External arms embargoes and their implications for government expenditure, democracy and internal conflict

Dizaji, S. F. & Murshed, S. M.

External arms embargoes and their implications for government expenditure, democracy and internal conflict

Sajjad Faraji Dizaji [a,b], Syed Mansoob Murshed [c,*]

[a] *School of Economics, Finance and Accounting, Coventry University, UK*
[b] *Tarbiat Modares University, Iran*
[c] *International Institute of Social Studies (ISS), Erasmus University Rotterdam and Centre for Trust, Peace and Social Relations (CTPSR) Coventry University, UK*

ARTICLE INFO

ABSTRACT

We examine how arms imports reductions due to external arms embargoes affect military expenditure, democratic quality and internal conflict in a sample of 48 countries from 1990 to 2017. We construct a theoretical model of arms restrictions influencing probabilities of peaceful and conflictual states via actions and efforts undertaken by the government and rebels to promote peace. We postulate that the effect of external arms embargoes on internal conflict is conditional, requiring empirical investigation. Our empirical analysis, based on the Panel Vector Autoregressive methods, reveals that the responses of political system and different indices of democracy to decreases in arms imports are positive, and the impact on military expenditures is negative, while the responses of education expenditures, health expenditures are positive. Despite this, our findings show that arms transfer restrictions can intensify ethnic tensions and internal conflicts.

1. Introduction

The Dutch economist, Jan Tinbergen, the first (joint) winner of the Nobel prize in economics stressed the inseparability of economic welfare and security; see Tinbergen and Fischer (1987). Thus, welfare and security go hand in hand. Security considerations, however, can become a tool in the hands of authoritarian regimes whose insecure legitimacy can lead them to exercise coercive and repressive measures on their citizenry. This can be a cause for concern for the global community who may exercise sanctions on oppressive regimes with a view to changing their behaviour. The literature on sanctions is not new; see Galtung (1967) on it, and Hufbauer, Schott, Elliot, and Oegg (2007) on economic sanctions. This paper will be concerned with the effects of a particular type of external smart sanction, controls on arms imports, on democratic development and conflict in a cross section of developing countries. Until the mid-1990s, most UN sanctions were comprehensive. Targeted sanctions—often referred to as "smart sanctions"—as an alternative to comprehensive trade embargos began in large measure as a response to the UN Security Council sanctions imposed on Iraq in 1990 and 1991, after its invasion of Kuwait.[1] Today, most sanctions are targeted, and their logic is to maximize the impact on leaders, political elites and segments of society believed responsible for objectionable behaviour,

while minimizing humanitarian consequences for the innocent population. However, the evidence regarding their efficacy and superiority over comprehensive sanctions is mixed (Tostenson & Bull, 2002). Bolks and Al-Sowayel (2000) and Allen (2005) argue that if the target state is a democracy, comprehensive sanctions are more likely to trigger quick concessions. Gershenson (2002) and Escriba-Folch (2010) discuss that comprehensive embargoes were more effective than targeted sanctions at ending intrastate conflicts. However, there are case studies that demonstrate the utility of targeted sanctions. The cessation of hostilities in Rhodesia (now Zimbabwe) in 1980 followed international sanctions against that country's White minority government. The South African apartheid regime was dismantled after more than forty years of sanctions.

There is an even greater ambiguity regarding the impact of a most common form of targeted sanctions—arms embargoes and their impact on political institutions and conflict. The coercive capacity of incumbent governments and their effective control over a state's territory against internal and external challengers relies essentially on the availability of arms. Most developing countries are unable to produce modern weapons, depending on imports. This raises an important question. What is the impact of external arms restrictions targeting an incumbent government and from thereon to conflict risk? One strand of the

---

literature indicates that substantial arms importers are more likely to become involved in war (see, for example, Karp, 1994). Weapons constitute the non-sufficient but necessary input in to conflict (Hirshleifer, 2000). Another strand of the literature argues that governments who want peace must prepare for war, while others believe that weapon acquisitions play no role in the incidence of conflict. Tierney (2005:661) concludes that "much of the impact of UN arms embargoes in civil wars can be summarized as irrelevance or malevolence." Contrarily, Brzoska (2008) points to clear successes, such as the 1993–2003 arms embargo of Angola.

The mechanisms through which the availability of weapons to incumbent governments increases or decreases the risk of conflict and their political consequences is of major importance for conflict prevention, and to both analysts and practitioners in the development studies community, as conflict is widely regarded as a major cause of development failure. And, this is a multi-disciplinary concern cutting across economics, political science, sociology, political ecology, area studies and anthropology. This paper complements the existing literature on sanctions by explicitly analyzing the impact of arms restrictions on the risk of conflict, government spending and political institutions. The majority of conflicts after the Second World War have been intra-state conflicts taking place in developing countries. In this study, we consider the effect of third-party intervention against an incumbent government by *endogenizing* the impact of arms sanctions within a Cournot-Nash game-theoretic model of intrastate conflict. However, we also control for the interacting impact of external conflict in our empirical analysis.

We develop a theoretical model to discuss how arms sanctions influence the strategic actions undertaken by incumbent government and rebels who oppose them. One implication of the model is that arms restrictions may moderate the autocratic characteristics of the incumbent government, decrease its military expenditures and strength the position of the peace party against the belligerent party inside the government. On the other hand, arms restrictions which weaken the government's military capabilities may embolden rebellious tendencies. Therefore, the final impact of arms restrictions on intensifying or abating internal conflict is ambiguous.

From the empirical standpoint, there is a lack of studies appropriately investigating the potential simultaneity between conflict, arms purchases, political institutions and government spending. In contrast, our study explicitly takes into account that weapon inflows not only impact on conflict, military expenditure and political systems, but there is the possibility of reverse causality as well, because the polity, military expenditure and ongoing conflict also cause the acquisition of military hardware. The empirical analysis in this paper is based on the historical responses of military expenditures, political institutions and conflict indices to the negative shocks in arms imports. We use this technique to analyse a shock that mimics the impact of arms restrictions on political system and conflict.

We offer an innovative approach based on an untried econometric technique, panel vector autoregressive techniques (PVAR) to surmount this endogeneity (or reverse causality). This method is more dynamic than static panel data analysis and has advantages over other commonly used dynamic panel data techniques such as the generalised method of moments (GMM). Estimated impulse response functions (IRFs) enable us to simulate the impact of negative shocks to arms imports on the other political, economic and conflict variables in the system.[2] Moreover, we utilise a new and novel data set on democracy emanating from the varieties of democracy (V-DEM) data base, which analyses many of the complex processes behind democratic development, including the distinction between the liberal and electoral aspects of democracy. We find that that the responses of political system and different indices of

democracy to arms embargoes are positive, and the impact on military expenditures is negative, while the responses of education expenditures, health expenditures are positive. Despite these developments, our findings show that arms transfer restrictions can intensify ethnic tensions and internal conflict.

Section 2 selectively reviews the literature. Section 3 provides a motivating theoretical model. Section4 describes our research design and data sources, followed by our results in section 5, before concluding in section 6.

2. Review of literature

The literature on the efficacy of sanctions suggests that they are broadly a failure from the standpoint of the sender country or multilateral agency. Specifically, it is argued and demonstrated in the empirical literature that sanctions worsen repression in authoritarian regimes; Allen and Lektzian (2013), Peksen (2009). It is also suggested that sanctions worsen the democratic credentials of targeted countries, Peksen and Drury (2010). This is because sanctions result in authoritarian regimes withdrawing on themselves, becoming more nationalistic and more willing to impose hardships on segments of their population. On the other hand, it is argued, Blad (2019) for example, that the effect of sanctions on state repression is mediated by the degree of democracy already present in the targeted nation. Thus, sanctions will not cause such a repressive response in more democratic states. Other studies pointed to the positive impact of sanctions on the political situation in target countries (Dizaji, 2019, 2022; Dizaji & van Bergeijk, 2023).

Dizaji & van Bergeijk (2013) use vector autoregressive (VAR) models to investigate the impact of oil sanctions, both on economic and political indices of Iran. Their empirical analysis reveals that oil sanctions impose economic costs that motivate the target country to change its political behaviour positively in first 2–3 years, but may turn negative in the longer-term. Dizaji (2022) simulates the military and political impact of oil sanctions on a group of oil-dependent countries in the greater Middle East. He finds that negative oil shocks caused by sanctions may increase the military burden and induce repressive policies in the short run. However, constraining the target country's budget may finally compel it to reduce military expenditure and become politically more flexible. Allen (2008) and Grauvogel, Licht, and von Soest (2014) point to the destabilizing impact of sanctions on target countries through triggering anti-government protests. Escriba'-Folch (2010) shows that sanctions led by international institutions are likely to increase the probability of conflict resolution whereas sanctions not involving international institutions are more likely to exacerbate civil war risk. Dizaji and Farzanegan (2021) demonstrate that the final impact of sanctions on the military expenditures of the target depends on the relative size of the security effect and income effect engendered by the sanctions. If the resultant insecurity impact on the target is greater than the diminution of financial resources, then sanctions will probably increase military expenditure and vice-versa.

Other studies show that government responses to sanctions lead to deteriorating social conditions in areas such as public health (Lopez & Cortright, 1997; Peksen, 2011), human rights and state repression (Reinisch, 2001; Wood, 2008), the treatment of minority groups, including women (Drury & Peksen, 2014), and subnational conflict (Regan & Aydin, 2006). McLean et al. (2018) suggest that the duration of terrorist campaigns tends to increase in sanctioned countries because sanctions force target governments to reduce their budget allocations for counterterrorism programs.

Outside intervention in intrastate conflict has often been analyzed in the political science and economics literature (Collier & Hoeffler, 1998; Balch-Lindsay & Enterline, 2000; Murdoch & Sandler, 2002). However, the literature on the effect of arms embargoes on internal conflicts is scant. Gershenson (2002) indicates that sanctions that create considerable damage on the target regimes may impel them to end conflict. However, sanctions with a minor impact on the target economy may be

---

[2] Brzoska (2008) discusses about the difficulties of effectively restricting the arms flows, but this is not our main concern.

counterproductive, provoking more aggressive behaviour by the target regime. Strandow (2006) argues that arms embargoes can probably reduce the likelihood of conflict, while threatened and imposed non-military sanctions may be ineffective in resolving the conflict. Brzoska (2008) considers three types of effectiveness in the context of arms embargoes: target compliance; reduction of arms flow; and satisfaction of the sender. While target compliance is quite low, effectiveness defined by the two other categories is much higher. In 39 percent of the cases, the flow of arms is reduced; and in 31 percent of the cases the sender is satisfied with the outcome, even if the target has not complied. Baron-chelli, Caruso, and Ricciuti (2022) find that sanctions on the sale of small arms are effective, especially when imposed by the European Union. Erickson (2023) finds that the presence of American made weapons is pervasive in conflicts around the world, despite arms embargoes. Hence, the literature is highly taxonomic, suggesting the need for further investigation using yet untried econometric techniques, as in our paper.

Empirical research on the relationship between arms imports and outbreak of conflict are inconclusive. Durch (2000) investigates inter-state and intrastate wars separately and analyzes the role of arms deliveries for 106 developing states between 1970 and 1995. His results suggest that arms transfers may facilitate the outbreak of external wars but do not affect the risk of internal wars. Suzuki (2007) regresses the outbreak of civil and ethnic conflicts on arms imports in a pooled regression covering 100 states between 1956 and 1998 and finds no statistically significant links. Other studies, by contrast, suggest that arms imports contribute to the outbreak of conflict. Based on a pooled regression analysis, Craft and Smaldone (2002) find that arms imports are a significant predictor of civil war incidence in sub-Saharan Africa (1967 to 1997). Pearson, Baumann, and Bardos (1989) found that arms transfers do not generally closely precede escalations of African wars, but that after two to four years, major weapons acquisitions result in a higher propensity to initiate conflict. Once again, further investigation is warranted. The impact of sanctions has been found to have mixed effects in forcing parties to negotiate in the cases of Yemen (Hudàkovà, 2022) and Libya (Portela & Romanet-Perroux, 2022), whereas travel restrictions impacted positively in abating internal conflict in the Côte d'Ivoire and Zimbabwe (Portela & Laer, 2022).

3. Theoretical analysis

The model that follows is based upon Addison and Murshed (2003). We are attempting to capture the effects of external sanctions on arms imports upon military expenditure, other public spending, and the political environment and from thence on to a potential civil war or other forms of domestic conflict. There are two sides: the government and the (possible) rebels. As we are mainly concerned with the effect of sanctions on internal conflict and civil war, we believe this to be the correct model specification as civil wars are defined as organised military challenges to the state. If there are more than one potential rebel groups, as is true of India, Myanmar, Ethiopia, Sudan and so on, the theoretical analysis that follows could be replicated for each dyad (state versus rebel group (1), state versus rebel group (2) and so on). We postulate two states, one a relatively peaceful state and the other a relatively conflictual state, whose probabilities are influenced by actions and efforts to promote peace by both sides.

3.1. The government side

The expected utility of the government side (G) is given by:

$$G = \pi(a,e)G^P + (1-\pi)(\cdot)G^C - C(a) \qquad (1)$$

Where G^P and G^C denote utilities[3] or pay-offs in peace and conflict respectively, weighted by the probabilities of the two states, peace (π) and war ($1 - \pi$). The pay-offs are endogenous in the sense that the probabilities of the two states depend on a strategic action (a) undertaken by the government. The parameter, a, is the strategic choice variable of the government. The strategic action parameter itself will depend on a number of variables described below.

The net income or rent of the government (G), defined in (2), is given by the difference in available revenue, Y^G and T is the 'transfer' made by the government to the rebels in the state of relative peace, as well as its military expenditure, F. Transfers can take a variety of forms including broad-based social (health, education) and development expenditure extended to the potential rebels and minorities. F, denotes military expenditure, this is clearly greater in wartime than during peace, hence $c > p$. The amount of F and T will depend on the grand objective function of the state (W), and externally imposed arms import controls, S, also diminishes military capability. This is elaborated upon later.

The chances of the peaceful state in equation (1) are positively associated with a. In other words, $\pi_a > 0$, but $\pi_{aa} < 0$, due to diminishing returns.[4] Peace is more likely if a transfer is made, including the excluded, rather than resorting to military expenditure with a view to overthrowing the rebels. There is a trade-off between transfers and fighting to generate the same level of expected utility indicated in (1). A more benevolent and developmental state may prefer making transfers to rebels to fighting them. In equation (1), C is the cost function of undertaking the action, a, which increases the probability of peace, π. Both $C_a > 0$ and $C_{aa} > 0$. This cost function may also incorporate psychological costs of making peace.

$$G^P = Y^G - pF^G - T$$

$$G^C = Y^G - cF^G$$

$$a = \frac{T(Y^G)}{F^G(W,S)}$$

$$c > p > 0; c + p = 1 \qquad (2)$$

The probabilities of the two states, relative peace and war, are not related to a Tullock-type rent-seeking contest. This is because the low-intensity conflict is not a war of attrition. In fact, the strategic actions of the two players are a ratio of peaceful-belligerent behaviour. This is reflected in the ratio of transfers to military expenditure in the definition of a in (2) for the government. Thus, its strategic action depends on T, Y^G, W, S and F^G. Totally differentiating the expression for a in (2) we obtain:

$$da = \frac{T_1}{F^G}dY^G - \frac{TF_1^G}{(F^G)^2}dW - \frac{TF_2^G}{(F^G)^2}dS \qquad (3)$$

In equation (3) there are opposing forces in operation, which drive 'peaceful' action, or for that matter hostility, in opposite directions. The first term is associated with a transfer to the excluded, and the second corresponds to a greater military effort against the rebels, and the third term indicates the diminished military capability of the government due to external controls on its arms imports. The first term is positive as $T_1 > 0$, greater income induces more transfers from the state to putative rebels, while the second term is ambiguous in sign (F_1^G?). This ambiguity stems from the fact that there are opposing forces within the government, some of whom prefer to assuage potential rebellion via

---

[3] The expected utilities are equal to pay-offs for risk neutral agents, which we adopt as a simplifying assumption for both government and rebels.

[4] The probability of relative peace or war, π, is strictly concave in its arguments, a and e.

concessions and transfers, and others who favour the use of force to suppress or deter rebellion. Regarding the third term, an externally imposed arms embargo or arms import restrictions will lower the state's fighting capability, $F_2^G < 0$, and increase peaceful actions from (3). This is because the government's military capacity has diminished, as can be deduced from the last term on the right-hand side of (3).

Given diminished military capacity, will the state increase transfers and be less aggressive towards the rebels? In other words, will peaceful actions go up in totality? The second term on the right-hand side of (3) is indicative of the innate preferences of those who rule and here there are trade-offs between fighting the opposition or mollifying them with transfers. Going back to the second term on the right-hand side of (3), in order to (theoretically) resolve the ambiguity of the second term in (3) let us now consider a simple version of competing interests within the state corresponding to the transfer-fighting trade-off by postulating that the government is composed of a belligerent party and a peace party, whose opposing interests can be aggregated into a grand objective function. The influence of the first group is measured by b, and the latter group by $1 - b$. The grand objective function (W) of the state, therefore, can take the following form:

$$W = bF^G + (1 - b)(Y^G - F^G - T) \tag{4}$$

Equation (4) is constructed such that the war party's influence is measured by b, and it receives utility from violently confronting those who are opposed to their rule (F^G). The peace party ($1 - b$) prefers making the transfer, being inclusive to the potential rebels via increased transfers, T and democratic concessions. It should be noted that the state of democracy lies along a continuum, improvements in democratic credentials are *relative*, and do not mean the achievement of a full and lasting democracy. Differentiating (4) with respect to F^G, holding other effects constant, we obtain:

$$\frac{dW}{dF^G} = 2b - 1 \begin{array}{c} > \\ < \end{array} 0 \cdots as \begin{array}{c} b > 1/2 \\ b < 1/2 \end{array} \tag{5}$$

We may utilize the condition in (5) to sign the partial derivative F_1^G in the second term on the right-hand side of (3) above. Thus, if the peace party has greater influence than the war party, ($F_1^G < 0$) the government will choose more transfers and higher levels of peaceful effort, a after a military sanction lowers fighting capability ($da > 0$ in equation (3)). This likely to occur in the context of improved democracy and more public expenditure in the social sectors following the external arms import restrictions. Conversely, $F_1^G > 0$ is a necessary condition for the sign of da in (3) to be negative, engendering greater autocracy, more fighting and less social sector spending. For example, in South Africa under apartheid governments were earlier more hawkish in their resolve to oppose the African National Congress with force, whereas later governments agreed to the dismantlement of petty apartheid leading to a peaceful resolution and the removal of apartheid by 1994.

3.2. The rebel side

Turning to the potential rebel or excluded group, its expected utility (R) is given by:

$$R = \pi(a, e)R^P + (1 - \pi)(\cdot)R^C - E(e) \tag{6}$$

where

$$\begin{aligned} R^P &= \alpha Y^R - pF^R + T \\ R^C &= Y^R - cF^R \\ e &= \frac{T(Y^G)}{\theta(S)} \end{aligned} \tag{7}$$

Again pay-offs are endogenous in the sense that the probabilities of the two states depend on strategic actions both sides, including (e) undertaken by the rebels. The strategic action parameter itself will depend on a number of variables. The income of the rebel group might be derived from voluntary contributions in rebel areas, or coercion of the local population, contributions from sympathetic citizens' abroad or the export of narcotics and natural resources such as diamonds.

E is the cost of effort, e, which increases the probability of peace, π. Also, $\pi_e > 0$, but $\pi_{ee} < 0$, $E_e > 0$, and $E_{ee} > 0$. Peaceful effort increases as more transfers or broad-based social expenditures are extended to the rebel group. We introduce an exogenous parameter, $\theta > 0$, which affects the level of peaceful action. It is a non-pecuniary and intrinsic measure of historical and *pure grievance*. The totality of grievances, therefore, contain a pure or historical element (θ), which may lie dormant for a while, and a component that can be mollified via pecuniary means through broad-based spending (T). A rise in dormant grievances, θ, could be caused by an increase in the ability to vent grievances in increased democratic situations, or because potential opponents of the state are emboldened by state weakness following sanctions ($\theta_1 > 0$); it serves to increase the cost of peaceful effort and raises belligerency amongst rebels. Thus, the strategic action by the rebels depends on T and θ. Totally differentiating, e, in (7):

$$de = \frac{T_1}{\theta}dY^G - \frac{T\theta_1}{(\theta)^2}dS \tag{8}$$

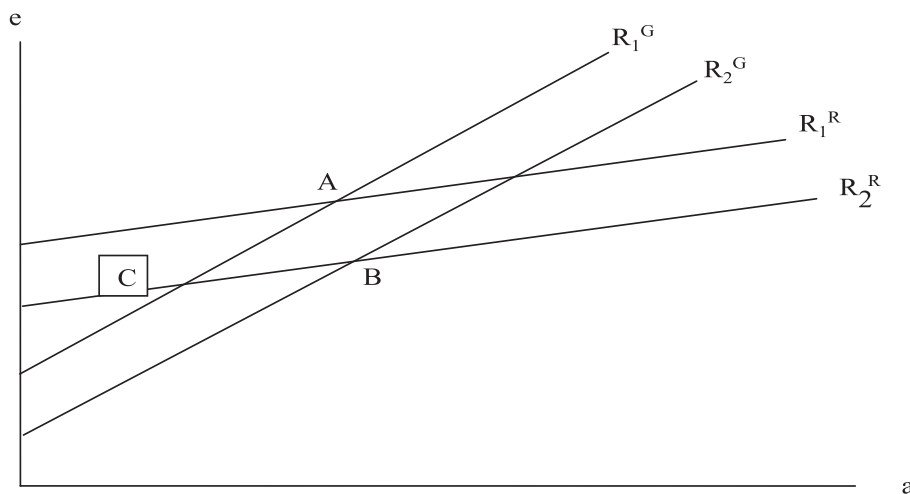It is important to note that while the first term on the right-hand side of

Fig. 1. Strategic interaction between government and rebels. Authors calculation.

(8) is positive, the second term is negative, indicating that peaceful behaviour by the potential rebels declines with increased grievances that were previously dormant. Furthermore, potential grievances increase in new democracies and during democratic transitions (Hegre, Ellingsen, Gates, & Gleditsch, 2001); these grievances can also rise due to perceptions of heightened state weakness in the context of its diminished military capacity. For example, civil war incidence in recent times peaked at the end of the cold war (Besley & Persson, 2008), coinciding with the third wave of democratisation also after the demise of the cold war.

3.3. Nash equilibrium

In the Cournot-Nash non co-operative one-shot game formulated above, each side will maximise its own utility function with respect to its own choice variable. For the government it implies maximising utility in (1), with respect to a as shown by:

$$\frac{\partial G}{\partial a} = \pi_a \left[G^P(\cdot) - G^C(\cdot) \right] - C_a = 0 \tag{9}$$

Rebels maximise (6) with respect to e:

$$\frac{\partial R}{\partial e} = \pi_e \left[R^P(\cdot) - R^C(\cdot) \right] - E_e = 0 \tag{10}$$

Equations (9) and (10) form the basis of the reaction functions for both sides in (a, e) strategy space, obtained by totally differentiating them with respect to a and e. Thus:

$$\frac{de}{da/R^G} = \frac{C_{aa} + \pi_{aa} \left[G^C(\cdot) - G^P(\cdot) \right]}{\pi_{ae} \left[G^P(\cdot) - G^C(\cdot) \right]} \gtreqless 0 \ \ if \ \ \pi_{ae} \gtreqless 0 \tag{11}$$

and

$$\frac{de}{da/R^R} = \frac{\pi_{ae} \left[R^P(\cdot) - R^C(\cdot) \right]}{E_{ee} + \pi_{ee} \left[R^C(\cdot) - R^P(\cdot) \right]} \gtreqless 0 \ \ if \ \ \pi_{ae} \gtreqless 0 \tag{12}$$

Note that $\pi_{ae} = \pi_{ea}$ by symmetry, and the Nash equilibrium postulated is stable as long as R^G in (11) is steeper than R^R in (12). The reaction functions are positively sloped if $\pi_{ae} > 0$, implying that the two side's strategies are complements (Fig. 1), which is the standard assumption in the literature on conflict, see for example Hirshleifer (1995). It means that increases in fighting or peaceful efforts by one side are matched in the same direction by the other side.

The imposition of the external sanction will shift the reaction functions of both sides, R^G for the government and R^R for the opposing rebels. In Fig. 1, the initial equilibrium is at point A. The rebel reaction function moves down, indicating less peaceful effort for every level of government action. As drawn, total government peaceful action increases indicated by a rightward movement of the government reaction function, meaning more peaceful actions by the state. The new equilibrium is at point B, with distinctly less peaceful effort by the rebels. In that case, the outcome is asymmetric with peaceful actions by the state increasing, with peaceful efforts by the state diminishing. Alternatively, as a *theoretical* possibility, we could be at an equilibrium like point like C in Fig. 1, along the rebel reaction function R^R_2, along another government reaction function (not drawn). This is most conflictual with diminished peaceful actions and efforts by both government and rebels.

In summary, we have two effects of externally imposed controls on the government's behaviour. The first is that the state's military capability is adversely affected by smart sanctions on arms imports. Then, there are effects which cause the state to become relatively more 'democratic', spend more on health and education, but this causes rebellious groups to become more restive either because grievances can now be expressed more openly, or because they perceive the government to be weaker. The state may choose to be more conciliatory or become more combative. There may be other third-party interventions,

such as in the case of the Congo (DRC) which may condition these. The net result could be intensified internal conflict. Consequently, we may formulate four empirically testable hypotheses:

1) Arms import restrictions restrict the state's military capability and military expenditure upon impact. For example, Iraq's annual arms imports (millions 2000 USD), which were $3463 million in 1990, completely ceased in all years from 1991 to 1998 during the UN sanctions. Consequently, the share of military spending in GDP, which was 34 % in 1989 decreased to 5.5 % in 1999 (Askari, 2006).
2) Arms import restrictions improves the polity's relative democratic credentials, but the government may remain autocratic, if the 'war' party prevails. For example, the conservative faction's views reinforced in Iran by the US decision to unilaterally leave the Joint Comprehensive Plan of Action (Dizaji, 2021). This finally led to Raisi's presidency, who is considered a hardliner in Iranian politics.
3) Arms import restrictions will lead to greater non-military public expenditure, (on health and education, for example). The political science literature has established evidence of a trade-off between public spending on military and more socially oriented areas such as education and health (Deger, 1985; Fordham & Walker, 2005; Dizaji, Farzanegan, & Naghavi, 2016).
4) Arms import restrictions exacerbate domestic civil conflict, via increased societal grievances, and because the government is militarily weakened, especially in countries with deeply entrenched autocratic governments, where the government side despite being militarily weakened chooses to fight political opposition. For example, the European Union (EU), the United States and several other countries applied sanctions against Syria to respond to the violence initiated by civil war in March 2011. However, these external sanctions failed to change the regime's growing violence against the armed opposition and civilians (Hultman & Peksen, 2017).

4. Research design

4.1. Data description

We apply a panel of annual data for 48 developing countries[5] that covers the period from 1990 to 2017. The list of countries is mentioned in the Appendix. To examine the dynamic interrelations among arms imports, political conditions, and the military spending, the following variables are used:

- Military variables: arms imports to GDP ratio (*armimp*), military expenditures to GDP ratio (*milex*) and the ratio of armed forces personnel to total labour force (*armforc*).
- Political variables: military in politics index (*militpolit*), government stability index (*govsrabil*), polity 2 index (*polity*), Varieties of democracy indices.
- Conflict variables: Internal conflict (*intconflict*), external conflict (*exconflict*), ethnic tensions (*ethnic*) and religious tensions (*religious*) indices.
- Other control variables for robustness analysis: GDP per capita (*gdpperc*), the ratio of general government total expenditures to GDP (*govex*), the ratio of government expenditure on education to GDP (*eduex*), the ratio of domestic general government health expenditure to GDP (*healthex*).

The data on GDP per capita, health and education expenditures are gathered from World Bank's World Development Indicators (WDI) on-line database (World Bank (2019), 2019). The data on general

---

[5] Our sample includes some countries in Eastern Europe whose economic status is similar to middle-income developing countries.

government total expenditures are from International Monetary Fund's World Economic Outlook Database (International Monetary Fund's World Economic Outlook Database, 2019). Data on arms imports and military expenditures are provided by the Stockholm International Peace Research Institute (SIPRI). There is a weak correlation between military spending and arms transfers variables in developing countries as a considerable part of military expenditures goes to operating costs of the military, not for weapons acquisitions (Brommelhorster, 2001).

Data on arms imports cover the transfer of major conventional weapons (MCWs). Thus, we do not include small arms and light weapons (SALWs) of rebels in our analysis for several reasons: arms embargos are most likely to reduce the inflows of major weapons systems rather than light weapons. This is because; MCWs are produced by state enterprises, while light weapons can more easily be manufactured and sold by private companies. Governments regularly deploy MCWs in conflicts as they are a potentially visible signal of a state's resolve and military capabilities (Kalyvas & Balcells, 2010) while arms transfers to rebels are usually illegal, secretive and much harder to detect.

The Polity*2* index (*polity*) is commonly used to measure the political situation and ranges from − 10 (full autocracy) to 10 (full democracy). This indicator shows combinations of autocratic and democratic characteristics of the political system for different years (Marshall, Gurr, & Jaggers, 2017). For robustness analysis, we also use different indices of democracy provided by the Varieties of Democracy (V-Dem) project, version 9; these are electoral democracy (*elecdem*), liberal democracy (*liberdem*), deliberative democracy (*delibdem*), egalitarian democracy (*egalitdem*), and participatory democracy (*participdem*). All of these democracy indices are ranged between 0 and 1. Larger values present a better quality of democracy. The V-Dem democracy indices are extremely dynamic and capture fine grained changes in politics and the quality of different components of democracy from year to year.

The required conflict data,[6] military in politics and government stability data are collected from International Country Risk Guide (ICRG).

- *govstabil* (Government stability index) is an evaluation both of the government's ability to stay in office, and its ability to carry out its stated program(s). It varies from 0 (very high risk) to 12 (very low risk).
- *intconflict* (Internal conflict; ranged from 0 to 12) is a measure of political violence and its actual or potential impact on governance in the country. The highest score indicates no armed or civil opponents to the government and the government does not indulge in arbitrary violence, direct or indirect, against its own citizens.
- *exconflict* (external conflict measure) measures the risk to the incumbent government from foreign action, ranging from non-violent external pressure to violent external pressure. It ranges from 0 (very high risk) to 12 (very low risk).
- *militpolit* (military in politics index) ranges from 0 to 6, so that lower scores stand for a greater degree of military involvement in politics and a higher level of political risk.
- *religious* (religious tensions index) ranges from 0 (very high risk) to 6 (very low risk). Religious tensions may be due to the domination of society and/or governance by a single religious group that wants to substitute religious law for civil law and to prevent other religions from the political and/or social procedure; the desire of a single religious group to control governance; the suppression off religious freedom; the desire of a religious group to express its own identity independently and separate from other parts of the country.
- *ethnic* (ethnic tensions; ranging from 0 to 6) shows the tension within a country which is related to the nationality, racial, or language divisions. Higher scores represent the lower risks of ethnic tensions.

---

[6] We do not use PRIO-Uppsala conflict data set, as there is insufficient variation in that data set for our purposes.

4.2. Methodology

Panel Vector Autoregressive (PVAR) models are applied to examine the possible interrelationships among the variables. PVAR modelling is an appropriate methodology for the purposes of our research. First, dynamic simultaneous relationships can be considered using PVAR models. For example, these models display the long run variations of political system, military spending and conflict over time as affected by shocks to arms imports. Second, some interactions between the arms imports, military expenditures, political institutions and conflict variations are examined. Considering the simultaneous relationships among arms imports, political system and conflict, the PVAR approach is useful as it assumes that all variables are endogenous and does not impose any prior restrictions on structural relationships among the variables. Third, the links across countries are taken into account in an unrestricted fashion. A gradual but steady increase in the interdependencies among regions and countries has made it no longer possible to treat economies and countries in isolation and spill overs are common. Panel Vector Autoregressive are able to model dynamic inter-dependencies, cross sectional heterogeneities and, at the same time, account for evolving pattern of transmission.

Panel VARs share the logic of standard VAR models but, by adding a cross sectional dimension, they become a much more powerful tool for addressing interesting policy questions related e.g. to the transmission of economic and political shocks across borders. The large dimension of panel VARs typically makes the curse of dimensionality an issue especially when researchers are interested in considering the possible links among a group of countries of interest, where the time series dimension of the panel is short (Love & Zicchiano, 2006; Dizaji & Farzanegan, 2023).

Furthermore, greater effort needs to be made to exploit the richness of the cross-sectional information. Additionally, many socio-economic and political variables are relevant in peace and conflict studies and ideally one would include all those variables in the panel VAR and test extensively for robustness of the sequence of the variables. Unfortunately, most of the data are available only at an annual basis and therefore we have to be parsimonious. This means that VAR methods may suffer from omitted variables bias.

The VAR method defines the dependent variables on the basis of the predetermined lagged variables; hence it is a reduced-form model (Koutsomanoli-Filippaki & Mamatzakis, 2009). This reduced form model is as follows:

$$Z_{it} = \Gamma(L)Z_{it} + \mu_i + \varepsilon_{it} \tag{13}$$

Where *i* marks the country, *t* denotes time $= 1, \ldots \mathrm{T}$, Z_{it} comprises a vector of stationary variables, $\Gamma(L)$ denotes a matrix polynomial in the lag operator with $\Gamma(L) = \Gamma_1 L^1 + \Gamma_2 L^2 + \cdots + \Gamma_P L^P$, μ_i is the vector of country specific effects and ε_{it} indicates the disturbance term. Simultaneity does not cause any problem in VAR system and OLS estimations are consistent, because only lagged values of the endogenous variables appear on the right-hand side of the equations. In the standard VAR models, the error terms are generally characterized by simultaneous correlations which enables the response of the system to the variations in a particular variable be the response of all those variables that have a contemporaneous correlation with it. However, this simultaneous correlation is settled by the Cholesky orthogonalization procedure. The dynamic changes of variables in reaction to shocks in a particular variable are explained by impulse response functions (IRFs). The IRFs enable us to consider the magnitude and statistical significance of the impulse responses to a one standard deviation decrease (or increase) in arms imports (Stock & Watson, 2001).

5. Empirical results

To avoid spurious regression estimations, we need to test the

Table 1
Panel Unit Root Tests.

Variables	Levin, Lin & Chu	Im, Pesaran and Shin	ADF-Fisher	PP-Fisher
Armimp	−15.16[**]	−15.49[**]	436.2[**]	489.84[**]
Milex	−7.84[**]	−6.85[**]	210.65[**]	230.26[**]
militpolit	−4.27[**]	−4.80[**]	151.1[**]	164.46[**]
govstabil	−7.73[**]	−7.68[**]	224.94[**]	190.27[**]
polity	−1.51[*]	−1.47[*]	98.86[**]	106.96[**]
exconflict	−4.11[**]	−8.07[**]	248.32[**]	200.15[**]
intconflict	−4.48[**]	−6.32[**]	208.62[**]	152.78[**]
Ethnic	−11.34[**]	−7.67[**]	154.44[**]	132.46[**]
religious	−7.14[**]	−10.78[**]	414.79[**]	97.98[**]
armforc	−0.92	−1.57[*]	131.76[**]	129.97[**]
elecdem	−2.69[**]	−3.11[**]	198.83[**]	238.83[**]

Note: Automatic lag length selection (Schwarz Information Criteria) is applied. According to the Levin, Lin and Chu test the null hypothesis is a unit root which assumes a common unit root process. For the other three tests, the null hypothesis is a unit root which supposes an individual unit root process. [**] indicate significance at the 5%. [*] indicate significance at the 10%.. Authors calculations.

Table 2
CIPS unit root test.

Variables	CIPS (t-statistic)	Truncated CIPS (t-statistic)	Critical values (5 %)	Critical values (10 %)
Armimp	−2.77[**]	−2.69[**]	−2.13	−2.04
Milex	−2.69[**]	−2.69[**]	−2.15	−2.05
militpolit	NA	NA	–	–
govstabil	−2.57[**]	−2.57[**]	−2.11	−2.03
polity	NA	NA	–	–
exconflict	NA	−2.71[**]	−2.11	−2.03
intconflict	−2.95[**]	−2.83[**]	−2.11	−2.03
Ethnic	NA	−1.7[**]	−1.55	−1.45
religious	NA	NA	–	–
armforc	−2.38[**]	−2.26[**]	−2.11	−2.04
elecdem	−2.05[*]	−2.05[*]	−2.11	−2.04

Note: [**] indicates significance at the 5% level; [*] indicates significance at the 10% level; Deterministic chosen: constant. Authors calculations.

stationarity of the variables. Adding the cross-section dimension to the time series dimension offers an advantage in testing for nonstationary since the cross-section increases the number of observations used in those tests, thus improving their power. Thus, we test the existence of unit roots for the variables. Tests in Levin, Lin, and Chu (2002), Im, Pesaran, and Shin (2003), Maddala and Wu (1999) and Choi (2001) are commonly used to test the unit roots within the context of panel data. Levin et al. (2002) suggest a common unit root under the null hypothesis against the alternative of stationarity of all individual variables, whereas the other tests suppose individual unit roots under the null hypothesis. Table 1 reports the results of panel unit roots tests. We have included a constant but not a time trend (see Dickey & Fuller, 1979). The results show that all of the variables are stationary in their level according to the different unit root tests.[7] An unrestricted VAR model should be applied when the variables are stationary in their levels.

The cross-section dimension also brings some new problems into question, namely the existence of cross-section dependency which can bias usual panel data unit root test results in small samples. To supplement the robustness of the unit root tests, we carried out the second-generation panel unit-root test developed on the assumption of cross-sectional dependence among panel units. Pesaran (2007) suggests a simple way of addressing cross-sectional dependence that does not require the estimation of factor loading. His method is based on

augmenting the usual ADF regression with the lagged cross-sectional mean and its first difference to capture the cross-sectional dependence (Dizaji & Farzanegan, 2023).

Table 2 reports the results of the cross-sectionally augmented IPS $CIPS = N^{(-1)}\sum_{(i=1)}^{N}(CADF)_i$, and the truncated version of the CIPS statistic where the individual cross-sectionally augmented Dickey-Fuller (CADF) statistics are suitably truncated to avoid the undue influences of extreme outcomes. Critical values reported in Pesaran (2007) are provided through Monte Carlo simulations for a specific specification of the deterministic component, and depend both on the cross-sectional and time series dimensions. The null hypothesis is the presence of a unit root. The results of Table 2 indicate that at the conventional levels of significance, our variables are stationary in levels.[8] Therefore, we will apply these variables in an unrestricted PVAR model and in their levels.

The ordering of the variables in VAR systems is important as different settings may lead to different results within a VAR model. As a common strategy, we put the variables with more exogenous natures first and the variables with more endogenous characteristics later in our Cholesky ordering. A sanctioned country's arms imports depend on the availability of alternative external channels from where the target country can import its required armaments, rather than relying on domestic production. Hence, arms imports shocks, to a great extent, are of an exogenous nature for the sanctioned country. We expect that significant shocks in arms imports simultaneously influence the other variables in the model. Military expenditures, political and conflict indices follow arms imports in our Cholesky ordering. The restrictions on arms imports affect both government expenditures on defence and political conditions and this may affect internal and external conflicts.[9] It should be noted that some of the conflicts exhibit elements of intrastate and interstate conflict simultaneously (see Gleditsch et al., 2002). In this study, we include both internal and external conflicts categorized by ICRG. The applied autoregressive approach in this study allows controlling for the possible interaction between internal and external conflicts.

We first estimate an unrestricted panel-VAR model consisting of six variables to test the impact of negative shocks to arms imports (as percentage of GDP) on military expenditures (as percentage of GDP), political institutions and conflict indices in developing countries. The vector of endogenous variables in our first PVAR model is as follows:

$$Y_t = [armimp.milex.militpolit, polity2, inconflict, exconflict] \qquad (14)$$

We have used unrestricted PVAR models in levels. Firstly, the results of panel unit root tests reveals that all of the variables are stationary in their level. When the variables are stationary in levels, an unrestricted VAR model is employed. Secondly, structural VAR models are "very often misspecified" (Tijerina-Guajardo & Pagán, 2003). Thirdly, in the short term, which is also important in my analysis to see the immediate effects of the sanctions, an unrestricted VAR performs better than a cointegrated VAR or vector error correction model (Clements & Hendry, 1995).

5.1. Impulse response functions

The impulse response functions (IRFs) display the impact of a one-time shock to arms imports on military expenditures, political institutions and conflict indices in the PVAR model. The confidence bands

---

[7] Armed forces personnel (as percentage of total labour force) and participatory index of democracy are stationary with respect to three tests out of four unit root tests.

[8] The exception is for *militpolit*, *polity* and *religious*, where we do not find evidence regarding their non-stationarity.

[9] For comparison, we also calculate the panel generalized impulse responses (PGIR) of the mentioned variables to a one standard deviation negative shock in arms imports as a percentage of GDP. The PGIR functions construct an orthogonal set of innovations that is independent of the ordering of the variables (Pesaran & Shin, 1998). The responses are similar to those which were obtained using Cholesky one standard innovation.
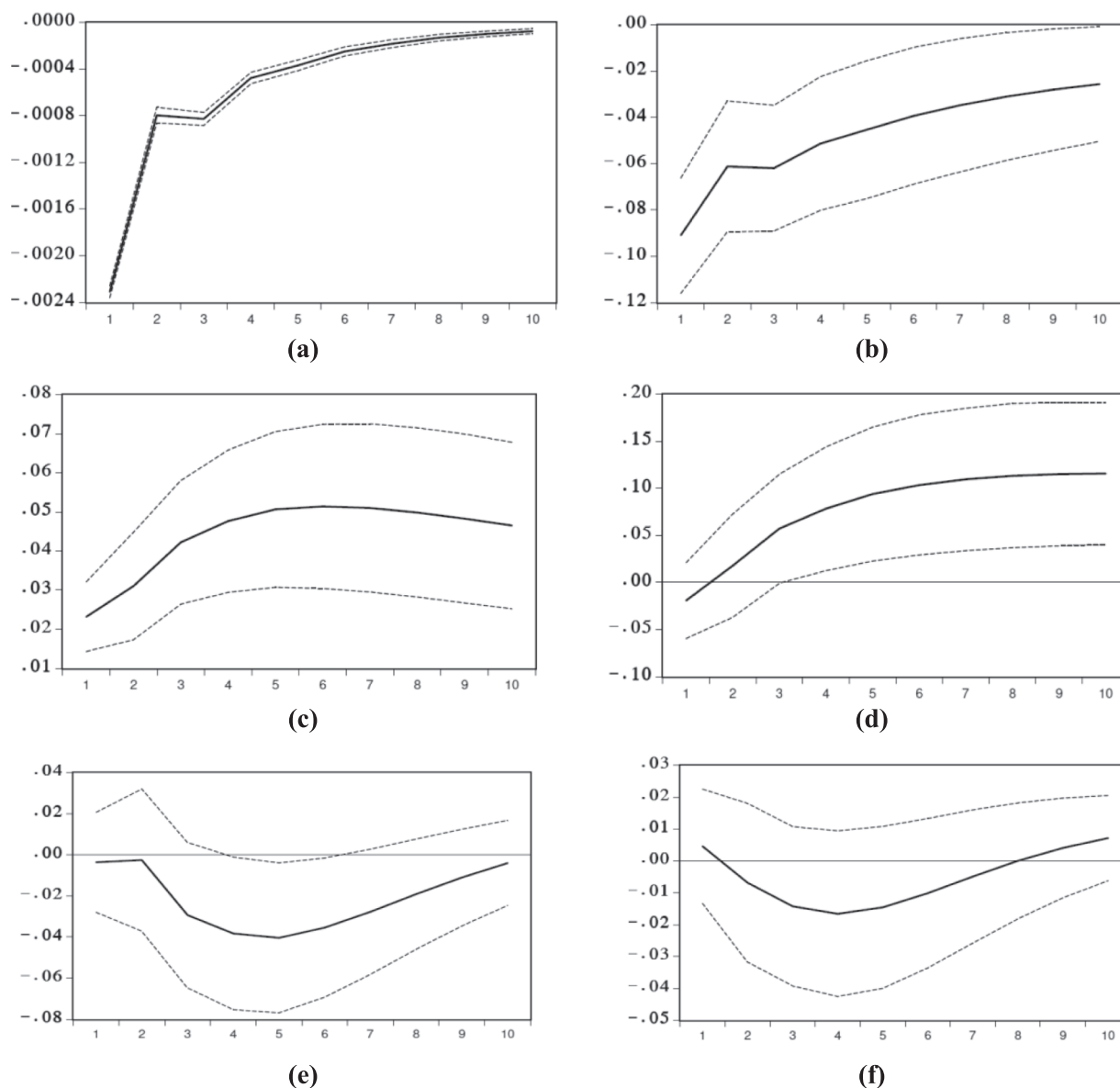
Fig. 2. Impulse response functions related to a one standard deviation negative shock in arms imports as a percentage of GDP. **(a)** Response of arms imports as a percentage of GDP. **(b)** Response of military expenditures as a percentage of GDP. **(c)** Response of military in politics index. **(d)** Response of polity2 index **(e)** Response of internal conflict. **(f)** Response of external conflict. *Notes*: The dotted lines depict ± 1 standard deviation. The horizontal axis displays the time periods (years) after the initial shock. Authors calculations.

around the impulse responses enable us to assess the statistical significance of them (Runkle, 1987). We estimate 68 % confidence intervals for the IRFs (Sims & Zha, 1999). In the presented IRFs in Fig. 2, the middle lines illustrate the response of the variables to a one standard deviation negative shock in arms imports (as percentage of GDP). The dotted lines represent confidence bands. The impulse responses are statistically significant wherever the horizontal line lies outside of the two confidence bands (Berument, Ceylan, & Dogan, 2010). The horizontal line in IRFs shows the time line and the vertical line shows the magnitude of responses to shocks.

The selected number of lags for the variables may also influence the PVAR estimations. Economic theory usually does not provide any definite guidelines on the appropriate level of lag length and how long changes in a variable should be taken into account in a VAR model. Fortunately, there are some statistical criteria such as LR (sequential modified Likelihood Ratio test statistic), FPE (final prediction error), AIC (Akaike information criterion), SIC (Schwarz information criterion), and HQ (Hannan–Quinn information criterion) that help us to choose the

Table 3
Panel VAR Lag order selection criteria.

Lag	LogL	LR	FPE	AIC	SIC	HQ
0	−6267.88	–	0.00	11.98	12.01	11.99
1	−192.05	12070.41	6.30e-08	0.45	0.64	0.52
2	72.29	522.13	4.07e-08	0.01	0.38*	0.15*
3	125.05	103.59	3.94e-08	−0.02	0.52	0.18
4	170.69	89.10*	3.87e-08*	−0.04*	0.67	0.23

Note: * indicates lag order selected by the criterion, LR: sequential modified LR test statistic (each test at 5% level). Authors calculations.

optimal lag length in VAR specifications. We choose the lag length of 2 according to the SIC and HQ criteria as these are often more parsimonious (Pesaran & Smith, 1998) and our relatively small data sample in the current study further supports this point. Table 3 represents the results of lag length tests.

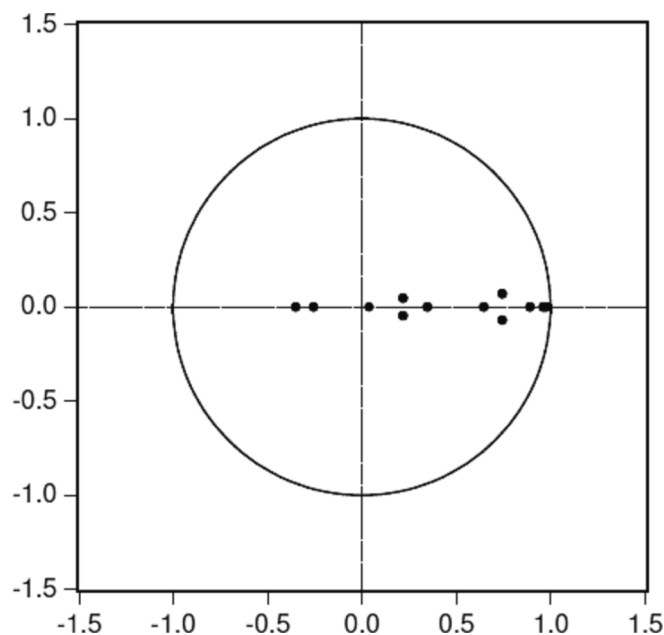Fig. 2 provides the panel impulse responses of conflict indices, the

Fig. 3. Inverse roots of AR characteristic polynomial. Authors calculations.

political situation and military spending as a percentage of GDP to a one standard deviation negative shock in arms imports to GDP ratio. We use this method to construct average effects- possibly across a heterogenous group of 48 countries, 1990 to 2017.

The ratio of arms imports to GDP is the first variable in our PVAR model, followed by military expenditures as a percentage of GDP, military in politics, polity2 index, and internal and external conflict indices. We postulate that arms imports (as a % of GDP) is the most exogenous variable in the model of arms sanctioned countries and can be used as an index to imitate the impact of arms embargoes on the political situation and conflict in developing countries. Decreases in arms imports impact military expenditure, and this may affect the military's involvement in politics, and thereafter the political behaviour of the government. Both fluctuations in military spending and the political situation may affect internal and external conflicts. Fig. 2 reveals that the decreases in the arms imports to GDP ratio have a negative and statistically significant impact on the military expenditure to GDP ratio during the entire period. Also, the arms imports variable responds negatively to its own negative shocks. The responses of the military in politics index (for the entire period) and polity2 index (after 2 years of initial shock) to the negative shocks in arms imports as a percentage of GDP are positive and statistically significant. Imposing arms restrictions will decrease government spending on the military and this lowers the military's involvement in politics and improves the political behaviour of the government. The responses of the external conflict index to decreases in arms imports as a percentage of GDP are negative but not significant, while the internal conflict index shows negative and significant responses within 3–6 years after initial shocks. This indicates that military embargoes are not effective in controlling external conflict in developing countries; they may even increase the risk of internal conflicts due to a weakening defence sector.

Fig. 3 displays the AR graph, which represents the inverse roots of the characteristic AR polynomial (see Lütkepohl, 1991). According to this figure, all roots in the PVAR model are located inside the unit circle and have modulus less than one and the PVAR model is stable.

5.2. Impacts on religious and ethnic tensions

In Fig. 4 we examine the impact of arms embargo on the political situation, as well as ethnic and religious tensions in developing

countries. We employ 2 lags as the optimum number of lags in our analysis. The VAR stability condition test (roots of characteristic polynomial) indicates that the VAR satisfies the stability condition.[10] The negative shocks to arms imports as a percentage of GDP have negative and statistically significant effects on defence expenditure as a percentage of GDP (for the entire period), and positive and improving impacts on the indices of military in politics (for the entire period) and polity2 (after two years of initial shocks). The response of ethnic tensions to the negative shocks in arms imports as a percentage of GDP is negative and statistically significant, but the response of religious tensions is not significant. These results confirm our previous findings regarding the decreasing impact of arms embargoes on military spending as a percentage of GDP and its improving impact on political institutions. Decreases in arms imports can worsen ethnic tensions by limiting the government's military capabilities.

5.3. Alternative definitions for democracy index and government stability

For robustness checks, we use an alternative new measure of democracy known as electoral democracy. This measure is based on data from a large number of indices collected through the Varieties of Democracy (V-Dem) project (see Pemstein, 2017). The electoral component of democracy represents the core value of making rulers responsive to people through competition for the approval of a broad electorate during periodic elections. In the V-Dem structure, electoral democracy is the base of any other component of representative democracy- liberal, participatory, deliberative, egalitarian, or some other. It ranges from 0 to 1. The higher scores show the better quality of electoral democracy (Coppedge, Lindberg, Skaaning, & Teorell, 2015, p.3). We also replace the military in politics index with the government stability indicator to examine whether the arms embargoes destabilize sanctioned governments or not. Furthermore, we use ethnic tensions and internal conflict in our panel VAR model presented in Fig. 5.[11]

We apply 2 lags for the variables according to LR, FPE, and HQ criteria. The VAR stability condition test verifies the stability of our PVAR model. Therefore, the standard errors of the impulse responses are valid. Fig. 5 indicates that a one standard deviation negative shock in arms imports (as percentage of GDP) will have a negative and statistically significant impact on military expenditures (as percentage of GDP) and government stability index, but a positive and significant (after one year of initial shock) on the electoral democracy index. The responses of ethnic tensions and internal conflicts are negative and statistically significant after 2 and 4 years of an initial negative shock to arms imports respectively. These indicate that arms embargoes may destabilize the government by weakening the military sector. This improves the quality of democracy but may lead to heightened ethnic tensions and internal conflict by undermining the military and destabilizing the central government.

5.4. Alternative definitions for negative arms imports shocks and military effect

In Fig. 6 we estimate a Panel VAR model using the "decreasing arms imports" and replace the military expenditures as a percentage of GDP with armed forces personnel (as % of total labour force). This will further help us to understand how the arms embargo motivates demilitarization by affecting the armed forces personnel. Another point is that positive and negative external shocks may have asymmetric effects on the military, conflict and the political system (Dizaji et al., 2016; Dizaji, 2019) by creating a ratchet effect. Imposing arms embargoes will cause negative shocks on target countries arms imports. Therefore, it can be

---

[10] This is available upon request.
[11] Internal conflicts and ethnic tensions showed significant responses according to our Panel VAR analysis in Fig. 2 and Fig. 4.
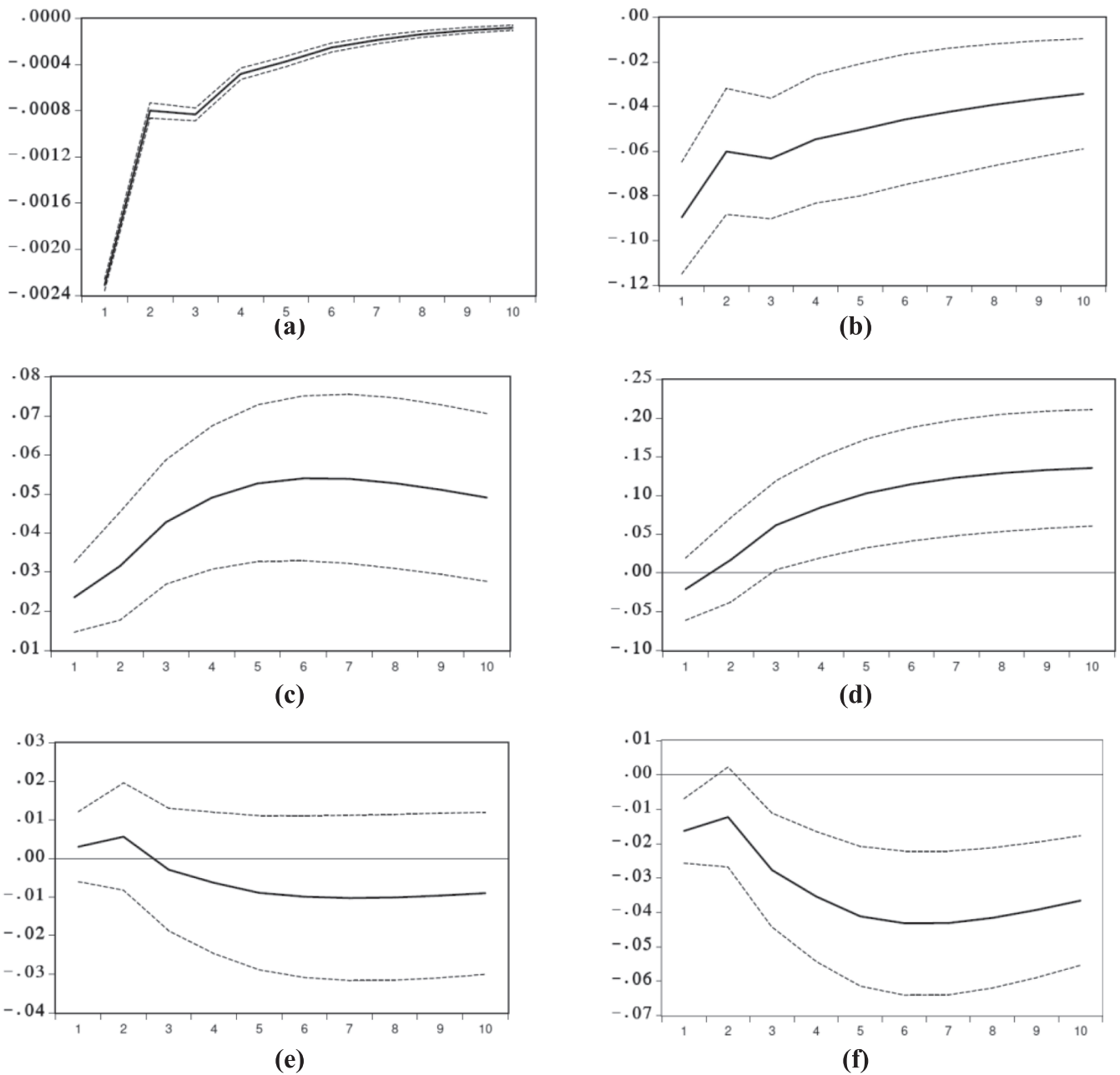
Fig. 4. Impulse response functions related to a one standard deviation negative shock in arms imports as a percentage of GDP. **(a)** Response of arms imports as a percentage of GDP. **(b)** Response of military expenditures as a percentage of GDP. **(c)** Response of military in politics index. **(d)** Response of polity2 index **(e)** Response of religious tensions. **(f)** Response of ethnic tensions. *Notes*: The dotted lines depict ± 1 standard deviation. The horizontal axis displays the time periods (years) after the initial shock. Authors calculations.

informative to consider asymmetric shocks on arms imports to test whether negative changes in this variable affect the political situation and conflict indices. For this purpose, we define the decreasing trend in arms imports as a shock variable. According to Mork (1994), which offers an asymmetric definition of oil price shocks to highlight the differences between positive and negative oil shocks, we define the negative changes in the arms imports as follows:

$$armimp_t^- = \min\left(0, \left(armimp_t - armimp_{t-1}\right)\right) \qquad (15)$$

SIC and HQ criteria suggest 2 lags for the variables. The Panel VAR stability condition test shows that the specified PVAR model is stable. Fig. 6 shows that a one standard deviation shock in the "negative changes" of arms imports leads to negative and statistically significant

response of armed forces personnel and significant improvements in military in politics and polity2 measures. The responses of ethnic tensions (after the second year of initial shock) and internal conflict (until the 8th year) are negative and statistically significant. These results reveal that negative changes in arms imports due to the arms sanctions demilitarize the target country by reducing the number of armed forces personnel. This will decrease the military's involvement in politics and improve the quality of electoral democracy. However weaknesses in the military structure due to the sanctions may worsen ethnic tensions and
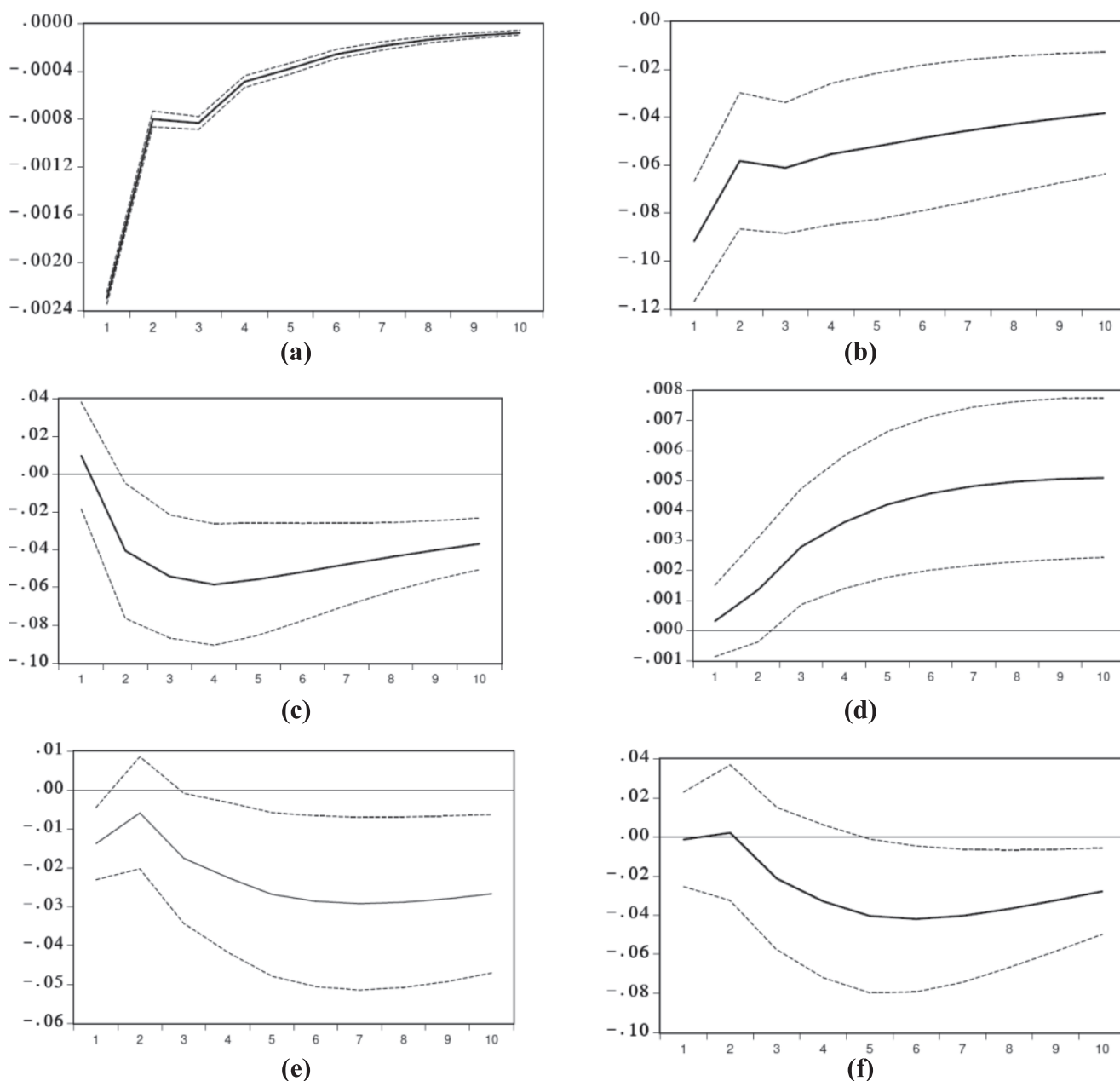
Fig. 5. Impulse response functions related to a one standard deviation negative shock in arms imports as a percentage of GDP. a Response of arms imports as a percentage of GDP. b Response of military expenditures as a percentage of GDP. c Response of government stability index. d Response of electoral democracy index e Response of ethnic tensions. f Response of internal conflict. *Notes:* The dotted lines depict ± 1 standard deviation. The horizontal axis displays the time periods (years) after the initial shock. Authors calculations.

internal conflicts in the sanctioned countries.[12]

5.5. Panel generalized impulse responses including different V-DEM democracy indices

The electoral part is important element of the V-Dem conceptual scheme; democratic regimes have necessarily an electoral democracy. However, holding elections alone is not sufficient, and also countries may feign "democratic features" without having real electoral

democracy (Coppedge et al., 2015). We therefore consider other components of democracy that offer different ways of defining democracy, i. e. liberal, participatory, deliberative, and egalitarian democracy beside electoral democracy.

- "The *liberal* part of democracy refers to the intrinsic value of preserving individual and minority rights against a potential "tyranny of the majority." This is obtained through constitutionally preserved strong rule of law, civil liberties, and effective checks and balances that restrict the use of executive power.
- The *participatory* component includes the values of direct rule and active participation by citizens in all political procedures; it highlights non-electoral shapes of political participation such as through civil society organizations and mechanisms of direct democracy.

---

[12] We have also used the negative shocks to the ratio of arms imports to GDP like before (instead of defining the asymmetric shocks to negative changes in the ratio of arms imports to GDP). The overall results by and large agree. These results are available upon request.
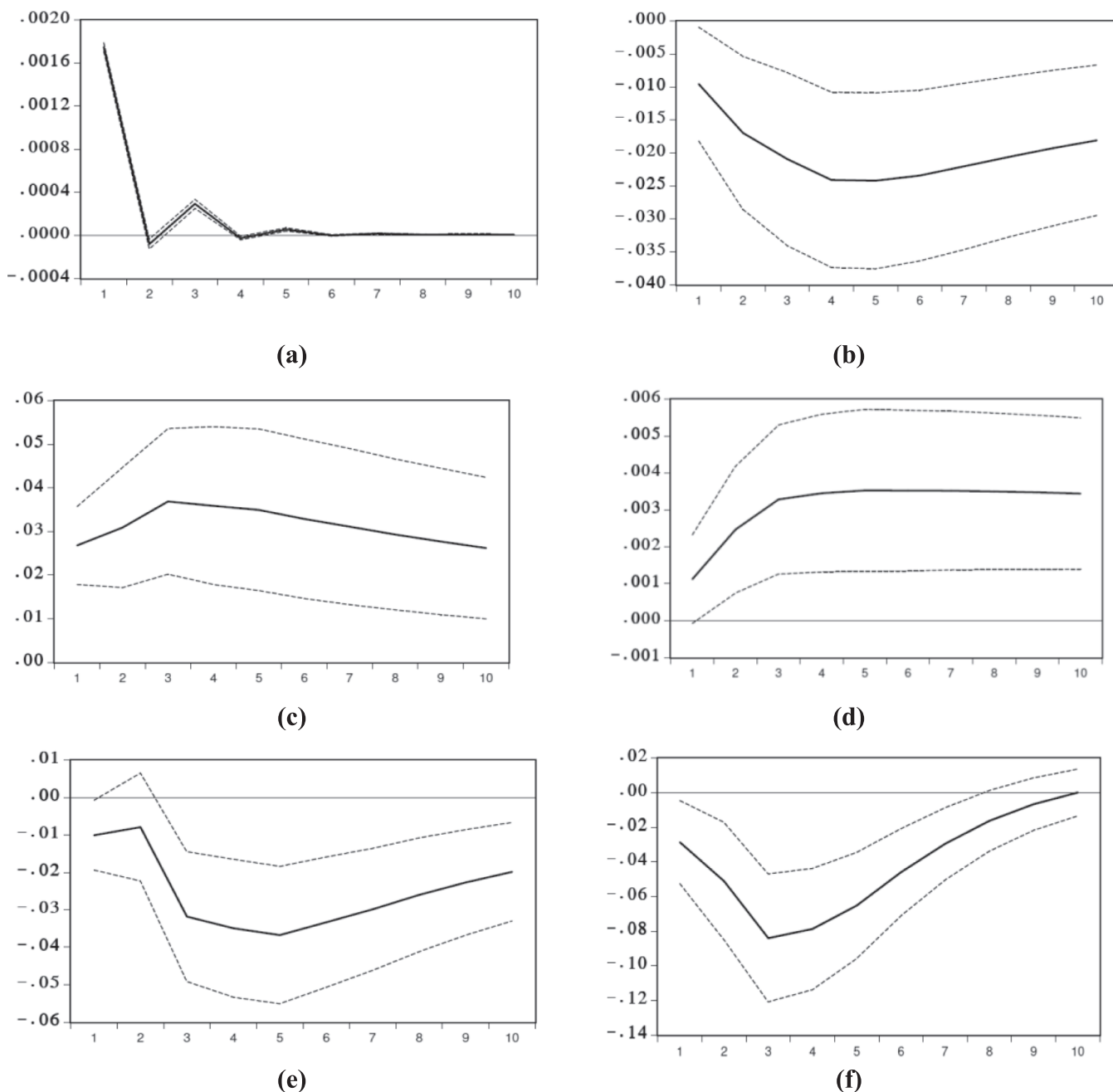
Fig. 6. Impulse response functions related to a one standard deviation shock to negative changes in arms imports as a percentage of GDP. **(a)** Response of arms imports as a percentage of GDP. **(b)** Response of armed forces personnel (% of total labour force). **(c)** Response of military in politics index. **(d)** Response of electoral democracy. **(e)** Response of ethnic tensions. **(f)** Response of internal conflict. *Notes*: The dotted lines depict ± 1 standard deviation. The horizontal axis displays the time periods (years) after the initial shock. Authors calculations.

- The *deliberative* component includes the core value that political decisions in pursuit of the public good should be informed by respectful and reasonable dialogue at all levels rather than by solidary attachments, emotional appeals, parochial interests, or compulsion.
- The *egalitarian* component includes that material and immaterial inequalities prevent the actual exercise of formal rights and liberties; then a more equal distribution of resources, education and health facilities among different groups should improve political equality" (Coppedge et al., 2015, p.5).

Ordering of these democracy indices in the PVAR model is important, and a different setting may lead to different panel impulse responses

(Dizaji, 2022). Generally, theory should guide us to opt for the most suitable ordering so that some variables follow the other variables rather than leading them. The panel generalized impulse response function (PGIRF) approach, which is based on Koop, Pesaran, and Potter (1996) and Pesaran and Shin (1998), suggests a useful solution when the theory is unable to link the variables clearly. The PGIRFs offer an orthogonal set of innovations that is not relying on the ordering of the variables in the Panel VAR system. Accordingly, we test the panel generalized impulse responses of the introduced democracy indices (i.e., electoral, participatory, liberal, deliberative, and egalitarian democracies), and arms imports as a as a percentage of GDP to a one standard deviation shock to asymmetric negative changes in arms imports as a as a percentage of GDP.
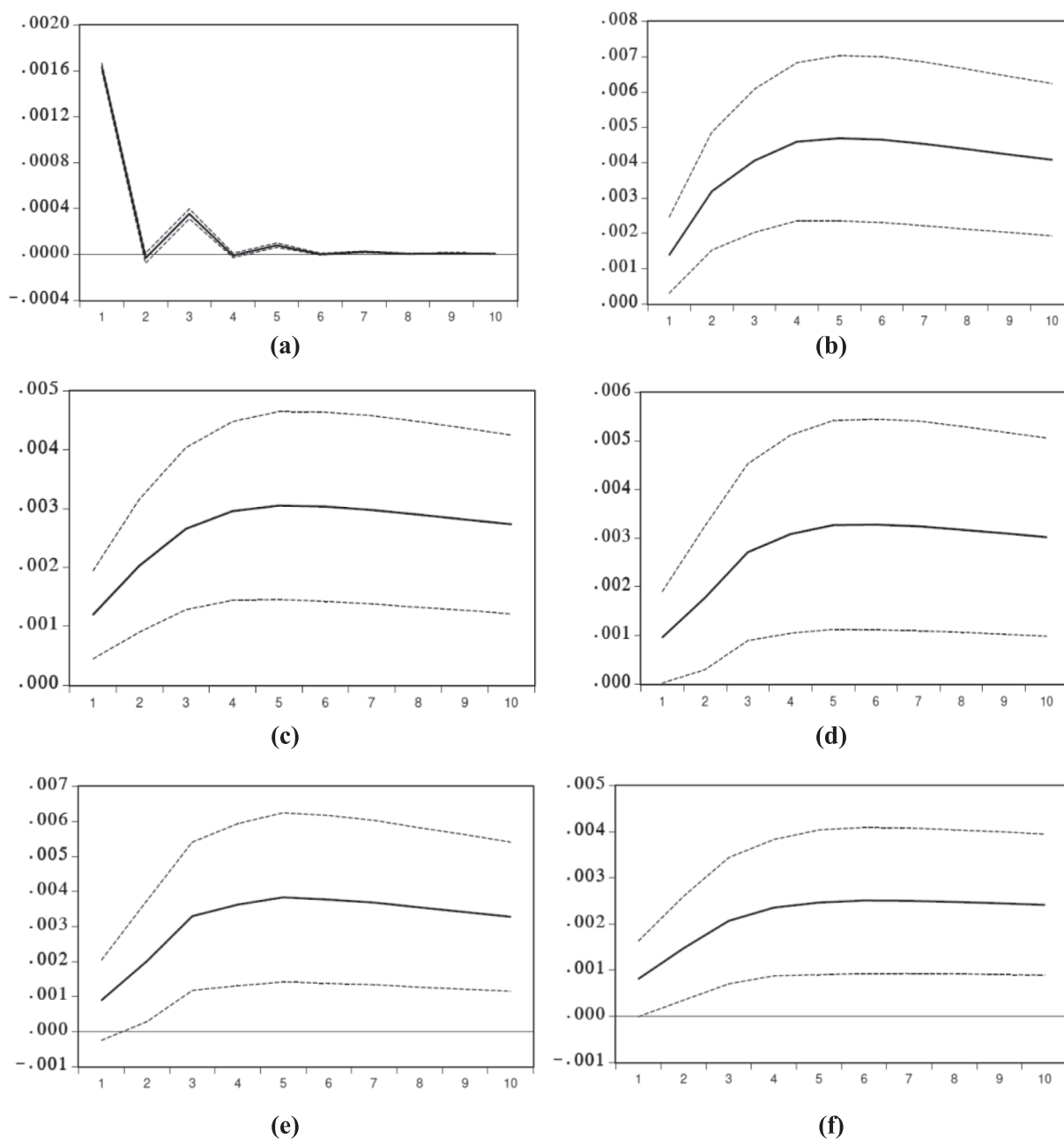
Fig. 7. Generalized impulse response functions related to a one standard deviation shock to negative changes in arms imports as a percentage of GDP. **(a)** Response of arms imports as a percentage of GDP. **(b)** Response of electoral democracy. **(c)** Response of egalitarian democracy. **(d)** Response of liberal democracy. **(e)** Response of deliberative democracy. **(f)** Response of participatory democracy. *Notes*: The dotted lines depict ± 1 standard deviation. The horizontal axis displays the time periods (years) after the initial shock. Authors calculations.

According to Fig. 7 the responses of electoral democracy, egalitarian democracy, liberal democracy, deliberative democracy, and finally participatory democracy indices to the negative changes in arms imports as a percentage of GDP are positive and statistically significant during the entire period.[13] The overall results indicate that the restrictions on

arms imports will encourage all electoral, liberal, participatory, deliberative, and egalitarian democracy indices.

5.6. The impact on government non-military expenditures and growth

The arms embargo may influence non-military expenditures (such as education expenditures and health expenditures), besides their impact on military expenditures. In Fig. 8 we have replaced military burden with education expenditures (as a percentage of GDP). We examine the impact of one standard deviation negative shocks in arms imports on education expenditures (as percentage of GDP), as well as political and

---

[13] We have also alternatively investigated the generalized impulse response functions of different components of democracy to negative shocks in ratio of arms imports in GDP (rather than the shocks to the asymmetric negative changes in arms imports to GDP ratio). The overall results confirm previous findings implying that arms embargo has positive impact on different components of democracy in developing countries. These results are available upon request.
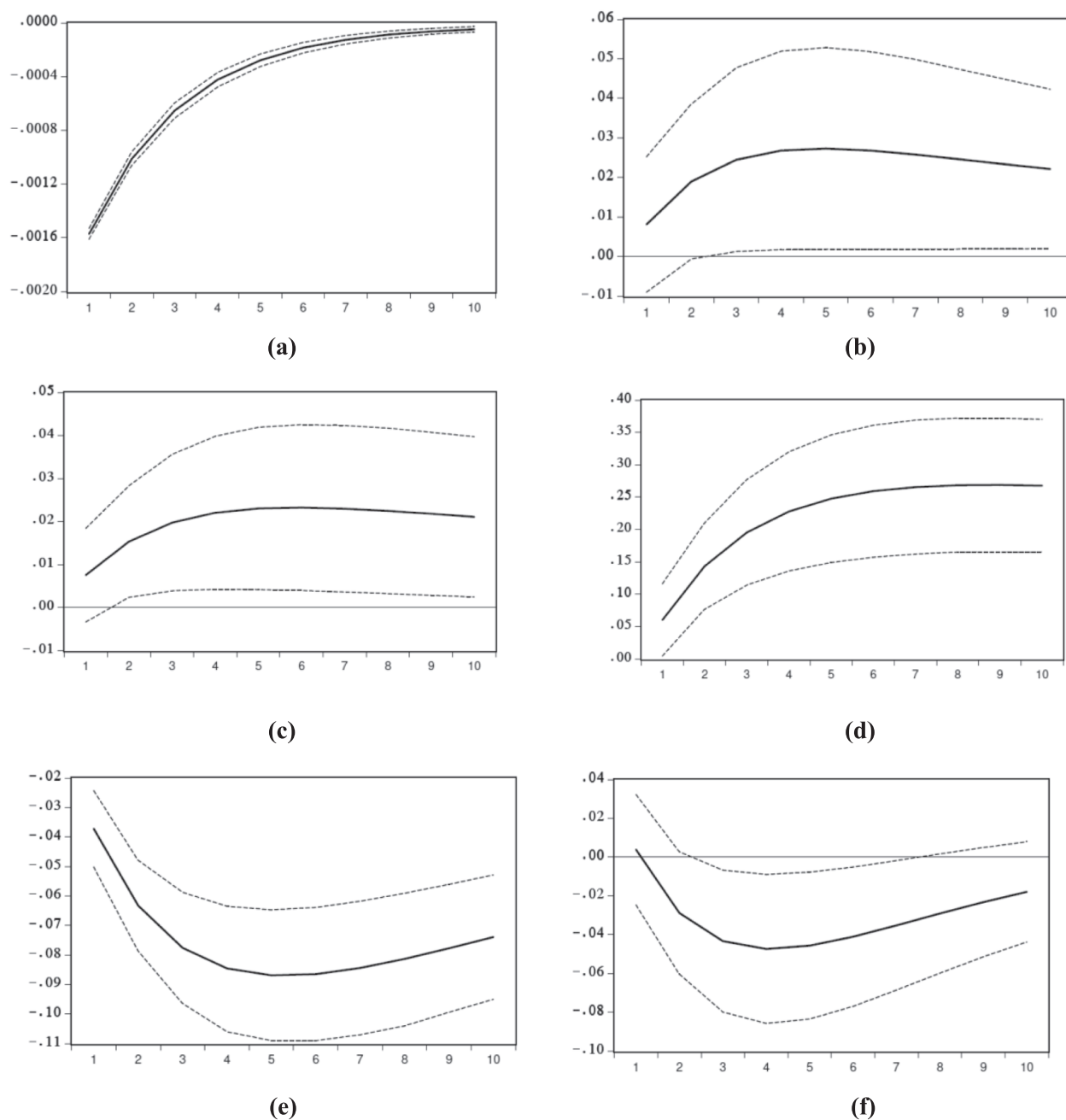
Fig. 8. Impulse response functions related to a one standard deviation negative shock in arms imports as a percentage of GDP. **(a)** Response of arms imports as a percentage of GDP. **(b)** Response of government education expenditures as a percentage of GDP. **(c)** Response of military in politics index. **(d)** Response of polity2 index. **(e)** Response of ethnic tensions. **(f)** Response of internal conflict. *Notes*: The dotted lines depict ± 1 standard deviation. The horizontal axis displays the time periods (years) after the initial shock. Authors calculations.

conflict indices for 32 developing countries over the period of 1990–2017.[14] The results show that arms embargo increases education expenditures (as a percentage of GDP) and improves political indices while it intensifies ethnic tensions and internal conflict in developing countries. We have also applied health expenditures (as percentage of GDP) as well as general government total expenditures (as percentage of GDP) alternatively and in different PVAR models. The results show that arms embargoes have positive and statistically significant impact on health expenditures[15] (as a percentage of GDP) while their impact on general government total expenditures (as percentage of GDP) are negative and statistically significant.[16]

Fig. 9 illustrates the responses of military expenditures, political development, economic development (captured by GDP per capita), as

---

[14] Due to the lack of consistent data on education expenditures, we have decreased the number of countries to 32 countries for the mentioned period.

[15] Our time period decreases to 2000–2017 when we use health expenditures (as percentage of GDP) in PVAR model.

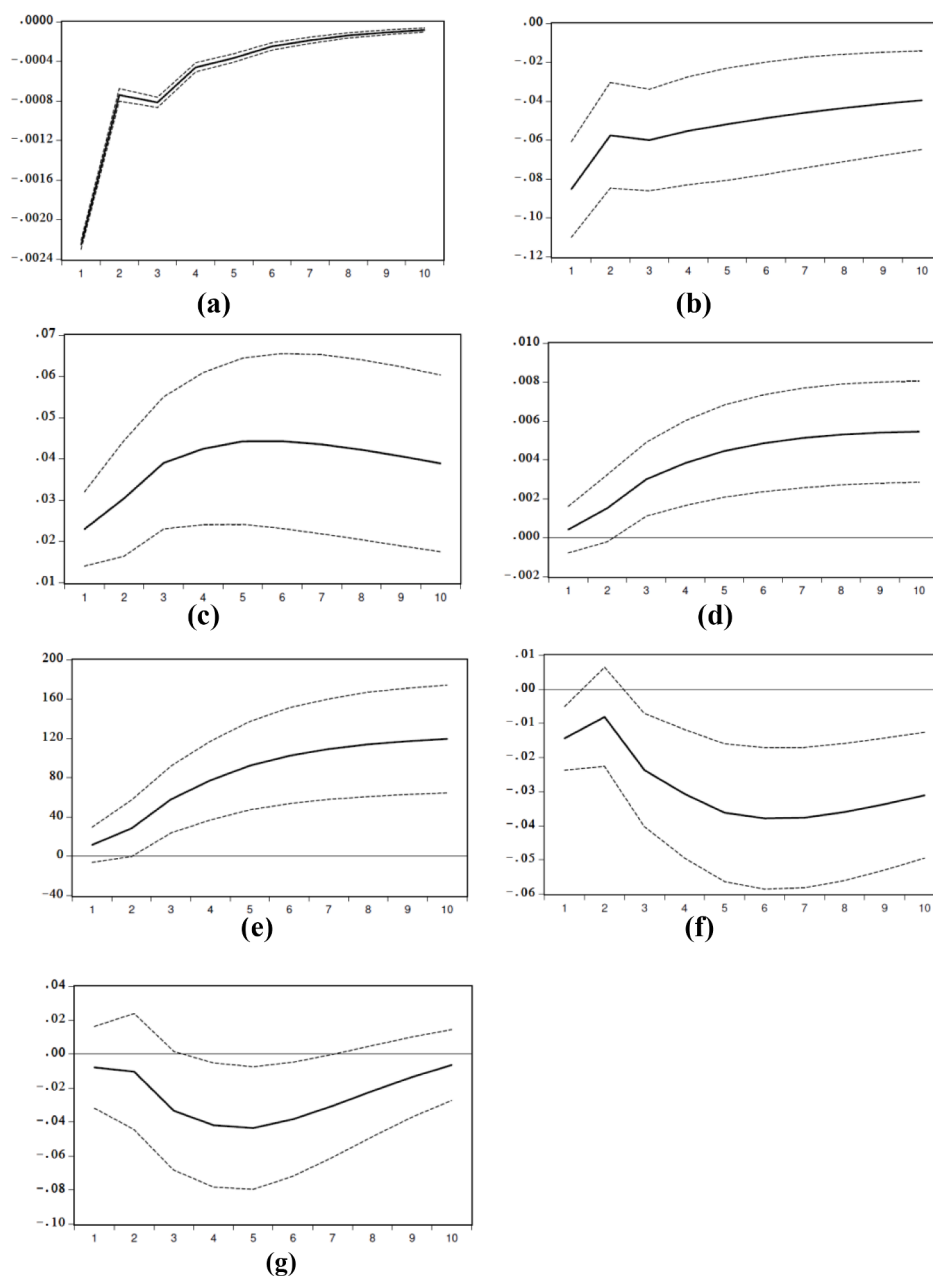[16] These results are available upon request.

Fig. 9. Impulse response functions related to a one standard deviation negative shock in arms imports as a percentage of GDP. **(a)** Response of arms imports as a percentage of GDP. **(b)** Response of military expenditures as a percentage of GDP. **(c)** Response of military in politics index. **(d)** Response of electoral democracy index **(e)** Response of GDP per capita. **(f)** Response of ethnic tensions. **(g)** Response of internal conflict. *Notes*: The dotted lines depict ± 1 standard deviation. The horizontal axis displays the time periods (years) after the initial shock. Authors calculations.

well as conflict variables to arms embargoes. According to this figure, the response of GDP per capita to negative shocks in arms imports is positive and statistically significant.[17] The responses of others variables confirm our previous findings. Therefore, arms embargoes reduce military spending and may improve political and economic development in sanctioned countries. However, decreases in the military capabilities of the government may worsen ethnic tensions and internal conflicts.

6. Conclusions

This study simulates the impact of arms embargoes on military expenditures, democracy indices and conflict variables in developing countries. We developed a theoretical mechanism relating arms restrictions to government military and non-military expenditures, democracy and internal conflict. We argued that the arms restrictions may increase government's willingness to undertake more peaceful actions through increasing the investments in state capacities in order to resolve a conflict. However, arms sanctions could also diminish the military capabilities of the government and encourage rebellion. Hence, arms restrictions alter the actors' decisions to follow peaceful actions because they change the underlying distribution of military capabilities. Therefore, the final impact of arms restrictions on internal conflict is

---

[17] We have also included GDP per capita in other PVAR models using education expenditures or health expenditures or government expenditures instead of military expenditures. We found the positive response of GDP per capita to negative shocks in arms imports in all of these specifications. These results are available upon request.

theoretically ambiguous, requiring empirical investigation.

The empirical part systematically analyzes the relationship between the restrictions on arms import, political institutions, government spending and conflict. Our theoretical hypotheses are borne out. The results of impulse responses functions, based on the estimated PVAR models that account for reverse causality between arms imports and conflict, reveal that negative shocks in arms imports have a negative impact on military expenditures and armed forces personnel, decreasing military involvement in politics, improving democratic indices. However, arms embargoes intensify ethnic tensions and internal conflicts in developing countries by attenuating government military or state power, and therefore destabilizing the government. Sanctions may enhance the degree of factionalism in society, and exacerbate existing inequalities. Another reason could be that many countries are at an early stage of their democratic transition. Hegre et al. (2001) indicate that conflict risk is lowest in both established autocracies and democracies. As many developing countries have only experienced democracy recently, improvements in democratic credentials can, at least initially, trigger pent up tensions and ethnic conflict. The potential for political development may interact with ethno-political competition, serving to raise the risks - and therefore increasing the proclivity for violence - in developing countries. Policymakers in the Western democracies that are the world's largest suppliers of weaponry should be concerned with the impact of arms restrictions on politics and conflict in developing countries.

The responses of the political system and different indices of democracy including electoral, participatory, deliberative, liberal, and egalitarian democracy to reductions in arms imports are positive and statistically significant. This is one of the innovations of our paper, as we are able to separate liberal and electoral aspects of democracy, capturing smaller and more continuous alterations in democratic quality. Furthermore, our findings show that while arms restrictions decrease military and general government total expenditures (as percentage of GDP), their impact on education expenditures (as percentage of GDP), health expenditures (as percentage of GDP) and GDP per capita are positive and statistically significant. This indicates that arms embargoes may substitute non-military expenditures (such as education and health expenditures) for military expenditures, and this counters the negative impact of military expenditures on economic growth and political development in developing countries. These results are robust to different approaches of defining the negative arms shocks, and different measurements of political conditions (V-DEM democracy indices and polity2), as well as different orderings of variables in the PVAR models.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Acknowledgements

Appendix

List of the countries

Algeria, Angola, Argentina, Bahrain, Bangladesh, Bolivia, Brazil, Chile, China, Colombia, Ecuador, Egypt, Ghana, Hungary, India, Indonesia, Iran, Jordan, Kazakhstan, Kuwait, Latvia, Lebanon, Lithuania, Malaysia, Mexico, Morocco, Myanmar, Nigeria, Oman, Pakistan, Peru, Philippines, Poland, Qatar, Romania, Saudi Arabia, South Africa, Sri Lanka, Sudan, Syria, Thailand, Tunisia, Turkey, UAE, Uruguay, Venezuela, Vietnam, Yemen.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.worlddev.2023.106410.

References

Addison, T., & Murshed, S. M. (2003). Debt relief and civil war. *Journal of Peace Research, 40*(2), 159–176. https://doi.org/10.1177/0022343303040002002

Allen, S. H. (2008). The domestic political costs of economic sanctions. *Journal of Conflict Resolution, 52*(6), 916–944. https://doi.org/10.1177/0022002708325044

Allen, S. H. (2005). The determinants of economic sanctions success and failure. *International Interactions, 31*(2), 117–138. https://doi.org/10.1080/03050620590950097

Allen, S. H., & Lektzian, D. J. (2013). Economic sanctions: A blunt instrument? *Journal of Peace Research, 50*(1), 121–135. https://doi.org/10.1177/0022343312456224

Askari, H. (2006). *Middle East Oil Exporters: What Happened to Economic Development?* Cheltenham, UK: Edward Elgar Publishing.

Balch-Lindsay, D., & Enterline, A. J. (2000). Killing time: The world politics of civil war duration, 1820–1992. *International Studies Quarterly, 44*(4), 615–642. https://doi.org/10.1111/0020-8833.00174

Baronchelli, A., Caruso, R., & Ricciuti, R. (2022). Trade in small arms and light weapons: Are embargoes effective. *World Economy., 45*(5), 1336–1361. https://doi.org/10.1111/twec.13217

Berument, M. H., Ceylan, N. B., & Dogan, N. (2010). The impact of oil price shocks on the economic growth of selected MENA countries. *Energy Journal, 31*(1), 149–176. https://doi.org/10.5547/ISSN0195-6574-EJ-Vol31-No1-7

Besley, T., & Persson, T. (2008). The incidence of civil wars: Theory and evidence national bureau of economic research. *Working Paper, 14585.* http://www.nber.org/papers/w14585.

Blad, J. (2019). Economic Sanctions and Repression: The Effect of Economic Sanctions on Repression Conditional on Democracy. Uppsala Universitet, https://www.diva-portal.org/smash/get/diva2:1277611/FULLTEXT01.pdf.

Bolks, S. M., & Al-Sowayel, D. (2000). How long do economic sanctions last? *Political Research Quarterly, 53*(June), 241–265. https://doi.org/10.2307/449280

Brommelhorster, J. (2001). Off budget military expenditure. *paper presented at the Conference on Data Collection on Armed Conflict, Department of Peace and Conflict Research.* Uppsala University, 8–9 June (www.pcr.uu.se).

Brzoska, M. (2008). Measuring the effectiveness of arms embargoes. *Peace Economics, Peace Science and Public Policy, 14*(2), article 2. https://doi.org/10.2202/1554-8597.1118

Choi, I. (2001). Unit root tests for panel data. *Journal of International Money and Finance, 20*(2), 249–272. https://doi.org/10.1016/S0261-5606(00)00048-6

Clements, M. P., & Hendry, D. F. (1995). Forecasting in cointegrated systems. *Journal of Applied Econometrics, 10*(2), 127–146. https://doi.org/10.1002/jae.3950100204

Collier, P., & Hoeffler, A. (1998). On economic causes of civil war. *Oxford Economic Papers, 50*(4), 563–573. https://doi.org/10.1093/oep/50.4.563

Coppedge, M., Lindberg, S., Skaaning, S. E., & Teorell, J. (2015). Measuring high level democratic principles using the V-Dem data. *International Political Science Review, 37*(5), 580–593. https://doi.org/10.1177/0192512115622046

Craft, C., & Smaldone, J. P. (2002). The arms trade and the incidence of political violence in Sub-Saharan Africa, 1967–97. *Journal of Peace Research, 39*(6), 693–710. https://doi.org/10.1177/0022343302039006003

Deger, S. (1985). Human resources, government education expenditure and the military burden in less developed countries. *Journal of Developing Areas, 20*(1), 37–48.

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association, 74*, 427–431. https://doi.org/10.2307/2286348

Dizaji, S. F. (2019). Trade openness, political institutions, and military spending (Evidence from lifting Iran's sanctions). *Empirical Economics, 57*(6), 2013–2041. https://doi.org/10.1007/s00181-018-1528-2

Dizaji, S. F. (2021). The impact of sanctions on the banking system: new evidence from Iran. In: Bergeijk, P.A.G. van. (Ed), Research Handbook on Economic Sanctions (pp. 330-350), Edward Elgar.

Dizaji, S. F. (2022). The impact of negative oil shocks on military spending and democracy in the oil states of the greater Middle East: Implications for the oil sanctions. *Journal of Peace Research.* https://doi.org/10.1177/00223433221116654

Dizaji, S, F., & van Bergeijk, P. A. G. (2013). Potential early phase success and ultimate failure of economic sanctions: A VAR approach with an application to Iran. Journal of Peace Research, 50(6), 721–736. doi: https://doi.org/10.1177/0022343313485487.

Dizaji, S, F., & van Bergeijk, P. A. G. (2023). Sanctions and Russian autocracy. In Bali, M. (Ed.), Sanctions and the Impact of the Russia-Ukraine Conflict. Nova Publishers (in print).

Dizaji, S. F., & Farzanegan, M. R. (2021). Do sanctions constrain military spending of Iran? *Defence and Peace Economics, 32*(2), 125–150. https://doi.org/10.1080/10242694.2019.1622059

Dizaji, S. F., & Farzanegan, M. R. (2023). Democracy and militarization in developing countries: A panel vector autoregressive analysis. *Defence and Peace Economics, 34*(3), 272–292. https://doi.org/10.1080/10242694.2021.1957191

Dizaji, S. F., Farzanegan, M. R., & Naghavi, A. R. (2016). Political institutions and government spending behaviour: Theory and evidence from Iran. *International Tax and Public Finance, 23*(3), 522–549. https://doi.org/10.1007/s10797-015-9378-8

Drury, C., & Peksen, D. (2014). Women and economic statecraft: The negative impact international economic sanctions visit on women. *European Journal of International Relations, 20*(2), 463–490. https://doi.org/10.1177/1354066112448200

Durch, W. J. (2000). *Constructing regional security: The role of arms transfers, arms control, and reassurance*. New York, NY: Palgrave.

Escriba-Folch, A. (2010). Economic sanctions and the duration of civil conflicts. *Journal of Peace Research, 47*(2), 129–141. https://doi.org/10.1177/0022343309356489

Erickson, J. L. (2023). Demystifying the 'gold standard' of arms export controls: US arms exports to conflict zones. *Global Policy., 14*(1), 131–138. https://doi.org/10.1111/1758-5899.13181

Fordham, B. O., & Walker, T. C. (2005). Kantian liberalism, regime type, and military resource allocation: Do democracies spend less? *International Studies Quarterly, 49*(1), 141–157. https://doi.org/10.1111/j.0020-8833.2005.00338.x

Galtung, J. (1967). On the effects of international economic sanctions: With examples from the case of Rhodesia. *World Politics, 19*(3), 378–416. https://doi.org/10.2307/2009785

Gershenson, D. (2002). Sanctions and civil conflict. *Economica, 69*(274), 185–206.

Grauvogel, J., Licht, A. A., & von Soest, C. (2014). Taking the Streets? Disentangling the Impact of Sanction Threats on Mass Protest. *Working paper*. Binghamton, NY, USA: Binghamton University-State University of New York.

Giumelli, F. (2015). Understanding United Nations targeted sanctions: An empirical analysis. *International Affairs, 91*(6), 1351–1368. https://doi.org/10.1111/1468-2346.12448

Hegre, H., Ellingsen, T., Gates, S., & Gleditsch, N. P. (2001). Towards a democratic civil peace? Democracy, civil change, and civil war 1816–1992. *American Political Science Review, 95*(1), 17–33. https://doi.org/10.1017/S0003055401000119

Hirshleifer, J. (2000). The macrotechnology of conflict. *Journal of Conflict Resolution, 44*(6), 773–792. https://doi.org/10.1177/0022002700044006004

Hirshleifer, J. (1995). Anarchy and its breakdown. *Journal of Political Economy, 103*(1), 26–52.

Hudàkovà, Z. (2022). Speak softly and carry a big stick. *Global Governance, 28*(2), 203–227.

Hufbauer, G. C., Schott, J. J., Elliot, K. A., & Oegg, B. (2007). *Economic Sanctions Reconsidered* (3rd Ed.). Washington DC: Peterson Institute for International Economics.

Hultman, L., & Peksen, D. (2017). Successful or counterproductive coercion? The effect of international sanctions on conflict intensity. *Journal of Conflict Resolution, 61*(6), 1315–1339. https://doi.org/10.1177/0022002715603453

Karp, A. (1994). The arms trade revolution: The major impact of small arms. *Washington Quarterly, 17*(4), 65–78. https://doi.org/10.1080/01636609409443750

Kalyvas, S. N., & Balcells, L. (2010). International system and technologies of rebellion: How the end of the cold war shaped internal conflict. *American Political Science Review, 104*(3), 415–429. https://doi.org/10.1017/S0003055410000286

Koutsomanoli-Filippaki, A., & Mamatzakis, E. (2009). Performance and Merton-type default risk of listed banks in the EU: A panel VAR approach. *Journal of Banking & Finance, 33*(11), 2050–2061. https://doi.org/10.1016/j.jbankfin.2009.05.009

Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics, 115*(1), 53–74. https://doi.org/10.1016/S0304-4076(03)00092-7

International Monetary Fund's World Economic Outlook Database, October 2019.

Koop, G., Pesaran, M. H., & Potter, S. M. (1996). Impulse response analysis in nonlinear multivariate models. *Journal of Econometrics, 74*(1), 119–147. https://doi.org/10.1016/0304-4076(95)01753-4

Levin, A., Lin, C., & Chu, C. J. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics, 108*(1), 1–24. https://doi.org/10.1016/S0304-4076(01)00098-7

Lopez, G. A., & Cortright, D. (1997). Economic sanctions and human rights: Part of the problem or part of the solution? *International Journal of Human Rights, 1*(2), 1–25. https://doi.org/10.1080/13642989708406664

Love, I., & Zicchiano, L. (2006). Financial development and dynamic investment behaviour; evidence from panel VAR. *The Quarterly Journal of Economics and Finance, 46*(2), 190–210. https://doi.org/10.1016/j.qref.2005.11.007

Lütkepohl, H. (1991). *Introduction to multiple time series analysis*. New York: Springer.

Maddala, G. S., & Wu, S. (1999). A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and Statistics, 61*(S1), 631–652. https://doi.org/10.1111/1468-0084.0610s1631

Marshall, M. G., Gurr, T. R., & Jaggers, K. (2017). *POLITY™ IV Project*. Vienna, VA: Center for Systemic Peace.

Mork, K. A. (1994). Business cycles and the oil market. *Energy Journal, 15*, 15–38.

Murdoch, J. C., & Sandler, T. (2002). Economic growth, civil wars, and spatial spillovers. *Journal of Conflict Resolution, 46*(1), 91–110. https://doi.org/10.1177/0022002702046001006

Pearson, F. S., Baumann, R. A., & Bardos, G. N. (1989). Arms transfers: Effects on African interstate wars and interventions. *Conflict Quarterly, 9*(4), 36–62.

Peksen, D. (2009). Better or worse? The effect of economic sanctions on human rights. *Journal of Peace Research, 46*(1), 59–77. https://doi.org/10.1177/0022343308098404

Peksen, D. (2011). Economic sanctions and human security: The public health effect of economic sanctions. *Foreign Policy Analysis, 7*(3), 237–251. https://doi.org/10.1111/j.1743-8594.2011.00136.x

Peksen, D., & Drury, C. (2010). Coercive or corrosive: The negative impact of economic sanctions on democracy. *International Interactions, 36*(3), 240–264. https://doi.org/10.1080/03050629.2010.502436

Pemstein, D. et al. (2017) "The V-Dem Measurement Model: Latent Variable Analysis for Cross-National and Cross-Temporal Expert-Coded Data". In: University of Gothenburg, Varieties of Democracy Institute: Working Paper 21.

Pesaran, M. H. (2007). A simple panel unit root test in the presence of cross-section dependence. *Journal of Applied Econometrics, 27*(2), 265–312. https://doi.org/10.1002/jae.951

Pesaran, M. H., & Shin, Y. (1998). Generalised impulse response analysis in linear multivariate models. *Economics Letters, 58*(1), 17–29. https://doi.org/10.1016/S0165-1765(97)00214-0

Pesaran, M. H., & Smith, R. P. (1998). Structural analysis of cointegration VARs. *Journal of Economic Surveys, 12*(5), 471–505. https://doi.org/10.1111/1467-6419.00065

Portela, C., & Romanet-Perroux, J. L. (2022). Mediation and sanctions in Libya: Synergy or obstruction. *Global Governance, 28*(2), 228–250.

Portela, C., & Laer, T. V. (2022). The design and impact of individual sanctions: Evidence from elites in Côte d'Ivoire and Zimbabwe". *Politics and Governance, 10*(1), 26–35. https://doi.org/10.17645/pag.v10i1.4745

Reinisch, A. (2001). Developing human rights and humanitarian law accountability of the Security Council for the imposition of economic sanctions. *American Journal of International Law, 95*(4), 851–872. https://doi.org/10.2307/2674632

Regan, P. M., & Aydin, A. (2006). Diplomacy and other forms of intervention in civil wars. *Journal of Conflict Resolution, 50*(5), 736–756. https://doi.org/10.1177/0022002706291579

Runkle, D. E. (1987). Vector autoregression and reality. *Journal of Business and Economic Statistics, 5*(4), 437–442. https://doi.org/10.2307/1391992

Sims, C. A., & Zha, T. (1999). Error bands for impulse responses. *Econometrica: Journal of the Econometric Society, 67*(5), 1113–1156. https://doi.org/10.1111/1468-0262.00071

Stock, J. H., & Watson, M. W. (2001). Vector autoregressions. *Journal of Economic Perspectives, 15*(4), 101–115. https://doi.org/10.1257/jep.15.4.101

Strandow, D. (2006). *Sanctions and Civil War: Targeted Measures for Conflict Resolution.* Uppsala, Sweden: Department of Peace and Conflict Research, Uppsala University.

Suzuki, S. (2007). Major arms imports and the onset of civil and ethnic wars in the post-colonial world, 1956–1998: A preliminary reassessment. *The Social Science Journal, 44*(1), 99–111. https://doi.org/10.1016/j.soscij.2006.12.009

Tierney, D. (2005). Irrelevant or malevolent? UN arms embargoes in civil wars. *Review of International Studies, 31*(4), 645–664. https://doi.org/10.1017/S0260210505006674

Tijerina-Guajardo, J. A., & Pagán, J. A. (2003). Government spending, taxation, and oil revenues in Mexico. *Review of Development Economics, 7*(1), 152–164. https://doi.org/10.1111/1467-9361.00182

Tinbergen, J., & Fischer, D. (1987). *Warfare and Welfare: Integrating Security Policy into Socio-Economic Policy*. New York: St. Martin's Press.

Tostenson, A., & Bull, B. (2002). Are smart sanctions feasible? *World Politics, 54*(3), 373–403. https://doi.org/10.1353/wp.2002.0010

Wood, R. M. (2008). A hand upon the throat of the nation: Economic sanctions and state repression, 1976–2001. *International Studies Quarterly, 52*(3), 489–513. https://doi.org/10.1111/j.1468-2478.2008.00512.x

World Bank (2019) World Development Indicators. Washington D.C.