The Geopolitics of Food and Agriculture*

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Abstract

Food has long served as an instrument of statecraft. Yet agricultural economics typically analyzes policy through the lens of consumer and producer welfare, which neglects security externalities. We review the literature at the intersection of agricultural economics and political science, examining how food systems both shape and are shaped by geopolitical forces through the two channels of (i) domestic instability with international spillovers, and (ii) the deliberate use of food in statecraft. Our synthesis of key findings in the literature suggests that (i) food prices relate to riots and instability while ambiguously relating to civil war and violence, (ii) the wide geographic spread of agriculture limits but does not eliminate unilateral coercive leverage compared with other strategic sectors, and (iii) domestic food policies are strongly related to national security goals. Moreover, we point out the many extant data sets one can use to do work in this area and identify several research gaps in the literature. As global uncertainty intensifies, integrating geopolitical analysis into agricultural economics is essential for policy relevance.

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1 Introduction

Throughout history, food policy has shaped and, perhaps more importantly, has been *shaped by* geopolitical forces. In times of war, governments have often rationed food to support military campaigns or weaponized food to inflict harm upon enemies (Runge and Graham, 2020). During the Cold War, food aid was wielded as a tool of diplomacy and as a means of winning allegiances and influencing ideologies. Today, as the world grapples with climate change, economic inequality, and geopolitical instability, food remains at the nexus of national security and global governance. The Russian invasion of Ukraine in 2022, for instance, sent shockwaves through global grain markets, exposing supply–chain fragility, and reigniting debates over the role of agriculture in geopolitical strategy.

Despite this historical record, contemporary agricultural economics has largely treated food policy through the lens of domestic and international welfare economics. Debates over agricultural protection ——whether at think-tanks like the American Enterprise Institute or in academic journals—— typically frame subsidies, price supports, and trade barriers as inefficient transfers that should be minimized. While not wrong on efficiency grounds, this framing neglects how geopolitical considerations such as food system resilience, strategic autonomy, or alliance maintenance, shape policy choices. As we show in this review, integrating geopolitical analysis is essential for understanding why states make the agricultural policy choices they do, and what the consequences of those choices are.

We review the literature at the intersection of food and agriculture and geopolitics, drawing on a literature that is at times disciplinary and at times cross–disciplinary to show that national–security concerns shape and are shaped by food systems. Here, *geopolitics* denotes interstate rivalry and related security externalities which

can manifest in tensions, coercion, or conflict. Some topics discussed in this article can also be understood as a subset of *geo-economics*, i.e., the study of the intersection of economics and geopolitics (Mohr and Trebesch, 2025). We focus on the entirety of the food and agricultural sectors, from producers to consumers as well as "midstream" of the supply chain (i.e., those agents in-between food producers and food consumers), both internationally and domestically, in what is often referred to vaguely as the "food system." In particular, we consider the strategic use of food and agricultural policy instruments to pursue geopolitical aims instead of their usual textbook goals.

We focus on in particular on the role of food in domestic conflicts and how food relates to international conflict, as well as the role of food in statecraft, where governments seek to build up and protect themselves from foreign leverage.[1] These themes arise in four distinct ways throughout this review.

First, food systems are often disrupted by conflict. These disruptions often threaten food security, which depends on the lack of conflict via stability, which is the fourth pillar of food security (D'Odorico et al., 2014). For instance, recent civil war in the Horn of Africa led to supply shortages and starvation, if not famine. The links can also be more indirect. In the early 1940s, the invasion of southeast Asia by Japanese forces disrupted regional rice supply networks, which led to famines in Bengal, Henan, and Tonkin, causing millions of casualties. In turn, the famine in India was one of the key reasons for the government to go to war (Bose, 1990). Given that food scarcity can cause death, inflicting damage on foreign food systems has been weaponized throughout history. In the 1800s, the systematic

[1]Because the focus of this review is on food and agriculture, we necessarily ignore the sizable literature on natural resources—-especially as they relate to energy—and geopolitics. For a recent example in that literature, see Kim, Paik and Ryu (2025), who find that geopolitical risk reduces the trade of coal and oil in a sample of 42 countries.

slaughter of buffalo herds in the American northwest was one instrument used to advance the interests of white settlers by decimating indigenous populations. In the 20th century, Hitler's hunger plan helped German military advancement in 1941 while killing millions via famine casualties in Ukraine (Runge and Graham, 2020).

Second, disruptions to the food economy themselves can lead to conflict. While food systems are often affected by violence and war, there have been numerous violent episodes in world history that were caused by the disruption of food systems. Although conflict is seldom caused by a single event or cause, food shortages or even food price inflation contributes to domestic conflicts, sometimes perhaps being the final straw. Riots and violence have been associated with increases in food prices (Bellemare, 2015). Baten and Wagner (2003) link import stoppages and the resulting price increases and decreases in the availability of protein-rich agricultural products to nationwide declines in food security and health in Germany during the period 1933-1937.

Third, food systems can be a tool to gain power and influence. Because food scarcity can have devastating effects on populations, control over the food supply can be leveraged to achieve political and geopolitical goals. During the Cold War, the US build political good will and influence through the Food for Peace program, which evolved into USAID, while the USSR implemented a system of preferential grain prices throughout Warsaw Pact countries. In 1980, the US put an embargo on grain exports to the USSR to retaliate against the Soviet invasion of Afghanistan (Commission et al., 1983). While the effectiveness of that embargo in terms of foreign policy has been questioned, the embargo had deleterious effects on the US farm sector, depressing farm incomes in particular. Finally, in response to recent US tariffs, retaliatory tariffs imposed by China and Canada specifically targeted

US agricultural producers, leveraging US political economy to inflict political cost to the Trump administration.

Fourth, and finally, food systems can help counter foreign pressure and defend against aggression. While some who have evaluated the effectiveness of Britain's preferential tariffs and long-term wheat purchases from Canada, Australia, and New Zealand following the Ottawa Agreement of 1931 have found the agreement not viable from a trade economics perspective (e.g. Glickman, 1947), others have argued that it was successful in binding the Dominions more tightly to the Empire, redirecting grain flows toward a cohesive political bloc and away from aggressive and unreliable rivals (Lobell, 1999). According to that view, British policymakers negotiated the trade agreement as a deliberate means of power projection rather than as a humanitarian or purely commercial policy. Indeed, about one decade later a decisive allied advantage during World War II was supply dominance. A more direct example is the Nazi occupation of Belgium, a highly food–import–dependent country, where mass starvation was mitigated through a decentralized, highly local food system of unofficial output (e.g., mini plots and home gardens), a large black market for food (often via cross–border smuggling), and firm–run feeding schemes, thereby limiting which limited devastation despite the occupation (Gillingham, 1982).

By synthesizing historical and contemporary evidence, we make the case that food policy cannot be understood in isolation. Ultimately, beyond deadweight loss triangles, food policy is inherently political and shaped by power dynamics that transcend national borders. As the world faces growing geopolitical uncertainty, understanding the geopolitics of food is critical for ensuring global stability and food security in the 21st century. As the agricultural economics profession has made substantial progress integrating economics and the environment, thereby

laying out several path ways to sustainability in food systems, bringing geopolitics is one missing piece of the puzzle.

This article extends Shemyakina (2022), who reviews conflict and food security, Mohr and Trebesch (2025) on geo-economics, and Drezner (2024) on sanctions. For brevity, we do not review the considerable literature on climate and conflict, except where that literature intersects directly with agricultural channels (e.g. Mendenhall et al., 2020; **?**). Similarly, we do not survey the broad literature on governance and famine beyond studies that explicitly analyze institutions in the agriculture—geopolitics nexus (e.g. Meng, Qian and Yared, 2015). Both areas have grown into large literatures that would warrant reviews of their own.

The remainder of this article proceeds as follows. Section 2 defines the scope of this review and and clarifies how food and agriculture are conceptualized in related research. Section 3 synthesizes cross-disciplinary insights on the relationship between internal and external tensions and reviews the empirical literature on the relationship between food and internal conflict. Section 4 summarizes cross-disciplinary work on statecraft and weaponized interdependence and reviews the literature looking at food and agriculture and related policy through the lens of geopolitics. Section 5 discusses the data sources commonly used in the literature as well as various measurement tools. Section 6, which is the heart of this review, discusses directions for future research. Section 7 concludes.

2 Food and geopolitics

To our knowledge, there is no formal theory on the relationship between agriculture, food and geopolitics. But across the disciplines of economics, political science, and geography, a number of studies develop general theories of resources

and power, and many applied studies put food in the context of competition over resources and conflict.

Before diving into the literature, it is incumbent upon us to clearly define some of the terms we will be using throughout this review. *Geopolitics* refers to interstate rivalry and related security externalities which can manifest in tensions, coercion, or conflict while the neologism *geo-economics* refers to the study of the intersection of geopolitics and economics. On the latter, see Mohr and Trebesch (2025), who review the literature on geo-economics, and McGuirk and Trebesch (2025), who review the literature on geo-economics and conflict, thereby extending the geo-economic toolkit beyond classic economic instruments to include covert operations, sabotage, and proxy interventions. Like other strategic sectors such as energy, defense and, more recently, rare-earth minerals and semiconductors, agriculture and food merit special attention within geo-economics.

But food also exhibits distinctive characteristics. First, as a necessity, food price instability is immediately felt by consumers, and given that food preferences are shaped by culture, food price instability is politically salient in ways that affect regime stability and leaders' audience costs (Bellemare, 2015; Hendrix and Haggard, 2015), which can destabilize regimes or escalate into broader geopolitical conflict (Fearon, 1994; Tir, 2010). Second, unlike oil or semiconductors, food production is geographically dispersed, eliminating to some extent possibilities of coordinated leverage from producer countries (Rothschild, 1977). Third, food trade creates distinct urban–rural distributional conflicts (i.e., consumers vs. producers) that structure domestic coalitions differently than for other commodities, which is critical to leaders who optimize international and domestic political economy problems (Putnam, 1988). Fourth, food vulnerabilities are heterogeneous across income groups. For instance, food trade dependence matters more for poor coun-

tries, where food constitutes a larger share of household budgets and strategic reserves are limited, creating asymmetric geopolitical leverage. These features explain why domestic food conflicts often have international dimensions, and why international food policies create domestic political effects—the central theme of this review.

3 Domestic instability and international spillovers

Causality between domestic instability and geopolitics flows both ways. As Putnam (1988) puts it in his seminal work,"[i]t is fruitless to debate whether domestic politics really determine international relations, or the reverse ... [t]he answer to that question is clearly 'Both, sometimes.'" Yet it is imperative to study how and when they affect each other. Domestic conflict can externalize through spillovers and international disputes, while geopolitical rivalry can internalize through proxies, competitive interventions, and the strategic manipulation of local factions. A useful way to organize these ideas is therefore around (i) domestic political incentives and constraints that shape external behavior, and (ii) international strategic involvement shaping domestic bargaining and violence as the key empirical domain for food and agriculture to shape this two-way causal relationship.

Food availability and food access on the most direct level have first domestic effects on violence, conflict and unrest. Food availability and prices are also key to people's perception of the economy, which in turn can lead to domestic instability. One central insight in political science and international relations is that domestic conflict and political instability can reshape states' external behavior and, in turn, be shaped by geopolitical competition. Most of these frameworks analyze geopolitics through a two-level game where leaders react to and optimize within both

domestic and international political economy and face trade-offs along several dimensions. Food and agriculture, with particularly salient features regarding geography, rural-urban dispersion and income-heterogeneity, is one important area where leaders can both win and lose audiences from.

The seminal works on regime instability and international conflict emphasizes how periods of domestic transition and mass mobilization—especially incomplete democratization—can increase incentives for external confrontation (Mansfield and Snyder, 1995). Complementing this, research on revolutionary upheaval argues that abrupt domestic transformations alter how other states perceive a country's intentions and capabilities, intensifying security competition and raising geopolitical risk (e.g Walt, 1992).

Another strand of literature focuses on the domestic constraints under which leaders bargain internationally. Audience-cost theories formalize how leaders who escalate abroad but back down can be punished at home, affecting credibility and crisis outcomes (Fearon, 1994). This frameworks help connect internal vulnerability to external behavior as leaders may face stronger incentives to signal resolve, or to seek rally effects. The empirical and theoretical literature also emphasizes scope conditions and limits of purely diversionary accounts (Tir, 2010; Fravel, 2010). For instance, Tir (2010) links the initiation of fatal militarized disputes to economic underperformance at home.

Beyond leader incentives, a large empirical literature shows that civil wars and intense domestic conflict systematically heighten cross-border frictions. Gleditsch, Salehyan and Schultz (2008) argues that domestic conflict invites intervention by external actors, creates cross-border sanctuaries, causes refugee and combatant flows, and other spillovers that tie neighboring states' interests directly to the internal conflict. Conversely, geopolitical competition can transform the trajectory

of domestic conflicts by changing the resource, incentive, and bargaining environment of local actors. Research on third-party intervention emphasizes that outside powers often become *de facto* veto players whose interests must be satisfied for conflict resolution. In many settings, this prolongs wars by reducing the costs of fighting for domestic belligerents and complicating credible settlement (Cunningham, 2010). Related work shows how regional diffusion risks motivate international intervention (Kathman, 2011).

One pathway from food systems to broader geopolitics is thus through domestic conflict. Shemyakina (2022) provides an extensive review of studies at the intersection of food and conflict. Here, we briefly review this literature, distinguishing how food can create instability and conflict and, in turn, how conflict affects the agriculture and food sector at the micro level.

3.1 Food and Conflict

A large body of empirical literature links food price movements to political violence. Food prices serve as a natural empirical entry point for studying conflict as they are observable, vary exogenously due to various plausibly exogenous shocks (e.g., unexpected changes to international markets, natural disasters), and directly affect both producers and consumers.

Theory predicts ambiguous effects operating through four channels (Winne and Peersman, 2021; McGuirk and Burke, 2020; Dube and Vargas, 2013). Higher food prices can *reduce* conflict through (i) the *opportunity cost* effect, where rising agricultural wages make rebellion more costly to farmers (Bazzi and Blattman, 2014), and (ii) the *state capacity* effect, where higher revenues from agriculture enable (local) governments to prevent or resolve conflict (Besley and Persson, 2010).

In contrast, higher food prices can *increase* conflict through (iii) the *predation* effect, where valuable crops attract contests over territory and strengthen armed groups seeking rents (Dube and Vargas, 2013), and (iv) the *relative deprivation* effect, where consumers facing eroded real incomes experience grievances that trigger unrest (Hendrix and Haggard, 2015; Bellemare, 2015).

Which channels dominate depends on the context, in particular the share of food producer versus food consumers in the population, institutions, rent concentration, and conflict type. As a consequence, empirical findings often contradicting findings and are hard to contextualize, especially when research designs do not adequately account for the pathway structure or fall short of identifying causal relationships.

Empirical studies usually exploit exogenous international price movements to identify effects. On the consumer side, food price increases consistently cause riots and protests. Bellemare (2015) points out that it is unexpected increases in food price levels, not increases in volatility around the food price level, that cause social unrest unrest.[2] Regional evidence confirms this pattern (Winne and Peersman, 2021).

With regards to civil war, the balance between opportunity cost and predation effects depends on context. Negative price shocks raise conflict risk in sub-Saharan Africa by reducing both agricultural incomes (weakening opportunity cost) and state capacity (Brückner and Ciccone, 2010; Fjelde, 2015), but broader samples find null effects (Bazzi and Blattman, 2014), suggesting heterogeneous effects.[3] Resolving part of this ambiguity, Dube and Vargas (2013) find that opportunity cost or

[2]Counter to the often vague sense in which the term "volatility" is used in the media and by policy makers, "volatility" is used here in its economic and financial sense, to refer to unexpected departures *either up or down* from the expecation of a given distribution.

[3]Ciccone (2018) finds positive price shocks reduce conflict when using time-invariant exposure weights.

predation dominates depends on whether rents are concentrated (predation) and thereby easy to appropriate or diffuse (opportunity cost).

Input-side shocks confirm these mechanisms as well. (Berman, Couttenier and Soubeyran, 2021) show that unequal soil endowments intensify predation-driven territorial contests, while droughts trigger pastoral conflict through livestock price channels opportunity cost (Maystadt and Ecker, 2014). In all of these instances institutions matter in shaping the contexts in which the channels operate. Hendrix and Haggard (2015) argue that food insecurity escalates violence primarily where governance is weak, and sustained price shifts matter more than temporary spikes (Ubilava, Hastings and Atalay, 2023).

Altogether, food price increases can trigger consumer-side unrest (riots), while producer-side effects on civil war are ambiguous and depend on rent structure, institutional quality, and ultimately the balance between opportunity costs and predation. We now turn to the literature that analyzes how conflict affects food and agriculture sectors.

3.2 Conflict and Food

While food prices can cause conflict, in many parts of the world conflict damages the food and agricultural sectors. The FAO estimates that nearly 60% of the world's hungry live in conflict-affected areas, with conflict serving as the primary driver of acute food insecurity for approximately 100 million people (GNAFC, 2021). Moreover, de Waal (2025) argues that contemporary famines are almost entirely driven by political decisions and conflict rather than natural causes. Yet the literature looking at how conflict affects food by looking at either domestic or international food economies is small relative to the literature discussed in the previous section.

On the international side, a growing empirical literature finds that higher geopolitical risk, as in Caldara and Iacoviello (2022), is associated with adverse price dynamics in agriculture. Broadly, geopolitical risk is positively correlated with agricultural commodity and food futures prices and trade (Goyal, Mensah and Steinbach, 2024; Ahn, Kim and Steinbach, 2023). Event studies and causal evidence on the 2022 Russian attack on Ukraine shows that the causal relationship flows from geopolitical risk to food, suggesting that spikes in geopolitical tensions transmit to agricultural markets rather than merely reflecting them (Saâdaoui, Jabeur and Goodell, 2022).[4] Estimates for 33 countries over time show that elevated geopolitical risk is linked to higher rates of food price inflation (Li et al., 2025).

When it comes to institutional drivers and microeconomic empirical evidence, Harris (2014) highlight the importance of governance for food security in Sub-Saharan Africa and in terms of structural effects with regards to food economies and Ripamonti et al. (2024) find that nongovernmental armed groups often govern food systems in developing countries. Steinhübel and Minten (2023) report differential effects of conflict on food production along Myanmar's urban–rural gradient, reflecting predominantly consumer instead of predominantly producer contexts. Adelaja and George (2019) show that attacks by Boko Haram in Nigeria led to declines in total output and productivity, thereby leading to a decreased supply of staple crops. Similarly, Jaafar and Woertz (2016) document burning as a tool used by terrorist groups in Syria and Iraq in the late 2010s and which caused food shortages and starvation. de Waal (2018) note the growing significance of political decision and military tactics in creating the conditions leading to famine. Markevich, Naumenko and Qian (2021) show that political bias in Soviet Russia led to 7

[4]Consistent with that, Devadoss and Ridley (2024) estimate that because of Russia's invasion of Ukraine, world wheat prices were expected to rise by 2%.

million casualties during the Holodomor, or Ukrainian famine, of 1932-1933.

4 Statecraft and weaponized interdependence

The previous section examined how domestic food crises can spill over internationally and summarized empirical evidence on the role of food in conflict as well as how conflict affects food and, by extension, causes harm. We now turn to the deliberate use of food as an instrument of statecraft——how states strategically leverage food aid, food trade, and food policy to project power, coerce adversaries, and secure strategic objectives.

Economic theory is built on the notion of choice in the face of unlimited needs and wants and scarce resources. Political scientists writing on statecraft describe a universal tendency to exploit scarcity in foreign policy (Baldwin, 2020; Drezner, 2024). Given the theoretical and empirical insights from the previous section, and given that food is a necessity at the very foundation of Maslow's hierarchy of needs, instigating food scarcity may have a larger return than measures targeting other sectors.

Farrell and Newman (2019) argue that global economic networks——particularly hub-and-spoke structures in finance and technology——enable states controlling critical nodes to surveil and cut off adversaries. Food trade networks, however, exhibit greater flexibility due to the greater geographical dispersion of agriculture. For instance, following Russia's invasion of Ukraine in 2022, grain flows rerouted despite initial disruptions. Likewise, US–China agricultural trade disputes led to rapid substitution as China shifted its purchases of soybeans to Brazil (Adjemian, Smith and He, 2021; Xu, 2025). And in the 1980s, the Soviet Union was able purchase grain from other countries following a US grain embargo in response to the

Soviet invasion of Afghanistan (Paarlberg, 1980).

The flexibility of food trade networks comes at significant cost, however. Russia's invasion triggered wheat price increases of 2 to 15% depending on region, with heterogeneous impacts. While Egypt managed substitution at high inflation cost, Lebanon and Sri Lanka required emergency assistance for both food and agricultural inputs (Devadoss and Ridley, 2024; Glauber and Laborde Debucquet, 2023). The US–China trade war led to $28 billion in required USS domestic farm payments to offset lost Chinese markets alongside broader welfare losses from tariff retaliation (Fajgelbaum and Khandelwal, 2022). The 1980 US grain embargo on the USSR, while failing to coerce Soviet withdrawal from Afghanistan when alternative suppliers emerged, generated lasting domestic political costs.

The geographic dispersion of food production limits unilateral coercive power but does not eliminate it (Rothschild, 1977). Even if market substitution is possible it imposes adjustment costs on both exporting and importing economies. Even if only temporarily, such switching costs fuel overall inflation and take time, during which prices can spike and create political vulnerabilities. As a consequence, even the costs of rerouting can create create exploitable leverage.

Luttwak (1990) formalizes how economic tools can serve geopolitical ends, with food sector measures including export bans, stock releases, and phytosanitary standards functioning as commercial weapons. Other tools that are specific to food and agriculture are through large-scale land acquisitions (colloquially known as "land grabs") in low- and middle-income countries (Keulertz and Woertz, 2015),[5] downstream control of food value chains (Selwyn, Bernhold and Leyden, 2025), and control over water resources (Woertz, 2022*b*), all of which can be understood

[5]Even though the extent of land grabs has been overstated in the literature (Liao and Agrawal, 2024), the underlying drivers of such policies are often rooted in food sovereignty concerns.

as efforts to reassert national authority over the food supply (Hopma and Woods, 2014; Nally, 2015). Clapp (2015) recasts food self-sufficiency as a risk management strategy rather than autarky, linking trade dependencies to national security concerns. Some scholars go further, arguing that international governance structures like the WTO or control over downstream value chains (distribution, retail) represent strategic sources of food power (Margulis, 2014; Selwyn, Bernhold and Leyden, 2025; Keulertz and Woertz, 2015).

4.1 Food and Geo-Economics

A nascent strand of literature in economics looks at geo-economics, or is the study of the intersection of economics and geopolitics. (Mohr and Trebesch, 2025) identify five key areas of research in geo-economics: (i) coercive policies, (ii) trade, (iii) finance, (iv) risk management, and (v) war economics, and each of these five areas allows researchers to look at economic outcomes through the lens of geopolitics. This harks back to how trade can (and often does) play a strategic role (Hirschman, 1945), to the concept of war economies (Keynes, 1940), and to how game theory relates to conflict (Schelling, 1958). Thus, Clayton, Maggiori and Schreger (2023) develops a modeling framework that allows representing economic policies under both geo-economic and traditional welfare functions.

Geo-economics also emphasizes policies like sanctions, embargoes, tariffs, export controls, investment screening, and aid measures, but also economic policy instruments that usually target growth and equality (Luttwak, 1990; Hopma and Woods, 2014). For instance, in 2025, the Canadian government responded to Donald Trump's tariffs with strategic tariffs aimed at goods produced in solidly Republican districts, such as tariffs on bourbon whiskey, which is predominantly made

in Kentucky. While these tariffs were obviously retaliatory, they also helped steer consumers toward Canadian whiskey. Moreover, McGuirk and Burke (2020) extend the geo-economics toolbox with more direct hostile actions like sabotage and military funding as instruments of geo-economics.

The previous section highlighted how conflict, violence, and political pressure respond to markets by discussing the opportunity cost and predation channels. But the relationship goes both ways, as markets also respond to violence and geopolitical pressure. As a consequence, when it comes to food and agriculture, there exist several policy instruments which not only serve the purpose of maximize economic, social and environmental welfare, but also of achieving geopolitical aims. In the limit, those policies may even be implemented with geopolitical aims in mind first and foremost.

4.2 Strategic trade policies

Globally, agriculture is the least liberalized economic sector. Since World War II, trade liberalization dramatically reduced protectionism around the world—with the exception of food and agriculture. In all likelihood, it is because of the relevance of food and agriculture to national security and geopolitics that many governments have been more hesitant to liberalize the trade of food (and, by extension, other agricultural commodities) than that of other sectors. Furthermore, national security clauses in trade agreements equips domestic interests groups with substantial leverage in the domestic political economy.

While there are other foreign policy instruments that can be used to bolster a country's geopolitical position (e.g., see He and Wang (2025) for how China has used strategically motivated border refusals of food imports from countries with

which it has trade disputes), in what follows we discuss trade wars as well as sanctions and embargoes, which constitute the bulk of the literature.

4.2.1 Trade wars

Trade policy is often weaponized in times of conflict, both cold and hot. Retaliatory trade measures from sanctions all the way to embargoes are means for countries to resolve conflicts without (or before) having to resort to military measures (Morgan, Syropoulos and Yotov, 2023; Drezner, 2024). Trade wars are perhaps one of the most obvious manifestation of the interlinking of geopolitics and economic policy. An emerging evidence base on recent tariff escalations consistently points to deadweight losses and broader economic damage, especially for agriculture, through disrupted trade flows, higher trade costs, and highly imperfect substitution across markets (Li, Balistreri and Zhang, 2020; Zhang, 2021; Adjemian, Smith and He, 2021; Grant et al., 2021; Dhoubhadel, Ridley and Devadoss, 2023; Xu, 2025).

At the macro level, general-equilibrium analyses reach similar conclusions about the welfare costs of retaliation and reallocation (Fajgelbaum and Khandelwal, 2022). Of crucial importance for this review is the fact that retaliation and reallocation policies are not designed to maximize welfare or promote specific sectors. Rather, they aim to pursue political, geopolitical, and sometimes unrelated objectives. While the literature offers insights on how trade flows have been reallocating in response to trade wars, there is limited empirical evidence on whether——and for whom——strategic goals beyond the economy are actually achieved. An exception perhaps can be found in Wallensteen (2021) who emphasizes the importance of supply concentration and demand dispersion in leveraging food power over other countries. There is also a lack of interdisciplinary frameworks that would allow analyzing the trade-offs of such policies. As such, this is one area where agricul-

tural economists can effectively contribute.

4.2.2 Sanctions and embargoes

In contrast to energy, arms, and semiconductors, food and agriculture is often excluded from sanctions given the humanitarian importance of food Larch, Luckstead and Yotov (2024). Even in the case of embargoes or isolation, food aid (see below) is often allowed to be imported and exported. North Korea, probably the most isolated country in the world, has received food aid in different forms while being heavily sanctioned by almost every other country in every other sector.

More broadly, the deterrent value of sanctions has come under scrutiny. McGuirk and Trebesch (2025) argue that the sanctions imposed on Russia following its 2014 annexation of Crimea may have inadvertently strengthened its wartime readiness by fostering greater economic independence.

An embargo is a deliberate cutoff or export restriction to a target country to exert geopolitical leverage. In the food context, Paarlberg (1980) looks at the grain embargo put by the US on the former Soviet Union in 1980 in response to the Soviet invasion of Afghanistan to argue that an embargo's effectiveness hinges on three factors: (i) the ability of the sender (in this case, the US) to control the volume and destination of its exports, (ii) the absence of third-party leakages, and (iii) the lack of adequate internal substitutes for the target country (in this case, the Soviet Union). If any of these conditions is not met, the embargo's coercive effect collapses. While Paarlberg's analysis showed the 1980 embargo failed to coerce the Soviet Union——which simply sourced grain from Argentina, Canada, and Australia——the episode had significant domestic political costs for the US farm sector and constrained future use of food embargoes, illustrating how geopolitical instruments can reshape domestic political coalitions even when they fail interna-

tionally. For a more recent example, see Koch (2021) on the embargo put on Qatar by the Arab League for allegedly supporting terrorism.

4.3 Food aid

Agricultural economists have pointed out the benefits to domestic food producers of giving foreign aid in the form of food as early as the 1950s (Davis, 1959). Food aid—development aid in general, but food aid specifically for our purposes—is a policy instrument that targets both economic and social as well as geopolitical outcomes.

Indeed, if names given to things are any indication of the intentions behind those things, the point is well illustrated by the US food aid program, by which Public Law 480 instituted a food aid program which eventually came to be known as the Food for Peace program in 1954. Consequently, there is a clear consensus in the literature that bilateral food aid does not serve one single purpose but rather has multiple motivations. As food aid must originate in a place with a food surplus, humanitarian aid and surplus marketing have always been commingled Trimble (1921). For multilateral food aid, however, the motives of the many donor countries are more likely to be humanitarian (Barrett and Heisey, 2002).

Several studies try to pinpoint the motivations of donor countries for their food aid policies. While several authors have noted that food aid is a natural remedy for surplus food (e.g. Barrett, 2001; Trimble, 1921; Schultz, 1960; Davis, 1959), a more exhaustive list is given by Ball and Johnson (1996), who identify surplus disposal, geopolitical strategy, humanitarian need, and future market development as drivers of US food aid, and empirically determine that these motivators have

been shifting over time.[6]

Given these multiple objectives, food aid effectiveness must be evaluated along several dimensions. We organize the evidence by distinguishing between: (i) outcomes in recipient countries' domestic food systems and economies (e.g., food security, market development), (ii) geopolitical effectiveness (whether aid achieves donors' strategic objectives), and (iii) unintended spillover effects on recipient countries' internal conflicts.

Food aid and food security in recipient countries. Tschirley, Donovan and Weber (1996) find that food aid was effective at developing downstream markets but depressed upstream commodity production in Mozambique in the 1980s and 1990s, but this latter effect found no support in Afghanistan in the late 1990s, when large inflows of food aid neither depressed prices nor disincentivized production (Chabot and Dorosh, 2007). Comparing the cases of India, Bangladesh, Ethiopia and Zambia, Del Ninno, Dorosh and Subbarao (2007) document widely varying experiences with food aid but find that, if timed correctly, food aid does not disincentivize local food production. This finding is consistent with those of Lentz, Passarelli and Barrett (2013), who estimate that local and regional procurement of food aid saves time and cost compared with transoceanic food shipments. Barrett (2001) finds that US food aid does not increase food availability in recipient countries and that productivity interventions and commercial international trade are more useful in promoting food security, health, and nutritional outcomes. Lastly, Kaya, Kaya and Gunter (2013) find that aid in the agricultural sector was positively associated with reductions in poverty in a longitudinal data set of 46 developing

[6]Consistent with this, Diven (2001) finds a consistent relationship between producer interests and US food aid policy as well as a strong relationship between commodity stocks and food aid shipments, especially in years when stocks are the greatest and when the US is involved in military conflicts.

countries.

Food aid as a geopolitical instrument. While the previous paragraph examines whether food aid achieves its stated humanitarian and development objectives, a distinct question is whether it effectively serves donors' geopolitical aims. The political science literature has examined this question primarily through the lens of Cold War competition and contemporary influence-building through alliances and political alignment.

Asongu and Nnanna (2019) show that even the threat of aid withdrawal (i.e., the instability of aid flows) has influenced recipient countries' human rights laws and policy alignment with donors. This suggests aid creates dependencies that donors can leverage for political concessions, but the causal mechanisms behind that finding remain understudied.

The governance literature provides mixed evidence on aid's effectiveness in achieving donors' political objectives. Zhang (2004) identifies conflicts between international trade governance (which restricts food aid as trade distortion) and food assistance governance (which prioritizes humanitarian access), suggesting that institutional constraints limit aid's strategic utility. Bräutigam and Knack (2004) documents deleterious effects of aid on recipient governance quality, arguing that aid can undermine the domestic accountability mechanisms donors claim to support. More optimistically, Olasehinde-Williams, NOOR and Olasunkanmi (2023) find positive associations between aid and political stability in Afghanistan (1995-2022), though the direction of causality remains unclear.

Zürcher (2012) finds that food aid is less likely to have harmful governance effects in countries with stronger pre-existing institutions. This suggests the geopolitical effectiveness of aid may depend on recipient state capacity——weak states may be more vulnerable to dependency but less able to deliver the stable align-

ment donors seek.

Food aid and conflict. Distinct from whether food aid achieves donors' geopolitical objectives is the question of whether it creates unintended consequences for conflict dynamics *within* recipient countries. This literature examines aid not as a strategic instrument but as a intervention with complex local effects that can either pacify or fuel violence. Wood and Sullivan (2015) theorize that aid can serve to pacify, unintentionally fuel violence, or both depending on the context. These effects operate through three mechanisms, viz. (i) appropriation of food aid by armed actors (i.e., by creating rents worth fighting over), (ii) hearts-and-minds effects when secure, well-targeted aid shifts civilian cooperation toward the state, and (iii) shocks that destabilize bargaining (i.e., large swings in aid change bargaining parties' relative strength).

Empirical results on these effects have been mixed. Despite several studies that found that food or humanitarian aid can spur conflict (e.g. Mary and Mishra, 2020; Tusiime, Renard and Smets, 2013), Christian and Barrett (2024) point out persistent methodological problems in the empirical literature having to do with data and causal identification. These problems are serious enough for Koppenberg, Mishra and Hirsch (2023) and Shemyakina (2022) to conclude that the literature has not offered conclusive empirical evidence about the effect of aid on conflict.

In sum, with the exception of the relationship between food aid and conflict, the empirical literature has more insights on the causes of food aid rather than on its consequences. Empirical studies have mostly looked at how food aid creates or prevents short-term conflict, but there is a lack of evidence on the role of food aid in achieving humanitarian goals, how effective it is in generating or projecting soft power, or in term of achieving broader geopolitical goals. Likewise, there is little to no evidence on how food aid helps donor countries' domestic food and

agricultural sectors, either in the short-run via emergency food purchases or in the long-run through the development of new foreign markets, all of which are key to domestic political economy contexts that shape broader geopolitics. While it is inherently complicated to identify such causal effects (and even more difficult to identify the mechanisms through which those causal effects operate), there are now more than 80 years of documented history of food aid deployed by several countries and international institutions, which should offering plenty of opportunities to leverage exposure, instrumental variables, or difference-in-differences designs to gain a better understanding of the short- and long-term effects of food aid, both domestically and internationally. Moreover, the recent termination of US food aid programs provides an opportunity to apply synthetic control methods to study the domestic effects of food aid, if not its international effects as well.

4.4 Domestic policies

Domestic agricultural policy represent another key area where policy can improve or worsen geopolitical resilience. While ostensibly targeting domestic objectives, domestic agricultural policy frequently invokes geopolitical rhetoric or is shaped by geopolitical considerations. In particular, such policies include agricultural input (e.g. Quitzow, Balmaceda and Goldthau, 2025) and output (Wieck et al., 2024, e.g.[) subsidies, agricultural insurance (e.g. Glauber and Effland, 2016), payments for ecosystem services (e.g. Kaiser, Haase and Krueger, 2021), biofuel mandates (e.g. Brutschin and Fleig, 2018) and buffer stock programs (e.g. Dalheimer et al., 2026). The challenge here is disentangling actual security concerns from rent-seeking by domestic interest groups using security as justification. While the preceding subsections examined how states use food in international statecraft, do-

mestic agricultural policies are not immune from geopolitical considerations. Self-sufficiency rhetoric, strategic reserves, and producer support often blend economic objectives with national security concerns—or use security rhetoric to justify policies that primarily serve domestic interest groups.

In the literature, "self-sufficiency" is often used virtually interchangeably with "food security." In an influential review article, Clapp (2017) shows food self-sufficiency is often justified with a national security rhetoric, yet it functions as a political project that prioritizes domestic production over food access and nutritional outcomes.

Using Japan as an example, Ishii and Kimura (2016) illustrates how states narrate declining food self-sufficiency as a strategic vulnerability to legitimize protective policy—less about hunger *per se* than about autonomy. (Pietrzak, Łapińska and Balcerzak, 2019)'s typology separates countries by production and consumption patterns and shows that high food self-sufficiency far from guarantees food security and in fact, trade-enabled access to food often matters more.

Godenau et al. (2020) go further, exposing hidden import dependencies even in "self-sufficient" regions. In spite of many countries' wartime rhetoric about home gardens, Suomalainen et al. (2023) find household self-provisioning has health and climate implications but offers only marginal benefits for national security. Starck, Fardet and Esculier (2023) and Goold et al. (2020) respectively show that phosphorus autonomy via phosphorus recycling and closed-loop systems designs can raise resilience, but only with costly infrastructure—and without eliminating interdependence altogether. Finally, Wanger et al. (2024) suggest that diversification and technology deliver environmental and food-security benefits without having to resort to autarky, pointing to robustness——not isolation——as the relevant policy target if one is aiming for resilience.

Invoking food self-sufficiency as "food security" conflates a geopolitical sovereignty goal (i.e., control over the food supply) with a welfare goal (i.e., stable and reliable access to a variety of foods). In domestic agricultural policy, that conflation matters because food-self-sufficiency-as-food-security policy instruments can trade off affordability and nutrition, whereas resilience policies better align with actual food-security outcomes while acknowledging strategic risks. Thus, this literature reveals that often governments might be pursuing geopolitical aims (or lobby interests rising therefrom) when pursuing these policies and reasoning.

5 Measurement tools

There are three categories of data used in the literature on the geopolitics of food and agriculture: (i) event-level conflict and unrest data such as the Armed Conflict Location and Event Data (ACLED) or data from the Uppsala Conflict Data Program (UCDP), (ii) standard macro aggregates such as the World Development Indicators (WDI) or administrative trade, climate, etc., and (iii) news- or text-based indices that look for specific keywords in news stories. While data collected at the micro level are probably the most accurate way to go when it comes to internal validity, the collection of such data is very costly and often spotty in terms of coverage either across space or over time, which limits the external validity (and, in many cases, the internal validity, due to measurement error) of any study relying on micro-level data. Macro-level data generally allow more external validity, but are often limited in how frequently they are collected and are subject to methodologies that often have issues or change over time, which limits construct validity.

5.1 Event-based measures

The UCDP/PRIO Armed Conflict Dataset (ACD) of country–year (as well opposing-actor dyad–year) data on state-based armed conflict since 1946, defining conflict as a contested incompatibility over government or territory that results in at least 25 battle-related deaths within a calendar year (with a "war" threshold at 1,000 deaths). The ACD also classifies conflicts as intrastate, interstate, and internationalized intrastate and reports conflict episodes and battle-death counts. Its broad coverage over time and across countries have made it the premier data set in the conflict literature at the macro level (e.g. Ciccone, 2018; Bazzi and Blattman, 2014; Brückner and Ciccone, 2010).

While convenient for wide cross-sectional and macro-level analyses, the limitations of the ACD data stem from its coarse spatio-temporal (specifically, annual and national) resolution which underrepresents low-intensity, localized violence such looting, protests, and riots, and thus blunts short-run violence dynamics. Moreover, the reliance on death thresholds and media/documentation introduces measurement error and sample-selection concerns over time.

Researchers studying food prices and violence at finer scales often complement or validate ACD-based results with event-level data, perhaps most preeminently the Armed Conflict Location & Event Data Project (ACLED). The ACLED data set provides geocoded, event-level records of political violence and protest worldwide, including precise dates, locations, actors, event types (e.g., battles, violence against civilians, riots/protests, remote violence), and reported fatalities; this fine spatial–temporal granularity enables sub-national econometric designs that link local markets to security outcomes (Raleigh et al., 2010). In the agriculture–conflict nexus, the ACLED have been central to identifying both directions of causality be-

tween food prices and violence (e.g. Ubilava, 2024; Ubilava, Hastings and Atalay, 2023; Hastings and Ubilava, 2025; Gutiérrez-Romero, 2022; Winne and Peersman, 2021; McGuirk and Burke, 2020; Maystadt and Ecker, 2014).

5.2 Text-based measures

With regards to the broader political environment, the literature has developed a host of text-based indices that measure policy uncertainty. For instance, Du and Dong (2023) develop a text-based measure of agricultural policy uncertainty, and Hao and Ki-Seong (2024) and Gopinath (2021) find that agricultural commodity markets are correlated with economic and trade policy uncertainty.

Perhaps most relevant to the study of geopolitics, Caldara and Iacoviello (2022) propose a recent yet already widely used measure of geopolitical risk which is available in a long monthly panel data set for a subset of 45 countries. Their index is a news-based measure that quantifies the share of major English-language newspaper articles discussing wars, terrorism, and interstate tensions, and offers a decomposition into (potential) "threats" and (realized) "acts," which allows to separate anticipatory effects from realized disruptions.

In food and agriculture, empirical work typically finds that geopolitical risk is positively associated with commodity prices, including food futures (Goyal, Mensah and Steinbach, 2024). Saâdaoui, Jabeur and Goodell (2022) document a one-way causal relationship from geopolitical risk to key food commodities during the recent Russo-Ukrainian war using pattern recognition tools, Gong and Xu (2022) find that geopolitical risk increases cross-market connectedness across commodities, including agricultural complexes. Li et al. (2025), for their part, link higher geopolitical risk to higher rates of food price inflation in a 33-country panel-data

analysis. Lastly, Dutta et al. (2024) show that for forecasting realized volatility in agricultural futures, market-based uncertainty gauges such as volatility indices can outperform news-based measures of geopolitical risk, cautioning against over reliance on geopolitical risk for forecasting.

Moreover, the measure inherits media and language biases (Anglophone coverage and editorial salience), defines geopolitical risk narrowly around conflict/terror frames (potentially under-capturing geo-economic tools such as sanctions unless framed as geopolitical), and can conflate levels with shocks. Identification can be non-trivial because media attention co-moves with macro conditions, so designs that treat geopolitical risk as exogenous must be theoretically justified. Caldara and Iacoviello (2022) describe several options to improve identification strategies. Perhaps one way to apply the framework in food and agriculture is to (i) analyze threats and and acts separately, (ii) interact geopolitical risk with research-relevant exposure (trade shares, supply routes, crop-specific dependencies), and (iii) control for other structural uncertainty and supply shocks to mitigate confounding. If well-embedded in the empirical research design, the indicator is a promising valid proxy for geopolitical risk, going beyond local violence and unrest measures.

Researchers working at the micro level and looking at food consumers (e.g., the relative deprivation channel) have also used riots/protest based measures such as the Social Conflict Analysis Database (SCAD) (e.g. Hendrix and Haggard, 2015), or custom-built measures that build up on web-scraping news papers or databases using keywords, with (e.g. Bellemare, 2015) being the best-known such example in the agricultural economics literature.

To date, indicators stemming from large, automated news event data with near-daily global coverage such as the Global Database of Events, Language, and Tone (GDELT) Project and the Integrated Crisis Early Warning System (ICEWS) devel-

oped and maintained by Lockheed Martin have not been used in the literature on food and agriculture and should thus be ripe for the picking. Similarly with global and gridded data on displacement (e.g. Henningsen, 2025; Borrelli et al., 2022) and spatial datasets ((e.g. Tollefsen, Strand and Buhaug, 2012)). Although they careful validation, these data might offer opportunities for a more nuanced analyses of the relationship between food and conflict through high-frequency, spatially gridded data.

News-based measures are promising remedy to scant geopolitical data as they allow measuring almost everything at any time and for nearly every location by defining the right keyword dictionary. There are, however, several caveats to bear in mind when using such data (e.g. Gentzkow, Kelly and Taddy, 2019; Grimmer and Stewart, 2013). First, these data are heavily dependent on media supply and suffer from editorial bias. Second, the foregoing leads to comparability problems across countries with differing degrees of press freedom heterogeneous media markets. Third, the validity of these data critically hinges upon keyword dictionary design. Finally, while the aforementioned issues can already lead to serious measurement error issues, since data coverage tends to be correlated with macro and market conditions, and reporters often go look for specific conflict-related stories in response to food and agricultural events. From a methodological perspective, a promising area of research lies in how to ground-truth (i.e., validate by comparing with actual clearly defined and recorded) these news-based data, or at the very least to ascertain their validity via attempts at ground-truthing them.

5.3 Macro aggregates

There are a myriad of country-level and sub-national-level indicators relating to the demand, supply, and trade of agricultural inputs and outputs available to researchers. Those are almost always provided by national statistical offices or collected and compiled by international institutions such as the World Bank or the International Monetary Fund.

As regards geopolitics, it is worth highlighting the Worldwide Governance Indicators (WGI) provided by the World Bank, the geo-economic fragmentation indicator provided by the International Monetary Fund, the regime/democracy scores and the corruption index provided by Transparency International. Moreover, there are several smaller and less well-known databases that compile information on country-level risk that are used in the financial industry, as well trade routes and chokepoint risk data, data on arms transfers and militarization, and data on interstate crisis risk. All of these are underutilized in empirical research in food and agricultural economics, yet they can provide proxies for key political and geopolitical factors that drive outcomes in the food and agriculture sector or are themselves driven by food and agricultural factors.

Finally, several studies develop indicators that are specific to geopolitics. Liu and Yang (2025) use country-level trade data to develop an indicator that measures international power based on trade dependency ratios across countries. Staples, Schaefer and Malone (2025) offer a measure of geopolitical risk based on the distance of between countries along governance indicators, and ground-truth it with voting data. (D'Odorico et al., 2014) develops calorie-trade network measures based on conventional food trade data. Dalin et al. (2012) propose virtual water trade network indicators, following the idea that much of geopolitics in

food and agriculture comes down to relative water scarcity (Woertz, 2022*c*). Finally, Markowitz and Fariss (2017) propose a measure of geopolitical competition that incorporates relative geography, relative economic power, and the degree of compatibility of interests, and Bailey, Strezhnev and Voeten (2017) develop an indicator measuring state positions toward the erstwhile US-led liberal order.

6 Future research directions

While an impressive body of interdisciplinary work has successfully integrated economics with other social sciences and with environmental sciences, there is a need to consider the geopolitical dimension. Geopolitics determines the very architecture within which agriculture and food producers, consumers, and policy makers operate, and because trade-offs between geopolitical and food and agricultural outcomes arise.

From a structural perspective, there is a need to develop models that embed storage, substitution, and shipping frictions in trade networks and incorporate stochastic climate and economic shocks and strategic behavior (e.g., tariffs, export bans, sanctions), so that policy endogeneity and geo-economic instruments become state rather than control variables (Woertz, 2022*a*; Zhou et al., 2020; Jaafar, Sujud and Woertz, 2022). On the forecasting side, climate-informed stress tests that layer ENSO cycles, sanctions, embargoes, and chokepoint disruptions along global agri-food trade routes can generate important *ex ante* policy insights and help put empirical estimates in policy context (Woertz, 2021; Talebian, Lager and Harris, 2024; Goldstein, 2023; Ripamonti et al., 2024).

Another gap of the empirical literature on the link between food and violence is the geographic focus of the literature on sub-Saharan Africa despite ample vari-

ation in food prices, protests, and political outcomes everywhere in the world. There is thus a need for systematic rigorous work on East and Southeast Asia, Latin America, and on OECD countries which (i) links sub-national, high-frequency consumer food price data to event-level contention, (ii) exploits plausibly exogenous shocks (e.g., animal disease outbreaks that spike specific food prices), and (iii) tracks political responses (e.g., protests, voter turnout, policy reversals). Earlier global studies show food prices are correlated and may even cause social unrest (e.g., Bellemare, 2015; Hendrix and Haggard, 2015), but we lack recent, internally valid evidence outside Africa.

More broadly, a credible research agenda here might consist of sub-national event-based studies that clearly look at the presumed causal relationship from local (e.g., county or district) exposure to commodity-specific price shocks to civilian (e.g., protest) and government (e.g., policy) responses, with careful attention to persistence, media bias, and multiple-testing corrections.

Of note here as well is that the literature on food and conflict as well as the literature on foreign aid and violence both suffer from serious methodological problems. A number of studies rely on cross-country panel data, and those almost always rely on country-level fixed effects for identification, which compromises the quality of evidence generated by those studies for two reasons. First, cross-country data are often rife with measurement error, both because of comparability issues between countries and because a lot of observations within a given country are the results of educated guesses or interpolations because not every variable is collected or compiled annually in every country.[7] Second, recent advances in panel-data econometrics have cast doubt on the literature's reliance on fixed ef-

[7] Worse, because state capacity is directly related to income, data quality issues tend to get worse as a country's level of income gets lower, which casts even more doubt on many of the studies focusing on sub-Saharan Africa.

fects over long periods of time (Millimet and Bellemare, 2025), which means that a lot of findings that rely on country fixed effects as their source of "identification" are likely to be spurious.

A number of key results in the literature have also proven to be spurious for other reasons. Christian and Barrett (2024) clearly show how the results of a widely cited article in this literature turn out to be spurious once assumptions are made that are closer to reality and the data are treated with the requisite amount of caution. In sum, while our theoretical understanding of the world has advanced, we often need to start over from scratch when it comes to empirical work Koppenberg, Mishra and Hirsch (2023).

While we have not focused explicitly on the issue, the intersection of biosecurity and geopolitics remains underexplored despite its growing relevance. Animal and plant disease outbreaks (e.g., mad cow disease) can have cross-border economic and political consequences comparable to traditional trade shocks, leading to import bans, export restrictions, and interstate tensions (Janjua, Fatima and Ashraf, 2021; Ingram, 2013). Conversely, biosecurity measures can be used as covert trade barriers or as an instrument of hybrid warfare (McGuirk and Trebesch, 2025). Future research should conceptualize biosecurity not only as an economic or veterinary issue but as a strategic area of intervention when it comes to the geopolitics of food. Modeling how biological risks propagate through agri-food value chains and determining how preventive or retaliatory measures reshape global power relations will require interdiscplinary collaboration between agricultural economists, animal scientists, political scientists, and public health researchers.

Finally, the literature needs to move from documenting causal relationships (or mere correlations suggestive thereof) between conflict and food prices toward modeling the underlying mechanisms that generate those relationships. Conflict

is a distal cause of food prices, which are determined by more proximate causes which themselves respond to conflict, such as storage dynamics, trade, market power, and policy responses. Here, structural econometric approaches can formalize these multiple channels and allow the estimation of counterfactuals and can link micro-foundations with geopolitical outcomes. Embedding such models within a a cumulative, testable research program rather than a set of isolated case studies on the geopolitics of food is key to deliver relevant policy and business strategy insights at a time when the post-World War II international order is being dismantled and reshaped.

7 Summary and concluding remarks

Economists often view economic policy as being exclusively about achieving economic aims, and consequently assess the effects of economic policy purely in terms of economics, often focusing on consumer or producer welfare and on various measures of efficiency. Such views tend to come from economic models which, while elegant and informative about the various mechanisms at play, are necessarily streamlined versions of reality that abstract from considerations which, though they may seem irrelevant to economists, may well matter in practice.

Political scientists and the new crop of "geoeconomists," however, view many of the same policy instruments as both economic policy instruments *and* as instruments used to improve or wield geopolitical power. As food and agriculture are strongly associated with civil unrest and conflict as well as political stability, agricultural subsidies, bans on food exports or imports, tariffs, food aid, and so on are important tools used by policy makers to (i) ensure domestic political stability, and (ii) (de)stabilize (un)friendly foreign governments help achieve foreign-policy

aims. With a few rare exceptions, the agricultural economics literature has not taken the latter view, and scientific debates around food self-sufficiency, food aid, and farm subsidies, for instance, often ignore key geopolitical causes and consequences.

While geopolitics has always been a sort of background hum in food and agricultural policy debate, that hum has recently become an inescapable roar with the return of overt trade protectionism, war in Europe, mercantilistic mentalities, and a global pandemic of likely zoonotic origins. Yet scholarship at the intersection of geopolitics and agricultural economics remains scant. What is needed now are (i) rigorous testable theoretical models that link strategic behavior and supply–chain disruption to market outcomes, (ii) transparent, validated data and indicators that capture geopolitical pressure with known error properties, and (iii) research designs that generate high-quality (ideally causal) evidence on how food and agriculture both shape and are shaped by geopolitical tensions. This can be accomplished by greater integration with the adjacent field of geo-economics and the adjacent discipline that is political science. Just as economics and environmental sciences have developed an effective interdisciplinary toolkit to study and combat climate change, we now need a comparable synthesis of agricultural economics and geopolitics to help develop the right tools to preserve the global peace that has prevailed since the end of the Cold War—if not since the end of World War II.

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