Global Economy Journal
Vol. 24, Nos. 1–4 (Mar.–Dec. 2024) 2450009 (40 pages)

DOI: 10.1142/S219456592450009X

World Scientific
www.worldscientific.com

AN ECONOMIC PLAN FOR REBUILDING GAZA: A BOT APPROACH

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Received 1 April 2024
Accepted 3 July 2024
Published 19 February 2025

The reconstruction of Gaza after the latest war between Israel and Hamas creates an opportunity to approach the problem from a purely economic viewpoint. The vision of CEESMENA is to treat internal MENA problems from a purely economic perspective. In that light, the solution to the Gaza problem can be found by focusing narrowly on the investment solution to a failed experiment. This is a common approach that economists address in a post-bankruptcy situation. The Hamas experiment, since Israel's unilateral withdrawal in 2005, has proven to be a complete failure. It has left Gaza in a devastating bankruptcy. To solve this bankruptcy problem, we suggest an approach based on the classic build–operate–transfer (BOT) framework. The countries that invest in this project will become equity shareholders with a 50-year lease. The civil administrators that will be brought into Gaza will develop an economic model based on the principle of "private provision of public services". It will also create the common law principles known as the "rule of law" as it is applied to property, contract, criminal and tort law under a market system. The sovereignty of the residents will be addressed only after the 50-year lease arrangement is complete along with the formation of a robust civil administration (e-Government) and common law paradigm referred to as "rule of law" is finalized. A revitalized education system will be instituted based on a reformed UAE, Bahrain and Saudi Arabian curriculum. A computable general equilibrium (CGE) model presented in the paper will be used to track a three-sector Gaza economy (tourism, agriculture and high-tech) and will be implemented to address alternative pathways for the development of this sovereign non-militarized green economy. The approach presented in this paper is a continuation of innovative thinking which was manifest when former President Trump perused the groundbreaking and successful "Abraham Accords" in complete rejection of the outdated and unsuccessful "Washington Consensus".

Paper presented at a joint meeting of the International Trade and Finance Association (ITFA) and the Center of Excellence for the Economic Study of the Middle East and North Africa (CEESMENA), Jerusalem, Israel, August 15, 2024. We thank the participants for their thoughtful comments.

Keywords: Computable general equilibrium models; law and economics; private provision of public services; privatization; middle East North Africa (MENA); Gaza; transitional economies; natural resource economics; spatial; transportation economics; urban economics; tourism economics.

JEL Classifications: C68, D58, H44, K1, K2,K3, K4, L22, L32, L33, N15, N17, N45, N47, O1, P1, Q2, R1, Z3

1. Introduction

The objectives of this research are to broaden the focus of the analysis of reconstructing Gaza and to use a more reasonable economic methodology devoid of political factors as constraints. Instead of focusing principally on past policy challenges, we address the general question of the economic development of Gaza based on a build–operate–transfer (BOT) framework and consider the likely effects of a series of policy initiatives that are feasible under various scenarios. We propose the use of a computable general equilibrium (CGE) model for Gaza, which can simulate alternative pathways based on changing parameters in our model.

This includes:

- The creation of a market with price flexibility, eliminating the market failure assumption associated with local tribal gangs and introducing the common law principles of "rule of law".
- Sectoral disaggregation of Gaza into three major sectors, tourism, agriculture and high-tech.
- The introduction of an urban environment with an above-ground rail system and 100% solar power throughout the strip.
- Selected investors under the BOT framework will be granted an equity stake in Gaza to last for 50 years.
- The civil administration of Gaza will be subcontracted by the selected investors and/or their representatives. Their primary market objective function is to create a civil governing system based on the general philosophy of "private provision of public services".
- The sovereignty of the residents will be addressed only after the 50-year lease arrangement is complete along with the formation of a robust civil administration (e-Government) and common law paradigm referred to as "rule of law" is finalized. There are no ex-ante restrictions on the mobility of local residents to exit Gaza.
- The introduction of a reformed school system from K to 12 will be established based on a reformed UAE, Bahrain and Saudi Arabian curriculum and will be staffed by international educators based on the Singapore IB model.

- A CGE model presented in the paper will be used to track a three-sector Gaza economy (tourism, agriculture and high-tech) and will be implemented to address alternative pathways for the development of this sovereign non-militarized green economy.

This paper is divided into eight sections. Section 2 addresses the context and background prior to the October 7, 2023, Hamas invasion of Israel and subsequent massacres. Section 3 addresses the question of Gaza's sovereignty and the rule of law going forward. Section 4 presents the necessary and sufficient logistical requirements to ensure the development of a tourism and housing sector in Gaza. Section 5 addresses the question of constructing an independent power station for Gaza. Section 6 addresses the question of constructing an independent airport and port facility for Gaza. Section 7 addresses the question of constructing a light rail system for Gaza under the assumption that the high density of the strip would require the elimination of all private modes of transportation and substitute a more efficient green technology. Section 8 outlines the basic CGE model that would be appropriate to simulate the economic outcomes suggested in this paper. Concluding remarks are presented in Section 9.

2. Context and Background Prior to the October 7, 2023 Hamas Invasion of Israel and Subsequent Massacres

The 1967 Arab-Israeli 6-day war led to significant territorial changes. Israel gained control of the West Bank previously held by Jordan and Gaza, previously administered by Egypt. In 2020 Israel proclaimed that a united Jerusalem would be its capital.

In 2005, Israel unilaterally withdrew from Gaza. There was no reciprocal move by either the PA or Hamas that jointly governed Gaza. Under international law and the Oslo agreement, Gaza remained a "disputed territory" with the agreed three segments, area C with Israeli sovereignty, Area B with shared PA and Israeli control and Area A with exclusive PA authority. Hamas, under international law, had no property rights within Gaza. The expectation on the Israeli side was that an independent Gaza would emulate Asian developing countries and concentrate on tourism and agriculture. That expectation was proven to be wrong. When Hamas assumed political control in 2007 it converted Gaza into a militant state by diverting all aid funds to support its militant infrastructure and weapons program. All the Western donors who were aware of Hamas' efforts to construct a militant territory did not reduce their aid flows. Given the asymmetry between Gaza and Israel, in terms of military power, Hamas undertook a 15-year program to create a fully functioning subterranean environment from which it would start barraging the

Israeli civilian population with an assortment of rockets. Rather than resorting to carpet-bombing and eliminating the danger from Gaza once and for all, as was attempted by the USA in Vietnam, Israel was forced by the USA to undertake a policy of occasional ping-pong battles and a policy of appeasing Hamas with Qatari money. The Israeli decision to surrender to US pressure, in their asymmetric alliance, was a complete strategic mistake.

In addition to the occasional ping-pong battles with Hamas, Israel along with Egypt imposed an embargo on Gaza. The Egyptian embargo which covered a 12 km border with Gaza, however, was very porous. Egypt wanted to keep Hamas geographically confined and away from the Muslim Brotherhood which had established its militant organization in Sinai. Egyptian border guards were easily compromised and subsequently created a very rich highway of illicit weapons smuggling into Gaza. It also created a very lucrative transit of wealthy Gazans to Egypt. Israel's entry into Rafah, in 2024, uncovered an enormous underground network directly entering Egypt.

The continuous shooting of missiles from Gaza against Israeli population centers resulted in several self-defense military actions against Hamas in Gaza in 2008, 2012, 2014, 2021, 2022 and May 2023. In each of these ping-pong actions portions of the Gaza infrastructure were destroyed and subsequently rebuilt with Qatari money. On October 7th, 2023, Hamas and their associates invaded Israel and committed the most heinous attack on Israel, killing, mutilating and burning over 1,200 civilians and kidnapping over 240 civilians, including infants. The accompanying map outlines the villages invaded in southern Israel. This assault was the worst single-day massacre of innocent Jewish civilians since the Holocaust. In per capita terms these murders and kidnappings would be the equivalent of over 40,000 American civilians murdered and 8,500 American civilians kidnapped in a single day.

The resulting Israeli attack against Gaza was in conformity with International Rules of Law.[1] This defensive military operation has caused internal displacement

[1] Convention Respecting the Laws and Customs of War on Land annex art. 22, October 18, 1907, 36 Stat. 2277, 207 Consol. T.S. 277 [hereinafter Hague IV]; Convention with Respect to the Laws and Customs of War on Land annex art. 22, July 29, 1899, 32 Stat. 1803, 26 Martens Nouveau Recueil (ser. 2) 949 [hereinafter Hague II]. The principle also appears in Additional Protocol I, albeit with the addition of "methods" of warfare. Protocol Additional to the Geneva Conventions of August 12, 1949, and Relating to the Protection of Victims of International Armed Conflicts art. 35(1), June 8, 1977, 1125 U.N.T.S. 3 [hereinafter Additional Protocol I].

Article 48 of Additional Protocol I, requires parties to "at all times distinguish between the civilian population and combatants and between civilian objects and military objectives". Articles 51 and 52 operationalize distinction in the context of military necessity. Thus, while Article 51 prohibits attacks on civilians, those who participate in the conflict lose said protection for so long as they "take a direct part in hostilities". Analogously, Article 52 prohibits attacks on objects that are not "military objectives", but acknowledges that civilian objects can become military objectives when, "by their nature, location, purpose or use", such objects "make an effective contribution to military action" and their "total or partial destruction, capture or neutralization, in the circumstances ruling at the time, offers a definite military advantage".

and destruction of the dual-purpose physical infrastructure that Hamas used as part of its military strategy. The evidence to date shows that Hamas has repeatedly violated international rules of war by using hospitals, UNRAW facilities, schools, ambulances and private homes for military purposes. Under International Rules of Conflict, Israel has the right to destroy all these institutions. This has created two spillover effects, displaced civilians and a housing shortage.

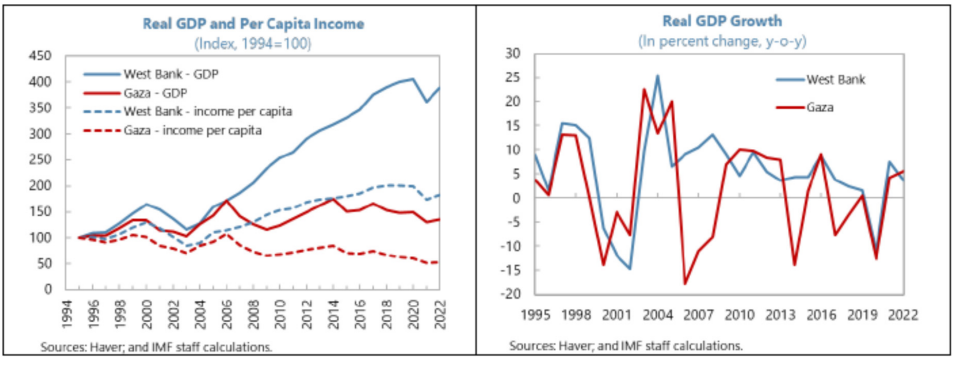
According to data reported by the IMF[2] during 2007–22, real GDP growth in Gaza averaged just 0.4%, with real GDP per capita declining at an annual

[2]IMF. West Bank and Gaza Selected Issues, September 11, 2023.

average rate of 2.5% amidst rapid population growth. This reflects Israeli and Egyptian land, sea and air blockade on Gaza once it elected Hama as its political and military leader in 2007 and began to focus its resources on its militant infrastructure. The ping-pong wars initiated by Hamas in 2008–09, 2012, 2014, 2021, 2022 and May 2023 are directly responsible for the economic disaster of the strip.

With the extreme instability of the strip, private investor funds dried up and the only financial support came from aid funded by Western governments and Qatar. Most of these funds were appropriated by Hamas to fund their underground militant infrastructure. Consequently, unemployment in Gaza reached 45% in 2022 and the percentage of the population living below the national poverty line stood at 53%, compared to 13% and 14%, respectively, in the West Bank.[3] The end result of Hamas control has been to convert Gaza into an international beggar when it comes to the population at large while at the same time confiscating most of the donor funds for their own personal use and for the militant infrastructure.

The current war between Israel and Hamas, which was brutally initiated by Hamas on October 7, 2023, leading to the brutal and inhumane killing of over 1200 civilians, focusing on women and children, has resulted in a major Israeli defensive counter strike which is still in progress. This has resulted in a large loss of human capital within Gaza. The accuracy of civilian casualty numbers in Gaza, as reported in the media, is highly disputed. Various analyses have raised significant concerns about the reliability of these figures, particularly those provided by the Hamas-controlled Gaza Ministry of Health. For example, discrepancies have been identified in casualty data, including statistically improbable correlations between



[3] Poverty data are based on PCBS's Expenditure, Consumption and Poverty Survey, 2017.

reported deaths of men, women and children. Some reports suggest that the numbers are arbitrarily assigned and not reflective of actual events on the ground. Anomalies such as inconsistencies in daily reported deaths and implausible casualty compositions indicate that the figures may not be accurate. More recently the UN reduced the Hamas-based casualty numbers by 50% without any explanation.

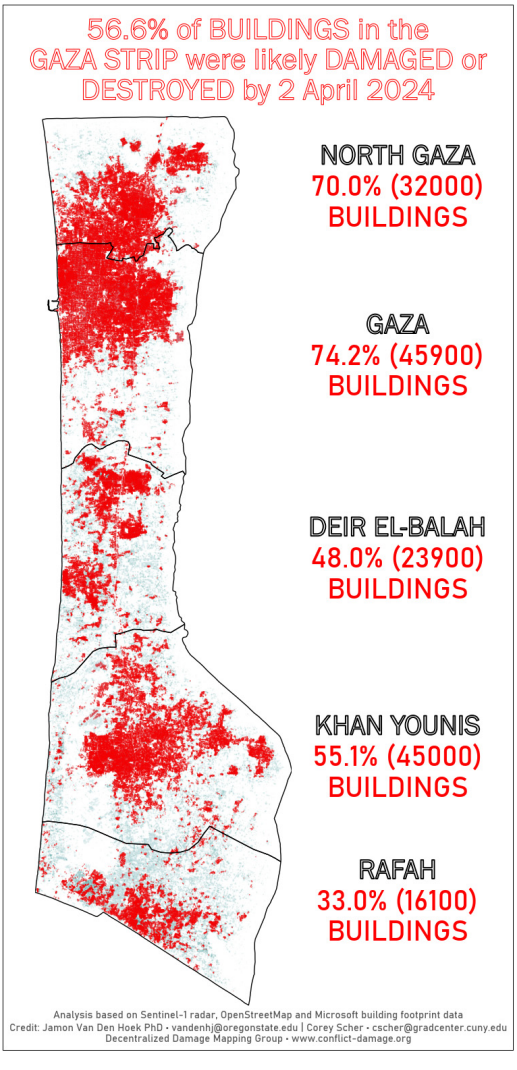
Consequently, the methodology for collecting and reporting these numbers has been criticized. Since November, a significant portion of the data has been supplemented by media reports, which are challenging to verify and often lack necessary details. This has led to overreporting of women and children casualties compared to earlier conflicts where men, who are more likely combatants, were proportionally more represented in casualty figures.

From the IDF it is reported that approximately 13,000 Hamas militants have been killed, thus far. The exact number of killed combatants is most likely accurate given that Israel documents the Hamas soldiers killed. Given the fog of war and the complexities of urban conflict where combatants and civilians are closely intermingled, the true civilian death toll is difficult to ascertain and likely different from Hamas figures. Historically data and independent assessments suggest that the reported high percentage of civilian casualties may be inflated. That has not stopped international organizations like the UN[4] to continue publishing this misinformation. That is also true for most of the Western press and a large group of Western politicians that continue to publish the "fake" news presented by Hamas, who runs the Gaza Ministry of Health. The best estimate on civilian death is a 1:1 ratio between combatants and civilians, resulting in an estimated total casualty count of 26,000 Arabs killed.

In addition to the human casualty loss, estimates of the infrastructure affected, without doing an on the ground assessment, must come from an aerial remote sensing estimate. Given that the tunnel infrastructure covers most of the 365 km^2 area of Gaza, there is a substantial destruction of physical assets designed to cover the militants' tunnels. As the Israeli Defense Forces (IDF), in their search for Hamas militants, have destroyed a good part of the tunnel network, they have also destroyed much of the above ground physical infrastructure. The information provided by the IDF is that close to 100% of the above ground structures, including mosques, hospitals, schools and residential units are built over existing exit and entrance portals into the militant tunnels. They also serve as mini storage units for military equipment.

[4]The latest UN report — UNCTAD. Preliminary assessment of the economic impact of the destruction in Gaza and prospects for economic recovery, January 2024, is a perfect example of the continued dissemination of "fake" data provided by Hamas and taken at its face value.

The World Bank (2024a, 2024b) in two recent studies assess the destruction of the physical infrastructure in Gaza on data provided by the Institut Public de Sondage d'Opinion Secteur (IPSOS), for the period October 2023–January 2024. These data are constructed using the Synthetic aperture radar (SAR) methodology which is a type of remote sensing that uses the movement of a radar antenna over a target area to create two-dimensional images or three-dimensional reconstructions of objects. This SAR technology is also used by Israel's geospatial intelligence unit



(GEOINT) to map the Gaza Strip's underground network of tunnels dug by Hamas.

The data displayed above are the latest information updated through April 2, 2024. The analysis is based on Sentinel-I radar, OpenStreetMap and Microsoft building footprint data.[5]

The World Bank IPSOSs data estimate that due to Hamas actions, 1.2 million Arabs in Gaza are now homeless and destitute. All these buildings housed Hamas militants. The Bank further estimates that approximately 62% of the remaining residential buildings have incurred some form of damage (The World Bank, 2024b, p. 3). The damage to these buildings reflects the outcome of an IDF strike against Hamas militants located in the building. In addition to housing, the Bank estimates that over 62% of all roads have been damaged or destroyed. Primary roads bear the brunt, with 92% affected, where almost 60% are destroyed (The World Bank, 2024b, p. 4). Due to extensive military operations and infrastructure impacts, sectors like health services and education have been significantly affected. It is important to ensure these sectors are restored and improved for the future well-being of Gaza's residents.

Overall, the post-October 7th defensive war by Israel, which is still in progress, is no longer a ping-pong war, but rather an existential war, where the key objective is to recover the 200 plus hostages abducted by Hamas and their associates and to eradicate Hamas and its other militants' co-conspirators. The resulting impact on Gaza is close to a complete eradication of the entire strip, destroying its economic and military infrastructure. The cost to the residents in Gaza is fully attributable to the existence of the Hamas militants. The objective function of the Hamas militants was to create chaos and maximize the loss of human capital in Gaza.

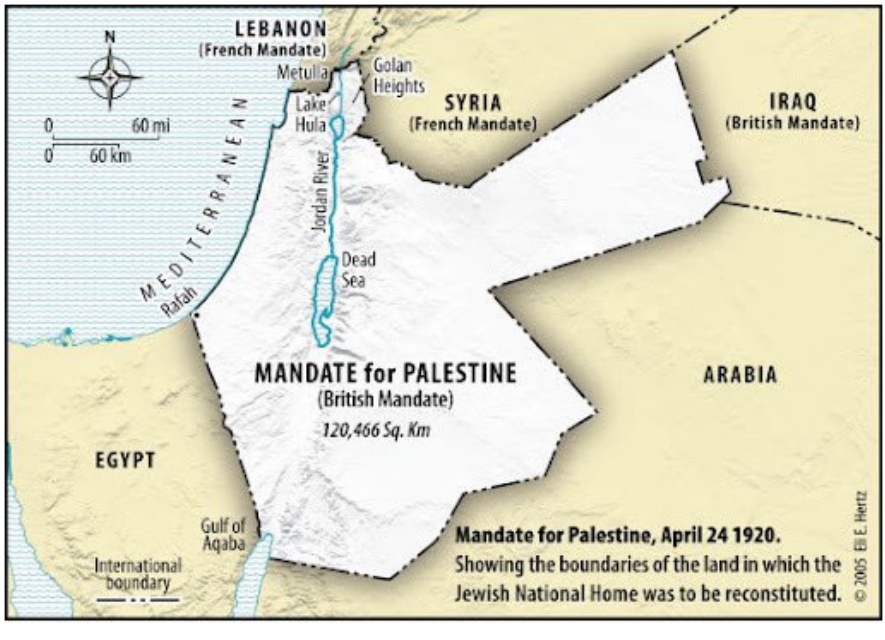
It is safe to say that the local Gaza economy has flatlined and is fully dependent on foreign assistance. Consequently, we begin our assessment of the cost of reconstructing Gaza under the assumption that we are starting with a blank screen. The cost of this reconstruction will be multifold higher than earlier recovery costs. UNCTAD reports that the 2014 recovery cost after the 2014 ping-pong war was $1.4 billion, the Türkiye/Syria Earthquake in 2022 was $3.7 billion and the recovery costs for the floods in Libya in 2023 was $1 billion. For a full reconstruction cost for Gaza, the amount will be between $1 and $2 trillion and will take 5–10 years to be completed.

[5] Jamon Van Den Hoek PhD vandenhj@oregonstate.edu and Corey Scher cscher@gradcenter.cuny.edu Decentralized Damage Mapping Group www.conflict-damage.org.

3. The Question of Gaza Sovereignty and the Rule of Law

If, as the popular saying goes, insanity is doing the same thing over and over again and expecting different results, then why would anyone even contemplate the same old proposals for post-war Gaza that have consistently and catastrophically failed before?

From a purely historical point of view, it must be pointed out that the area referred to as the Mandate for Palestine was supported by the international community and assigned to Great Britain, with the explicit requirement that it was to be the location for the Jewish national home, is noted in the following map. It includes the areas of the Mandate which are now referred to as Gaza and Jordan. The biggest adjustment, and historically "the" foremost error, occurred in 1921–22, when Great Britain unilaterally granted much of the Mandate area (over 70%) to the Hashemite Kingdom, without any regard to either the Jewish or Arab residents. Rather than dividing the area into Jewish and Arab sovereign states, within the entire area referred to as the Mandate for Palestine, Great Britain introduced an unrelated third party, the Hashemite Kingdom into the mix. The result of this colonial exercise of power is the chaos we see today.[6]



[6] A great deal of history has occurred from 1920 to today. Historians will attribute the "unintended consequences" to this one mindless decision made by Great Britain.

A snapshot of the Gaza Strip in 2003, post Oslo presents a sober assessment of the question of Sovereignty and the Rule of Law as applied to this "disputed territory". First, the Gaza Strip is not a state, has never been declared a state and has not been recognized as a state. The last countries that had jurisdiction in this area included the Ottoman Empire followed by Great Britain, under the mandate period. The Egyptians came on the scene in 1948 when they attacked Israel and occupied the Strip, previously controlled by Great Britain. Egypt never annexed the Gaza Strip. It maintained military–civilian rule but did not grant residents ownership rights. Currently, under international law, the only country that can grant leasing rights to foreign investors is Israel, specifically in area C, explicitly in the northern segment of Gaza, which is void of Hamas militants.

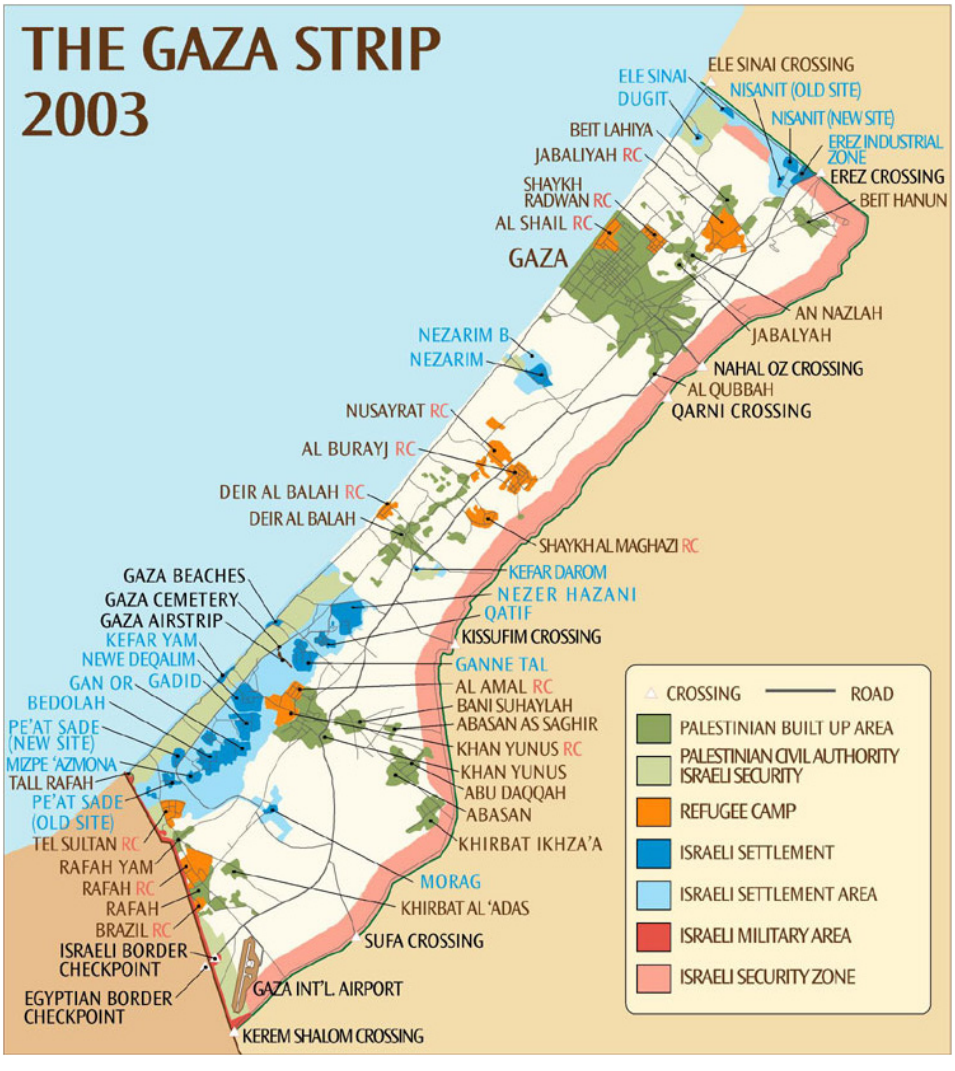
The attached map for 2003 sets up the international divisions under Oslo. The Oslo Accords established that Gaza is an autonomous area within Israel's military occupation. According to this agreement, three types of areas were determined. Area A — under the civil and security responsibility of the PA. Area B — under the PA civil administration and security responsibility relegated to the IDF. Area C — the civil and security responsibility of the IDF. In area C, there were Jewish settlements that were destroyed and evacuated along with the agricultural areas and highways.

Since Israel left the Gaza Strip unilaterally in 2005, without any agreement with the PA, the status of the public areas remained virtually unchanged. Lacking any property laws the entire Gaza is available for a lease arrangement. The only parties that can offer a lease arrangement to foreign investors are Israel and the PA, depending on their respective zones.

In the attached map you can see that area C, in a light blue shade, is the area where Israel is entitled to grant long-term leases. In Areas A and B, the PA and Israel will have to negotiate the division of their respective property rights before they can issue long-term leases. Under Oslo, Hamas has no property rights in Gaza. In fact, under international law, the Hamas leadership can be sued by Western donors in order to recapture (disgorge) the billions of dollars that they expropriated from them falsely.

Given the reality of the Gaza Strip as a "disputed territory" under International Law and the Oslo agreement makes our suggested BOT approach to rebuilding Gaza the best approach. In fact, a pilot project can start immediately in the Northern segment of Gaza with leasing arrangements worked out with Israel. A port and a desalination facility should be the first elements in this pilot project. In the past, the pathway to a two-state solution has failed largely due to PA intransigence.[7] Under the former Trump administration, the "Abraham" accords

[7] See former President Clinten comments found in Hirsh (2001).



proved to be a refreshing new approach. The current Biden, administration, which supports the "Washington Consensus" did not pursue an expansion of the "Abraham" accords and returned to push the old Obama paradigm. A pack of Democrat policy think tanks, continued with this outdated "Washington Consensus".[8] Historically, Israel has agreed to at least five different versions of a two-state solution — all of them were rejected by Arafat. It is time to think out of

[8] A brief set of articles presenting this naïve set of proposals which help make up the Washington Consensus include: Miller and Kurtzer (2023), Orion (2023), Fantappie and Nasr (2023), and Hassan (2023).

the box and start on a new path.[9] Our proposal of a BOT accompanied by a 50-year lease, supplemented by a civil administration and an introduction of a complete common-law legal system, continuing the earlier Trump approach, may actually create an incentive for the inhabitants to introduce a more enlightened government leadership able to govern a demilitarized Gaza (Keinon, 2023; Tawil, 2023).

Today, we see the explicit rejection of any two-state solution or peace initiative in the Hamas Charter, as being "in contradiction to the principles of the Islamic Resistance Movement".[10] Moreover, recent surveys confirm that the majority of the general Arab population in Gaza and the West Bank also vehemently oppose any two-state solution.[11] Based on these local surveys, it is clear that the overwhelming majority of Palestinian civilians continue to support Hamas as their only representative,[12] seeking the genocide of the Jews, and calling for the conquest of the historic lands of Israel "from the river to the sea" as the final one-state solution.[13] They also deny the historical fact that Jews are indigenous to Israel for

[9] From the end of 2006 until the end of 2008, Israeli Prime Minister Ehud Olmert held 36 negotiating sessions with Palestinian Authority President Mahmoud Abbas in an effort to reach a peace agreement. Additional talks were being held at the same time between Israel's Foreign Minister Tzipi Livni and Palestinian negotiator Ahmed Qurei. Under this plan, Israel would cede almost 94% of the West Bank for the establishment of a Palestinian state. Abbas rejected the deal (Rice, 2011; Isacharoff, 2013; "Abbas says he rejected Olmert peace offer in 2008 over unseen map," 2015; Begin, 2020).

The Government of the State of Israel and the PLO team (the Palestinian Delegation), representing the Palestinian people, agree that it is time to put an end to decades of confrontation and conflict, recognize their mutual legitimate and political rights, and strive to live in peaceful coexistence and mutual dignity and security and achieve a just, lasting and comprehensive peace settlement and historic reconciliation through the agreed political process. The "Oslo Agreement" signed on September 13, 1993 and came into effect. Israel Ministry of Foreign Affairs. It was immediately followed by Arab violence in the streets of Israel. The first intifada and subsequent intifada (acts of violence against Jews), all supported by the PA ("Former Palestinian FM and Chief Negotiator Nabil Shaath: Saudi King Abdullah Financed the Second Intifada," 2017).

The White house delusional approach toward Israel peace continued with Obama I. Obama I and Kerry expressed the belief that it was Israel's fault that militants in Lebanon and Gaza bombarded Israel with rockets, even after its troops withdrew from both places, because Israel had withdrawn unilaterally without a peace treaty. They ignored the fact that neither the Palestinians nor the Lebanese had any interest in making peace with Israel.

Despite evidence to the contrary, Obama I and Kerry insisted, "The Palestinian Authority has committed itself to a policy of nonviolence. They are the only entity out there in that region that has committed themselves to nonviolence".

In 2009, Obama had demanded that Israel freeze settlement construction, something the Palestinians had not requested. Israeli Prime Minister Benjamin Netanyahu reluctantly agreed to a 10-month freeze but refused to include Jerusalem. The Palestinians, meanwhile, saw Obama's inability to force Netanyahu to a total freeze as weakness. Palestinian Authority President Mahmoud Abbas refused to negotiate with Netanyahu during those 10 months and then used the expiration of the freeze as an excuse not to talk to him afterward. After nine months, the Obama I Kerry initiative was dead (Booth and Eglash, 2014; Birnbaum and Tibon, 2014).

[10] From the Hamas Covenant, cited on the Israeli Embassy (2024) website: "[Peace] initiatives, and so-called peaceful solutions and international conferences are in contradiction to the principles of the Islamic Resistance Movement... Those conferences are no more than a means to appoint the infidels as arbitrators in the lands of Islam... There is no solution for the Palestinian problem except by Jihad. Initiatives, proposals and international conferences are but a waste of time, an exercise in futility" (Article 13).

[11] Palestinian Center for POLICY and SURVEY RESEARCH, Public Opinion Poll No. 90, December 13, 2023.

[12] See Maqdsi (1993).

[13] Jamal and Robbins (2023). Palestinian Center for POLICY and SURVEY RESEARCH, Poll No. 90, December 13, 2023.

millennia and attempt to erase the archaeological evidence of it.[14] Lesson learned — if we intend to remove this conflict out of the pages of history our proposed BOT approach is the only viable alternative.[15]

This paper proposes a new and fresh approach to an old problem. We consider this the most pragmatic approach from an economic framework to establish a BOT schema, where foreign investors are given equity shares in Gaza for a 50-year period where their investment will reconstruct Gaza (Build) and establish (Operate) a civil administration, based on the market principle of "private provision of public services". It will also create the common law principles known as the "rule of law" as it is applied to property, contract, criminal and tort law under a market system. The sovereignty for the residents will be addressed only after the 50-year lease arrangement is complete along with the formation of a robust civil administration (e-Government) and common law paradigm referred to as "rule of law" is finalized. Sovereignty for the inhabitants (Transfer) in Gaza will be determined by these stakeholders after the 50-year leasing arrangement is completed.

First, the security of Gaza, in the short run, must be assigned to impartial partners, who share the common interest of removing Hamas and their co-conspirators from any role, who are interested in demilitarizing Gaza permanently, and who are determined to safeguard the financial interests of the investors. Second, to provide civilian governance in Gaza, the stakeholders have the best incentives to introduce the most qualified talent from abroad to safeguard their financial investments. There are many international examples of investor-sponsored civil governance structures. From the US, we have Panama and Puerto Rico,[16] and from Great Britain, we had Hong Kong.

The Transfer issue can be addressed by the investors after their 50-year lease is complete and the civil administration is functioning efficiently under the common-law principles that govern property, contract, criminal and tort law under a market system. The primary objective function for the investor stakeholders is the development of a sovereign demilitarized green economy that is profitable and self-sustaining. Any fear of expropriation by a future government will have to be addressed by the investor stakeholders during the transfer period.[17]

[14] https://en.wikipedia.org/wiki/Jewish_history#:~:text=The%20earliest%20recorded%20evidence%20of,dated%20to%20about%201200%20BCE.

[15] https://en.wikipedia.org/wiki/Two-state_solution#:~:text=In%202002%2C%20the%20Arab%20League,solution%20was%20no%20longer%20achievable.

[16] In 1898, following the Spanish American War, Puerto Rico was acquired by the United States. See Monge (1999).

[17] Several economic models of the transfer problem can be found in: Pelzman *et al.* (2021), Pelzman and Isaabayev (2019), and Pelzman *et al.* (2018).

4. The Necessary and Sufficient Logistical Requirements to Ensure the Development of a Tourism and Housing Sector in Gaza

The first step in making Gaza available for a full re-start will require the complete elimination of the underground military infrastructure. This will require digging up the entire 365 km^2 Gaza land mass and creating a set aside of 3.0–5.0 km on the three borders with Israel and the single border with Egypt. This would be equivalent to establishing a DMZ between North and South Korea.

The Gaza Strip is 41 km (25 mi) long from its northern border with Israel to Egypt in the south. Gaza is 13 km at its widest at the Egyptian border, about 5 km at its narrowest, and about 10 km at the top bordering Israel. The total area of Gaza is approximately 365 km (square) or 141 sq.mi. The current estimate of Gaza's population is unknown. Based on UN data, it is estimated that there are approximately 1.4 million inhabitants in Gaza, of which 50% are children. The resulting Gaza population density ranges between 1,917 and 3,835 people per square kilometer. Based on world estimates of population density provided by the world population review, noted below, Gaza would be ranked the sixth most densely populated area in the world.

As part of the restructuring of Gaza and assuring the complete eradication of the Hamas underground militant network, the entire Gaza area would have to be completely excavated. This process can be combined with the cost of building a hotel network on the West side of Gaza (sea front) and a housing complex on the East side. Construction costs of hotels and residential housing units can vary significantly based on various factors such as location, building type, materials used, design complexity, labor costs and current market conditions. Therefore,

Top 10 most densely populated countries in the world in 2020

	Density (/km^2)
Macau	21,674
Monaco	18,079
Singapore	8,430
Hong Kong	7,140
Gibraltar	4,811
Bahrain	1,909
Vatican City	1,736
Maldives	1,726
Malta	1,677
Bangladesh	1,342

Source: https://worldpopulationreview.com/country-rankings/countries-by-density.

providing an exact average price without specific details is challenging. Based on US construction costs[18] a rough estimate for the construction cost per meter of a mid-rise to high-rise building can range from $5,380–15,000 per square meter, excluding land costs and other expenses. This is a very general estimate, and the actual price can be higher or lower depending on the factors listed above.

In order to get a local MENA estimate of the relative construction cost for housing and hotels we focus on the Saudi Public Investment Fund (PIF, the sovereign wealth fund), which is providing financial support for a number of mega-projects. These include the Neom high-tech development covering nearly 27,000 km^2 on the far-north-west coast; the Red Sea Project (a luxury resort development encompassing 34,000 km^2 on the western coast between the cities of Umluj and Al Wajh); the Qiddiya entertainment city near Riyadh (which is touted to be three times the size of the Walt Disney resort in Florida); the transformation of the World Heritage Site of At-Turaif into a much-visited cultural destination; and the establishment of the King Abdullah Financial District in the north of Riyadh. The construction cost of a hotel complex and housing units including the complete excavation of the terror tunnels and a full array of solar power infrastructure will range from $500 billion to $1 trillion and will take at least 5 years to complete.[19]

5. Independent Power Station for Gaza

On October 6th, Gaza's supply of energy comprised 60–80 MW generated with diesel at the Gaza Power Plant (GPP) (capacity of 140 MW) and approximately 120 MW of imports from Israel Electric Corporation (IEC). As a result of the deficit, cycling power outages and localized outages were common in the West Bank and Gaza. Going forward, any investment in Gaza's domestic generation must replace diesel with natural gas as a transition toward a cleaner energy mix, including solar photovoltaic energy (PV).

According to the EU,[20] the GPP is the only large-scale power plant in Gaza. GPP is an independent power producer, owned and operated by the Gaza Power Generation Company (GPGC). Consolidated Contractors Company (CCC) is the majority shareholder of GPGC, which operates GPP under a concession with the

[18] Estimates based on Home Guide, USA.

[19] Construction of the $500 billion Neom mega-city is now under way in Saudi Arabia. It will feature a 170-km-long belt of zero-energy walkable communities, to be known as The Line. The blueprint for Neom also includes the largest floating structure in the world in the form of Oxagon, a huge water-based industrial district. The Economist Intelligence Unit (EIU) (2023) believes that significant delays are inevitable and that the original plans, which envisaged a city 33 times the land area of New York, will be scaled back. Cost overruns are expected.

[20] EU. ***Gas for Gaza*****,** Measure in favor of Palestine for 2021–2023, Opsys number: NDICI-GEO-NEAR/2022/ACT-60721 — JAD.958463, Financed under the Neighborhood, Development and International Cooperation Instrument (NDICI-Global Europe).

Palestinian Authority. The contract expires in mid-2024. GPP has a 140 MW capacity. Yet, the high cost of diesel fuel and difficulties in sourcing the fuel makes the plant extremely expensive to operate, leading to only half capacity use (50–80 MW).

The European Commission, the Netherlands, and the Office of the Quartet have proposed an investment program to provide gas supply to Gaza. The overall project cost is estimated to be $85–100 million, shared as follows: Cost in Israel: $ ∼ 70–80 million, Cost in Gaza $ ∼ 15–20 million. The so-called *Gas for Gaza* (G4G) project is intended to connect Gaza to the Israeli natural gas network. This will provide natural gas principally to the GPP; Gaza's only power plant) to support its operation at 140 MW and its expansion to 600 MW by 2033. Converting the GPP energy production (140MW) from diesel to natural gas would reduce electricity production costs by two-thirds.[21]

For the purposes of this paper, we want to focus on the development of electric power in Gaza independent of Israel. A recent gas power plant in the UAE has been planned to use natural gas at an expected construction cost of $3.4 billion.[22] The plant will include a desalination plant to provide the clean water for agriculture (not for the public). This plant is being constructed in part by the PRC as part of its Belt and Road Initiative, with the help of GE. Consequently, at a very low construction cost. The UAE and the PRC expect that this power plant will meet 20% of Dubai's electrical demand. A plant of this size for Gaza is estimated to cost at least double ($16.8 billion) due to the infrastructure cost and repair of the destroyed power grid. An additional cost of importing natural gas from the US and/or Europe will have to be added.

Despite the talk concerning alternative green technology for MENA and Gaza, natural gas continues to play the prominent role as the major energy source for power generation for many MENA countries. On average, it makes up more than 90% of the power generation mix in Egypt, UAE and Algeria, and almost two thirds of the power generation mix in Saudi Arabia. For Gaza, it will be close to 100% (Benali *et al.*, 2021).

Overall, the cost of a single power plant for Gaza, independent from Israel, will be approximately $20 billion.

[21] Ibid., p. 10. The EU, supporting this proposal, operates under the assumption that regional stability and welfare are shared responsibilities. Following Israel's withdrawal in 2005, governance and security challenges have persisted in Gaza.

[22] The announcement came in a statement quoting Sheikh Ahmed bin Saeed Al Maktoum, the chairman of the Dubai Supreme Council of Energy and CEO of the group owning the long-haul carrier Emirates. February 4, 2022.

6. Independent Airport and Port for Gaza

As part of the Oslo II Accords, signed in September 1995, Israel and the PLO agreed to establish an international airport in the Gaza Strip. Three years later, on November 24, 1998, the Dahaniya International Airport, located on the Egyptian border, opposite the Kerem Shalom crossing, was inaugurated (Scharf, 2023). The cost of the airport with a single runway was $100 million funded by international donors. In the first year after its inauguration, it was reported that approximately 100,000 Gazans passed through the airport. After the outbreak of the Second Intifada in September 2000, Israel shut down the airport, and a year later IDF bulldozers destroyed the runway. After the Hamas takeover of the Gaza Strip in 2007 the airport has remained closed and in ruin.

A seaport for Gaza was also on the agenda, but that never materialized. Currently, Gaza only has a small port in Gaza City, that facilitates local fishing boats and the GAZA naval police. After the Hamas takeover in 2007 and the beginning of the ping-pong war, Israel imposed a strict blockade on Gaza.

In early 2024, the U.S. military constructed a temporary port on the Gaza Coast, to allow for increased humanitarian aid. This temporary port was designed to create a maritime corridor connecting Gaza with Cyprus (Ward, 2024). The temporary port involved deploying a large floating modular unloading platform about three miles offshore, allowing supplies to be transferred by smaller boats offshore (Magdy *et al.*, 2024; Debusmann, 2024). Given the weather conditions on the Gaza Mediterranean shore, this temporary port proved to be ineffective, wasting over $230 million. Parts of the port broke away and floated onto the Israeli beaches. The US government has terminated this port.

Building a seaport in the Gaza Strip in the aftermath of the current Hamas-Israel war is predominantly subject to political and security considerations rather than economic ones. Nevertheless, we present a rough set of cost estimates for constructing a deep seaport based on PRC data (de Loisy, 2019). These costs are average estimates only for standard Tiers 1 transportation infrastructure. They do not include the purchase cost of land. Keep in mind that no two infrastructure projects are identical, and each one pier strongly depends on variables such as natural geography, soil composition, machines required, technology levels deployed, workforce available, workforce expertise, country standard of living, working conditions, local sustainability, ESG requirements, etc. These estimates cannot compare in any way to a quantity surveyor's work, which takes all those variables into account and much more. For a working estimate of the cost of a seaport, the construction costs range from $16 million per 300 m berth to $7 billion per full commercial port.

7. Light Rail for Gaza

The economic literature on the 21st century of transforming the urban landscape (Vernon Henderson *et al.*, 2021; Duranton and Puga, 2023; Akbar *et al.*, 2023) makes a credible argument in favor of reducing Urban congestion by using public transportation. In the context of the congestion in Gaza an above-ground rail system may be the most efficient mode of transportation.

Using as our source the cost data from de Loisy (2019), we have two sets of cost estimates. For a normal rail system, the construction cost will range from $1 million per km to $5 million per km. For a speed rail system, the cost would be $20 million per km to $30 million per km.

8. The CGE Model Applied to Gaza

The basic structure of the CGE model that we are proposing for the economic analysis of the reconstruction of Gaza is like other CGE models in the literature (Shoven and Whalley, 1992; Pelzman, 2003). In constructing the model for Gaza, however, there are major data limitations that affect the structure of the model in several ways.

First, the lack of data does not allow us to break down the household sector into sub-groups nor to distinguish different types of labor. Hence, the production functions of the model have only two primary inputs: labor and capital.

Second, in the scarce literature on Gaza, there is only a limited amount of information on the various elasticities related to the demand and supply sides of the economy. On the production side, no estimates are available on the elasticities of substitution between primary inputs. A consequence of this is that we opt for a Cobb–Douglas specification with its unitary substitution elasticity. In addition, we cannot allow an upper tier of substitution between the intermediate input requirement and value added in the production of gross output. Intermediate inputs enter production in fixed proportions of output.

For the same reason, it is necessary to adopt a similar simplified structure on the demand side as well. Personal consumption arises from the decision of one household actor. In addition, the utility function, the maximization of which yields consumption, is assumed to be Cobb–Douglas. This results in a linear expenditure system characterized by constant shares allocated to the consumption of output of different sectors.

Third, Gaza is a distortionary economy with a strong Hamas militant structure that diverts most of the donations coming from donor nations. We assume that this kind of behavior will generally not affect world prices. With respect to imports, therefore, Gaza can be considered a price-taker, in which case the assumption of fixed world import prices seems reasonable. With respect to the limited exports

originating from Gaza, one can also assume that they are price takers. The only exception to this assumption is the enormous smuggling business via the terror tunnels at the Egyptian border with Gaza.

Despite the limitations imposed by the lack of data, the proposed CGE model has been kept quite general. In addition to the data problem, there are a number of other issues we would like to highlight.

First, the import and export data collected by the UN for Gaza indicate that there are imports and exports for all traded sectors, despite their low level. Lacking any further information, we employ the Armington assumption of imperfect substitution between the domestic and imported parts of consumption associated with the traded sectors. We employ an analogous assumption of imperfect substitution between domestic and exported parts of output for the producers. The CES functions that have been used for such purposes require some knowledge about the respective elasticities of substitution. Since the Gaza literature is not much help, and an assumption of perfect substitution is too inconsistent with reality to be acceptable, we have preserved the assumption of imperfect substitution using borrowed elasticity estimates from other failed states.

Second, since Gaza's imports and exports have been restricted by Israel post-2007, the local Hamas government of Gaza does not have the authority to impose tariffs on imports. It does impose the standard gangster user fees. In effect, there is a differential tax on certain types of products smuggled by way of the tunnels via Egyptian territory. We treat these surcharges as a rough estimate of a tariff from the standpoint of the CGE model. Similarly, there may be financial incentives for producers to export, which may be identical to export subsidies from the standpoint of the model. As a result, the equations relating domestic import and export prices to their corresponding world prices have been kept quite general. Since information regarding these gangster tariffs and subsidies remains murky, they are assumed not to be zero in the current version of the model and are therefore subjected to random simulation.

Our third general remark regarding the model is that we are trying to model the Gaza economy and its relationship with the Israeli economy without modeling the Israeli economy. The economic relationship between segments of Gaza, the so-called, high-tech industry and the Israeli economy has been an open secret but not well documented. It is expressed in the model in terms of the social, economic and political interactions between Gaza on the one hand and Israel on the other. It is beyond the scope of this work, however, to develop behavioral equations to describe the processes with respect to the Israeli economy, at this stage.

Modeling redistribution in the Gaza economy is a difficult task. As will become clear from the discussion below, there are numerous types of transactions among the actors of the Gaza economy. Our general strategy is to combine all the

transactions between any two given actors and capture the flow through an appropriately specified equation. Although most of the transactions (generally transfers) involving Israeli actors have been treated exogenously, this is not the case for transactions between Gaza and Israel.

The aggregation of different types of transactions into a single flow is assumed to work in the current stage of the Gaza-specific CGE model development. The different types of transactions could be modeled separately in the future, but that would require further database development and better knowledge about the behavioral patterns of various actors in the Gaza economy. Moreover, while the aggregate flows are currently specified as multiplicative functions of the relevant argument variables, the actual relationships are likely to be nonlinear. Better data and a better understanding of behavior will allow for more sophisticated modeling in the future.

The question of Gaza's economic future is essentially a dynamic one. The question that interests everyone is what will happen to the Gaza economy if certain changes are made in its relationship with Israel. Such changes may relate to standard economic items like Israeli transfers, and Israeli taxation. Another dynamic question is how other changes (i.e. those unrelated to Gaza's relationship with Israel) will affect the Gaza economy. Such changes may relate to the investment allocation pattern sourced from the GCC countries, the efficiency and extent of government involvement in the economy, the trade orientation of the economy and the sources of future capital inflow.

One of the most important changes referred to in our rendition of the CGE model for Gaza is that it will have three dominant sectors, tourism, agriculture and high-tech. Education as a sector would be run by foreign experts imported by the stakeholders, designed to provide a balanced curriculum with external oversight to assure the development of a skilled population. This sector will be calculated as a net importer in the current account. The specification of our CGE model will allow us to analyze the effect of financial flows in and out of the territory. Given that Gaza will not have any monetary authority, all capital flows will be controlled by foreign stakeholders.

8.1. *Indices, variables and parameters*

The indices of the model are as follows:

i, j	:	Indices of all sectors
ie	:	Index of export sectors
ien	:	Index of non-export sectors
im	:	Index of import sectors
imn	:	Index of non-import sectors

ig : Index of public administration sector
ign : Index of sectors other than public administration
iss : Index of sectors with sector-specific capital input
issn : Index of sectors without sector-specific capital input

The price variables are as follows:

R : Exchange rate, nominal
PWE : World price of export
PE : Domestic price of export
PM : Domestic price of import
PD : Domestic price of domestic output
PQ : Price of demand composite
PX : Price of supply composite
PVA : Price of value added
PK : Price of capital by destination sector
PSSI : Price of sector-specific capital input
PINDEX : Price index (GDP deflator)

The output variables are as follows:

X : Gross output
E : Export
M : Import
D : Domestic sales of domestic output
Q : Demand for composite good

The factor market variables are as follows:

KD : Sectoral demand for capital
SSID : Demand for sector-specific capital
LD : Sectoral demand for labor
WA : Average wage for economy
AJRAGN : Adjusted common rate of return on capital for sectors other than public administration
LST : Total labor supply
KSTGN : Total capital supply for sectors other than public administration
SSI : Supply of sector-specific capital

The income-expenditure flow variables are as follows:

HHBGAZAC	:	GAZA household balance with GAZA business
HHBGAZAG	:	GAZA household balance with Gaza government
HHBIL	:	GAZA household balance with Israel government
HHBILC	:	GAZA household balance with Israeli corporations
HHBNR	:	Gaza household balance with GAZA non-residents
GAZABHH	:	GAZA business sector's balance with GAZA households
GAZABGAZAG	:	GAZA business sector's balance with GAZA government
GAZABIL	:	GAZA business sector's balance with Israeli government
GAZABILC	:	GAZA business sector's balance with Israeli corporations
GAZABNR	:	GAZA business sector's balance with GAZA non-residents
GAZAGBHH	:	GAZA government's balance with GAZA households
GAZAGBGAZA	:	GAZA government's balance with GAZA business
GAZAGBIL	:	GAZA government's balance with Israeli government
GAZAGBILC	:	GAZA government's balance with Israeli corporations
GAZAGBNR	:	GAZA government's balance with GAZA non-residents
ILTRANS	:	Overall balance with Israeli government
NINVINC	:	Net investment income
NRTRANS	:	Overall balance with GAZA non-residents
HHINC	:	Household income
HHSAV	:	Household savings
CD	:	Personal consumption by sector
CORPSAV	:	GAZA business sector's saving (including depreciation)
ITAXTOT	:	Total indirect tax
GOVREV	:	GAZA government's revenue
GDTOT	:	Total GAZA government's purchases
GOVSAV	:	GAZA government's savings
GD	:	GAZA government's purchases by sector
DOMSAV	:	GAZA total domestic savings
FSAV	:	External savings
IABROAD	:	GAZA investment abroad
DOMINV	:	Gross domestic investment
FXDINV	:	Fixed domestic investment
DK	:	Fixed investment by sector of destination
FID	:	Fixed investment demand by sector of origin
ICD	:	Inventory change demand by sector of origin
INT	:	Intermediate input demand

The aggregate income variables are as follows:

RGDP	:	Real GDP
GDPVA	:	Nominal GDP (value added at market prices)
GNP	:	Nominal GNP
RGNP	:	Real GNP

The parameters of external trade are as follows:

pwm	:	World price of import
tm	:	Tariff rate on import
te	:	Subsidy rate on export
η	:	Elasticity of demand for exports

The parameters of production and factor supply are as follows:

io	:	Input-output coefficient, where io_{ij} is the intermediate input of i used in j
ccm	:	Capital composition coefficient, where ccm_{ij} is the capital component of i used in j
ad	:	Production function shift parameter
α	:	Output elasticity wrt labor
β	:	Output elasticity wrt plant and equipment capital
ϕ	:	Output elasticity wrt sector-specific capital
wdist	:	Sectoral proportionality factor for wage
λ	:	Elasticity of labor supply wrt real wage
baselst	:	Constant for labor supply equation

The parameters of aggregation are as follows:

at	:	Shift parameter for supply aggregation function
ρt	:	Elasticity parameter for supply aggregation function
γ	:	Share parameter for supply aggregation function
ac	:	Shift parameter for demand aggregation function
ρc	:	Elasticity parameter for demand aggregation function
δ	:	Share parameter for demand aggregation function

The parameters of demand are as follows:

mps	:	Marginal propensity to save
basehhsav	:	Constant term for household savings equation
cles	:	Sectoral shares in consumption
mpgs	:	Marginal propensity for government saving
basegovsav	:	Constant term for government saving function
gles	:	Sectoral shares in government's purchases
baseexp	:	Constant for export demand function
icdr	:	Coefficient determining inventory change demand

The parameters of redistribution are as follows:

itaxr	:	Indirect tax rate–gangster tax
hhshcapinc	:	Household share in capital income
hhtaxrate	:	Overall tax rate on household income
captaxrate	:	Overall tax rate on corporate income
invfrac	:	Fraction of domestic saving that is invested abroad

8.2. *Equations*

The price equations are as follows:

(1) $PM_{im} = pwm_{im} \cdot (1 + tm_{im}) \cdot R$,

where
PM — Domestic price of import,
pwm — World price of import,
tm — Tariff rate on import,
R — Exchange rate, nominal,
im — Index of import sectors.

(2) $PE_{ie} = PWE_{ie} \cdot (1 + te_{ie}) \cdot R$,

where
PE — Domestic price of export,
PWE — World price of export,
te — Subsidy rate on export,
R — Exchange rate, nominal,
ie — Index of export sectors.

(3) $PQ_i \cdot Q_i = PD_i \cdot D_i + PM_i \cdot M_i$,

where
PQ — Price of demand composite,
Q — Demand for composite good,
PD — Domestic price of domestic output,
D — Domestic sales of domestic output,
PM — Domestic price of import,
M — Import,
i — Index of all sectors.

(4) $PX_i \cdot X_i = PD_i \cdot D_i + PE_i \cdot E_i$,

where
PX — Price of supply composite,
X — Gross output,
PD — Domestic price of domestic output,
D — Domestic sales of domestic output,
PE — Domestic price of export,
E — Export,
i — Index of all sectors.

(5) $PVA_i = (1 - itaxr_i) \cdot PX_i - \sum_j io_{ji} \cdot PQ_j$,

where
PVA — Price of value added,
$itaxr$ — Indirect tax rate,
PX — Price of supply composite,
io — Input-output coefficient, where io_{ji} is the intermediate, input of j used in i,
PQ — Price of demand composite,
i, j — Indices of all sectors.

(6) $PK_i = \sum_j PQ_j \cdot ccm_{ji}$,

where
PK — Price of capital by destination sector,
PQ — Price of demand composite,
ccm — Capital composition coefficient, where ccm_{ji} is the, capital component of j used in i,
i, j — Indices of all sectors.

(7) $PINDEX = GDPVA/RGDP$,

where
PINDEX — Price index (GDP deflator),
GDPVA — Nominal GDP (value-added at market prices),
RGDP — Real GDP.

The equations of production and factor demand are as follows:

(8) $X_{issn} = ad_{issn} \cdot LD_{issn}^{\alpha} \cdot KD_{issn}^{\beta}$,

where
X — Gross output,
ad — Production function shift parameter,
LD — Sectoral demand for labor,
α — Output elasticity wrt labor,
KD — Sectoral demand for capital,
β — Output elasticity wrt plant and equipment capital,
issn — Index of sectors without sector-specific capital input.

(9) $X_{iss} = ad_{iss} \cdot LD_{iss}^{\alpha} \cdot KD_{iss}^{\beta} \cdot SSI_{iss}^{\phi}$,

where
X — Gross output,
ad — Production function shift parameter,
LD — Sectoral demand for labor,
α — Output elasticity wrt labor,
KD — Sectoral demand for capital,
β — Output elasticity wrt plant and equipment capital,
SSI — Supply of sector-specific capital,
ϕ — Output elasticity wrt sector-specific capital,
iss — Index of sectors with sector-specific capital input.

(10) $WA \cdot wdist_{ign} \cdot LD_{ign} = \alpha_{ign} \cdot PVA_{ign} \cdot X_{ign}$,

where
WA — Average wage for economy,
wdist — Sectoral proportionality factor for wage,
LD — Sectoral demand for labor,
α — Output elasticity wrt labor,
PVA — Price of value added,
X — Gross output,
ign — Index of sectors other than public administration.

(11) $PSSI_{iss} \cdot SSI_{iss} = \phi_{iss} \cdot PVA_{iss} \cdot X_{iss}$,

where
$PSSI$ — Price of sector-specific capital input,
SSI — Supply of sector-specific capital,
PVA — Price of value-added,
X — Gross output,
ϕ — Output elasticity wrt sector-specific capital,
iss — Index of sectors with sector-specific capital input.

(12) $\log(LST) = baselst + \lambda \cdot (\log(WA) - \log(PINDEX))$,

where
LST — Total labor supply,
$baselst$ — Constant for labor supply equation,
λWA — Average wage for economy,
$PINDEX$ — Price index (GDP deflator).

(13) $X_{ie} = at_{ie} \cdot (\gamma_{ie} \cdot E_{ie}^{\rho t_{ie}} + (1 - \gamma_{ie}) \cdot D_{ie}^{\rho t_{ie}})^{\frac{1}{\rho t_{ie}}}$,

where
X — Gross output,
at — Shift parameter for supply aggregation function,
γ — Share parameter for supply aggregation function,
E — Export,
ρt — Elasticity parameter for supply aggregation function,
D — Domestic sales of domestic output,
ie — Index of export sectors.

(14) $X_{ien} = D_{ien}$,

where
X — Gross output,
D — Domestic sales of domestic output,
ien — Index of non-export sectors.

(15) $Q_{im} = ac_{im} \cdot (\delta_{im} \cdot M_{im}^{-\rho c_{im}} + (1 - \delta_{im}) \cdot D_{im}^{-\rho c_{im}})^{-\frac{1}{\rho c_{im}}}$,

where
Q — Demand for composite good,
ac — Shift parameter for demand aggregation function,
δ — Share parameter for demand aggregation function,
M — Import,

ρc — Elasticity parameter for demand aggregation function,
D — Domestic sales of domestic output,
im — Index of import sectors.

(16) $Q_{imn} = D_{imn}$,

where
Q — Demand for composite good,
D — Domestic sales of domestic output,
imn — Index of non-import sectors.

(17) $M_{im} = D_{im} \cdot (\frac{PD_{im}}{PM_{im}} \cdot \frac{\delta_{im}}{(1-\delta_{im})})^{\frac{1}{1+\rho c_{im}}}$,

where
M — Import,
D — Domestic sales of domestic output,
PD — Domestic price of domestic output,
PM — Domestic price of import,
δ — Share parameter for demand aggregation function,
ρc — Elasticity parameter for demand aggregation function,
im — Index of import sectors.

The equations of income–expenditure flows are as follows:

(18) $HHBGAZAC = hhshcapinc \cdot (\sum_i \beta_i \cdot PVA_i \cdot X_i + \sum_{iss} \varphi_{iss} \cdot PVA_{iss} \cdot X_{iss})$,

where
HHBGAZA GAZA — household balance with GAZA business,
hhshcapinc — House hold share in capital income,
β — Output elasticity wrt plant and equipment capital,
PVA — Price of value added,
X — Gross output,
ϕ — Output elasticity wrt sector-specific capital,
i — Index of all sectors,
iss — Index of sectors with sector-specific capital input.

(19) $HHBGAZAG = hhtaxrate \cdot (\sum_i \alpha_i \cdot PVA_i \cdot X_i + HHBGAZAC)$,

where
HHBGAZAG — GAZA household balance with GAZA government,
hhtaxrate — Overall tax rate on household income,
α — Output elasticity wrt labor,
PVA — Price of value added,

X — Gross output,
HHBGAZAC — GAZA household balance with GAZA business,
i — Index of all sectors.

(20) $GAZACBHH = -HHBGAZAC$,

where
GAZACBHH — GAZA business sector's balance with GAZA households,
HHBGAZAC — GAZA household balance with GAZA business.

(21) $GAZACBGAZAG = -captaxrate \cdot (\sum_i \beta_i \cdot PVA_i \cdot X_i + \sum_{iss} \varphi_{iss} \cdot PVA_{iss} \cdot X_{iss})$,

where
GAZACBGAZAG — GAZA business sector's balance with GAZA government,
captaxrate — Overall tax rate on corporate income,
β — Output elasticity wrt plant and equipment capital,
PVA — Price of value added,
X — Gross output,
ϕ — Output elasticity wrt sector-specific capital,
i — Index of all sectors,
iss — Index of sectors with sector-specific capital input.

(22) $GAZAGBHH = -HHBGAZAG$,

where
GAZAGBHH — GAZA government's balance with GAZA households,
HHBGAZAG — GAZA household balance with GAZA government.

(23) $GAZAGBGAZA = -GAZACBGAZAG$,

where
GAZAGBGAZAC — GAZA government's balance with GAZA business,
GAZACBGAZAG — GAZA business sector's balance with GAZA government.

(24) $HHINC = \sum_i \alpha_i \cdot PVA_i \cdot X_i + HHBGAZAC + HHBGAZAG + HHBIL + HHBILC + HHBNR$,

where
HHINC — Household income,
α — Output elasticity wrt labor,
PVA — Price of value added,
X — Gross output,
HHBGAZAC — GAZA household balance with GAZA business,

HHBGAZAG — GAZA household balance with GAZA government,
HHBIL — GAZA household balance with Israeli government,
HHBUSC — GAZA household balance with Israeli corporations,
HHBNR — GAZA household balance with GZA non-residents,
i — Index of all sectors.

(25) $HHSAV = basehhsav + mps \cdot HHINC$,

where
HHSAV — Household savings,
basehhsav — Constant term for household savings equation,
mps — Marginal propensity to save,
HHINC — Household income.

(26) $PQ_i \cdot CD_i = cles_i \cdot (HHINC - HHSAV)$,

where
PQ — Price of demand composite,
CD — Personal consumption by sector,
cles — Sectoral shares in consumption,
HHINC — Household income,
HHSAV — Household savings,
i — Index of all sectors.

(27) $CORPSAV = \sum_i \beta_i \cdot PVA_i \cdot X_i + \sum_{iss} \varphi_{iss} \cdot PVA_{iss} \cdot X_{iss} \cdot X_{iss} + GAZACBHH + GAZACBGAZAG + GAZACBILC + GAZACBIL + GAZACBNR$,

where
CORPSAV — GAZA business sector's saving (including depreciation),
β — Output elasticity wrt plant and equipment capital,
PVA — Price of value added,
X — Gross output,
ϕ — Output elasticity wrt sector-specific capital,
GAZACBHH — GAZA business sector's balance with GAZA households,
GAZACBGAZAG — GAZA business sector's balance with GAZA government,
GAZACBUSC — GAZA business sector's balance with Israeli corporations,
GAZACBIL — GAZA business sector's balance with Israel,
GAZACBNR — GAZA business sector's balance with GAZA non-residents,
i — Index of all sectors,
iss — Index of sectors with sector-specific capital input.

(28) $ITAXTOT = \sum_i itaxr_i \cdot PX_i \cdot X_i,$

where
ITAXTOT — Total indirect tax,
itaxr — Indirect tax rate,
PX — Price of supply composite,
X — Gross output,
i — Index of all sectors.

(29) $GOVREV = ITAXTOT + GAZAGBHH + GAZAGBPRC + GAZAGBIL + GAZAGBILC + PRGBNR + \beta_{ig} \cdot PVA_{ig} \cdot X_{ig},$

where
GOVREV — GAZA government's revenue,
ITAXTOT — Total indirect tax,
GAZAGBHH — GAZA government's balance with GZA households,
GAZAGBPRC — GAZA government's balance with GAZA business,
GAZAGBFED — GAZA government's balance with Israeli government,
GAZAGBILC — GAZA government's balance with Israeli corporations,
GAZAGBNR — GAZA government's balance with PR non-residents,
β — Output elasticity wrt plant and equipment capital,
PVA — Price of value added,
X — Gross output,
ig — Index of public administration sector.

(30) $GOVSAV = basegovsav + mpgs \cdot GOVREV,$

where
GOVSAV — GAZA government's savings,
basegovsav — Constant term for government saving function,
mpgs — Marginal propensity for government saving,
GOVREV — GAZA government's revenue.

(31) $PQ_i \cdot GD_i = gles_i \cdot (GOVREV - GOVSAV),$

where
PQ — Price of demand composite,
GD — GAZA government's purchases by sector,
gles — Sectoral shares in government's purchases,
GOVREV — GAZA government's revenue,
GOVSAV — GAZA government's savings,
i — Index of all sectors.

(32) $GDTOT = \sum_i GD_i$,

where
$GDTOT$ — Total GAZA government's purchases,
GD — GAZA government's purchases by sector,
i — Index of all sectors.

(33) $DOMSAV = HHSAV + GOVSAV + CORPSAV$,

where
$DOMSAV$ — Total domestic savings,
$HHSAV$ — Household savings,
$GOVSAV$ — GAZA government's savings,
$CORPSAV$ — GAZA business sector's saving (including depreciation).

(34) $ICD_i \cdot PQ_i = icdr_i \cdot X_i \cdot PX_i$,

where
ICD — Inventory change demand by sector of origin,
PQ — Price of demand composite,
$icdr$ — Coefficient determining inventory change demand,
X — Gross output,
PX — Price of supply composite,
i — Index of all sectors.

(35) $IABROAD = invfrac \cdot DOMSAV$,

where
$IABROAD$ — GAZA investment abroad,
$invfrac$ — Fraction of domestic saving that is invested abroad,
$DOMSAV$ — Total domestic savings.

(36) $DOMINV = DOMSAV + FSAV \cdot R - IABROAD$,

where
$DOMINV$ — Gross domestic investment,
$DOMSAV$ — Total domestic savings,
$FSAV$ — External savings,
R — Exchange rate, nominal,
$IABROAD$ — GAZA investment abroad.

(37) $FXDINV = DOMINV - \sum_i PQ_i \cdot ICD_i$,

where
FXDINV — Fixed domestic investment,
DOMINV — Gross domestic investment,
PQ — Price of demand composite,
ICD — Inventory change demand by sector of origin,
i — Index of all sectors.

(38) $FID_i = \sum_j DK_j \cdot ccm_{ij}$,

where
FID — Fixed investment demand by sector of origin,
DK — Fixed investment by sector of destination,
ccm — Capital composition coefficient, where ccm_{ij} is the,
capital component of *i* used in *j*,
i, *j* — Indices of all sectors.

(39) $INT_i = \sum_j io_{ij} \cdot X_j$,

where
INT — Intermediate input demand,
io — Input-output coefficient, where io_{ij} is the intermediate, input of *i* used in *j*,
X — Gross output,
i, *j* — Indices of all sectors.

(40) $ILTRANS = HHBIL \cdot R + GAZACBIL \cdot R + GAZAGBIL \cdot R$,

where
ILTRANS — Overall balance with U.S. Federal government,
HHBFED — GAZA household balance with Israeli government,
R — Exchange rate, nominal,
GAZACBIL — GAZA business sector's balance with Israeli government,
GAZAGBIL — GAZA government's balance with Israeli government.

(41) $NINVINC = HHBILC \cdot R + GAZACBILC + GAZAGBILC \cdot R$,

where
NINVINC — Net investment income,
HHBILC — GAZA household balance with Israeli corporations,
R — Exchange rate, nominal,
GAZACBILC — GAZA business sector's balance with Israeli corporations,
GAZAGBILC — GAZA government's balance with Israeli corporations.

(42) $NRTRANS = HHBNR \cdot R + GAZACBNR \cdot R + GAZAGBNR$,

where
NRTRANS — Overall balance with GAZA non-residents,
HHBNR — GAZA household balance with GAZA non-residents,
R — Exchange rate, nominal,
GAZACBNR — GAZA business sector's balance with GAZA non-residents,
GAZAGBNR — GAZA government's balance with GAZA non-residents.

The equations of market clearing are as follows:

(43) $Q_i = INT_i + CD_i + ICD_i + FID_i + GD_i$,

where
Q — Demand for composite good,
INT — Intermediate input demand,
CD — Personal consumption by sector,
ICD — Inventory change demand by sector of origin,
FID — Fixed investment demand by sector of origin,
GD — GAZA government's purchases by sector,
i — Index of all sectors.

(44) $\sum_i LD_i = LST$,

where
LD — Sectoral demand for labor,
LST — Total labor supply,
i — Index of all sectors.

(45) $SSID_{iss} = SSI_{iss}$,

where
SSID — Demand for sector-specific capital,
SSI — Supply of sector-specific capital,
iss — Index of sectors with sector-specific capital input,

(46) $\sum_{im} PM_{im} \cdot M_{im} = \sum_{ie} PE_{ie} \cdot E_{ie} + ILTRANS + NRTRANS + NINVINC + FSAV - IABROAD$,

where
PM — Domestic price of import,
M — Import,
PE — Domestic price of export,

E — Export,
ILTRANS — Overall balance with Israeli government,
NRTRANS — Overall balance with GAZA non-residents,
NINVINC — Net investment income,
FSAV — External savings,
IABROAD — GAZA investment abroad,
PINDEX — Price index (GDP deflator).

The equations for measures of aggregate income are as follows:

(47) $GDPVA = \sum_i PVA_i \cdot X_i + ITAXTOT$,

where
GDPVA — Nominal GDP (value added at market prices),
PVA — Price of value added,
X — Gross output,
ITAXTOT — Total indirect tax,
i — Index of all sectors.

(48) $RGDP = \sum_i (CD_i + ICD_i + FID_i + GD_i) + \sum_{ie} E_{ie} - \sum_{im} M_{im}$,

where
RGDP — Real GDP,
CD — Personal consumption by sector,
ICD — Inventory change demand by sector of origin,
FID — Fixed investment demand by sector of origin,
GD — GAZA government's purchases by sector,
E — Export,
M — Import,
i — Index of all sectors,
ie — Index of export sectors,
im — Index of import sectors.

(49) $GNP = GDPVA + NINVINC + HHBNR$,

where
GNP — Nominal GNP,
GDPVA — Nominal GDP (value added at market prices),
NINVINC — Net investment income,
HHBNR — GAZA household balance with GAZA non-residents.

(50) $RGNP = GNP \cdot (1/PINDEX)$,

where
RGNP — Real GNP,
GNP — Nominal GNP,
PINDEX — Price Index (GDP Deflator).

9. Concluding Remarks

This paper presents a proposed economic structure for rebuilding Gaza under a well-established BOT approach. The solution that we propose to the Gaza problem can be found by focusing narrowly on the investment solution to a failed experiment. This is a common approach that economists address in a post — bankruptcy situation. The Hamas experiment, since Israel's unilateral withdrawal in 2005, has proven to be a complete failure leaving Gaza in a devastating bankruptcy.

To solve this bankruptcy problem, we suggest an approach based on the classic BOT framework. The countries that invest in this project will become equity shareholders with a 50-year lease. The civil administrators that will be brought into Gaza will develop an economic model based on the principle of "private provision of public services". It will also create the common-law principles known as the "rule of law" as it is applied to property, contract, criminal and tort law under a market system. The sovereignty for the residents will be addressed only after the 50-year lease arrangement is complete along with the formation of a robust civil administration (e-Government) and common law paradigm referred to as "rule of law" is finalized. A revitalized education system will be established based on a reformed UAE, Bahrain and Saudi Arabian curriculum. A CGE model presented in the paper will be used to track a three-sector Gaza economy (tourism, agriculture and high-tech) and will be implemented to address alternative pathways for the development of this sovereign non-militarized green economy. The approach presented in this paper is a complete repudiation of the failed "Washington Consensus" that the Western experts and intellectuals have proposed for the last 75 years, without any success.

The reconstruction program will focus on three sectors. The primary sector will be the tourism sector which will have hotels constructed on the West side of the territory facing the sea. The residential community will be in PRC styled 30 floor housing units on the East side of the territory. The territory will be serviced by an above ground rail system, avoiding private vehicles. The power source for both the hospitality sector and the housing sector will be solar power. The surplus power will be transferred to a revitalized grid.

The second sector will be agriculture. Before Israel left the territory in 2005, Gaza had a successful agricultural sector with an abundance of green houses and exportable commodities. The reconstruction effort will re-start this sector to bring self-sufficiency and food security to Gaza.

The third sector to support in the reconstruction effort will come from the high-tech and service sectors. These sectors can bring back — E-Government and E-Commerce. The logistics to be built will be based on artificial intelligence and robotics.

Finally, the reconstruction project will include an airport, a seaport, a power plant and a desalination station all monitored by AI.

Overall, the CGE model we propose will be used to measure the performance of the reconstruction project and simulate alternative development strategies based on both internal and external factors. The cost of this massive reconstruction of Gaza will range from $1 to $2 trillion and will take 5–10 years to complete. The investors will have a direct equity share in Gaza with a 50-year lease and the incentives to build and operate a civil infrastructure to govern Gaza under the market assumption of "private provision of public services".

The Transfer issue can be addressed by the investors after their 50-year lease is complete and the civil administration is functioning efficiently under the common-law principles that govern property, contract, criminal and tort law under a market system. The primary objective function for the investor stakeholders is the development of a sovereign demilitarized green economy that is profitable and self-sustaining. Any fear of expropriation by a future government will have to be addressed by the investor stakeholders during the transfer period.

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