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1

The Pen Family Farm

AN INTRODUCTION

THE PEN family farmhouse—wooden, tall, and aged—sits in the middle of a former battlefield in Lumphat District, Ratanakiri Province, Cambodia. The original thatch roof has been replaced with aluminum, but the house has retained much of its traditional Khmer architecture, like the hardwood frame, gabled roof, and open-air ground floor.

The bedroom and living room on the second floor sit upon ten-foot pylons, allowing air to circulate during the hot season and lifting the house above floodwater during the wet season. Acres of agricultural land—some of the most fertile in the country—are visible from the kitchen and the platform table on the ground floor.

When the first generation of Pens settled here sometime in the 1940s, this land was a forest basin, filled with nutrient-rich, loose, loamy soil. Over the course of twenty years, Thida and Rithy Pen cleared the majority of the trees on their ten hectares, using the wood to build the house that stands here today.¹ Looking around their property from the ground floor, our view is broken by an occasional thirty-meter-tall tree, a remnant of

the dwarf rainforest that was here when the Pen family arrived over eighty years ago. The trees have long, smooth trunks topped by bushy branches spread against the sky, like giant broccoli crowns. They are called *cheuh tiel tom* in Khmer. You can cut a notch in the tree, burn the hole to stimulate sap flow, and place a bucket below to collect the sap. The liquid serves many purposes: a wood sealant, a soap ingredient, and a fire starter. For these reasons, English-speaking arborists call them “resin trees.”

Thida and Rithy Pen are now retired, but they have passed their farm on to their children, including their son Leang and daughter-in-law Lom. Prematurely gray-haired, Lom takes us to their garden to see the soil, calling it by its colloquial name, *dei krahom* (red soil).² The technical Cambodian name is *labansiek* soil, according to scientists at the International Rice Research Institute. It has a burnt, reddish-brown color. The soils formed on the sides of hills as the lava flow of ancient volcanoes created balsamic rock that has been weathered down over millennia. When you touch the grains of soil, it feels both cushioned and dense, like an expensive foam mattress. It has a clay-like texture, but also falls apart like sand when it’s dry. The soil’s microstructure is well suited for holding water, to the point that it does not need to be regularly irrigated for commercial production. Horticulturalists estimate that without fertilizer, this soil should be able to produce 1,400 to 1,600 kilograms of rice per hectare (Nesbitt 1997).

Lom and Leang are experienced farmers—she can identify wild boars by their tracks and he has built a walking tractor from spare parts—and the fruit trees and vegetable garden that surround the house are thriving.³ Leang has grown up on this land, and Lom raised chickens, dogs, cows, cassava, and cashews in Prey Veng Province, Cambodia, where she was

born. Together, they grow fruits and vegetables twelve months a year in the garden beds (*jomkaa*). Hollow-stem spinach, amaranth, wax gourd, mungbean, kabocha squash, eggplant, cucumber, winged beans, tamarind mangoes, apple bananas, plantain bananas, and Madagascar plums are among the produce that the family grows here.

Despite their years of experience and hard work, Lom and Leang are more or less failing at small-scale commercial production. The couple own about three hectares (the rest of Thida and Rithy's land is owned by Leang's siblings), but Lom and Leang have scarcely a hectare under cultivation now, and their land is thus an odd patchwork—largely wild and overgrown but punctuated by irregularly placed and well-maintained fields. In the cultivated areas, Lom is usually able to produce only a half-kilogram of rice per year, and even that depends on luck. (Once, she lost her entire crop in one night when a wild boar ate everything.) Why are these smart and hardworking farmers in one of the country's most fertile areas tallying so many losses, unable to clear their share of agricultural profits?

To answer this question, Lom and Leang tell me about two intertwined local events, which loom large in the family's memory: the 1970 siting of a military base within a few kilometers from the Pen family farmhouse, and the subsequent repeated bombings of the area. The base was built by General Lon Nol, who took over the country from 1971 to 1975, seizing power from King Norodom Sihanouk on the encouragement of the US State Department. During Lon Nol's rule, he sent the Khmer National Armed Forces, a branch of the state military, to Ratanakiri Province, where they fought Pol Pot's guerrilla army of revolutionaries and their Vietnamese communist counterparts. Lon Nol sited the army's Ratanakiri base on Elephant

Hill, only a few kilometers from the Pen farmhouse; it included a hospital tent, soldier barracks, and even hiding places underneath the treeline. Shortly after Lon Nol took power, the US renewed its aerial attacks on Cambodia as part of an effort to break up communist supply lines that ran from North Vietnam through Laos and Cambodia to South Vietnam. From 1970 to 1973, the US dropped bombs on Elephant Hill and throughout much of the basin where the Pens' farm is located.

As they tell me this story, Leang's and Lom's body language and voices betray just how immediate these fifty-year-old events still are: "There's a bomb crater as big as our house," Leang shouts from the house, pointing in the direction of Elephant Hill.⁴ Lom wants to take us to see it, but she is worried: we mustn't stray off the path, she cautions. She is dressed casually in a bright floral shirt, loose trousers, and rubber flip flops, and weather-creases line the bottom of her eyes. "Even I still get scared. . . she admits and tilts her head to gauge my comprehension. Her land is covered with unexploded bombs, some hidden inches or even feet below the surface, and it is impossible for newcomers to detect what is lurking inches below without specialized equipment and training.

I promise to be careful and follow her lead, and we make our way west on a raised clay footpath. We walk through a strangely mottled landscape. In the area close to the house, we are in brilliant sunshine, wading through emerald rice stalks in a paddy full of water and mud, working our way toward a large fallow pasture of brush and fallen trees. Only a little farther on, though, we come to a big, gravelly mound of alluvial deposits that looks like clumps of clay and steel-cut oats. Blackened tree branches stick up through the mound, encrusted with metal shards and ash.

We are now at Lom's detonation point, where she explodes or stores the stray munitions that she finds. (Professional deminers do not want to move the likely unstable bombs and usually detonate them onsite; Lom moves the bombs to a central site for detonation because she does not wish to further damage potentially arable land.) She shows me a cluster bomb that she found while tilling her soil just last week. Half of the bomb is encased in dirt, and the exposed side reveals a rusty metal casing, stone-gray with reddish-brown tints. Until I look at it closely, it looks almost identical to the rocks in the soil, except the bomb is perfectly spherical—smooth, exact manufactured curves.

The Pens' experience belies neoclassical growth models, which assert that a land's history of political violence should play little, if any, role in contemporary production. In the past three decades, neoclassical growth theory became one of the dominant paradigms of development economics, and a bridge to other fields, notably political science, history, and anthropology. Scholars like Robert Barro and Xavier Sala-i-Martin (1992) initially used these models to explore why poor US states and European countries eventually converge toward rich ones. Other economists, like Chris Blattman and Edward Miguel (2010), rooted their application of the theory less in the advanced industrial world and more in the developing world, especially countries recovering from war. The draw of this framework, in their view, is its ability to clarify how war damage to particular factors of production (i.e., physical capital, labor, human capital), technology, institutions, or prices would impact economic performance (p.38). They argue that periods of depletion are followed by periods of transitory growth until a steady state is attained—until population size and capital

stocks (inevitably) bounce back. According to these theories, postwar surges in the birthrate will offset wartime casualties and repopulate neighborhoods demolished by violence; similarly, they assert that as long as a country's capital stock is only partially destroyed and its production function remains the same (defined here as its ability to produce maximum output, given a certain quantity of inputs and level of technology), then the economy will experience only a temporary bump in capital accumulation, for production will quickly return to prewar levels.

We encounter some evidence confirming these theories in seminal pieces on interstate war. Cross-national statistical analyses from political science (Przeworski 2000) and economics (Organski and Kugler 1977) find that national economies tend to quickly converge back to steady-state growth, at least in terms of macroeconomic indicators like per capita income.⁵ The model's predictions are also borne out in examinations of industrialized cases like Japan and Germany (Davis and Weinstein 2002; Brakman, Garretsen, and Schramm 2004) and semi-industrialized economies like Vietnam (Miguel and Roland 2011). But what about Cambodia? When I went to Cambodia in 2018, I wanted to see how these theories of postwar recovery were shaking out in an agrarian context, where farming was the most common occupation and local economies were dependent on rice production.

I had entered Ratanakiri Province in a rented van the week before, accompanied by two American students, one who came to collect soils and another who came to practice interviewing, and two Khmer interpreters.⁶ We had spent the first days getting acclimated to Banlung, the provincial capital, where we walked in forests that once hid the Ho Chi Minh Trail; we met former Khmer Rouge supporters and soldiers, as well as

those who fought against them and those who were imprisoned by them. Alongside these encounters with internationally known people and places, that morning at the Pens' farm in Lumphat District may seem mundane. But it retains a certain burnish, because it exemplified both how vulnerable farmers are to unexploded bombs as they move from one of their fields to another and also the bombs' outsized effect: as I found, an unknown number of hidden bombs create a "sphere of fear" (Perlman 2006) that dampens economic activity throughout an entire settlement.

Over the course of the summer, I would crisscross the province many times, revisiting people and places in order to describe not only the undetonated and leftover weapons that remain behind in conflict zones, but also the hangover effects of those weapons on the civilian population. This was among the most dangerous of a series of journeys that I had made to rural Cambodia over the past twelve years. I made this particular journey with professional deminers, who taught me how to identify and locate bombs and introduced me to village chiefs, former soldiers, indigenous minorities (Tumpuon, Jarai, Krung, Lao), and even a Khmer Rouge commander—people who would have been difficult to access otherwise. By the end of the summer, my respondents taught me a central irony of life in postconflict Cambodia. American airstrikes were designed to avoid civilian settlements, but the remnants of these rural bombings have forced civilian farmers to regularly do one of the most dangerous and strenuous tasks that the military can assign to its professional soldiers: the identification and clearance of unexploded ordnance. Our failures in military technology—the bombs' failures to explode on impact—have drained Cambodian fields of their safety and economic potential.

I had originally gone to Cambodia to study political folklore, but as I wended my way among the bombs, I wondered if the economic studies that have downplayed war's lasting effects might have missed something. Top-line numbers, like gross domestic product and export ratios, could be misleading. They may not capture inequality within a country or the relevant aspects of poverty that lead to long-term growth traps, like limited access to land and slow adaptation of technology. These powerful tools for quantitative analysis may abstract the messy, complicated human reality. The Pen family's story seemed to underscore how, by listening closely and becoming sensitive to context, an ethnographic approach can redefine the range of economic outcomes we should study: for instance, agricultural productivity variables (which are central to economic growth models, particularly in the developing world) and variables that are related to quality of life and human health, such as food insecurity and occupational safety. My ethnographic approach—observing and interacting with my respondents first—deeply informed my subsequent mass-sample surveys, which are still enormously helpful for capturing how a large population interacts with the market at a given point in time. My respondents defined what was appropriate for the study, and my econometric practices evolved to use various measures of welfare, security, and happiness. Long-term, immersive fieldwork allowed me to tell the rich and complex stories of how people navigate their postconflict environments to provide for themselves and their families from day to day.

I began my fieldwork as a college senior in 2006. That year, I invested in daily Khmer lessons so I could speak with people who lived on floating houses atop Boeung Kak, a lake in the center of Phnom Penh.⁷ Five years later, as a graduate student, I lived in the countryside for four months, working in

rice paddies and tobacco fields. I learned to coat rice with talcum powder prior to planting; talcum is a common biofertilizer that increases shoot growth and protects from fungal disease (see Tamreihao et al. 2016). I harvested, housed, and stripped tobacco remains. I harvested with the men, who worked early in the morning before peak heat and bundled the leaves with twine to bring back to the hamlet. In the afternoon, I sat with the women and children around piles of leaves, threading leaves on wooden skewers so they can hang to cure in dry houses. My hands were soon stained by black tar (a pair of disposable gloves cost five hundred riel, and a completed skewer gets you only one hundred riel). While we worked, people told stories of their routine encounters with leftover metals and occasionally munitions. The stories around the tobacco pile illustrated how, although neoclassical growth models may capture economic productivity in aggregate, they also miss critical elements of peoples' lived experience of farming—particularly negative aspects such as risk exposure, physical injury, and social harm, as well as the historical factors that produced these dangerous environmental conditions.

Over the course of the Vietnam War, the United States dropped 500,000 tons of bombs over Cambodia—more than the combined weight of every man, woman, and child in the country. What started as a secret infiltration of Laos, in which a few CIA officers would train and arm local Hmong villagers to fight the communist forces, eventually enveloped Cambodia and escalated into a nine-year war over the Ho Chi Minh Trail—a war fought primarily with bombs. It is now fifty years after the last sortie went out, and my respondents' stories show how the half-century legacy of unexploded ordnance has sedimented the war into the layers of contemporary society. Forward-looking policies aimed at developing or modernizing

Cambodia, from economic liberalization to authoritarian consolidation, must be realized in an environment that is still haunted by the violence of the past. Drawing on original interviews, a wealth of new historical data, and extensive fieldwork at the Cambodia-Vietnam border, I show how the unintended failure of military technology creates a dark halo around post-conflict land. I also show how, paradoxically, these same failures can protect the farmers even as they endanger them: the very bombs that endanger and impoverish farming communities deter predatory elites from grabbing and commodifying their land. As the stories captured in this book show, the bombing served as a critical juncture in these postconflict villages—marking the place in time where development stopped.

Why We Bomb

What I learned in the field about aerial weapons undercut much of what I was taught about how political scientists and military historians currently frame their study of technology and war. For decades, the conventional view among international relations experts was that more technological innovation yielded more power and plenty. Historian Geoffrey Parker (1988), in his acclaimed work *The Military Revolution*, attributes the rise of European empire in the nineteenth century to the Europeans' willingness to adopt new technologies and improve them for military use. Political scientist Kenneth Waltz (1979) argues that all great powers must exploit technological change; otherwise, they would lag behind other states and face threats to their survival.

In the past several years, however, research has begun to suggest otherwise. Scholars of international security like Michael Horowitz and Stephen Biddle point out that military forces

with better technology and capabilities can still lose wars (for example, the Vietnam War). Contemporary scholarship in their subfield, which is largely concerned with issues of national security, argues that it is in a great power's best interest to invest in superior weapons, but these states do not always end up acquiring or using them. To explain this inconsistency, international security scholars have pointed to the influence of domestic politics. As Michael Horowitz (2010) notes, some militaries are better at adopting new technologies than others due to their financial capacity and organizational structure. According to Stephen Biddle (2010), military leadership plays an important role here, for leadership's "force employment decisions"—how it chooses to organize and deploy its resources—intervene between theory and practice. Other scholars, such as Dan Reiter and Allan Stam (2010), instead highlight the regime type as the deciding factor, arguing that the foreign policy options of countries operating under democratic leadership are constrained by domestic audience costs. This new line of scholarship in international security seeks to unpack the concept of hard power to show that it is more than a budgetary byline or a count of infantry or aircraft carriers—that it is a product of domestic politics. This new tradition has helped us understand how political institutions, bureaucratic rules, and leadership ideology can intervene to impede technology acquisition and usage. But in its focus on battlefield outcomes and balance of power, it has left in the background the connections between superior military technologies and the people on whom they are used.

In the past century, weapons have grown in size and sophistication and increased their deadliness and destructive range to people on the ground. One prime example is aerial weaponry, which, according to advocates, offers a more efficient and rapid

projection of force than land or naval alternatives (Schelling 2008; Pape 2014). The world's first payload drop occurred in 1911, when Lieutenant Giulio Gavotti released four grenades, by hand, over the side of his plane during the Italian-Turkish War (De Groot 2005). A half-century later, a formation of six B-52s, dropping their bombs from thirty thousand feet, could obliterate almost everything within a box about five-eighths of a mile wide by two miles long, destroying military infrastructure faster than any battalion (Sheehan 1998). The five-hundred-pound MK-82 warhead, used in the US carpet bombing of Vietnam, Cambodia, and Laos (and more recently in the 2016 Saudi bombing of Yemen), is such an effective weapon of destruction that it annihilates its victims beyond recognition. After interviewing Yemeni witnesses, *New York Times* journalist Jeffrey E. Stern describes the visceral experience in his 2018 article:

The shell fractures into several thousand pieces, becoming a jigsaw puzzle of steel shards flying through the air at up to eight times the speed of sound. Steel moving that fast doesn't just kill people; it rearranges them. It removes appendages from torsos; it disassembles bodies and redistributes their parts. A sphere of expanding gas coming off the bomb, meanwhile, fills a body's hollow parts with energy, rupturing eardrums, collapsing lungs, perforating abdominal cavities and making hidden things bleed. The blast wave pushes air to such extraordinary speeds that the wind alone can cast limbs off bodies.

Warheads are capable of destroying so much from a safe distance. This was the guiding insight of Robert Pape. Pape (2014) and his predecessor Thomas Schelling (2008) believed that superior military technology, like airplanes, surface-to-air

missiles, and explosive warheads, would improve combat in two ways: one, faced with the prospect of devastatingly destructive airstrikes, targeted societies are more likely to fold, helping great powers win wars more decisively. Two, modern weapons would shield the flesh-and-blood soldier from the dangers associated with the battlefield. By finding a way to fight without putting soldiers at risk, coercive air power became an increasingly attractive policy tool—one with little cost in terms of domestic public opinion.⁸ This sentiment is echoed in Jason Lyall and Isaiah Wilson’s 2009 article, in which they describe the mechanization of militaries as largely beneficial, “increas[ing] mobility and survivability on contemporary battlefields” (p.68). Their comment underscores the implicit bias in international security: survivability is measured only in terms of our own soldiers and not carried over to adversarial populations.

The problem with this approach lies in its distorted perspective, its definition of cost as maximizing the odds of the great power winning while minimizing its casualties. Clearly, the distribution of casualties and the risks are extremely unequal. Aerial weapons pose enormous costs to the people who are being bombed. Attempts to make war less brutal for the American soldier have increased its brutality for those targeted. In 1971, Vietnam War journalist Neil Sheehan characterized aerial weapons not as a military necessity but as “a political convenience, a substitute for sufficient infantrymen to hold the countryside.”⁹ One could argue that ground troops make missions more merciful, since an infantryman can make moral determinations of life and death with more discrimination than a bomb,¹⁰ but bombs dropped from B-52 jets flying fifty thousand feet in the air cannot differentiate between a child and a combatant. Drone operators still have this problem today.

In 2019, an American F-15 attack jet dropped two warheads on a large crowd of women and children in the Syrian town of Baghuz, thinking they were Islamic State fighters; over seventy people were killed (Philipps and Schmitt 2021). If civilians often bear the brunt of wartime violence, the question of higher responsibility hangs over the heads of state and military, as well as the domestic audiences who hold them accountable.

These realities stand in contrast to Pape's argument that superior military technology would improve combat, an argument grounded in his belief that airstrikes were less violent than alternative forms of combat: as the final sentence of his book puts it, "This approach will not only be more effective but also harm fewer civilians" (2014: p.331). According to Pape's argument, denial bombing is more effective because it induces quicker concessions: by overflying enemy land armies and inflicting direct harm on key infrastructure, airstrikes deter opposing forces from engaging in full-scale land combat. Pape was not entirely wrong—improvements in bomb accuracy have made it easier to focus on military targets. But precision technology is not the cause of all advancements in humane war tactics in the past half century.

Ever since the Vietnam War, public opinion has been more sensitive to casualties on all sides and more involved in assessing the proportionateness of response (Mueller 1994; Gelpi, Feaver, and Reifler 2009). There is now a worldwide revulsion toward firebombing, napalm, nuclear devastation, and casualties on all sides. These shifts in international norms—both in terms of public opinion and in terms of global legislation around human rights—have also influenced how military campaigns are conducted. In 1977, the Geneva Conventions were updated to ban "indiscriminate attacks against civilians, the targeting of civilian infrastructure, harm to civilians that was

disproportionate to the military objective” (Filkins 2021).¹¹ Now, when US commanders are considering a military action, defense lawyers must weigh in on whether it comports with international treaties like the Geneva Conventions that protect human rights. It forces US military leaders to justify their targets, choose them carefully, and spare lives whenever possible. If the military does not hold itself to these standards, it faces possible sanctions from Geneva Convention signatories (though this has not yet happened against the US) and condemnation in the court of public opinion, which sometimes produces real material backlash. For example, after the *New York Times* published investigative reports of the covered-up civilian casualties from US air operations in Afghanistan, Iraq, and Syria (Khan 2021a,b; Philipps and Schmitt 2021; Savage et al. 2022), Congress imposed restrictions on military funds until the Pentagon submitted a new civilian casualty policy.¹² Defense Secretary Lloyd Austin III subsequently ordered “a standardized reporting process on civilian harm, the creation of a new military ‘center of excellence’ and the completion of a comprehensive new policy on the issue that has been in the works for nearly two years” (Schmitt, Savage, and Khan 2022).

In the field of international relations, most scholars studying the role of airpower in international conflict focus heavily on its consequences on US foreign policy, warfare, and the distribution of power in the international system. They often fail to examine the equally important effects on the other half of the conflict, the ones who suffer the bombings. In one sense, humanitarian laws and modern precision weapons can be seen to save what lives can be saved in the midst of great killing. In another sense, it now seems easier than ever for great powers (and those studying them) to have a sense of deniability of the consequences. More advanced military technology now

requires more layers of mediation—analysts, satellites, planes, drones, technicians, and bases—between those inflicting damage and their targets. Between the large number of parts in the military apparatus and the growing physical distance between the target and the ones dropping the payloads, it is easy for the possessors of advanced military technology to ignore the real human costs of military action.

Consequences of Bombing

Scholars of comparative politics and development economics have begun to document this overwhelming form of firepower's extensive political and economic impacts on society. First, they note, the immediate loss in human life and property from indiscriminate aerial bombardment has increased the resolve of insurgents and swayed civilians to their side (see Kocher, Pepinsky, and Kalyvas 2011, and Dell and Querubin 2017, on Vietnam; Lyall 2009 provides contradictory evidence in Chechnya). The political antipathy toward those doing the bombing can be transmitted to the next generation, as Laia Balcells's description (2012) of the Spanish Civil War shows: adult children share their parents' identity as victims and seek to punish the political party associated with the bombing, a finding that likely generalizes to lasting political antipathy against other nations involved in bombing campaigns.

However, according to economists, these traumatic experiences that shape political attitudes in a lasting way do not seem to have long-lasting impacts on economic development; both Hiroshima and Nagasaki experienced a population boom soon after World War II that reinvigorated the depleted workforce, and their economies quickly rebounded (Davis and Weinstein

2002). Inspired by the findings on Japan, Steven Brakman, Harry Garretsen, and Marc Schramm (2004) applied a similar econometric approach to analyze the impact of bombing on postwar Germany, reaching similar conclusions: bombing leaves only a temporary impact on urban growth. Why? Perhaps the answer lies in older bombing technology's lack of precision: according to military historian Tami Biddle (2009), air theorists have overstated the precision of long-range bombers during the two World Wars, for American and British assessment reports indicated that bombs failed to hit many of their industrial targets.¹³ Tony Judt's history (2006) of Europe after 1945 demonstrates that the industrial damage was limited, allowing Germany's economy to recover remarkably fast. He uses the example of the German automobile industry. As he points out, the Ford factory was largely undamaged, and at Volkswagen, 91 percent of the machinery survived the bombing (and the postwar looting); by 1946, he says, the Volkswagen factory was producing one of every two cars in West Germany (p.85). He writes, "By early 1947 the chief impediment to a German recovery was no longer war damage, but rather raw material and other shortages—and above all, uncertainty over the country's political future" (p.86).¹⁴ In industrialized countries such as Japan and Germany, postwar economic trajectories fall in line with traditional neoclassical growth theory: when an external shock (like bombing) damages an area, the affected area will experience an accumulation of capital until it converges back to its steady state.

But what can this story of remarkable post-World War II economic recovery in industrialized nations tell us about Southeast Asian development after the Vietnam War? For the past ten years, the scholarly narrative about postwar Southeast Asia has followed this same trajectory. In a genre-defining

article, Edward Miguel and Gerard Roland (2011) find that Vietnam War-era bombing has little significant impact on the poverty rates of South Vietnamese districts today. Their analysis of the Vietnamese district economies has added to the ongoing debate about the efficacy of bombing, drawing on expanded bodies of evidence and intricate econometric analysis to find that in the ten to twenty-five years following the Vietnam War, bombings have had no long-run impact on population density, poverty rate, consumption, literacy, or access to electricity. To reach these conclusions, they compared provinces and districts within Vietnam and regressed development indicators against historical rates of bombing. They use their regression results as evidence for long-run recovery in Vietnam. Their famous null-results publication has launched ships, inspiring many similar studies of Laos and Cambodia (including my own). Yet the new line of inquiry launched by their groundbreaking work has produced evidence that contradicts their findings in Vietnam—bombs can actually *produce* long-term poverty traps—and have introduced reasons to question Miguel and Roland’s interpretation of their data (Yamada and Yamada 2021; Lin 2022; Guo 2020).

This new tradition of study, which applies quantitative tools to study the legacy of war, grapples with an important inferential concern that arises when a large- N study compares the economic trajectory of bombed and nonbombed communities. One might wonder if the places where bombs were dropped were simply places that were more likely to recover quickly: richer, more educated villages might be more desirable targets, having more industry and transport infrastructure to be bombed. These more educated and organized villages might also be better at reducing damage from bombs, hiding equipment and themselves with clever strategies such as the Cu

Chi tunnels, an intricate underground tunnel network developed by the Vietnamese Communists to protect villagers from bombs. This line of questioning illustrates why it is hard to do this analysis—and why different scholars who examine the same region and even use the same data might reach different conclusions.

The problem is that regions “assigned” to suffer bombing were not randomly chosen, though this language (borrowed from experimental research design) implies that they were. Bombs were dropped on geographic areas with suspected communist ties. If particular social and political histories were driving contemporary behaviors around bombing and locals’ responses to bombing, then observed differences in postconflict behaviors and outcomes would not be a legacy of war; they would be a reflection of historical patterns of sociopolitical development that predate the Vietnam War. For instance, if economic outcomes are a function of a geographic location of a community (e.g., suppose that higher elevation communities are more isolated, self-sufficient economies, uninterested in commercial production), then differences between bombed communities and other communities would simply be due to the fact that bombed communities are located in areas that have these geographic characteristics that (like high elevation) are associated with economic underdevelopment. The experience of war would be irrelevant; we could explain the divergence in behavior by the fact that bombs were dropped in geographic areas with features that have been and remain today associated with less dependence of external markets. If we were to simply pool units together and run regressions, then each unit would lack a clear counterfactual comparison. It may not be useful to compare two villages with different economic trajectories that have widely divergent geographic characteristics and violence

histories, because we would not be able to tease apart the impact of the geographic factor from that of the history of violence. Fortunately, the recent works I mention here do not fall into that trap. Relying on advances in causal identification techniques, machine learning, and the other tools for handling large amounts of data that have transformed this area of literature, they each pick some form of a natural experiment that allows simple comparisons between treated and control groups.

Miguel and Roland develop a strategy that exploits the geography of conflict to solve this problem of causal identification. They argue that the distance from a key war site is a source of exogenous variation in the intensity of violence.¹⁵ Since the bombing was more intense at the border between North and South Vietnam, they use the distance from the 17th parallel demilitarized zone to represent the intensity of airstrikes. This seems an appropriately random type of selection for empirical statistical analysis; because the border was arbitrarily drawn during the Cold War negotiations between US and Soviet diplomats, its placement likely did not take into account local economic conditions or US military needs. Yet, as Melissa Dell and Pablo Querubin (2017) point out, firepower is not randomly allocated: while bombs may concentrate in regions closer to North Vietnam, they are nonetheless locally targeted. The US military sought out civilian populations, particularly “places where insurgency is already on the rise, confounding simple correlations” (p.703).¹⁶

However, comparisons of district-level statistics are unable to paint a more detailed picture of bombing patterns, and these more granular comparisons can misrepresent the story. As Miguel and Roland are careful to report, they are interpreting aggregate statistics. While they found that bombed districts *on average* can recover as quickly as nonbombed districts, one

cannot infer that these results carry over to the village or individual-level behaviors. For instance, imagine a scenario where one village received all the bombing in a district. Say that village remains underdeveloped today, while all the surrounding villages in the district, which were not bombed, have high levels of development. At the district level, it would look like bombing leads to development, but at the village-level, the opposite would be true. This ecological fallacy is why it is dangerous to assume individual behavior from group statistics.

In fact, studies that measure at a more fine-grained geographic unit (at the village- and individual-level) find the opposite: bombing occasionally creates poverty traps (Yamada and Yamada 2021; Guo 2020). While these statistical evaluations have set a new standard in estimating effects and building confidence in the causal connection between violence and development outcomes, they have perhaps focused overly narrowly on causal inference, ignoring the mechanisms that link long-term socioeconomic change and war. The problem we economists face today is how to connect the long-term rhythms of postconflict development to the populace's specific, local experiences of violence. Few studies link an individual's early-life bombing experiences to later-life economic behavior, and whether violence alters the economic risk preferences central to decision-making is an open question. If bombing does alter individual risk preferences, this could help explain why certain countries fall into cycles of conflict and poverty (Collier et al. 2003).

This book picks up where prior researchers left off. Its driving theme is that people are trying to make a living in the trenches and fortifications of a postwar landscape, and it seeks to describe how they negotiate that tension and the results of the solutions they have chosen. This focus on *why* is novel;

previous work focuses not on why but on statistically detailed and data-driven results—a necessarily incomplete analysis that cannot attend to context and to individual stories that link history, feelings, and behavior. This book uses ethnographic observations and interviews from immersive fieldwork (the most time-honored approach to the study of rural subjects—e.g., de Tocqueville 2003; Geertz 1973; Scott 1985; Cramer 2016) to illustrate possible causal mechanisms and generate new hypotheses for testing, and integrates this qualitative analysis with statistical work, seeking to build on the strengths of both approaches. Since ethnographic observations are not scalable and findings don't necessarily translate from one context to another, I use them to triangulate my quantitative findings. Oral narrative can fill in what regressions leave out and help us understand mechanisms that connect historical violence to rural development today. As information is gathered, we get a better sense of the overall structure of the problem.

With fuller evidence gained through ethnographic observation and clearer thinking about mechanisms, I draw here a more complete picture of how bombing affects long-term economic development in various contexts in rural Cambodia, concluding that previous work has underestimated war's long-term economic effects in certain contexts.

Why Bombs Persist

Unexploded bombs—physical remnants of war—remain in the ground for decades, retaining their potential to cause lethal harm. By highlighting how old bombs left undetonated in the ground make soft, fertile soil more dangerous and—counterintuitively—less valuable to farmers, this study provides a deeper understanding of the particular mechanisms

that would allow us to give substance to the empirical correlations I examine here, documenting the causal mechanisms that connect historical violence to contemporary outcomes. This empirical analysis addresses the historical legacy arguments, demonstrating why legacies of war persist and affect economic behavior and outcomes even today, fifty years later. As I show, the bombs continue to confound household agricultural management and human security despite several postwar decades of changing political regimes, ministry policy encouraging rice production, and the improvement of agricultural technologies.

The following chapters draw on original econometric analysis and more than a year of ethnographic research on Cambodian agricultural practices to reorient prevailing scholarly conceptions of the economic legacy of war, offering a reinterpretation of war's effects through the close examination of the US bombing campaign and its consequences across geography, language, and time. The book reveals a reversal of fortune that rendered Cambodia's most fertile land unworkable. For rural Cambodian people, ranging from village chiefs of the highland tribes to urban migrants from Phnom Penh to former soldiers who fled the Khmer Rouge, unexploded ordnance produces a sphere of fear over their communities—a pervasive fear that stalls out economic growth. Moving beyond the America-centric corpus of Vietnam War history and theories of economic recovery delimited by macroeconomic indicators, the book draws not only on immersive fieldwork in remote Cambodian villages but also declassified materials and scholarly sources spanning several languages (English, Khmer, Jarai, and Tumpuon). This comparative, multimethod approach highlights both the heterogeneity of the people involved in and affected by war and the value of consulting discrete sources of data in tandem. From oral histories of indigenous elders

to Cambodian Ministry of Interior surveys, from US military maps of payload targets to personal observation of professional deminers, these sources together shine a bright light on the enduring consequences of a presidential action taken by Richard Nixon and his advisor Henry Kissinger, who later admitted that he never regretted the decision to indiscriminately bomb a neutral country (Kissinger 1994; Grandin 2015: p.173–186).

The approach I offer here—bringing ethnographic depth and specificity to bear on abstract empirical analysis—is necessary to appreciate the true breadth and persistence of bombing’s destructive nature. Scholarly debate on the efficacy of airstrikes remains limited to their immediate impact on destruction and insurgency, but these oral narratives remind us that even the most advanced military technology often fails, and these failures impact lives long beyond the intended lifespan of a carpet bomb. My respondents illuminate cultural practices that might otherwise remain obscure, since scholarship by and large focuses exclusively on American military archives and English-language sources; this work thus provides a new perspective on the history of the Vietnam War, one that better suits our complex, layered, globalized political present. This approach also pushes back against our tendency to frame interstate war in terms of deterrence, coercion, bargaining—the traditional topics in international relations. Academic concepts like these represent theories of war from the top down, as security experts try to understand the decisions made by political and military leaders. But I’m compelled to think about the inverse perspective. What does war look like from the bottom up? To fully understand what impact bombing has on its victims, we have to describe what an air campaign looks like from below. This kind of work

prioritizes on-the-ground and off-the-tarmac fieldwork and asks the researcher to write about life as they find it.

This kind of research frees ideas to circulate in new ways. My respondents managed to scramble the predominant scripts held by airpower experts, who focused overwhelmingly on what bombing means for “us,” not “them,” and by postwar economists, who failed to notice that not all bombs explode. These are powerful correctives. But my respondents also revealed how the problem of unexploded ordnance has been woven into the history of the nation, whose politics and ethnic ties turn out to be as layered and whorled as a handwoven Cambodian *krama*.¹⁷

This grounded, actor-based approach revealed an important lesson: one cannot separate this legacy of war from the social fabric in which it exists, in particular the ethnic prejudices and political inequalities in that society. My book is really about the ways in which unexploded ordnance becomes part of, and exposes, the social and political context in Cambodia. As I spent time in one multi-ethnic village, I observed how ethnic hierarchy and positionality shape the understanding of and response to the bombs in the ground. As I shadowed a team of humanitarian deminers, I was surprised to learn how demining can make less-powerful, rural Cambodians vulnerable to predation via the new land laws in the country. By attending to the intimate nuances of power and emotion, I began to see how individual lives are shaped and determined by long-term historical processes. I also came away with a grim understanding of how America’s air war looks to its Cambodian targets.

Broadly speaking, my book uses a fieldwork-based approach to understand the legacies of war, showing how that legacy a) impedes growth; b) is filtered through social relations; and c) unexpectedly provides protection against predation. All of this

may be seen through an underappreciated legacy of US foreign policy. These stories about the implications of unexploded ordnance assign importance to political agency. Survivors make crucial decisions about how to frame the narratives they tell about other ethnic groups. Moreover, farmers in later time periods face another choice: to request professional demining services (though elites may steal their land afterward) or to keep bombs in their land (so elites can be deterred from taking it).

Across the book's central empirical chapters, we move from the personal to the political. The work begins by considering the war's transformation of rural life in Cambodia: the American bombing campaign stunted the livelihoods of indigenous minorities and the Khmer ethnic majority. Focusing on Ratanakiri, the most contaminated province in Cambodia, the next chapter traces the transmission of agricultural practices—which in this area often include bomb-handling practices—from parents to children. The following chapter zooms out to examine how unexploded bombs interact with the regional predatory economy, in which elite land grabs threaten smallholder farms; it shows that, paradoxically, the same bombs that threaten local farmers' livelihoods also serve to protect their land from being gobbled up by capitalist development. The book's final chapter, "Beyond Cambodia," takes a global perspective, examining how a similar legacy of unexploded ordnance from more recent bombings is affecting war refugees in Syria, Bosnia, Lebanon, Yemen, and Ukraine, hindering their return home. As in Cambodia, advanced military technology was no guarantee against failure, for despite more precise weaponry and real-time satellite monitoring, many bombs still simply do not explode on impact. The immediate, tangible damage from properly exploded bombs is terrible, but it is finite, immediate, and known: it can be repaired because it has

actually happened. In contrast, the damage from unexploded bombs lingers as *potential* damage that cannot be repaired because it is not yet over; the pending not-yet-but-someday explosions keep people frozen, waiting and waiting for the worst to happen so they can finally move forward. As the stories in this chapter show, Cambodia's half-century-old tragedy is being repeated right now in many other parts of the world—and it will continue to repeat as long as American manufacturers produce and sell warheads and munitions to US allies. Whether they work or fail, these advanced munitions leave permanent scars on their rural targets, often locking them into cycles of poverty and stalling out the economic recovery that we see in postwar industrialized areas.

Overview of the Book

This introduction has laid out the theoretical framework of the book and contextualized it within the vast array of scholarly approaches to rural growth and development. Rather than attempting to survey all of the development literature, I reviewed studies from economics, political science, and history that help us examine recent surges in economic inequality. I argue that certain changes in prosperity can be best seen as they emerge from landmark conflict. Over the course of war, the state and other contentious actors confiscate, plunder, and extort what the dead and displaced leave behind—houses, land, and assets—as advanced military weapons reduce entire neighborhoods to rubble and disintegrated jungles, from the Tokyo firebombing during World War II to the deployment of carpet bombs and Agent Orange during the Vietnam War. As I show, this military technology leaves behind unintended political and material legacies. When undetonated and leftover

weapons remain behind in conflict zones, their physical presence haunts the civilians who live there. With each step in the process of postwar reconstruction, the book shows, local political and economic practices shift in response to the new war-sculpted environmental landscapes in which constituents must eke out their livelihoods.

Chapter 2 turns to the world of Cambodian farmers, who make up 80 percent of the country's population. After conflict, the unexploded bombs produced and intensified economic inequities, as farmers in heavily bombed areas were and still are unable to take advantage of modern agricultural machinery and innovations, such as tractors, water pumps, and new types of commercial crops that require tillage. This chapter examines both the surface conditions at the targeted sites and the number of bombs at these sites to discover how and where impact fuses fail to trigger. It shows how large numbers of unexploded bombs tend to cluster in the most fertile soil, causing farmers in these seemingly ideal areas to produce crops only at the subsistence level. Drawing on personal interviews with farmers on the Cambodia-Vietnam border, this chapter elaborates on the livelihood strategies and economic decision-making of current residents, who are often unwilling to invest in green revolution technologies that require them to be closer to the bombs. In this chapter, I describe a large-N statistical analysis of the invisible economic power of undetonated bombs, often unseen and hidden beneath the ground, across the entirety of Cambodia.

Chapter 3 examines the relationship between risk and race, picking apart the tangled skein of relationship between indigenous minorities and the Khmer majority and examining how each group justifies its own bomb-handling practices and judges those of others. The remarkable changes in the

agricultural and social practices within one multi-ethnic commune at the Cambodia-Vietnam border tell us much about adaptive mindset of its residents as they contend with the psychic weight of everyday struggle. A collection of oral histories across ethnicity, age, gender, and wealth betray no fantasy of resilience: Khmer brothers remember human remains hanging from the branches of the village tamarind tree after an indigenous man accidentally detonated a cluster bomb; a Khmer migrant, a former soldier, scoffs at the minorities for “knowing nothing” about bomb safety; a Tumpuon elder sets out to teach his new Khmer neighbors what places to avoid, based on his memory of the bombing. The chapter considers the fearlessness, unprocessed grief, and desire to blame carried by certain residents, particularly children and former soldiers, as they face the difficulties that still linger for the community.

In chapter 4 I examine the country’s turn to authoritarianism under Cambodian Prime Minister Hun Sen, the longest-ruling leader in Asia, whose rule has coincided with the spread of land disputes and land seizures across the country. This chapter pays particular attention to the 2001 Land Law, a reform designed to redistribute land to the poorest that has instead been used by the political elite to justify their enclosure of communal land for economic development. My respondents in Ratanakiri Province reveal the odd insurance offered by land too dangerous to use: while the unexploded bombs endanger them and prevent them from using their land fully, the bombs also protect them from the Land Law, making the damaged land unattractive to commodification by speculators. If residents seek to increase their economic security by removing bombs and making the land arable, they also increase their economic risk by making the land desirable to others. I show

this process at work, tracing the process of explosives clearance in one area and its aftermath: residents in cleared areas lost their protection against the Cambodian predatory economy and were soon evicted.

The conclusion synthesizes the book's findings and implications, suggesting new directions for further inquiry. Though the effects of bombings might vary by context, there are good reasons to expect that some of these findings will apply beyond Cambodia. In the Falklands, 80 percent of the twenty-five-thousand mines are hidden in sandy beaches, which allow the mines' positions to shift over time, making detection difficult. In the Balkans, 150,000 pieces of unexploded ordnance remain in rural landscapes such as the forests around Sarajevo and Trebevic mountainsides. In Bosnia and Herzegovina, the most heavily mined area is the fertile Dobož region, where demining operations cost an average of one thousand euros per munition and financial cutbacks have delayed removal efforts. Unfortunately, this book's findings will likely continue to be relevant, for despite innovations in precision-guided munitions, other areas are likely to be cluster bombed; the United States still maintains a domestic arsenal of 2.2 million cluster munitions and 1.5 million abroad. While the last confirmed US airstrike involving cluster munitions took place in 2009 in Yemen, survivors of a 2016 Saudi aerial attack of Yemen found the latest generation of US-manufactured cluster bombs. If American manufacturers continue to sell cluster munitions abroad, then unexploded ordnance should be treated as an enduring political problem, deserving of continued study and attention, rather than a one-off historical phenomenon.

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