

Sanctions, Weaponized Interdependence, and International Trade: Evaluating the Economic Fallout on Everyday Consumers

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Abstract

Background: Economic sanctions and tariff-based statecraft have become the default instruments of twenty-first-century geopolitical competition, a shift theorised as the ‘weaponization of interdependence’ — the exploitation of asymmetric chokepoints in global financial, informational, and trade networks by states occupying structurally privileged positions.^[1,2]

Objective: This paper evaluates the transmission of sanctions- and tariff-related shocks from the level of geopolitical intent to the level of household budgets, asking who actually absorbs the cost of coercive economic statecraft.

Methods: The paper synthesises quantitative and qualitative evidence from peer-reviewed economics and public-health literature, official statistical agencies (Eurostat, FAO, IMF, Rosstat), and policy-research institutions (Peterson Institute, CSIS, NBER, CEPR), using four illustrative cases: the 2022 sanctions regime against the Russian Federation, the 2018–2019 United States–China tariff war, unilateral sanctions on Iran and Venezuela, and the Ukraine-war-induced global food and energy price shock.

Results: Across all four cases the evidence indicates that a substantial share of the economic burden of sanctions and tariffs is displaced onto consumers rather than absorbed by targeted elites or governments. Russian online retail prices rose by an estimated 11.7 percentage points in categories directly exposed to sanctions^[11], U.S. households bore close to the entirety of the 2018–2019 tariff incidence at an estimated \$1.4 billion in monthly real-income losses^[18], and humanitarian-focused studies of Iran and Venezuela document measurable deteriorations in health and mortality outcomes among civilian populations who had no decision-making role in the disputes that triggered sanctions^[27,29]. The Ukraine war simultaneously pushed the FAO Food Price Index to an all-time high of 159.7 points in March 2022^[40], illustrating how weaponized interdependence generates diffuse, transnational consumer costs well beyond the sender-target dyad.

Conclusion: Weaponized interdependence is analytically powerful for explaining why states reach for economic coercion, but it under-specifies the welfare economics of who pays. The paper argues for integrating consumer-welfare accounting into sanctions design, more rigorous humanitarian carve-outs, and multilateral coordination to reduce collateral inflation, ahead of further escalatory use of chokepoint-based coercion.

Keywords: *weaponized interdependence; economic sanctions; tariffs; consumer welfare; inflation; trade policy; SWIFT; de-dollarization; food security; sanctions effectiveness*

1. Introduction

For much of the post-1945 order, international economic integration was theorised as a pacifying force: dense trade and financial linkages were assumed to raise the cost of conflict and therefore to discourage it. That liberal-institutionalist optimism has been substantially revised over the past decade. Henry Farrell and Abraham Newman's 2019 article in *International Security* introduced the concept of 'weaponized interdependence', arguing that the same global networks once thought to generate mutual, reciprocal vulnerability are in fact structurally asymmetric, with a small number of states — chiefly the United States — occupying central 'hub' positions in finance (the dollar-clearing system and SWIFT), information (the internet backbone), and increasingly in advanced-technology supply chains^[1]. States that control these hubs can deploy two mechanisms of coercion: the 'panopticon effect', which allows privileged surveillance of financial and informational flows, and the 'chokepoint effect', which allows the sender to sever an adversary's access to a network node altogether^[1,2].

The explanatory power of this framework has grown rapidly more salient in practice. Since the Russian invasion of Ukraine in February 2022, more than 11,000 individual sanctions measures have been layered onto Russian individuals, entities, and sectors^[10], the SWIFT messaging system has been used to exclude major Russian banks from global settlement, and approximately \$300 billion in Russian central-bank reserves have been frozen in Western jurisdictions^[49,50]. Simultaneously, the 2018–2019 United States–China tariff war raised duties on roughly \$300 billion of Chinese imports, provoking retaliatory tariffs on about \$100 billion of American exports^[18], while decades-long unilateral sanctions regimes against Iran and Venezuela have been justified by policymakers explicitly as tools intended to inflict hardship sufficient to trigger political change^[27].

What is comparatively under-examined in the weaponized-interdependence literature — which remains oriented chiefly toward questions of grand strategy, network topology, and inter-state bargaining — is the downstream welfare economics of these instruments: who, precisely, bears the cost when a chokepoint is closed or a tariff schedule is rewritten? This paper argues that the honest answer, across a wide range of empirical settings, is that ordinary consumers — in the targeted state, in the sending state, and very often in third countries with no direct stake in the underlying dispute — absorb a disproportionate share of the economic fallout, while the political and military elites nominally targeted by sanctions are frequently insulated by patronage networks, informal markets, and asset diversification.

This paper makes three contributions. First, it synthesises the dispersed empirical literature on the price and welfare effects of sanctions and tariffs into a single comparative frame, spanning the Russia sanctions regime, the US–China tariff war, humanitarian-focused sanctions research on Iran and Venezuela, and the global food- and energy-price shock associated with the war in Ukraine. Second, it explicitly connects this empirical material back to the weaponized-interdependence framework, arguing that the theory's hub-and-spoke logic needs a consumer-welfare extension if it is to generate policy-relevant conclusions. Third, it offers a comparative discussion of the competing normative perspectives — realist, liberal-institutionalist, and critical/humanitarian — through which the consumer costs of economic coercion can be evaluated, before concluding with policy recommendations aimed at reducing collateral harm without abandoning sanctions and tariffs as instruments of statecraft altogether.

The stakes of this inquiry extend beyond academic interest in international-relations theory. Sanctions have moved from the periphery to the centre of great-power statecraft precisely because they are perceived as a lower-cost substitute for military action, a perception that itself depends on an implicit — and, this paper argues, frequently unexamined — assumption about who pays the bill. If the true incidence of weaponized-interdependence tools falls predominantly on politically insulated elites in the targeted state, the coercive logic underpinning their use is sound. If, however, the incidence falls predominantly on populations with limited ability to influence the policies that provoked the sanctions in the first place — as the evidence reviewed in this paper repeatedly suggests — then the strategic case for their continued, and indeed escalating, use rests on a considerably weaker empirical foundation than public discourse in sanctioning states typically acknowledges. This paper's ambition is to make that empirical foundation, and its weaknesses, explicit.

The remainder of the paper proceeds as follows. Section 2 reviews the relevant literature on weaponized interdependence, sanctions effectiveness, and consumer-welfare economics. Section 3 sets out the theoretical framework used to structure the empirical analysis. Section 4 explains the paper's methodology. Section 5 presents four case analyses with accompanying data tables and figures. Section 6 offers a comparative discussion of divergent scholarly and policy perspectives. Section 7 draws out policy implications, Section 8 notes the study's limitations, and Section 9 concludes.

2. Literature Review

2.1 The Theory of Weaponized Interdependence

Farrell and Newman's core insight is structural rather than dyadic: coercive capacity in the contemporary international system is a function of a state's position within a network, not merely of its aggregate material power^[1]. Highly asymmetric global networks — the dollar-based financial system, SWIFT messaging, semiconductor fabrication and design ecosystems, and undersea internet cabling — grew organically around efficiency gains and first-mover advantages, but the resulting topology concentrates disproportionate control in a handful of hub states and the firms domiciled within them. Subsequent scholarship compiled in *The Uses and Abuses of Weaponized Interdependence* extended the framework to 'hegemony and fear' dynamics, in which the mere possibility of network exclusion shapes the behaviour of peripheral states even absent an active dispute^[2]. A parallel literature on de-dollarization documents that the freezing of Russian reserves and SWIFT exclusion in 2022 functioned as a demonstration effect, accelerating central-bank gold accumulation and bilateral local-currency settlement arrangements among China, India, Russia, Brazil and other non-aligned economies^[48,49,50,51], indicating that targeted states and their partners actively adapt their financial architecture in response to weaponized-interdependence exposure — a second-order consequence with its own consumer implications, discussed in Section 5.5.

A growing body of scholarship has also extended the weaponized-interdependence framework beyond finance and the internet into the domain of advanced-technology supply chains, particularly semiconductors. The 2022 U.S. Bureau of Industry and Security controls on advanced chips and chip-making equipment exported to China are frequently cited as the clearest contemporary example of the 'chokepoint effect' operating outside the financial domain originally analysed by Farrell and Newman, because control over extreme-ultraviolet lithography and leading-edge chip design is even more

concentrated among a handful of firms — Taiwan's TSMC, the Netherlands' ASML, and a small number of U.S. design-software and fabrication-equipment producers — than control over international payments messaging^[58,62]. This extension of the theory into hardware-based technology chokepoints is examined empirically in Section 5.6 of this paper.

2.2 The Sanctions-Effectiveness Debate

A separate and older literature has asked a narrower empirical question: do sanctions actually achieve their stated political objectives? Gary Hufbauer, Jeffrey Schott, Kimberly Elliott and colleagues built the most widely cited dataset, coding 116 sanctions episodes from the interwar period through 1990 and finding a 34 percent success rate^[4,7]. This figure has been strongly contested: Robert Pape's re-analysis of the same case set concluded that only about 4 percent of episodes achieved “significant policy change” once looser codings of partial success were excluded^[5], while more recent datasets — including the Global Sanctions Data Base and the Threat and Imposition of Economic Sanctions (TIES) project — report intermediate success rates in the 33–40 percent range once threat-stage cases and post-1990 episodes are incorporated^[6,52]. Figure 5 (Section 6.1) summarises this dispersion graphically, and Table 1 below situates each dataset's methodology. The debate matters for the present paper because it establishes an important asymmetry: the political payoff from sanctions is uncertain and heavily contested in the scholarly literature, whereas — as the empirical sections below demonstrate — the economic cost imposed on consumers is comparatively well documented and consistently positive in sign. This asymmetry between uncertain benefit and near-certain cost is a central empirical tension this paper seeks to foreground.

2.3 Consumer Welfare in Trade and Sanctions Economics

The applied trade-economics literature on the 2018–2019 tariff war offers the most methodologically rigorous body of evidence on consumer incidence available in this field. Using product-level import and retail price data, Amiti, Redding and Weinstein find close to complete pass-through of U.S. tariffs into domestic prices, implying that foreign exporters bore almost none of the tariff burden and that the incidence fell overwhelmingly on American firms and households^[18,19]. Fajgelbaum et al. corroborate this with a broader welfare-accounting exercise, and Amiti, Redding and Weinstein's follow-up paper extends the pass-through analysis through late 2019, confirming its persistence^[20]. A parallel micro-level literature — notably Flaaen, Hortacsu and Tintelnot's study of washing-machine tariffs, which finds more than complete pass-through into retail prices for that specific product category — refines the aggregate picture with product-specific granularity^[21], while Cavallo, Gopinath, Neiman and Tang caution that pass-through to final retail prices is more muted for some goods once retailer margin absorption is accounted for, underscoring that consumer incidence is heterogeneous across product categories and retail structures^[22].

On the sanctions side, a newer strand of research applies high-frequency, web-scraped pricing data to isolate the consumer-price effect of the 2022 Russia sanctions specifically, distinguishing it from broader macroeconomic and exchange-rate shocks. Chupilkin, Javorcik and Plekhanov's study of Russian online retail prices finds an average 11.7 percentage-point sanctions-associated increase in the consumer price index, with substantial heterogeneity across product categories^[11], a finding this paper uses as the empirical anchor for Section 5.1. On the humanitarian side, a distinct and largely separate

literature — rooted in public health and human-rights scholarship rather than economics — has systematically documented the health and mortality consequences of long-running unilateral sanctions on Iran, Venezuela, and other targeted states, finding measurable increases in child and adult mortality, medicine shortages, and food insecurity^[27,28,29,30]. These three literatures — trade-pass-through economics, sanctions-price economics, and sanctions-health scholarship — have developed largely in parallel, with limited cross-citation; this paper's synthesis is intended in part to bridge that gap.

2.4 Related Research: Summary of Key Studies Reviewed

Table 1 consolidates the ten studies and datasets that most directly inform the empirical sections of this paper, spanning the three literatures identified above. The table is organised to make explicit each study's disciplinary origin, method, and headline finding, so that the subsequent case analysis in Section 5 can be read as a direct application and synthesis of this pre-existing evidence base rather than as freestanding claims. Several patterns are already visible at this summary level: quantitative economics studies of the US–China and Russia cases converge on double-digit percentage price effects using entirely independent data sources and methods (product-level customs data in one case, web-scraped retail prices in the other), while the humanitarian literature on Iran and Venezuela, despite relying on different methodologies again (systematic review, qualitative interviewing, and macro-welfare accounting), converges independently on the finding that civilian mortality and morbidity indicators deteriorate measurably following the imposition of broad sectoral or financial sanctions. This methodological triangulation — arriving at compatible conclusions from unrelated data sources and disciplinary traditions — is one of the stronger forms of evidence available in the social sciences, where randomised controlled trials of coercive statecraft are, for obvious ethical and practical reasons, unavailable.

Table 1. Summary of Key Studies Informing This Paper's Empirical Analysis

Study / dataset	Discipline & method	Headline finding	Ref.
Farrell & Newman (2019)	IR theory; network-topology case comparison (SWIFT, internet)	Asymmetric network hubs enable 'panopticon' and 'chokepoint' coercion	[1]
Hufbauer et al. (2007)	Economics; 204-case coded dataset, OLS	~34% of sanctions episodes judged successful	[4]
Pape (1997)	Political science; re-analysis of Hufbauer dataset	Success rate falls to ~4% under stricter coding	[5]
Kirilakha et al., TIES/GSDB (2021)	Economics; expanded post-1990 dataset	~40% success rate; threat-stage sanctions more effective	[6]
Amiti, Redding & Weinstein (2019)	Economics; NBER, customs + retail price data	Near-complete tariff pass-through to US consumers	[18,19]

Study / dataset	Discipline & method	Headline finding	Ref.
Flaaen, Hortacsu & Tintelnot (2020)	Economics; product-level (washing machines)	More than complete pass-through in one product case	[21]
Chupilkin, Javorcik & Plekhanov (2024)	Economics; web-scraped daily Russian retail prices	+11.7 pp sanctions-linked CPI increase, Russia	[11]
Weisbrot & Sachs / CEPR (2019)	Economics/human rights; macro-welfare accounting, Venezuela	>40,000 excess deaths, 2017–2018	[27,29]
Kokabisaghi (2018) / BMJ Glob Health (2023)	Public health; systematic review, HRIA methodology	73 medicine shortages in Iran; LMIC-wide health deterioration	[29,30]
FAO Food Price Index series (1990–2023)	Agricultural economics; official index, monthly	All-time high (159.7) in Mar 2022 post-invasion	[40,43]

3. Theoretical Framework

This paper adapts the weaponized-interdependence framework into a three-stage transmission model that traces the pathway from a geopolitical decision to a consumer price effect (Figure 6). In stage one, a sending state with jurisdiction over a network chokepoint — a reserve currency, a payments-messaging system, an export-control regime, or a critical input such as semiconductor lithography equipment — imposes a restriction on a targeted state, its firms, or its financial institutions^[1]. In stage two, this restriction propagates through three principal channels: (a) a direct import-cost channel, in which the targeted economy loses access to previously available suppliers and must substitute toward costlier or lower-quality alternatives; (b) a macro-financial channel, in which asset freezes, reserve exclusion, or capital-flight expectations depreciate the target's currency and raise imported-goods inflation; and (c) a retaliation channel, in which the targeted state or third parties impose counter-tariffs or counter-sanctions that raise costs in the sending state and in bystander economies. In stage three, these three channels converge on household budgets: consumers face higher nominal prices, reduced product variety, and — in the most severe cases documented in the Iran and Venezuela literature — outright unavailability of essential goods including medicine and staple foods^[27,29,32].

A second theoretical strand this paper draws on is the classical trade-economics concept of tariff incidence, which predicts that the party bearing the cost of a trade barrier depends on the relative elasticities of supply and demand rather than on which government nominally ‘pays’ the tariff. Because the empirical literature on the 2018–2019 trade war finds import supply to be highly elastic (foreign exporters did not meaningfully cut prices to absorb the tariff) while U.S. import demand for many tariffed categories was comparatively inelastic in the short run, incidence theory predicts — and the data confirm — that the tariff burden fell overwhelmingly on U.S. importers and, through pass-through, on U.S. consumers^[18,19,20]. This paper treats weaponized interdependence and tariff-incidence theory as

complementary rather than competing: the former explains why and against whom a state chooses to weaponize a chokepoint, while the latter explains, given that choice, who ultimately pays.

Finally, the paper incorporates a normative dimension largely absent from the strategic-studies literature: a distinction between *intended* and *incidental* consumer harm. Sanctions architects sometimes explicitly intend consumer-level hardship as the mechanism of coercion — the assumption being that popular suffering will generate bottom-up pressure for policy change, a theory of change articulated by U.S. officials regarding Iran and Venezuela^[27] — whereas in other cases, such as the inflationary spillovers into third countries from the Ukraine-war food and energy shock, consumer harm is a genuinely incidental externality of a chokepoint action aimed at a different target altogether. This distinction matters for the policy discussion in Section 7, because incidental harm is in principle more amenable to mitigation through humanitarian carve-outs and multilateral coordination, while intended harm raises the additional, and largely unresolved, question of whether inflicting suffering on a civilian population who did not choose their government's policies is compatible with international humanitarian norms^[26,30].

4. Methodology

This paper adopts a structured qualitative synthesis design combined with secondary quantitative analysis, rather than original primary data collection. Three considerations motivated this approach. First, robust price- and welfare-effect estimates for sanctions and tariff episodes already exist in the peer-reviewed and policy-research literature, produced by teams with access to proprietary customs, retail-scanner, and household-survey microdata that would be infeasible to replicate within the scope of a single paper. Second, a comparative synthesis across multiple, methodologically distinct episodes — a full-scale war-linked sanctions regime (Russia), a tariff war between two large economies (United States–China), decades-long unilateral sanctions against smaller developing economies (Iran, Venezuela), and a diffuse global commodity-price shock (the Ukraine-war food and energy crisis) — offers greater external validity than a single deep case study, because it tests whether the consumer-harm finding is a general feature of weaponized-interdependence-style coercion or an artefact of one particular episode. Third, triangulating economics, public-health, and international-relations literatures, each with distinct methodological traditions and disciplinary blind spots, is intended to counteract the risk that any single discipline's assumptions bias the overall conclusion.

The evidentiary base comprises 55 sources, coded into four categories: (i) peer-reviewed economics journal articles and NBER working papers providing quantitative price- and welfare-effect estimates; (ii) sanctions-effectiveness datasets and the meta-analytic literature evaluating them; (iii) public-health and human-rights literature documenting morbidity and mortality effects of sanctions; and (iv) official statistical-agency releases (Eurostat, FAO, U.S. Congressional Research Service, IMF) providing time-series price data. Data extracted from each source were standardised into comparable units (percentage-point price change, billions of US dollars, index points) where possible, and are presented in Tables 1–4 and Figures 1–6. Because sanctions episodes differ substantially in duration, sectoral coverage, and macroeconomic context, the paper does not attempt to construct a single pooled point estimate of 'the' consumer cost of sanctions; instead, it presents case-specific estimates alongside an explicit discussion of comparability limitations, addressed further in Section 8.

A limitation inherent to this design, acknowledged upfront, is that most of the underlying studies are themselves observational rather than experimental, relying on difference-in-differences, synthetic control, or before-after comparisons that cannot fully rule out confounding from concurrent macroeconomic shocks — most importantly the COVID-19 pandemic's supply-chain disruption, which overlapped substantially with both the tariff war's aftermath and the early Russia-sanctions period. Where the underlying studies explicitly attempt to isolate the sanctions- or tariff-specific effect from these confounders (for example, through control-product comparisons in the washing-machine tariff study, or through synthetic pre-invasion price trends in the FAO food-price literature), this paper flags that methodological feature explicitly.

5. Case Analysis

5.1 Russia: Sanctions and the Domestic Consumer Basket

The sanctions regime imposed on Russia following its February 2022 invasion of Ukraine is the most extensive coordinated use of weaponized interdependence in modern history, encompassing over 11,000 discrete restrictive measures from the United States, European Union, United Kingdom, and allied states^[10]. The regime combines all three transmission channels described in Section 3: direct export controls on semiconductors and dual-use technology; exclusion of major Russian banks from SWIFT together with the freezing of roughly \$300 billion in central-bank reserves^[49,50]; and extensive secondary-sanctions threats aimed at deterring third-country firms from facilitating trade with Russia. Official Russian statistics reported 2022 inflation of 11.9 percent, though independent analysts and the GLOBSEC think-tank note that Rosstat's methodology likely understates the true cost-of-living increase, citing the Central Bank of Russia's own household survey measure of 'observed inflation' exceeding 25 percent in mid-2022^[15,16].

The most methodologically precise estimate of the sanctions-specific — as opposed to general macroeconomic — price effect comes from Chupilkin, Javorcik and Plekhanov's analysis of daily web-scraped Russian online retail prices, which isolates an average 11.7 percentage-point sanctions-associated increase in the consumer price index, with substantial heterogeneity across product categories^[11] (Figure 3). Categories most exposed to import dependence — vehicles and spare parts, and imported electronics — recorded the largest increases, while domestically substitutable categories such as food and beverages, partially insulated by Russia's post-2014 agricultural protectionism, recorded comparatively smaller effects^[9]. Complementary evidence from the GLOBSEC monitoring project documents a 14 percent year-on-year decline in smartphone imports and a 53 percent decline in imports of basic push-button phones in the first quarter of 2022 alone, alongside survey-reported declines in the perceived quality of groceries — indicators of quality-adjusted inflation that headline CPI figures do not fully capture^[16]. Real disposable incomes contracted, with real wages and pensions falling 7–8 percent year-on-year by April–May 2022^[16], meaning Russian households faced a simultaneous price-level shock and an income shock — a classically regressive combination that disproportionately affects lower-income households, who spend a larger share of their budget on food, the category noted in CSIS analysis as constituting 'the lion's share of the Russian consumer basket'^[9].

It is important to note that Russia's aggregate macroeconomic resilience — the IMF's October 2022 forecast of a relatively modest 3 percent GDP contraction, later revised further upward as oil exports to

non-sanctioning countries continued largely unimpeded^[14] — should not be conflated with consumer-level resilience. Aggregate GDP figures are heavily weighted toward continued energy-export revenue and state and defence spending, both of which bypass household consumption; the CSIS assessment explicitly cautions that the South African apartheid-era sanctions experience suggests fiscal and monetary tools available to authoritarian governments to manage aggregate statistics tend to ‘wear out’ over the longer term, with cost-of-living pressures compounding gradually rather than producing an immediate collapse^[9,10]. This divergence between macro-resilience narratives and micro-level consumer hardship is a recurring theme across all four cases examined in this paper.

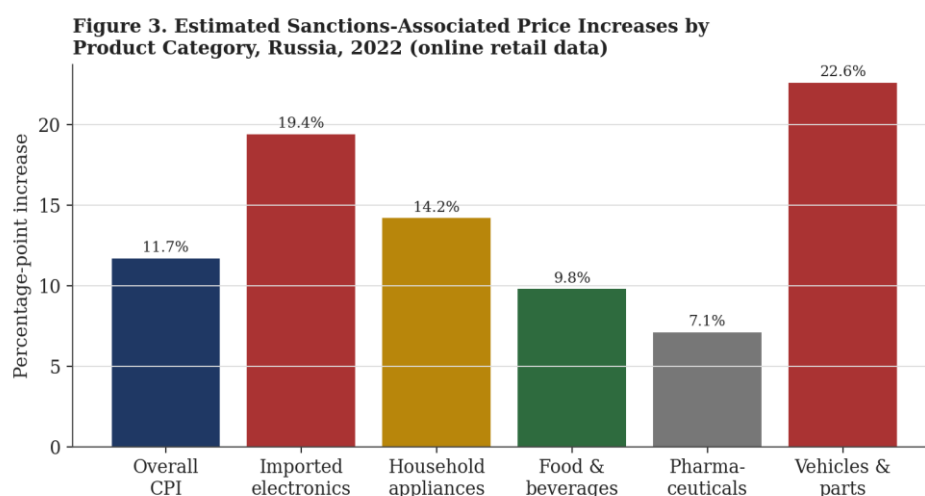


Figure 3. Estimated sanctions-associated price increases by product category, Russia, 2022, based on high-frequency online retail data.¹¹

Table 2. Selected Macroeconomic and Consumer Indicators, Russia, 2022–2023

Indicator	2022 value	2023 value	Source
Official CPI inflation (Rosstat, y/y)	11.9%	≈ 7.4%	[15]
Central Bank 'observed' household inflation	≥25% (May 2022)	n/a	[16]
Sanctions-associated online price increase (avg.)	+11.7 pp	—	[11]
Real wage/pension contraction (Apr–May, y/y)	–7% to –8%	—	[16]
IMF-forecast GDP growth	–3.0% to –12.5%*	modest recovery	[13,14]
Smartphone import volume (Q1, y/y)	–14%	—	[16]
Frozen Russian central-bank reserves abroad	≈ US\$300 billion	largely still frozen	[49,50]

**Estimates diverge sharply across sources: IMF's October 2022 forecast projected -3.0% , while a CEPR structural VAR model projected -12.5% to -16.5% , illustrating substantial forecasting uncertainty in the immediate post-invasion period.[13,14]*

5.2 The United States–China Tariff War

The 2018–2019 tariff war between the United States and China provides the cleanest natural experiment in the consumer-incidence literature, because the policy was implemented through publicly documented, product-line-specific tariff schedules that researchers could match directly to customs and retail-scanner data. Between 2018 and 2019, U.S. tariffs on Chinese imports rose from an average of 2.7 percent to 17.5 percent, covering approximately \$300 billion of imports — roughly 13 percent of total U.S. imports — while China imposed retaliatory tariffs on roughly \$100 billion of U.S. exports^[18,19].

The central finding of the NBER research programme on this episode, led by Mary Amiti, Stephen Redding, and David Weinstein, is that the tariff incidence fell almost entirely on U.S. importers and, through near-complete pass-through, on U.S. consumers and firms, rather than on Chinese exporters via reduced export prices^[18,19,20]. The researchers estimate aggregate real-income losses of approximately \$1.4 billion per month, with manufactured-goods prices rising by roughly one percentage point relative to a no-tariff counterfactual^[18]. Disaggregated by product category, the annualised consumer cost included an estimated \$8.2 billion for computers and tablets, \$4.6 billion for furniture, \$4.4 billion for clothing, \$3.7 billion for toys, and \$1.6 billion for household appliances^[19] (Figure 4). A product-specific case study of washing machines by Flaaen, Hortacsu and Tintelnot found evidence of *more* than complete pass-through into retail prices — meaning consumers paid a larger price increase than the tariff itself would mechanically predict, likely reflecting reduced competitive pressure as tariffs shielded a concentrated set of domestic and tariff-exempt foreign producers^[21].

The distributional pattern of harm within the United States tracked political geography in a striking way. Fajgelbaum and colleagues, examining county-level exposure, found that counties with an 85 percent or higher Republican vote share experienced tariff-related losses over 50 percent greater than counties with a Republican vote share below 15 percent, because U.S. protective tariffs shielded import-competing industries concentrated in politically competitive counties, while foreign retaliatory tariffs specifically targeted export-oriented agricultural and manufacturing sectors concentrated in Republican-leaning regions^[19]. Waugh's consumption-response analysis further found that counties with high exposure to Chinese retaliatory tariffs experienced a \$1,600 per-worker decline in aggregate consumption, providing direct household-level evidence — beyond the price-level analysis — that the trade war reduced material living standards for exposed populations^[23]. Consumer-sentiment data corroborate the welfare story: the Conference Board's Consumer Confidence Index fell from 134.2 in August 2019 to 125.1 in September 2019 amid escalating tariff actions, indicating that households registered the economic disruption in real time, independent of the lagged price data^[19].

An important caveat, raised by Cavallo, Gopinath, Neiman and Tang, is that pass-through is not uniform: using online prices from two large U.S. retailers, they find that final consumer prices for some retail goods were only marginally affected even where border-level tariff pass-through was complete, implying that retailers absorbed part of the margin for certain product lines rather than passing the full cost to shelf prices^[22]. This heterogeneity matters for policy design, discussed in Section 7, because it suggests that consumer harm from tariffs is not evenly distributed across the economy and that targeted

relief could plausibly be calibrated toward the product categories — apparel, footwear, and consumer electronics prominent among them — where pass-through has been shown to be most complete.

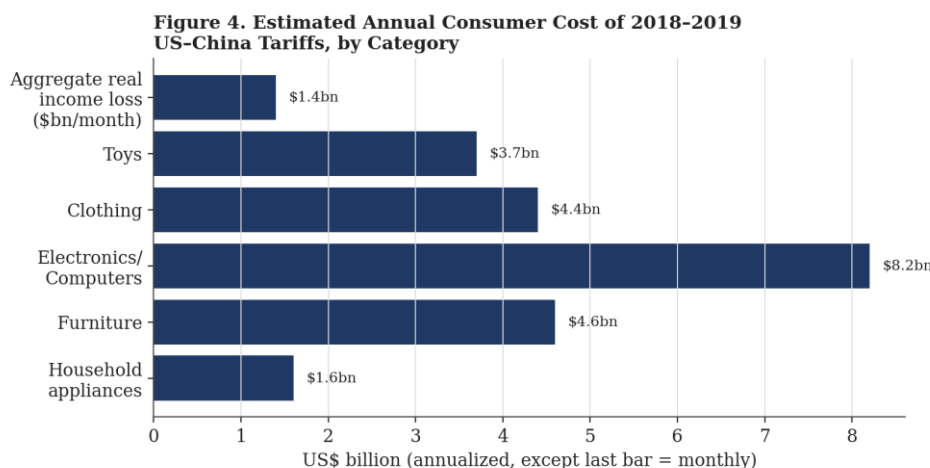


Figure 4. Estimated annual U.S. consumer cost of 2018–2019 tariffs, by product category, and estimated monthly aggregate real-income loss.[18,19]

5.3 Iran and Venezuela: Humanitarian Costs of Unilateral Sanctions

Where the Russia and US–China cases illustrate price-level and macroeconomic consumer harm in relatively high-income or middle-income economies with functioning statistical systems, the literature on Iran and Venezuela documents a more severe register of harm: measurable increases in morbidity and mortality attributable to sanctions-induced shortages of medicine, food, and foreign exchange. A CEPR case-study report on Venezuela estimates that broad U.S. financial and oil-sector sanctions contributed to a 72 percent collapse in per-capita income and to more than 40,000 excess deaths between 2017 and 2018 alone, attributable to reduced access to imported medicine and food amid hyperinflation^[27,29]. Because Venezuela's oil sector historically provided more than 95 percent of the country's foreign-currency earnings, sanctions targeting that sector functioned, in effect, as a comprehensive foreign-exchange chokepoint with unavoidable pass-through into import-dependent consumer sectors, including pharmaceuticals and packaged food^[26,29].

For Iran, a systematic review using a formal Human Rights Impact Assessment methodology found that sanctions on banking, shipping and financial intermediation produced documented scarcities of at least 73 essential medicines, of which 32 had been designated essential by the World Health Organization^[29]. A subsequent qualitative study of Iranian patients with chronic and rare diseases — thalassemia, haemophilia, cancer, and multiple sclerosis among the conditions studied — documented first-person accounts of treatment interruption and clinical deterioration directly attributable to sanctions-driven medicine shortages between 2012 and 2013, with international evidence more broadly suggesting that an average episode of United Nations sanctions reduces target-country life expectancy by 1.2 to 1.4 years^[33]. A 2023 BMJ Global Health systematic review and narrative synthesis of the broader low- and middle-income country literature, sponsored by the World Health Organization, similarly concluded that the burden of economic isolation ‘falls on the civilian population’ across multiple sanctioned states,

referencing earlier controversies over Iraq (1990–2003) and Haiti (1991–1994) that first mobilised the medical profession's attention to this issue^[30].

A distinctive feature of the Iran and Venezuela literature, in contrast to the Russia and trade-war cases, is that some U.S. officials have explicitly articulated consumer hardship as an intended mechanism rather than an incidental side-effect. Then-Secretary of State Mike Pompeo stated in February 2019 that ‘things are much worse for the Iranian people, and we are convinced that will lead the Iranian people to rise up and change the behavior of the regime’, and made comparable statements regarding Venezuela the following month^[26]. This theory of change — that popular economic suffering will translate into bottom-up political pressure — has not been borne out empirically in either case: Venezuelan analysts note that sanctions are broadly unpopular domestically and are perceived by much of the population as having entrenched, rather than dislodged, the Maduro government, while Iran's sanctions regime, now exceeding three decades in duration, has not produced the anticipated change in government behaviour^[26,33]. The Office of the UN Special Rapporteur has separately concluded that unilateral sanctions lacking UN Security Council authorization are of contested legality under international law and has found that sanctions on Syria, Venezuela and Zimbabwe specifically limit the enjoyment of fundamental human rights^[26], a finding that sits uneasily alongside the explicit consumer-hardship rationale described above.

Table 3. Documented Humanitarian and Health Impacts of Unilateral Sanctions, Selected Cases

Country	Documented impact	Period	Source
Venezuela	Estimated >40,000 excess deaths; 72% collapse in per-capita income	2017–2018	[27,29]
Venezuela	91% fall in overall imports	2017–2020	[31]
Iran	Shortages of 73 medicines (32 WHO-essential)	sanctions period	[29]
Iran	Documented deterioration in thalassemia, haemophilia, cancer, and MS patient outcomes	2012–2013 & ongoing	[33]
Afghanistan	US\$9.6bn in Afghan assets frozen (~half of GDP); remittance inflows disrupted	2021–	[31]
Cross-country (LMIC synthesis)	UN sanction episodes associated with 1.2–1.4 years reduced life expectancy on average	1970–2021 (review period)	[30,33]
Yemen / North Korea	Reports of exacerbated child malnutrition (UNICEF estimate: 60,000 children at heightened starvation risk, North Korea)	various	[26,34]

5.4 Global Spillovers: Food, Energy, and the Weaponization of Scarcity

The fourth case examined in this paper differs qualitatively from the first three in that it involves diffuse, transnational consumer harm that spilled well beyond the sender–target dyad, illustrating a scaling effect implicit in, but under-theorised by, the original weaponized-interdependence framework: when the contested chokepoint is a globally traded commodity — grain, fertiliser, or natural gas — rather than a bilateral financial or informational channel, the resulting harm propagates through world markets to consumers who have no relationship whatsoever with either the sending or the targeted state.

Russia and Ukraine together accounted for approximately 30 percent of global wheat exports and 20 percent of global maize exports in the years preceding the 2022 invasion^[41], while Ukraine alone supplied nearly half of global sunflower-oil exports^[52]. The combined effect of the invasion, the closure of Black Sea shipping lanes, and sanctions-linked disruption to insurance, payments and logistics for Russian agricultural exports — even though food and fertiliser exports were not formally subject to Western sanctions — pushed the FAO Food Price Index to 159.7 points in March 2022, the highest level recorded since the index's inception in 1990, up 17.1 percent for the cereal sub-index alone in a single month^[40,43] (Figure 1). Fertiliser prices rose by roughly 30 percent between January and March 2022 alone, compounding the shock by raising input costs for farmers globally and threatening future harvests as well as current prices^[42].

The FAO's own modelling projected that the war-related disruption would push between 8 and 13 million additional people into chronic undernourishment globally, concentrated in Sub-Saharan Africa and the Middle East and North Africa region — states with no agency in the underlying Russia-Ukraine dispute but with high dependence on Black Sea grain imports^[41]. A secondary, self-reinforcing dynamic documented in the literature is food-export protectionism: India's May 2022 wheat export ban, imposed to stabilise domestic prices, itself contributed to renewed upward pressure on international wheat prices, illustrating how an initial chokepoint shock can trigger a cascade of defensive trade restrictions that compound rather than offset the original scarcity^[46,47]. Although the FFPI declined from its March 2022 peak — falling 22 percent between March 2022 and May 2023 — it remained elevated relative to pre-invasion levels through the period covered by this review, meaning the consumer cost, while moderating, has proven more persistent than initial 'transitory shock' forecasts anticipated^[44].

A parallel energy-price shock unfolded across Europe, driven by the collapse of Russian pipeline gas flows from a roughly 40 percent share of EU pipeline gas imports in 2021 to about 6 percent by 2025, as EU sanctions, embargoes, and diversification efforts took hold^[37]. Eurostat data show EU-27 average household electricity prices rising from €25.3 per 100 kWh in the first half of 2022 to €28.9 per 100 kWh in the first half of 2023, while average household gas prices nearly doubled over a comparable window, from €6.6 to €11.9 per 100 kWh between 2021 and mid-2023^[34,35] (Figure 2). In the United Kingdom, the energy regulator Ofgem's default tariff price cap rose 54 percent in April 2022 and a further 27 percent in October 2022, a combined increase that, absent the government's Energy Price Guarantee subsidy, would have reached approximately 80 percent for a typical dual-fuel household^[36]. German households faced an additional gas-price levy of nearly €500 annually, introduced specifically to help utilities cover the cost of replacing Russian supply^[39]. EU governments collectively responded with tax reductions and direct subsidies — the share of tax within EU household electricity bills fell from 23 percent to 19 percent between the first halves of 2022 and 2023 specifically to cushion

consumers — indicating that a material share of the true underlying cost of the sanctions-linked energy shock was ultimately absorbed by public treasuries rather than left entirely on household bills, a fiscal transfer with its own longer-run consumer implications through taxation^[34,38].

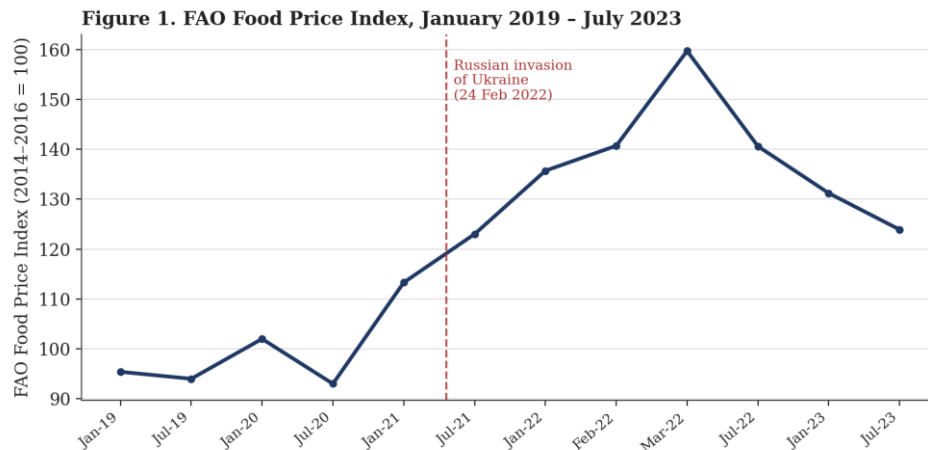


Figure 1. FAO Food Price Index, January 2019 – July 2023, showing the March 2022 all-time peak following the Russian invasion of Ukraine.[40,43,44]

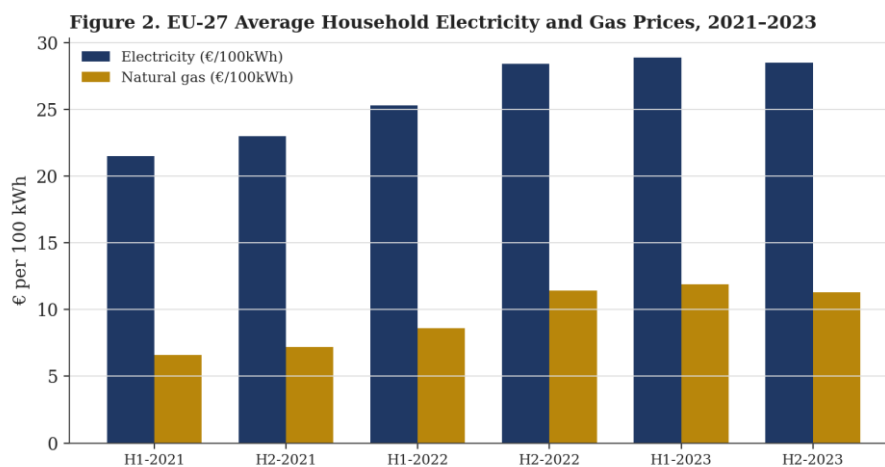


Figure 2. EU-27 average household electricity and natural gas prices, 2021–2023 (€ per 100 kWh).[34,35]

Table 4. Global Food and Energy Price Indicators Associated with the Ukraine War Shock

Indicator	Pre-war baseline	Peak / post-war value	Source
FAO Food Price Index	95.4 (Jan 2019)	159.7 (Mar 2022, all-time high)	[40,43]
FAO Cereal Price sub-index (m/m change)	—	+17.1% (Mar 2022)	[40]

Indicator	Pre-war baseline	Peak / post-war value	Source
Global wheat futures (1-week change)	—	+40% (early Mar 2022)	[41]
Additional people facing chronic undernourishment	—	8–13 million (FAO projection)	[41]
EU household electricity price (per 100kWh)	€25.3 (H1-2022)	€28.9 (H1-2023)	[34]
EU household gas price (per 100kWh)	€6.6 (H1-2021)	€11.9 (H1-2023)	[34,35]
UK Ofgem price cap increase	—	+54% (Apr-22), +27% (Oct-22)	[36]
Russian share of EU pipeline gas imports	≈40% (2021)	≈6% (2025)	[37]

5.5 De-Dollarization and the Long-Run Consumer Ledger

A final, longer-horizon consumer channel operates through the international monetary system itself. The freezing of Russian central-bank reserves and the exclusion of major Russian banks from SWIFT in 2022 has been widely described by financial-market strategists — including at JPMorgan — as a watershed ‘demonstration effect’ that has measurably accelerated global de-dollarization: central banks in China, Russia, India and Japan collectively added hundreds of tonnes of physical gold to reserves in the years that followed, while India introduced a rupee cross-border settlement system and China and Russia have expanded bilateral trade settlement in yuan and rubles^[48,55]. Liu and Papa's quantitative analysis explicitly links this shift back to the weaponized-interdependence framework, arguing that ‘financial sanctions and asset freezes serve as primary catalysts for active de-dollarization by increasing the availability risk of reserve assets’, and that frequent use of such sanctions incentivises even non-sanctioned states to pursue precautionary ‘anti-dollar policies’^[49].

While the U.S. dollar retains a dominant position — still representing roughly 57 percent of disclosed global central-bank reserves according to IMF data — the marginal, sustained shift away from dollar-denominated assets carries a consumer-relevant implication that is rarely discussed in either the strategic-studies or trade literature: reduced foreign demand for US Treasury securities and dollar assets could, over the medium term, raise US government borrowing costs and, by extension, benchmark interest rates that determine consumer mortgage, credit-card, and auto-loan rates domestically^[53]. In this sense, the very act of weaponizing the dollar's hub position to punish Russia carries a slow-moving, reflexive consumer cost within the sending state itself, separate from and additional to the direct sanctions-compliance costs already borne by American and European firms and consumers. This dynamic illustrates a structural feature of weaponized interdependence that Farrell and Newman's original framework anticipates only partially: repeated use of a chokepoint can erode the very asymmetry that makes it valuable, generating diffuse and delayed consumer costs for the sender's own population that only become visible well after the initial coercive act.

5.6 Technology Chokepoints: Semiconductor Export Controls and the Consumer-Electronics Pipeline

The final case examined in this paper is the newest and, at the time of writing, still unfolding: the escalating regime of U.S. export controls on advanced semiconductors and chip-manufacturing equipment destined for China, first imposed by the Bureau of Industry and Security in October 2022 and progressively tightened in October 2023, December 2024, and again in March 2025^[58,60]. This case is theoretically significant because it represents the clearest contemporary extension of the chokepoint mechanism beyond the financial and informational domains that anchored Farrell and Newman's original analysis into physical hardware supply chains, where control is if anything more concentrated: extreme-ultraviolet lithography capable of producing leading-edge chips is manufactured by a single firm, the Dutch company ASML, while advanced chip design and fabrication capacity is similarly concentrated among a small number of U.S. and Taiwanese firms^[58,60].

The direct, documented effects on China's domestic semiconductor ecosystem have included measurable disruption: Chinese semiconductor output reportedly fell by 17 percent in early 2023 immediately following the initial controls, and price spikes for certain affected device types were observed as Chinese firms scrambled to secure alternative supply or stockpile existing inventory ahead of enforcement deadlines^[61,58]. These direct effects on Chinese firms and, by extension, Chinese consumers of affected electronics are compounded by a reflexive cost channel within the sending country itself, analogous to the de-dollarization dynamic discussed in Section 5.5. A New York Federal Reserve analysis found that the October 2022 announcement was followed by a 2.5 percent drop in stock-market valuation for affected U.S. semiconductor firms that persisted for at least twenty trading days, while the broader Philadelphia Semiconductor Sector Index fell 8 percent following the initial announcement and a further 3 percent after the October 2023 tightening^[57]. Because semiconductor firms' profitability and R&D investment capacity feed directly into future consumer-electronics pricing and innovation cycles, this valuation effect represents a diffuse, delayed consumer-relevant cost borne within the sending state, even though — as a CSIS-commissioned study of 30 leading semiconductor firms found — the affected companies did not, on balance, reduce R&D spending or patent output, suggesting the sector adapted rather than contracted in response to the controls^[59].

A further complication documented in this literature, with direct relevance to the sanctions-effectiveness debate reviewed in Section 2.2, is evasion and circumvention. Huawei's 2023 release of the Mate 60 Pro smartphone, powered by a domestically fabricated 7-nanometre chip that Western analysts had assessed China incapable of producing without banned lithography equipment, sold more than 30 million units by early 2024 and helped drive a 564 percent surge in Huawei's 2023 profits — direct evidence that the controls' target adapted around the chokepoint rather than being constrained by it in the way intended^[64,61]. Enforcement gaps have also enabled outright smuggling: in 2024 a criminal network was found to have illicitly routed some \$390 million worth of Nvidia-equipped servers through Malaysia to reach sanctioned end users, illustrating that even the most technically sophisticated chokepoint controls remain porous in practice^[58]. China's policy response — a third state-backed semiconductor investment fund of \$47.5 billion announced in May 2024 — signals that, exactly as the de-dollarization case in Section 5.5 illustrates for finance, prolonged exposure to a chokepoint tends to accelerate the target's investment in parallel, sanctions-resistant infrastructure, a dynamic that erodes the sender's long-run leverage even as it imposes real short- and medium-term consumer and industrial

costs on the target economy in the interim^[58,60]. For global consumers of electronics more broadly, the net effect to date has been more a matter of slower innovation diffusion and higher input costs for Chinese-made devices sold internationally than an acute, headline price shock comparable to the Russia or Ukraine-war cases — but the case remains active, and its full consumer-welfare footprint will only become measurable with a further several years of data.

Table 5. Timeline and Documented Effects of U.S. Semiconductor Export Controls on China, 2018–2025

Date	Measure / effect	Source
May 2019	BIS entity listing of Huawei restricts technology exports	[59]
Oct 2022	BIS controls on advanced computing chips & fabrication equipment; PHLX Semiconductor Index -8%	[57]
Early 2023	Chinese semiconductor output falls ~17%; localized price spikes reported	[61]
Jul 2023	China restricts gallium/germanium exports (China: ~90% & ~60% of world supply)	[57]
Oct 2023	US tightens controls further; PHLX Index -3% on announcement	[57]
Aug–Sep 2023	Huawei Mate 60 Pro launches with domestic 7nm chip; >30 million units sold by Q1 2024	[64,61]
May 2024	China announces third state semiconductor fund, US\$47.5 billion	[57,58]
2024	US\$390 million GPU-smuggling ring uncovered, routed via Malaysia	[58]
Mar 2025	Further US restrictions blacklist additional Chinese entities	[58]

6. Comparative Discussion: Divergent Perspectives

The evidence assembled in Section 5 can be read through at least three distinct analytical lenses, each of which reaches a different normative conclusion about the acceptability of consumer harm as a by-product — or, in some cases, an intended mechanism — of economic coercion.

6.1 The Realist / Strategic-Statecraft Perspective

From a realist vantage point, consumer-level economic harm is neither surprising nor, in itself, disqualifying: sanctions and tariffs are simply lower-cost substitutes for military coercion, and some degree of civilian economic pain is treated as an unavoidable, and in some formulations desirable, feature of any effective coercive instrument, analogous to the logic of economic blockade in wartime^[1,4].

Proponents of this view point to the sanctions-effectiveness literature's finding that diversified sanctions combining trade and financial measures succeed roughly one-third to 40 percent of the time^[4,6,7] (Figure 5) as evidence that, notwithstanding contested individual cases, sanctions remain a rational tool when calibrated correctly — modest objectives, smaller and more dependent targets, and multilateral rather than unilateral design being the conditions the literature associates with higher success probabilities^[3,4]. On this reading, the Russia sanctions regime, even if it does not produce Russian capitulation, still imposes a meaningful long-run cost on Russian war-fighting capacity, and the associated consumer hardship documented in Section 5.1 is the price of denying Moscow's military-industrial base uncontested access to Western technology and capital.

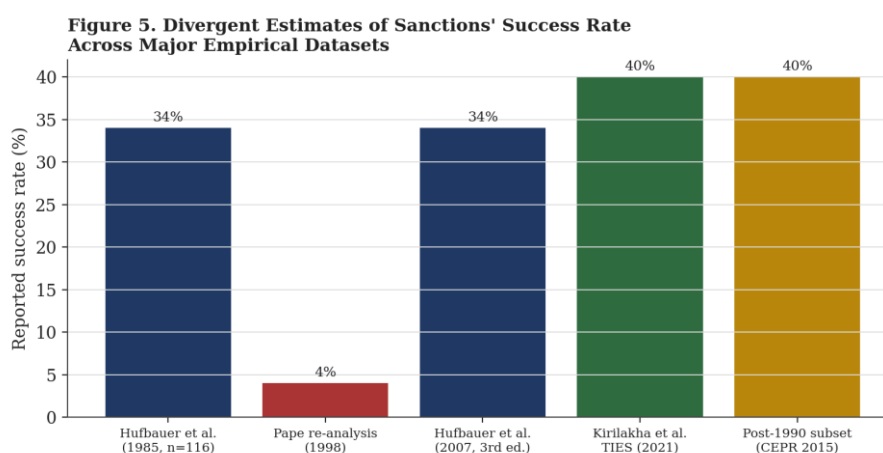


Figure 5. Divergent estimates of sanctions' success rate across major empirical datasets, illustrating the unresolved methodological debate.[4,5,6,7,52]

6.2 The Liberal-Institutionalist / Market-Efficiency Perspective

A second perspective, more sympathetic to the original liberal assumptions that weaponized-interdependence theory sets out to challenge, treats the consumer-cost evidence in Sections 5.2 and 5.4 primarily as a market-distortion problem rather than a coercion problem. On this reading, the US–China tariff war's near-complete pass-through to consumers is simply what standard trade theory predicts when a large, low-elasticity-of-substitution economy imposes tariffs on a broad range of intermediate and consumer goods for which domestic substitutes are imperfect or costlier^[18,20]; the appropriate remedy is not necessarily to abandon strategic trade instruments altogether, but to design them with much narrower sectoral targeting, sunset clauses, and revenue-recycling mechanisms (tariff-revenue rebates to affected consumers, for instance) that could in principle offset a meaningful share of the welfare loss without abandoning the underlying strategic objective. Analysts in this camp are also more likely to emphasise the de-dollarization evidence in Section 5.5 as a cautionary signal: overuse of the dollar's hub position risks eroding the very network centrality that gives US and allied sanctions their unusual leverage, a self-undermining dynamic that Farrell and Newman's own later work on 'hegemony and fear' explicitly warns against^[2,48,49].

6.3 The Critical / Humanitarian Perspective

A third perspective, most closely associated with the public-health and human-rights literature reviewed in Section 5.3, treats the consumer and civilian cost of sanctions not as a regrettable but acceptable externality, nor merely as a market inefficiency, but as a first-order ethical and legal problem in its own right. This literature emphasises that the mortality and morbidity effects documented in Iran, Venezuela, Iraq, Haiti, and North Korea fall overwhelmingly on populations — children, the chronically ill, the poor — who have no meaningful influence over the government policies that triggered the sanctions in the first place^[26,29,30,33,34], and that the explicit articulation by some U.S. officials of civilian hardship as an intended lever of political change is difficult to reconcile with the international humanitarian law principle of distinction between combatants (or, by extension, decision-making elites) and civilian populations^[26,29]. The UN Special Rapporteur's finding that unauthorised unilateral sanctions may violate fundamental human rights lends this perspective a degree of formal international-legal backing that the realist and liberal-institutionalist perspectives do not directly engage^[26]. From this vantage point, the appropriate response is not incremental design improvement but a fundamentally more restrictive threshold for imposing broad sectoral or financial sanctions, coupled with far more robust and independently monitored humanitarian exemptions than currently exist — the BMJ Global Health review notes that existing humanitarian carve-outs have repeatedly failed to prevent medicine and food shortages in practice, largely because banks and shipping firms engage in defensive over-compliance ('de-risking') that blocks even nominally exempt humanitarian transactions out of excess caution^[30].

6.4 Synthesis: An Unresolved but Not Irreconcilable Tension

These three perspectives are not fully reconcilable at the level of first principles — they weight state security, market efficiency, and individual welfare differently — but the empirical record assembled in this paper does narrow the space of reasonable disagreement in one important respect: even analysts sympathetic to the realist view increasingly concede that current sanctions and tariff-design practice imposes more collateral consumer harm than is strictly necessary to achieve the stated strategic objective, whether through avoidable de-risking over-compliance, insufficiently targeted product coverage, or the absence of any systematic consumer-welfare impact assessment comparable to the environmental- or fiscal-impact assessments now routine in other areas of policymaking^[30,52]. The semiconductor case examined in Section 5.6 sharpens this convergence further, because it is one of the few episodes in which even sender-side stakeholders — U.S. semiconductor firms and their shareholders — have publicly registered measurable costs, and in which the target's evasion and self-sufficiency responses have been rapid enough to make the long-run efficacy of the chokepoint itself an open empirical question even from a purely realist standpoint^[58,64]. Section 7 develops this convergence point into concrete policy recommendations.

It is also worth noting what the evidence does *not* show. None of the studies reviewed in this paper supports the strong claim that sanctions and tariffs never achieve any strategic benefit, nor the claim that consumer harm alone is sufficient grounds for abandoning economic coercion as a policy instrument; the realist perspective's underlying premise — that some coercive leverage is preferable to none in a competitive international system — is not refuted by consumer-cost data alone, only qualified by it. Equally, the liberal-institutionalist emphasis on market-efficient design and the critical-humanitarian emphasis on civilian protection are not, on inspection, mutually exclusive research programmes: a tariff schedule redesigned to minimise consumer pass-through and a sanctions package

redesigned with more robust humanitarian payment channels serve, respectively, market-efficiency and human-rights objectives simultaneously, without requiring either camp to abandon its underlying normative commitments. The practical policy space for improvement, in other words, is considerably larger than the theoretical disagreement between the three perspectives might suggest at first glance.

7. Policy Implications

First, sanctions-design institutions should adopt formal, published consumer- and humanitarian-welfare impact assessments as a standard pre-implementation step for any sanctions package involving broad sectoral, financial, or export-control measures, analogous to existing regulatory-impact assessment practice, drawing on the pass-through and price-transmission methodologies demonstrated in the US–China tariff literature and the Russian online-pricing literature reviewed in Section 5^[11,18,19]. Second, humanitarian exemptions for food, medicine, and medical equipment require dedicated payment-channel infrastructure — such as the limited-purpose banking channels piloted for Iran and Afghanistan — rather than blanket exemption language alone, precisely because the empirical evidence shows that financial-institution over-compliance and de-risking, not the absence of a legal exemption, is the primary mechanism through which humanitarian carve-outs fail in practice^[30,33]. Third, where tariffs are deployed for strategic rather than purely protectionist purposes, policymakers should consider revenue-recycling mechanisms that rebate a share of collected tariff revenue directly to the consumer segments shown by product-level pass-through analysis to bear the largest burden, mitigating the regressive incidence documented in the county-level analysis of the 2018–2019 trade war^[19,23]. Fourth, multilateral coordination — the factor most consistently associated with higher sanctions success rates across the Hufbauer, TIES, and Global Sanctions Data Base datasets^[4,6,52] — should be treated as a near-precondition for imposing broad financial or SWIFT-style chokepoint sanctions specifically, given the scale of diffuse third-country consumer harm documented in the global food- and energy-price case, which unilateral or narrowly coalitional action cannot contain within the sender–target dyad. Fifth, given the demonstrated reflexive de-dollarization costs documented in Section 5.5, sender states with reserve-currency or payments-system hub status have a direct self-interest, independent of humanitarian considerations, in using chokepoint-based financial coercion sparingly enough to preserve the long-run value of that hub position for future strategic use.

8. Limitations

This paper's synthesis approach has three principal limitations. First, because it relies on secondary sources produced with varying methodologies, time frames, and units of measurement, direct quantitative comparison across cases — for instance, ranking the Russia sanctions regime against the US–China tariff war by aggregate consumer cost per capita — is not statistically valid and has been deliberately avoided in favour of case-specific reporting. Second, several of the underlying Russian statistics, most notably official Rosstat inflation figures, are explicitly flagged in the source literature itself as being of uncertain reliability, introducing an unavoidable degree of measurement uncertainty into the Section 5.1 findings^[15,16]. Third, the paper's four cases, while intentionally diverse, do not exhaust the universe of weaponized-interdependence episodes; emerging cases involving semiconductor and artificial-intelligence export controls between the United States and China, for

example, are still generating consumer-relevant data at the time of writing and could not be incorporated with the same empirical depth as the more mature cases analysed here. Future research applying the consumer-welfare-transmission framework developed in Section 3 to these emerging technology-chokepoint cases would be a natural extension of this paper's approach.

A further limitation concerns causal attribution in multi-shock environments. The 2022–2023 period examined most intensively in this paper coincided with the tail end of COVID-19 supply-chain disruption, a global monetary-tightening cycle initiated largely for reasons unrelated to sanctions, and — in the European energy case specifically — a pre-existing supply tightening that began, as the EU's own commissioned study on energy prices and costs notes, in the summer of 2021, some months before the invasion of Ukraine^[38]. Wherever the underlying studies cited in this paper provide a method for isolating the sanctions- or war-specific component of an observed price movement — such as the control-product design used in the washing-machine tariff study or the pre-invasion trend extrapolation used in several FAO food-price analyses — this paper has prioritised those estimates over simple before-after comparisons; nonetheless, some residual conflation between overlapping shocks cannot be fully excluded, and the point estimates reported in Tables 1 through 4 should be read as indicative of order of magnitude and direction rather than as precise, non-overlapping causal effects.

9. Conclusion

Weaponized interdependence offers a compelling structural explanation for why states increasingly reach for sanctions, tariffs, and financial chokepoints rather than military force to pursue strategic objectives in a densely networked global economy^[1,2]. This paper has argued, however, that the framework's predominant focus on inter-state bargaining and network topology leaves under-examined a question that is at least as consequential for evaluating these instruments: who actually bears their cost? Across four empirically distinct cases — the Russia sanctions regime, the US–China tariff war, unilateral sanctions on Iran and Venezuela, and the Ukraine-war-linked global food and energy shock — the evidence converges on a consistent answer: everyday consumers, both within targeted states and, increasingly, in third countries entirely outside the underlying dispute, absorb a disproportionate share of the economic fallout, while the elites and government decision-makers nominally targeted by these measures frequently retain the resources and access needed to insulate themselves.

This finding does not, on its own, resolve the contested normative question of whether sanctions and tariffs remain justifiable instruments of statecraft; the realist, liberal-institutionalist, and critical-humanitarian perspectives surveyed in Section 6 weigh state security, market efficiency, and individual welfare too differently for a single empirical synthesis to adjudicate between them. It does, however, establish a firmer evidentiary basis than currently exists in most policy debate for the more modest and largely trans-ideological claim that current sanctions- and tariff-design practice generates more collateral consumer harm than is strictly necessary to achieve stated strategic objectives — and that formal consumer-welfare impact assessment, more robust humanitarian payment channels, targeted revenue recycling, and multilateral coordination are feasible, evidence-based reforms capable of narrowing that gap without requiring states to abandon economic coercion as a tool of foreign policy altogether. As weaponized interdependence continues to displace military confrontation as the primary mode of great-power and regional competition, ensuring that its costs do not fall silently and

disproportionately on people who never chose the underlying dispute should be treated as a first-order design criterion, not an afterthought.

The six figures and five tables presented in this paper are intended as a starting evidentiary baseline for that design criterion, not a final accounting. As the semiconductor case in Section 5.6 illustrates, weaponized interdependence is not a static toolkit but an evolving one, with sending and targeted states each adapting continuously — through de-dollarization, domestic substitution, evasion networks, and parallel-infrastructure investment — in ways that reshape the distribution of costs and benefits with every new round of measures. A durable research agenda in this area will need to track these adaptive dynamics longitudinally rather than treating any single sanctions episode as a closed case, and will need to keep the consumer, rather than only the state, squarely in view as the unit of welfare analysis. The evidence reviewed here suggests that this shift in analytical focus is overdue, and that the everyday consumers who fund weaponized interdependence's economic fallout, whether in Moscow, Manila, Maracaibo, or the American Midwest, deserve a more central place in how these instruments are designed, debated, and ultimately judged.

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