Dear CPWers,

While all comments are certainly welcomed and appreciated, I’d like to highlight a few issues that I find particularly vexing and solicit your feedback.

1. **Framing/Puzzle:** Reflecting the many versions of this paper, I fear that the puzzle and framing becomes a bit muddled. The project started out focused on jobs in rentier states, and only later came to really address commitment problems. As such, the paper’s framing is a bit convoluted. I’d love to hear what people think of this problem and recommendations on changes.

2. **Theory:** Relatedly, while I’d like to present the theory as a general one, addressing commitment problems broadly, the model itself is specific to jobs. Does this read as a shameless rhetorical move on my part or does the general discussion and theoretical implications seem reasonable?

3. **Model:** While there’s certainly much left to do here, I have to pick my battles at this point, lest the paper become (even more) ponderous and unwieldy. I have left the model and proofs in text—sorry, no neat appendix—do you find the overall logic, if not math, accessible and intuitive? How about the assumptions, are they plausible?

4. **Cases:** I think I have some novel and somewhat surprising results. So much so, that I worry people won’t buy it unless I have strong cases to illustrate the mechanism and different trajectories (*a la* Acemoglu and Robinson’s four motivating cases for their book). Recommendations on specific cases beyond the Gulf states, and suggestions on how to best present these cases, would be much appreciated.

With that, I hope I haven’t jaundiced your reading too much. Thanks so much for your time and efforts!

-Trevor
Tying Hands Versus Sticky Fingers: Credible Commitment in Authoritarian Regimes

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Abstract

Recent work on authoritarian regimes has explored how rulers use institutional reforms to solve their inherent commitment problems. In times of crisis, autocrats have various tools to pacify or co-opt the opposition. Depending on the severity of the threat, however, the promise of future transfers and other distributive payments may not be sufficient. Given the autocrat’s capacity to defect in the future, such a promise is ultimately incredible. The autocrat may simply wait until the protests abate and then return to their previous distributive policy. According to conventional wisdom, solving this dynamic commitment problem requires an institutional mechanism to tie the ruler’s hands. In the following paper, I challenge this literature, arguing that these accounts ignore the role of non-institutional and informal commitment devices. I present a Markov model of regime change and show how rulers can credibly commit, absent any institutional reform, by offering public sector jobs as a form of private goods. In contrast to fiscal transfers or consumption subsidies, public jobs are sticky and thus provide the ruler with a means to (more) credibly promise future redistribution. While no job is entirely safe, firing public sector workers comes at a high cost. By increasing the public sector, the autocrat can raise the costs of future defection, thereby making today’s promises more credible and helping buy-off the opposition without formal institutional change. The model demonstrates the conditions under which a ruler will swallow a poison pill, inflating the public sector today— and thus introducing profound labor market inefficiencies— to credibly commit to future redistribution tomorrow. As such, it offers an alternative account for the robustness of authoritarian regimes, especially those most unconstrained, like the absolutist monarchies of the rentier Arab Gulf.

1 Introduction

Whether democratic or authoritarian, all rulers confront commitment problems. Yet despite their ubiquity, the severity of these problems varies significantly across regimes. Credible commitment is perhaps most difficult in authoritarian regimes where the ruler faces few, if any, independent constraints. Absent institutional checks, the ruler enjoys unfettered power but at a high cost. Unconstrained rule makes any promise suspect, as the rule of law itself becomes subject to the autocrat’s whim. This problem is perniciously expansive, deterring investment (Wright 2008; Gehlbach and Keefer 2011), undermining credit markets (North and Weingast 1989), and inspiring coups
(Magaloni 2008). As such, recent scholarship on authoritarian regimes has focused on this basic problem, asking the simple question, how do autocrats commit?

The most popular answer, and one offering considerable analytical leverage, borrows from the logic of democratic theory. While certainly not immune to commitment problems—especially those deriving from dynamic inconsistency and intertemporal trade-offs (Cukierman 1992)—democratic systems comprise institutional constraints that make commitment generally more credible. Institutional checks like the separation of powers help constrain the executive, while the rule of law and regular elections further ensure that politicians are held accountable for their actions and words. There is, however, a cost to these checks and balances. These overlapping constraints can be stifling, producing credible commitment at the expense of government efficiency and reducing the range of feasible outcomes. Most significantly, autocrats also have to consider whether these constraints may actually lead to their own demise by providing potential challengers a means to threaten their once-absolute rule.

Yet despite these costs, the difference between credible and incredible commitment is significant, making institutional constraints an attractive solution. If forced to choose, the survival-oriented ruler may very well prefer to tie his hands to ensure future stability. The recent proliferation of semi-authoritarian regimes suggests that many autocrats may have made such a choice, having appropriated democratic institutions to prevent regime collapse (see Levitsky and Way 2002). However effective this solution may be, it is extremely costly and often comes as a last resort. Therefore, ceteris paribus an autocratic ruler would prefer to maintain stability without ceding any meaningful control. The question becomes, is this even possible, and if so, under what conditions? In short, how can autocrats credibly commit without formal institutional constraints?

In answering this question, this paper focuses on the puzzle of rentier robustness in the Arab Gulf. This region represents one of the last areas in the world where autocratic regimes continue to survive, absent institutional constraints. In these resource rich states, absolutist monarchs enjoy nearly unconstrained rule without appearing to compromise investment, growth or regime stability. The institutional answer simply cannot explain these regimes’ success. This success, moreover, is especially puzzling today, as the basic rentier model has become increasingly obsolete (Gray 2011). In the past, the rentier states could obviate traditional commitment problems by virtue of their massive resource wealth, which allowed these rulers to easily meet their commitments without tying their hands. But given newly binding revenue constraints and ascendant social groups calling for a greater share of the pie, the rentier state confronts a set of difficult planning problems. Even before the recent recession, these regimes had to confront new redistributive pressures, undermining their implicit social compact and making their promises increasingly suspect. Now, like any autocrat, to ensure stability these rulers must reassure their citizens of this compact and find a way to credibly commit in the absence of formal constraints.

While certainly motivated by the general problem of autocratic commitment, this paper focuses
principally on the puzzle of rentier stability. Despite these new revenue challenges and social pressures, the rentier states of the Arab Gulf have maintained their exceptional stability in a region wrought with turmoil, all the while resisting formal institutional change. By exploring the rentier case, I hope to expose an overlooked solution to the commitment problem: the differential effects of distributive goods. Simple models of redistribution too often ignore the profound differences among goods. Beyond the simple public-private dichotomy, distributive goods exhibit distinct economic, welfare and dynamic properties. How regimes allocate or target these goods can thus help us understand credible commitment without constraints. In this paper, I concentrate on the distributive side of the story, which has been subordinated to the redistributive problem, popular in recent formal models. At the same time, by reframing this debate we can begin to explore questions once thought orthogonal to the commitment problem. Specifically, why do some regimes pursue apparently suboptimal spending and investment strategies?

To this end, I offer a formal model of rentier spending and revolutions. Through the model, I explore the economic and political trade-offs between three distributive goods: 1) growth-inducing public goods, 2) economically neutral fiscal transfers, and 3) inefficient patronage jobs. Employing a Markov Perfect Equilibrium, I model how autocrats allocate spending across these goods, subject to the citizenry’s capacity and decision to revolt. Absent institutional constraints, autocratic rulers can exploit these goods’ differential effects to prevent revolution. The model demonstrates the conditions under which autocrats will over-provide inefficient, sticky goods (i.e. jobs). When the benefits of public goods are too diffuse and fiscal transfers insufficient, jobs may provide the ruler with a means to (more) credibly promise future distribution, thus overcoming the commitment problem without formally tying hands.

The remainder of this paper will proceed as follows. Section 2 will begin generally, describing commitment problems and classic institutional solutions. Drawing on this framework, I then consider the specific case of rentier stability. Section 3 offers an explanation for this continued stability, refocusing the discussion on distributive goods. Moving beyond this general account, Section 4 presents a formal model of public jobs as private, sticky goods. I define the specific conditions under which this device should solve the autocrat’s commitment problem. Finally, Section 5 concludes, recapitulating the paper’s major findings and discussing avenues for future work.

2 Commitment Problems and Institutional Solutions

All rulers confront commitment problems, which left unaddressed can frustrate investment and retard growth. Overcoming this problem is especially difficult in states with developing, inchoate or otherwise weak institutions. Absent binding institutional constraints, autocratic rulers have the capacity to easily and relatively cheaply defect from promises or future commitments. Consequently, citizens, investors and other social, political and economic actors must worry that contracting with the state comes at great risk. Given such risk, contracting will either be impossible or only feasible
under some limited range of agreement, often generating inefficient outcomes (Acemoglu 2003). Recent scholarship has explored this problem in greater depth and offers potential solutions. In the current section, I discuss this work and focus on a set of institutional solutions that overcome commitment problems by tying the ruler’s hands.

2.1 Coups, Revolutions and Credible Redistribution

Let us first consider the extreme case of absolutist, authoritarian regimes, which best illustrate the commitment problem. Autocrats face two potentially regime-undermining commitment problems. The first derives from within the ruling coalition (Bueno de Mesquita et. al. 2002, 2005). To preempt elite-driven coups, the ruler must credibly offer a share of the pie, sufficient to buy off any would be challenger and her supporters. If this promise is seen as incredible and a challenger’s offer more attractive, supporters will defect whenever it is in their interest to do so, making coalitions extremely fractious and short-lived. When such instability is regular, constant government turnover can have significant downstream economic implications, leading asset holders to divest and producing anemic growth. In the long run, this decreased economic activity shrinks the pie even further, making commitment evermore difficult. Ultimately, such a commitment problem is self-fulfilling, leading to an unstable, predatory state. Lacking an “encompassing interest” or sufficiently long time-horizon, the ruler cannot credibly commit or refrain from predation (Olson 2000). Thus, in equilibrium, the autocrat preys and would-be investors and potential supporters stay away.

The second threat originates from outside the ruling coalition, deriving from society at large and taking the form of opposition protest or revolutionary movements. Recent work has refocused our attention on these ruler-citizen dynamics and the bargaining that underpins regime stability (see Desai 2009). Although full-scale revolution is rare, and often assumed out-of-equilibrium behavior, every ruler must fear popular revolt to some degree. In a series of papers, Acemoglu and Robinson (2001, 2006) have developed one of the most popular and elegant models for this process of regime transition. In their model, consolidated democracy obtains in political economies with moderate levels of inequality. If inequality is too high, the cost of redistribution is so large that elites would rather repress the poor than allow for institutional change. If too low, there is not sufficient pressure from below for regime change. Regime transition results when elites cannot credibly commit to future redistribution.

If we consider these distinct threats jointly, we can reduce the question of regime stability to a basic planning problem: the ruler must allocate goods (public and private) at the elite and mass level to increase the probability of survival. This problem is especially difficult because of economic crises and other shocks that may alter the bargaining power among actors. The inherent uncertainty of such shocks can make future promises incredible. Given this uncertainty and the potential to defect, long-run stability depends on the ruler’s capacity to provide some assurance that his commitment is secure into the future. In other words, that he is constrained from defecting.
2.2 Tying The Ruler’s Hands

Institutional constraints are therefore the most common solution to commitment problems. Although democratic systems may also face these difficulties (see Cukierman 1992), their commitment problems are often much less severe. Systemic checks and institutional constraints ensure that democratic politicians not only face accountability for their actions, but may be blocked or punished for deviating from past policies and promises. Borrowing from this logic, hybrid regimes, which comprise both democratic and authoritarian structures, provide rulers with a means to partly constrain themselves without fully transitioning to democracy (Diamond 2002). While perhaps not as constraining as in consolidated democracies, these hybrid regimes nonetheless achieve many of the positive outcomes we associate with credible commitment.

How exactly hybrid regimes produce these favorable conditions can vary widely. Establishing a legislature is perhaps the oldest of these institutional solutions. North and Weingast (1989) argue that representative rule in 17th C. England arose out of the king’s need for credit. To reassure creditors that the crown would not expropriate their wealth or default on loans, the king was forced to accept limited rule, giving birth to parliamentary democracy. Even today, this logic holds. In a cross-sectional time-serial analysis, Wright (2008) demonstrates that among authoritarian regimes, those with binding legislatures attract greater investment and growth. This result is particularly robust for resource poor countries, who are especially in need of capital investment. Legislatures are hardly the only solution. Myerson (2008) argues that proto-constitutional courts can similarly constrain the monarch and thus help overcome immanent commitment problems. Whatever the mechanism, the logic is the same: rulers can achieve credible commitment by erecting independent institutions capable of constraining themselves and tying their hands.

This solution, however, is not without its problems. To be effective, institutional constraints must be binding, which can be extremely costly. Were they not binding, the constraints would be ineffective in solving the commitment problem. It is precisely this effectiveness, however, that makes them so costly. Rulers will tie their hands in the hopes of achieving a more favorable outcome (e.g. survival, growth) but through this process, they may also be sowing the seeds of their own destruction. Once power and authority is ceded, it is difficult to recover what is lost or even prevent further reductions to one’s rule. Even in the exemplary case of 17th C. England, representative rule did not appear immediately but emerged overtime, resulting from a gradual, incremental process. When rulers tie their hands to credibly commit, they do so at the risk of potentially losing more power in the future. Thus, institutional constraints may be a last resort, coming only when necessary and possibly too late to avert revolution.

Notwithstanding such dangers, all told, these hybrid forms of government provide a compelling solution for many autocrats, who hope to stave off collapse without fully relinquishing power. The vast majority of non-democratic regimes appear to have adopted this compromise, falling within this gray zone. Admittedly, the empirical record on these regimes is mixed. It is not entirely clear
whether these power-sharing, semi-authoritarian regimes are any more robust than their absolutist counterparts. However, existing empirical tests are fraught with selection bias, as it is precisely the most fragile of regimes that should implement these partial reforms. Yet irrespective of these tests, the autocrat’s calculus is clear: to survive, constraints are necessary.

Perhaps more problematic, the institutional solution cannot help us understand the robustness of unconstrained regimes. If commitment requires constraints, how is it that some regimes can produce stability and encourage investment without any meaningful institutional checks, at least as we traditionally conceptualize them? This question is especially important as we begin to consider the role—or rather, absence—of commitment problems in rentier states.

2.3 The Puzzle of Rentier Stability

Despite their general nature, we have good reason to suspect that commitment problems would be most severe for the rentier states of the Arab Gulf, which critically depend on distribution to maintain stability. Around the world, most rulers today, out of necessity or pragmatism, have disaggregated power either through the party system or legislature, creating semi-competitive authoritarian regimes (Levitsky and Way 2002). Even as the rules of the game remain decisively skewed to the advantage of the regime, these hybrid systems nonetheless provide citizens with at least the rudiments of some choice and the means to participate in decision-making, thus constraining the ruler.

This is not so in the Arab Gulf, which has remained a relative bulwark against the recent wave of democratic power-sharing. Power remains centralized within the ruling family and their close coterie of business and political elites (see Herb 1999). Although not unprecedented, when absolute rule prevails it is usually reinforced and complemented by a vast intelligence and internal security force. Again, however, with the exception of Saudi Arabia, the rentier states largely deviate from this general trend. The relative openness of Qatari or Emirati society today hardly resembles the carefully constructed panopticon of Saddam Hussein’s Iraq. Lacking an expansive security or repressive apparatus, rentier robustness is built on distribution, rather than costly repression. Stability depends on satisfying potential challengers before any frustration foments into open opposition, from within or outside the ruling elite. Therefore, the rentier states, among all others, have leveraged their stability on this promise of distribution, which if unmet, could be severely destabilizing. They have neither the institutional means to defuse challenges formally, nor the extra-institutional devices to sustain a long, bloody campaign of repression.

Given this apparent vulnerability, we should expect commitment problems to be especially challenging for rentier states. Absent institutional constraints, it remains to be seen how these regimes can credibly commit to future distribution or convince liquid asset holders that their investments are secure from expropriation. Property rights are only effective if they can be enforced. In the case of these rentier states, where the judiciary is beholden to the state, enforcement is
ultimately a matter of regime choice. Thus, extant theory would suggest that the states of the Arab Gulf should suffer from profound commitment problems, compromising stability and deterring foreign investment. And yet, surprisingly, neither of which is true. The rentier state has proven to be exceptionally robust to such pressures or crises, even without institutional constraints.

As such, the robustness of the rentier state—along with the exceptional growth these states have enjoyed over the past few decades—appears to constitute a real challenge to the conventional tying hands argument. Extant theory cannot explain how these regimes have flourished, however rich they may be, when their lack of constraints undermines long-term commitments. Moreover, recent scholarship even suggests that these regimes’ access to oil may actually enflame distributive pressures while at the same time raising the stakes of regime change. Together, these effects will heighten authoritarian pressures and make commitment evermore difficult, reducing the space over which rulers can credibly commit to future redistribution (Dunning 2008).

Classic rentier theory offers a simple answer to this puzzle: massive oil and gas reserves finance large, continuous and sustained payments. According to this argument, rentier states do not face the same commitment problems that other authoritarian regimes confront because they are not subject to the same budget constraints. However true this may have been in the past, such a strategy has become increasingly unsustainable (for review, see Gray 2011). The rentier states of the Gulf face two challenges that fundamentally undermine their long-term political economic position, bringing commitment problems to fore. First, overextended and facing revenue shortfalls, the Gulf states have been forced to undertake renewed efforts to diversify their economies in the midst of a global recession. While necessary, these reforms have been met with popular frustration and raised fears among the citizenry that their once privileged position could soon disappear. Such fears undermine the very legitimacy of the rentier state, which depends on an implicit social contract: citizens remain loyal to the state and relinquish their claims to participate politically in exchange for public goods and services. When this exchange is compromised, so too is the very legitimacy of the rentier state. Second, and exacerbating these revenue problems, the ascendance and growing influence of once-marginalized groups has led to greater demands on the state’s provision of goods. Together, these challenges have pushed the rentier state to recognize a problem endemic to all authoritarian regimes: how to credibly commit.

Simply put, both rentier and institutional-based tying-hands theories fail to explain how the Gulf states have responded to their new distributive pressures while maintaining stability. To answer this question, in the next section I reconsider the model of the rentier state and its basic distributive foundations, exploring the subtle ways by which these regimes selectively target groups to overcome their commitment problems.
3 Rentier Distribution: Commitment Through Sticky Goods

Just as the emergence of the rentier state produced a new political economic system, growing redistributive pressures and the threat of commitment problems has led to a distinctive solution. Rather than provide institutional constraints, as many protesters in Bahrain have demanded, the rentier state has found an alternative means to satisfy redistributive pressures: targeted goods. Ostensibly, this answer is neither novel nor particularly illuminating. After all, every ruler, democratic or authoritarian, employs various means to strategically target his supporters.

In the Gulf, however, the rentier states have begun to deliver these services in such a way as to disguise their redistributive transfers through public investments and other expenditures. And in the case of public jobs, in particular, these goods can actually help overcome the basic commitment problem without relying on costly, potentially regime-undermining, institutional change. While institutional reform ties the ruler’s hands, jobs stick them together, making future defection more costly. Hardly a perfect commitment device, increasing the public sector enfranchises a group that can more easily punish the ruler, and thus hold him accountable in the future should he defect. From the ruler’s point of view, this solution, while inefficient, is certainly preferable to whole-scale regime change.

In this section, I begin to develop an alternative theory of distribution that helps explain the robustness of the rentier state and how it has overcome commitment problems without institutional constraints. I will first problematize our traditional conception of distributive goods and then move on to the specific case of jobs. Public sector jobs serve as targeted private goods, redistributing to citizens while at the same time helping overcome the regime’s inherent commitment problems.

3.1 The Differential Effects of Distributive Goods

As revenues decline and new social groups demand a greater share of the pie, the rentier states will be forced to make tough spending choices. Given these challenges, the classic rentier model is becoming increasingly obsolete, making its redistributive foundations untenable and rulers’ commitments incredible. Therefore, we should expect a more targeted, selective redistributive strategy, that buys off supporters more efficiently and credibly. Such a strategy must reconcile the various and, at times, competing effects of different goods.

Over the past few decades, political economists have complicated our traditional understanding of distributive goods. Classic theories of distributive politics distinguish between goods along two dimensions: the degree to which they are excludable and rivalrous. In such a simple classification scheme, public and private goods comprise the ideal, antipodal types. While fecund, these typologies are extremely parsimonious and can not capture the recent innovations in distributive theories of goods. Reducing the problem to “public versus private” is a tremendous simplification, overlooking the various ways in which goods may differ, having distinct economic and welfare
effects.

Some of the earliest work comes from Besley and Coate (1991), who introduce quality and units of goods. Ostensibly, a trivial complication, this change implies that even universal public goods can have an implicit redistributive effect, transferring wealth from rich to poor. Given a perfect market for goods, wealthier citizens with a preference for higher quality goods will opt out of the public sector and choose private substitutes. Besley and Coate further show that such a system is often inefficient, as a cash transfer or voucher would be Pareto optimal. Such inefficiency is actually endemic to many distributive systems and induces perverse incentives for policymakers. In a simple electoral model, Coate and Morris (1995) extend this logic, demonstrating how incomplete information leads politicians to invest in public projects as disguised transfers to special interests. Even globally inefficient outcomes, where projects have concealed costs, can be supported in equilibrium. Complementarily, in later work Besley and Coate (1998) find conditions under which policymakers actually avoid efficient projects. Dynamic inconsistency problems produce inefficient outcomes when the good investment would alter the policymaker’s future budget or result in a change in office. Knowing this, the policymaker prefers not to invest efficiently, at the detriment of social welfare.

Recent work by Acemoglu and coauthors builds on these models and gets us even closer to the rentier case, which may not perfectly resemble these early election-based models. Acemoglu (2003) argues that absent a Coasean contract, survival-oriented rulers will use inefficient taxes or pignouvian subsidies to overcome basic commitment problems. This inefficient redistribution is especially common when groups vary in their relative bargaining power. Acemoglu and Robinson (2002) show how regimes will inefficiently target some groups, departing from the social optimum, when they depend on those groups and hope to maintain their social power or strength overtime. This type of targeting is evident throughout the Gulf, as the native population feels threatened by expatriates and their growing power. By erecting consumption barriers and restricting access to goods, the rentier states have been able to maintain their commitment to redistribution while at the same time pursuing difficult reform. Preferential access to “public” services and goods provides the rentier state with the means to target supporters, implicitly redistributing from one social group to another.

Notwithstanding their distinct modeling strategies and obvious differences, these models all suggest that goods must be differentiated in a more nuanced way than the simple public versus private distinction implies. Such facile distinctions among goods are especially problematic when we consider developing countries, where the state enjoys a broader, more expansive role in the economy and private sector. By including quality, targetability and differential economic effects, these models complicate our traditional view of goods and help us better understand the subtle redistributive effects of public spending and investment. Nonetheless, it remains to be seen how these goods can help solve the rentier commitment problem.
3.2 Public Jobs as Private (Sticky) Goods

However impressive and significant these innovations, this work remains insufficient when we return to the fundamental commitment problem that motivates this paper. Disguised transfers may be more effective redistributive targeting, but they do not overcome the central problem of credible commitment. Transfers, by their nature, can be easily rescinded. The promise today is hardly constraining. Simply put, what is to stop the ruler from withdrawing these payments tomorrow?

As a concrete example, take the recent protests in Bahrain. In early February when the protesters had just begun to amass, King Hamad bin Isa Al Khalifa tried to defuse the situation by offering a series of concessions, including a $2,500 fiscal transfer to each family and increased subsidies.¹ These promises came on the heels of the regime’s recent plans to reduce subsidies as part of its vital austerity measures. Ultimately, these concessions did little to assuage the opposition, as the protests swelled until Saudi-backed troops finally crushed the movement. The promise of a fiscal transfer was either insufficient or simply incredible, requiring costly repression to resolve the conflict.

Although a similar protest cycle began in neighboring Oman, it ended swiftly and proved much less costly. In the Omani case, counter-protests even formed, demonstrating popular support for Sultan Qaboos and the ruling family. Yet perhaps more significant than the counter-protests, the different outcomes can be explained by the regimes’ distinct responses. In Bahrain, the regime began with fiscal transfers and moved on to repression only when this first option failed. In Oman, by contrast, the regime began with targeted transfers and another promise: jobs.

Responding to unemployment and growing economic frustration, the Omani regime announced a monthly unemployment allowance along with the creation of 50,000 jobs.² By early May, nearly 35,000 jobs had already been created and filled.³ The regime not only delivered payment immediately, but into the future. Whereas transfers are shortlived, jobs carry over. A $2,500 transfer is an immediate payment but can just as easily be withdrawn. Were the protesters to accept the offer and disperse, the regime could rescind its offer, knowing that the opposition was already spent. Even if the payments were made, this transfer is a one-time benefit. Public or state jobs, however, are sticky.

It is precisely this stickiness of pubic jobs, in concert with the cost to remove them, that makes this offer a more credible commitment than a simple fiscal transfer. In addition to quality, targetability and differential economic effects, some goods are just stickier than others, which helps explain how specific goods or transfers may resolve commitment problems. While jobs can certainly be removed, this comes at a high cost for the ruler. In many developing states, workers feel entitled to their position, holding some informal sense of ownership over their public job. Austerity measures aiming to shrink the public sector are especially costly for the regime because of this

²“Qaboos orders 150 riyals monthly allowance for registered job seekers.” Gulfnews.com, February 27, 2011.
sense of ownership and, more significantly, the organizational capital workers enjoy.

When threatened, public sector workers already have a common enemy— the state— making coordination easier and mobilization less costly. Moreover, as the state relies evermore on worker co-optation to sustain itself, the regime enfranchises a group capable of punishing it. If the public sector accounts for a disproportionately large share of the economy, the threat of public sector protest can be crippling. This threat becomes more credible and costly as the state inflates the public sector, while crowding out private firms. Thus, increasing the public sector not only decreases the cost to mobilize, but may also make protest more costly should it occur. In this sense, jobs are sticky and costly. They not only become difficult to take away, but also provide workers with a greater bargaining strength.

Ultimately, jobs serve the same role as institutions, albeit to a less binding degree. Where institutions constrain by tying the ruler’s hands, jobs raise the costs of defection, sticking the ruler’s hands without fully tying them. However imperfect it may be, this “solution” to the commitment problem allows the ruler to suppress protest without resorting to costly institutional reform.

4 A Dynamic Model of Spending and Protests

In this section, I present two models of distributive spending and protest, teasing out the differential effects of goods and showing how jobs can be used to partly overcome commitment problems when institutional constraints are absent. In the first model, I do not include public sector jobs. These results serve as a baseline, with which to compare the second model, where the ruler decides on how many jobs to provide.

4.1 Basic Model: Spending Without Jobs

The following dynamic game models the strategic interaction between citizens and a dictator. Depending on the political state of the world, the ruler makes a spending allocation. If the dictator makes the decision, the citizens then decide whether or not to revolt. The solution concept is a Markov Perfect Equilibrium, in which strategies condition on the state of the world and are in this sense, ahistorical. Through the model, I will show the conditions under which a ruler can credibly commit to future redistribution, and thus avert revolution.

State Space Let us begin by first defining the state space. In Markov games, the state of the world is critically important, as it constrains the feasible action space, determines the structure

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4 For all intents and purposes, this is a two-player game. In the simple model presented here, I assume that the citizens are identical in every way, reducing the problem to a simple two-player game. A more elaborate model would allow targeting and would thus require we distinguish within the citizenry. I leave this complication for future extensions.

5 In a Markov game, the totality of information required to make a strategic choice is contained within the present state, and does not depend on the complete history of the game up to the present, as in iterated games.
or sequence of game play and may even alter the model’s basic parameters (e.g. capital stock, transaction costs). In the following game, we will assume that the state \( s_t \) is a 2-tuple of the form \((A, y_t)\) or \((R, y_t)\).\(^6\)

The first element reflects the political state, either Authoritarian (A) or Revolutionary (R), which tells us who is in power. When the state is Authoritarian, the dictator makes the spending choice, but when Revolutionary (an absorbing state) the citizens decide on spending and investment.

The second element represents the economic state, which captures the total wealth, \( y_t \), at period \( t \). This wealth level is jointly determined by the stochastic variable \( \delta_t \) and the previous period’s spending and investment choices (more on this below).

**Players and Utilities** Given the state space, let us now consider the players and their utilities. The population is of size \( \eta + 1 \), with \( \eta \) citizens and the one dictator. Individuals maximize utility over an infinite horizon economy, where their utility can be defined as follows:

\[
U_i = \sum_{t=0}^{\infty} \beta^t u_t^i 
\]

\[
u_t^C = u(g_t, h_t) 
\]

\[
u_t^D = u(g_t, k_t) 
\]

Equation (1) represents the general maximization problem, where an individual \( i \)'s total utility, \( U_i \), is the discounted present value for all future consumption. In each period, from \( t \) to infinity, individual \( i \) will receive some payoff \( u_t^i \), which she discounts by \( \beta \). Equations (1a) and (1b) define these period utilities for citizens and the dictator, respectively.

Each citizen receives some positive utility from spending on goods \( g_t \) and \( h_t \). Loosely, we may think of \( g_t \) as a growth-inducing good, like education or infrastructure, and \( h_t \) as a basic fiscal transfer, which has no economic externalities. The function, \( u(\cdot) \), is a simple technology of consumption, where \( u(\cdot) \) is increasing and concave in both arguments and is a mapping \( u : R^2_+ \rightarrow R_+ \).\(^7\)

Equation (1b) reflects the dictator’s utility. For symmetry, I assume that the dictator also enjoys utility from public goods, \( g_t \), and his own private transfer, \( k_t \), which resembles the citizenry’s private good \( h_t \). Like the citizens’ consumption function, the dictator’s utility is increasing and concave, as specified by the function \( u(\cdot) \) for both actors, it would not be difficult to allow for the dictator and the citizenry to differ in how they consume goods. This complication, however, would not alter the results.

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\(^6\)While these two cases represent the full state space, the possible state combinations are actually infinite, as \( y_t \) is a continuous variable.

\(^7\)Additionally, to generate an interior solution, we will assume that actors have a strict preference for some mix of goods (i.e. \( u'(0, \cdot) = \infty \) and \( u'(\infty, \cdot) = 0 \) for both arguments).
Finally, we will assume spending on goods cannot be negative (i.e. \( g_t, h_t, k_t \geq 0 \)) and all wealth is consumed in each period.\(^8\) This leads us to the following budget constraint, which will be critical in reducing the math later in the model.

\[
y_t = k_t + \eta(g_t + h_t)
\]  
(2)

**Economic Production**  
In addition to consumption, spending choices also have important economic implications and help determine future revenue. However, they do not fully determine the economic production because of a stochastic component. This model, after all, is a stochastic game, allowing for exogenous shocks to alter bargaining power or induce economic crisis. Therefore, revenue generation is part deterministic and part stochastic.

First consider the stochastic component, which is captured by \( \delta_t \) and can take two values \( \delta_t \in \{\delta^h, \delta^l\} \). This term is a scalar reflecting the general state and productivity of the economy in period \( t \). To reduce the mathematical complexity, let us assume that \( \delta^h = 1 \) and obtains with probability \( 1 - q \), and \( \delta^l = \delta \) with the complementary probability \( q \). By assumption, \( 0 < \delta < 1 \) and \( q < \frac{1}{2} \), implying recessions are costly but relatively rare. While more complicated Markov chains and processes could be allowed here, they make finding a closed form solution almost impossible. As such, I choose to model the stochastic component as independent events.

Along with this stochastic component, we have the deterministic effects from the previous spending choice. The total state revenue available next period, \( y_{t+1} \), is a multiplicative function of last period’s total public good spending, \( \eta g_t \), and the fixed resource wealth, \( \omega \), all scaled by the instantiation of the stochastic term this period \( \delta_{t+1} \). Previous investment in the growth-inducing good \( g_t \) translates into greater revenue in the next period, as defined by the increasing and concave production function, \( \gamma(\cdot) \). Thus, revenue is computed as follows:

\[
y_{t+1} = \delta_{t+1} \left( \gamma(\eta g_t) \omega \right)
\]

(3)

In terms of dynamic games, Expression (3) is the transition equation, relating the previous period’s strategic choices to the current state variable. Note that the private transfers, \( k_t \) and \( h_t \), are assumed revenue neutral, having neither positive nor negative effects on future economic performance. The model assumes that neither fiscal transfers to the citizenry (i.e. \( h_t \)) nor extracted rents (i.e. \( k_t \)) should have significant effects on economic productivity. Of course, this a reduced-form economy and while adding such effects would not be impossible, these changes would only complicate the model without altering the results.

Relatively, in addition to production, we must also define the destruction of wealth that results from revolution. In an Authoritarian state, the dictator sets the spending policy. Following the

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\(^8\)Although the model does not allow explicitly for savings, the next section explores the growth-inducing revenue effects of goods, which effectively serves the same role as savings in classic growth models.
dictator’s proposed spending package, the citizens decide whether to revolt. The citizenry’s capacity to protest can be roughly summarized by the relative costs of revolt, $\mu$, which is a scalar taking the value $\mu \in (0, 1)$. If the citizenry choose to revolt, $1 - \mu$ of the total revenue is destroyed, leaving $\mu y_t$ after the revolution.

**Sequence/Timing** Finally, we can define the total sequence of game play as follows:

*If in Authoritarian State, i.e. $s_t = (A, y_t)$:*

1. The stochastic state, $\delta_t$, is realized and the economy inherits previous government spending, $g_{t-1}$.
2. The dictator makes current spending and investment allocation $\{g_t, h_t, k_t\}$
3. The citizens decide whether to revolt ($r_t$); if revolt occurs (i.e. $r_t = 1$), a fraction $\mu$ of the total wealth $y_t$ remains
4. The period ends and consumption takes place

*If in Revolutionary State $s_t = (R, y_t)$:*

1. The social optimum is implemented, the period ends and consumption takes place.

**Definition of an Equilibrium** Having outlined the model, we can now describe the strategy space for the actors and begin to define a solution to the game. In a Markov Perfect Equilibrium, strategies depend only on the current state and any prior actions that may have been taken in that period. Therefore, the strategy may be seen as a mapping $\sigma(\cdot)$ of the state into the action space for each player. In other words: $\sigma^D(s_t) \rightarrow \{g_t, h_t, k_t\}$ for the dictator, and $\sigma^C(s_t, \{g_t, h_t, k_t\}) \rightarrow r_t \in \{0, 1\}$ for the citizens.

Markov games are mathematically founded on Bellman’s Principle of Optimality. As such, an equilibrium is a set of strategies $\sigma^D, \sigma^C$ that simultaneously solve the following Bellman Equations:

$$
V^D(s_t) = \max \left\{ u^D(\sigma^C, \sigma^D, s_t) + \beta \int V^D(s_{t+1})dS(s_{t+1}|\sigma^C, \sigma^D, s_t) \right\}
$$

$$
V^C(s_t) = \max \left\{ u^C(\sigma^C, \sigma^D, s_t) + \beta \int V^C(s_{t+1})dS(s_{t+1}|\sigma^C, \sigma^D, s_t) \right\}
$$

These strategies are best responses to each other, for all possible states of the world. The Bellman equation reflects the net present discounted value for the game, which is a recursive function of current consumption and future discounted expected consumption. We further assume that

---

*In a revolutionary state, which is absorbing, I assume that the allocation is the social optimum. Post-revolutionary states may take on various political forms and fully characterizing this system is beyond the scope of this paper. Instead of doing so, I make this assumption to reduce the game’s complexity.*
The value function that maximizes the expected utility—is increasing, concave and twice differentiable.

**Solving the Game**  To solve, I will proceed in a series of steps to reduce the mathematical and analytical complexity of this game. First, I will carve up the parameter space, defining cutpoints for equilibrium behavior. Second, based on these cutpoints, I define unconstrained or optimal policies. Third, given these optimal policies, we need only define the best responses when neither actor is unconstrained and then derive the necessary values for the cutpoints to ensure that this behavior is optimal. Collectively, these cutpoints and their respective spending policies characterize the full equilibrium of the game.

Let us begin by introducing and defining a few terms that will make solving easier. Recall, the costs to revolution, $\mu$, is a scalar for the wealth remaining after revolution. Thus, a high $\mu$ represents lower relative costs. Let $\underline{\mu}$ be the maximum level such that revolution is too costly to undertake. In other words, when $\mu \leq \underline{\mu}$ the relative costs of revolution are too great that the citizenry will always accept the dictator’s spending package and no threat of revolution is feasible. In effect, the opportunity cost of revolution is too great to warrant revolt. Similarly, define $\overline{\mu}$ as the minimum level such that revolution is so cheap it is unavoidable. When $\mu \geq \overline{\mu}$, no spending package is sufficient to deter revolution. For this case, the costs of revolution are so cheap relative to the destruction of wealth that the citizenry will always revolt.

Leaving these cutpoints undefined for now, we can characterize the optimal policies for the citizenry and dictator. These cutpoints help determine the equilibrium strategies for particular parameter spaces when actors are unconstrained. First consider the case where $\mu \leq \underline{\mu}$. Under this condition, the dictator is free to pursue his optimal policy, unaffected by fear of revolt. Let $\{\hat{g}, \hat{h}, \hat{k}\}$ be the dictator’s optimal policy. Because the citizenry’s threat of revolt is incredible, the game reduces to a simple dynamic programming problem. Like any optimization problem, we can solve for the dictator’s optimal policy by taking First Order Conditions. However, this task is somewhat complicated by the dynamic context of this game, requiring we apply the Envelope Theorem to derive the Euler equation.

The first step is to redefine the Bellman Equations above, making them more manageable for our purposes. When unconstrained, these equations can be used to solve each player’s respective programming problem in the absence of strategic interaction. Starting with expression (4) from above, I begin by substituting the first term in brackets with the dictator’s objective function from Equation (1b). Next, I replace the integral with the transition function, from Equation (3).

\[
V(y_t) = \max \left\{ u_t^D + E_t \beta V(y_{t+1}) \right\} = \max \left\{ u(g_t, k_t) + E_t \beta V\left( \delta_{t+1}(\gamma(\eta g_t)\omega) \right) \right\}
\]  

(4a)

Using the budget constraint from (2), we can further reduce the optimization problem to one of
a single variable, $g_t$. When unconstrained, the dictator has no incentive to provide private goods, $h_t$, to the citizenry, which only detracts from his spending on $k_t$ and $g_t$. Setting $h_t$ equal to zero, we can then solve for $k_t$ in terms of $g_t$.

$$V(y_t) = \max \left\{ u\left(g_t, y_t - \eta(g_t + h_t)\right) + E_t \beta V\left(\delta_{t+1}(\gamma(g_t)\omega)\right) \right\} \quad (4b)$$

Maximizing expression (4b) with respect to $g_t$ leads to the following First Order Condition (FOC)\(^\text{10}\)

$$u'(g_t) - \eta u'(k_t) + \beta V'(y_{t+1})E_t \delta_{t+1}\gamma'(g_t)\eta = 0$$

$$u'(k_t) = \beta V'(y_{t+1})E_t \delta_{t+1}\gamma'(g_t)\omega + \frac{u'(g_t)}{\eta} \quad (6)$$

To reduce this expression further, we apply the Envelope Theorem, differentiating (4a) with respect to $y_t$.\(^\text{11}\) Note, I again use the budget constraint, now solving for $y_t$ in terms of $g_t$.\(^\text{12}\)

$$V'(y_t) = \beta V'(y_{t+1})E_t \delta_{t+1}\gamma'(g_t)\omega \quad (7)$$

Re-expressing the FOC from (6), we have

$$\beta V'(y_{t+1}) = \frac{\eta u'(k_t) - u'(g_t)}{E_t \delta_{t+1}\gamma'(g_t)\omega\eta} \quad (6a)$$

Using this expression, we can plug it into (7), leaving us with a clean expression for the derivative of the value function

$$V'(y_t) = \frac{\left(\eta u'(k_t) - u'(g_t)\right)E_t \delta_{t+1}\gamma'(g_t)\omega}{E_t \delta_{t+1}\gamma'(g_t)\omega\eta}$$

$$= \frac{\left(\eta u'(k_t) - u'(g_t)\right)\gamma'(g_t)\omega}{\gamma'(g_t)\eta} \quad (8)$$

Finally, updating expression (8) one period, and plugging it back into the FOC from (6), we reach the following Euler equation

\(^{10}\)I use $u'(\cdot)$ to denote partial derivatives, i.e. $u'(\cdot) \equiv \frac{\partial u}{\partial \cdot}$.

\(^{11}\)The Envelope Theorem states that derivative of the value function, $V'(\cdot)$, only depends on the direct effect of the differentiated term. While the choice of control variables may have indirect effects, these effects are assumed to be zero along the equilibrium path, and thus drop out.

\(^{12}\)Most programming problems explicitly include the state variable in the transition function, which my model does not. Using the budget constraint, and substituting it into (4), makes the expression differentiable with respect to $y_t$. 

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\begin{align*}
u'(k_t) &= \beta \left( \frac{(\eta u'(k_{t+1}) - u'(g_{t+1}))\gamma'(y_{t+1})}{\gamma'(g_{t+1})} \right) E_t \delta_{t+1} \gamma'(g_t)\omega + \frac{u'(g_t)}{\eta} \\
u'(k_t) - \frac{u'(g_t)}{\eta} &= \frac{\left( \beta E_t \delta_{t+1} \gamma'(g_t)\omega \right) \left( \eta u'(k_{t+1}) - u'(g_{t+1}) \right) \gamma'(y_{t+1})}{\gamma'(g_{t+1})} \\
\eta u'(k_t) - u'(g_t) &= \frac{\left( \beta E_t \delta_{t+1} \gamma'(g_t)\omega \gamma'(y_{t+1}) \right) \left( \eta u'(k_{t+1}) - u'(g_{t+1}) \right)}{\gamma'(g_{t+1})} \tag{9}
\end{align*}

After solving for the Euler equation in (9), we need two boundary conditions to fully characterize the optimal path. First, we stipulate initial conditions for the state variable. Second, we impose the Transversality condition, which effectively requires that the marginal utility tends toward zero in the limit. \(^{13}\) Assume the following boundary conditions hold

\begin{align*}
y_0 &= y \tag{9a} \\
limit \ y_t V'(y_t) &= 0 \tag{9b}
\end{align*}

Jointly, (9), (9a) and (9b) define the optimal path starting from any \( s_t = (A, y_t) \) when the costs of revolution are too high to credibly threaten protest (i.e. when \( \mu \leq \mu^* \)). The dictator’s optimal policy, \( \{\hat{g}, \hat{h}, \hat{k}\} \), solves this Euler equation, subject to the initial and Transversality conditions.\(^{14}\)

Before moving onto the complementary analysis for the citizenry’s optimal policy, let us first briefly unpack these results. The Euler equation can be seen as an intertemporal extension of the First Order Condition for optimization problems and, thus, has an analogous intuition. Generally speaking, the Euler equation states that the marginal utility from consumption today is equal to the expected, discounted marginal utility from consumption in the next period, which in turn depends on the additional wealth available tomorrow given postponing consumption today. In other words, it equates the marginal benefits and costs from consumption across present and future periods.

Decreasing spending on \( g_t \) may result in greater consumption today in the form of \( k_t \), but it also decreases tomorrow’s revenue to be consumed or further invested in the future. The Euler equation characterizes spending and investment choices along the equilibrium path. Therefore, its solution must ensure that no deviation in the present would be profitable—neither in the short-term nor long-term— and since the policy function is state dependent and captures the recursive structure of the Bellman Equation, the Euler solution satisfies this condition for every period.

The Euler equation in (9), however, is slightly more complicated than most growth models, \(^{13}\) The Euler equation is necessary but not sufficient. To ensure existence, we must assume the Transversality condition, which imposes asymptotically bounded returns. This condition is clearly satisfied by the concavity of \( u(\cdot) \), \( V(\cdot) \) and the discount factor \( \beta \). \(^{14}\) The solution to a dynamic programming problem is generally referred to as a policy function, which is a stationary mapping of the state into a spending and investment vector.
which rarely allow for multiple choice variables. As such, the Euler equation for this model must account for the trade-off between goods, both in terms of their marginal utility and revenue effects. The LHS of (9) represents the difference in marginal utility today from spending on $k_t$ and $g_t$. This difference has to be equal to the RHS, which includes the expected discounted revenue effects from increasing $g_t$, times the difference in utility next period from $k_{t+1}$ and $g_{t+1}$. In other words, the marginal utility change next period multiplied by the total revenue change. This is all divided by the marginal revenue increase tomorrow from $g_{t+1}$. All told, the marginal benefit from consumption today in the form of $k_t$ and $g_t$, must equal the marginal benefit tomorrow, scaled by the revenue effects these choices should generate.

In a similar vein, we can find the optimal, unconstrained policy for the absorbing revolutionary state, where the citizenry makes the policy choice. If $\mu \geq \overline{\mu}$, the costs of revolution are so low that a revolution is unavoidable, no matter what the dictator offers. In which case, the game enters an absorbing state, where the social optimum is implemented ad infinitum. In effect, the dictator ceases to be a player in the game, allowing us to solve the simple programming problem that maximizes the citizens’ total welfare. As each citizen is identical, we can solve for the social optimum by taking a typical individual from the population of $\eta$ and solving for their optimal choice. Let us define $(\hat{g}, \hat{h}, \hat{k})$ as this socially optimal policy.

Like the dictator’s programming problem, solving this problem simply requires we find the Euler equation and corresponding boundary conditions. Rather than repeat the analysis from above, let expressions (10), (10a) and (10b) define these conditions.

$$u'(h_t) - u'(g_t) = \frac{\beta E_t \delta_{t+1} \gamma'(g_t) \omega \gamma'(y_{t+1})}{\gamma'(g_{t+1})} \left( u'(h_{t+1}) - u'(g_{t+1}) \right)$$

s.t.

$$y_{0} = y$$

$$\lim_{yt} y_{t} V'(y_{t}) = 0$$

There are a few items to note here. First, it should be readily apparent— and unsurprising— that these conditions look similar to the dictator’s. When unconstrained, the dictator and citizen have nearly identical optimization problems, at least in this baseline model. The only real difference derives from their private goods (i.e. $h_t$ vs. $k_t$) and the fact that the citizen is socially optimizing, and thus maximizes over the entire citizenry of $\eta$. This latter difference, however, is little more than a scalar change. Ultimately, both optimization problems seek to maximize their total utility over the infinite horizon, trading-off between their instantaneous utility from consumption today and the revenue losses in the future. The optimal policies provide some combination of growth-inducing public goods $(\hat{g}, \tilde{g})$ and private goods $(\hat{k}, \tilde{h})$, with each player setting the other’s private goods to zero $(\hat{h} = 0, \tilde{k} = 0)$. 

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The question remains, however, how does spending change when the planner is constrained? Fully characterizing the equilibrium requires we define what the dictator will do when constrained by the threat of revolution. This question brings us to the final case, where \( \mu < \mu < \bar{\mu} \). Under this condition, the costs of revolution are sufficiently low such that the citizenry retain a plausible threat to revolt but at the same time, the costs are not so low that the citizenry will revolt irrespective of the dictator’s policy. The dictator’s problem then becomes more than a simple optimization. Now, he must consider the minimum value to prevent revolution. In short, his problem resembles a Hicksian demand function, where the planner maximizes utility by minimizing total expenditure subject to some constraint.

In this case, the constraint is defined by the citizenry’s outside option (i.e. the expected discounted value from revolt). Let the state be some generic \( s_t = (A, y_t) \) and suppose \( \mu < \mu < \bar{\mu} \). Should the citizenry revolt, their continuation value is\(^{15}\)

\[
V(r_t = 1 \mid A, y_t) = \mu u(\tilde{g}, \tilde{h}) + \beta V(R, \tilde{y}_{t+1})
\]

Conversely, if they choose not to revolt, given some policy \( \{g^*, h^*, k^*\} \) proposed by the dictator, then their continuation value is

\[
V(r_t = 0 \mid A, y_t) = u(g^*, h^*) + \beta V(A, y^*_{t+1})
\]

The citizenry will not to revolt so long as the RHS of (12) is at least as great as the RHS of (11). In other words, when the following condition holds

\[
\begin{align*}
u(g^*, h^*) + \beta V(A, y^*_{t+1}) &\geq \mu u(\tilde{g}, \tilde{h}) + \beta V(R, \tilde{y}_{t+1}) \\
u(g^*, h^*) - \mu u(\tilde{g}, \tilde{h}) + \beta \left( V(A, y^*_{t+1}) - V(R, \tilde{y}_{t+1}) \right) &\geq 0
\end{align*}
\]

The Hicksian Demand policy \( \{g^*, h^*, k^*\} \) solves the dictator’s Bellman Equation from (4) while simultaneously satisfying the constraint imposed by expression (13). In effect, this policy reflects the minimum expenditure necessary to assuage the citizenry and prevent revolution. Analytically solving for this policy, however, is difficult, as it depends on the utility and revenues generated by optimal policies defined above.

It is nonetheless evident that the solution \( \{g^*, h^*, k^*\} \) will put some positive value on each spending choice. The degree to which the policy over-provides \( g_t \) and \( h_t \) (i.e. tends away from the dictator’s optimal policy) will vary. Most notably, \( g^* \) and \( h^* \) is increasing in \( \{\tilde{g}, \tilde{h}\} \), \( \mu \) and \( \beta \). In other words, it becomes costlier to buy-off the citizenry as the socially optimal spending package increases, and as the costs to revolt and the discount factor decrease. Finally, while the dictator

\(^{15}\)I use \( u(\tilde{g}, \tilde{h}) \) and \( \tilde{y}_{t+1} \) to denote the utility and expected revenue induced by the socially optimal policy \( \{\tilde{g}, \tilde{h}, \tilde{k}\} \) that solves (10), (10a) and (10b) above.
would prefer, *ceteris paribus*, to meet this constraint by increasing \( g_t \) only, the functional form of \( u(\cdot) \) (see Footnote 24) implies an interior solution. How much the dictator provides, trading-off between \( g_t \) and \( h_t \), will depend on the specific parameters and the functions \( u(\cdot) \) and \( \gamma(\cdot) \).

Heretofore, we have defined the optimal policies for three distinct parameter spaces. The final step in this analysis is to define the cutpoints that cleave these spaces. Given the optimal policies defined above, we now ask, what must be true about the costs of revolt to support these policies?

First consider \( \mu \). Similar to the derivation of the Hicksian constraint, we begin by defining the citizenry’s continuation values. In this case, the value for continuing under an authoritarian regime (i.e. not revolting given the optimal policy defined above) is

\[
V(r_t = 0 \mid A, y_t) = u(\hat{g}, \hat{h}) + \beta V(A, \hat{y}_{t+1})
\]  

(14)

As for revolt, the continuation value is exactly the same as in (11). Setting the RHS of (14) greater than or equal to the RHS of (11) and solving for \( \mu \), we reach the following condition

\[
\mu \equiv \mu \leq \frac{u(\hat{g}, \hat{h}) + \beta \left( V(A, \hat{y}_{t+1}) - V(R, \tilde{y}_{t+1}) \right)}{u(\hat{g}, \hat{h})}
\]  

(15)

When \( \mu \) is less than this value, implying a relatively high cost to revolt, the dictator is unconstrained and can implement his optimal policy. Conversely, when the costs of revolt are so low—relative to the value for continuing under an authoritarian regime, no matter how generous the respective Hicksian expenditure—then revolution is inevitable. This cutpoint, \( \mu \), is defined as follows,

\[
\mu \equiv \mu \geq \frac{u(\hat{g}, \hat{h}) + \beta \left( V(A, \hat{y}_{t+1}) - V(R, \tilde{y}_{t+1}) \right)}{u(\hat{g}, \hat{h})}
\]  

(16)

Together, these cutpoints parse the parameter space, supporting the policies derived above. Note that while these cutpoints are fixed—at least in terms of how they are computed relationally—because the economy is dynamic and \( y_t \) varies over time given the spending choices, some regimes may transition across these spaces. While some states may demonstrate cyclical spending patterns, vacillating between different spending packages as they find themselves above or below \( \mu \), others may remain fully below \( \mu \), allowing the dictator to pursue his optimal policy unconstrained. Yet others still may fall above \( \mu \) and transition into the absorbing revolutionary state. The specific dynamics a regime manifests will depend on the initial conditions \( (y_0) \), factor endowments \( (\omega, \eta) \), production capacity \( (\gamma(\cdot)) \), utility function \( (u(\cdot)) \), and stochastic variable \( (\theta, q) \).16

16In a future extension, I hope to simulate these dynamics across a range of parameters using the Euler equations above.
The Equilibrium  Having reduced the complexity of the game by dividing up the parameter space and solving for the optimal policies, we can finally characterize the equilibrium.

Suppose the society starts in an Authoritarian state, \( s_t = (A, y_t) \). Then:

1. If \( \mu \leq \underline{\mu} \): the dictator implements his optimal policy \( \{\hat{g}, \hat{h}, \hat{k}\} \); the citizenry choose not to revolt \( (r_t = 0) \).

2. If \( \mu \geq \overline{\mu} \): the citizenry choose to revolt \( (r_t = 1) \), irrespective of the dictator’s policy; the game enters an absorbing state \( s_{t+1} = (R, \tilde{y}_{t+1}) \) where \( \{\tilde{g}, \tilde{h}, \tilde{k}\} \) is implemented in every period.

3. If \( \underline{\mu} < \mu < \overline{\mu} \): the dictator implements the Hicksian solution \( \{g^*, h^*, k^*\} \); the citizenry choose not to revolt \( (r_t = 0) \).

4.2 Jobs Model

In the baseline model, the dictator and citizenry consider only spending on public and private goods. In this section, I introduce public sector jobs, \( j_t \) as another distributive good. The planner’s choice space now takes the form \( \{g_t, h_t, k_t, j_t\} \). This addition is far from trivial, introducing a series of changes in the model and qualitatively altering the equilibrium conditions.

The first major change relates to the state space itself. Now, the state is a 3-tuple of the form \( (A, y_t, \mu_t) \) or \( (R, y_t, \mu_t) \). The third element of the state, \( \mu_t \), which still reflects the organizational costs to protest, is now endogenous. Introducing a scalar for the relative cost of revolution is neither novel nor unique to this paper. However, most models assume this cost to be fixed and exogenous. I assume neither. Just as revenue depends on the previous spending choice, the cost of revolt is endogenous to these choices. Specifically, the cost of revolt is decreasing in the number of public sector workers, \( j_t \), such that \( \mu_t = \mu(j_{t-1}) \), \( \mu'(\cdot) > 0, \mu''(\cdot) < 0 \) and \( \mu < \mu_t < 1.17 \) As \( \mu_t \) increases, the cost to revolt (measured by the total waste from revolution) decreases. Asymptotically, as the number of public jobs approaches infinity, the cost to revolution becomes trivially small.

Beyond the costs to protests, jobs also enter into the basic utility of the citizenry. In addition to consumption from public and private goods, citizens also enjoy utility from holding a public job. Each job, garners a set wage of \( \theta \). The total number of jobs available in any given period, \( j_t \), is a choice of the planner. Thus, the probability of receiving a job, which for simplicity is assumed to be distributed randomly at the end of the period, is the total number of jobs over the population

\[
\text{I assume a minimum bound for } \mu_t, \text{ otherwise the model would tend to an absorbing state where the dictator provides no jobs-- driving the costs of revolution to their maximum-- and allowing him to pursue his optimal policy ad infinitum.}
\]
size, \( \eta \).\(^{18}\) Expression (1a') reflects this change.

\[
u_t^C = u(g_t, h_t) + \frac{\theta j_t}{\eta} \quad (1a')
\]

As distributive goods, jobs also affect future revenue but unlike the positive externality from spending on \( g_t \), I assume that state revenue is negatively influenced by the number of public sector jobs, \( j_t \). In terms of the model, this negative externality is determined by the increasing and convex function \( \phi(\cdot) \).\(^{19}\) As the number of public jobs increases (i.e. there is greater inflation of the public sector), the economic distortions grow. This functional form reflects the severe economic consequences of public sector waste. According to Gelb et. al. (1991), in many developing countries, the public sector is analogous to an “unproductive sink,” which may “sap the economy of its dynamism, eliminating improvements in living standards for all but the few who obtain rent yielding jobs.” Additionally, the opportunity cost of over-employment and inflated wages can be equally prohibitive. Over investment in the public sector discourages growth when “fiscal resources are needed to support the sink and its investment claims, thereby diverting resources from productive investment” (Gelb et. al. 1991, 1196). These costs are loosely captured by \( \phi(\cdot) \) in the modified transition equation below.

\[
y_{t+1} = \delta_{t+1} \left( \frac{\gamma(\eta g_t)\omega}{\phi(j_t)} \right) \quad (3')
\]

Having accounted for these necessary changes to the model, the question then becomes, how does the equilibrium differ from the baseline? Admittedly, at first, there does not appear to be significant change. Following the same strategy for solving as before, suppose there exists some cutpoint \( \mu \) such that the dictator is unconstrained for any \( \mu \leq \mu \). Under this condition, the optimal policy is nearly identical to the baseline result. Even as the Euler condition changes slightly, the dictator’s actual solution to his maximization problem remains the same, as he simply sets both \( h_t \) and \( j_t \) to zero, while solving for the optimal combination of \( g_t \) and \( k_t \). This result is obvious from the way in which \( j_t \) enters the model. Not only does spending on jobs detract from the dictator’s consumption of goods today, it also decreases future revenue and, most critically, raises the costs of revolution tomorrow. If unconstrained, the dictator would prefer to forgo these economic and political costs, setting \( j_t \) to zero and pursuing his optimal policy as defined in (9'), (9a') and (9b') below. When \( \mu \leq \mu \), the dictator’s optimal policy, \( \{\hat{g}, \hat{h}, \hat{k}, \hat{j}\} \), solves the following conditions\(^{20}\)

\(^{18}\)A more sophisticated model would take into consideration the stickiness of individual jobs. This distinction, while important, would require the citizenry be better disaggregated, which is a significant complication and beyond the scope of this paper.

\(^{19}\)To ensure jobs are strictly costly, I further assume the following bounds \( \phi(j_t) \in [1, \infty] \).

\(^{20}\)Another slight difference involves the initial conditions. With a 3-tuple state variable, we must additionally assume a starting value for \( \mu_t \).
\[ \eta u'(k_t) - u'(g_t) = \frac{\left(\beta E_t \delta_{t+1} \gamma'(g_t) \omega \gamma'(y_{t+1})\right) \left(\eta u'(k_{t+1}) - u'(g_{t+1})\right)}{\gamma'(g_{t+1}) \phi(j_t)} \]  \hspace{1em} (9')

s.t.
\[ y_0 = y, \mu_0 = \mu \] \hspace{1em} (9a')
\[ \lim_{y_t} V'(y_t) = 0 \] \hspace{1em} (9b')

Notwithstanding this similarity, the optimization problem changes considerably for the citizenry who must balance the expected benefit of increasing the number of jobs with the drag this imposes on the economy in the future. Accordingly, their optimal policy must account for this trade-off, requiring we now solve for a series of Euler equations. For space, I omit the math here. The only difference from before relates to the Envelope Theorem and its application. I again use the budget constraint, now
\[ y_t = k_t + \eta(g_t + h_t) + \theta j_t \] \hspace{1em} (2')

to solve for the choice variables \(g_t\) and \(j_t\) in terms of \(y_t\), which I substitute into \(V(y_{t+1})\) to compute their respective Euler equations. Given this slight change, the analysis follows just as before with an additional series of steps to produce a pair of Euler equations. The citizenry’s optimal policy, \(\{\hat{g}, \hat{h}, \hat{k}, \hat{j}\}\), solves the following conditions
\[ u'(h_t) - u'(g_t) = \frac{\left(\beta E_t \delta_{t+1} \gamma'(g_t) \omega \gamma'(y_{t+1})\right) \left(u'(h_{t+1}) - u'(g_{t+1})\right)}{\gamma'(g_{t+1}) \phi(j_t)} \]  \hspace{1em} (10')
\[ \phi'(j_t) = \frac{\left(\beta E_t \delta_{t+1} \gamma(\eta g_t) \omega \theta\right) \left(\phi'(j_{t+1})\right)}{\phi'(y_{t+1})} \] \hspace{1em} (10')

s.t.
\[ y_0 = y, \mu_0 = \mu \] \hspace{1em} (10a')
\[ \lim_{y_t} V'(y_t) = 0 \] \hspace{1em} (10b')

Expressions (10'), (10a') and (10b') should look familiar. The Euler equation in (10') is similar to (9') in terms of the change from the baseline. In both cases, the only difference appears to be the term \(\phi(j_t)\) in the denominators. However, in the case of the dictator’s Euler equation in (9'), \(\phi(j_t)\) dropped out. By setting \(j = 0\), which implies \(\phi(0) = 1\), the Euler equation in (9') reduces to the dictator’s baseline condition in (9). In contrast, the same term in the denominator in (10') does not drop out because the citizenry may allocate some positive spending on jobs in equilibrium, as they enjoy utility from these positions (i.e. a wage of \(\theta\)).
This utility from jobs comes at a cost, which is reflected in the citizenry’s second Euler equation, (10”). This expression indicates that under the socially optimal policy \{\tilde{g}, \tilde{h}, \tilde{k}, \tilde{j}\}, the number of jobs provided will balance the costs today (i.e. LHS of (10’)) with the expected discounted revenue in the next period, times the benefit from jobs today, scaled by the marginal cost function in terms jobs over the cost function in terms of revenue. Jointly, the two Euler equations in (10’) and (10”) define the optimal policy as one that weights the expected benefits and costs of each of these spending choices, considering both their utility and revenue effects.

As before, the dictator’s Hicksian policy \{g^*, h^*, k^*, j^*\} will obtain in equilibrium when he is constrained by the citizenry’s threat of revolt (i.e. \(\mu < \mu < \bar{\mu}\)). Similar to the baseline result, this solution is derived by maximizing the dictator’s Bellman Equation, subject to the following constraint

\[
\left( u(g^*, h^*) - \mu_t u(\tilde{g}, \tilde{h}) \right) + \frac{\theta}{\eta} \left( j^* - \mu_t \tilde{j} \right) + \beta \left( V(A, y^* t+1, \mu^* t+1) - V(R, \tilde{y} t+1, \tilde{\mu} t+1) \right) \geq 0 \quad (13')
\]

The first two terms in expression (13’) represent the difference in current utility between the Hicksian solution and the socially optimal policy that would prevail should the citizenry revolt. The third term reflects the future, discounted difference between the two policies. Consider the first term in this expression. The costliness of this constraint, and the degree to which it pushes the dictator away from his optimum, is clearly increasing in \(\mu_t\). As the costs of revolt decline, the dictator is forced to further increase spending to satisfy the citizenry today. Similarly, the constraint’s cost to the dictator is also increasing in \(\beta\) because the third term will always be negative, as even the most generous Hicksian spending package will be valued less than the social optimum. What is less clear, however, is the role of \(\theta\) and \(\eta\) in the second term. If the difference between \(j^*\) and \(\mu_t \tilde{j}\) is positive, then the expression is increasing in \(\theta\) and decreasing in \(\eta\). If it is negative, then the opposite holds.

Finally, we can define the necessary cutpoints \(\underline{\mu}\) and \(\bar{\mu}\) that support these policies. These cutpoints are as follows

\[
\underline{\mu} \equiv \mu_t \leq \frac{u(\tilde{g}, \tilde{h}) + \beta \left( V(A, \tilde{y} t+1) - V(R, \tilde{y} t+1) \right)}{u(\tilde{g}, \tilde{h}) + \frac{\theta \tilde{j}}{\eta}} \quad (15')
\]

\[
\bar{\mu} \equiv \mu_t \geq \frac{u(g^*, h^*) + \frac{\theta j^*}{\eta} + \beta \left( V(A, y^* t+1) - V(R, \tilde{y} t+1) \right)}{u(\tilde{g}, \tilde{h}) + \frac{\theta \tilde{j}}{\eta}} \quad (16')
\]

Ostensibly, these conditions look similar to the analogous baseline results. However, there is a slight but critical distinction between those defined in (15) and (16) versus (15’) and (16’).
While the previous cutpoints also related, at least implicitly, to the state variable \( y_t \), they did not directly depend on previous spending choices as they do in \((15')\) and \((16')\). In the baseline model, the change in wealth overtime could result in a regime rising above or dropping below some cutpoint. And while the spending package mattered, the dictator’s control was also moderated by the stochastic component. If the economy suffered too profound a recession (e.g. a low \( \delta \)) or too frequently experienced downtimes (e.g. large \( q \)), then the dictator may not have been able to prevent revolution forever.

In this model, however, jobs directly influence \( \mu_t \). The dictator’s spending package influences the costs of revolt not only through future revenue, but directly through jobs. Although the dictator would prefer growth-inducing packages of accommodation, when the future is highly discounted, jobs may be the only way to satisfy the citizenry, no matter the future costs of revolt.

**The Equilibrium**  
We can now specify the full equilibrium with jobs.

Suppose the society starts in an Authoritarian state, \( s_t = (A, y_t, \mu_t) \). Then:

1. If \( \mu_t \leq \underline{\mu} \): the dictator implements his optimal policy \( \{\hat{g}, \hat{h}, \hat{k}, \hat{j}\} \); the citizenry choose not to revolt \( (r_t = 0) \).

2. If \( \mu_t \geq \overline{\mu} \): the citizenry choose to revolt \( (r_t = 1) \), irrespective of the dictator’s policy; the game enters an absorbing state \( s_{t+1} = (R, \tilde{y}_{t+1}, \tilde{\mu}_{t+1}) \) where \( \{\tilde{g}, \tilde{h}, \tilde{k}, \tilde{j}\} \) is implemented in every period.

3. If \( \underline{\mu} < \mu_t < \overline{\mu} \): the dictator implements the Hicksian solution \( \{g^*, h^*, k^*, j^*\} \); the citizenry choose not to revolt \( (r_t = 0) \).

Ultimately, comparing the baseline model to the jobs model above, we see that much of the results are qualitatively the same. The critical difference comes in the downstream dynamics from introducing jobs, which endogenizes the costs of revolution. Co-optation through jobs can put the society on a path towards increasing political and economic instability. The jobs policy solves the commitment problem today, thus averting revolution, precisely because it gives workers and citizens more power in the future. By increasing jobs today, the dictator not only decreases the next period’s revenue (because of the economic distortions introduced) but also decreases the relative cost to revolt, making this is a potentially risky strategy. Suppose the economy faces a recession in the next period. The dictator will be forced again to cede more power through jobs. Unless this policy is reversed– which is actually harder to do the longer the dictator relies on workers–this society will ineluctably reach a point where the costs to revolt are so low that revolution is unavoidable. In the short-term, however, these jobs constitute a form of partial commitment, through which the ruler is able to avoid revolution during an economic crisis.
5 Discussion

This paper critically depends on the notion that goods differ. This premise is relatively uncontroversial. Even in the case of the rentier Gulf, policymakers have incentives to manipulate spending to implicitly target groups. It would be impossible to capture these subtle redistributive effects without better parsing goods and accounting for the multiplicity of dimensions. In addition to quality, targetability and other dimensions, I argue that public jobs differ in two important ways from most goods: they are costly and sticky. They are costly in the sense that unlike growth-inducing public goods or revenue-neutral fiscal transfers, jobs introduce profound economic distortions, influencing labor markets, growth and investment. They are sticky in the sense that once given, jobs are harder to take away.

I have integrated these features into a Markov model of regime change and shown how rulers can avoid institutional reform by offering public sector jobs as a form of private goods. In contrast to fiscal transfers or consumption subsidies, public jobs are sticky and thus provide the ruler with a means to (more) credibly promise future redistribution. While no job is entirely safe, firing public sector workers comes at a high cost, helping the ruler buy-off the opposition without having to promise formal institutional change. The paper demonstrates the conditions under which a ruler will swallow a poison pill, inflating the public sector today– and thus introducing profound labor market inefficiencies– to credibly commit to future redistribution tomorrow.

As the public sector grows, so too does the citizenry’s capacity to revolt. Initially, this claim may appear bizarre. After all, the recent literature of authoritarian robustness suggests that it is precisely the public sector that constitutes one of the major bulwarks of regime survival. These accounts, however, are by their nature incomplete. They argue that public workers are co-opted, but fail to appreciate the strength that these workers also enjoy. Client-patron relationships are complicated. While the patron (i.e. state) may appear to be in a position of strength, once granted, it is much more difficult to withdraw a benefit (i.e. job). As the state and its economy rely evermore on the public sector, workers have a greater bargaining position.

Ultimately, this paper contributes to our understanding of several unresolved puzzles in the study of political economy and the rentier state. First, it helps explain how the Gulf states manage their allocation problems in providing public and private goods, while balancing the political economic trade-offs. Second, building on existing models, the paper extends the logic of dynamic inconsistency and commitment problems to the rentier state, showing how perilously these states depend on credible redistribution. Finally, and most importantly, it helps explain how the rentier state has maintained stability in the face of growing socio-economic pressures by using jobs to credibly commit to future redistribution.
Works Cited


