# Land for peace? Game theory and the strategic impediments to a resolution in Israel-Palestine

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#### Abstract

Why have Israel and the Palestinians failed to implement a 'land for peace' solution, along the lines of the Oslo Accords? This paper studies the application of strategic behavior models, in the form of games, to this question. I show that existing models of the conflict largely rely on unrealistic assumptions about what the main actors are trying to achieve. Specifically, they assume that Israel is strategically interested in withdrawing from the occupied territories pending resolvable security concerns but that it is obstructed from doing so by violent Palestinians with other objectives. I use historical analysis along with bargaining theory to shed doubt on this assumption, and to argue that the persistence of conflict has been aligned with, not contrary to, the interests of the militarily powerful party, Israel. The analysis helps explain, from a strategic behavior perspective, why resolutions like the Oslo Accords, which rely on the land for peace paradigm and on self-enforcement, have failed to create peace.

Keywords: Israel-Palestine, land for peace, strategic behavior, game theory

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### 1 Introduction

Strategic political interactions<sup>1</sup> can sometimes be understood and modeled as 'games' among rational or semi-rational actors, and this approach has been increasingly used to study political conflict and peace (Blattman and Miguel 2010). This paper investigates the application of strategic behavior models, in the form of game theory, to explanations around the absence of a peaceful resolution in Israel-Palestine. The paper highlights what this literature assumes about the actors' strategic interests, and offers a critique of some of the predominant assumptions involved. It then suggests a way that the game theoretic approach can more realistically model strategic interests and therefore help explain the endurance of the conflict.

On Israel-Palestine, the strategic behavior or game theoretic studies mostly follow in the fifteen year period after the initiation of the Oslo Peace Accords in 1993. The Accords, signed by Israel and the Palestine Liberation Organization (PLO), promised a five year plan for Israel to withdraw from the territories it occupied in 1967 and grant Palestinians sovereignty in exchange for Palestinian compliance with Israeli security demands, in what is referred to as the two-state solution or 'land for peace' paradigm. These papers aim to use the principles of strategic interaction and rational behavior to explain the increasingly obvious failure of the Oslo Accords in generating peace along the lines of a two-state solution, eschewing the notion that the absence of a solution is illogical. Methodologically, many use formal models though some apply game theoretic principles to Israel-Palestine without formal modelling.

The review of the literature presented in this paper shows that, when distilled to their core assumptions, many papers, and most formal ones, assume that the Israeli state is strategically interested in withdrawing and in granting the Palestinians sovereignty over the territory occupied in 1967 pending resolvable security concerns, but that all or some Palestinians have other objectives and use violence to achieve them. Informed by these assumptions, the

<sup>&</sup>lt;sup>1</sup>Throughout, 'strategic' interactions will refer to the situation where agents act based on an expectation of punishments and rewards, and taking into account how these are influenced not only by their own behavior but also their opponent's options, calculations, and decisions. Though such strategic interactions can be analyzed in a number of ways, the focus in this paper will be on the use of games and game theory.

existing models largely present the conflict as an impasse or deadlock perpetuated by shortterm hostilities that collapse any land for peace deal, with the responsibility for this impasse falling on the shoulders of these Palestinian factions conducting or aiding hostilities.

The assumption that the militarily strong party, Israel, is willing to withdraw from the occupied territories in a land for peace deal is so embedded in these models that it often goes unexplained and undefended. Instead, the main debate, and difference between the models, concerns the motivations and strategies of the Palestinians spoiling this opportunity.

In contrast, papers on Israel-Palestine that draw on the principles of game theory and strategic behavior but informally and using interdisciplinary methods suggest alternative explanations for the failure of the two-state solution. In particular, these papers suggest that Israel is possibly not willing, for reasons beyond security concerns, to withdraw from the occupied territories. However, the inference from these papers about the strategic interests of relevant parties is often implicit, not highlighted with clarity, and limited to the analysis of short time periods. The informal analyses also make a comparison with more formal contributions difficult.

After examining the above literature, I argue that the predominant assumption in the formal models, that Israel is strategically interested in withdrawing from the occupied territories, is flawed. I do this by overviewing Israeli settlement policy since the beginning of the occupation in 1967, since settlements are very costly and difficult-to-reverse investments and are thus a credible signal of long-term strategic interest in the land. This analysis shows that Israel has pursued the expansion, not retrenchment, of its control in the occupied territories as a top national priority under all circumstances. I also discuss how Israel's security discourse can be understood in this context.

To highlight the importance of the land for peace assumption in driving conclusions in the formal literature about the conflict, I apply a noncooperative bargaining model to the conflict which instead accommodates the possibility that both parties, including Israel, see the territories as strategic and integral for their future. Under this modified assumption, and if the land is 'sufficiently' strategic, the game can produce a moving equilibrium where Israel pursues nonstop settlement expansion in the territories, effectively blocking the possibility of a two-state solution and matching what we see on the ground. The conclusions thus become different to those in the formal literature and, I argue, more historically plausible.

Four clarifications are in order. First, this paper does not claim that game theory can fully explain the Israel-Palestinian conflict even if such a thing were possible. It focuses on the application of such principles to the conflict and therefore examines this approach on its own terms.

Second, and relatedly, alternative models of the conflict are not offered as a complete explanation for the absence of peace, but rather as possessing an explanatory advantage relative to existing models. The goal is not to argue that Israel's strategic interests are the only impediment to peace, but to show in straightforward albeit simplified terms that if Israel views the occupied territories as integral to its future standing and its political project, which as I argue is historically plausible, then that alone is sufficient to derail any peace initiative and to result in growing Israeli expansion over the land.

Third, and for these reasons, I do not provide a rich account of various political, institutional, or social features of the conflict, though the analysis in this paper is meant to be complementary to these aspects, which fall outside its purview. Fourth, to retain focus on the assumptions about key strategic interests relating to the land, I do not provide an account of information problems, exchanges beyond land, or games beyond two players; all these issues, while important, are abstracted from. Instead, I restrict the analysis to a full information dynamic game with two players bargaining over land. As I argue in Section 4, this narrows but does not negate the usefulness of the necessarily abstracted modeling process.

Given these limitations, I conclude that addressing head-on the question of strategic national interests, using analysis that combines history and strategic behavior theory, may be useful in helping to explain part of the persistence of the Israeli-Palestinian conflict. It points to the possibility that the conflict has endured in large part because of, and not despite, the strategic interests of the militarily powerful party, Israel.

The implication for international peace initiatives is nontrivial: agreements like the Oslo

Peace Accords, which rely on self-enforcement and which assume land for peace is strategically desired by both parties, will not be enforced because they do not correspond to key underlying strategic interests. Unlike existing strategic behavior approaches, this paper suggests a primary reason for this is Israel's strategic long-term interest in the land. Barring a major shift in these interests, or a supra-national enforcement mechanism to enforce the vision regardless, similar peace initiatives are also likely to fail to generate a peaceful resolution.

The paper is structured as follows. Section 2 examines the literature that applies game theoretic principles to the subject, classifying papers by the assumptions they make about Israel and the Palestinians' strategic interests. Section 3 provides a historical overview of settlement policy to critique the predominant assumption in formal models about Israeli interest in land for peace, and situates Israel's security discourse in this context. Section 4 presents a model whereby Israel (like the Palestinians) views the territories as a highly strategic asset, and shows that this can be more useful for understanding and predicting the trajectory of the conflict. The section also discusses limitations of this approach. Section 5 summarizes and concludes.

# 2 The strategic behavior literature

The papers that analyze the interdependent strategic interactions of Israel and the Palestinians via games can be broadly classified into two groups. One group assumes that Israel is interested in handing over the occupied territories to the Palestinians pending resolvable security concerns, and tends to present formal game theory models to make the case. In this interpretation, the failure of a land for peace deal owes to various Palestinian strategic motivations that do not align with such a deal.

The other group adopts alternative assumptions about Israel's strategic interests and about the root causes of a failure to generate a two-state solution. This literature tends to draw on and discuss the principles of game theory without formal modelling and to sometimes lack a systematic analysis of the actors' strategic interests, especially Israel's.

I analyze each in turn, omitting mathematical details in favor of a descriptive overview

of the main assumptions and implications.

#### 2.1 Israel as strategically interested in withdrawal/solution

As will be clear, the assumption that Israel is interested in withdrawing from the occupied territories encompasses a delicate tradeoff. It is assumed, explicitly or implicitly, that Israel would inherently rather retain its control over the occupied territories, but that there is conflict with or aggression by Palestinians which is sufficiently costly such that Israel would prefer to withdraw (if it can stop this violence) to the status quo.

If Israel is strategically interested in withdrawal for peace, then the reason it has not withdrawn must be that the interests and actions of Palestinians are wholly or partly irreconcilable with this vision. The conceptualization of these Palestinian interests and strategies, and which Palestinians in particular are to blame for the continuation of the conflict, is the main point differentiating these papers.

A few papers assume outright that all Palestinians have interests that are irreconcilable with a two-state solution. Although it is a short paper written by an economist who is affiliated with the Israeli political class for a think tank, rather than a peer-reviewed article, it is useful to start with Plessner (2001). This is because Plessner lays out very clearly, and in its most radical form, this assumption that Palestinians are simply not interested in peace and instead pursue a dominant strategy of violence. Even though he uses the language of game theory, Plessner does not explain the rationale behind this Palestinian obstruction, arguing that such mentality 'cannot be construed as part of the pursuit of everyday individual happiness' (5). Of Israel, by contrast, 'there can be no doubt [that it]... strives to achieve peace with insurance [and...] is prepared to let the Palestinians create an independent state' (7). He suggests Israel must 'get a lot tougher' and 'exact a heavy price' on the Palestinians to alter the latter's dominant strategy (11).

Mizrahi, Mehrez, and Naor (2001) also assume that Palestinians adopt a dominant strategy of being violent. Israelis, by contrast, support 'giving up territory in exchange for peace' (52). They assume that Israelis are not interested in ceding land if Palestinians are peaceful, but, if Palestinians are violent, Israelis would rather cede land than engage in even more escalated mutual hostilities. In a simple 2x2 setup, the result is as an asymmetric chicken game, with the resultant Nash equilibrium that Israel cedes territory while Palestinians continue to be violent.

Jacobson and Kaplan (2007) focus on the second Intifada as a 'sustained terror campaign' (789) and suggest Palestinian terrorists decide on how frequently to attack Israeli civilians and that they derive utility from killing said civilians. Meanwhile, the Israeli government decides how often to kill suspected terrorists ('targeted killings' (772)) and derives utility from minimizing Israeli and Palestinian civilian casualties. Using a repeated two-period game model where the Palestinian terrorists first decide how many suicide bombings to carry out, after which the Israeli government decides how many 'hits' to carry out, the authors calculate the resulting rate of terror attacks and counterterror hits. The authors do not present a meaningful discussion of Palestinian strategies other than terror attacks, nor of the relationship between terror tactics and interest in the land. The implication is that Palestinian terrorism is at the heart of the conflict and is an end goal in and of itself, offering utility from the act of killing.

The more influential interpretation in the literature, however, is not that all Palestinians obstruct a land for peace deal. Rather, it is that a specific extremist Palestinian faction spoils the peace process between Israel and more moderate Palestinians.

De Figueiredo and Weingast (2001) model a dominant ingroup (Israel) against moderate and terrorist sub-groups of an outgroup (Palestinians). The authors assume Palestinian extremists desire control over all the land, including Israel proper, while moderates are content with an intermediate share such as the occupied territories. In the second stage of the game, Israel and the Palestinians reach a bargain over the division of the land which is more favorable to Palestinians the more extreme (closer to extremists) the moderates are. Foreseeing this, in the first stage the extremists may terrorize Israel to elicit suppression on themselves and alienate moderates due to Israeli 'targeting error' (killing innocent Palestinians) and 'triggering sympathies' (10). If the Palestinian moderates are highly suggestible, and if the cost of terrorism to Israel is sufficiently high, it is possible to have an equilibrium with continuous cycles of Palestinian violence and Israeli suppression. This delays a move to a bargain and demonstrates as enduring conflict.

While in the above the Palestinian extremists are delaying peace to improve the bargaining position, another conceptualization is that Palestinian extremists want to thwart the bargain altogether and are able to do so for various reasons. Kydd and Walter (2002) model Israel as the government while Palestinians are split into moderates and extremists. The authors suggest that the Israeli government most strongly prefers mutual fulfillment of the Oslo Accords. The problem, however, is not only that Palestinian extremists want to overthrow the Accords, but also that Palestinian moderates with whom Israel can make a deal could subsequently betray it ('relaunch the struggle', (268)).

Specifically, in the first stage of the game, the extremists may launch attacks on Israel and the moderates may try to suppress those, successfully or unsuccessfully. Israel cannot see the suppression effort but uses the outcome to revise its expectations of moderates' trustworthiness, and hence its decision to fulfill its end of the peace deal in the second stage. Knowing this, the extremists can attack to drive a wedge between Israel and the Palestinian moderates. This may reduce Israel's trust in the moderates below what is necessary to implement a deal, thereby thwarting the deal. This is what the authors suggest happened, arguing that 'terrorist violence ... reduced the value Israelis placed on peace ... [with] an opponent they increasingly viewed as untrustworthy' (285).

Berrebi and Klor (2006) also draw on the theme of trust, of Israel in the Palestinians' future actions, and use it to explain the absence of a solution despite presumed Israeli interest. In the model, Israel would like to continue occupying the territories, but it is willing to withdraw to stop Palestinian violence. Palestinians are divided into moderates and extremists, both with the potential to engage in terrorist violence, but their objectives are different. Moderates want to establish a sovereign state on 1967 territory while extremists want a state that eradicates Israel. Therefore, unlike moderates, extremists will not accept an agreement whereby Israel withdraws (only) from 1967 territory in exchange for a cessation

of violence. Knowing this, Israelis may believe violence is coming from the extremists and hence be unwilling to concede territory. Therefore, the stalemate owes to extremist Palestinian objectives which fracture Israel's trust in the efficacy of an agreement for achieving security from attacks.

In de Mesquita's (2005a) model, Israel's utility increases with counterterror efforts and decreases with concessions to Palestinians, while Palestinians are all terrorists who obtain utility from destroying Israel to two varying extents, differentiating them into moderate and extremist terrorists. In equilibrium, Israel may offer concessions to the moderates if they aid it in counterterror efforts (against extremists) and the moderates may accept, after which the two play a simultaneous commitment game. Because concessions are costly to Israel and counterterror aid is costly to moderates, the game degenerates into a prisoner's dilemma where neither concessions nor aid are followed through on, even though both Israel and the moderates prefer land for peace to the status quo. The author shows that in an infinite game with trigger strategies, mutual cooperation can become self-enforcing, but opines that what thwarted peace efforts was the lack of commitment of the Palestinian moderates.

In another paper, de Mesquita (2005b) abstracts from the commitment problem on the Israeli side altogether and focuses on the (lack of) credibility of the Palestinian moderates arising from the unobservability of counterterror effort. In the model the moderates play first and, if they succeed in counterterror, Israel grants the agreed upon concessions. If they fail, Israel will not enact concessions and, making deductions about the moderates' ability and effort, may choose to 'replace the former terrorist leadership with a new negotiating partner' (237). The author shows that if the threat of replacement is not sufficiently tied to counterterror performance, the moderates will have an incentive to exert low effort and to claim they tried but failed. Therefore, whereas Israel commits to peace, it may be obstructed from withdrawal by the presence of moral hazard in moderate Palestinians' counterterror efforts.

Berman and Laitin (2008) concede that there are Palestinian moderates but focus on Palestinian terrorists and model the strategic considerations within these organizations that inform their makeup and rules, instead of modeling the interaction of Palestinians and Israelis. Regarding strategic interests, they suggest that the goal of Palestinian organizations like Hamas is far more extreme than a two-state solution and involves the conquest of the entire territory comprising Israel-Palestine. Though Israeli interests are not modeled (Israel is represented as simply wanting to thwart extremist attacks), it is plausible that these factions stand in the way of any land for peace plan, since even if Israel were to withdraw from the occupied territories, attacks would not desist.

### 2.2 Israel as possessing other strategic interests

An early strategic behavior exposition of Israeli interests other than land for peace is found in Hirsch (1996), who examines the conflict over occupied East Jerusalem and suggests that Israel is strategically unwilling to relinquish this land and is thus involved in a zero sum game with the Palestinians. Hirsch does not formalize his intuition, but to the extent that the game over East Jerusalem is a zero-sum game then it is not a prisoner's dilemma; there is no room for cooperation even with trigger strategies because one party will value mutual defection over mutual cooperation.

If cooperation is relinquishing some of the claim over East Jerusalem, the party blocking mutual cooperation will be the one which benefits more from a continuation of the mutual defection status quo, which Hirsch suggests is inarguably Israel, the party in control of East Jerusalem. He also argues that the negative payoffs from sharing East Jerusalem are particularly high for Israel due to the construction of new settlements, a strategy which 'illustrates the technique of preemption or irrevocable commitment [... This] increases the negative payoffs [of relinquishing claim over the city] and reduces the likelihood Israel will adopt such a move' (710).

Whereas Hirsch confines the zero sum aspect to East Jerusalem, Pape (2003) suggests there is a strong zero sum aspect over the remaining occupied territories as well. Studying the strategic motivation of Palestinian suicide attacks in the mid to late 1990s, Pape argues their end goal had not been to thwart a negotiated settlement where Israel withdraws from the territories occupied in 1967, but rather to pressure Israel to do so, using war of attrition because negotiations are viewed as a failure. The implication is that extremists are different from moderates not in goal but in method. Examining the timing of suicide attacks in 1994-1995, he shows that attacks followed not Israeli concessions, but Israeli *delays* of Oslo's agreed-upon deadlines for military withdrawals from Palestinian population centers. On Israel, and in other occupation contexts as well, Pape argues that suicide attacks may pressure the occupying state into granting modest and reversible concessions but 'are unlikely to affect the target state's interests in the issues at stake' (355), which are usually to retain control over the occupied territories. He notes that Israel's concessions to the Palestinians in 1994-1997 involved 'temporary and partial withdrawal' from important areas at the same time that settlements doubled and there was 'little to hinder the Israeli Defense Forces' return' (356).

Therefore, Pape (2003) overturns the land for peace paradigm on its head: it is not that Israel wants to withdraw but is prevented from doing so by a highly successful terrorist campaign, but rather that Israel does not want to withdraw and will not be forced to do so by weakly coercive terrorist attacks.

In a qualitative discussion, Kydd and Walter (2006) support the idea that suicide bombings are an attrition strategy tool employed by weak actors and suggest that a major determinant of whether attrition works is the occupying state's 'level of interest in the issue under dispute', since 'states with ... important interests at stake rarely do [capitulate to terrorist demands]' (60). They note that a state's strategic interests are often forward looking, with an eye to how territorial concessions today may reduce bargaining power and result in further territorial loss later. Regarding Israel, they point that 'Israel is unlikely to withdraw from East Jerusalem' (61). However, they do not generalize this notion, of a high strategic priority of the land to Israel and unwillingness to permanently withdraw, to the wider occupied territories.

Like Pape, Bloom (2004) questions the spoiler game theoretic accounts that suggest Israeli withdrawal from the territories was forthcoming but spoiled by terrorism. Since the acceleration of attacks in 2002 'took place against a political backdrop with few substantive peace negotiations between Israel and the PA [...] It is unclear how effective the attacks are at spoiling a peace no one believes in' (64). Bloom shows that Palestinian support for military movements was low (less than one third) but soared in 2000 once it was clear to Palestinians that they were not reaping any sovereignty dividends from Israel, and that the rate of attacks followed pace. Bloom also shows that Israel responded to attacks post-2000 with extreme violence and not with land concessions, even reoccupying Palestinian territories at various points. Though the connection is not explicit in her paper, this reifies the observation that attacks are unlikely to significantly alter a state's national interests in occupied territories and suggests that Israel is unwilling to withdraw regardless.

Pearlman (2009) also critiques standard spoiler accounts and demonstrates more reasons, besides war of attrition, that persistently blocking sovereignty would encourage the use of violence by weak actors even when these methods generate limited concessions. Examining the history of the Palestinian national movement in two peace negotiation episodes including Oslo, she suggests that not all is driven by external utility considerations and that internal contestation dynamics also matter, especially in non-state entities like occupied territories. The dominant faction having most to gain will negotiate while those excluded may resort to violence, particularly once it is clear negotiations have failed. Therefore, continued absence of sovereignty is likely to fuel violence not just to pressure withdrawal but also to differentiate one's party domestically and carve out a space in the contested non-state entity. Like Bloom, Pearlman does not directly address Israel's strategic interests, but one interpretation is that continued violence is a reaction to, not a roadblock toward the implementation of, Israel's strategic interests in the territories.

Abrahams (2019) presents a qualitative discussion of principal-agent problems to analyze recent developments in the relationship between Israel (principal) and the Palestinian Authority (agent), seen as the moderate faction. He argues that security efforts by the PA have been met with financial rewards, not sovereignty, by Israel. Between 2007-2013, the PA under Prime Minister Fayyad cracked down extensively on militant factions, with one IDF general remarking that Israel and the PA 'are close to the ceiling of security cooperation' (19). Fayyad presented this to the Palestinian people as a necessary compromise for sovereignty, but, eventually, his inability to deliver on the sovereignty promise led to popular backlash and his ejection. Abrahams observes that the post-Fayyad government has continued to comply with Israel's security platform without any serious prospect for a sovereign state, and in exchange for private benefits (recognition and funding), but has avoided Fayyad's predicament by increasingly using repression instead of political legitimacy to rule.

Among this group of papers, Schiff (2012) provides perhaps the clearest criticism of the assumption that Israel has been interested in withdrawing from some or all of the territories but prevented by unending violence. Drawing on negotiation theory and on publicly documented discourse within Israel's Knesset (parliament) and between the Israeli government and the public in 1992-1995, Schiff argues there was never a real plan to withdraw to 1967 borders and to allow a sovereign Palestinian state to emerge, and rather that the Accords were a tactic in continuing conflict management for Israel. By contrast, the Palestinians supposed, or hoped, that the interim agreement was paving the way for statehood by providing the agenda and suggested timeframes. Schiff argues that despite the fundamental incongruence of long-term interests, the signing of the Accords was facilitated technically by some of the ambiguous language and driven strategically by the desire of Rabin and Arafat to score points externally and domestically.<sup>2</sup>

Two exceptions to the non-formal methodology in this group of papers are Baliga and Sjostrom (2012) and Konyukhovskiy and Grigoriadis (2019). Baliga and Sjostrom (2012) use a game with incomplete information to model the conflict as one where the two sides would have reached a resolution but were prevented from doing so by the provocative actions of extremists. They point specifically to the actions of Israeli Prime Minister Sharon, whose visit to East Jerusalem in September 2000 helped spark the second Intifada, as an example

<sup>&</sup>lt;sup>2</sup>Schiff (2012) argues Rabin hoped that peace talks would lead to a breakthrough in the normalization of Israel's relationship with the Arab bloc headed by Syria. For Arafat, the recognition of the PLO as the sole representative of Palestinian people and the creation of the Palestinian Authority gave the PLO both representation powers and funding; domestically, Arafat could present 'some achievement that would be considered a breakthrough on the road to a Palestinian state' (82).

of extremist provocation, suggesting that in the absence of such provocation a solution could have been possible. However, core Israeli strategic interests are still implicitly framed within the land for peace paradigm and with more hawkish tendencies modeled as a fringe aberration, making this a relatively nominal departure from the literature that assumes Israel is interested in land for peace.

Konyukhovskiy and Grigoriadis (2019) model the conflict as constituting a proxy war for global parties. The proxy relationship is analyzed within a principal-agent setup, with the United States acting as principal for Israel and (up to the 1980s) the Soviet Union for the Palestinians. The authors do not rely on the land for peace paradigm to model either party's strategic interests, suggesting instead that both parties benefit from an aggression parameter but want to reduce the cost they pay for escalation from this aggression. In the model, a balanced bilateral proxy war can lead to a stable resolution of the conflict; the authors argue that the deterioration of viable proxies for Palestinians, and consolidation of the US-Israel alliance, have therefore worsened the conflict. Despite its insight into the role of superpowers, however, the paper does not offer an in-depth analysis of Israeli or Palestinian strategic interests, taking them as a given while focusing on the role of third parties.

### 3 Strategic interests reexamined

As shown above, the majority of the formal economics literature on strategic behavior in Israel-Palestine assumes that Israel is interested in relinquishing its control over the occupied territories in exchange for peace but obstructed by Palestinian violence that has other objectives. Another group of papers uses game theoretic principles more informally, and with reference to historical context, to suggest alternative reasons, predominantly incongruent claims over the land, for the failure of a solution. However, papers in the latter group sometimes lack an explicit and systematic analysis especially of Israeli interests, and often focus on short time periods.

This section argues that settlement policy demonstrates systematically that Israel is interested in expanding its control over the occupied territories as a top national priority. Settlements are very costly investments, making them a more credible arbiter of strategic interests than potential cheap talk like proclamations or signed agreements, which are less costly to send and more easily reversible. Therefore, because settlements in the occupied territories make Israeli withdrawal extremely difficult, it is highly instructive to examine Israel's strategic interest in these territories by examining settlement policy since 1967.

In this section I show, through a historical overview, that settlement policies have been consistent across different Israeli governments, suggesting the presence of a national consensus around the strategic value of the occupied territories, and that such policies have been largely unperturbed by acts of Palestinian violence or lack thereof. I also briefly address how Israeli demands for security can be understood in this context. This then sets the stage for discussing concretely, in the next section, how such 'alternative' assumptions change strategic behavior analysis of the conflict.

### 3.1 Settlement policy since 1967

Israel began to settle members of its population in the Palestinian territories as soon as it occupied them in 1967. Under the direction of the left-leaning Labor party, and within weeks of winning the June 1967 war, the government demolished 160 Palestinian houses in East Jerusalem and appropriated 600 buildings so they can be rebuilt for Israelis (UN CEIRPP 1982). In July of that year, defense minister Yigal Allon presented the Allon Plan to the Prime Minister, the basic outline of which was that Israel would annex the Jerusalem corridor, retain control over the western component of the West Bank, and create separate and noncontinuous enclaves for Palestinians in the region connected by specific roads (Allon 1967).

Settlement drives intensified over the next ten years under Labor rule, reaching 90 settlements populated by 10,000 settlers by 1977. There was also active planning for the road, electricity, and water networks among settlements, and discussion of future plans for highways that can link existing settlements and facilitate the rise of new ones. During that time, Prime Minister Yitzhak Rabin, who would later be reelected in the 1990s and sign the Oslo Accords, declared that settlements increase Israel's security and that it is important to 'renew, expand [the settlements]' and 'establish defensible borders for the State of Israel' by bolstering settlements along the Jordanian border, in Jerusalem and Hebron, and south of the Gaza Strip (U.S. Congress Committee on International Relations 1977, 14).

There was little question of the extent of the government's involvement in settlement expansion. The Israeli government had allocated 400 million US dollars to settlements over that ten-year period, a sum equivalent to about 2.3% of its yearly GDP. This included direct subsidies to encourage settlers to transfer to the occupied territories through the use of tax exemptions, inexpensive loans, and material assistance with water, electricity, and phone services and with transportation facilities (UN CEIRPP 1982). The Ministry of Agriculture also dedicated a growing portion of its budget to settlements, as did the Ministry of Housing for the construction of new building units in new settlements (National Lawyers Guild 1978).

The more right-wing Likud won elections in 1977 on the platform that the territories are part of the historic Land of Israel and that 'no part should [...] be handed over to foreign rule' (Israel Ministry of Foreign Affairs 1977), and elaborated on the settlement policy initiated by its Labor predecessor. Ariel Sharon, then minister of agriculture who would become Prime Minister in 2001, put forth a plan for an extension of Jewish settlements, partially based on the Allon Plan, that was approved by the government in October 1977. The plan suggested establishing settlement urban areas in the western part of the West Bank, extending Jewish settlements in the eastern part, building roads connecting these eastern and western settlements, and encircling Jerusalem with a 'belt' of settlements (ECF 1977). Sharon's long-term vision was that the settlements would reach two million settlers by the year 2000 and would constitute a second axis of Jewish population parallel to the coastal one in Israel proper (U.S. Congress Committee on the Judiciary 1978, 11).

During that period, while the Labor party supported handing over populated centers in the occupied territories to Jordan, 'its position on the existing Jewish settlements was much less clear cut: it never declared that these should be removed for peace' and there was approval in its political bureau of trade union participation in building settlement infrastructure (Demant 1983).

Though in 1978 Israel had signed the Camp David Accords with Egypt which stipulated that Israel would grant occupied Palestinians autonomy after five years, domestically Israeli policymakers were frank that autonomy could only mean limited population self-rule, not territorial sovereignty, and that settlement policy was strategically meant to prevent the rise of a Palestinian state. Matityahu Drobles, an appointee of Prime Minister Begin, head of the Settlement Division in the World Zionist Organization, and author of the influential Drobles Plan for settlement expansion (adopted by the government), wrote in 1980 stating clearly that the creation of settlements is a 'race against time' intended to 'create facts on the ground' to prevent withdrawal from the occupied territories (UN CEIRPP 1982). A year later, in 1981, Prime Minister Begin himself publicly swore that he would never give up 'Judea and Samaria' (Demantt 1983).<sup>3</sup>

The Likud government was reelected in 1981 and escalated its settlement construction endeavors, including in response to a plan by Ronald Reagan in 1982 to freeze settlements. Although Reagan, in defiance of the UN and Geneva Conventions, suggested settlements were not illegal and only pushed for granting Palestinians self-rule without a sovereign state, his call to freeze settlements was unanimously rejected by Israel's cabinet. The cabinet declared that 'settlement is a Jewish inalienable right and an integral part of our national security' and emphasized that prior agreements like Camp David were about 'autonomy to inhabitants not territory' (Shipler 1982). Immediately after the Reagan plan was announced, Israel established new settlements, and there were discussions about increasing the number of settlers from 30,000 to 100,000 by 1986 to form a bloc 'strong enough to block any significant territorial concession' (Demant 1983).

With the first Intifada and growing organization of Palestinian protesters, a united Likud-Labor government proposed a 'peace initiative' in 1989 which stated that 'Israel yearns for peace [...] by means of direct negotiations based on the principles of the Camp David Accords [...but] Israel opposes the establishment of a Palestinian state in the Gaza district and in the

<sup>&</sup>lt;sup>3</sup>'Judea' and 'Samaria' are biblical terms for the West Bank meant to popularize the notion that they are inherently Jewish and part of the greater Land of Israel.

area between Israel and Jordan' (emphasis mine) (ECF 1989, 1). The plan also opposed any negotiations with the PLO, and, like Camp David, proposed a five-year interim period during which Israel would 'accord Palestinian inhabitants self-rule by means of which they will conduct their affairs of daily life [while] Israel will continue to be responsible for security, foreign affairs, and all matters concerning Israeli citizens [in the occupied territories]' (3). After five years, permanent status negotiations would aim to achieve 'a permanent solution acceptable to the negotiating parties' and arrange for 'peace between Israel and Jordan', with explicit refusal of Palestinian statehood (2).

In 1993, the Labor government under Yitzhak Rabin signed the Oslo Accords which were negotiated directly with the PLO and where refusal of Palestinian statehood was not explicit, but domestically Rabin made it very clear that Israel was still fundamentally opposed to Palestinian statehood and to withdrawal from or even freezing of settlements. In a speech to the Knesset in October 1995, Rabin outlined the desired permanent solution as the state of Israel 'alongside a Palestinian entity which will be a home to most of the Palestinian residents living in the Gaza Strip and West Bank [...] We would like this to an entity which is less than a state [...] The borders of the state of Israel, during the permanent solution, will be beyond the lines which existed before the [1967] War. We will not return to the 1967 lines.' (emphasis mine) (Rabin, 1995) He emphasized that 'we committed ourselves before the Knesset not to uproot a single settlement in the framework of the interim agreement and not to hinder building for natural growth' and that, in the permanent agreement, his government envisions a 'united Jerusalem' as well as 'the establishment of blocs of settlements in Judea and Samaria.' (ibid)

These were not empty words. In the first three years of the Oslo peace process, instead of withdrawing, Israel actually expanded the number of settlers from about 250,000 at the beginning of 1993 to 305,000 by 1996, not just through 'natural growth' but also the construction of new settlements.

Since 1996 the Israeli government has alternated between Likud and more centrist factions, but settlement growth has remained strong, with the number of settlers reaching an estimated 655,000 by 2018 and with growth post-2000 largely driven by settlements in the West Bank. Though Prime Minister Sharon unilaterally pulled the 8,000 settlers out of Gaza in 2005 after the second Intifada, this disengagement was simultaneous with an even bigger expansion of West Bank and East Jerusalem settlements; therefore, it was not part of a larger withdrawal plan. Rather, the Gaza Strip was seen as an extremely high-density region (over 2 million Palestinians in only 40 km squared by 2005) such that the demographic threat from annexing it outweighed any territorial advantages. The plan also indefinitely maintained complete military control over the Strip, with the Israeli army deployed on the borders of the Gaza Strip, controlling its airspace, and patrolling its coast.

Most recently, under the auspices of the Trump administration, Israel has entered into mutual-benefit 'peace' deals with various Arab governments, with no conditions relating to withdrawals from the occupied Palestinian territories (or any territories). In fact, Israel's settlement approvals had hit record highs in 2020 relative to the decade prior (Peace Now 2020), while the new year 2021 was ushered with the Israeli government issuing 2,500 new tenders for settlement homes on the eve of Biden's inauguration in the US (Aljazeera English, January 20, 2021). By 2021, there were an estimated 700,000 settlers in the West Bank and East Jerusalem, representing about 23% of the total population in the area, up from about 250,000 settlers at the beginning of the Oslo peace process (JVL 2021). All signs point to the materialization of the annexation vision verbalized in 2020 by Prime Minister Netenyahu and greenlit by former US Secretary of State Pompeo (Aljazeera English, April 22, 2021).

At this juncture, by the very permanence of settlements, it is very difficult to justify settlement growth as a tactical response to Palestinian violence which still makes room for a two-state solution should violence desist. If Israel is interested in Palestinian commitment to a land for peace solution and needs to use a strategy to ensure that such commitment is forthcoming, it would not be logical to use a strategy which makes this commitment impossible to begin with.

Figure 1 demonstrates the growth in the settler population from 1967 to 2020; B'Tselem (2019a) estimates that 60% of growth comes not from 'natural' expansion but new settler

families. Geographically, the jurisdiction of the regional councils of the settlements currently extends to 40% of the total area of the West Bank (B'Tselem 2019b).



Territory - EJ - GS - Total - WB

Figure 1: Settler growth in the occupied Palestinian Territories, 1967–2020.

Figure 1 shows the number of Israeli settlers in the West Bank, East Jerusalem, and Gaza, as well as the total over all territories, from 1967 to 2020. The solid line represents settlers in the West Bank. The dot-dashed line intersecting it just before the year 2000 represents settlers in East Jerusalem. The dotted line at the bottom represents settlers in the Gaza Strip (until 2005). The dashed line on top is the sum of settlers in all the occupied territories. Source: Author's construction from B'Tselem settlement statistics, Foundation for Middle East Peace settlement population, and Peace Now settlement watch data. Missing data 1968–1971 and 1973–1975 imputed from trends.

To emphasize that this trend of settler expansion is secular of Palestinian violence and nonviolence, **Figure 2** plots the number of Israelis killed by Palestinians (Israeli fatalities) per year from 1987-2019, the period for which data is available, showing the absence of plausible correlation between the two trends. For perspective on the asymmetric coercive power of the two parties, it also plots the number of Palestinians killed by Israeli security forces (Palestinian fatalities) per year during that period.



Fatality - Israeli - Palestinian

Figure 2: Israeli and Palestinian fatalities, 1987-2019.

Figure 2 shows the number of Israeli and Palestinian fatalities per year from 1987 to 2019. The solid line represents Israelis killed per year, while the dashed line represents Palestinians killed per year. Source: Author's construction from B'Tselem fatalities statistics.

### 3.2 The security discourse

In using the above assessment of strategic behavior, it is useful to address the possible critique that Israeli interest in controlling the occupied territories, albeit demonstrable, may not be rational at all because it compromises Israel's security, and hence difficult to justify in any framework that assumes semi-rational actors. This is usually based on the idea that retaining control over the occupied territories (i) diminishes Israel's security in a physical sense by inviting continued attrition type of violence, and more importantly (ii) diminishes its security in a demographic sense by compromising the Jewish majority in the land under its control. In fact, these considerations are what drive much of the formal literature to assume at face value that Israel is committed to withdrawing to achieve its security, both physically and demographically.

The issue of physical security has been partly addressed by some of the above literature. Given the huge asymmetry of power between Israel and the Palestinians and the internal divisions between Palestinian factions, Palestinian violence to pressure Israel to withdraw appears to be a weakly coercive strategy which has become even weaker in recent years, as Israel has successfully outsourced much of its security operations to the Palestinian Authority post-Oslo in exchange for financial resources, but not sovereignty. As shown in **Figure 2**, with exception of second Intifada, Israel has been able to keep a very tight grip on security concerns, through the cooperation of the PA and through escalating attacks on noncooperating Palestinians.<sup>4</sup> The latter can be understood as part of a 'peace for peace' strategy in which Israel 'instead of buying peace by creating a viable Palestinian state, buys peace by moving out of densely populated Palestinian areas and convincing the Palestinians that if they are aggressive they can become the target of hugely asymmetric attacks' (Khan 2009, 17).

To sum, it appears that Israel's vastly superior military strength and its security cooperation with the PA allow it to suppress Palestinian attrition violence without needing to satisfy its demands for a state.

<sup>&</sup>lt;sup>4</sup>See for example the attacks on the Gaza Strip in 2009 and 2014.

The second argument around demographics is trickier but necessary to address, especially since Israeli leaders have in their internal discourse emphasized that expanding settlements increases the security of the Jewish Israeli national project. Why is this so? Only a deeper dive into Israeli politics, beyond the scope of this paper, can answer this question fully. However, one possible explanation put forth by Khan (2005) is that, beside wanting to retain a Jewish majority, Israel is equally or even more concerned about maintaining preferential rights for the Jewish demographic whether in a majority or not.

While giving Palestinians in the occupied territories sovereignty alleviates the majority concern, it is not clear that it alleviates the preferential rights concern and may even make it worse. This would be the case if sovereignty in the occupied territories emboldens the Palestinian citizens of Israel, who constitute 20% of Israel's population, to demand equal rights which they currently do not have (see Adalah Discriminatory Laws Database 2017) and/or if it emboldens Palestinian refugees to demand their right, by international law, to return to their homelands in Israel proper. Unless Israel can force Palestinians within Israel and in the Diaspora to accept transfers to the occupied territories, which is very unlikely, then granting sovereignty to the Palestinians in the territories does not guarantee 'demographic security' for Israel and may even exacerbate the problem for it.

Understood this way, Israel's strategic interest in expanding control over the occupied territories is not orthogonal to its security concerns. Furthermore, while Israel's precondition of security is superficially understood to mean only the (very sensible) demand that it not suffer from physical violence and hence a resolvable precondition for withdrawal, it may more importantly signal very sensitive - and less internationally acceptable - concerns which are irreconcilable with withdrawal and with Palestinian sovereignty, and where Israel's 'Palestine problem' has no permanent solution and must be perennially contained. In this case, the notion that Israel's security is undermined by Palestinian statehood rings both true and, from a human rights perspective, alarming.

### 4 Strategic interests remodeled

To bring into sharp focus how the analysis can change when key assumptions are altered, I provide an example of an alternative assessment of strategic interests, along the lines discussed in Section 3, integrated into a game. I do this by applying a noncooperative bargaining model whose assumptions, I argue, fit more closely with that historical assessment. As emphasized earlier, this is a highly abstracted process that cannot offer complete insight into the conflict or the absence of peace, even if such a thing were possible. But it is useful in examining the strategic behavior modelling approach on its own terms, and in bringing the question of strategic interest in the land and its role in the endurance of the conflict into sharp focus.

#### 4.1 Setup

If Israel is strategically interested in control over the occupied territories and since Palestinians want sovereignty over these territories, then a noncooperative bargaining model is one example of an appropriate representation of the conflict, since a key feature of noncooperative bargaining is that the parties have orthogonal interests over a specific object: each wants to maximize its share at the expense of the other. They attempt to bargain with one another by one player offering a specific division and seeing if the other agrees, and so on over potentially infinite periods.

In most bargaining models there is also an outside option available, so that a player could exit the game and attempt to impose a division some other way. However, exiting the game is costly to both parties and so in equilibrium, an agreed upon division is reached within the bargain. The party with the better outside option has stronger bargaining power and obtains a larger share of the pie, without actually exiting the game.

Since the outside option determines bargaining power and the equilibrium outcome, a crucial point in the noncooperative bargaining literature relates to *what* constitutes and determines the outside option. The literature on bargaining between states or political entities usually assumes the outside option is an all-out war where one side swiftly wipes out the other, and that each party's strength is determined by the probability p that it wins such a war

and the cost c it pays to wage a war. A player is more powerful the greater its probability of winning an exit war, and the lower the cost it would have in waging it, and can therefore successfully demand a greater share of the pie simply by using the threat of the exit option. (Powell 2002, 2006)

In most models the probability of winning and the costs are exogenous to the model, but Fearon (1997) makes the probability of winning endogenous to the share of the object held in the previous period. For example, if State 1's share is  $x_t$  at time t, then  $p_{t+1} = f(x_t)$  where f' > 0. The idea is that the object not only yields utility today but helps improve bargaining power and therefore improves one's ability to obtain more of it tomorrow. Therefore, it is a strategically important asset.

I apply a slightly modified version of this model to Israel-Palestine and argue that it is one example of a helpful formal representation of the conflict. Therefore, I am assuming not only that both parties want to maximize their share of the occupied territories (defended in Section 3) but also that the occupied territories are a source of future bargaining power. The positive effect of more land on the probability of winning a war can operate through having more military bases, a localized supportive population (in the case of Israel, the settlers, who are also heavily armed), and potentially a more expansive intelligence network. In fact, the very placement of settlement on the hilltops has been argued to serve a security and intelligence function for Israel (Weizman 2007).

I add to Fearon's model to include a second channel in which the object can be strategic: by reducing the cost of waging a war. Therefore,  $c_{1,t+1} = c_1(x_t)$  where  $c'_1 < 0$ , and  $c_{2,t+1} = c_2(x_t)$  where  $c'_2 > 0$ : a player's future cost of waging war declines with its own land share and increases with the other's land share. In the case of territorial disputes, this can operate through the generation of economies and geographies of scale in the use of military technology. It can also operate through reducing the cost of suffering international consequences due to belligerency, if major world powers side with or provide immunity to the party that more successfully acquires land should a war break out, given that its territorial advantages and strengths make it a more desirable ally. There is evidence that both cost channels are relevant to Israel-Palestine; see **Appendix A** for a discussion of this and of the relationship between territorial strength and bargaining power more generally in this context.

Finally, to reflect the asymmetric bargaining power between Israel and the Palestinians, I use, as in Fearon (1997), a take-it-or-leave-it bargaining protocol whereby only one of the two parties is in a position to make offers every time period. The other party can either accept or resort to its exit option. In this context, this would be Israel and the Palestinians respectively. The Palestinians are under Israel's military occupation, the ultimate form of asymmetric bargaining power, and it is unclear how they could seriously 'offer' Israel a land agreement. By contrast, Israel can and does make effective bargains by expanding or removing settlements. Importantly, Palestinian 'acceptance' of a move by Israel does not necessarily imply they are satisfied with it; rather, that due to low bargaining power they prefer to acquiesce over engaging in an all-out, game-ending war with Israel.

The resulting setup is as follows. Assume the amount of land is 1 where the share of State 1 (Israel) is x while the share of State 2 (Palestinians) is 1 - x. Each party's utility increases with its own share; using a simple linear utility function provides  $u_{1t} = x_t$  and  $u_{2t} = 1 - x_t$ , where  $u_{Nt}$  is the utility of player N at time t. Utilities are discounted by a discount factor  $\delta$  every period.

Starting from an exogenous initial division  $(x_0, 1 - x_0)$ , S1 makes an offer  $x_1$  to S2 at  $t_1$ . There are two possibilities. First, if S2 accepts, the period ends with a division  $(x_1, 1 - x_1)$  with commensurate utilities. S1 will make another offer  $x_2$  in the next period, and the resultant payoffs are discounted by  $\delta$ . Second, if S2 rejects, it will end the game by using its outside option. For S1, this means receiving the whole pie with probability p and nothing with probability 1 - p, so it expects p(1) + (1 - p)(0) = p. Since war is a game-ending move, it will actually secure this payoff every period, hence p this period,  $\delta p$  next period,  $\delta^2 p$  after that, and so on. Summed to infinity this is  $\frac{p}{(1-\delta)}$ , from which we subtract the cost of fighting  $c_1$ . Therefore, S1's expected total lifetime utility from this exit at time  $t_1$  is  $\frac{p(x_0)}{(1-\delta)-c_1(x_0)}$ . Similarly, the expected utility from this exit for S2 is  $\frac{1-p(x_0)}{(1-\delta)-c_2(x_0)}$ . Subsequent exit payoffs are discounted appropriately. Figure 3 demonstrates the resultant bargaining tree, with the payoffs in brackets for S1 and S2 respectively, for the first three periods of this game.



Figure 3: Bargaining game tree

Figure 3 illustrates the first three periods of the infinite-time noncooperative bargaining game.

#### 4.2 Results

The following proposition summarizes the main result of this game.

**Proposition 1.** Playing the game results in an equilibrium appeasement condition in which S2 'appeases' S1 by accepting the offered  $(x_t, 1 - x_t)$  distribution each period. This is because S1 offers the  $(x_t, 1 - x_t)$  every period which meets S2's point of indifference between accepting the offer and entering into an all-out war. The share that generates appeasement every period is a function of the current and previous land distribution, the discount factor, and the endogenous parameters around probability of winning a war and the cost of a war.

*Proof.* See Appendix B.

As shown in **Appendix B**, the appearement condition is as follows:

$$(1 - x_t) + \delta \left( \frac{1 - p(x_t)}{1 - \delta} - c_2(x_t) \right) = \frac{1 - p(x_{t-1})}{1 - \delta} - c_2(x_{t-1}) \tag{1}$$

In the game, S1 offers  $(x_t, 1-x_t)$  distributions each period according to Equation (1), knowing it will meet S2's point of indifferent acquiescence, and S2 will accept the division every period.

Equation (1) is a first difference equation and can be re-expressed in terms of  $x_t$  as a function of  $x_{t-1}$ ; when functional forms for the endogenous bargaining power parameters are imposed, this difference equation can be solved explicitly for the equilibrium time path. For simplicity I impose linear functions, so that  $p(x_t) = \beta x_t + \frac{1}{2}(1-\beta)$  and  $c_2(x_t) = \phi x_t + c_2$ .<sup>5</sup> The sign restrictions are  $\beta > 0$ , since the probability of winning for S1 increases with its share, and  $\phi > 0$ , since the cost for S2 increases with S1's share. Substituting the linear expressions in Equation (1) and rearranging with  $x_t$  on the left-hand side yields the following first difference equation:

$$x_{t} = \frac{\beta + (1 - \delta)\phi}{\delta\beta + (1 - \delta)(1_{\delta}\phi)} x_{t-1} + \frac{(1 - \delta)^{2}c_{2} + 0.5(1 - \beta)(1 - \delta)}{\delta\beta + (1 - \delta)(1 + \delta\phi)}$$
(2)

We can solve for an equilibrium, if it exists, by setting  $x_t = x_{t-1} = x^*$ . But for the purposes of this paper a more pertinent question concerns the stability of equilibrium. If the parties start at an exogenous division  $x_0 \neq x^*$ , do they move toward  $x^*$  and remain there, or do they move away? Within the context of Israel-Palestine, these can be understood respectively as (i) some form of stable two state solution versus (ii) an ongoing expansion by one state at the expense of the other until one is eliminated. Importantly, both scenarios would occur in equilibrium in the game, but with differences in dynamic stability and convergence toward or divergence from  $(x^*, 1 - x^*)$ . The next proposition addresses this question.

<sup>&</sup>lt;sup>5</sup>The form for the probability function guarantees that p(1/2) = 1/2, so that whomever has half the land has half the probability of winning. The parameter  $\beta$  affects the slope around this midpoint, i.e. whether a small increase (decrease) raises (lowers) the probability of winning to a small or large extent.

**Proposition 2.** Any division of offers is stable if and only if  $\beta + (1 - \delta)\phi < 1$ . The more important the asset is to future bargaining power, the more likely it is that this condition is violated, and therefore that the outcome is a moving equilibrium where one state increasingly dominates.

*Proof.* The first difference equation is stable, in that share offers converge to the equilibrium  $(x^*, 1 - x^*)$  over time, if and only if the coefficient on the lagged endogenous land share  $\frac{\beta + (1-\delta)\phi}{\delta\beta + (1-\delta)(1+\delta\phi)} < 1$ . This will only be the case when  $\beta + (1-\delta)\phi < 1$ .

As with any unstable equilibrium, the direction of divergence depends on the initial conditions relative to equilibrium. Therefore, if the stability condition  $\beta + (1 - \delta)\phi < 1$  is violated, then beginning with a more favorable scenario for S1,  $x_0 > x^*$ , will generate  $x_0 < x_1 < x_2 < x_3$  and so on until  $x_t \to 1$  as  $t \to \infty$ . By contrast, a more favorable initial point for S2,  $x_0 < x^*$ , will lead to growing movement down from  $x^*$  and hence compounding concessions by S1 to S2.

The stability condition is illustrated in **Figure 4**. The x-axis is  $\phi$ , the degree to which land affects bargaining power via cost of war (for S2), and the y-axis is  $\beta$ , the degree to which land affects bargaining power via probability of winning a war (for S1). The greater these parameters, the greater is the extent to which land affects future bargaining power and is therefore a strategically important asset. More specifically, at all values of  $\beta > 1$ , the stability condition is violated, since  $1 + (1 - \delta)\phi \ge 1$ . Similarly, at all values of  $\phi > \frac{1}{1-\delta}$  the stability condition is also violated, since  $\beta + 1 \ge 1$ ; these values define the y-intercept and the x-intercept of the Figure, respectively. The line connecting them has a slope of  $-\frac{1}{1-\delta}$ . Any point under the line such as point O falls within the stability condition, such that the game converges toward constant land shares  $(x^*, 1 - x^*)$ . By contrast, any point above such as N generates the increasing dominance of one party, with the dominant party being determined by the initial positions  $(x_0, 1 - x_0)$  relative to the equilibrium.



Figure 4: The instability condition

Figure 4 captures the model's implications about equilibrium (in)stability. Combinations of  $\beta$  and  $\phi$  below the line, such as O, indicate a low-level strategic object and ensure that the system is stable and offers converge toward an intertemporal equilibrium if one exists. Combinations above the line, such as N, imply a highly strategic object; the system is unstable and offers diverge if the initial starting point is not at equilibrium.

To be clear, the model is informative precisely because gradual expansion as would be generated at point N is not a guaranteed outcome of the model. Rather, it is only a possibility, depending on the degree to which the asset is strategic for future bargaining power.

### 4.3 Application and limitations

Piece-wise strengthening expansion is a roughly accurate description of Israel's expansionary settler policies in the occupied territories since 1967, illustrated in **Figure 1**, which are orthogonal to the land for peace paradigm. The above application of a noncooperative bargaining model illustrates how such a situation can arise when both parties are interested in the land and when it is highly strategic for them. Under these conditions one state can grow bigger over time by gradually making land grabs (better 'offers' for itself) that its opponent acquiesces to as the latter becomes increasingly weaker.<sup>6</sup> Acquiescence by the latter reflects not contentment with this situation but rather the inability to effectively resist it.

As described in Section 3, the suitability of these conditions to Israel-Palestine is informed principally by historical evidence, not by arbitrary theoretical exercise. Nevertheless, that the outcomes from integrating these conditions into a game roughly matches long-run trends on the ground emphasizes the value of this historical record for explaining, strategically, the ongoing deterioration of the situation, at least for the Palestinians. Whereas in the games reviewed in Section 2 the absence of a solution is contrary to the strategic interests of the militarily dominant party, here it is aligned with them. No solution, or in fact deteriorating prospects for one, emerges as the natural result of incongruent demands over highly strategic territory. The implication for peace policy is also nontrivial: so long as peace accords around land for peace rely on self-interested enforcement by the parties involved, and barring a shift in how the Israeli state views the occupied territories in relation to its long-term strategic interests, peace accords are likely to continue to fail.<sup>7</sup>

The application of this model to Israel-Palestine is useful only to the extent that the tenants and limitations of this application are also clearly outlined. First, I take the land split (x, 1 - x) to reflect effective control through settled territory, not simply military control. Otherwise, if x is meant to signify only strict military control, then at 1967 Israel's share of the land would have been the whole pie, and the Oslo Accords, for example, would seem a concession in giving Palestinians some administrative control over their territories. However, it is unclear the extent to which some Palestinian administrative autonomy over population centers is orthogonal to Israeli control over the territories, especially as Israel continues to

<sup>&</sup>lt;sup>6</sup>This is the 'salami tactics' approach to expansion, originally discussed by Thomas Schelling in his book Arms and Influence (1966).

<sup>&</sup>lt;sup>7</sup>One can speculate here about the role of the international community (an issue also touched on in Appendix A). The parameter  $c_2' > 0$  may be understood to partly reflect the involvement of the international community in that if a game ending war does breakout, the party losing land faces very high costs of waging the war because it has become weaker alliance-wise over time. If this changes so that the international community aligns itself more strongly with the party losing land, the parameter  $\phi$  in Equation (2) becomes negative, increasingly likelihood of a stable equilibrium; in effect, international states would then work as a balancing force.

control the borders and airspace of these territories, and given that this vision of limited population self-rule with no sovereignty has been repeatedly framed within Israel as compatible with securing and expanding Israel's control over the territories (Section 3) and with settler expansion (see settler growth post-Oslo in **Figure 1**). In contrast, settlements are directly correlated to, and by creating costly facts on the ground also a highly reliable indicator of, the extent to which land-for-peace is (im)possible. It is for this reason that discussions in popular media around the 'death of the two state solution' principally refer to settlement expansion as proof of the moribund fate (e.g. Djerejian, Muasher, and Brown 2018).

Second, the model does not explain Israel's unilateral withdrawal of 8000 settlers from the Gaza Strip in 2005. At face value, this development contradicts the story of Israeli expansionism. However, taking the occupied territories as a whole, this removal of settlers from Gaza was accompanied by a much larger settler expansion in the West Bank and East Jerusalem over the same period, so that the overall trend (growth in x in the model) was more than sufficiently maintained. Withdrawal from Gaza was not part of a larger concessional plan to the Palestinians, while Israeli control over the Strip has remained and taken a strong nonannexationist format (blockade-level border control). Certainly, this differentiated approach to different parts of the territories is outside of the purview of the model. Nonetheless, it emphasizes the strategic concerns which underlie Israeli interest in the territories, in that an extremely small high-density region like the Gaza Strip poses a demographic threat from annexing it which outweighs any territorial advantages from doing so.

Third, the model, in its simplification of two players, brushes over any heterogeneity within Israeli and Palestinian parties. Given the focus on Israeli strategic interests in this paper, a concern is that differences within the Israeli polity are entirely ignored. For the purposes of this paper, however, the issue is not whether or not differences exist within the Israeli state, as they certainly do, but whether they generate a major schism on the issue of settlement expansion versus full and necessarily settler-free sovereignty for the Palestinians over the occupied territories. As described in Section 3, the main impetus across all major Israeli political parties since 1967 has been the retention and expansion of settlements, including by the Labor peace camp, with the main points of contention being around the shape and desirability of limited Palestinian self-rule over population centers. This is not to say that no parties in Israel depart from the annexationist vision (e.g. Meretz) but they remain a minority in the political sphere.<sup>8</sup> For this reason, albeit two unitary players is a massive simplification, it is helpful for highlighting that the strategic interests for Israel and the Palestinians over the occupied territories plausibly coalescence around control and sovereignty, respectively.

Fourth, the modelling abstraction leaves other details wanting when applied to a historically entrenched conflict. One issue is that the full information aspect does not allow us to examine episodes of violence on both sides, which may be understood as signaling mechanisms to showcase strength in an attrition conflict. However, abstracting from such information problems may be helpful; for example, if the second Intifada was a failed attempt by Palestinians to signal strength to Israel, then because that signal was not credible it does not alter the broader dynamic of the conflict. Another issue is that the focus on land does not allow us to examine other types of exchanges between the parties such as security cooperation by the Palestinian Authority in exchange for recognition, funding, and private benefits from Israel, as effected by the Oslo Accords. Still, Oslo may be understood as an outside factor that increased the exogenous cost  $c_2$  to the Palestinians of entering an all-out war with Israel, due to the PA's role in crushing armed movements (Abrahams 2020); therefore, non-land exchanges can be understood through their effect on the ultimate bargaining power dynamic.<sup>9</sup>

Finally, as explained in the introduction, the purpose is not to suggest that Israel's strategic interests are the *only* impediment to peace. Rather, it is that if Israel views the occupied

<sup>&</sup>lt;sup>8</sup>Also for this reason, a game in which there is a 'moderate' versus 'annexationist' faction within Israel would do more to obscure the degree of consensus around this key issue than to clarify it. It would obfuscate what are essentially differences over the desire for limited Palestinian autonomy, as differences over the desire for land-for-peace and for full sovereignty for Palestinians.

<sup>&</sup>lt;sup>9</sup>Another more technical limitation of the application of the model to Israel-Palestine is that continuous divisibility of the land is necessary to assume to generate similar results (Fearon 1997). Such continuous divisibility is not a perfect descriptor of the situation especially in East Jerusalem. However, it is a good approximation of at least the situation in the West Bank, where Israel has gradually expanded without major barriers except in the (geographically small) Palestinian population centers.

territories as integral to its future standing and its political project, which I argue is historically plausible, then that alone is sufficient to result in growing Israeli expansion over the land and to derail any peace initiative.

### 5 Conclusion

The conflict in Israel-Palestine is one of the most protracted of the contemporary period, with past mediation efforts repeatedly failing in producing a two-state solution, seen internationally as the legally just and feasible resolution. Several papers have applied the logic of interdependent strategic interaction, through game theory, to this conflict in an effort to understand the failure of peace initiatives in a methodical way which does not resort to concepts of irrationality or zealotry.

This paper reviews these applications of strategic behavior theory to Israel-Palestine, and shows that the relevant formal scholarship has been reliant on the assumption that Israel is prepared to withdraw from the occupied territories pending resolvable security concerns. In this 'land for peace' paradigm, Israel is obstructed from fulfilling its withdrawal plans by Palestinians whose strategic interests and actions are irreconcilable with this vision. Most papers offering an alternative assessment do not offer a formal framework, making comparisons with the formal literature difficult, and they sometimes lack a systematic assessment of Israeli strategic interests.

The paper then reassesses this assumption on which most formal models are based, using a systematic overview of Israel's settlement policy since 1967, and argues that Israel has in fact viewed the territories as important for its future and as a top national priority under all circumstances. It outlines an adapted model which formalizes this assumption, and shows that, if the land is highly strategic for the Israeli state, it is possible that Israel will continue to expand in the territories, undermining any land for peace deal. This is not to argue that such strategic interests are the only impediment to a deal, but to demonstrate that if they are historically plausible as I argue, then they are sufficient in thwarting such a deal, regardless of what Palestinians choose to do. The prognosis offered in this paper has important implications for peace initiatives in the region. Contracts which rely on voluntary enforcement by the parties involved must have incentives aligned with the interests of these parties, and peace resolutions are no exception. Resolutions like the Oslo Accords, albeit sponsored by global powers, do not have a supranational enforcement mechanism. Therefore, they are only likely to succeed to the extent that they reflect underlying strategic interests of Israel and of the Palestinians.

The analysis suggests that, barring a major shift in existing strategic interests, resolutions like the Oslo Accords based on the proposition of land for peace will fail by design, and not necessarily because, as assumed in much of the literature, Palestinians use violence as a dominant strategy. If accurate, then not only is a different paradigm for peace in the region, and for how to achieve it, necessary, but also Israel's strategic interests in the land must be considered centrally when formulating such a paradigm and when anticipating what the future will look like.

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# APPENDIX

### A Israel's bargaining power

The model, applied to Israel-Palestine and if the outcome is an unstable equilibrium, suggests that a virtuous cycle exists between Israel's territorial expansion and between its military bargaining power vis-a-vis the Palestinians, represented in the (rising) probability of Israel winning an all-out war and (falling) costs to it of such a war. **Figure 1** establishes the trend of increased territorial expansion for Israel vis-a-vis the Palestinians. To complete the argument, it must be that (i) Israel's military bargaining power in those terms has also increased over time, and that it (ii) exhibits a virtuous loop with territorial expansion, being boosted at least in part by it, and boosting it in turn.

Assessing these empirically is challenging. Regarding the first point, the exit option of an all-out war in the model - through which bargaining power actuates into probabilities of winning and costs of warfare - is not resorted to, leaving it an open question how to precisely measure these probabilities and cost functions for empirical testing. Regarding the second point, even if measurement were not a challenge, assessing empirically the argument that Israel's territorial expansion and bargaining power reinforce each other runs into the problem that by definition both trends are endogenous to one other; one would need credible exogenous shifters of each in to quantify the causal components of this relationship.

Although tackling these challenges in a rigorous way is beyond the scope of this paper, it is still possible and useful to give some (descriptive) backing to the above assumptions. Below, I point to evidence, for the Israeli side, of proxies for growing military strength, lower potential costs of warfare, and increased international military support. Even as the outside option is not exercised, these can point to an enhanced position for Israel in terms of the *threat* of outside option, which is how the model defines greater bargaining power. Similar calculations are not feasible for Palestinians who do not have a military, but it is not far-fetched that the prospects for Palestinians in a game-ending war with Israel are extremely bleak. As I discuss below, there is some evidence that these trends reflecting increased bargaining power have worked in mutually reinforcing fashion with the trend of territorial expansion.

Military strength. Israel's growing military prowess over the course of the occupation may be most evident in the evolution of its standing as an arms exporter, to become what is now the eighth largest, and first largest per-capita, arms exporter in the world (Wezeman, Kuimova, and Wezeman 2021). As calculated by the Stockholm International Peace Research Institute (SIPRI), Israel's arms exports have increased an average of 30% per year in nominal terms of a common 'Trend Indicator Value' from 1967 to 2016, with exports to 40 countries and with an edge in asymmetric warfare technology and in air defense systems. For perspective, the largest Arab country and military in the region, Egypt, currently exports less than 1% of the value of Israeli arms exports. (SIPRI Arms Transfers Database 2021)

The development of Israel's military into a global power is intricately tied to the nation's ambitions for territorial expansion and control. The development of light weapons predated the creation of the Israeli state, in the 1930s, and was used to help Jewish nationalist militias take over land in then-British mandate Palestine (Rubin 2017). The Israeli arms industry's growth since then has been motivated by the desire to achieve and defend its territorial ambitions, especially in the face of early arms embargoes from nations such as France in the 1960s and which signaled the need in Israel for self-reliant arms development. The domestic industry is currently the prime source, in addition to U.S. aid, of weaponry to the IDF.

Not only has military power helped secure territorial expansion, but it is plausible that it has been aided by it as well. The settlements themselves have served military control and surveillance functions (Weizman 2007), but there is also evidence that the occupied territories have served as 'laboratories' for experimentation with and development of new military technology. Israeli arms producers distinguish themselves in world markets as producing battlefield-tested, tried and true weaponry, and as, for similar reasons, possessing a nearly unparalleled edge in non-conventional asymmetric warfare including drones and surveillance technology. (Knipp 2013)

**Direct costs of military strength.** As a rough indicator of the potential burden of military spending for a future all-out war, one can consider current military spending as a

percent of GDP. For Israel this fell from 30% of GDP in 1975 to an all-time low of 5.2% in 2019 (SIPRI Military Expenditures Database 2021) representing annual decline of 3.2% over the period. Moreover, only a *fraction* of this budget is expended on control in the occupied territories in the first place, as evidenced by the (limited) data on additional appropriations in the budget for military action in the occupied territories (Swirski, 2008). Therefore, Israel's broad defense capabilities have not only improved over time but have become more tolerable, cost-wise, at least as indicated by direct government spending. In terms of personnel, Israel's armed forced personnel have remained under 200,000 since 1989, for which data is first available, representing a halving in the share of the labor force over the period (World Bank DataBank 2021).

Other costs: international stance on military action. Although the international community encompasses a range of actors with diverse positions on the Israeli-Palestinian conflict, the prime consideration for potential support or costly punitive action during an all-out war is the position of the United States. US support for Israel is well-known. Since 1968, the US has committed to maintaining Israel's qualitative military edge (QME) over other regional actors, with QME even becoming codified into law by Congress in 2008, and with 'the ultimate expression of Israel's QME [being] its not-so-secret possession of a nuclear arsenal.' (Wunderle and Briere 2008, 68) More openly, QME involves a variety of financing and aid strategies, including 10-year memorandums of understanding (MOUs), starting in 1999, pledging to provide Israel with military aid and in which the amount pledged has increased from each MOU to the next (Sharp 2020).

In addition to increasingly subsidizing the cost of Israel's military strength, the US has also enabled Israeli expansionism by protecting Israel from any potential costs such as sanctions over territorial expansion and large-scale attacks on civilian populations, including by the consistent use of veto power against such United Nations resolutions (Newton 2021). On territorial expansion specifically, the US position has increasingly accommodated Israel. Ronald Reagan's government began to address settlement activity as 'not illegal' but rather 'counterproductive' in 1981 (Neffer 1994), Bill Clinton publicly endorsed the use of U.S.- guaranteed funds to expand existing settlements in 1993 (ibid), and Donald Trump officially reversed the position that Israeli settlements violate international law, policies that have not been turned back to a meaningful extent by the Biden administration (Russonello 2021).

In turn, Israel's growing military strength has been instrumental in solidifying its position as a top US ally and in curbing any potential costs to it of belligerency, even as its military strength, which is important to the US for regional purposes, is inevitably exercised on the Palestinian population, a population which itself is of little strategic importance to American foreign policy. In fact, the power to overtake and defend territory was critical to the crystallization of the US-Israel security relationship. Although John F. Kennedy initiated the creation of security ties with Israel in 1961, it was only after Israel successfully defeated Arab armies in 1967, and the latter were seen as 'lost' to the Soviet Union, that the United States began to adopt clear pro-Israel stance instead of one which avoided the appearances of favoritism. (Wunderle and Briere 2008) In the post-Soviet era, Israel's military strength has kept it the most central and reliable partner to the United States' efforts to contain Iranian power in the region, despite some divergence in recent years between the two allies on how to best handle such containment (Sobelman 2018).

To sum, despite challenges toward rigorous measurement, it seems plausible that Israel's bargaining power relative to the Palestinians, at least in the narrow sense of being able to win an all-out war and of being able to endure the costs of such a war, has grown since the beginning of the occupation, and it can be seen this has occurred in tandem with its sustained settler expansion in, and effective control over, the occupied territories. Of course, the above discussion falls short of causally identifying and quantifying the relationship between these two phenomena. Nonetheless, Israel's bargaining power via its military strength has surely enabled its territorial expansion and its ability to defend and consolidate these gains, and it is also plausible that this has in turn supported its growth into a world military power and into a top US ally, two key aspects of its ability to improve its bargaining position further.

# **B** Proof of Proposition 1

*Proof.* If S2 appeases S1 every time period, its expected utility is:

$$EU(S_2) = (1-x_1) + \delta(1-x_2) + \ldots + \delta^{t-2}(1-x_{t-1}) + \delta^{t-1}(1-x_t) + \delta^t(1-x_{t+1}) + \ldots = \sum_{i=1}^{\infty} \delta^{i-1}(1-x_i)$$
(B.1)

But if S2 appeases S1 every period until t - 1, then at t chooses to fight, its expected utility is:

$$EU(S_2) = (1 - x_1) + \delta(1 - x_2) + \ldots + \delta^{t-2}(1 - x_{t-1}) + \delta^{t-1} \left[ \frac{1 - p(x_{t-1})}{1 - \delta} - c_2(x_{t-1}) \right]$$
(B.2)

Given the above, S2 will only appease at time t if:

$$\delta^{t-1}(1-x_t) + \delta^t(1-x_{t+1}) + \delta^{t+1}(1-x_{t+2}) + \ldots = \delta^{t-1} \left[ \frac{1-p(x_{t-1})}{1-\delta} - c_2(x_{t-1}) \right]$$
(B.3)

Dividing through by  $\delta^{t-1}$ , we obtain:

$$(1 - x_t) + \delta(1 - x_{t+1}) + \delta^2(1 - x_{t+2}) + \ldots = \left[\frac{1 - p(x_{t-1})}{1 - \delta} - c_2(x_{t-1})\right]$$
(B.4)

On the left hand side, the second, third, and subsequent arguments can be simplified as follows:

$$\delta \left[ (1 - x_{t+1}) + \delta(1 - x_{t+2}) + \dots \right] = \delta \sum_{i=t+1}^{\infty} \delta^{i-(t+1)}(1 - x_i)$$
(B.5)

Therefore, Equation (B.4) can be rewritten as:

$$(1 - x_t) + \delta \sum_{i=t+1}^{\infty} \delta^{i-(t+1)}(1 - x_i) = \left[\frac{1 - p(x_{t-1})}{1 - \delta} - c_2(x_{t-1})\right]$$
(B.6)

But everything inside the summation operator in the left hand side, which is the expected return to S2 of appearing S1 at every point in time starting at t + 1, should be equivalent to S2's expected return to fighting at t + 1. Otherwise, S2 would fight instead. In turn, the expected return to fighting at t + 1 is directly a function of  $x_t$  as follows (mirroring the above logic):

$$\sum_{i=t+1}^{\infty} \delta^{i-(t+1)}(1-x_i) = \left(\frac{1-p(x_t)}{1-\delta} - c_2(x_t)\right)$$
(B.7)

Substituting this into the relevant expression in Equation (B.6) gives us the appeasement condition:

$$(1 - x_t) + \delta \left( \frac{1 - p(x_t)}{1 - \delta} - c_2(x_t) \right) = \left( \frac{1 - p(x_{t-1})}{1 - \delta} - c_2(x_{t-1}) \right)$$
(B.8)

This completes the proof for Proposition 1.