set of groups who receive some positive share in equilibrium, such that $x_j^* > \bar{x}\ \forall j \in \mathcal{C}$. We can think of this set as the winning coalition from among the support base, and is thus a subset of $\mathcal{S}$. This division resembles other models of authoritarianism, where the ruler's "selectorate" $\mathcal{S}$ is a superset of a more narrowly defined elite coalition $\mathcal{C}$ (Bueno de Mesquita et. al. , 1999, 2002).[20]

Taking these constraints then, we can solve by first setting up the traditional Lagrangian function

$$L = \pi x_A \Omega - \lambda\Big(\sum_{i=1}^{N} x_i + x_A - 1\Big) + \lambda_j(x_j - \bar{x}) + \lambda_i x_i + \lambda_A x_A \tag{1.9}$$

Differentiating this expression with respect to x_A, x_j and x_i (where x_j is the representative group in $\mathcal{C}$ and x_i is the representative for all groups not in $\mathcal{C}$), we have a series of first-order conditions (FOC), which are fully specified in Appendix A. Along with the constraints, these FOC represent the Kuhn-Tucker conditions for this problem. The optimal $\mathbf{x}$ solves these conditions.

A solution to this problem is now relatively straightforward. First note that in equilibrium, the Autocrat will not provide any positive shares to groups outside of $\mathcal{C}$, so we can immediately set $x_i^* = 0$. We are now left with x_A and x_j. Given the

[20]For some particularly inclusive regimes, these sets may coincide, such that all groups in $\mathcal{S}$ are also included in the coalition $\mathcal{C}$. Such a condition may help explain why some rentier states build more expansive coalitions than are typically seen in resource-poor autocracies. In most cases, however, the Autocrat will construct a smaller coalition.

structure of this problem and the Autocrat's need to balance survival prospects and potential rents, further note that the solution must be an interior one with respect to x_A (a full proof of this point can be found in Appendix A). With $x_i = 0$ and $0 < x_A < 1$, we can reduce the number of FOC to a more manageable set. Solving for x_A^*, the Autocrat's optimal share is simply

$$x_A^* = \frac{\pi}{\pi_j'} \tag{1.10}$$

The term π_j' represents the marginal effect of x_j on the Autocrat's probability of survival. Expression (1.10) reveals the basic tension in the Autocrat's choice problem. On the one hand, the Autocrat's share is increasing in π: as the probability of survival grows, the relative benefit increases and the Autocrat wants to maximizes these rents by increasing x_A. At the same time though, the Autocrat's share is decreasing in π_j': as the marginal effect of a group increases, the Autocrat is forced to divert more resources to this group, which reduces his personal share by some degree.

Expression (1.10) is crucial. Not only does it characterize the Autocrat's share, but it also reveals a key to solving for x_j^*. Since this expression holds for all groups in $\mathcal{C}$, the Autocrat must provide each group the exact amount necessary to make all groups' marginal effect on survival equal. While some groups will receive more or less than others, in equilibrium their induced marginal effects should be equal. If this were not true, then the Autocrat could increase his expected utility by redistributing shares from at least one group to another. Such a deviation would imply the allocation were not optimal. Thus, taking any two groups j and k in $\mathcal{C}$, the optimal x_j^* and x_k^* make the following true

$$\pi_j' = \pi_k' \tag{1.11}$$

While the math is not clean, using this expression we can further derive an analytic solution for x_j^*. For now, however, let Expression (1.11) implicitly characterize this solution. Altogether then, an optimal allocation is defined in the following lemma.

Lemma 2. *In equilibrium, the Autocrat's allocation* $\mathbf{x}^*$ *is an* N+1 *vector such that:*

$$\mathbf{x}^* = \begin{cases} 0 & \forall i \notin \mathcal{C} \\ x_j^* & \forall j \in \mathcal{C} \\ x_A^* & \textit{for the Autocrat} \end{cases}$$

where x_A^* *and* x_j^* *are defined implicitly by Expressions (1.10) and (1.11), respectively.*

The Autocrat's optimal choice is relatively straightforward, reflecting the basic allocation problem and role of groups in this reduced-form model. When the Autocrat does not depend on societal production (i.e., enjoys access to immense resource wealth), distribution fundamentally depends on the political value that different groups provide. Marginalized groups receive no benefits, while supporters' benefits are tied to their relative influence on Autocrat survival (i.e., ψ_i). Finally, combining this result with the groups' strategy above, we can define an equilibrium to the allocation game.

Proposition 1.1. *An equilibrium is a set of strategies* $\mathbf{x}^*$ *and* s_i^* *(*$\forall i \in \mathcal{S}$*) that simultaneously satisfy Lemmas 1 and 2.*

The equilibrium broadly captures the conventional wisdom on rentierism: the marginalized (e.g., migrants) fare poorly in this system, with targeted benefits focused on elites and other supporters. Further note that Proposition 1.1 allows for the support coalition $\mathcal{C}$ to be quite expansive, and may include a large share of society. This result is driven by the survival function, which rewards even relatively low-value groups (like citizens), who may not be as critical as elites, but nonetheless play a role in buttressing the Autocrat. Of course, these groups receive fewer

benefits, but at least enough to purchase their support. Ultimately, this model provides a set of baseline results and the structure for building a more elaborate game.

I.3.2 Sabotage Game

Building on the simple allocation game above, I now incorporate labor into the production function. This extension opens up the possibility of economic sabotage, which may influence the Autocrat's distributive policy. Previously, production was mechanistic and did not depend on labor or other actors in society. I relax this assumption by including a new stage in which groups make an effort choice. This effort choice is now the second stage of the game, coming after the Autocrat's allocation choice and before ω is revealed.

Production and Destruction After observing the Autocrat's proposed distributive allocation, each group moves simultaneously, deciding how to deploy their effort e_i, which can be thought of as some asset (e.g., capital or labor).[21] While capital and labor are certainly different in practice, for the purposes of this model I remain agnostic about what exactly effort entails. Both forms of effort matter to economic production and all groups in society make this choice.

Formally, each group i can deploy its effort productively, p_i, or destructively, d_i.[22] These individual choices scale up and sum across society, resulting in aggregate production $P = \sum p_i^{\phi_i}$ and destruction $D = \sum d_i^{\delta_i}$. Each of these functions also introduce group-specific parameters ϕ_i and δ_i. The first of these terms ϕ_i helps

[21] For simplicity, I do not make any assumptions about constraints on effort. In principle, any group could invest an infinite amount of effort, but this choice would be suboptimal.

[22] Note that this set-up allows for the possibility that any given group can invest time in both production and destruction. In equilibrium, however, no group will invest a non-zero amount in both at the same time. In this simple model, groups do not enjoy a wage from their productive investments. If we allowed for such a wage, it is possible that some groups would invest in production and destruction simultaneously. This trade-off is certainly important but would only attenuate the results, without changing them qualitatively.

captures the economic power or importance of a given group. We can think of this parameter as representing a group's relative position within important sectors of the economy, skill-level or even group size. However defined, as ϕ_i increases, group i plays a greater role in overall production. In a similar vein, we can think of δ_i as the destructive potential of a given group. This term may reflect a group's access to vital sectors or other sensitive targets, or even the capacity to overcome collective costs and coordinate. In practice, ϕ_i and δ_i may associate with each other, particularly when we think of more explicitly economic forms of sabotage (e.g., targeting a particular industry), but for the purposes of this model, I keep these terms separate.[23] I assume that these parameters are both bounded such that $0 < \phi_i, \delta_i < 1 \ \forall i \in \mathcal{N}$.

The aggregate terms P and D can be easily incorporated into the earlier production function from Expression (1.1). As before, economic production depends on the fixed resource wealth Γ and the productivity factor ω, but now also includes group labor P. Government revenues depend on both state-owned capital (i.e., resource wealth) and labor, which jointly produce economic output. These inputs are multiplicative, while destruction D enters as a simple drag on the overall economy, as follows:

$$\Omega = \omega \Gamma P - D \tag{1.12}$$

In the previous set-up, the economy was entirely dependent on some varying capital stock. Although still fairly simple, the economy in Expression (1.12) now at least captures the state's dependence on labor. However minor the change to the production function, it will prove to have major implications for the Autocrat's optimal distributive policy and the equilibrium dynamics described below.

[23] I return to this point below and consider the implications when these parameters are correlated.

Equilibrium Strategies and Analysis The overall sequence of the game remains largely the same. After the effort choice, production commences (ω is revealed), and the groups have the final move of the game, selecting some degree of support. To solve, I proceed just as before, beginning with the terminal move and working backwards.

Immediately note that while the group's utility function has changed (which I describe in detail below), the actual support choice is identical to that in the simple allocation game. Since the effort choice precedes this support decision, the effort investments (whether productive or destructive) are sunk costs and do not inform the choice over s_i. Just as before, each group must simply evaluate their expected benefits under Autocrat survival and death, and the degree to which they should offer support. Subgame perfection implies that their optimal choice will be identical in both games. Accordingly, the same cutpoint strategy from Lemma 1 holds: groups will only support the Autocrat if the condition in Expression (1.6) is satisfied, in which case, the optimal support s_i^* is determined by Expression (1.7).

Of course, the sabotage game diverges significantly once we consider the groups' effort choice. Before the production stage, each group has to make a decision over how to best deploy its efforts across p_i and d_i. At this point, each group faces the following maximization problem:

$$\max_{p_i, d_i} \mathbf{E}\left\{\pi(x_i\Omega) + (1-\pi)(r_i\Omega) - p_i - d_i - s_i^*\right\} \tag{1.13}$$

Since ω is unknown at this point, this maximization problem includes the expectation operator. This expectation captures the uncertainty around Ω, π and s_i^*, all of which depend on ω. Conditional on these expected values, each group has to decide how to allocate effort across production p_i and destruction d_i. Since p_i and d_i cancel each other out, allocating non-zero effort to both choices is a waste

of resources and will not occur in equilibrium. As such, we can narrow our focus to three possible cases: (i) $p_i > 0$, $d_i = 0$; (ii) $p_i = 0$, $d_i > 0$; and, (iii) $p_i = d_i = 0$.

Beginning with case (i), we can simplify the maximization problem above by dropping d_i. This simplification reduces the problem to one of unconstrained optimization with a single variable. Taking the first-order conditions with respect to p_i and solving, we find:

$$p_i^* = \left[\frac{\omega \Gamma \phi_i \Big((x_i - r_i)(\pi'_\Omega \Omega + \pi) + r_i \Big)}{1 + s'_p} \right]^{\frac{1}{1-\phi_i}} \tag{1.14}$$

This expression captures the various downstream effects of production, and how they inform the group's optimal choice. In defining p_i^*, I introduce two new terms, π'_Ω and s'_p. The former is simply the marginal effect of Ω on π. Since support is weakly increasing in Ω, and π is increasing in support, we know that this term is non-negative. As for s'_p, this term is the marginal effect of group i's production on group i's future support choice, which is also non-negative.[24] More than just useful shorthand, these terms reveal the underlying complexity to the group's choice. Contributing to production has downstream effects, introducing potential benefits but also costs.

Expression (1.14) not only defines the optimal amount of production, but it also helps reveal the critical cutpoint underlying this choice. Case (i) obtains if and only if:

$$\bar{\bar{x}} = r_i - \frac{r_i}{\pi'_\Omega \Omega + \pi} \tag{1.15}$$

[24]By allocating effort to production, group i increases the expected total revenues, which in turn makes group i more invested in survival. Thus, by producing, group i not only incurs a direct effort cost, but also an indirect (expected) cost in the future, when choosing optimal support. Of course, given the stochastic nature of production, this indirect cost may never be borne out, particularly if revenues drop significantly before the support choice.

This expression defines the effort cutpoint $\bar{\bar{x}}$. If group i's payment exceeds this threshold (i.e., $x_i > \bar{\bar{x}}$), then i will invest some effort in production (i.e., $p_i^* > 0$). This cutpoint naturally emerges from the optimization problem above. If the cutpoint is not reached, then the numerator in (1.14) becomes negative, as does the whole expression. Since production must be positive in case (i), exceeding the cutpoint is a necessary and sufficient condition. Comparing the support and effort cutpoints from Expressions (1.6) and (1.15), respectively, we immediately see that $\bar{x} \geq \bar{\bar{x}}$.[25] This relationship suggests that mobilizing political support is more costly than inducing production. All supporters contribute to production, but not all producers support survival.

Just as the earlier cutpoint divides supporters and non-supporters, the threshold in Expression (1.15) separates groups in terms of their effort choice, distinguishing producers from saboteurs. Moving to this latter group, now suppose that the condition above is not met (i.e., $x_i < \bar{\bar{x}}$). Under this condition, case (ii) obtains and a group chooses to commit its effort to destruction. Solving as before, we find that the optimal d_i is

$$d_i^* = \left[-\delta_i \Big((x_i - r_i)(\pi'_\Omega \Omega + \pi) + r_i \Big) \right]^{\frac{1}{1-\delta_i}} \tag{1.16}$$

Note how much this expression resembles that for the optimal level of production. The term within the parentheses is the same for Expressions (1.14) and (1.16), which is to be expected since this term was used to derive the effort cutpoint. Here, however, the parenthetical is negative, making the whole expression positive and supporting the group's choice to allocate effort to destruction.

Finally, let us briefly consider case (iii), where a group invests no effort at all,

[25] The key term here is $\pi'_\Omega \Omega + \pi$ from the denominator on the right-hand side of Expression (1.15). Since this quantity is always positive, for any $r_i > 0$ it must be the case that $\bar{x} > \bar{\bar{x}}$. If $r_i = 0$, then these cutpoints are equal.

choosing to refrain from production and destruction. For such a case to obtain, a group must be at the indifference point, where $x_i = \bar{\bar{x}}$. Under this condition, a group chooses $p_i^* = d_i^* = 0$ in equilibrium. Although refraining from outright destruction, this choice can be thought of as the most mild form of sabotage, what I referred to earlier as *obstruction*. Withholding labor is a passive form of sabotage, which interrupts or obstructs production, without actually destroying capital. If such a group were critical to the economy (i.e., had a relatively large ϕ_i), the potential productivity losses could be significant. Whether such a scenario is even likely in practice, let alone in equilibrium, is a point I return to below. For now, however, we can define the groups' optimal effort choice in following lemma.

Lemma 3. *In equilibrium, each group i ($\forall i \in \mathcal{N}$) allocates effort e_i according to the following cutpoint strategy:*

$$e_i^* = \begin{cases} \{0, d_i^*\} & \text{if } x_i < \bar{\bar{x}} \\ \{0, 0\} & \text{if } x_i = \bar{\bar{x}} \\ \{p_i^*, 0\} & \text{if } x_i > \bar{\bar{x}} \end{cases}$$

where $\bar{\bar{x}}$ is defined in Expression (1.15), and p_i^* and d_i^* in Expressions (1.14) and (1.16), respectively.

Taking these effort choices into account, we can now solve for the Autocrat's equilibrium strategy. In the previous allocation game, the Autocrat only had to consider how this policy would influence his potential support base. Now, he must also consider the effect on production. Just as before, the Autocrat faces a constrained optimization problem but we can no longer assume that $x_i = 0$ for non-supporters (i.e., $\forall i \notin \mathcal{C}$). The Autocrat's policy choice is more complicated when all groups can contribute to production (or commit sabotage). Even if $x_i < \bar{x}$, a non-zero distributive share for group i may induce greater production (i.e., increase

p_i) or deter destruction (i.e., decrease d_i). These choices not only increase revenues and the Autocrat's potential rents, but they also raise the probability of survival.

Therefore, in making his distributive allocation, the Autocrat must weigh these revenue effects with the need to directly target supporters with benefits. To the extent these groups overlap, the Autocrat does not face much of a trade-off; distributive shares used to purchase support also make these groups more invested in production. Tensions arise, however, when marginalized groups are critical to production. If some group i $\in \mathcal{M}$ has a large ϕ_i (or δ_i), then ignoring this group may result in a significant productivity loss (or costly sabotage). How the Autocrat balances these various pressures is thus the key question driving his distributive policy.

To solve, suppose we have two pairs of groups i, k and j, m where i, $k \in \mathcal{S}$ and j, $m \in \mathcal{M}$. Although groups j and m belong to the marginalized, both groups must now be included in the Autocrat's constrained optimization problem. At one level, this complication actually simplifies the problem somewhat. In the earlier allocation game, the groups' cutpoint strategy implied an additional constraint on the Autocrat: groups only receive benefits if those benefits were sufficiently large to make them support the Autocrat (i.e., $x_i > \bar{x}$). In the sabotage game, no such constraint binds. While the cutpoint strategies in Lemmas 1 and 3 certainly hold, every group matters (however indirectly) to the Autocrat's survival. Therefore, even if a group does not support the Autocrat (i.e., $x_i < \bar{x}$) they still have to decide whether and how much effort to deploy towards production or destruction.

Solving as before, we can construct the Lagrangian and differentiate to derive the Kuhn-Tucker conditions, which can be found in Appendix A. Taking these conditions, let us first solve for the Autocrat's optimal share x_A^*. For any given

group i, the Autocrat's share can be defined as follows:

$$x_A^* = \frac{\pi\Omega}{\pi_i'\Omega + \pi\Omega_i'} \tag{1.17}$$

In equilibrium, Expression (1.17) holds for every group i and j that receives a non-zero share (i.e., $x_i, x_j > 0$). Compared to the simple allocation game from before, we see that the Autocrat's share now also depends on a group's effect on production. The only difference between Expression (1.10) and (1.17) is the new term $\pi\Omega_i'$, which represents the marginal effect of group i on economic production, times the probability of survival. If we dropped this term, then x_A^* would be exactly as before. Since $\pi\Omega_i' \geq 0$, the Autocrat's share is decreasing in Ω_i'.[26] This reduction represents the new pressure on the Autocrat, who must now divert resources to induce production.

Such a pressure not only reduces the Autocrat's share, but it also changes the shares individual groups receive relative to each other. Suppose we have two potential supporters, groups i and k (both in set $\mathcal{S}$). In the previous game, these groups' benefits solely depended on their potential contribution to the Autocrat's survival. Ceteris paribus, the more valuable group received a greater share of benefits. Now consider how this allocation changes after incorporating production. Using the Kuhn-Tucker conditions again, these shares must satisfy the following:

$$\pi_i' = \pi_k' + \frac{\pi(\Omega_k' - \Omega_i')}{\Omega} \tag{1.18}$$

Expression (1.18) captures the Autocrat's need to balance revenue effects (which indirectly influence survival), with maximizing his support base. The parenthetical

[26] That being said, when comparing x_A^* across Expression (1.10) and (1.17), whether the Autocrat's equilibrium share is actually smaller is a separate and more complicated question. Although the Autocrat must pay a given group more for their production efforts, the inclusion of other groups into this problem may have reduced the marginal effect of some group on the Autocrat's survival (i.e., decreasing π_i'), thus raising x_A^* overall.

on the left-hand side is the difference between group i and k's marginal effects on survival. This difference still plays a major role, and is scaled by the total revenues produced. As for production, the right-side parenthetical represents the difference in these groups' effects on revenue. All told, the relationship indicates that when dealing with potential supporters, the Autocrat must consider both support and production. He can no longer simply reward the most politically valuable groups, but must also weigh their contribution to production. The groups most likely to be affected by this new condition are those who have a high ψ_i but low ϕ_i. Such a group would receive a lower share in the sabotage game, since their political value is now weighed down by their minor economic role in production.

The opposite could be said for the final group in this system, the marginalized. The shares of the marginalized depend entirely on these groups' economic value. In the previous game, all groups in $\mathcal{M}$ received nothing. As Expression (1.17) makes clear, however, the Autocrat must now redistribute some of his personal rents to groups, marginalized or otherwise, whose effects on economic production are critical. How much these groups receive will depend on their role in production (or destruction). In equilibrium, for any two groups j and m in $\mathcal{M}$, the optimal shares x_j^* and x_m^* solve the following expression:

$$\Omega_j' = \Omega_m' \tag{1.19}$$

The Autocrat's optimal distributive policy $\mathbf{x}^*$ must satisfy Expression (1.19), for all marginalized groups receiving a non-zero share. This equation requires that the marginal effect of these groups on production must be equal. And given the expression's general form, this relationship holds for all marginalized groups, whether they are producers or saboteurs. While the total benefits may differ significantly between producers and saboteurs (e.g., $x_j^* > \bar{\bar{x}} > x_m^*$), to the extent the

Autocrat provides any benefits to saboteurs (i.e., $x_m^* > 0$), this allocation should make the marginal effect of destruction and production equal. The optimal distributive policy can thus be summarized in the following lemma.

Lemma 4. *In equilibrium, the Autocrat's allocation* $\mathbf{x}^*$ *is an* N+1 *vector such that:*

$$\mathbf{x}^* = \begin{cases} x_i^* & \forall i \in \mathcal{S} \\ x_j^* & \forall j \in \mathcal{M} \\ x_A^* & \textit{for the Autocrat} \end{cases}$$

where x_A^*, x_i^* *and* x_j^* *are defined by Expressions (1.17), (1.18) and (1.19), respectively.*

Lemma 4 represents the final piece need to define an equilibrium to the sabotage game. Combining the last two lemmas with the earlier game's result on the support choice, we can simply state an equilibrium in the following proposition.

Proposition 1.2. *An equilibrium is a set of strategies* $\mathbf{x}^*$, e_i^* *and* s_i^* $(\forall i \in \mathcal{N})$ *that simultaneously satisfy Lemmas 1, 3 and 4.*

I.3.3 Comparative Statics and Empirical Implications

Having solved the sabotage game, let us return to the motivating questions that began this paper and consider the model's broader implications for the Gulf. The first question: under what conditions are regimes vulnerable to sabotage? Another way of putting this question, why do we see sabotage in some countries and not others? While the threat of sabotage is endogenous to the game, some regimes are more likely to be vulnerable at the outset. Vulnerability is increasing in the relative size of the marginalized population (i.e., number of groups in $\mathcal{M}$) and their relative position across vital sectors of the economy. A regime will be more vulnerable if there is little overlap between supporters (i.e., groups with a high ψ_i) and producers (i.e., groups with a high ϕ_i). Under this condition, the autocrat must trade-off

between critical supporters and major producers. When these groups are the same, he can induce support and production at the same time. As they become more disjoint, satisfying both groups becomes more costly, and his equilibrium rents x_A^* decrease. Such a trade-off can be found throughout the Gulf, where rulers depend on a narrow selectorate comprising citizens, but must also induce production from marginalized communities. That being said, the relative economic power of these groups varies widely across the region.

Regimes may also be vulnerable to sabotage if economic shocks are particularly severe. Given the multiplicative structure of the economy, a group has a greater incentive to produce when the productivity factor ω is higher. As recessions become more severe (i.e., low ω^l) and more frequent (i.e., higher q), expected production declines, as does the group's incentive to expend effort or labor. Shocks are especially damaging if a country has relatively few resources (i.e., low Γ). Regimes with greater resources can more easily absorb these shocks. Facing these fiscal constraints, the autocrat may be forced to prioritize spending on vital supporters, reducing the size of his distributive coalition and the payments made.

The Gulf states vary significantly in their resources and relative robustness to shocks. Among the Gulf states, Qatar has the most gas and oil revenues per capita ($16.4 trillion in reserves in 2013). These reserves are vital to consumption smoothing, which helps the regime maintain high payments to supporters and continue to invest in marginalized communities even with the precipitous drop in oil prices. Other states have considerably fewer resources to insulate themselves from such shocks. In 2009, Dubai declared bankruptcy and needed its oil-rich neighbor Abu Dhabi to bail it out. Dubai has nearly exhausted its oil reserves, providing far fewer resources to draw on when a recession hits and making it more vulnerable to acts of sabotage. A similar constraint limits Bahrain's capacity to buy off supporters and marginalized groups.

The second question: how does the mode of sabotage vary across groups and regimes? In other words, when should we see destructive versus obstructive sabotage? Obstruction, is relatively common in equilibrium and in practice. All economies suffer some productivity losses when workers choose not to contribute maximal effort. Such obstruction is all but inevitable and represents a mild form of sabotage where workers do not invest all of their effort in productive labor. That being said, how widespread and pernicious obstruction is will ultimately depend on a group's expected shares (i.e., x_i) and total benefits. These benefits figure into a group's calculus and must exceed the relative cost of effort. And while expected redistribution (i.e., r_i) also figures into this calculus, it is far more important to destructive sabotage. For sabotage to be sequentially rational, a group must expect a relatively large r_i (as defined by in Expression 1.15). And whereas obstruction grows during recessions, destructive sabotage should be increasing in high production periods.

Despite their many similarities, the Gulf states vary considerably in the type and degree of threats they face. For Qatar, there is little threat of destruction. Not only does the regime provide enough benefits to eliminate this threat, but few marginalized groups should have a high expectation of redistribution. A migrant worker from Nepal has little reason to expect any form of redistribution should the regime fall, reducing this individual's r_i to nearly zero. However little such a worker can expect from redistribution, he may still have few incentives to work hard or deploy his labor productively. Obstruction can be seen in Qatar to some degree, but far more in the UAE, where Abu Dhabi and Dubai have been less successful in providing enough benefits to prevent strikes and work stoppages.

Destruction is most pronounced in regimes where marginalized groups expect to receive major redistribution or other concessions if the autocrat falls. This condition is best seen in Bahrain, but also found to some degree in Saudi Arabia

and Kuwait as well. In each of these states, the regime has marginalized large segments of its population (e.g., religious minorities), treating them as less than full citizens and openly discriminating against them. Since 2011, Bahrain's Shia population has used various violent tactics to threaten investment and tourism in the country. Having been disenfranchised, the Shia must compete with migrants for many blue-collar jobs, producing high unemployment and grievances among the population. Unlike migrants, however, these citizens can expect that if the Sunni regime fell, there may be massive redistribution and new economic opportunities for the disadvantaged but majority Shia population. Given such expectations (i.e., a high r_i), Bahrain's regime has found it impossible to fully stamp out the threat of destructive sabotage, especially during high-profile events that draw international attention and investment (e.g., the annual Formula One race). Buying off this population is simply too expensive.

The third and final question: when does this threat lead to regime concessions for marginalized groups? Put simply, when do the marginalized benefit? All things being equal, groups that are economically powerful (i.e., high ϕ_i) in wealthy states (i.e., high Ω) should do best. The autocrat needs these groups to continually grow the pie. And since the pie is relatively large, he can afford to divert resources to them without compromising his support base. Similarly powerful groups may be able to extract concessions in poorer states but such benefits will be conditional on economic shocks and how much the autocrat's survival needs are in tension with these economic pressures. Even potentially destructive saboteurs may be bought off so long as their price (i.e., r_i) is not too high. If such payments are too expensive, or this destruction but a minor irritant (i.e., a low δ_i), the autocrat may find it more profitable to accept some sabotage and not raise these groups' benefits above the cutpoint in Expression 1.15. Worst of all are those marginalized groups that are both politically disenfranchised and have no real economic influence. Such groups

enjoy little bargaining power and can expect marginal benefits, if any at all.

The threat of sabotage (and the particular form it takes) clearly varies across regimes, which further implies different strategies in responding to these threats. For the most resource-rich states, sabotage can be avoided by preemptively targeting these marginalized groups with distributive goods. Qatar may best exemplify this strategy. As its dependence on foreign labor has grown, and become vital to developing a diversified economy less reliant on oil, these groups have received more targeted benefits. Improvements in housing and other basic services have been critical to the state's recent investments, locating new projects in migrant-only areas. When resources become scarce or volatile, regimes are less likely to use these preemptive measures, and may instead accept some risk of sabotage. Such risk has grown over the last decade in Dubai, as the regime became over-leveraged and heavily in debt. Earlier efforts to invest in migrant areas, like the much-touted International City in Dubai, have become a lower priority for the regime in recent years. Not surprisingly, Dubai has seen a spike in strikes and protests over the last two years, renewing fears that some of the worst sabotage of the early 2000s may be returning. Especially beleaguered regimes like Bahrain have to accept regular sabotage. Short of massive redistribution, Bahrain's Shia population will not be pacified. The regime has tried more limited measures (e.g., fiscal transfers during the height of protests in 2011), but even these efforts failed to quiet broad outrage. With sabotage a constant problem, the regime has instead focused on keeping its migrant population happy and productive, particularly Sunnis from South Asia who have become a major pillar for the regime during periods of instability.

I.4 Conclusion

Ultimately, the model suggests that under some conditions, the threat of sabotage can significantly inform the autocrat's distributive strategy. The autocrat

buys support from groups by offering them a sufficient share of the pie, such that they become invested in the regime and have an interest in the autocrat's survival. As the pie shrinks, either through sabotage or some exogenous shock, the opportunity cost of not supporting the ruler decreases. Consequently, the autocrat is forced to extend benefits more broadly, even including otherwise marginalized groups. Whether buying support or deterring sabotage, the underlying logic is the same: by providing benefits, the autocrat can tie groups to the regime's survival, thus raising the opportunity cost of their political defection or act of sabotage.

Depending on the parameter space, either form of sabotage may obtain in equilibrium but the logic driving each of them is distinct. Obstruction (i.e., the withholding of productive activity) may be rational for a large range of groups whose distributive benefits are limited. Benefitting little from the system, these groups are not sufficiently invested to find it profitable to deploy their assets productively. Destruction, however, is much more costly and only obtains when groups expect to benefit more under regime collapse than survival. For destructive sabotage to be sequentially rational, there must be some subset of society who is not only marginalized, but also expect to receive a net welfare increase from regime collapse. By committing sabotage, they hope to reduce the productivity of the system, which in turn decreases the total wealth available to buy support, and thus makes autocratic survival less likely. As the economic costs of regime collapse increase, this condition is harder to sustain, making it less likely for destructive sabotage to obtain in equilibrium, no matter how aggrieved the population.

Ultimately, the model generates a series of predictions on when we should see sabotage, what form it takes, and how rulers may respond to these threats through distributive policies. I argue that however politically marginalized some groups may be, they are not powerless. With the threat of sabotage, even migrants can influence policymaking and extract distributive concessions.

CHAPTER II

Weapons of the Marginalized: Authoritarian Bargaining Under the Threat of Sabotage

II.1 Introduction

For the marginalized, life under authoritarian rule can be especially hard. Politically disenfranchised and socially ostracized, these vulnerable groups enjoy few protections or rights. From Idi Amin's expulsion of Indians in Uganda, to Saddam Hussein's use of chemical weapons against Iraqi Kurds, marginalized groups have been a frequent and all too easy target for abuse. Such discrimination and brutality has hardly gone unnoticed. These regimes often receive wide condemnation, notoriety, and become the focus of significant scholarship (**?**Tullock, 1987; Linz, 2000; Turits, 2004). Yet while these regimes exist, and certainly deserve public attention, they represent but a minority of cases.

Modern authoritarian rule, and the treatment of marginalized groups, in particular, is far more varied and complicated than these cases suggest. As we move beyond such dictators, we find that most autocrats do not rely solely, or even principally, on repression to survive. Nor do they simply target marginalized groups with unremitting abuse. In fact, under some regimes, these communities even receive targeted benefits. The Arabian Gulf state of Qatar is one such case.

Over the past decade, the Qatari regime has targeted migrant workers, an otherwise marginalized group, with increasingly extravagant spending projects and other distributive goods and services. Such targeting is not only inexplicable for existing theory, but also runs contrary to popular narratives on authoritarianism in the Gulf and beyond. Ultimately, Qatar's puzzling behavior reveals an underlying complexity to modern authoritarian rule, leading to the question: *why provide benefits to the marginalized?*

In asking this question, I challenge long-held conventional wisdom about marginalized groups and their role within authoritarian regimes. Having been systematically excluded, the marginalized are often assumed inconsequential to leader survival. As such, existing political economic theories tend to ignore the marginalized altogether, focusing instead on elites and the autocrat's broader selectorate (Bueno de Mesquita et. al. , 2004; Acemoglu et. al., 2008). But in some regimes, these groups cannot be ignored. Migrant workers represent the largest marginalized group in Qatar today. Filling positions both banal and critical, these non-citizens comprise 94 percent of the active workforce, making Qatar utterly dependent on them (QSA, 2010). Less clear is how this dependence translates into bargaining power for these marginalized groups. Although crucial to the political economy of the state, foreign workers represent a subaltern class with no prospect of ever receiving citizenship or access to Qatar's generous welfare system. These disenfranchised migrants have become a permanent minority in the country, subject to rampant abuse, discrimination and exploitation.[1] And yet despite their systematic exclusion, this group has also received targeted distributive goods. In recent years, migrant communities in Qatar have received benefits that include new

[1]For a recent account of these abuses, see Amnesty International (2013, 2014).

housing projects,[2] entertainment complexes,[3] and athletic facilities.[4]

These targeted goods are surprising in light of traditional political economic models, which implicitly assume marginalized groups lack the bargaining power needed to extract such benefits from the state. Their treatment in Qatar challenges this assumption and suggests that omitting the marginalized could be theoretically problematic. That being said, this targeting does not reflect a real shift in coalition lines or growth in the selectorate. While this spending has grown,it has not coincided with any less repression. Ghettoization and draconian immigration law remain the regime's principal means of controlling these marginalized communities (Longva, 1999; Crystal, 2005). Clearly, efforts to coopt this growing (and increasingly restive) population have not come at the expense of traditionally repressive strategies. The Qatari case ultimately reveals an unappreciated complexity to modern authoritarian rule, calling for theoretical refinement and a better, more thorough discussion of the role of the marginalized within these regimes.

To help explain such complexity, I develop a theory of authoritarian bargaining under the threat of sabotage. I begin with a simple premise: to survive, all autocrats must solicit the *support* of various groups in society. Generally, we can think of this support as everything from the passive compliance that sustains a ruler's popular legitimacy (Levi, 1989), to elite loyalty when facing a challenger (Bueno de Mesquita et. al. , 2004; Egorov and Sonin, 2011). However conceptualized, the value of this support derives from these groups' political power or influence within society. Autocrat survival thus reduces to a bargaining game between the autocrat and these groups, who exchange their support for selective benefits. Lacking any

[2]Dylan Bowman. March 2, 2008. "Qatar to build $1.1bn labourer city." ArabianBusiness.com

[3]Jaimee Haddad. "Thousands flock to Grand Mall opening in Industrial Area." Doha News. October 12, 2013.

[4]Rizwan Rehmat. "Doha unveils brand new cricket stadium, impresses Asian body." Peninsula. Oct. 21, 2012.

real value or influence, the marginalized are typically absent in such bargaining theories, which would predict that these groups should receive few, if any, targeted benefits.

But even if their support is worthless, the marginalized are not entirely powerless. The power of the marginalized lies outside traditional bargaining dynamics, and comes from these groups' vital role within the economy. Whether through repression or cooptation, building a large support base does not come cheap and depends on continuous growth and production. To the extent marginalized groups are critical to such production, they have the capacity to threaten costly economic *sabotage*. In the spirit of Scott's "weapons of the weak" (1985), sabotage refers to the myriad of ways a marginalized group can challenge the regime by destroying capital or impeding its growth. As the marginalized take on a greater role within the economy and across vital sectors, the threat of sabotage grows. Regimes vulnerable to such attacks may be forced to provide these marginalized groups with distributive benefits, hoping to prevent sabotage before it compromises production. Ultimately, this threat provides marginalized groups with a potential bargaining power that is simply nonexistent in traditional theories of authoritarianism.

In testing my theory, I return to the motivating case of Qatar and draw on a unique spatial dataset that maps goods and services across the country. My empirical strategy exploits the spatial segregation of groups in Qatar to evaluate the relationship between distributive targeting and the location of marginalized communities. Consistent with my theory, I find evidence that the Qatari regime differentiates among the marginalized, selectively providing goods and services to those groups who are the biggest threat of sabotage. A disproportionate share of benefits flow to migrant workers in areas that represent the greatest political and economic threat to the regime. At the same time though, these areas are also targeted with more security installations, military personnel and police.

The rest of the paper proceeds as follows. In Section 2, I begin with a brief survey of existing theory and its implications for authoritarian bargaining. Building on this discussion, Section 3 then introduces the threat of sabotage. Section 4 develops a set of hypotheses on the threat of sabotage and the conditions under which autocrats provide distributive benefits to marginalized groups. In Section 5, I consider the empirical implications for Qatar. I introduce the data, discuss my empirical strategy, and conduct the analysis. Finally, Section 6 concludes with a discussion on the main findings and broader welfare implications.

II.2 Authoritarian Bargaining as Support-Buying

No autocrat rules alone. Even in the most personalistic dictatorship, the ruler depends on the support of key allies and groups within society (**?**Acemoglu et. al., 2009). Most political economic theories of authoritarianism thus reduce to some kind of bargaining game, where the autocrat negotiates with groups, exchanging goods and services for their support. Whether conceptualized as durable coalitions, a collection of corporatist interests, or even popular constituencies, the autocrat must build a support base comprising these vital groups (Bueno de Mesquita et. al. , 2004; Besley and Kudamatsu, 2007; Acemoglu et. al., 2008; Myerson, 2008; Svolik, 2009).

In bargaining with these groups, the autocrat can use various tools at his disposal, both coercive (i.e., repression) and persuasive (i.e., cooptation) (Wintrobe, 1998). Over the long-run though, no autocrat can survive using repression alone (Crystal, 1994). Repression works best in response to some immediate challenge or, as a more blunt instrument, in coercing compliance. These measures are far less effective when it comes to ensuring loyalty or constructing a durable coalition of supporters. To survive and prosper over time, the autocrat needs more than just compliance or passive obedience; he needs active support. And when building such a durable

coalition of supporters, repression will not suffice. The autocrat must ensure that these supporters' loyalty persists even when challenged. By using targeted benefits, the autocrat can tie supporters' welfare to his own, investing them in the regime and its survival (Yom, 2011). Without these private benefits, supporters would defect at the first opportunity or whenever threatened. In short, to achieve real stability, the autocrat cannot simply coerce loyalty, but must purchase it, making support-buying the bedrock of modern authoritarian rule.

Less clear is what exactly this support looks like. More than just political loyalty, we can think of support as some effort made on behalf of the ruler. Autocrats depend on support across a myriad of venues, helping them develop and craft new policies, and manage the state apparatus (Stepan, 1978; Schneider, 1992). In semi-democratic or competitive authoritarian regimes, this support is often channeled through institutions like legislatures (Gandhi and Przeworski, 2006, 2007) and parties (Brownlee, 2007). And yet even in these more institutionalized regimes, political actors depend on support outside formal venues, mobilizing non-electoral support through street politics and militias (Cammett and Issar, 2010; Cammett, 2014). Such support is especially crucial during periods of instability. At other times, support may be more passive, better resembling loyalty to the state (Anderson, 1987), political quiescence, or compliance (Levi, 1989; Tsai, 2011). Absent a direct threat, authoritarian stability depends more on the passive acceptance of the status quo, than actually getting boots on the streets.

Whatever the form, autocrats rely on the support of key groups in society, who vary depending on the specific regime and the coalition of interests that sustain it. Generally speaking, the most valuable of these groups are described as elites. From the banal administration of the state, to monitoring and disrupting opposition movements, elites play a crucial role in regime maintenance and survival. Elites with control over prominent institutions (e.g., the military), or even those outside

the state apparatus (e.g., holding personal fiefdoms in semi-autonomous regions), are especially valuable to the autocrat. By coopting these elites, the autocrat not only builds his support base, but also reduces the number of potential challengers to his rule (at least, so long as they remain coopted). Of course, the loyalty of such a group does not come cheap. But it is a first-order concern, especially during economic crisis, when elite defection threatens even the most stable hegemonic party (Reuter and Gandhi, 2011).

Beyond this elite stratum, autocrats also depend on political support from broader constituencies and social groups. A large support base may deter challengers and, in the case of revolt, serve as a popular bulwark against opposition movements. Facing a mass-uprising, autocrats often rely on para-military organizations and ordinary citizens to help slow the spread of protest (Horvath, 2011). An overwhelming show of support in the streets not only signals the ruler's popularity, but also the regime's power (Smyth, Sobolev and Soboleva, 2013). Such a signal may intimidate the opposition, pushing them to demobilize without having the regime resort to state violence or costly repression. Moreover, even when not under attack, this support can further help to ensure broad compliance from society. A mass support base can "neutralize dissent" while giving the regime much-needed "public credibility" (Yom, 2011, 223). With a large support base, a ruler can expect less dissent or vocal opposition to his policies. At a minimum, the perception of broad regime support may induce preference falsification, discouraging open challenges so long as (true) preferences remain suppressed (Kuran, 1989, 1991).

How much support is needed, and from whom, will vary considerably across states. For regimes steeped in identity politics and countries divided by major cleavages, autocrats tend to build their support coalitions around their own ethnic, sectarian or tribal groups (Khoury and Kostiner, 1990; Abd al-Jabbar and Dawod,

2003). In other cases, the regime relies on constituencies defined by socio-economic characteristics, comprising powerful corporatist interests built around class or sector (Blaydes, 2006; Hinnebusch, 1990). Often times, these cleavages overlap or reinforce each other, sharply dividing society along coalitional lines. While certainly context dependent, all autocrats rely on some set of politically valuable groups, whose support is vital to their survival.

Marginalized groups are notably, though not surprisingly, absent in this discussion. As the disenfranchised, they fall outside of the ruler's selectorate (Bueno de Mesquita et. al. , 2004), let alone elite coalition (Acemoglu et. al., 2008). Having been systematically excluded, the marginalized are precisely those groups lacking any real political or social capital. In practice, they include historically disenfranchised ethnic or sectarian groups like the Shia in Bahrain (Louer, 2013, 2014), poor communities like the stateless *bidoon* in Kuwait (Al-Nakib, 2000), and even recent migrants to a country, like the millions of South Asian workers found throughout the Arabian Gulf (Gardner, 2010). Given their subaltern status, these groups enjoy only some of the rights and benefits conferred upon "full," native-born, and documented citizens. In terms of regime survival, their political support is largely inconsequential, neither helping to defend against a well-entrenched challenger, nor providing legitimacy to a ruler facing revolt. Ultimately, within in a traditional support-buying framework, we should not expect the marginalized to receive any targeted benefits.

II.3 Marginalized Groups and the Threat of Sabotage

And yet despite their exclusion, marginalized groups are not entirely powerless. Even if the autocrat does not need their support, the marginalized can influence regime survival by threatening costly economic sabotage. Whether buying support or coercing compliance, survival does not come cheap, and the autocrat must

continuously raise revenues. Constant revenue generation thus underlies the entire support-buying exchange, making the autocrat's survival dependent on production and the actors critical to this process. The threat of sabotage provides marginalized groups with a potential bargaining power absent from traditional political economic theories of authoritarianism.

Formally, let us define sabotage as *any act that destroys capital or obstructs its creation.* Such a broad and encompassing definition allows for sabotage to be either destructive or obstructive in nature. Destructive sabotage includes more traditional attacks on the economy, like protests, strikes, and violent riots. Each of these acts interrupts production by suspending economic activity and/or depreciating capital. Beyond these material costs, destruction may also influence public perception. Such sabotage is publicly observable and may damage the autocrat's reputation or credibility. This public signal can have major economic effects, scaring off foreign investors and shaking the confidence of local firms. For the saboteur, this observability also implies a greater likelihood of being punished. Even if not revolutionary in scope, destructive sabotage may be seen as a direct threat against the regime and inspire a harsh response.

Sabotage may also be obstructive, slowing down production by withholding some vital input (e.g., labor) or increasing transaction costs. In today's integrated global economy, disrupting supply chains, even just by delay, can have major consequences for firms and investors. Bottlenecks and slowdowns create friction costs, decreasing productivity and leading to unseen deadweight losses. If widespread, such sabotage can be especially pernicious for an economy, and as potentially damaging as destruction. Often hidden from public view, it is difficult to detect obstruction and punish saboteurs. Ultimately, to prevent obstruction, autocrats must provide sufficient incentives to ensure that even the marginalized profit from production and feel invested in the regime.

Table 2.1: Migrant Population and Workforce Across the Gulf

Country	Population Size	% Migrant (Population)	% Migrant (Workforce)
Bahrain	1,234,571	54.0	74.8
Kuwait	3,965,144	68.7	82.9
Oman	3,855,206	43.7	79.9
Qatar	1,699,435	85.7	93.9
Saudi Arabia	29,994,272	32.4	56.0
United Arab Emirates	8,264,070	88.5	92.9

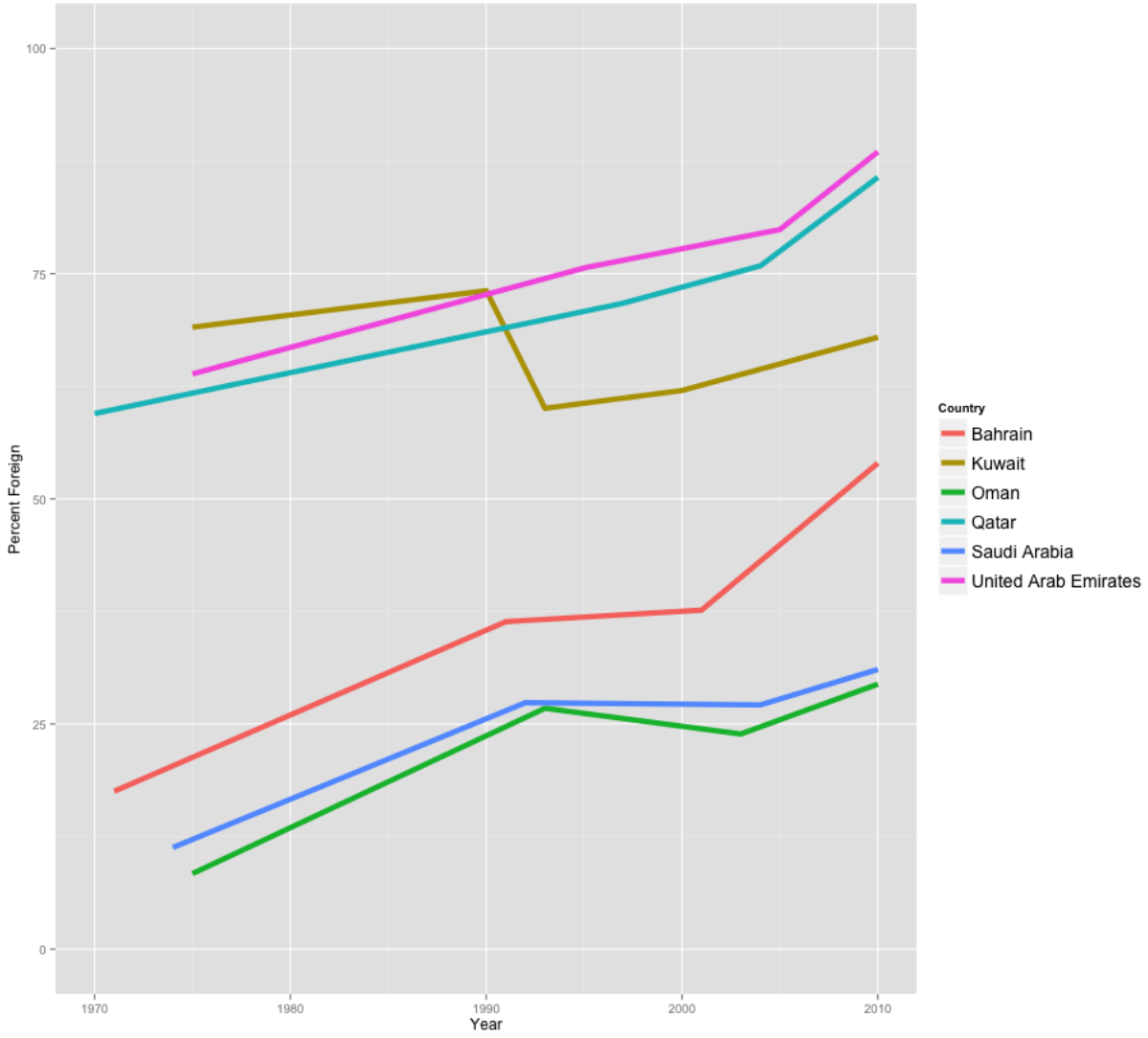
Note: Table reproduced with permission from the Gulf Labor Markets and Migration website. These estimates have been taken from individual country data from 2010 to 2014. See GLMM Website for updated data and country years.

Over the past decade, sabotage has become a growing threat in the Arabian Gulf. Though often cited for its exceptional robustness (Byman and Green, 1999; Herb, 2002), the stability of the Gulf belies an underlying fragility and latent opposition (Okruhlik, 1999). The Gulf states are utterly dependent on marginalized groups, whose critical role in production has made these regimes vulnerable to sabotage. While some of these marginalized groups are nominally citizens and other native-born residents of these countries (e.g., Bahraini Shia or the Kuwaiti *bidoon*), most are migrant workers from Asia. Long-reliant on foreign labor, the Gulf's demand for migrant workers has grown dramatically since the oil-boom of the 1970s (Baldwin-Edwards, 2011; Shah, 2012). Table 2.1 reports the most recent estimates of migrants across the Gulf, as a share of both the total population and active workforce. Non-citizens constitute a majority of the population in all of the Gulf states except Oman and Saudi Arabia, but even in these states migrants clearly outnumber citizens in the workforce.

Foreign workers are employed across all economic sectors, holding positions both banal and critical to these political economies. Without these workers, oil and gas would be left in the ground, floors would remain unswept, and construction sites found vacant. As evident in Figure 2.1, this dependence has only grown over time. Drawing on data from the Gulf Labor Markets and Migration program, we

see that most of the Gulf states experienced a secular a growth in the share of foreigners in their population from 1970 to 2010.[5] This growth has made these states increasingly vulnerable to sabotage.

Figure 2.1: The Change in Foreign Population Over Time



Such vulnerability has resulted in periodic acts of sabotage across the region. At the height of the Arab Spring in 2011, strikes erupted throughout Oman.[6] These

[5]Of the six Gulf states, only Kuwait saw a net decline over this period, which was largely due to the 1991 Gulf War, when many non-citizens fled or were deported for a being seen as a security threat.

[6]Sunil Vaidya. March 9, 2011. "Employees of three companies join Oman protests." GulfNews.com.
May 14, 2011. "Omani forces arrest protesters after clashes." Reuters.

protests even reached the capital of Muscat, where workers blocked exits, seized vehicles and stopped production at a manufacturing estate on the outskirts of the city.[7] A year later, strikes among oil and gas workers briefly compromised energy production, forcing the regime to act quickly and promise concessions.[8] Such strikes have been especially common in the UAE, where in 2013, workers for the prominent construction firm Arabtec refused to report to their job sites.[9] The strike came at an especially inopportune time for the company, which was less than three weeks away from releasing new shares to investors.[10] Arabtec's stock price fell after the first day of the strike, and the work stoppage soon spread from Dubai to Abu Dhabi, affecting major projects across both Emirates.[11]

Though less common, Qatar has also seen the occasional strike or act of public resistance. In November 2014, hundreds of workers from two construction companies went on strike after complaining of poor "pay, accommodations and working conditions."[12] These companies had illegally re-written their workers' contracts and forced employees to accept these new conditions. For days, the strike went unreported, having been contained to a single camp within the worker ghetto of Industrial City. In other cases, however, media quickly report on these stories, like a school bus strike in 2013,[13] and a taxi strike in 2014.[14]

In each of the cases described above, sabotage has been relatively modest in scale and obstructive in nature. These acts have interrupted production and signaled grievances without resorting to destruction. At other times, sabotage

[7] Sunil Vaidya. March 17, 2011. "Omanis go on strike for better pay, conditions." GulfNews.com

[8] June 1, 2012. "Oman's Shura Council to discuss labour unrest tomorrow." GulfNews.com.

[9] May 21, 2013. "Dubai's Arabtec says projects unaffected by strike." Reuters.

[10] Hadeel al Sayegh. May 30, 2013. "Arabtec shares riding high." The National.

[11] Asa Fitch. May 20, 2013. "UAE Laborers in Rare Strike for More Wages." The Wall Street Journal.

[12] Peter Kovessy. November 25, 2014. "Witnesses: Authorities arrest laborers striking over low pay in Qatar." DohaNews.com

[13] September 17, 2013. "Academic: Rare bus driver strike could have ripple effect in Qatar " DohaNews.com

[14] Victoria Scott. January 13, 2014. "Report: Some Al Million taxi drivers strike over pay and conditions." DohaNews.com

has been much more violent, with disgruntled workers and other marginalized groups attacking infrastructure and destroying capital. Protests in Dubai escalated into full-blown riots in March 2006, when workers went on a “rampage" over “harsh working conditions, low or delayed pay, and the general lack of rights" (Kapiszewski, 2006, 12). Oman experienced similar violence with riots and looting in the industrial port city of Sohar in 2011.[15] And no Gulf state has witnessed the same level of destruction and violence as that seen in Bahrain. Bahrain, of course, is admittedly a special case: the regime must not only contend with the challenge from migrant workers, but also the majority Shia population, which has been historically disenfranchised (Louer, 2014). The marginalized Shia community was the driving force behind the uprising of 2011, and continues to stage violent protests throughout the country. These protests have often been distinctly economic, coinciding with Bahrain’s largest international event, the annual Formula One Grand Prix.[16] Protestors have exploited the event’s publicity to send a strong signal to the international community and potential investors.

Whether destructive or obstructive, sabotage is a constant threat to production in the Gulf, giving the marginalized a new weapon to extract concessions from these states. Sabotage can be seen as an extension of James Scott’s seminal work on peasant resistance and the “weapons of the weak" (1985). Scott describes these methods as “informal, often covert," with fundamentally distributive goals that are “concerned largely with immediate, de facto gains" (Scott, 1985, 29-33). Like workers across the Gulf today, Scott recounts how servants could resist their masters “by performing their work carelessly and inefficiently" (1985, 33). Sabotage extends this logic to migrants and other marginalized groups, who are often crucial to their states’ economies but remain exploited and politically excluded. The question then

[15] Sunil Vaidya. February 28, 2011. “One more dead as looting continues in Sohar." GulfNews.com

[16] Alexander Dziadosz. April 21, 2013. “Bahrain stages F1 race amid protests, heavy security." Reuters.

becomes, how do marginalized groups use this influence to extract benefits?

II.4 Policy Responses to the Threat of Sabotage

In its simplest form, my argument is one of bargaining under threat. By incorporating the threat of sabotage into our traditional bargaining theories, we may be able to better capture the role that marginalized groups play across authoritarian regimes. This threat alone may influence the autocrat's distributive calculus. In a world of complete information, we should expect sabotage (at least the more public and destructive acts) to be rare, representing an out-of-equilibrium behavior. If feasible, the autocrat would prefer to prevent sabotage altogether, responding in anticipation to the threat before it becomes a reality. We can think of this threat as an expected cost, comprising two parts: the risk (or likelihood) of an attack, and the potential cost (or economic losses) incurred from sabotage.

First consider the risk of sabotage. Even if the potential costs are significant, the actual threat of sabotage may be negligible if attack is a low-probability event. The likelihood of sabotage depends on a group's capacity to overcome the many hurdles that plague collective action. These same challenges may undermine sabotage as well, making it harder for marginalized groups to credibly threaten production. Coordination is be especially difficult when the marginalized do not represent some homogeneous group or class. Lacking a common language, culture or religion, diversity can undermine broader attacks (Gardner, 2012). At the same time, authoritarian regimes may use spatial segregation to further divide groups, frustrating collective action while also helping monitor movement and opposition activity. These passive forms of repression are instrumental to disrupting coordination among groups and decreasing the threat of sabotage. Marginalized groups unable to credibly threaten sabotage will not enjoy the same kind of influence when bargaining with the autocrat as those groups who can overcome

such challenges.

Notwithstanding the many hurdles described above, groups can more easily coordinate when they are densely concentrated in a given area and can regularly interact. In expectation, the risk of sabotage should be increasing in areas where marginalized groups predominate. All things being equal, it is easier to coordinate when groups live near each other or share a common workplace (e.g., construction site or factory). Repeated, local interaction makes communication possible, helping groups overcome basic coordination problems. Such communication is critical when it comes to more expansive campaigns of sabotage, like those seen in Bahrain in 2011 and in the UAE in 2013.

In addition to risk, sabotage threat also depends on the severity or potential cost of an attack. Losses may be strictly economic (e.g., destruction of capital, reduced productivity), or take the form of broader reputation costs (e.g., increased uncertainty among investors and other regime supporters). These costs should be increasing in the degree to which marginalized groups can attack sensitive areas or vital economic sectors. Marginalized groups in the proximity of government installations and other administrative buildings represent a major threat to the regime, especially when sabotage is destructive or takes the form of open resistance. In Oman in 2011, protests were often located in highly public areas (like a prominent downtown traffic-circle) or near government buildings, which helped to maximize attention. The publicity of such a protest compounds any direct economic costs, shaming the regime in the eyes of the international community and investors.

Access to critical sectors thus increases a group's sabotage potential. All things being equal, interrupting production within vital economic sectors is more costly, making marginalized groups employed in these industries a greater potential threat. Which sectors are particularly critical to the economy is, of course, context dependent, reflecting the relative endowments of the state and how these different

industries or sectors contribute to production. At a more micro-level, the threat of sabotage is increasing in areas where marginalized groups can easily attack these sensitive targets. In purely spatial terms, this access could be simple distance: increasing proximity to potential targets makes it easier for protestors to march to a government structure or factory. When marginalized groups reside near these buildings or industries, the threat of destructive sabotage may be especially pronounced. Alternatively, we could think about access in terms of employment and the individual's capacity to slow down production within the workplace. This form of sabotage is typically covert and obstructive. To the extent the marginalized reside near their places of work, these two forms of access (and distinct modes of sabotage) should largely coincide. It becomes more problematic, however, when these groups are not employed in the same areas in which they reside, attenuating the relationship between access and distance.[17]

Taken together, the threat of sabotage should be greatest in areas where both the risk of attack *and* potential costs are high. These conditions jointly determine the relative threat of sabotage, both across regimes and within them. Such variation further implies that the autocrat should condition his response, differentiating among marginalized groups according to the relative threat they pose. The question remains though, given such a threat, how will the autocrat respond?

The multiplicity of policy instruments offers the autocrat great flexibility, allowing him to tailor his response to the distinct demands and challenges that he faces. Cooptation is an especially attractive option for autocrats hoping to avoid sabotage altogether. At their most effective, these measures are preemptive, pacifying marginalized groups and removing threats before they result in actual attacks. Although in principle the autocrat may use broad policy concessions to coopt the marginalized (Malesky and Schuler, 2010), these measures are less preferred than

[17] I return to this problem in the empirics below and consider how this issue constrains the analysis.

more targeted benefits. In competitive authoritarian regimes, electoral strategies often depend more on the delivery of patronage than on large policy concerns (Lust-Okar, 2006). Distributive goods and services provide geographically concentrated benefits, allowing for more granular targeting and clientelistic exchanges (Cammett and Issar, 2010). Moreover, policy concessions can set a dangerous precedent, relaxing the autocrat's control and opening up space for future challenges. This concern may be especially acute in countries with large marginalized populations, where major concessions could very well mean the end of the regime and the rigid hierarchy that sustains it. If broad policy concessions can be avoided, autocrats would prefer to do so with targeted benefits, buying off groups/areas depending on their relative threat. This prediction is formalized in the following hypothesis.

Hypothesis 1: Targeted benefits should be increasing in areas that represent a greater threat of sabotage.

The targeted provision of distributive goods likely represents a first-best response for the autocrat. It improves welfare (without making major concessions), helping to resolve grievances and invest marginalized groups in the system. Targeted at those groups or areas that represent a greater threat, these benefits should reduce the likelihood and severity of sabotage. But such a policy may not always be possible or preferred. This cooptive strategy resembles support-buying and, as such, can become prohibitively expensive or simply infeasible. If groups are not segregated or cleanly sorted, such a differentiated response may be impossible and targeted benefits less efficient. In which case, the autocrat may employ a more repressive approach, coercing compliance instead of buying support. Crucially though, these approaches need not be substitutes and may be used simultaneously, working through different channels or even complementing each other.

Whereas the cooptive strategy is agnostic to the specific mode of sabotage (i.e., it works to discourage both destruction and obstruction), repressive tools are often more flexible and conditionally effective. Active forms of repression are especially useful when a regime is threatened by destructive sabotage, making investments in military and police forces crucial. Overt challenges to the regime (e.g., violent riots), can be suppressed with the rapid deployment of security forces, which we should expect to be located in areas that represent the greatest threat of destructive sabotage. Alternatively, such coercive instruments are less useful when responding to the threat of obstruction. Often hidden, these acts of sabotage must first be identified, making surveillance technologies, monitoring devices and other forms of passive control more effective. All told, this logic leads to the following two hypotheses.

Hypothesis 2a: As the threat of *destructive* sabotage increases, the autocrat should draw on more active forms of repression (e.g., military/police personnel and equipment).

Hypothesis 2b: As the threat of *obstructive* sabotage increases, the autocrat should draw on more passive forms of repression (e.g., censorship, segregation).

Collectively, these hypotheses offer an explanation to the motivating puzzle that began this paper. In short, autocrats provide benefits to marginalized groups to prevent sabotage. Neither benevolent nor universal, the autocrat targets these benefits to those groups that represent the greatest threat to economic production. Beyond simply incorporating the marginalized into a traditional bargaining framework, this argument also differentiates among these groups. Such nuance is critical to explaining why some marginalized groups receive benefits and

others do not. To test my theory, I return to the case of Qatar in the next section, where I evaluate the degree to which distributive policies respond to sabotage threat.

II.5 Segregation and Distributive Targeting in Qatar: An Empirical Test of Sabotage

Having developed my general theory of bargaining under the threat of sabotage, I now consider the theory's main predictions situated within the Qatari context. A small peninsula in the Arabian Gulf, Qatar is an absolutist monarchy with vast resources and a small native citizen population. By any standard measure, Qatar can be classified as authoritarian.[18] Absent democratic institutions, Qatar resembles many other autocratic states with power highly consolidated among a narrow elite. In this case, these elites are mostly members of the royal family, the Al Thani, who dominate the state apparatus and have vast influence throughout the private sector (Herb, 1999). Along with a monarchical culture built around credible commitment, the Qatari regime has effectively managed internal elite conflicts, avoiding bloody coups and other costly transitions (Menaldo, 2011, 2012). As the quintessential rentier state, the regime's support is predicated on a generous welfare system (Yom, 2011). Subsidies, public sector jobs and housing grants are just some of the many benefits offered citizens, which help buy the population's support while growing the state's presence and control over the everyday lives of its citizens.

Yet however robust this regime and broad its support base, Qatar remains utterly dependent on foreign workers, a systematically marginalized population whose numbers (and grievances) have only grown over time. At its last census in 2010, Qatar's population was estimated to be nearly 1.7 million, of whom 86 percent were non-citizens. This demographic imbalance is even greater in the workforce, with

[18] From 1971 to the present, Qatar has received a Polity score of -10, the lowest possible.

Table 2.2: Foreign Workers Across Economic Sectors in Qatar

Sector	Workers
Agriculture and fishing	17,070
Mining and quarrying	80,654
Manufacturing	99,871
Electricity, gas, water and waste management	3,310
Construction	505,721
Motor vehicle sales and repairs	140,940
Transportation and storage	33,249
Accommodation and food service activities	28,961
Information and communication	6,877
Financial and insurance activities	7,911
Real estate activities	8,132
Professional, scientific and technical activities	20,067
Administrative and support service activities	38,795
Public administration and defence	30,124
Education	18,171
Human health and social work activities	15,570
Arts, entertainment and recreation	4,350
Other service activities	5,307
Activities of households as employers	132,401

Note: Qatar Statistics Authority, Census 2010.

foreign labor accounting for nearly 94 percent of the employed population. Table 2.2 reports the estimated number of foreign workers by economic sector in Qatar in 2010. Unsurprisingly, construction is the most popular sector at just over half a million workers. Foreign workers are nonetheless found in large numbers across various sectors, employed in household activities, manufacturing and other service industries. While individual workers may be seen as replaceable, as a class, they are indispensable to Qatar's economy.

Although a majority of the population, foreign workers enjoy few of the rights and protections conferred upon Qatari citizens. This politically disenfranchised population is left vulnerable to systemic abuse, which some critics have alleged is tantamount to "indentured servitude" under "near-feudal conditions."[19] Human

[19]Richard Morin. "Indentured Servitude in the Persian Gulf." The New York Times. April 12, 2013.

rights groups and other non-governmental organizations have detailed these abuses, releasing a series of scathing reports over the past few years.[20] These conditions are not unique to Qatar. Across the Gulf, migrant workers confront structural hurdles that limit their capacity to seek redress or even protect themselves (Longva, 1997; Gardner, 2012). Many of these hurdles are by design, and rooted in the body of immigration law known as the *kafala*. The *kafala* system requires that non-citizens be sponsored by a citizen or company if they are to be granted entry for work in Qatar. Continued employment and legal residence is conditional on this sponsorship. Even in cases where the terms of their contracts have been grossly violated, workers cannot change jobs or leave the country without the permission of their sponsors.

Notwithstanding their marginalized status, even migrants in Qatar are not entirely powerless. It is precisely this combination of growing grievances, a lack of alternative options, and profound economic importance that makes these migrant workers such a significant threat of sabotage. In recent years, small-scale strikes have begun to make news in Qatar, inspiring fears that the country could soon see sabotage as that found throughout the Gulf. According to Qatar's 2013 annual economic report, falling labor productivity has resulted in "a non-oil and gas economy operating below its potential" (QEO, 2013, 9). The report further warned that capital investments alone could not solve these inefficiencies, and "would require changes in the incentives faced by various actors in Qatar's labour market" (QEO, 2013, 9). With oil prices having fallen precipitously in recent months, productivity losses in non-energy sectors have come at an especially inopportune time. And Qatar has now begun to curb spending as it predicts its first budget deficit since 2000.[21]

[20] For recent examples, see ?Human Rights Watch (2013); (Amnesty International, 2013, 2014).

[21] Peter Kovessy. "Qatar forecast to run first budget deficit in more than a decade." Doha News. March 4, 2015.

Data and Empirical Strategy

Hoping to maintain production and, at least, prevent more costly acts of sabotage, the Qatari state has begun to target benefits to marginalized groups. If my theory is correct, the regime should differentiate among marginalized groups, varying targeted benefits according to a group's sabotage threat. Such a strategy operates at a local level (e.g., camps and housing compounds), having testable implications for the spatial distribution of goods and services across Qatar.

In testing my theory, I draw on a unique spatial dataset. Most of the data were collected by the Qatari state as part of their urban planning and development strategy. These data are broken into a series of GIS files gathered by different government agencies. Of these files, I focus on two: water and electricity, and landmarks. The water and electricity data serve as a master file, comprising data on all utilities customers in Qatar. All told, the utilities data include nearly 160,000 unique customers (i.e., structures on the grid). Along with spatial coordinates and other geographic markers, this file includes information on the type of customer (e.g., residence, government, or firm). In addition to this master file, I also draw on the landmarks data, which supplements the water and electricity data by providing more detailed information for coding a structure's type of service or industry.

Recognizing the potential power of spatial planning, Qatar was an early adopter of GIS technologies and data. Through spatial planning and social engineering, the new Qatari state could be deliberately designed to meet the regime's needs. With state control over the provision of housing plots and construction grants, the government could essentially decide where citizens would live (Nagy, 2006). And as foreign labor became instrumental to development, this control also extended to the location of worker camps and expatriate housing. Spatial planning helped to erect (quite literally) concrete divisions among communities. Walled behind state-located villas and firm-controlled compounds, Qatari society has been effectively

and wholly segregated.

The effects of this spatial policy can be readily seen throughout Qatar, as evident in Figures 2.2-2.4. These three figures spatially map the density of different housing types across the country. Roughly, we can break down the population into three general categories: native citizens, high-skill (largely Western) expats, and low-skill (largely Asian) migrants. These three communities map onto distinct housing types. Villas are allotted to citizens, flats (i.e., apartments) to high-skill expats, and camps for low-skill migrant workers. When we compare the distributions of these three housing types, we can see the clear effects of sorting on communities. Citizens are the most widely spread group throughout the country, while expats are almost entirely concentrated in one area in the North-East part of Doha. The density plot of camps suggests a different distribution altogether for migrant workers. While not as uniformly distributed as villas, camps are much more spread out than flats, reflecting the demand for workers across Qatar. In Appendix B, I draw on tools from spatial statistics to formally show this segregation across a series of figures, plotting Ripley's K-function for different housing types.

Without gainsaying the broader normative and welfare implications of this policy (a point to which I return later), this communal segregation plays a crucial role in my analysis. I exploit this spatial sorting to evaluate my theory, investigating whether benefits and repression are disproportionately located in areas that represent the greatest threat of sabotage. For the regime, this spatial planning and policy choice operates at a local level across different *zones*. The state of Qatar is divided into 87 distinct zones, most of which are found in or near the capital city of Doha. Zones are not only simple administrative units, but are instrumental to the regime's spatial planning and segregation policies. Different zones have been planned to house specific groups or communities, depending on nationality and socio-economic position (Nagy, 2006; Gardner, 2012). Of course, complete

Figure 2.2: The Density of Villas Across Qatar

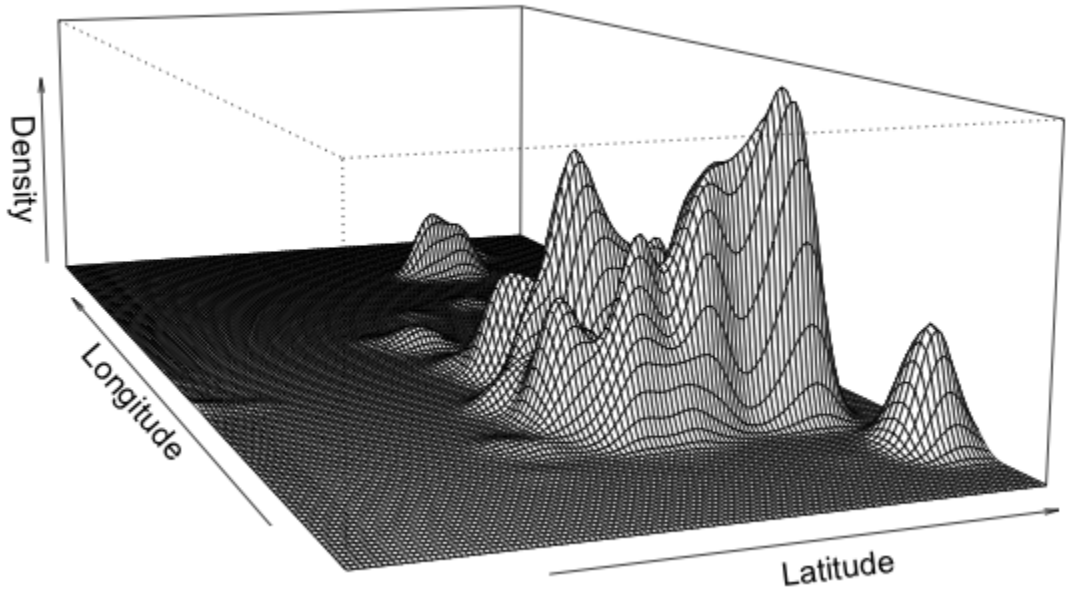


Figure 2.3: The Density of Flats Across Qatar

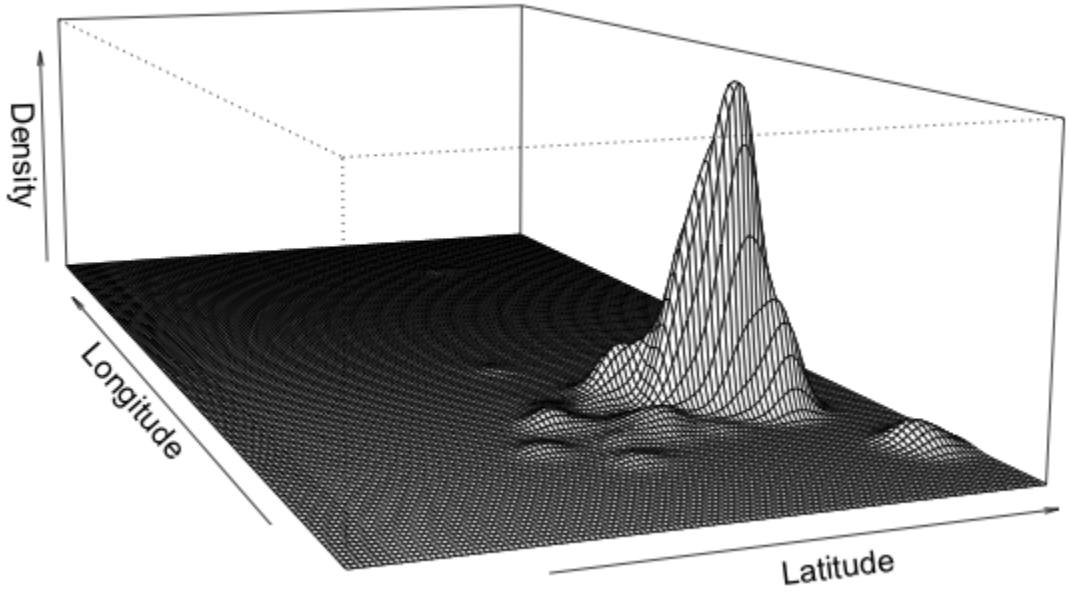
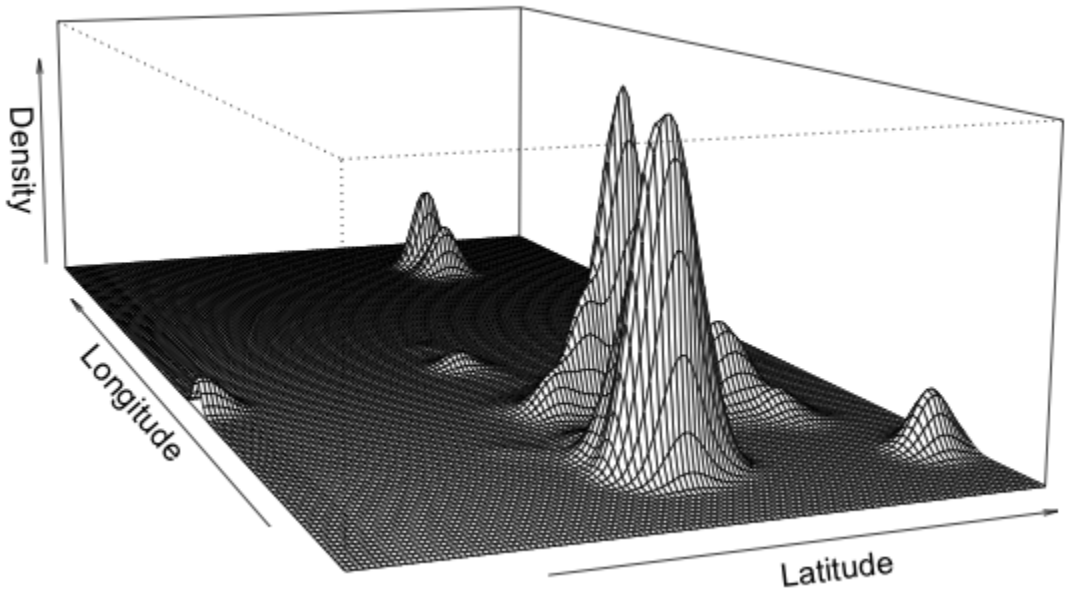


Figure 2.4: The Density of Camps Across Qatar



segregation is impossible, and some zones are more starkly segregated than others. I leverage this variation to evaluate the degree to which sabotage threat translates into targeted benefits for (some) marginalized communities in Qatar.

Using the GIS files described above, I begin my analysis by coding each observation according to household type or service. I then group these coded observations by zone to create a series of count variables. For dependent variables, I construct two measures that represent benefits: *Utilities* and *General Services*. The *Utilities* variable is a composite measure of basic utilities, like drainage and toilets. Good drainage and access to waste services is critical for workers living in communal camps. In Dubai, some of the most severe protests came out of disgruntled workers frustrated with poor drainage and unhygienic living conditions (Krane, 2009). The *General Services* variable is a category defined within the government GIS files and comprises various transport, shipping, and other services.[22] Given the migrant's transnational status, these services are a crucial

[22]Note that some of these services may be provided, at least nominally, by the private sector. I say nominally because the reality in Qatar is much more complicated in practice. First, there is

link home, connecting the migrant to his or her family and allowing for easier transmission of goods. Finally, I have also coded a measure for repression, which I call *Security Installations*. For this variable, I simply use the GIS files' coding for military barracks and police stations.

Each of these outcome measures are count variables at the zone-level. These counts can vary widely across Qatar. Given the spatial nature of the data, rather than plot these variables as simple histograms, I have created a series of heat maps (Figures 2.5-2.7) for each outcome measure. *General Services* and *Utilities* appear to have similar distributions, with the former slightly more spread throughout the country, and the latter more concentrated around Doha. The *Security Installations* have a much different distribution, found predominantly in the North-Western side of the country, partly reflecting the need for military bases on Qatar's border with Saudi Arabia.

a real question as to the degree to which the public and private sector actually represent distinct sectors. Across many industries, especially those crucial to state development (e.g., energy), the state either owns firms outright or holds major/controlling shares. Second, even if firms are wholly private, their location is not the product of market forces. Rather, firm location is a function of state planning, with the government agencies explicitly allocating plots of land for private use. Central planning gives the regime incredible power over the targeting of goods and services, even those provided by the private sector.

Figure 2.5: A Heat Map of Utilities Across Zones

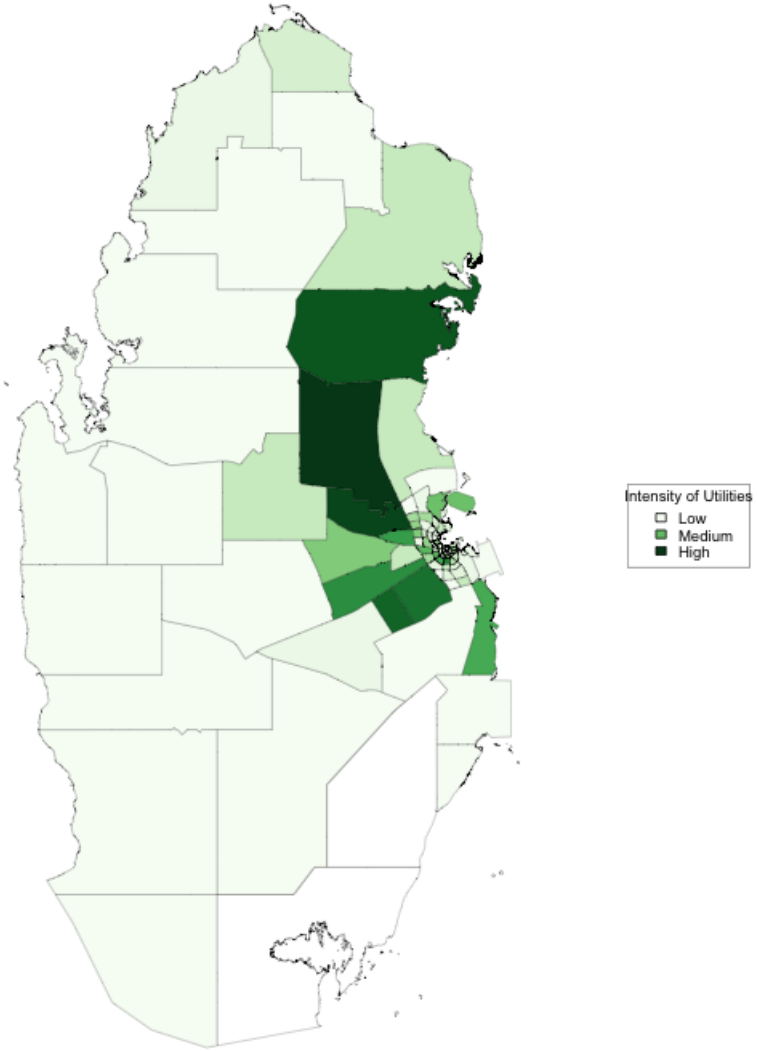


Figure 2.6: A Heat Map of General Services Across Zones

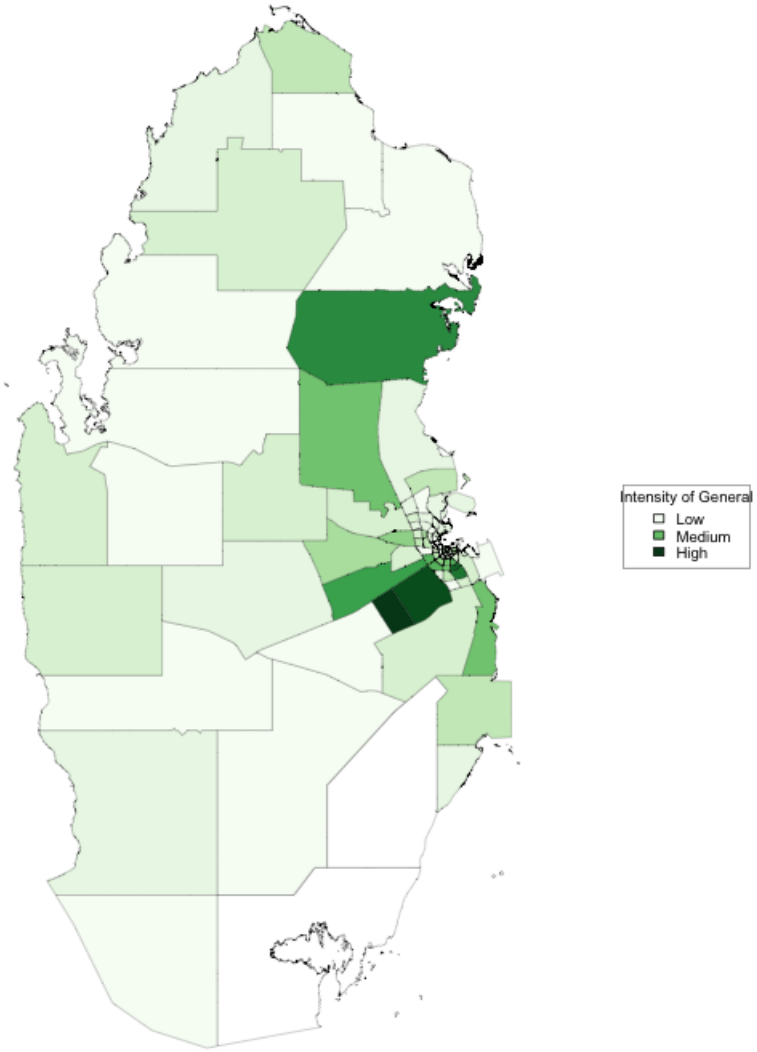


Figure 2.7: A Heat Map of Security Installations Across Zones

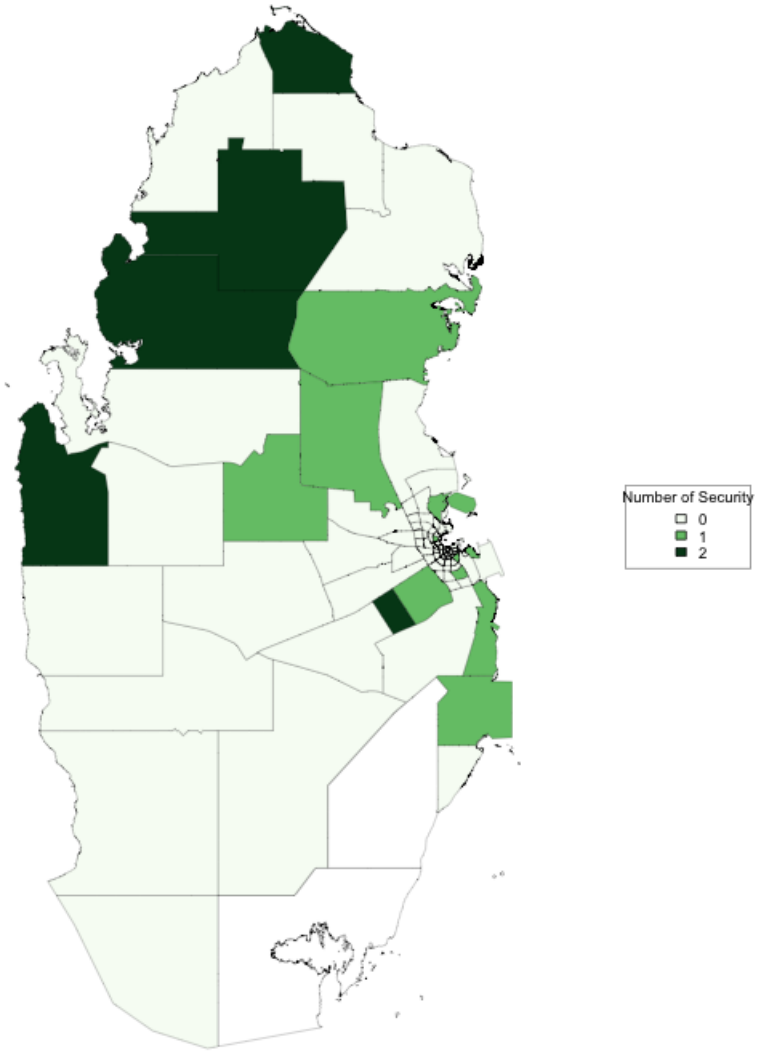
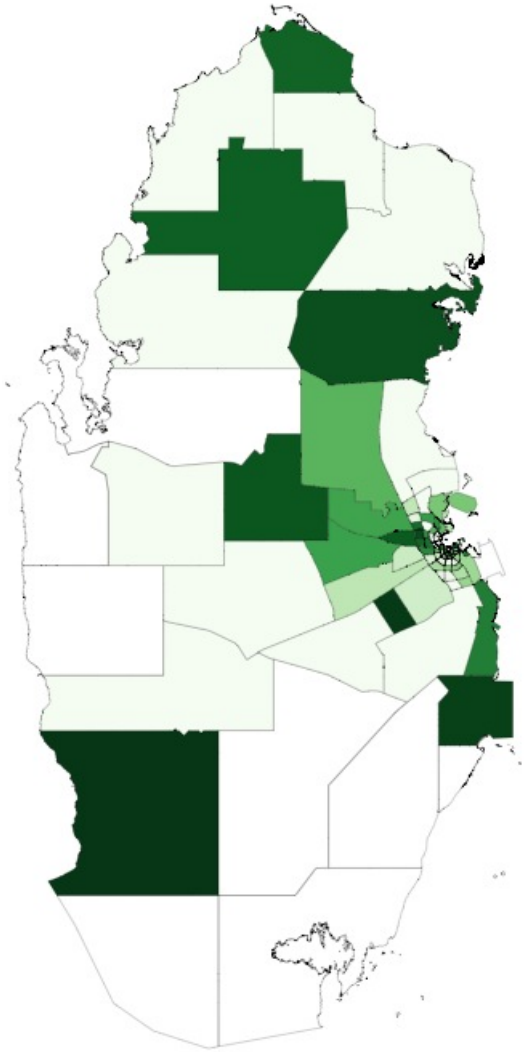


Figure 2.8: A Heat Map of Camps Across Zones



I also use these data to code a series of independent variables, which operationalize the threat of sabotage. Recall that the first component of sabotage threat is risk. In capturing risk, I construct a variable that represents the relative share of migrant workers in a given zone. This variable is called *Camps*, and is a ratio of migrant camps to the total number of residences in that zone. A ratio captures the relative dominance of workers in an area. As workers come to dominate a given zone, they represent an increasing threat. If sabotage depends on reaching some critical mass, then risk should be increasing in the relative presence of migrants. As with the dependent variables above, I have created a heat map for this *Camps* measure. Consistent with the density plot from before, we see a non-uniform distribution of camps in Figure 2.8. The intensity of camps clearly varies across Qatar, with some zones being majority-migrants and others only having a small share.[23]

As for the potential cost of sabotage, I consider a couple of measures. The most direct and costly target of sabotage would be government administrative buildings and other state-owned installations. Public opposition around these buildings or industries is a major risk to the regime and the reputation it has cultivated. In addition to government installations, the regime should be especially concerned with sabotage in areas where media and international audiences can easily observe them. Acts of sabotage cannot be easily ignored or hidden from the public when camps are located near media or foreign embassies, making these public attacks even more costly for the regime. The count variable *Government* captures these public concerns, summing the number of (non-security) government buildings, media and any foreign embassies in a given zone.

While perhaps less direct of a challenge, attacks on the private sector are also

[23]Note that this measure suffers from one major weakness: it is a count of camps and not workers. As with the other residences, the water and electricity data identify households, not individuals. As such, we should be cautious about interpreting the net welfare effects since we do not have a real per capita measure.

integral to my theory of sabotage. To capture this threat, I construct a count of the total number of firms in each zone. This variable, called *Firms*, is a simple but coarse measure of the potential cost to production from sabotage in a given zone. We can think of this count as roughly capturing economic production or activity across zones. All things being equal, acts of sabotage in highly productive areas should have a greater cost, interrupting more economic activity than in other, less productive areas.

Finally, in addition to the independent variables described above, I also include a control for *Population Density* by zone, which comes from Qatar's 2010 Census. The measure divides each zone's population by its area in kilometers squared. Population density is a crucial factor in state planning, particularly in Qatar where some areas vary widely in population size and area. Few distributive goods are truly non-rivalrous, making such density measures a crucial tool for urban planners looking to avoid shortages or congestion effects. Descriptive statistics for all of the variables used in this analysis can be found in Table 2.3.

Table 2.3: Descriptive Statistics

Statistic	Mean	St. Dev.	Min	Max
Camps	0.037	0.153	0	1
Utilities	4.114	5.084	0	24
General Services	2.659	3.529	0	19
Security	0.239	0.547	0	2
Government	13.898	16.004	0	82
Firms	14.182	75.507	0	696
Manufacturing	0.29	0.385	0	1
Non-Manufacturing	0.357	0.415	0	1
Population Density	4,886	8,087	0	43,094

Note: The variables for Camps, Manufacturing and Non-Manufacturing are proportions. The Utilities, General Services, Security, Government, and Firms are all counts. The Population Density measure is population divided by zone size (in km^2).

Analysis and Results

Having described the data, I now discuss my estimation strategy. Normal OLS is generally considered inappropriate when the outcome measures are count variables. Moreover, the distribution of these services across Qatar appears significantly skewed and possibly over-dispersed. To model this over-dispersion, I estimate a series of Negative Binomial models, regressing the various goods and services on sabotage threat.[24] For each of the three outcome measures described above (i.e., *Utilities*, *General Services* and *Security Installations*) I estimate the following two specifications:

$$\begin{aligned} Count &= \alpha + \beta_1 Camps + \beta_2 Government + \beta_3 Camps \times Government \\ &\quad + \beta_4 Controls + \theta + \epsilon \\ Count &= \alpha + \beta_1 Camps + \beta_2 Firms + \beta_3 Camps \times Firms \\ &\quad + \beta_4 Controls + \theta + \epsilon \end{aligned}$$

The *Camps* variable represents the risk of sabotage, while the *Government* and *Firms* variables capture the potential costs. The interaction between risk and costs (i.e., *Camps x Government* and *Camps x Firms*) represent the threat of sabotage in a given area. For each model, this interaction term is the main quantity of interest and we should expect it to be positive (i.e., $\beta_3 > 0$). In addition to these two specifications, I also estimate models with and without Municipality fixed effects.[25] Qatar's 87 zones are aggregated into seven broader Municipalities. Along with the control for *Population Density*, these Municipality fixed effects should help

[24] As a robustness test, I have also replicated these results with a standard Poisson Regression and Zero-Inflated Negative Binomial. The results are qualitatively the same.

[25] The inclusion of Municipality fixed effects helps further control for unobservables, particularly those that may be associated with different regions across the country. If the results were being driven by some particular Municipality (e.g., the capital of Doha or the gas-rich Ras Laffan), then we would expect the fixed effects results to differ markedly.

capture some of the underlying demand and planning considerations that drive the provision of goods and services across Qatar.

Table 2.4 reports the estimates from the Negative Binomial Models when using the *Government* variable. The dependent variable in the first two columns is *Utilities*, the next two are *General Services*, and the last two are *Security Locations*. We see that the coefficient on *Camps* is negative across all outcome variables, but the significance varies considerably. The coefficient on the *Government* measure is positive and highly significant, at least for the *Utilities* and *General Services*. Of greatest interest is the interaction term *Camps x Government*. As the theory predicts, the coefficient is positive and highly significant across all specifications. The negative coefficient on *Camps* suggests that when the potential cost of sabotage is relatively low (i.e., there are no media or government targets in the area), increasing the number of camps reduces benefits (either measured as *Utilities* or *General Services*). However, conditional on government or media in the area, increasing the number of camps results in more benefits and security. All told, these results provide suggestive evidence consistent with both the conventional wisdom and my theory of sabotage. Although migrant-dominant areas generally receive fewer benefits, increasing their proximity or access to government buildings and media makes it more likely that these areas will receive more services, both beneficial and potentially repressive.

Table 2.4: Sabotage Threat as Proximity to Government Buildings

	Dependent variable:					
	Basic Utilities	Basic Utilities	General Services	General Services	Security	Security
	(1)	(2)	(3)	(4)	(5)	(6)
Camps	−5.802**	−5.644*	−2.169***	−0.634	−2.813*	−3.734
	(2.270)	(2.948)	(0.609)	(0.883)	(1.649)	(2.555)
Government	0.036***	0.045***	0.032***	0.048***	0.014	−0.001
	(0.005)	(0.006)	(0.005)	(0.007)	(0.010)	(0.019)
Camps x Government	0.440***	0.436**	0.284***	0.189***	0.409***	0.467***
	(0.140)	(0.181)	(0.053)	(0.065)	(0.125)	(0.180)
Population Density	0.00004***	0.00003***	0.00003***	0.00002	−0.0001	−0.00003
	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.0001)	(0.0001)
Constant	0.476***	0.353**	0.109	−1.113***	−1.621***	−17.281***
	(0.178)	(0.145)	(0.181)	(0.169)	(0.477)	(1.411)
Municipality FEs		Yes		Yes		Yes
Observations	80	80	80	80	80	80
Log Likelihood	−183.210	−176.843	−158.647	−152.985	−42.804	−39.754
θ	2.866***	3.720***	2.422***	3.256***	1,862.650	3,271.829
AIC	376.421	375.686	327.294	327.970	95.608	101.508

Note: Negative binomial regression with robust standard errors; *p<0.1; **p<0.05; ***p<0.01

Table 2.5 reports the results when using the *Firms* variable as a measure of potential cost. The coefficients on the *Camps* and *Firms* variables are broadly consistent with the previous results and our expectations. All things being equal, benefits are decreasing in areas with a lot of migrants (i.e., a greater density of *Camps*), but increasing where there is significant economic production (i.e., a greater density of *Firms*). These negative and positive associations, respectively, also correspond to the earlier results when using *Government* as a measure of cost. Yet despite these similarities, we immediately see a major difference when we consider the interaction term for *Camps x Firms*. Contrary to the theory's prediction, the interaction term is negative and highly significant. This result implies that conditional on the number of *Firms* in an area, increasing the prevalence of *Camps* actually reduces goods and services in that zone. Not only does this result run counter to my theory of sabotage, but also the findings from the previous set of estimations. It is not clear why increasing the share of camps actually produces fewer benefits (or security) in economically dense areas. Although this negative result is less robust than the positive estimates above, it remains troubling for the theory.

Table 2.5: Sabotage Threat as Proximity to Firms

	Dependent variable:					
	Basic Utilities	Basic Utilities	General Services	General Services	Security	Security
	(1)	(2)	(3)	(4)	(5)	(6)
Camps	−4.250***	−4.082***	−0.430	−0.930**	0.511	−0.099
	(1.087)	(1.105)	(0.461)	(0.387)	(1.023)	(0.847)
Firms	0.015***	0.017***	0.015***	0.016***	0.012**	−0.001
	(0.005)	(0.006)	(0.004)	(0.005)	(0.005)	(0.007)
Camps x Firms	−0.013*	−0.015*	−0.016***	−0.018***	−0.012*	0.009
	(0.007)	(0.008)	(0.005)	(0.007)	(0.006)	(0.010)
Population Density	0.00000	0.00002*	−0.00000	0.00001	−0.0001	−0.00003
	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.0001)	(0.0001)
Constant	1.386***	1.350***	0.848***	−0.034***	−1.275***	−17.296***
	(0.169)	(0.011)	(0.158)	(0.009)	(0.330)	(1.159)
Municipality FEs		Yes		Yes		Yes
Observations	80	80	80	80	80	80
Log Likelihood	−203.903	−196.415	−171.097	−168.715	−44.631	−39.580
θ	1.130***	1.505***	1.279***	1.422***	1,335.311	3,302.931
AIC	417.805	414.831	352.193	359.429	99.262	101.161

Note: Negative binomial regression with robust standard errors; *p<0.1; **p<0.05; ***p<0.01

There are a couple of possible explanations for this surprising result. The first, and most obvious: the theory is simply wrong. The threat of sabotage– at least, as it has been operationalized here– may not provide the marginalized with any bargaining power to extract distributive concessions. If the theory were wrong, however, we might have expected to find a similarly negative relationship in the previous table as well. Instead, we find that one interaction term is positive and the other negative: one provides support for the theory, while the other contradicts it. But suppose the negative result is correct, it is not easy to even explain such a relationship. In falsifying the theory, we may have suspected a null result, which would suggest that the regime makes no distinction between camps across areas of varying economic productivity. The negative result instead implies that camps in economically dense areas receive fewer goods and services. Even if the autocrat does not fear sabotage in these areas, it is not clear why he would withdraw benefits or security.

Alternatively, this result may simply reflect the coarse, noisy measurement of the *Firms* variable. This measure is meant to capture economic productivity, with the assumption that sabotage would produce greater costs in areas with more firms. Such an assumption, however, may be problematic, as it treats all firms as if they are the same. Firms differ in various ways, from their size, internal organization, and workforce. These differences should have major implications for the relative threat (and potential cost) of sabotage. It may be the case that costly and effective sabotage depends on particular firm features, which make some firms more or less susceptible to sabotage.

Ideally, we could tease out these differences with firm-level data. Unfortunately, the GIS files do not provide information on such covariates. What we can determine, however, is the respective sector or industry of these firms. While not a perfect proxy for the many differences between firms, this sectoral dimension is at least

a good place to start unpacking the counterintuitive result from above. The cleanest and perhaps most obvious division is that between manufacturing and non-manufacturing firms in Qatar.

This breakdown has both theoretical and empirical advantages. Returning to the theory, the costs of sabotage should be greater in areas where marginalized groups can organize, coordinate and gain access to valuable targets. Collective action of this form often begins in the workplace, and may be easier in some industries than others. On the factory floor, workers can communicate and share grievances, and have ready access to the means of production. Workers in other sectors, like finance, tourism or domestic services, have far less opportunity to interact with their co-workers. For Qatar, in particular, the difference between factory and non-factory workers should be even greater. Factory workers are perhaps the most likely group to actually live near their place work in Qatar. Zoning laws have pushed migrants and factories outside of the main population centers, creating "bachelor cities" (Gardner, 2012, 3), which may have inadvertently made sabotage a greater threat. Workers in other industries often have to take a company bus or public transportation to their workplace. This is especially true for workers in Doha, who often have to travel across the city, moving across many zones. For these workers, living in an economically dense area may not represent their capacity to target their own firms or commit sabotage, introducing significant noise in the *Firms* variable.

Using sectoral codings, we can now better represent the production profile of a given area to better capture how different zones more or less depend on distinct industries or particular sectors of the economy. To do this, I first code each firm as either manufacturing or non-manufacturing. For each zone, I then create two variables: *Manufacturing* and *Non-Manufacturing*, which are simply the shares of each industry in that zone. These shares or ratios are computed by dividing the number of manufacturing and non-manufacturing firms by the *Firms* variable.

Table 2.6: Sabotage Threat in Manufacturing Areas

	Dependent variable:					
	Basic Utilities	Basic Utilities	General Services	General Services	Security	Security
	(1)	(2)	(3)	(4)	(5)	(6)
Camps	−5.575***	−6.020***	−0.388	−0.786***	0.393	−0.349
	(1.632)	(1.919)	(0.311)	(0.290)	(1.004)	(0.879)
Manufacturing	1.044***	0.814***	0.834***	0.813***	0.537	0.477
	(0.274)	(0.255)	(0.291)	(0.290)	(0.580)	(0.602)
Camps x Manufacturing	6.528***	7.432***	2.348***	2.787***	3.221**	4.462***
	(1.668)	(1.963)	(0.543)	(0.552)	(1.550)	(1.394)
Population Density	−0.00000	0.00001	−0.00000	0.00000	−0.0001	−0.00003
	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.0001)	(0.0001)
Constant	1.118***	0.570**	0.673***	−0.814***	−1.403***	−17.775***
	(0.159)	(0.254)	(0.154)	(0.290)	(0.404)	(0.835)
Municipality FEs		Yes		Yes		Yes
Observations	80	80	80	80	80	80
Log Likelihood	−199.714	−193.400	−170.935	−168.897	−44.413	−39.215
θ	1.311***	1.747***	1.269***	1.400***	1,438.034	3,221.517
AIC	409.428	408.800	351.871	359.795	98.826	100.431

Note: Negative binomial regression with robust standard errors; *p<0.1; **p<0.05; ***p<0.01

Using these variables, I then re-estimate the models from before, now considering how the threat of sabotage may work through different sectors. If sabotage threat operates through a specific sector, we should expect the interaction term between *Camps* and that sector to be positive. As Tables 2.6 reveals, when we include the *Manufacturing* variable, the results closely resemble those from Table 4. Along with a negative coefficient on *Camps* (significant in three of the six models), the interaction term *Camps x Manufacturing* is positive and significant across all outcome measures and specifications. This result is broadly consistent with the theory: conditional on manufacturing, more camps leads to an increase in benefits and repression.

Table 2.7: Sabotage Threat in Non-Manufacturing Areas

	Dependent variable:					
	Basic Utilities	Basic Utilities	General Services	General Services	Security	Security
	(1)	(2)	(3)	(4)	(5)	(6)
Camps	0.956	1.095	1.791**	1.818*	1.532	1.282
	(0.895)	(0.959)	(0.905)	(0.996)	(1.153)	(1.513)
Non-Manufacturing	0.373	0.257	0.397	0.349	−0.610	−0.943
	(0.236)	(0.251)	(0.243)	(0.262)	(0.545)	(0.732)
Camps x Non-Manufacturing	−8.933***	−9.576***	−2.277**	−3.002**	1.368	0.232
	(2.289)	(2.615)	(1.123)	(1.369)	(1.430)	(2.122)
Population Density	0.00001	0.00003**	0.00001	0.00002	−0.0001	−0.00001
	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.0001)	(0.00003)
Constant	1.345***	1.382***	0.780***	−0.003	−1.161***	−17.302***
	(0.190)	(0.002)	(0.188)	(0.002)	(0.357)	(0.850)
Municipality FEs		Yes		Yes		Yes
Observations	80	80	80	80	80	80
Log Likelihood	−207.571	−200.912	−174.991	−173.216	−46.366	−41.777
θ	1.008***	1.273***	1.058***	1.126***	1.828	2,774.573
AIC	425.143	423.824	359.982	368.432	102.732	105.555

Note: Negative binomial regression with robust standard errors; *p<0.1; **p<0.05; ***p<0.01

We see a very different trend in Table 2.7, which instead uses the *Non-Manufacturing* variable. The *Camps* variable is largely insignificant (and even positive for some specifications), while the *Camps x Non-Manufacturing* interaction term is mostly negative and significant. This negative coefficient effectively recovers the results found for the raw counts measure of *Firms*, possibly helping to explain this surprising finding. Comparing the distinct results from Tables 2.6 and 2.7, we see strong sectoral differences. These results suggest that if the threat to economic productivity matters– such that it raises the potential cost of sabotage– this effect is most pronounced in manufacturing areas.

More generally, the results from Tables 2.4 and 2.6 offer suggestive evidence for my theory. The interaction terms for these variables have qualitatively similar effects on spatial planning and distributive choices in Qatar. We can see this relationship graphically by using these estimates to plot the expected counts. Figures 2.9-2.14 use the coefficient estimates from the Negative Binomial regressions to estimate the effect of *Camps* on each of the three outcome measures, conditional on *Government* and *Manufacturing*. In each figure, there are three panels, representing a low, medium and high value for the modifying variable. I use the coefficient estimates from Tables 2.4 and 2.6, while setting the *Population Density* at its mean value (and dropping the Municipality fixed effects). I then plot the effect of *Camps* across the three different values of the modifying variable.

Figures 2.9-2.11 show these plots for *Government*. For each outcome measure, we see that *Camps* has a flat or negative slope when *Government* is low (i.e., the left panel). The slope begins to increase for a moderate value (i.e., middle panel), and finally becomes clearly positive for high values of the *Government* variable (i.e., right panel).[26] Although the plots look different, we see a similar trend overall in Figures 2.12-2.14, which use the *Manufacturing* variable as the modifier.

[26]Since these plots are expected counts– and are thus constrained above zero– the confidence intervals do not indicate significance, as they would for a marginal effects plot of OLS estimates.

Figure 2.9: The Effect of Camps on Utilities, Conditional on Government

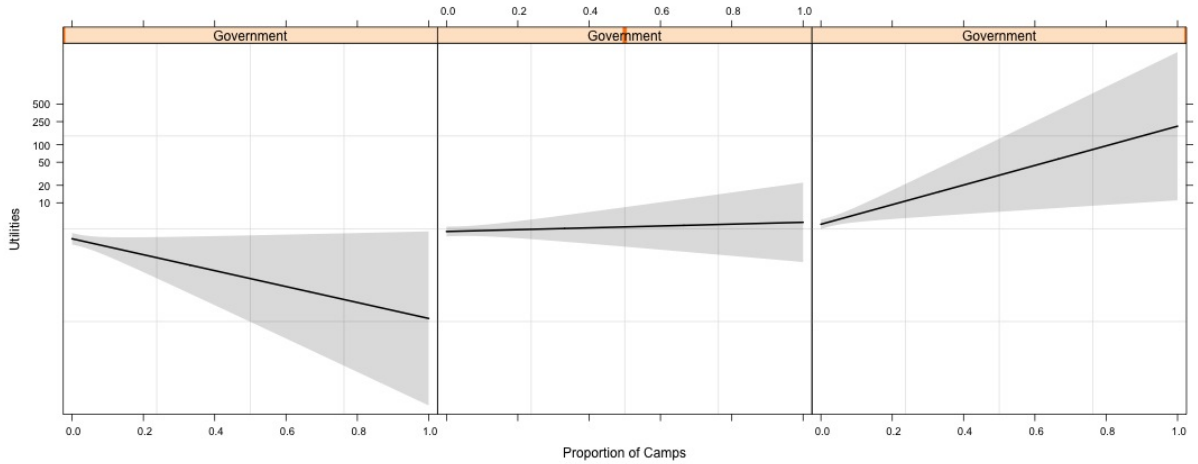


Figure 2.10: The Effect of Camps on General Services, Conditional on Government

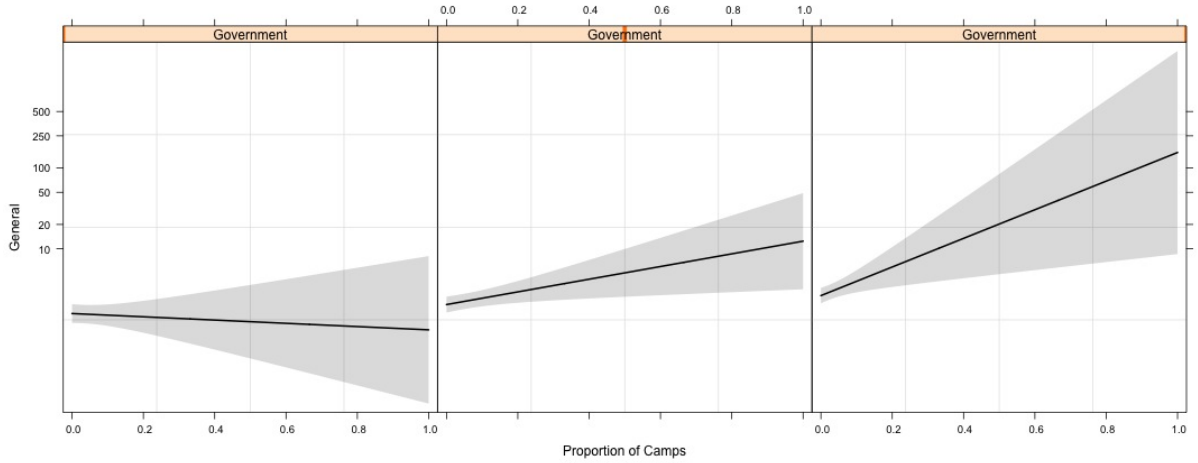


Figure 2.11: The Effect of Camps on Security, Conditional on Government

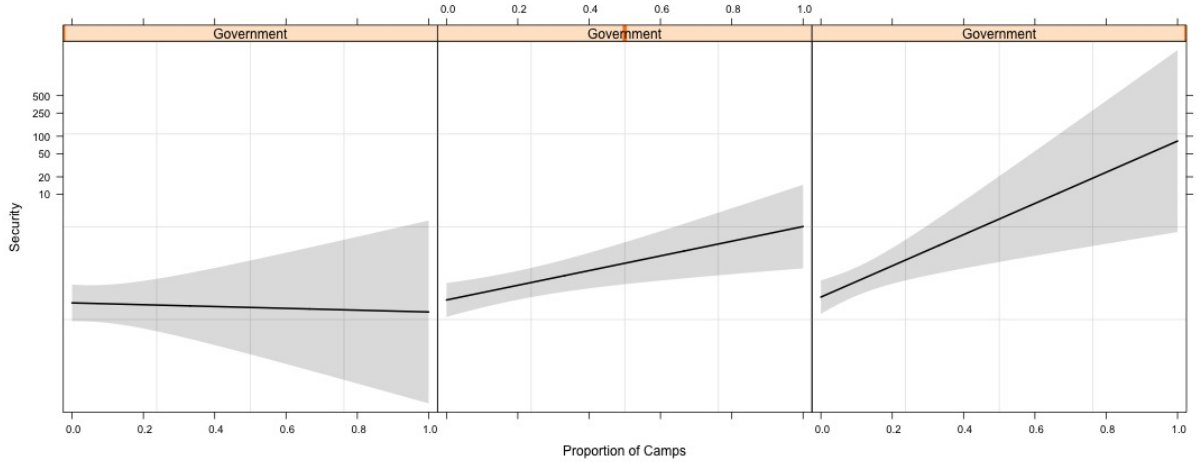


Figure 2.12: The Effect of Camps on Utilities, Conditional on Manufacturing

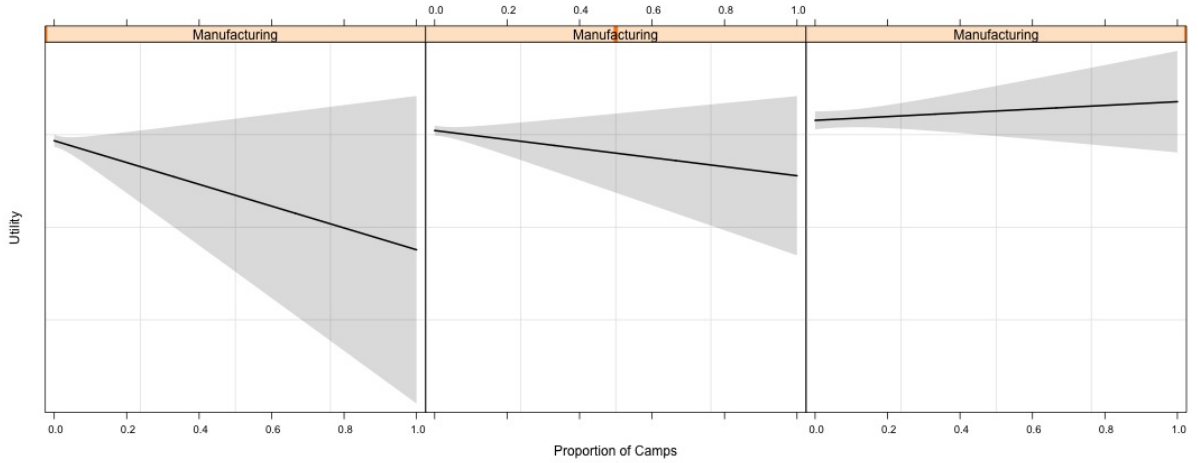


Figure 2.13: The Effect of Camps on General Services, Conditional on Manufacturing

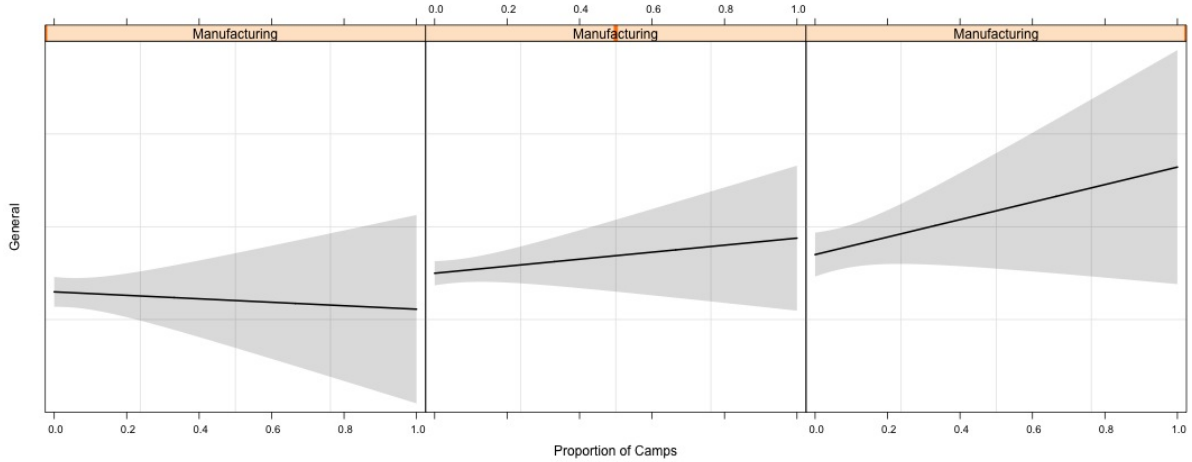
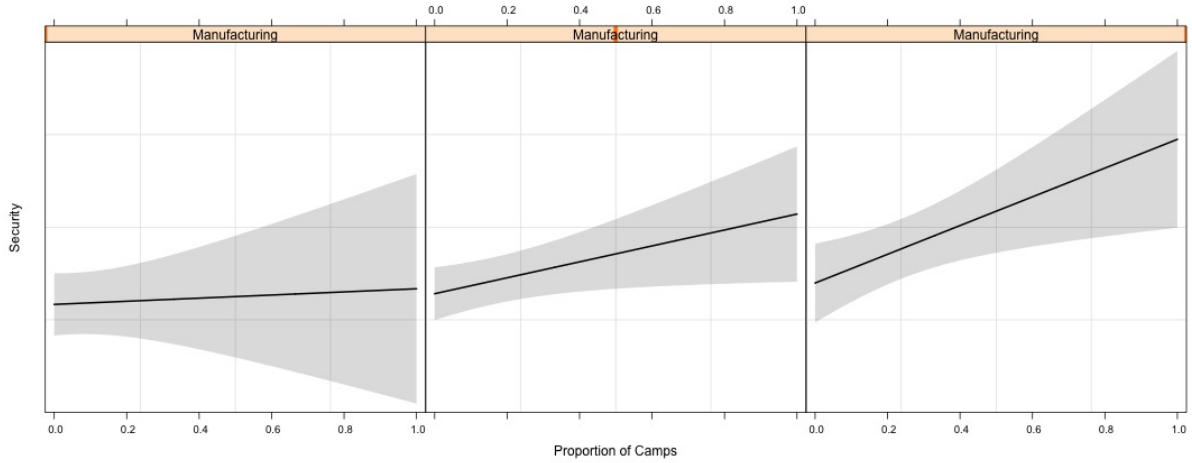


Figure 2.14: The Effect of Camps on Security, Conditional on Manufacturing



The marginal effects plots illustrate how conditional on access or proximity to high value targets (like government buildings or factories), increasing the number of camps results in greater benefits and repression. This result is especially surprising since the *Manufacturing* and *Government* variables only correlate 0.23. Such a small correlation suggests that these variables do not simply represent the same zones, or that areas with a lot of manufacturing also have a disproportionate share of government buildings, media and embassies.

While broadly consistent with my theory, we should be cautious about reading too much into these findings. These data provide suggestive evidence of targeting in Qatar, but they present several challenges. The data are not time-serial, limiting our tests and making it impossible to evaluate the effect of changing levels in threat (e.g., increases to camps density or time-varying production profile) on distributive policies. These spatial data are novel and provide suggestive evidence consistent with my theory, but they represent associations and cannot speak to causality. In particular, we may worry about the causal direction of targeting, with camps actually being targeted or located in areas with fewer goods. Without time-serial data, it is difficult to really answer this question of timing. However, given the sticky and path-dependent nature of housing policy (which actually goes back decades in Qatar), this problem of reverse causality is less worrisome.

Perhaps most significantly though, these tests cannot fully speak to the broader external pressures calling on Qatar to improve its treatment of migrant workers. The regime's policies are not driven solely by the threat of sabotage, and must also reflect these pressures. That being said, if these targeted goods were just a response to such pressures, the interaction terms should not be significant. Instead, the results suggest that the regime appears to differentiate among the marginalized, disproportionately locating benefits (and repression) in those areas representing the greatest risk of sabotage. Moreover, these benefits are relatively modest. They

do not address the deeper inequities that motivate international activists or human rights group (e.g., immigration reform).

Finally, it is worth considering the broader normative and welfare implications of these results. However suggestive, if we accept the general findings– that sabotage threat brings some additional benefits for particular groups– we may be tempted to conclude that life under authoritarian rule, even for the marginalized, may not be so bad after all. Drawing any such conclusion is problematic. The net welfare effects of these policies is more complicated than these results would suggest. On the one hand, some of these marginalized communities receive targeted goods and services, which have long-been seen as exclusive benefits for elites and other supporters. In this sense, migrant quality of life may be better than some of the harshest critics contend. On the other hand, these benefits also come with an additional security presence. Targeted benefits are only part of the regime's strategy. Preventing sabotage begins by providing marginalized groups with benefits to make them feel invested in the regime and its survival. Without some incentives to work, the most passive forms of obstruction could become rampant. At same time though, if destructive sabotage occurs, the regime must be ready to respond quickly. When speaking to the broader welfare implications, the value of these benefits must be weighed against these additional security installations. And all of this says nothing about the quality of life for those marginalized groups without a credible threat of sabotage. For such groups, the standard narrative remains apt: their structural vulnerability leaves little recourse for extracting benefits from the state.

II.6 Conclusion

I began this paper by highlighting some of the more extravagant spending projects that have recently targeted migrant workers in Qatar. Ostensibly,

these projects represent a profound departure from traditional narratives on the treatment of marginalized groups under authoritarian regimes, in general, and Qatar, in particular. Over the course of this paper, I have tried to show how this distributive targeting derives from a shrewd political economic logic of survival. Until recently, such targeted benefits were hardly necessary. Contained within worker ghettos, the regime felt secure from these marginalized groups and any challenge they posed. But as this population has grown rapidly over the past decade– at a time, when Qatar's neighbors and regional rivals have seen unmet demands result in violence and sabotage– the regime has been forced to offer greater concessions, targeting the marginalized with more and better goods.

The threat of sabotage provides even the most marginalized groups a means to resist. By withholding their services (i.e., obstruction) or actively attacking key infrastructure (i.e., destruction), marginalized groups can undermine the political economy of the state, exacting a high cost on the regime and its supporters. This threat, when credible and costly, gives these groups a bargaining power missing from more traditional political economic models of authoritarianism. Ultimately, I argue that the provision of targeted goods to marginalized groups is not the choice of some benevolent dictator. Rather, it represents shrewd, pragmatic policymaking and a response to this underlying challenge. And while appeasement is unpopular, it may be necessary to prevent sabotage.

However informative the Qatari case, we have to be cautious in generalizing beyond it. After all, there are few regimes in the world that enjoy the same advantages or face the same challenges as Qatar. Nonetheless, the Qatari case is instructive for both theoretical reasons and practical considerations. While Qatar may be an extreme case, it can still help reveal how autocrats negotiate challenges and make distributive choices. In the past few years, Qatar's development planning has suffered from various delays, bottlenecks and an over-worked construction

industry. As Qatar has ramped up construction in anticipation of the 2022 World Cup, labor supplies and other resources have proven scarce, and the regime has been forced to curb spending and cancel projects. Even without traditional budget constraints, the regime must still prioritize spending and investment. Under these distinct constraints, the Qatari case reveals how rulers may conceptualize threat and respond proactively. The regime's use of multiple policy instruments– some cooptive and some repressive– represents a more general story of how autocrats respond to threats by differentiating among groups. Qatar may just be a special case, where the regime uses a particular mix of policies that would otherwise be prohibitively expensive or infeasible for most regimes. Sabotage is a threat wherever marginalized groups are crucial to economic production. And as this threat grows, we should expect regimes to respond with targeted benefits and repression.

The Qatari case also has some immediate lessons for other autocratic regimes, albeit a select group: the Gulf states. Qatar resembles its neighbors across various dimensions. In terms of resources, Qatar may lead the region in per capita terms, but the UAE and Kuwait are relatively similar. At the same time though, the Qatari economy lags behind other states in some key sectors. In recent years, Qatar has made efforts to rapidly diversify its economy towards tourism and finance, a process begun decades earlier in resource-poor Dubai and Bahrain. Most importantly though, the growing dependence on foreign labor extends beyond Qatar to the entire region. None of the Gulf states are immune to this threat, and most have already seen major acts of sabotage. Qatar's late but rapid development allowed it to take more deliberate, preventive measures to defuse this threat. The regime not only exploited new technologies, but also had the advantage of seeing earlier policy failures in neighboring countries. Part-cooptive and part-repressive, Qatar's policies may help us better understand the Gulf's future as it responds to the threat of sabotage. With migration critical to the Gulf's continued development, this

challenge is not likely to abate anytime soon. As the threat grows, these regimes must find new strategies for resolving their tensions and maintaining production. Repression alone will not suffice. And for better or worse, Qatar may just be the model for the rest of the region.

CHAPTER III

Authoritarian Abdication: Bargaining Power and the Role of Firms in Migrant Welfare

III.1 Introduction

In recent years, non-state actors have taken on an increasingly prominent role in development, having a profound effect on welfare outcomes for some of the most structurally vulnerable and marginalized populations in the world. Scholars warn, however, that non-state provision of welfare can also have more complicated and pernicious long-term political consequences (Cammett and MacLean, 2011). These services may substitute, complement or even compete with existing state-provided services, mediating the relationship between the state and society (Tsai, 2011; Mcloughlin, 2014). Much of this recent work focuses on failed or weak states, where non-state actors can exploit a political vacuum by offering services that would otherwise go unprovided (Cammett and Issar, 2010; Cammett, 2011). While most pronounced in these contexts, non-state actors can also be found in more centralized and autocratic regimes, like those of the Arabian Gulf.

The Gulf states represent an altogether different context: they are generally richer, stronger, and more authoritarian than the typical country where we find prominent non-state actors. Across the region, the immigration law known as

the *kafala* formally delegates to firms and other "sponsors" control over migrants' mobility, housing, and general welfare. These states have effectively abdicated almost any responsibility over migrants, giving firms nearly unchecked power over their workers' daily lives. This system has led to rampant exploitation (Khan and Harroff-Tavel, 2011; Bajracharya and Sijapati, 2012; Murray, 2012). Human rights organizations and international media have exhaustively documented such abuse, criticizing these regimes for their complicity in a system that leaves migrants structurally vulnerable and subject to conditions tantamount to "indentured servitude."[1] And yet however prevalent this abuse may be, there is considerably more variation across firms and even within camps than is typically recognized. Such variation suggests a more complicated relationship between firms, migrants, and welfare outcomes in the Gulf. In this paper, I explore the welfare implications of this system, asking the question: *under what conditions can migrants protect themselves and extract concessions from their employers?*

In answering this question, I focus on migrant bargaining power. Standard narratives on the Gulf tend to stress how structural challenges leave migrants marginalized within the Gulf. And for the most part, this description is accurate. Under the *kafala*, migrants enjoy few rights and have limited access to means of redress (Gardner et. al. , 2014). But not all migrants are treated the same. Some migrants enjoy better working and living conditions than others, varying widely in their satisfaction and welfare. I argue that this variation crucially depends on individual bargaining power. Specifically, workers with a contract and more credible or attractive exit options should hold greater bargaining power vis-a-vis their employers. With a labor contract, workers can threaten to report employers for breach of contract, an all but necessary first step in accessing formal channels of redress. Although formal protections remain relatively limited, they offer at least

[1] Morin, Richard. "Indentured Servitude in the Persian Gulf." *The New York Times.* April 12, 2013.

some means of pressuring employers to improve conditions. Should this option fail, migrants can threaten exit, either leaving the country or pursuing employment in the risky informal sector. But not all migrants can credibly threaten such exit, having their mobility constrained by force or onerous debt (Gardner, 2011, 2012; Jureidini, 2014). Contracts and exit options ultimately underly migrant bargaining power, which should influence individual welfare.

To test this argument, I draw on data from a nationally representative survey in Qatar. The survey's stratified sample includes migrants from around the country, living in different camps and employed by firms of varying size and sector. Using these data, I estimate a series of regressions and multilevel models on several different outcome measures. I find that migrants with a contract and credible exit options (e.g., less debt) hold higher perceptions of welfare. Building on these results, I then consider the problem of selection: namely, those migrants who receive contracts are somehow qualitatively different than those who do not. After matching on demographics and how migrants found their employment, I conduct a series of difference of means tests. These tests indicate that even after matching on observables, contracts have a positive and highly significant effect on welfare. Such results challenge the prevailing conventional wisdom that contracts are largely unenforced and ineffectual in the Gulf. At the same time though, they also corroborate claims that restricted mobility and onerous debt make migrants more susceptible to abuse. All told, contracts and credible exit options appear to provide even the most vulnerable workers a means of protection.

The rest of the paper proceeds as follows. In section 2, I briefly discuss existing work on non-state actors and welfare. Section 3 then introduces the *kafala* system. Despite the general structure to the *kafala*, I show that migrant welfare and satisfaction varies widely under this system. In section 4, I offer an explanation of such variation, focusing on migrant bargaining power. Section 5 introduces the data

from Qatar and tests my argument. Finally, I conclude in Section 6, summarizing the main findings and discussing the broader implications for migrants in the Gulf and beyond.

III.2 Non-State Actors and Welfare Provision

The presence of non-state actors in welfare provision has vast and significant implications for developing societies. Most immediately, these goods and services can have tremendous effects on the everyday lives and personal welfare for individuals in these countries (Tsai, 2011). However inequitable the provision, in many states these services fill a vital need that the state cannot or refuses to meet. Downstream, of course, the net welfare effects of these non-state services are more complicated, potentially crowding out or dis-incentivizing states from investing in similar services. Notwithstanding these complications, such goods are often crucial to sustaining communities in developing countries, especially the more structurally vulnerable or marginalized populations. NGOs and other actors may explicitly target such communities, who have been neglected by the state and live on the fringes of society. More than just intermediaries, non-state actors have become indispensable in many of these communities, having a profound effect on local welfare and broader development outcomes.

The long-term political and institutional consequences are no less significant. Non-state services mediate the relationship between citizens and the state. In exchange for compliance (e.g., taxes and civil obedience), states distribute various goods and services (Mcloughlin, 2014). This exchange– and the underlying social contract between the state and society– becomes tenuous when non-state actors provide substitute goods and services. In such cases, the state may become viewed as illegitimate, and more likely to see challenges arise. These non-state actors and other political entrepreneurs can exploit the state's weakness, carving out

semi-autonomous spaces to grow their own power. Under these conditions, an adversarial dynamic emerges, as state and non-state actors use goods and services to compete with each other. Such competition is especially problematic when these services are conditional on identity or political loyalty, cleaving society and pitting groups against each other as state and non-state elites battle for authority (Cammett and Issar, 2010; Cammett, 2011). This contestation is especially common in weak states, and often further undermines state capacity and political development (Mcloughlin, 2014).

Yet however bleak this dynamic, not all states confront the same challenges. In fact, in some cases, these non-state services may actually improve or strengthen the relationship between citizens and the state. Tsai (2011) finds that the co-production of services may increase compliance, leading citizens to hold more favorable positions on the government. Notably though, this positive feedback only obtains for some non-state actors (e.g., community leaders), representing the complexity underlying these relationships. Who these non-state actors are obviously matters a great deal and crucially informs how the state responds, speaking to a broader question of context dependence. The state's political economic context characterizes many of the conditions that determine whether these relationships are beneficial or threatening to regime legitimacy and political development.

For the most part, the contexts in which these actors operate have a few key features in common. The growing literature on this topic has largely focused on developing countries, many of which can be classified as weak or failed states (Cammett and MacLean, 2011). These countries tend to be relatively poor, though some have transitioned into the middle-income category. Such states face major financial or institutional constraints that limit their capacity to project state power or extend control over their territory. Given the developing context, non-state actors also tend to emerge in semi-democratic, or at least contested authoritarian states

(Cammett, 2011). Rarely do we find them playing a major role in consolidated democracies or entrenched autocracies.

The role of firms in the Arabian Gulf represents a notable exception to many of these conditions. While varying in their relative resource wealth, the Gulf states do not face the same kind of capital constraints that many developing states confront. The Gulf states are highly centralized, using modern technologies of control to effectively and broadly project state power. This centralization also extends to the political sphere, where the Gulf states do not allow for any meaningful contestation or competition. Such overwhelming control makes the prevalence of non-state actors in the Gulf that much more surprising. And while resource-rich states typically do not build large fiscal systems– a major component of state capacity– they have nonetheless developed expansive welfare states, bureaucracies, and security/intelligence services. Clearly, these regimes do not want for resources or authority, and yet they have come to depend on non-state actors to fill a vital role in the provision of goods and services. In the next section, I explore this role more thoroughly and discuss the vast influence that private firms have on everyday welfare outcomes in the Gulf.

III.3 Firms and Migrant Welfare in the Gulf

The Gulf states represent a vastly different context than those where we typically see non-state actors playing a prominent role in welfare. Not only are these states wealthier and less democratic than most developing countries, but they also differ dramatically in their population demographics. Capital-rich and labor-poor, the Gulf economies have relied on foreign labor for decades (Baldwin-Edwards, 2005, 2011; Shah, 2012). Table 3.1 reports recent estimates of the total foreign population in the Gulf. Although varying significantly, we see that non-citizens represent a majority of the workforce in every Gulf state, reaching highs of over 90 percent

in Qatar and the UAE. Initially, many of these workers came from the Gulf's neighboring Arab states (e.g., Egypt, Yemen, and Palestine) and played a vital role in the development of the petro-state in the mid-20th Century. Over time, this labor supply has changed significantly. Across the Gulf today, the vast majority of workers come from Asia (Shah, 2013). Although many Western, African and Arab expats remain vital throughout the Gulf, they are greatly outnumbered by workers from countries like Nepal, India, Bangladesh, Pakistan, the Philippines, and Indonesia.

Table 3.1: Non-Citizens Across the Gulf

Country	Total Size of Population	% Non-Citizen of Population	% Non-Citizen of Workforce
Bahrain	1,234,571	54.0	74.8
Kuwait	3,965,144	68.7	82.9
Oman	3,855,206	43.7	79.9
Qatar	1,699,435	85.7	93.9
Saudi Arabia	29,994,272	32.4	56.0
United Arab Emirates	8,264,070	88.5	92.9

Note: Table reproduced with permission from the Gulf Labor Markets and Migration website. These estimates have been taken from individual country data from 2010 to 2014. See GLMM Website for updated data and country years.

The change in this labor supply reflects the region's varying economic demands and political dynamics. Aggregate labor growth has been driven by increasing oil and gas revenues, giving these states an ever-growing demand for foreign workers. Largely blue-collar and low-skill positions, imported labor fills most of the jobs locals simply do not want. The changing demographics of this foreign population represents a more complicated process. While wages certainly drove the shift towards Asian workers, Arab expats were also seen as a greater political threat. Many Arab workers come from countries with radical and Islamist ideologies that are inimical to the Gulf regimes' legitimation strategies. Given their shared language and religion, Arab migrants are also more likely to interact with Gulf citizens and potentially spread these radical ideas (Louer, 2008). Asian migrants,

by contrast, have been considered “more efficient, obedient, and manageable" (Kapiszewski, 2006, 7), making them an ideal labor force. Replacing Arabs with Asian workers was both an economic and political-security choice for the Gulf regimes (Kapiszewski, 2001).

To manage this population, the Gulf states rely on a set of draconian immigration policies broadly known as the *kafala*, or sponsorship system. The *kafala* formally delegates to firms and other “sponsors" control over migrants’ mobility, housing, and general welfare. The *kafala* emerged out of the growing need for an expansive and efficient system that could manage the millions of foreign workers emigrating to the Gulf each year. Although varying somewhat across the region, the *kafala* system can be reduced to three basic features:

1. The migrant’s entry requires a local sponsor, or *kafeel*, with whom the worker signs a labor contract of some fixed length.

2. The migrant’s living and employment conditions (e.g., housing, transportation, food, medical care, and basic utilities) are the sponsor’s responsibility, as stipulated in the labor contract.

3. The migrant’s exit from the country and/or change in employment (if even allowed under the state’s laws) requires the sponsor’s release or permission.

These three features define the *kafala*’s basic structure as it is practiced throughout the Gulf today. The *kafala* effectively delegates to firms and individual employers the basic welfare and security of migrants. Initially, this delegation was a necessity. The Gulf states were relatively late developers. Before the discovery of oil and gas in the region, the Arabian Gulf emirates (i.e., small principalities) were British protectorates, comprising local commercial centers and villages built around pearling and other basic commodities (Herb, 1999). There was little to no bureaucracy or state apparatus. And however quickly the petro-states grew, they

could not manage the even faster growing foreign population. Given the need for workers, and their obvious state capacity constraints, the *kafala* became a logical solution for the Gulf states. Firms took responsibility for both migrant welfare, and the cultural or security threat that they posed the Gulf. For these nascent states, effectively monitoring and policing migrant workers would have been all but impossible. Instead, they chose to create a more decentralized security system, delegating this responsibility to firms and individual sponsors (Longva, 1997, 1999; Crystal, 2005).

At least in terms of its origins, this prominent role for firms in welfare provision resembles the emergence of non-state actors in other developing states under capacity constraints. But today's Gulf looks very different than that of the mid-20th Century. Drawing on their tremendous resource wealth, the rentier states of the Gulf developed rapidly and built modern bureaucracies (Mahdavy, 1970; Beblawi, 1987). Regime stability depends on these bureaucracies, which support a broad welfare state and expansive security apparatus (Luciani, 1994; Yom, 2011). Crucially though, these services only extend to citizens, for whom the Gulf states take full responsibility over their welfare and security. Firms and other private sector actors continue to play the principal role in migrants' lives. While these regimes could, in theory, eliminate the *kafala* and take over responsibility for migrants, this does not appear to be likely any time soon (Diop et. al. , 2015).

Although firms provide a vital role substituting for the state in the Gulf, the status quo is not without its costs. In other contexts, the prevalence of non-state actors can represent a political threat to the regime, if not a very challenge to state sovereignty. This is not the case for the Gulf. There is little threat to these regimes, who see the private sector as a partner rather than competitor. Costs come in the form of public criticism and pressure from human rights organizations and other international actors. The *kafala* leaves migrants vulnerable to exploitation and

other structural abuses (Khan and Harroff-Tavel, 2011; Bajracharya and Sijapati, 2012; Murray, 2012). By abdicating responsibility for migrants' welfare, these regimes have given firms incredible power and control over their workers' lives. Without much oversight, sponsors have been able to exploit their workers, leading to countless reports on worker and human rights violations across the Gulf.

And yet however prevalent this abuse may be, not all workers are exploited or suffer under these conditions. Individual welfare varies far more than is typically recognized. We can see this variation in Figure 3.1. Using 2011 survey data from Qatar, I have constructed an additive measure of migrant satisfaction per zone. Migrants were asked how satisfied they were across a range of dimensions (e.g., job, housing, medical care, transportation). These responses ranged from one to five, with five being the highest satisfaction. With these measures, I first created an average level of satisfaction for each individual and then aggregated respondents into their residential zones to capture the spatial variation across Qatar. Figure 3.1 plots these zone-level aggregates relative to the total mean in the population. Given the relatively small sample size (only 841 respondents), we should be careful reading too much into this figure. Nonetheless, we see that aggregate satisfaction varies widely across zones, with some zones more than a point higher than the average.

This variation, moreover, is not easily explained by job or living conditions alone. Figures 3.2-3.4 plot migrants' satisfaction over wages, camp size, and working hours. In Figure 3.2, the x-axis is logged wages and the y-axis is the average satisfaction per respondent. The figure also fits a LOESS curve through the data, which shows a positive association between satisfaction and wages. The relationship is fairly noisy and the scatterplot reveals upper-triangular data. On average, high-income respondents are very satisfied, but there is significant variation among low and medium-income migrants. Figure 3.3 graphs satisfaction across camp size and

suggests a similar trend. Workers in larger camps are generally more satisfied, but those in small camps vary widely in their responses. This trend likely reflects how little standardization there is across smaller camps. Large camps are more likely to be run by bigger firms, which may be more concerned about state monitoring and the enforcement of minimum living standards. It is simply easier to detect abuses and punish firms that manage these larger camps, forcing them to provide better conditions. Finally, Figure 3.4 plots satisfaction over working hours. The negative LOESS curve is largely driven by respondents at the high end, whose extreme number of hours is clearly abusive. But for the typical migrant, who works eight to eleven hours each day, there is significant variation.

This variation ultimately suggests a more complicated relationship between firms, migrants, and welfare outcomes in the Gulf. Individual satisfaction cannot be explained by wages or job conditions alone. In the next section, I offer an explanation of such variation by answering a more basic question on the conditions under which migrants can protect themselves and extract concessions from their employers.

III.4 Contracts and Exit Options as Migrant Bargaining Power

Migrant welfare crucially depends on bargaining power. Broadly defined, we can think of bargaining power as an individual's leverage or influence, through which benefits are extracted. Relative power (i.e., the balance between parties) is essential to explaining distributive outcomes in any bargaining dynamic. And it is vital to understanding worker-employer relationships in the Gulf, which determine migrants' living and working conditions. All things being equal, we should expect improved welfare for those migrants with a greater bargaining power vis-a-vis their employers. The question then becomes, what does migrant bargaining power look like within the *kafala* system, and under what conditions are migrants able to

Figure 3.1: Aggregate Satisfaction by Zone

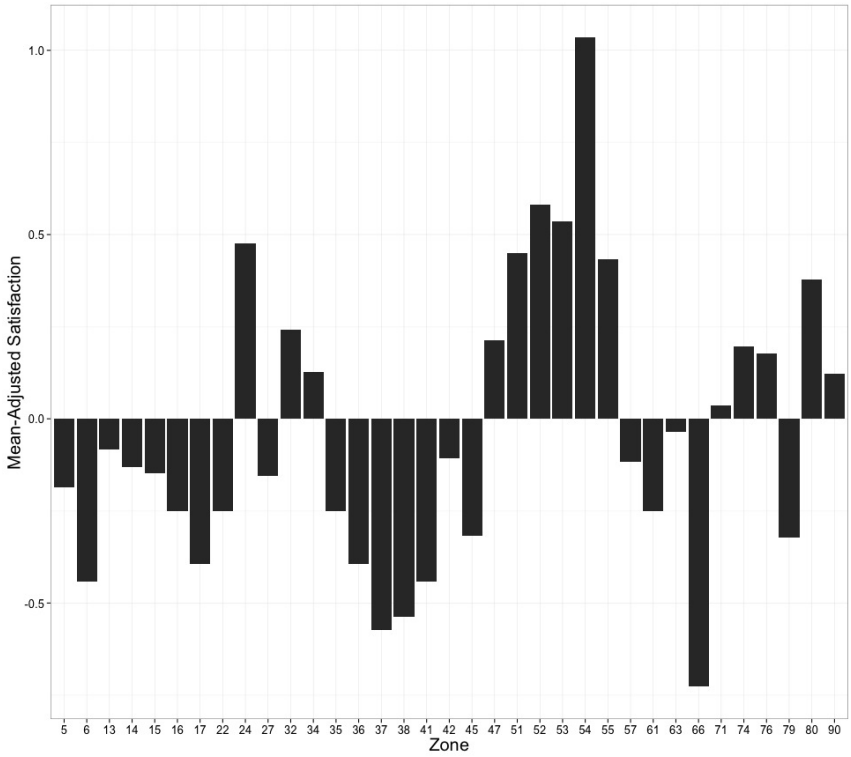


Figure 3.2: Wages and Migrant Satisfaction

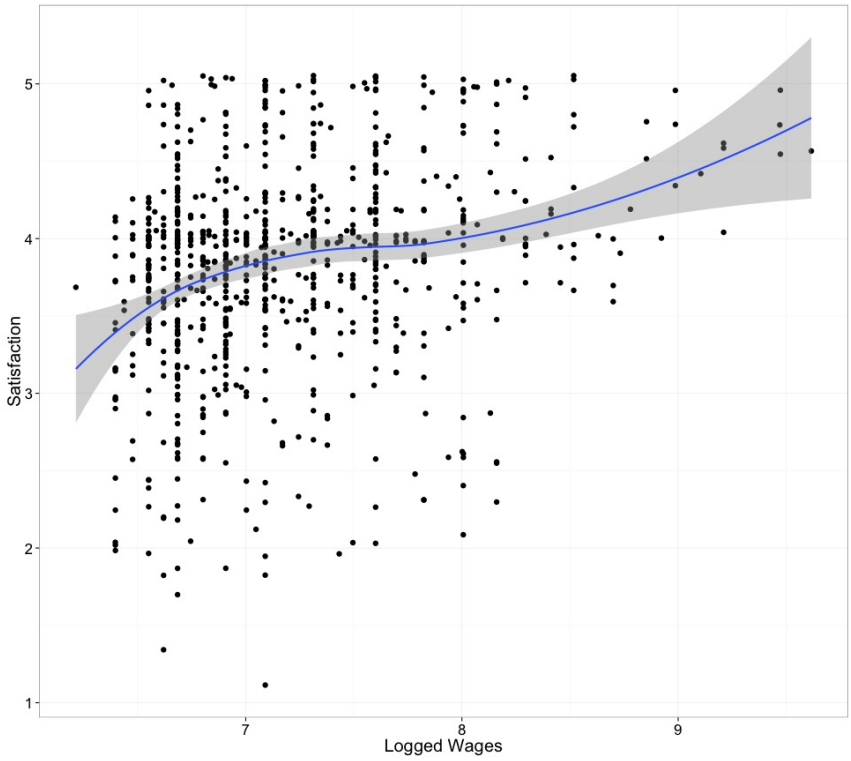


Figure 3.3: Camp Size and Migrant Satisfaction

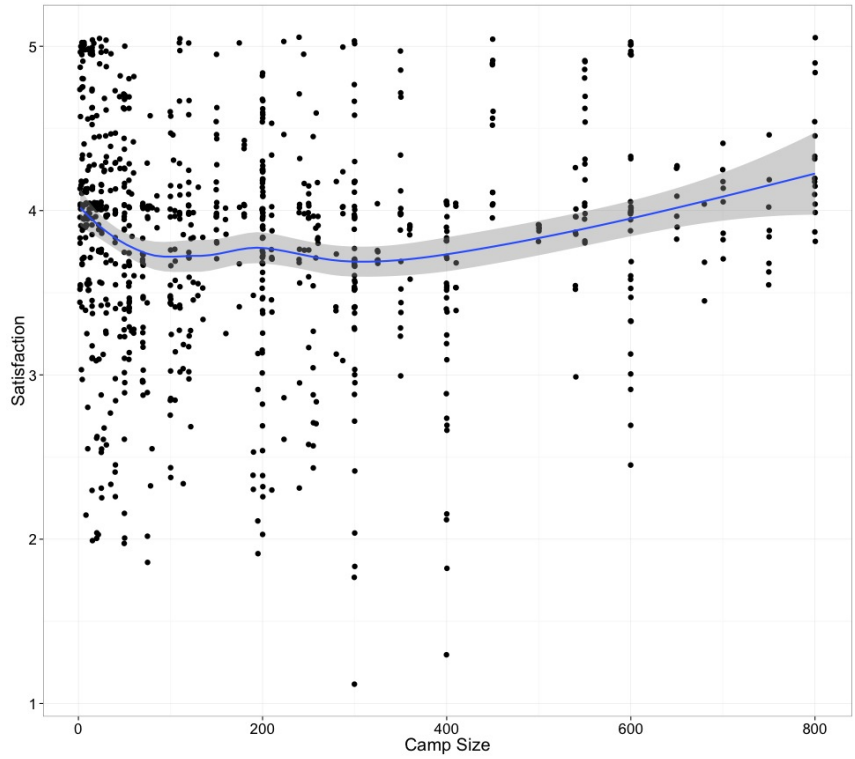
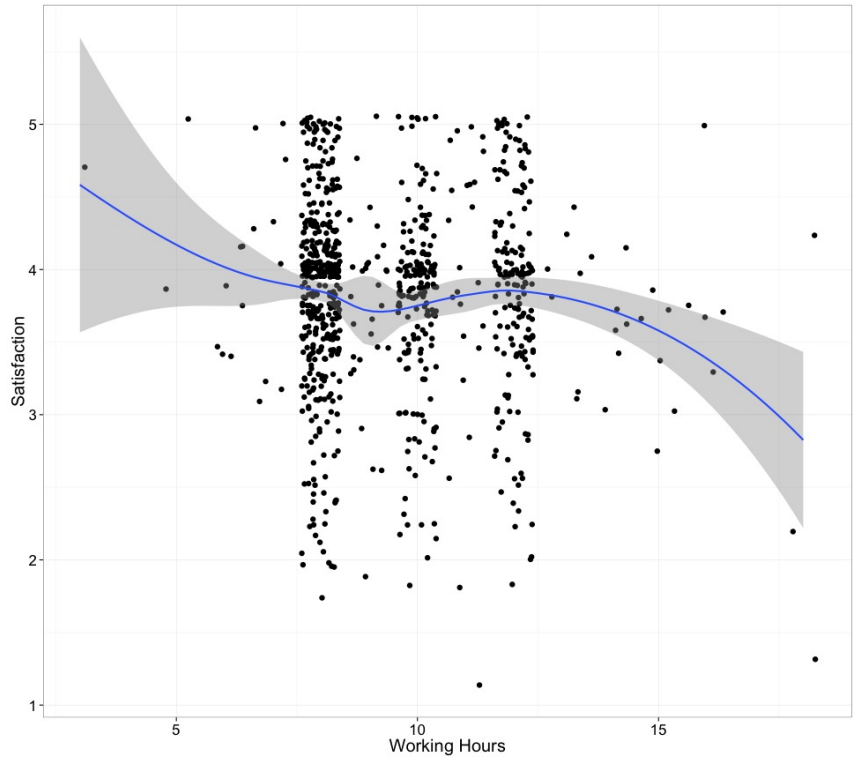


Figure 3.4: Hours and Migrant Satisfaction



protect themselves?

In many advanced industrialized states, labor's bargaining power depends on various legal protections, which provide rights to organize, strike, and pursue collective bargaining. None of these protections can be found in the Gulf. While some Gulf states allow for citizens to join toothless labor groups and trade syndicates, not even these opportunities extend to non-citizens. Migrants enjoy few legal means of bargaining with employers or negotiating over collective demands. And as non-citizens, they cannot participate in elections or other forms of popular consultation (e.g., *majlis* meetings). Directly lobbying the regime or pursuing policy change through political means is simply not possible for migrants. And while work stoppages or strikes are possible, effective collective action depends on broader coordination. Instead, most workers must directly negotiate the terms of their treatment with employers, making bargaining power critical to individual welfare outcomes.

Crucial to this bargaining power is whether a migrant has a labor contract. However limited their formal protections, we should nonetheless expect migrants holding contracts to have greater bargaining power. Labor contracts provide workers a concrete statement of their rights and benefits of employment. With a contract, workers can more easily access formal channels of redress and identify specific conditions of abuse. Migrants without a contract are more vulnerable and may be subject to more severe working conditions. While some forms of abuse are outright illegal (e.g., physical or sexual assault), other maltreatment may be less obvious unless explicitly proscribed by the terms of a contract.

Admittedly, in the Gulf, contracts tend to have far less power than they do elsewhere. Signing a labor contract does not guarantee that it will be respected or even recognized. Contract substitution is an all too frequent occurrence in the Gulf. Migrants often sign a contract in their home countries, only to arrive and be forced

to accept new terms or even a completely different job (Shah, 2013; Pessoa et. al. , 2014). Migrants may also be misled when signing contracts. Assuming the migrant is even literate, the contract may be in a language he or she does not understand (Jureidini, 2014). And yet despite these challenges, contracts nonetheless represent a key component of migrant bargaining power under the *kafala* system. With a labor contract, workers can threaten to report employers for breach of contract, an all but necessary first step in accessing formal channels of redress. The welfare implications of contracts are summarized in the following hypothesis.

Hypothesis 1: Migrants with contracts enjoy greater protection and welfare.

Beyond contracts, we should also expect migrants to hold greater bargaining power when they have viable exit options. For the most vulnerable migrants (e.g., those lacking a contract), exit may be the only feasible alternative to escape abuse or exploitation. But not all migrants enjoy such exit options. The credibility and attractiveness of exit options varies widely for migrants in the Gulf. In the most literal sense, exit may be impossible when workers are physically prevented from leaving the country or changing jobs. Under the *kafala*, migrants must receive a release or exit visa to depart the country. In most cases, it is only the the migrant's sponsor who can provide this exit permit. Such a policy is obviously problematic since it gives complete power to the sponsor, who is responsible for the very conditions that make exit attractive in the first place. And given the potential losses for the employer (e.g., replacement and transaction costs), there is little incentive for the sponsor to grant such a release.

For some workers, the lack of mobility can reach prison-like conditions. Worker camps often include high walls, security gates and other measures designed to police entry and exit. Many such camps are found on the outskirts of cities, effectively

segregating these workers from the main population centers (Gardner, 2012). This segregation helps firms better monitor movement and control the freedom of their workers. Illegal flight is difficult when workers cannot reach friendly NGOs or home-country embassies, which may be located on the other side of the city, if not even farther away. Worse yet, domestic servants typically live in the homes of their sponsors, which imposes even greater constraints on their movement (Nagy, 1998; Murray, 2012; Fernandez, 2014). Most domestic workers live in the family villa or house, which may be a stand-alone home or contained within a larger compound, making flight especially difficult.[2] In the Gulf, such flight is broadly known as "absconding," and is often the last resort for the most vulnerable workers. The absconding nanny has become a common trope in Gulf media, but only receives international attention when the abuse is especially egregious, like the torture of an Indonesian maid in Doha in April 2015.[3]

The seizure of passports has become emblematic in this debate, representing the profound control that sponsors hold over their employees (Longva, 1997; Gardner et. al. , 2013). Although an exit visa is required to leave the country, the migrant's loss of passport represents yet another hurdle for exit and curtails freedom. Without their passports, migrants have greater difficulty gaining access to formal means of protection. From consulate or embassy services, to local ministries of manpower and labor, passports not only identify migrants, but define their legal status within the country. Lacking such documentation can be dangerous for migrants, who may be swept up and deported in government crackdowns, even if legally employed.[4]

[2]In March 2015, such a compound in Qatar came under criticism for its policy that forbade domestic servants from leaving the premises if unaccompanied by their sponsor. The compound's gate security were tasked with playing the role of prison guard, introducing yet another layer of monitoring and enforcement. While the company in charge of the compound claimed that the policy was to protect children from being abandoned, critics alleged the policy was nothing but a bald attempt at preventing flight. For more detail, see Lesley Walker. "Qatar real estate firm denounces, retracts permission policy for workers." March 8, 2015. DohaNews.com.

[3]D'mello, Chantelle and Peter Kovessy. "Plight of domestic worker beaten in Qatar sparks outcry." April 19, 2015. DohaNews.com.

[4]In 2013, Kuwait's ministry of interior made headlines for an aggressive enforcement campaign

While having little effect on the bigger structural problems surrounding immigration, such policies make migrants more vulnerable and their access to passports a critical protection. By seizing migrants passports, employers can more effectively control the movement of their workers and cow their obedience. Migrants with passports should be less vulnerable or dependent on their sponsors. As such, they should have greater bargaining power, leading to the following hypothesis.

Hypothesis 2: Migrants who hold their passport enjoy greater protection and welfare.

If unable to flee the country, migrants may choose other forms of exit. Across the Gulf, there is a large and growing informal sector, where employers and migrants skirt the *kafala*'s contractual rigidity and its attendant inefficiencies (Shah, 2013). Entering the informal sector places the migrant in an especially vulnerable position, forced to find employment and residence while holding illegal status. Such status opens up the possibility of migrants facing even greater abuse, but at least gives these workers some agency and may be an improvement over their previous conditions.[5] The informal sector can be a risky option under the best of conditions. However abusive a migrant's current position, continuing to work under his or her sponsor at least offers stability and a relatively constant income stream. But upon entering the informal sector, migrants cannot be sure of future employment or even availing themselves of the meager protections under the *kafala*.

that promised to deport a million illegal migrants. The campaign, and its unrealistic goal, was widely publicized in Kuwait, where the beleaguered government hoped that it would pacify a growing opposition disgruntled with unemployment.

[5]Not surprisingly, this form of exit is often associated with domestic workers in the Gulf, whose mobility is especially circumscribed. Hidden away from the public eye or scrutiny, these workers are often women from the Philippines and Indonesia, and enjoy even fewer protections than their male or female counterparts with jobs in public spaces. NGOs and foreign governments have been particularly critical of the Gulf on this topic, calling for the region to enact sweeping reform (Fernandez, 2014).

And as with other forms of exit, not all migrants face the same risks or expected costs.

This risk is most pronounced for migrants carrying major debt or other financial burdens. More economically secure migrants can risk entering the informal sector without having to worry about repaying some onerous debt. And to the extent some migrants have savings, they can be more selective in their employment and not forced to accept intolerable working conditions. Compare this choice to migrants whose families took out major loans for their travel to the Gulf. In many countries, this migration choice represents a collective (e.g., family, village) investment decision (Stark, 1991; Taylor, 1999; Gardner, 2011; Gardner et. al. , 2013). Officially, the Gulf states require that only the firm, sponsor or recruitment agency can incur costs, and that these costs cannot be passed onto the migrant in fees (Jureidini, 2014). In practice, however, these fees are especially common for Gulf migrants, who often take out large loans that must be paid back over years (Gardner et. al. , 2013). Depending on the size of the loan, some migrants may not even be able to pay it off before their first contract ends, forcing them to stay longer in the Gulf.

Carrying such debt, migrants come to resemble “indentured servants," rendering exit all but impossible as they accept conditions tantamount to “wage slavery."[6] Such conditions have become a focus for human rights organizations, which highlight the structural relationship between debt, exploitation, and abuse. These workers simply cannot afford to lose their current job and risk employment in the informal sector. They must pay off their debt and continue to send remittances home to support their families. Not only are such workers less likely to pursue employment in the informal sector, but they will be less inclined to challenge their employers or demand improved benefits or wages. In short, workers carrying such

[6]Morin, Richard. “Indentured Servitude in the Persian Gulf." *The New York Times.* April 12, 2013.

recruitment debts should have less bargaining power. The consequent welfare implications are as follows.

Hypothesis 3: Migrants with lower debt enjoy greater protection and welfare.

Collectively, these hypotheses suggest that migrant welfare should vary systematically with individual bargaining power. There is little, if any, empirical work on this topic. And while most scholars and activists agree that Gulf migrants suffer under difficult conditions, few offer explanations that go beyond structural accounts of the *kafala*. Fewer still provide a test of these explanations at the individual-level. Drawing on the hypotheses above, I now turn to such a test.

III.5 An Empirical Test of Migrant Bargaining Power

Although catching up rapidly, the Gulf has historically been one of the least-studied areas in the world, and remains relatively data-poor. Testing my hypotheses regionally is simply impossible without consistent or reliable cross-national data. Instead, I focus on the case of Qatar, which has recently invested heavily in survey methodology and adopted rigorous data standards.

With migrants comprising 94 percent of its economically active population, Qatar has the largest relative share of foreign workers among the Gulf states, if not the entire world. And in recent years, no Gulf state has been subjected to more scrutiny or criticism for its treatment of these workers. This pressure has grown rapidly since Qatar won the hosting rights for the 2022 FIFA World Cup, which will require millions of workers to complete the promised stadiums and related infrastructure projects. Hardly a month goes by without human rights organizations releasing a new report demanding improved welfare and protections

for these vulnerable workers.[7]

Data and Descriptive Statistics

To evaluate the hypotheses above, I draw on data from Qatar's 2011 Omnibus Survey. These data come from a nationally representative survey of Qatar, which was conducted by the Social and Economic Survey Research Institute (SESRI) in Doha. The survey uses government data on electricity and water customers to construct a stratified systematic sample. In addition to native citizens and white-collar expatriates (usually from the West), the survey includes 840 blue-collar, migrant workers living in camps throughout Qatar. Dropping the citizens and white-collar expatriates, I exclusively focus on the migrants in the analysis below.

The survey includes a series of questions on migrant satisfaction and their general quality of life in Qatar. I use several of these questions to construct different outcome measures for perceptions of welfare. Note that these measures all derive from self-reports and thus may be significantly inflated, especially given the autocratic context in which we find these workers. That being said, so long as inflated reports do not systematically associate with the explanatory variables, we should not expect bias. If anything, this problem should introduce noise and inflate the average response, making it more difficult to tease out variation among workers and find significant differences.

The first two outcome measures are *Job Satisfaction* and *Workplace Satisfaction*, which capture migrant satisfaction with their employment conditions. These variables are both ordinal and range from a low of one to a high of five. As evident in Table 3.2, these variables have similar distributions among respondents, with *Workplace Satisfaction* having a higher mean response than the more general *Job Satisfaction*, likely capturing other grievances (e.g., wages, benefits). The third

[7] For recent review, see Human Rights Watch 2012a, 2012b, 2013, and Amnesty International 2013, 2014.

Table 3.2: Descriptive Statistics

Variable	Mean	St. Dev.	Min	Max
Job Satisfaction	3.813	0.968	1	5
Workplace Satisfaction	3.964	0.859	1	5
Recommend	3.882	1.089	1	5
Difficulties	0.455	0.498	0	1
Info Rights	0.181	0.385	0	1
Contract	0.449	0.498	0	1
Passport	0.15	0.35	0	1
Pay	0.850	0.357	0	1
Dependents	5.479	3.290	0	55
Age	34.2	9.1	17	69
Education	3.7	1.45	1	8
Monthly Wage	1,625	1,467	9	15,000
Size	202.2	202.660	2	800
Hours	9.5	1.9	3	18
Years	5.300	5.990	0	35
Found Family	0.157	0.364	0	1
Found Friends	0.233	0.423	0	1
Found Agency	0.379	0.485	0	1

Note: The outcome variables for the regression analysis include: Job Satisfaction, Workplace Satisfaction, Recommend, Difficulties, and Info Rights. The first three are ordinal measures, and the latter two are dichotomous. The control variables and other regressors are continuous, except for Education (ordinal); and Passport, Contract, Pay, Found Family/Friends/Agency (all dichotomous). Monthly Wage is measured in Qatari Riyals, where 1 USD = 3.64 QR.

outcome variable is *Recommend*, and is also ordinal from one to five. This question asked respondents whether they would recommend employment in Qatar to friends or family back home. If migrants feel pressure to report better conditions than they actually enjoy (i.e., out of fear of punishment from employers), then we may suspect that this question will solicit more sincere responses. However, we see little difference in mean response from the previous satisfaction questions, though the variance is higher here.

In addition to these ordinal measures, I also use two dichotomous outcome variables: *Difficulties* and *Info Rights*. The first of these variables takes a one if a respondent reports that they have experienced any workplace difficulties, which include: “Employment Conditions (long hours of work, contract issues)," “Income (low pay)," and “Poor housing conditions." If a respondent has not experienced

any of these conditions, they receive a zero. The second binary dependent variable derives from a question asking workers about a hypothetical education program for future migrants, and what information they think would be most useful. If a respondent selected "Rights of foreign workers in Qatar," they receive a one for *Info Rights*, and a zero otherwise. The descriptive statistics for these measures vary widely, with nearly half the sample (mean of 0.455) reporting workplace difficulties, but less than twenty percent (mean of 0.181) recommending more information on rights.

Having described the outcome measures, let us now consider the main explanatory variables used in this analysis. The *Contract* variable is dichotomous. Respondents were asked whether they had signed a contract *before* coming to Qatar. If they reported that they had (either with their sponsor, employer or recruitment agency), then they receive a one for *Contract* and zero otherwise. For exit options, I consider two measures that should capture different aspects of worker mobility: *Passport* and *Pay*. The first of these variables is pretty straightforward: migrants were asked whether they currently hold their passports and if they said yes, they received a one. This variable should proxy for general mobility and ease by which a migrant may move within Qatari society or leave the country. The second variable helps get at the effects of debt on potential exit. Migrants were asked whether they had to pay some agency fee to secure their job in Qatar. If yes, the respondent receives a one for *Pay*. Note, however, this question was only asked of migrants who found their employment through an agency, comprising 38 percent of the sample. As such, more than half of the respondents did not answer this question and are missing.[8]

[8]Unfortunately, we cannot simply impute a zero for migrants who found employment through other means. In practice, migrants often pay such fees to brokers and other informal intermediaries (including family and friends), who help them find employment (Rahman, 2011; Pessoa et. al. , 2014). In the empirical analysis, below, I return to this missing data problem and consider the implications for interpreting the results.

Finally, in addition to these explanatory variables, the estimations include a series of controls. These covariates include basic demographics, such as: *Dependents*, *Age*, and *Education*. The latter two variables are straightforward, with *Age* a self-reported number and *Education* an ordinal measure (one to eight) for level of schooling, from no formal education to master's degree. *Dependents* represents the number of family, friends, and even fellow villagers who depend on the migrant's remittances. In addition to these demographics, I also include measures for general job and living conditions: *Monthly Wage*, *Size*, and *Hours*. The variables for *Monthly Wage* and *Hours* (per day) are self-reported, while the *Size* variable comes from official government data (used in constructing the representative sampling frame), and measures the number of workers in a given camp. As seen in Table 3.2, these measures all vary widely for migrants in Qatar.

Model Specification and Regression Results

I use these variables to evaluate my hypotheses on the effects of bargaining power on welfare. Specifically, I consider how *Contract*, *Passport* and *Pay* associate with the outcome variables described above. For each of these welfare measures, I estimate two baseline specifications:

$$Welfare_i = \alpha_i + \beta_1(Contract_i) + \beta_2(Passport_i) + \beta_3(Controls_i) + \epsilon_i \quad (1)$$

$$Welfare_i = \alpha_i + \beta_1(Contract_i) + \beta_2(Passport_i) + \beta_3(Pay_i) + \beta_4(Controls_i) + \epsilon_i \quad (2)$$

These two specifications correspond to columns (1) and (2) in Tables 3.3-3.7. Each table reports the results from regressing individual-level covariates on the respective outcome measure. With some outcome measures ordinal and others dichotomous, I estimate both OLS and logit models in the analysis below. These models all include heteroskedastic robust standard errors, computed using a

standard sandwich estimator.

Beyond these baseline models, I also include a series of fixed effects. Columns (3) and (4) replicate the models above but also include fixed effects for zones. Zones vary widely in their production profile, with different areas devoted almost exclusively to particular sectors (e.g., manufacturing or energy). If firms across these sectors treat their workers systematically better or worse, then the fixed effects should help capture some of these differences. Moreover, given the suggestive results in Figure 3.1 from before, we may suspect welfare to vary systematically across zones for reasons beyond camp or firm policy. The fixed effects should help control for such spatial variation.

I also include fixed effects for an individual's nationality (i.e., country of origin). These results are found in columns (5) and (6). Although predominantly from Asia, migrants come from all over the world to work in the Gulf, and these countries of origin differ in various and important ways. A home country's politics, culture and economic opportunities all play a role in how migrants evaluate their lives in the Gulf. Such experiences not only inform migrant expectations and grievances, but also the degree to which exit represents an attractive option. If migrants from Nepal have much lower reservation wages than those coming from the Philippines, then they may be less willing to pursue exit. Conflict or other conditions in the home country may also influence a migrant's choice to exercise exit options. At the same time, the comparison to the home country may actually inflate perceptions of the Gulf and personal welfare. Even if their conditions in Qatar are abusive, migrants may be generally satisfied given the implicit comparison to their home country, where economic opportunities are scarce. In either case, controlling for home country conditions is critical, making the nationality fixed effects vital to this analysis.

Finally, in each table below, columns (7) and (8) report results from a multilevel

or mixed effects model. As before, I include all of the measures from the baseline specifications.[9] I also include the nationality fixed effects, as in the previous two models. The zone also comes into these multilevel models but now as random effects. Including both zone and nationality fixed effects asks a great deal from the data, especially for zones that may only include a single individual from a given country. With these random effects, we can include all of these individual-level covariates while still capturing the hierarchical structure of the data with individuals nested in zones.

First consider the results found in Tables 3.3-3.5. These models estimate the relationship between bargaining power and *Job Satisfaction*, *Workplace Satisfaction*, and *Recommend*, respectively. Although ordinal, I treat these outcome measures as if they are continuous. Simple OLS offers more intuitive estimates and does not make as weighty of parametric assumptions as ordered logit. The results, however, are largely robust to ordered logit and so I focus on the OLS results here.

Table 3.3 provides strong support for Hypotheses 1 and 3. The coefficients on *Contract* and *Pay* are both in the right direction (positive and negative, respectively) and highly significant across all specifications. Having a contract associates with a significantly higher job satisfaction, whereas having paid a recruitment agency has the opposite effect. There is no support, however, for Hypothesis 2: the coefficient on *Passport* is marginally significant (i.e., the 0.10 level) in only two specifications, but even these results differ in the sign.

[9]For multilevel models, robust standard errors cannot be computed with a sandwich estimator. The reported standard errors derive from the inverted information matrix.

Table 3.3: Job Satisfaction in Qatar

	Dependent Variable: Job Satisfaction							
	OLS Base Model		*Zone-Level Fixed Effects*		*Nationality Fixed Effects*		*Linear Mixed Effects*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
dependents	0.022**	0.027**	0.019**	0.026**	0.019*	0.022**	0.018*	0.021
	(0.010)	(0.011)	(0.010)	(0.010)	(0.010)	(0.009)	(0.010)	(0.014)
age	0.005	−0.005	0.006	−0.008	0.004	−0.002	0.005	−0.002
	(0.003)	(0.005)	(0.004)	(0.005)	(0.004)	(0.006)	(0.004)	(0.006)
education	−0.061**	−0.021	−0.039	−0.016	−0.047*	0.003	−0.029	0.007
	(0.024)	(0.036)	(0.025)	(0.040)	(0.025)	(0.038)	(0.026)	(0.042)
monthly wage	0.0001***	0.0001***	0.0001***	0.0002***	0.0001***	0.0001***	0.0001***	0.0001***
	(0.00002)	(0.00004)	(0.00003)	(0.00005)	(0.00002)	(0.00004)	(0.00003)	(0.00005)
size	0.0002	0.001***	0.0005**	0.001***	0.0003*	0.001***	0.0005**	0.001***
	(0.0002)	(0.0002)	(0.0002)	(0.0003)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
hours	−0.031	−0.064**	−0.017	−0.053	−0.032	−0.058**	−0.025	−0.055**
	(0.020)	(0.030)	(0.023)	(0.034)	(0.020)	(0.030)	(0.018)	(0.025)
contract	0.282***	0.422***	0.343***	0.429***	0.287***	0.380***	0.329***	0.378***
	(0.066)	(0.100)	(0.072)	(0.116)	(0.066)	(0.100)	(0.069)	(0.110)
passport	0.163*	−0.254	0.115	−0.315	0.155	−0.359	0.131	−0.359*
	(0.098)	(0.224)	(0.104)	(0.232)	(0.097)	(0.225)	(0.103)	(0.202)
pay		−0.362***		−0.331***		−0.392***		−0.386***
		(0.104)		(0.114)		(0.117)		(0.148)
Constant	3.644***	4.111***	3.159***	3.465***	3.579***	4.644***	3.425***	4.619***
	(0.261)	(0.376)	(0.346)	(0.467)	(0.276)	(0.390)	(0.976)	(0.440)
Observations	841	393	841	393	841	393	841	393
R^2	0.074	0.143	0.148	0.212	0.122	0.177	–	–

Note: Models 1-6 include robust standard errors. Starred coefficients indicate *p<0.1; **p<0.05; ***p<0.01.

Table 3.4: Workplace Satisfaction in Qatar

	Dependent Variable: Workplace Satisfaction							
	OLS Base Model		*Zone-Level Fixed Effects*		*Nationality Fixed Effects*		*Linear Mixed Effects*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
dependents	−0.007	0.001	−0.006	0.0004	−0.007	−0.005	−0.006	−0.006
	(0.012)	(0.020)	(0.011)	(0.015)	(0.011)	(0.016)	(0.009)	(0.013)
age	0.006*	0.001	0.005	−0.002	0.005	0.004	0.005	0.003
	(0.003)	(0.005)	(0.003)	(0.005)	(0.003)	(0.005)	(0.003)	(0.005)
education	−0.042*	−0.022	−0.013	−0.004	−0.030	0.004	−0.013	0.015
	(0.023)	(0.034)	(0.023)	(0.036)	(0.024)	(0.035)	(0.023)	(0.038)
monthly wage	0.0001***	0.0001*	0.0001***	0.0001**	0.0001***	0.0001*	0.0001***	0.0001*
	(0.00003)	(0.00004)	(0.00002)	(0.00005)	(0.00003)	(0.00004)	(0.00003)	(0.00004)
size	0.0002	0.001***	0.0004**	0.001***	0.0003*	0.001***	0.0005***	0.001***
	(0.0001)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
hours	−0.010	−0.048*	−0.002	−0.039	−0.008	−0.041	−0.004	−0.036
	(0.017)	(0.026)	(0.019)	(0.029)	(0.017)	(0.025)	(0.016)	(0.022)
contract	0.248***	0.414***	0.363***	0.435***	0.280***	0.404***	0.349***	0.409***
	(0.058)	(0.088)	(0.062)	(0.108)	(0.057)	(0.089)	(0.062)	(0.101)
passport	0.163*	−0.313	0.144	−0.407*	0.146	−0.406*	0.147	−0.423**
	(0.095)	(0.236)	(0.101)	(0.227)	(0.092)	(0.227)	(0.092)	(0.180)
pay		−0.074		−0.078		−0.122		−0.117
		(0.101)		(0.108)		(0.111)		(0.132)
Constant	3.734***	3.904***	3.568***	3.887***	3.776***	4.484***	3.622***	4.385***
	(0.231)	(0.343)	(0.235)	(0.342)	(0.266)	(0.365)	(0.879)	(0.395)
Observations	841	393	841	393	841	393	841	393
R^2	0.060	0.106	0.157	0.204	0.108	0.158	–	–

Note: Models 1-6 include robust standard errors. Starred coefficients indicate *p<0.1; **p<0.05; ***p<0.01.

Table 3.5: Recommendations of Qatar

			Dependent Variable: Recommend					
	OLS Base Model		*Zone-Level Fixed Effects*		*Nationality Fixed Effects*		*Linear Mixed Effects*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
dependents	0.010	0.007	0.008	0.014	0.009	0.003	0.008	0.004
	(0.017)	(0.026)	(0.015)	(0.024)	(0.017)	(0.023)	(0.012)	(0.017)
age	0.005	0.003	0.005	−0.001	0.004	0.002	0.005	0.0003
	(0.004)	(0.007)	(0.004)	(0.006)	(0.004)	(0.007)	(0.004)	(0.007)
education	−0.127***	−0.131***	−0.099***	−0.109***	−0.122***	−0.139***	−0.098***	−0.117**
	(0.028)	(0.040)	(0.029)	(0.041)	(0.029)	(0.042)	(0.030)	(0.049)
monthly wage	0.0001***	0.0001**	0.0001***	0.0002***	0.0001***	0.0001**	0.0001***	0.0002***
	(0.00004)	(0.0001)	(0.00004)	(0.0001)	(0.00004)	(0.0001)	(0.00003)	(0.0001)
size	−0.0002	0.0001	0.0001	0.001*	−0.0001	0.0003	0.0001	0.001**
	(0.0002)	(0.0002)	(0.0002)	(0.0003)	(0.0002)	(0.0002)	(0.0002)	(0.0003)
hours	−0.055***	−0.094***	−0.050**	−0.086***	−0.054**	−0.084***	−0.045**	−0.075***
	(0.021)	(0.028)	(0.023)	(0.030)	(0.021)	(0.027)	(0.020)	(0.029)
contract	0.182**	0.270**	0.192**	0.364***	0.189**	0.227**	0.203***	0.238*
	(0.075)	(0.112)	(0.080)	(0.123)	(0.075)	(0.116)	(0.079)	(0.131)
passport	0.335***	−0.157	0.212**	−0.156	0.346***	−0.268	0.261**	−0.264
	(0.100)	(0.232)	(0.103)	(0.223)	(0.097)	(0.236)	(0.117)	(0.231)
pay		−0.465***		−0.394**		−0.384**		−0.351**
		(0.153)		(0.165)		(0.163)		(0.170)
Constant	4.324***	4.959***	4.684***	4.747***	4.855***	5.481***	4.734***	5.405***
	(0.292)	(0.427)	(0.374)	(0.581)	(0.353)	(0.498)	(1.106)	(0.510)
Observations	841	393	841	393	841	393	841	393
R^2	0.087	0.108	0.168	0.235	0.105	0.143	–	–

Note: Models 1-6 include robust standard errors. Starred coefficients indicate *p<0.1; **p<0.05; ***p<0.01.

Finally, Table 3.5 reports the OLS estimates using *Recommend* as the dependent variable. Consistent with the results for the satisfaction measures, migrants who have a contract are significantly more likely to recommend Qatar to family and friends. Hypothesis 3 also receives strong support. Migrants that have paid an agency report a significantly lower recommendation of Qatar. And unlike the previous models, we find some support for Hypothesis 2 here. The coefficient on *Passport* is positive and significant in four of the eight specifications, all of which do not include the *Pay* variable and its reduced sample.

Table 3.4 further supports Hypothesis 1, with the coefficient on *Contract* again positive and robustly significant. Hypothesis 3 does not fare as well when it comes to *Workplace Satisfaction*, as the coefficient on *Pay* remains negative but is no longer significant. And as before, there is little support for Hypothesis 2. If anything, the evidence suggests that holding one's passport actually associates with lower *Workplace Satisfaction*. Crucially though, this finding is only significant in the specifications that include the *Pay* variable, which cuts the sample in half. More than just a reduction in the sample size, this subset of respondents is systematically different from the full sample, since this variable only applies to respondents that found employment through an agency.

In addition to these OLS results, Tables 3.6-3.7 report the estimates from the logistic regressions. As before, we find that the coefficients on *Contract* and *Pay* are largely significant and in the expected directions. Migrants with a contract are less likely to report workplace difficulties, which is not surprising given their greater overall satisfaction seen above. Additionally, having a contract makes respondents less likely to recommend more information on rights. Moreover, we find that the coefficients on the *Pay* variable operate in the opposite (but predicted) direction: migrants who have paid an agency are more likely to report workplace difficulties and recommend more information on rights.

Table 3.6: Workplace Difficulties in Qatar

	Dependent Variable: Workplace Difficulties							
	Logit Base Model		*Zone-Level Fixed Effects*		*Nationality Fixed Effects*		*Generalized Linear Mixed Effects*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
dependents	0.028	0.047	0.036	0.058	0.029	0.043	0.038	0.049
	(0.023)	(0.035)	(0.030)	(0.054)	(0.024)	(0.035)	(0.028)	(0.048)
age	0.003	0.027*	0.005	0.030*	0.008	0.026	0.009	0.026*
	(0.009)	(0.016)	(0.010)	(0.017)	(0.010)	(0.017)	(0.010)	(0.016)
education	0.252***	0.276**	0.212***	0.233*	0.286***	0.273**	0.233***	0.225*
	(0.069)	(0.109)	(0.073)	(0.123)	(0.074)	(0.116)	(0.073)	(0.118)
monthly wage	−0.001***	−0.001***	−0.001***	−0.001***	−0.001***	−0.002***	−0.001***	−0.002***
	(0.0002)	(0.0003)	(0.0002)	(0.0003)	(0.0002)	(0.0004)	(0.0002)	(0.0003)
size	0.0004	−0.001	0.0002	−0.0005	0.0005	−0.0005	0.0002	−0.001
	(0.0004)	(0.001)	(0.0005)	(0.001)	(0.0004)	(0.001)	(0.0005)	(0.001)
hours	0.085**	0.169***	0.068	0.134**	0.092**	0.175***	0.081*	0.164**
	(0.038)	(0.060)	(0.044)	(0.067)	(0.039)	(0.062)	(0.046)	(0.068)
contract	−0.431***	−0.176	−0.381**	−0.127	−0.496***	−0.372	−0.493***	−0.442
	(0.152)	(0.248)	(0.168)	(0.296)	(0.158)	(0.271)	(0.181)	(0.293)
passport	−0.327	0.733	−0.063	0.756	−0.307	0.359	−0.118	0.373
	(0.258)	(0.550)	(0.300)	(0.596)	(0.268)	(0.537)	(0.283)	(0.580)
pay		1.817***		1.711***		1.804***		1.734***
		(0.457)		(0.479)		(0.493)		(0.481)
Constant	−0.824	−3.371***	−17.926***	−21.949***	−15.608***	−1.976	−16.178	−1.784
	(0.569)	(1.077)	(0.764)	(2.128)	(1.356)	(1.203)	(4,041.742)	(1.249)
Observations	841	393	841	393	841	393	841	393
Log Likelihood	−526.193	−224.479	−472.327	−198.184	−504.727	−217.824	−490.382	−217.465
Akaike Inf. Crit.	1,070.386	468.957	1,030.655	472.369	1,061.455	473.649	1,034.764	474.929

Note: Models 1-6 include robust standard errors. Starred coefficients indicate *p<0.1; **p<0.05; ***p<0.01.

Table 3.7: Information on Rights in Qatar

			Dependent Variable: Info on Rights					
	Logit Base Model		*Zone-Level Fixed Effects*		*Nationality Fixed Effects*		*Generalized Linear Mixed Effects*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
dependents	0.038*	0.056*	0.045	0.098	0.039*	0.048*	0.036	0.063
	(0.022)	(0.031)	(0.033)	(0.062)	(0.022)	(0.029)	(0.034)	(0.059)
age	−0.004	−0.025	−0.015	−0.024	−0.004	−0.023	−0.013	−0.027
	(0.010)	(0.018)	(0.012)	(0.020)	(0.010)	(0.019)	(0.012)	(0.019)
education	0.037	0.190*	0.008	0.254*	0.044	0.230**	0.008	0.258*
	(0.065)	(0.106)	(0.076)	(0.140)	(0.067)	(0.116)	(0.078)	(0.139)
monthly wage	−0.00001	−0.0001	−0.0001	−0.0005	−0.00002	−0.0001	−0.0001	−0.0004
	(0.0001)	(0.0002)	(0.0001)	(0.0003)	(0.0001)	(0.0002)	(0.0001)	(0.0003)
size	−0.001	−0.001*	−0.001**	−0.001*	−0.001	−0.001	−0.001**	−0.002*
	(0.0005)	(0.001)	(0.001)	(0.001)	(0.0005)	(0.001)	(0.001)	(0.001)
hours	0.077*	0.139**	0.063	0.068	0.079*	0.164**	0.065	0.094
	(0.044)	(0.065)	(0.055)	(0.079)	(0.044)	(0.066)	(0.054)	(0.074)
contract	−0.514***	−1.006***	−0.600***	−0.861***	−0.545***	−1.143***	−0.689***	−0.932***
	(0.176)	(0.260)	(0.202)	(0.324)	(0.181)	(0.291)	(0.212)	(0.349)
passport	0.007	0.672	0.054	0.602	−0.003	0.369	0.100	0.490
	(0.258)	(0.473)	(0.310)	(0.549)	(0.261)	(0.500)	(0.310)	(0.563)
pay		1.513***		1.877**		1.787***		1.721**
		(0.540)		(0.733)		(0.687)		(0.702)
Constant	−1.816***	−3.079***	−18.453***	−20.418***	−16.645***	−2.471*	−17.935	−2.919*
	(0.606)	(1.046)	(1.332)	(2.428)	(1.275)	(1.284)	(6,987.179)	(1.507)
Observations	841	393	841	393	841	393	841	393
Log Likelihood	−436.745	−192.537	−346.753	−155.879	−427.838	−187.707	−374.200	−177.718
Akaike Inf. Crit.	891.491	405.075	779.505	387.758	907.676	413.413	802.401	395.435

Note: Models 1-6 include robust standard errors. Starred coefficients indicate *p<0.1; **p<0.05; ***p<0.01.

Stepping back, these results broadly support the theory above and are consistent with Hypotheses 1 and 3. I have argued that contracts provide workers with greater bargaining power, and that recruitment debts limit exit options. Both of these factors should influence migrants' capacity to protect themselves and extract concessions from employers. At the very least, lacking a contract or being weighed down by excessive debt, a worker may be more likely to accept harsh or abusive conditions. The empirical results largely corroborate this expectation. Satisfaction, workplace difficulties and general recommendation of Qatar all associate with contracts and debt as predicted.

The major exception, of course, is the *Passport* variable, which is often insignificant. These results offer no real support for Hypothesis 2. Anecdotal accounts have-long highlighted the practice of passport seizure as a critical means of control for sponsors. And yet we find little evidence that migrants with their passports differ in perceptions of welfare. In part, this result may be explained by the fact that even if a migrant holds her passport, she cannot leave the country without an exit visa. Exit ultimately depends on the sponsor releasing the migrant. Seizing passports may very well have some deleterious effects on migrant welfare, but as long as exit visas are necessary, stopping flight is not one of them.

Alternatively, this finding may be driven by a selection effect. Specifically, follow-up surveys from SESRI in Doha have found that many migrants willingly give up their passports because their housing conditions are not secure (Gardner et. al. , 2013). Without a safe place for keeping their personal documents, some migrants entrust their sponsors with holding onto the passport, suggesting an altogether different mechanism at play. As such, this *Passport* variable may be quite noisy, and not picking up what we would normally expect.

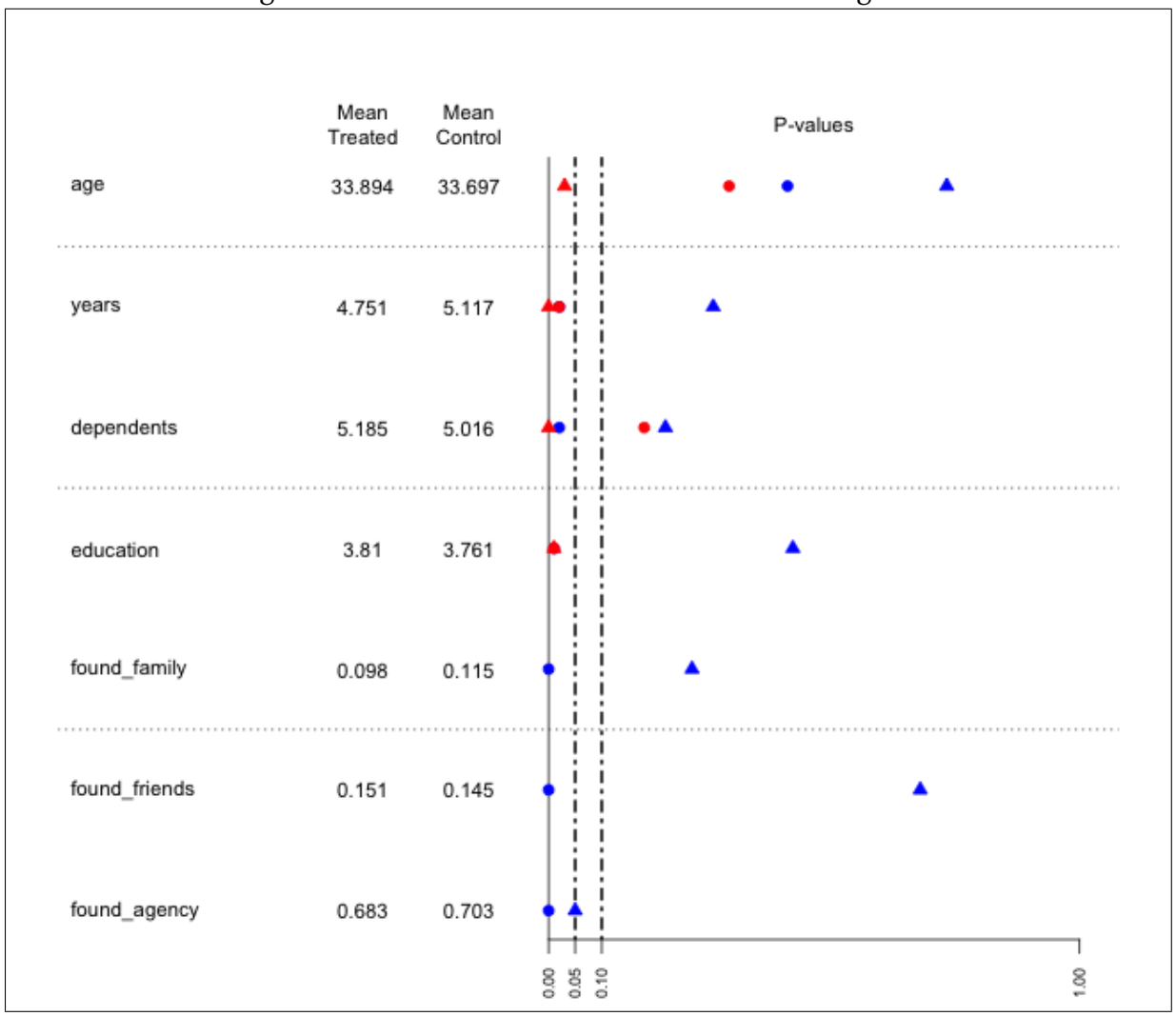
Selection Problem and Matching Results

The problem of selection is not only limited to the *Passport* variable, but also underlies the results on *Contract*. However robust these findings, we have to consider the possibility that migrants who are offered a contract may systematically differ from those who do not receive such offers. Moreover, these differences may drive selection in such a way that migrants who are more likely to receive contracts, also tend to enjoy better welfare and have their rights protected, independent of the contract itself. This selection problem can also work at the firm-level. Firms that provide (and enforce) contracts may also be more likely to provide better welfare conditions, even after controlling for wages, camp size, and working hours. In short, the coefficient on *Contracts* may be inflated or entirely spurious, and driven by selection of "better" migrants or firms.

Randomly assigning contracts to migrants represents one solution to this problem. Notwithstanding the dubious normative implications of such a strategy, randomization is obviously impossible in this case. The potential outcomes framework offers an alternative approach that matches respondents on observables and treats the assignment of contracts *as if* random. We can begin by defining those migrants without a contract as our "control," and those with a contract as our "treatment" group. Using a genetic matching algorithm (Sekhon and Mebane, 1998), I then match pairs of individuals across these groups, to represent as close to a counterfactual as possible. A key assumption here is that by matching on observable pre-treatment covariates, we can estimate the effect of contracts on welfare. Of course, this method is only as good as the data available. If unobservables correlate with the likelihood of assignment (i.e., receiving a contract) and welfare outcomes, then the selection problem remains.

The balance plot for these matched groups can be seen in Figure 3.5. In matching these groups, I include the demographic covariates from before (i.e., *Dependents*,

Figure 3.5: Balance Plot for Covariate Matching



Note: The circles indicate before-matching p-values, while triangles represent after-matching p-values. The blue marks denote mean-differences and red marks represent distributional (i.e., KS) differences.

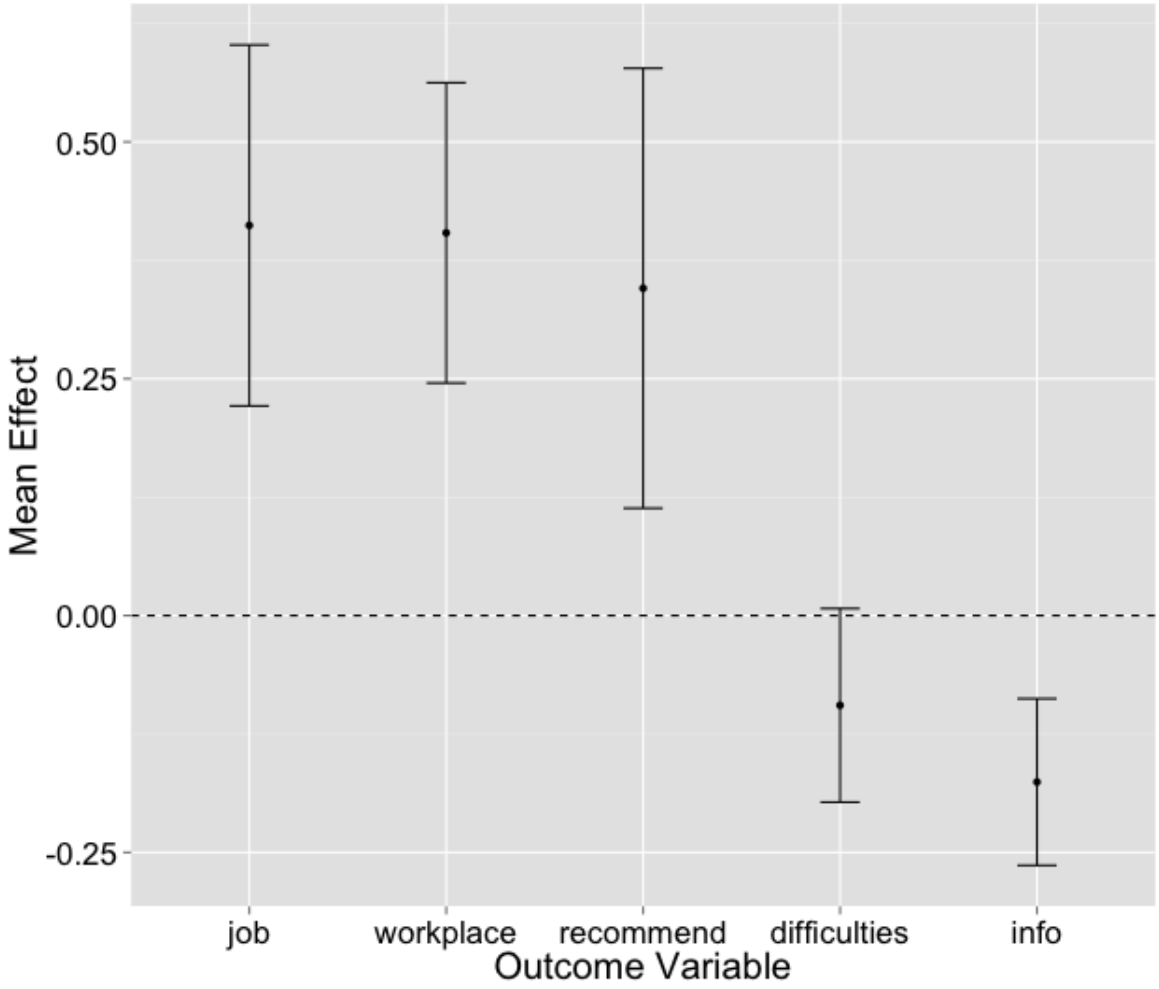
Age, and *Education*), along with a few new variables to better capture the selection process and how migrants found their jobs. These variables include: *Years*, *Found Family*, *Found Friends*, and *Found Agency*. The *Years* variable is simply the number of years that a migrant has lived in Qatar. Migrants who stay longer not only reveal their preference for living in Qatar, but also gain information and experience over time, which may influence their personal welfare. The remaining three covariates are indicator variables for how a migrant found her job in Qatar. Migrants vary widely in their prior knowledge and network connections, making them more or less vulnerable to exploitation. Such vulnerability is driven in part by how migrants find employment, either informally through friends and family, or formally through a recruitment agency. These variables are thus critical to explaining the selection process.

As the balance plot reveals, matching was largely successful, though not perfect. Before matching, the treatment and control groups appeared significantly different, both in terms of their mean covariate values (i.e., the blue circles) and their distributions (i.e., the red circles).[10] After matching, the only covariate mean that remains unbalanced (right at the 0.05 level) is *Found Agency*. Matching the full sample is difficult given the diversity among the migrant population in Qatar. Using these matched samples, I then estimate the average treatment effect for the treated (ATT) and Abadie-Imbens (AI) standard errors (Abadie and Imbens, 2006; Sekhon, 2011).

The effect of contract on each of the five outcome variables can be seen in Figure 3.6. The y-axis plots the difference between treatment and control groups (i.e., those with and without a contract, respectively), and the x-axis notes the different outcome measures. Effects are significant if the 95 percent confidence bars do not cross the dotted-line at zero, which represents no significant difference

[10]Note that the binary variables do not include p-values for the distributional differences (i.e., triangles).

Figure 3.6: The Effect of Contracts on a Matched Sample of Migrants



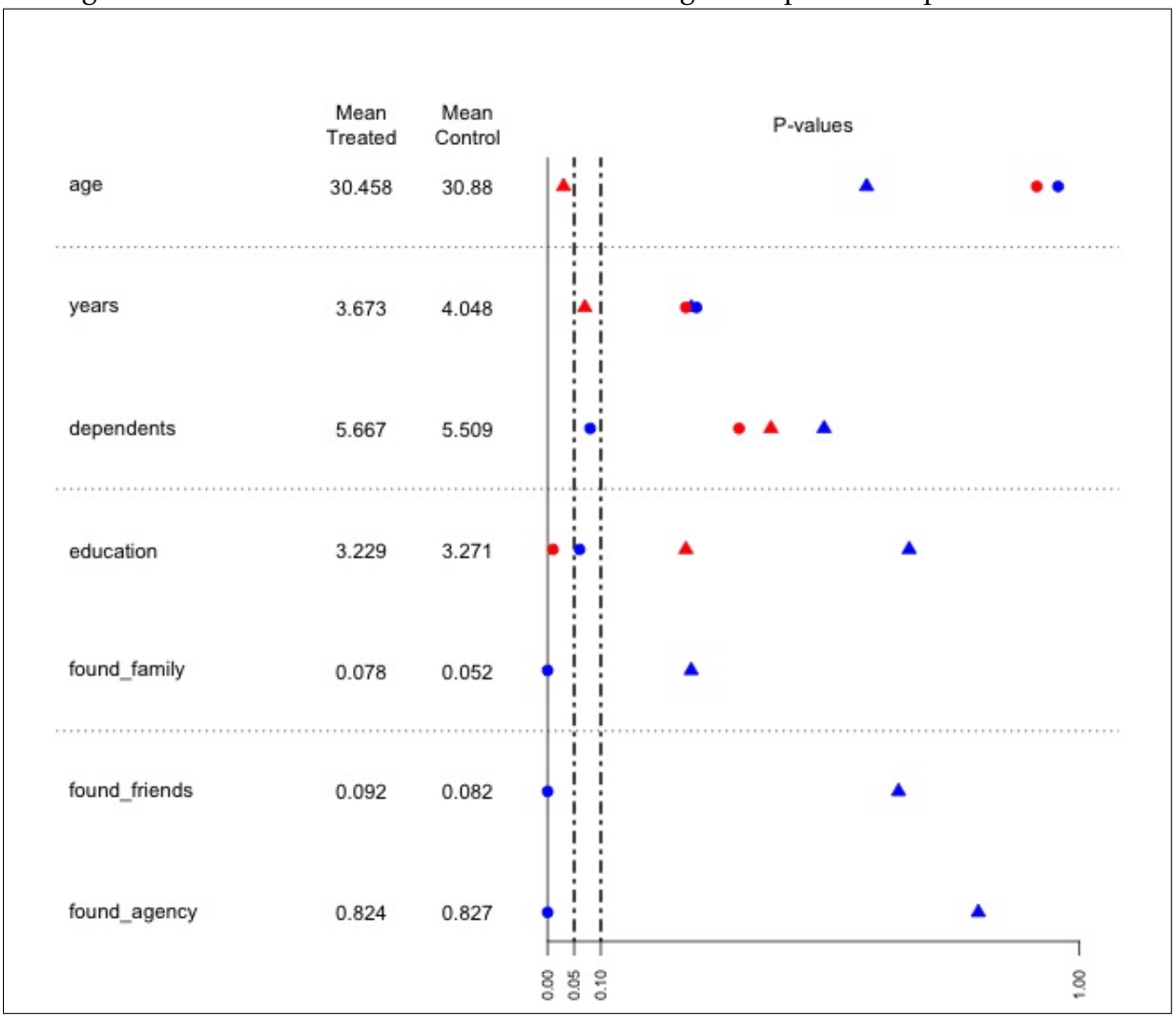
between groups. Consistent with the regression results above, we see that contracts have a positive and significant effect on *Job Satisfaction*, *Workplace Satisfaction*, and *Recommend*. Contracts also have a negative effect on *Difficulties* and *Info Rights*, but only the latter result is significant. All told, these results broadly support the earlier findings. And to the extent the matching process has been effective, these results provide suggestive evidence that contracts have a real effect on migrant satisfaction and perceptions of welfare.

As a final robustness check, I have also restricted the sample to Nepalese migrants (328 respondents) and replicated this matching process. Not surprisingly, the balance results are much cleaner, as seen in Figure 3.7. And even with the loss of power from a reduced sample, Figure 3.8 indicates that the treatment effects are significant and larger for each outcome measure. From a potential outcomes framework, these results should not be all that surprising. By restricting the sample to only Nepalese workers, we are able to better control for various confounds and other unobservable differences between migrant groups. As such, we now have a much cleaner comparison between treated and control units, which offers a better test of the effect of contracts on welfare.

III.6 Conclusion

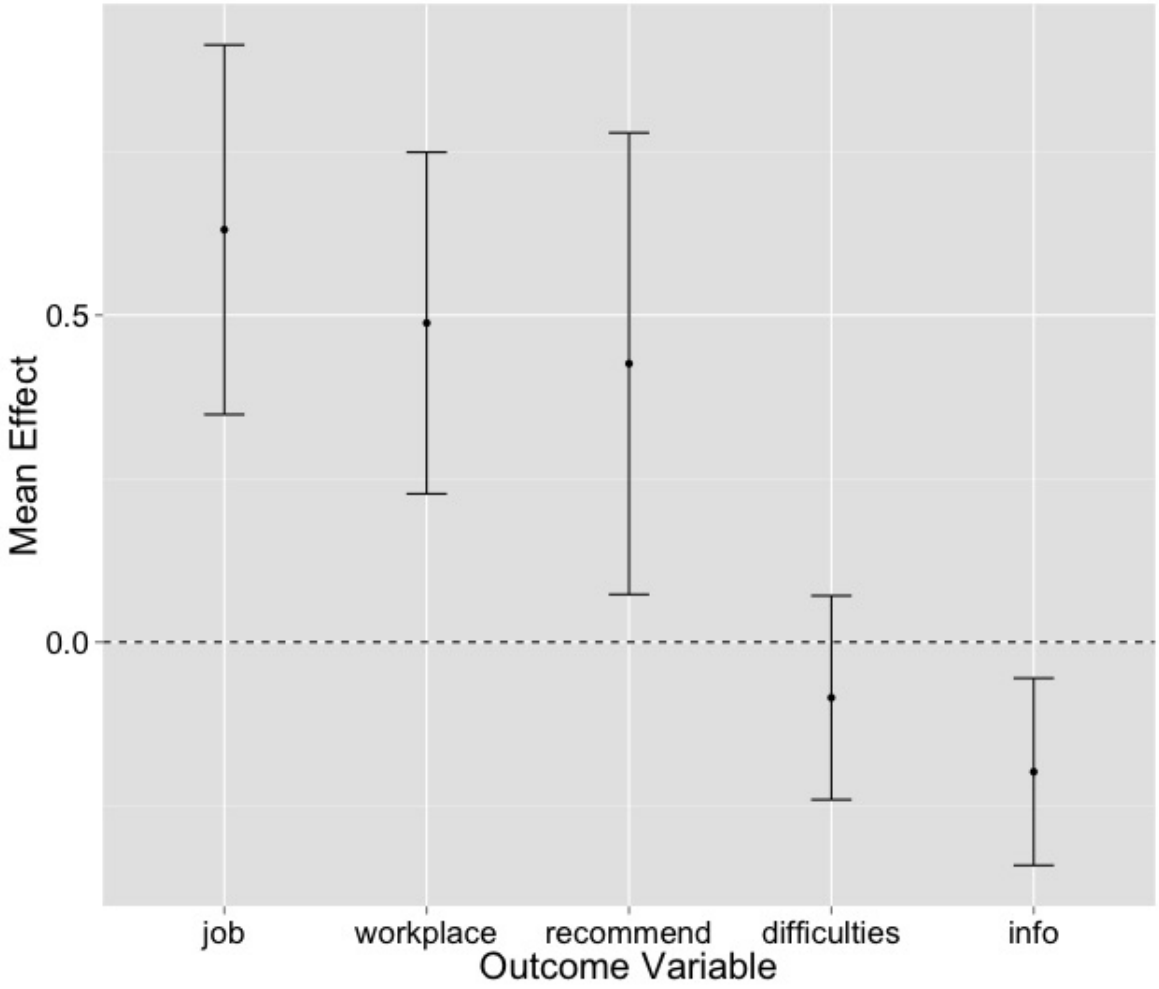
The Gulf states differ markedly from other developing contexts in which we typically find non-state actors playing a prominent role in welfare provision. They are not only wealthier and more autocratic, but they also depend on a large migrant population, which is critical to the entire region's political economy. Despite their vast resources and relatively high capacity, these regimes have delegated the everyday welfare of this vital population to the firms that employ them. The *kafala* system reduces the burden on the state and allows firms to control their own workforce, a major concession to capital-holders. As this case reveals, not all

Figure 3.7: Balance Plot for Covariate Matching on Nepalese Respondents



Note: The circles indicate before-matching p-values, while triangles represent after-matching p-values. The blue marks denote mean-differences and red marks represent distributional (i.e., KS) differences.

Figure 3.8: The Effect of Contracts on a Matched Sample of Nepalese Migrants



autocrats necessarily want to maximize control and, under some conditions, may prefer to abdicate responsibility to private, non-state actors. Rather than a loss of sovereignty, this delegation represents an informal partnership between the public and private sectors in the Gulf.

From a normative perspective, such delegation is problematic. As non-citizens, these migrants have few formal rights or protections for holding their employers to account. Given their vulnerability, exploitation has become an all too common problem for the Gulf states, which provide little oversight or monitoring of firms. Within this context, some migrants have been able to more effectively secure better working and living conditions. Although the *kafala* system clearly advantages firms, workers with contracts and a more credible threat of exit have greater bargaining power vis-a-vis their employers. Drawing on data from Qatar, I find evidence consistent with this argument, suggesting that migrants with contracts and lower debt enjoy higher satisfaction and overall perceptions of welfare. These results challenge the conventional wisdom that contracts are largely unenforced and ineffectual in the Gulf. At the same time though, they also corroborate anecdotal evidence that suggests restricted mobility and onerous debt make migrants more susceptible to abuse. All told, contracts and credible exit options appear to provide even the most vulnerable workers a means of protection within authoritarian states.

These findings have important implications for the Gulf and beyond. While the empirical analysis only uses data from Qatar, similar dynamics are likely to hold throughout the Gulf. The *kafala* is practiced across the region, providing similar conditions for firms to control and regulate the lives of their workers. Not only are these structural conditions similar, so too is the population of workers, who tend to come from the same migrant-sending countries. Although replication in other Gulf states is critical to validating some of the more general claims made here, we can reasonably speculate that similar employer-worker bargaining dynamics hold

elsewhere in the region.

We have to be much more cautious, however, when drawing similar conclusions about countries outside of the Gulf. At one level, the dynamics described here may very well resemble those found in other developing states. As both welfare provider and security force, the firm's control and domain extends broadly over a vulnerable population of workers. Such conditions should be familiar to scholars from Africa to the early Americas. From factory towns in early industrial New England, to villages serving oil companies in Nigeria today, we should expect similar types of distributive conflict to erupt between workers and the firms that employ, house, feed, and police them.

This comparison begins to breakdown once we consider the distinct context of the Gulf. In these other cases, the population of workers may be disenfranchised, but they are also permanent residents (and usually citizens) of the state. Even if the demand for foreign labor is hardly temporary, individual migrants in the Gulf are largely seen as replaceable. If their demands become excessive, an employer can replace his workers and look for other, cheaper supplies of foreign labor. The owner of a textile factory in 19th C. Lowell may have far fewer options. At the same time, workers in these contexts often enjoy other forms of bargaining power (e.g., voice), which may offer advantages over a Gulf migrant's meager exit options. Notwithstanding these differences, the Gulf case has broader implications for bargaining power and the conditions under which workers can extract concessions from their employers. Ultimately though, this bargaining power is context-dependent, and the Gulf represents but one example of how vulnerable groups can protect themselves in autocratic systems that structurally favor capital-owners.

APPENDICES

APPENDIX A

Mathematical Proofs

Proof of Lemma 1

Optimal Support Suppose Expression (1.6) is satisfied such that $x_i \geq \bar{x}$. We can solve the maximization problem from Expression (1.5) by taking the first-order conditions.

$$\pi' x_i \Omega - \pi' r_i \Omega - 1 = 0$$
$$\pi' = \frac{1}{\Omega(x_i - r_i)}$$

Using the survival function from Expression (1.2), and taking the derivative with respect to s_i, we can rearrange terms to derive the analytic solution for s^* found in

Expression (1.7)

$$\frac{\psi_i s_i^{\psi_i - 1}}{n} = \frac{1}{\Omega(x_i - r_i)}$$

$$s_i = \left[\frac{n}{\psi_i \Omega(x_i - r_i)}\right]^{\frac{1}{\psi_i - 1}}$$

$$s^* = \left[\frac{1}{n}\psi_i \Omega(x_i - r_i)\right]^{\frac{1}{1-\psi_i}} \tag{1.7}$$

This solution characterizes the optimal support level conditional on Expression (1.6) being satisfied. Now suppose that this condition were not met, and $x_i < \bar{x}$. The term within the brackets would become negative, requiring $s_i^* < 0$. By assumption, this impossible since s_i is bounded by zero. Thus, if $x_i < \bar{x}$, then $s^* = 0$. ■

Comparative Statics For an interior solution to the maximization problem in Expression (1.5), the optimal support level is defined by s^* above. Note that the exponent, is always positive since $\psi_i > 1/2$ by assumption. The term outside the parenthesis is also always positive since each of these parameters are strictly greater than zero. Thus, s^* is strictly positive if the condition in Expression (1.6) is satisfied. Taking the comparative statics is relatively straightforward since these terms are mostly just positive or negative scalars. The following comparative statics hold:

$$\frac{\partial s^*}{\partial x_i} > 0 \qquad \frac{\partial s^*}{\partial r_i} < 0$$

$$\frac{\partial s^*}{\partial n} < 0 \qquad \frac{\partial s^*}{\partial \psi_i} > 0$$

$$\frac{\partial s^*}{\partial \Omega} > 0$$

Proof of Lemma 2

Optimal Allocation The Autocrat's constrained optimization problem is as follows

$$\max_{\mathbf{x}} \left\{ \pi x_A \Omega \right\}$$

$$s.t.$$

$$x_i \geq 0 \qquad \forall i \in \mathcal{N}$$

$$x_j \geq \bar{x} \qquad \forall i \in \mathcal{C}$$

$$x_A \geq 0$$

$$\sum_{i}^{N} x_i + x_A = 1$$

Using the λ multipliers to incorporate these constraints, we can generate the Lagrangian function from Expression (1.9)

$$L = \pi x_A \Omega - \lambda \left(\sum x_i + x_A - 1 \right) + \lambda_j (x_j - \bar{x}) + \lambda_i x_i + \lambda_A x_A \tag{1.9}$$

Taking the FOC, the following Kuhn-Tucker conditions hold

$$
\begin{aligned}
&\frac{\partial L}{\partial x_j} = \pi_j' x_A \Omega + \lambda_j = \lambda \\
&\frac{\partial L}{\partial x_i} = \pi_i' x_A \Omega + \lambda_i = \lambda \\
&\frac{\partial L}{\partial x_A} = \pi \Omega + \lambda_A = \lambda \\
&\sum x_i + x_j + x_A - 1 = 0 \quad \forall i, j \in \mathcal{N} \\
&\lambda_j x_j = 0 \qquad \lambda_i x_i = 0 \qquad \lambda_A x_A = 0 \\
&\lambda_j \geq 0 \qquad \lambda_i \geq 0 \qquad \lambda_A \geq 0 \\
&x_j \geq \bar{x} \qquad x_i \geq 0 \qquad x_A \geq 0
\end{aligned}
$$

To show there exists a unique interior solution, consider three possible cases: i) $x_A = 0$; ii) $x_A = 1$; and iii) $0 < x_A < 1$. I will first show that the two corner cases are not optimal, and then derive the interior solution.

Case (i) Suppose $x_A = 0$. The Autocrat receives no share, fully distributing benefits across society. Since $x_A = 0$, the first and second FOC above become $\lambda_j = \lambda$ and $\lambda_i = \lambda$, respectively. Let j be some group that receives benefits such that $x_j > \bar{x} \geq 0$. Since $x_j > 0$ and $\lambda_j x_j = 0$ (from above), then $\lambda_j = 0$, which further implies $\lambda = 0$. By Lemma (1) we know that if $x_j > \bar{x}$ then $s_j > 0$ and thus $\pi > 0$. Therefore $\pi\Omega + \lambda_A > 0$, which implies $\lambda > 0$. However, this is a contradiction, thus $x_A^* \neq 0$.

Case (ii) Suppose $x_A = 1$. In this case, the Autocrat keeps all of the benefits for himself. If $x_A = 1$, then $x_i = 0 \; \forall i \in \mathcal{N}$ and $\lambda_A = 0$. Given Lemma (1), $s_i = 0 \; \forall i \in \mathcal{S}$, and thus $\pi = 0$. Therefore $\pi\Omega + \lambda_A = 0$, making $\lambda = 0$. But since $\pi_j' x_A \Omega > 0$, then $\lambda > 0$. However, this is a contradiction, thus $x_A^* \neq 1$.

Case (iii) Finally, suppose $0 < x_A < 1$. In this case, the Autocrat receives some share, as does at least one group j such that $x_j > \bar{x} \geq 0$. Both λ_A and λ_j must be zero, giving us the following reduced FOC

$$\pi_j' x_A \Omega = \lambda$$
$$\pi \Omega = \lambda$$

Setting these quantities equal and solving, we have Expression (1.10):

$$x_A^* = \frac{\pi}{\pi_j'} \tag{1.10}$$

Since this expression must hold for all groups $j, k \in \mathcal{C}$, we can also derive Expression (1.11)

$$\pi_j' = \pi_k' \tag{1.11}$$

The Autocrat's optimal allocation must simultaneously satisfy Expressions (1.10), (1.11) and the remaining constraints from above. ■

Proof of Lemma 3

Optimal Effort The optimal effort choice e_i^* can take one of three possible cases: (i) $p_i^* > 0$, $d_i^* = 0$; (ii) $p_i^* = 0$, $d_i^* > 0$; and, (iii) $p_i^* = d_i^* = 0$. These cases depend on the cutpoint defined in Expression (1.15). To derive this cutpoint, I first solve for p_i^* and d_i^*, and then consider the conditions (i.e., value of $\bar{\bar{x}}$) necessary to support the optimal choice.

Case (i) Suppose $x_i > \bar{\bar{x}}$. Under this condition, we can let $d_i^* = 0$. Using

the maximization problem from Expression (1.13), we can take the first-order conditions with respect to p_i:

$$\pi'_p x_i \Omega + \pi x_i \Omega'_p + (1-\pi)(r_i \Omega'_p) - \pi'_p r_i \Omega - s'_p - 1 = 0$$
$$\pi'_p \Omega(x_i - r_i) + \Omega'_p(\pi x_i + r_i - \pi r_i) = 1 + s'_p$$

Let $\pi'_p = \pi'_\Omega \Omega'_p$. Substituting in this expression, we can simplify terms as follows:

$$\pi'_\Omega \Omega'_p \Omega(x_i - r_i) + \Omega'_p(\pi x_i + r_i - \pi r_i) = 1 + s'_p$$
$$\Omega'_p\Big(\pi'_\Omega \Omega(x_i - r_i) + \pi x_i + r_i - \pi r_i)\Big) = 1 + s'_p$$
$$\Omega'_p = \frac{1 + s'_p}{\pi'_\Omega \Omega(x_i - r_i) + \pi x_i + r_i - \pi r_i}$$

Finally, by differentiating Expression (1.12) with respect to p_i, we can plug in an analytic value for Ω'_p, and derive Expression (1.14):

$$\omega \Gamma \phi_i p_i^{\phi_i - 1} = \frac{1 + s'_p}{\pi'_\Omega \Omega(x_i - r_i) + \pi(x_i - r_i) + r_i}$$
$$p_i^* = \left[\frac{\omega \Gamma \phi_i((x_i - r_i)(\pi'_\Omega \Omega + \pi) + r_i)}{1 + s'_p}\right]^{\frac{1}{1-\phi_i}} \tag{1.14}$$

Case (ii) Suppose $x_i < \bar{\bar{x}}$. Letting $p_i^* = 0$, we can now take the FOC w.r.t. d_i:

$$\pi'_d x_i \Omega + \pi x_i \Omega'_d + (1-\pi)(r_i \Omega'_d) - \pi'_d r_i \Omega - s'_d - 1 = 0$$
$$\pi'_d \Omega(x_i - r_i) + \Omega'_d(\pi x_i + r_i - \pi r_i) = 1 + s'_d$$

Since $\bar{\bar{x}} \leq \bar{x}$, $s_i^* = 0$. Therefore s'_d drops out. Solving as before, we recover Expression

(1.16):

$$
\begin{aligned}
-\delta_i d_i^{\delta_i - 1} &= \frac{1}{\pi'_\Omega \Omega(x_i - r_i) + \pi(x_i - r_i) + r_i} \\
d_i^* &= \left[-\delta_i \Big((x_i - r_i)(\pi'_\Omega \Omega + \pi) + r_i \Big) \right]^{\frac{1}{1-\delta_i}}
\end{aligned} \tag{1.16}
$$

Case (iii) So far, we have found that case (i) obtains when $x_i > \bar{\bar{x}}$ and case (ii) holds iff $x_i < \bar{\bar{x}}$. Now suppose $x_i = \bar{\bar{x}}$. If this condition holds, then the right-hand sides of Expressions (1.14) and (1.16) are both equal to zero.

To see this, consider the parenthetical term in the numerator of Expression (1.14). The same term is also found in Expression (1.16) and is critical to defining the cutpoint $\bar{\bar{x}}$ that separates these cases. We can derive this cutpoint by letting $x_i = \bar{\bar{x}}$ and setting the parenthetical term equal to zero:

$$
\begin{aligned}
(\bar{\bar{x}} - r_i)(\pi'_\Omega \Omega + \pi) + r_i &= 0 \\
(\bar{\bar{x}} - r_i) &= \frac{-r_i}{(\pi'_\Omega \Omega + \pi)} \\
\bar{\bar{x}} &= r_i - \frac{r_i}{(\pi'_\Omega \Omega + \pi)}
\end{aligned} \tag{1.15}
$$

When $x_i = \bar{\bar{x}}$, the numerator in Expression (1.14) is zero, making the whole expression zero. Expression (1.16) is also zero when this condition holds. However, if $x_i \neq \bar{\bar{x}}$, then either $p_i^* > 0$ or $d_i^* > 0$. Since $s'_p \geq 0$, the denominator in Expression (1.14) is always positive (as is $\omega \Gamma \phi_i$). Thus, $x_i > \bar{\bar{x}}$ is a necessary and sufficient condition to ensure that $p_i^* > 0$. A similar logic holds for d_i^*. Since $\delta_i > 0$, when $x_i < \bar{\bar{x}}$ the parenthetical term is negative, making Expression (1.16) positive and $d_i^* > 0$. ■

Proof of Lemma 4

Optimal Allocation Under Sabotage The Autocrat's revised optimization problem produces the following Lagrangian

$$L = \pi x_A \Omega - \lambda\left(\sum x_i + x_A - 1\right) + \lambda_i x_i + \lambda_j x_j + \lambda_A x_A$$

After differentiating this expression, we can derive the following Kuhn-Tucker conditions:

$$\begin{aligned}
&\frac{\partial L}{\partial x_i} = \pi_i' x_A \Omega + \pi x_A \Omega_i' + \lambda_i = \lambda \\
&\frac{\partial L}{\partial x_j} = \pi_j' x_A \Omega + \pi x_A \Omega_j' + \lambda_j = \lambda \\
&\frac{\partial L}{\partial x_A} = \pi \Omega + \lambda_A = \lambda \\
&\sum x_i + x_j + x_A - 1 = 0 \quad \forall i, j \in \mathcal{N} \\
&\lambda_i x_i = 0 \qquad \lambda_j x_j = 0 \qquad \lambda_A x_A = 0 \\
&\lambda_i \geq 0 \qquad \lambda_j \geq 0 \qquad \lambda_A \geq 0 \\
&x_i > 0 \qquad x_j \geq 0 \qquad x_A \geq 0
\end{aligned}$$

The steps in Lemma 2 that show no corner solutions exist also hold here. Therefore, $x_A^* \neq 0$ and $x_A^* \neq 1$. Moving to the interior case, suppose $0 < x_A < 1$. As before, the Autocrat receives some positive share. Crucially though, every group now has some effect on production– and since these effects are concave– all groups receive some benefit in equilibrium. This condition holds for both producers and saboteurs.

Let x_i be some group in $\mathcal{N}$. Since $x_A > 0$ and $x_i > 0$, $\lambda_A = 0$ and $\lambda_i = 0$. The first and

third conditions reduce as follows:

$$\pi_i' x_A \Omega + \pi x_A \Omega_i' = \lambda$$
$$\pi \Omega = \lambda$$

Setting these conditions equal and solving, we can derive Expression (1.17)

$$\pi_i' x_A \Omega + \pi x_A \Omega_i' = \pi \Omega$$
$$x_A^* = \frac{\pi \Omega}{\pi_i' \Omega + \pi \Omega_i'} \tag{1.17}$$

To solve for the group shares, suppose we have two pairs of groups i, k and j, m where $i, k \in \mathcal{S}$ and $j, m \in \mathcal{M}$. Since Expression (1.17) holds for any group in $\mathcal{N}$, we can replace the i's with k's and set them equal to each other to derive Expression (1.18)

$$\frac{\pi \Omega}{\pi_k' \Omega + \pi \Omega_k'} = \frac{\pi \Omega}{\pi_i' \Omega + \pi \Omega_i'}$$
$$\pi_i' \Omega + \pi \Omega_i' = \pi_k' \Omega + \pi \Omega_k'$$
$$\pi_i' \Omega = \pi_k' \Omega + \pi (\Omega_k' - \Omega_i')$$
$$\pi_i' = \pi_k' + \frac{\pi (\Omega_k' - \Omega_i')}{\Omega} \tag{1.18}$$

While this general condition also holds for $j, m \in \mathcal{M}$, we can reduce this expression further for these groups. Since marginalized groups do not have a direct effect on Autocrat survival, we can let $\pi_j' = \pi_\Omega' \Omega_j'$. This term π_Ω' represents the net effect of

Ω on the Autocrat survival. Using this definition, we can derive Expression (1.19)

$$\begin{aligned}
\frac{\pi\Omega}{\pi'_m\Omega + \pi\Omega'_m} &= \frac{\pi\Omega}{\pi'_j\Omega + \pi\Omega'_j} \\
\pi'_j\Omega + \pi\Omega'_j &= \pi'_m\Omega + \pi\Omega'_m \\
\pi'_\Omega\Omega'_j\Omega + \pi\Omega'_j &= \pi'_\Omega\Omega'_m\Omega + \pi\Omega'_m \\
\Omega'_j(\pi'_\Omega\Omega + \pi) &= \Omega'_m(\pi'_\Omega\Omega + \pi) \\
\Omega'_j &= \Omega'_m \qquad (1.19)
\end{aligned}$$

APPENDIX B

Spatial Clustering and Segregation in Qatar

Using methods from spatial statistics, we can test for segregation with Ripley's K-function. The K-function is a formal measure of clustering, which estimates the number of points within a set distance from a given point (Ripley 1988). Segregation occurs when this clustering is biased according to type. With respect to Qatar, we should expect that given some particular camp, and having specified a distance measure, there will be more camps clustered in that area than either flats or villas. Figures B.1 and B.2 plot the K-function across various radii, r, for clustering of camps and villas, respectively. In both figures, the radius is on the x-axis, and there are two functions plotted: a dotted red-line that represents the clustering of a random (Poisson) stationary point process, and a solid black-line for the estimated K-function.

The estimated K-function for the camps plot (Figure B.1), differs significantly from the theoretical Poisson-generated line, suggesting significant clustering across all radii. The difference between the villas K-function (Figure B.2) and the base-line are far less obvious, and even indistinguishable for a small radius. Comparing these estimated functions to each other, we see that the slope of the K-function for camps is much steeper, especially at a smaller radius, which indicates strong

and significant clustering of camps at local levels. The K-function for villas really only begins to increase significantly once the radius gets much larger, which is not surprising given how small Qatar is and the simple fact that increasing the distance measure means more area (and points) will be included. The local difference, however, clearly indicates a significant clustering of camps.

Figure B.1: Clustering of Camps (Around a Camp)

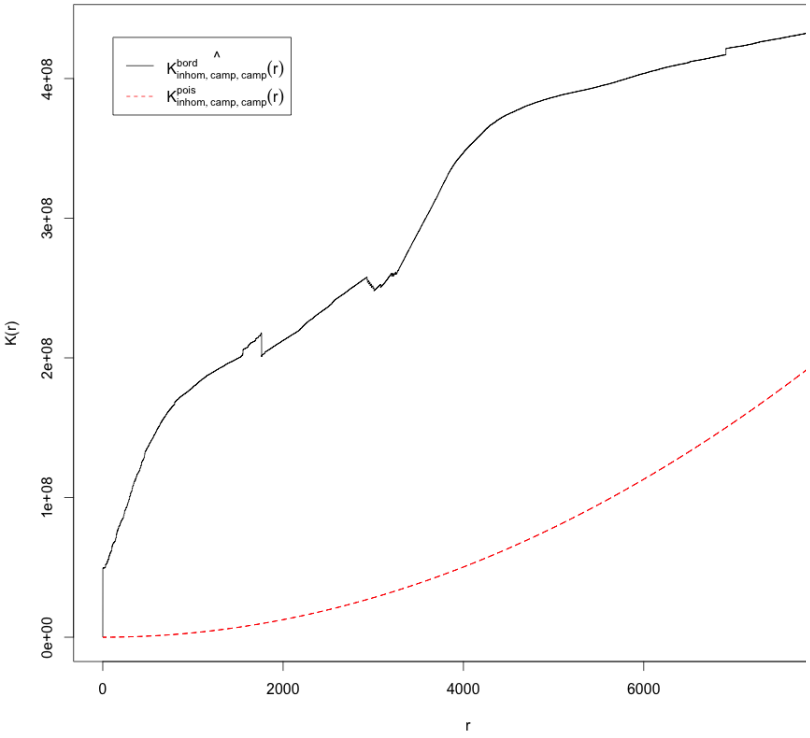
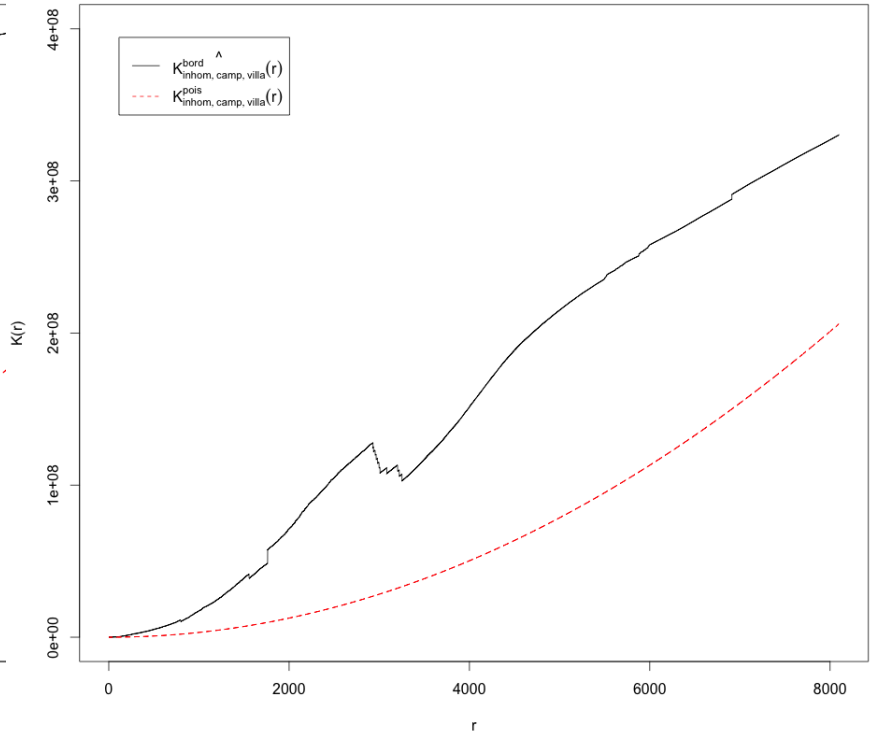


Figure B.2: Clustering of Villas (Around a Camp)



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