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The Persistence of Weapons: Global Evidence

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The Persistence of Weapons: Global Evidence

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Abstract

This study investigates persistence (or hysteresis) in weapons using a panel of 163 countries for the period 2010 to 2015. The following are some main findings. (i) Compared to countries that are landlocked, persistence in heavy weapons is more apparent in nations that are open to the sea. (ii) Relative to the Middle East & North Africa (MENA), heavy weapons is more persistent in the East Asia and the Pacific countries. This tendency is consistent with "weapons imports". (vi) Evidence of persistence is not very apparent in "weapons imports" with the exception of the fact that it is higher in low income countries, compared to their high income counterparts. Hence, there is less hysteresis in weapons exports when compared with heavy weapons when weapons exports. (v) The determinants of persistence employed in the conditioning information set are contingent on fundamental characteristics and panels. Policy implications are discussed.

JEL Classification: H56; L64; K42; P50
Keywords: War; Armaments; Global evidence; Persistence

1. Introduction

The paper is motivated by three main strands in academic and policy-making circles, namely: (i) the growing cost of wars in the world; (ii) the policy relevance of understanding determinants of and persistence in weapons and (iii) gaps in the literature. These points are expanded in chronological order.

First, according to the Global Peace Index (GPI) published in 2015, approximately thirteen percent of the global wealth or Gross Domestic Product (GDP) is spent on addressing issues that are related to wars and violent activities (Anderson, 2015; Asongu & Kodila-Tedika, 2017). The GPI report substantiates that in the year 2014, the underlying expenditure was equivalent to the annual wealth or GDP of the following countries: Brazil, Canada, France, Germany, Spain and the United Kingdom (UK). In the light of this stylized fact, arms from the global trade in weapons are substantially contributing to starting, fuelling and stopping wars that are socking a significant amount of world GDP. This wealth would otherwise have been spent on other socio-economic amenities and/or attainment of global policy initiatives like the sustainable development goals[1]. It is also relevant to note that arms acquisition spending (which are reflected in the weapons trade) does not equal to the cost of wars because if a country acquires weapons, it does not necessarily engage in war.

Second, in the light of the above, it is important to understand on the one hand, what drives the acquisition of weapons and on the other hand, factors behind the sustainability of trade in weapons. Understanding these factors underlying persistence is crucial because, by

[1] From intuition, improvements in human well-being are lost due to war and violence related expenditure. In the light of recent human well-being literature, human development consists of at least three main components, namely: income, education and health (Asongu & Odhiambo, 2019a, 2019b). War and violence deteriorate health and education infrastructure as well as reduce opportunities for citizens to effectively go to school and get treatment at the best hospitals from the best medical doctors. By extension, the realization of all the 17 sustainable development goals can be negatively affected by war and violence. These include: Goal 1 (i.e. "*End poverty in all its forms everywhere*"); Goal 2 (i.e. "*End hunger, achieve food security and improved nutrition, and promote sustainable agriculture*"); Goal 3 (i.e. "*Ensure healthy lives and promote well-being for all at all ages*"); Goal 4 (i.e. "*Ensure inclusive and equitable quality education and promote life-long learning opportunities for all*"); Goal 5 (i.e. "*Achieve gender equality and empower all women and girls*"); Goal 6 (i.e. "*Ensure availability and sustainable management of water and sanitation for all*"); Goal 7 (i.e. "*Ensure access to affordable, reliable, sustainable and modern energy for all*"); Goal 8 (i.e. "*Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all*"); Goal 9 (i.e. "*Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation*"); Goal 10 (i.e. "*Reduce inequality within and among countries*"); Goal 11 (i.e. "*Make cities and human settlements inclusive, safe, resilient and sustainable*"); Goal 12 (i.e. "*Ensure sustainable consumption and production patterns"); Goal 13(i.e. "Take urgent action to combat climate change and its impacts*"); Goal 14 (i.e. "*Conserve and sustainably use the oceans, seas and marine resources for sustainable development*"); Goal 15 (i.e. "*Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss*"); Goal 16 (i.e. "*Achieve peaceful and inclusive societies, rule of law, effective and capable institutions*") and Goal 17 (i.e. "*Strengthen Means of Implementation and revitalise the global partnership for sustainable development*").

preventing and/or mitigating them, more trade in weapons could be substituted for more trade in other activities that are more beneficial to humanity. Persistence in a phenomenon is a tendency whereby past observations in the phenomenon influence future observations of the phenomenon (Asongu, 2018). Moreover, within the framework of panel data analysis, persistence in weapons among countries is apparent when there are cross-country differences in determinants of weapons trade, such that countries with lower levels of weapons trade may be catching-up their counterparts with higher levels in weapons trade. Elements adopted in the conditioning information set (or control variables) also capture characteristics of a nation's domestic defence industry. The notion of persistence is contingent on cross-country differences in these domestic characteristics. It is also relevant to clarify that persistence influences path dependence and the outcome of a path-dependent process is contingent on the nature of persistence in the outcome variables. Accordingly, the nature of persistence can influence a path-dependent process to either converge to a unique equilibrium or one of many equilibria.

Third, the positioning of this study is even more relevant from a scholarly perspective because the contemporary and sparse literature on the subject has not engaged the problem statement. In order to make room for more policy outcomes, the analysis is tailored towards emphasising some fundamental features. Accordingly, the dataset is decomposed into fundamental characteristics based on legal origins, regional proximity, income levels, landlockedness and religious domination.

To put the above positioning in more perspective, the extant literature on the subject has primarily articulated three strands, notably: determinants of access to weapons; drivers of the weapons industry and nexuses between arms trade and other institutional and macroeconomic factors. In the first strand, studies have focused on *inter alia*: linkages between, sex, selection of weapons and ornaments (McCullough et al., 2016); defensive weapons and defence signals in plants (Maag et al., 2015); the relevance of technical corporations in making nuclear weapons (Brown & Kaplow, 2014); access to firearms by people with mental disorders (Pinals et al., 2015) and reducing access to weapons by persons with suicidal intensions (Barber & Miller, 2014).

With regards to the second strand, studies have been concerned with, among others: the relevance of assault weapon bans and weapon laws on murder rates (Gius, 2014); assessment of whether nuclear weapons are worth having (Suni, 2015); the nexus between nuclear strategy, nonproliferation and nuclear deployment (Fuhrmann & Sechser, 2014);

questioning the effect of nuclear weapons on conflicts (Bell & Miller, 2015) and security guarantees and nuclear proliferation (Bleek & Lorber, 2015).

In the third strand, linkages between arms trade and other institutional and macroeconomic factors are oriented towards, *inter alia*: dependence in arms transfer and conflict in foreign policy (Kinsella, 1998); the US rhetoric against arms trade in the enhancement of democracy and human rights in developing countries (Blanton, 2000); instruments of repression in the light of arms import and human rights in developing countries (Blanton, 1999); global arms trade and regional security complexes (Kinsella, 2001); analysis of the evolving structure of arms trade (Kinsella, 2003); connections between military balances, arms transfer and interstate relations (Sanjian, 2003); nexuses between US arms transfer, democracy and human rights (Blanton, 2005); comparative analysis on the effects of US versus Chinese arms transfers (De Soysa & Midford, 2012); insights into associations between international reputation, human rights and arms exports (Erickson, 2015); geostrategic aims of arms trade and strategic choices between buying versus making weapons (Blank & Levitzky, 2015; Bağcı & Kurç, 2016); chemical weapons use, domestic repressions and growing tendencies in nuclear weapons delivery systems (Brathwaite, 2016; Wasson & Bluesteen, 2018).

The studies in the literature closest to this research are Asongu (2018) and Asongu and Acha-Anyi (2019). The former has investigated persistence in global incarcerations while the latter have examined the comparative economics on global murder rates. This research extends this strand of studies by focusing on global weapons.

The rest of the paper is organized as follows. The theoretical underpinnings are discussed in Section 2 while Section 3 presents the data and methodology while the empirical results and corresponding discussion are covered in Section 4. We conclude in Section 5 with future research directions.

2. Theoretical underpinnings

The theoretical foundation supporting the assessment of determinants of and persistence of weapons is consistent with recent literature on financial progress (Stephan & Tsapin, 2008; Goddard et al., 2011) and persistence in homicide and incarcerations (Asongu & Acha-Anyi, 2019; Asongu, 2018). Moreover, the theoretical foundations are in line with mainstream literature on income level convergence which has been documented within the premise of neoclassical growth models (see Barro, 1991; Barro & Sala-i-Martin, 1992, 1995; Mankiw et al., 1992; Baumol, 1986). The underlying theoretical framework has been recently

extended to other areas of development economics, notably: inclusive development (Mayer-Foulkes, 2010; Asongu, 2014) and progress in financial markets (Narayan et al., 2011; Bruno et al., 2012; Asongu, 2013). As argued by Narayan et al. (2011), it is unlikely to establish persistence and convergence within a heterogeneous set of countries because idiosyncratic tendencies may be many and loom substantially. Hence, the dataset is categorized into homogenous fundamental characteristics that have been established in contemporary global comparative literature on persistence in phenomena that are closely associated with weapons (Asongu, 2018; Asongu & Acha-Anyi, 2019).

It is relevant to note that, new economic growth theories were developed in the post-Keynesian époque. In essence, theoretical papers gained prominence fundamentally because of the sharp progress of the neoclassical revolution which resulted in substantial changes in income level differences across countries. Within the theoretical framework, market equilibrium concepts were expanded to articulate the relevance of economic growth theories which forecasted absolute reductions in cross-country income level differences. In accordance with Mayer-Foulkes (2010), success in such convergence trends was partly the result of favorable "free market competition". Two main strands are dominant in the literature. On the one hand, a strand of the literature has established the presence of divergence or absence of convergence. This contending strand justified the absence of convergence with arguments such as: differences in initial conditions or multiple endowments and the presence of multiple equilibria (Barro, 1991; Pritchett, 1997). On the other hand, there is another stand in the theoretical literature which maintains that irrespective of initial endowments, cross-country changes in income levels can be apparent within the remit of long-run equilibria or countries' common steady state (Asongu & Nwachukwu, 2017a).

This study is not positioned on any of the highlighted contending strands. In essence, the paper leverage's on the common denominator used by the two contending strands to either establish or reject the hypothesis of convergence. According to the corresponding criterion, for convergence to be apparent, the absolute value of the estimated lagged endogenous variable should be between the interval of zero and one. Convergence in the context of the study is a process whereby, countries with low levels in a given phenomenon or macroeconomic outcome are catching-up their counterparts with higher levels in the same phenomenon or macroeconomic outcome (Asongu, 2013; Narayan et al., 2011). In other words, in the presence of convergence in weapons, countries with small stocks of weapons are catching-up their counterparts with large stocks of weapons. It follows that the hypothesis of convergence in weapons is apparent when cross-country differences in weapons are

decreasing across time and this decreasing tendency is apparent when the discussed convergence criterion is met, notably: the absolute value of the estimated lagged variable corresponding to weapons should be between the interval of zero and one. In what follows, we discuss why convergence should be expected across income levels, religious dominations, openness to the sea, regions, and legal origins.

As supported by recent literature, convergence is unlikely to occur in a heterogeneous set of countries which is the primary motivation for decomposing the data into homogenous settings prior to assessing evidence of convergence (Asongu, 2013; Narayan et al., 2011). Hence, the choice of underlying homogeneous characteristics (i.e. income levels, religious dominations, openness to the sea, regions, and legal origins) is motivated by contemporary comparative development literature on their relevance in explaining cross-country differences in economic development (Narayen et al., 2011; Beegle et al., 2016; Mlachila et al., 2017; Asongu, 2018). Hence, while the expectations that convergence can occur within the homogenous sets of characteristics is consistent with the attendant comparative development literature, whether such convergence can be apparent within the framework of weapons is a matter of empirical scrutiny.

3. Data and Methodology

3.1 Data

The study assesses a panel of 163 countries with data for the period 2010 to 2015 from a plethora of sources, namely: the Institute for Economics and Peace (IEP); the Uppsala Conflict Data Program (UCDP) Battle-Related Deaths Dataset; a Qualitative assessment by the Economic Intelligence Unit (EIU) analysts' estimates; the United Nations Committee on Contributions; the United Nations Office on Drugs and Crime (UNODC) Surveys on Crime Trends and the Operations of Criminal Justice Systems (CTS). The temporal and geographical scopes are contingent on data availability constraints at the time of the study (Asongu, 2018; Asongu & Acha-Anyi, 2019).

Three main outcome variables are used in the study: (i) nuclear and heavy weapons; (ii) weapons imports and (iii) weapons exports. Variables in the conditioning information set include: security officers & police; political instability; military expenditure; death from internal conflicts and United Nations Peace Keeping Force (UNPKF). These indicators have been documented to determine access to weapons and weapons proliferation (see Brown & Kaplow, 2014; McCullough et al., 2016; Maag et al., 2015; Barber & Miller, 2014; Brown & Kaplow, 2014).

Following the motivation of this study, the dataset is decomposed into fundamental characteristics based on: (i) regions (Latin America; North America; South Asia; Europe & Central Asia; East Asia & the Pacific; Middle East & North Africa (MENA); sub-Saharan Africa (SSA)); (ii) openness to sea (Landlocked and Coastal); (iii) religious domination (Christian countries with Catholic domination; Christian countries with Protestant inclination; Christian countries in which another Christian religion apart from Catholicism and Protestantism is dominant; Islam-dominated countries and Buddhist-oriented countries); and (iv) legal origins (English Common law, French Civil law, German Civil law, Scandinavian Civil law and Socialists countries). It is also important to note that these fundamental characteristics have been employed in recent comparative development literature (D'Amico, 2010; Narayan et al., 2011; Beegle et al., 2016; Asongu & Le Roux, 2017; Mlachila *et al*., 2017; Asongu & Nwachukwu, 2017b; Asongu, 2018; Asongu & Acha-Anyi, 2019). The information criteria with which the fundamental characteristics are selected are discussed in what follows.

The underpinning of legal origins are from La Porta et al. (2008, p.289) whereas income levels are classified in relation to the stratification of income groups by the World Bank[2]. Categorisation by religious-domination is from the World Fact Book (CIA, 2011) of the Central Intelligence Agency (CIA). Countries that are landlocked vis-à-vis those that are open to the sea are directly apparent from a world map. Details on the definitions of variables and corresponding sources as well as sampled countries can be found in Appendix 1. Appendix 2 provides the summary statistics. The correlation matrix is presented in Appendix 3.

3.2 Methodology

We adopt the Generalised Method of Moments (GMM) as empirical strategy in this study. This estimation approach is consistent with the recent economic development literature on the persistence of macroeconomic outcomes (see Doyle, 2017; Asongu, 2018; Asongu & Acha-Anyi, 2019). The following four fundamental features motivate the choice of the estimation approach. (i) The N(163)>T(6) condition is met because the number of countries are higher than the number of periods in each country. (ii) The technique does not eliminate cross-country differences because it is based on a panel data structure. (iii) Endogeneity is taken into account because simultaneity is taken into consideration via the process of

[2] There are four main World Bank income groups: (i) high income, $12,276 or more; (ii) upper middle income, $3,976-$12,275; (iii) lower middle income, $1,006-$3,975 and (iv) low income, $1,005 or less.

instrumentation. Moreover, there is also some bit on the unobserved heterogeneity because there is control for time invariant omitted variables. (v) The *system estimator* corrects inherent small biases that are specific to the *difference* estimator.

In this study, we use the Roodman (2009a, 2009b) empirical strategy. This estimation approach which is an extension of Arellano and Bover (1995) is adopted because when compared with traditional empirical approaches (*systems* and *difference* GMM techniques), it decreases over-identification (or the proliferation of instruments) and accounts for cross-sectional dependence (Love & Zicchino, 2006; Baltagi, 2008; Boateng *et al*., 2018; Asongu & Nwachukwu, 2016a; Tchamyou, 2019a, 2019b).

The following equations in level (1) and first difference (2) summarise the standard *system* GMM estimation procedure.

$$W_{i,t} = \sigma_0 + \sigma_1 W_{i,t-\tau} + \sum_{h=1}^{5} \delta_h X_{h,i,t-\tau} + \eta_i + \xi_t + \varepsilon_{i,t} \quad (1)$$

$$W_{i,t} - W_{i,t-\tau} = \sigma_1 (W_{i,t-\tau} - W_{i,t-2\tau}) + \sum_{h=1}^{5} \delta_h (X_{h,i,t-\tau} - X_{h,i,t-2\tau}) + (\xi_t - \xi_{t-\tau}) + (\varepsilon_{i,t} - \varepsilon_{i,t-\tau}) \quad , \quad (2)$$

where, $W_{i,t}$ is an indicator of weapons (nuclear & heavy weapons; weapons imports and weapons exports) in country i at period t, σ_0 is a constant, X is the vector of control variables (security officers & police; death from internal conflicts; military expenditure; political instability and the United Nations Peace Keeping Force), τ represents the coefficient of auto-regression which is one for the specification, ξ_t is the time-specific constant, η_i is the country-specific effect and $\varepsilon_{i,t}$ the error term.

We devote some space to substantiating the narrative on, simultaneity, identification and exclusion restrictions which is essential for a good GMM specification. With regard to the issue of simultaneity, regressors that are lagged are used as instruments for variables that are forward-differenced. In essence, for fixed effects to be purged from affecting the nexuses being assessed, Helmet transformations are used on the regressions in the light of attendant GMM-centric literature (Arellano & Bover, 1995; Love & Zicchino, 2006). The underlying transformation consists of forward mean-variations of indicators as opposed to subtracting the previous observations from the contemporary observations (Roodman, 2009; Asongu & De Moor, 2017). Such a transformation enables parallel conditions between lagged and forward-differenced variables. Moreover, regardless of lag numbers, to reduce the loss of data, these transformations are engaged for all observations, except for the last in each country: "And

because lagged observations do not enter the formula, they are valid as instruments" (Roodman, 2009b, p. 104)

Concerning the exclusion restrictions, we treat all explanatory variables as predetermined or suspected endogenous and only time invariant omitted variables are acknowledged as strictly exogenous (Boateng et al., 2017; Asongu & Nwachukwu, 2016b; Tchamyou *et al*., 2019). Note should be taken of the fact that the definition and selection of time invariant variables is in accordance with Roodman (2009b) who has argued that it is not feasible for time invariant indicators to become endogenous after first difference[3].

With respect to exclusion restrictions, in accordance with the identification process, the time invariant variables affect weapons exclusively via the predetermined or suspected endogenous variables. Moreover, the suggested exclusion restriction hypothesis is valid if and only if the null hypothesis related to exclusion restriction is not rejected. This null hypothesis pertains to the Difference in Hansen Test (DHT) for the exogeneity of instruments. In other words, the strictly exogenous variables or main instruments should elucidate weapons exclusively via the engaged suspected endogenous variables or selected mechanisms.

In the light of the above, in the result that are reported in Section 4, the hypothesis of exclusion restriction is valid if the DHT that is connected to instrumental variables (IV) (year, eq(diff)) is not rejected. It is important to note that the engaged process for validating exclusion restrictions is similar to the standard IV procedure in which, failure to reject the null hypothesis corresponding to the Sargan Overidentifying Restrictions (OIR) test implies that the strictly exogenous variables influence weapons exclusively through the suspected endogenous variable channels (see Beck et al., 2003; Asongu & Nwachukwu, 2016c).

4. Empirical results

The empirical results are presented in Tables 1-6. Tables 1-2, Tables 3-4, Tables 5-6, respectively show results for "nuclear and heavy weapons", "weapons imports" and "weapons exports". The first set of tables for each dependent variable category discloses findings corresponding to income levels, religious domination and landlockedness while second set of tables discloses findings pertaining to regions and legal origins. The last column of all tables shows results of the full sample. Four main information criteria are used to examine the

[3] Hence, the procedure for treating *ivstyle* (years) is 'iv (years, eq(diff))' whereas the *gmmstyle* is employed for predetermined variables.

validity of the GMM models[4]. Based on these criteria, most of the models are valid. It is important to also clarify that, while the validity of models is a necessary and sufficient conditions for assessing significant determinants, it is not a sufficient condition for establishing persistence in a dependent variable. In the narrative that follows, we discuss the criteria for establishing persistence.

Consistent with recent literature, in order to establish the presence of convergence, the lagged outcome variable should meet two conditions; namely: be statistically significant and fall within the interval of zero and one. For lack of space, we invite the interested reader to have more insights into the underlying criteria in recent catch-up literature (see Fung, 2009, p. 58; Asongu, 2018; Asongu & Acha-anyi, 2019). Note should be taken of the fact that, in standard GMM reporting, the estimated coefficient corresponding to the outcome variable can be reported. Subsequently, one is subtracted from the coefficient to obtain beta (β= a-1), and the information criterion for convergence is that beta should be less than zero. Furthermore, the estimated lagged value of the outcome variable can still be directly reported. Within the perspective of this alternative framework, the convergence criterion is that, the absolute value of the estimated lagged variable falls within the interval of zero and one (see Prochniak & Witkowski, 2012a, p. 20; Prochniak & Witkowski, 2012b, p. 23; Asongu, 2013, p. 192; Asongu & Nwachukwu, 2016d, p. 459).

Given the above clarifications, the following is adopted as information criterion for establishing persistence when two sub-samples are compared: the sub-sample reflecting a higher estimated lagged value in the outcome variable is acknowledged to reflect more persistence. This is essentially because the relevance of the magnitude of the estimated lagged outcome variable. In essence, within such a comparative scope, such a magnitude is important in the perspective that, it translates how past values of weapons influence future values of weapons.

"Insert Tables 1-6 here"

The following findings can be established from Tables 1-4. (i) Comparative persistence cannot be established in relation to income levels, legal origins and some regions because the information criteria for convergence are not met, notably: the absolute values of

[4] "*First, the null hypothesis of the second-order Arellano and Bond autocorrelation test (AR(2)) in difference for the absence of autocorrelation in the residuals should not be rejected. Second the Sargan and Hansen overidentification restrictions (OIR) tests should not be significant because their null hypotheses are the positions that instruments are valid or not correlated with the error terms. In essence, while the Sargan OIR test is not robust but not weakened by instruments, the Hansen OIR is robust but weakened by instruments. In order to restrict identification or limit the proliferation of instruments, we have ensured that instruments are lower than the number of cross-sections in most specifications. Third, the Difference in Hansen Test (DHT) for exogeneity of instruments isalso employed to assess the validity of results from the Hansen OIR test. Fourth, a Fischer test for the joint validity of estimated coefficients is also provided*" (Asongu & De Moor, 2017, p.200).

estimated lagged outcome variables are not within the interval of zero and one. (ii) With respect to Christian-orientation, two of the sub-samples do not reflect estimated lagged outcome variables that meet the information criteria for persistence. Of the three other variables that meet the underlying criteria, the following order of increasing persistence in "nuclear and heavy weapons" is apparent: Buddhist-oriented countries; Christian-oriented countries with a Christian religion that is other than Christianity and Protestantism and; Catholic-dominated Christian countries. (iii) Compared to countries that are landlocked, persistence in heavy weapons is more apparent in nations that are open to the sea. (iv) The full sample does not reflect evidence of persistence. This partly justifies the imperative of decomposing the dataset into sub-panels. Accordingly, the absence of convergence in the full sample should not be construed as the absence of catch-up within some fundamental features in the full sample. (v) Compared to the MENA countries, the underlying weapons are more persistent in the East Asia and the Pacific countries. This tendency is consistent with "weapons imports". (vi) Evidence of persistence is not very apparent in "weapons imports" (i.e. Tables 3-4) with the exception of the fact that it is apparent in low income countries, compared to their high income counterparts.

The findings of Tables 5-6 are somewhat different from those in Table 1-4 because the persistence in "weapons exports" is consistently marginally low. It follows that the hysteresis hypothesis is more relevant for "nuclear and heavy weapons" and "weapons imports", compared to "weapons exports". From Table 1 to Table 6, the determinants of persistence employed in the conditioning information vary in terms of sign and significance across fundamental characteristics and panels.

5. Concluding implications and future research directions

This study has investigated persistence global of weapons using a panel of 163 countries for the period 2010 to 2015. The empirical evidence is based on Generalised Method of Moments and three outcome variables (heavy weapons; weapons imports and weapons exports). (i) The following order of increasing persistence in "heavy weapons" is apparent: Buddhist-oriented countries; Christian-oriented countries with a Christian religion that is other than Christianity and Protestantism and; Catholic-dominated Christian countries. (ii) Compared to countries that are landlocked, persistence in heavy weapons is more apparent in nations that are open to the sea. (iii) Compared to the Middle East & North Africa (MENA), the underlying weapons are more persistent in the East Asia and the Pacific countries. This tendency is consistent with "weapons imports". (vi) Evidence of persistence is not very apparent in "weapons imports"

with the exception of the fact that it is higher in low income countries, compared to their high income counterparts. (v) The determinants of persistence employed in the conditioning information set are contingent on fundamental characteristics and panels. In what follows we clarify some established linkages and discuss implications for policy.

The fact that persistence in "weapons imports" is more apparent in low income countries compared their higher income counterparts is logical because, weapons are largely produced by more advanced (or developed) countries. The absence of convergence in some sub-samples may be traceable to the fact that these sub-samples may not substantially reflect cross-country differences in variables (employed in the conditioning information set), needed to affect the outcome variables. This is a fundamental caveat in conditional convergence modeling. Accordingly, the evidence of persistence is contingent on variables we choose and model. Hence in some instances, these variables may behave differently in some sub-samples compared to other sub-samples.

We have also established that compared to "heavy and nuclear weapons" and "weapons imports", there is comparatively less persistence in "weapon exports". This implies that policies designed to influence trade in weapons should focus less on the "weapons exports". This is essentially because of the corresponding less apparent hysteresis: past values of weapon exports influencing future values of weapon exports. *Ceteris paribus*, trade can be more influenced by trade dynamics that are more persistent over time compared to trade dynamics that are less persistent over time because historic data is comparatively more likely to be used to effectively predict trade dynamics that are more persistent. It is important to note that, there is an underpinning of stochasticity and processes that are more stochastic are more likely to be correctly influenced and predicted based on historic observations or data, compared to processes that are less stochastic. The inference and by extension, a recommendation pertaining to weapons exports, does not imply that policy makers should not be concerned with arms imports.

We have also observed that the determinants of persistence employed in the conditioning information vary in terms of sign and significance across fundamental characteristics and panels. This implies that blanket policies on drivers in the trade of weapons are unlikely to succeed unless they are contingent on initial levels of the outcome variables (nuclear and heavy weapons; weapons imports and weapons exports) and tailored differently across countries with high, intermediate and low initial levels in the outcomes variables.

Future studies can improve the extant literature by assessing if the established findings withstand empirical scrutiny within country-specific settings. Such idiosyncratic lines of inquiries are essential for more targeted policy implications. Accordingly, for the sampled periodicity, China and Russia are having rising military ambitions and armaments. Moreover, the rise of the Islamic State of Iraq and the Levant is also relevant in this periodicity and by extension, other factors which may help determine weapons inventories/access that are taken on board include, for example whether a country is in an alliance, is part of an enduring interstate rivalry, or is industrially advanced. However, all these factors which should be considered in future research could not be taken on board because of data availability constraints and specificities of the adopted empirical strategy. Accordingly, while time specific effects are considered in the analysis, country-specific effects are not taken on board in the panel data analysis because the adopted GMM approach is theoretically and practically designed to control for endogeneity pertaining to the correlation between the lagged outcome variable and country-specific effects, by eliminating country-specific effects.

Another caveat that should be considered in future studies pertains to the fact that nuclear weapons and heavy weapons fall under the same category. Accordingly, the incentives for having nuclear weapons, the conditions for accessing them, the possibilities for having them, security policy reverberations, *inter alia*, are very much different to acquiring conventional arms and arms systems. Hence, it would be reasonable to separate 'nuclear weapons' and 'heavy weapons'. Moreover, there is officially no market for nuclear weapons. However, it is also relevant to clarify that it is the categorisation used by the official data sources from which the dataset was obtained. These sources are provided in Appendix 1. Hence, we did not add "Nuclear weapons" and "Heavy weapons" to form the variable "Nuclear and Heavy weapons". We simply adopted the official categorisation in the light of our data sources.

Table 1: Persistence in Nuclear and Heavy Weapons with income levels, religious domination and landlockedness

	Dependent Variable: Nuclear and Heavy Weapons											
	Income Levels				Religious Domination					Openness to sea		Full
	HI	UMI	LMI	LI	CC	CP	CO	Islam	Bhu	LL	NLL	Sample
Constant	**-0.188*** **	**0.183*** **	**-0.021** **	-0.004	0.007	0.002	-0.169	0.041	0.008	**0.207** ** *	0.092	0.030
	(0.005)	**(0.008)**	**(0.016)**	(0.170)	(0.765)	(0.759)	(0.710)	(0.427)	(0.961)	**(0.000)**	(0.293)	(0.472)
Nuclear weapons (-1)	**1.000*** **	**1.048*** **	**1.007*** **	**1.001*** **	**0.985*** **	**1.003*** **	**0.978*** **	**1.064*** **	**0.967*** **	**0.794** ** *	**0.982** ** *	**1.011*** **
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Security Officers & Police	-0.005	-0.007	**0.004***	0.0008	0.002	-0.0001	0.044	0.009	-0.010	**0.014** ** *	-0.002	0.004
	(0.229)	(0.679)	**(0.082)**	(0.183)	(0.644)	(0.867)	(0.625)	(0.892)	(0.822)	**(0.000)**	(0.841)	(0.515)
Death from internal conflicts	**0.184****	-0.007	**-0.015*** **		0.0009	**0.002*** **	0.005	**-0.012*** **	-0.027	**0.006** ** *	0.0008	-0.004
	(0.011)	(0.368)	**(0.000)**	**0.001****	(0.394)	**(0.000)**	(0.907)	**(0.005)**	(0.209)	**(0.000)**	(0.912)	(0.346)
Military Expenditure	-0.001	**-0.127*** **	**0.007****	**(0.011)**	-0.007	**-0.004****	0.077	**-0.058*** **	0.051	0.001	**-0.037****	**-0.026****
	(0.738)	**(0.000)**	**(0.018)**	-0.0003	(0.116)	**(0.049)**	(0.406)	**(0.000)**	(0.294)	(0.289)	**(0.032)**	**(0.015)**
Political Instability	**0.011*** **	0.0004	-0.001	(0.670)	**0.006***	0.0001	-0.039	0.010	-0.008	**-0.012** ** *	-0.003	-0.007
	(0.001)	(0.975)	(0.706)		**(0.097)**	(0.724)	(0.570)	(0.281)	(0.910)	**(0.001)**	(0.760)	(0.366)
UNPKF	0.004	-0.009	**0.004***	**0.001*** **	-0.0001	-0.0008	0.003	-0.006	0.006	-0.0001	0.004	0.003
	(0.189)	(0.348)	**(0.068)**	**(0.008)**	(0.902)	(0.120)	(0.906)	(0.361)	(0.565)	(0.928)	(0.364)	(0.159)
AR(1)	**(0.111)**	**(0.220)**	(0.065)	(0.059)	**(0.189)**	**(0.251)**	**(0.246)**	**(0.170)**	**(0.127)**	(0.009)	(0.058)	(0.089)
AR(2)	**(0.375)**	**(0.211)**	**(0.621)**	**(0.388)**	**(0.358)**	**(0.404)**	**(0.356)**	**(0.319)**	**(0.825)**	**(0.244)**	**(0.218)**	**(0.203)**
Sargan OIR	**(0.871)**	(0.000)	(0.045)	**(0.365)**	**(1.000)**	**(0.960)**	**(0.137)**	(0.000)	**(0.216)**	(0.000)	(0.000)	(0.000)
Hansen OIR	**(0.658)**	**(0.705)**	**(0.481)**	**(0.391)**	**(0.810)**	**(0.739)**	**(0.997)**	**(0.700)**	**(0.999)**	**(0.598)**	**(0.889)**	**(0.369)**
DHT for instruments												
(a)Instruments in levels												
H excluding group	**(0.844)**	**(0.785)**	**(0.415)**	**(0.688)**	**(0.863)**	**(0.772)**	**(0.963)**	**(0.345)**	**(0.999)**	**(0.696)**	**(0.634)**	**(0.471)**
Dif(null, H=exogenous)	**(0.430)**	**(0.521)**	**(0.478)**	**(0.242)**	**(0.614)**	**(0.571)**	**(0.980)**	**(0.799)**	**(0.978)**	**(0.445)**	**(0.865)**	**(0.314)**
(b) IV (years, eq (diff))	**(0.777)**	**(0.789)**	**(0.644)**	**(0.399)**	**(0.883)**	**(0.600)**	**(0.991)**	**(0.590)**	**(0.993)**	**(0.386)**	**(0.917)**	**(0.655)**
H excluding group												
Dif(null, H=exogenous)	**(0.278)**	**(0.331)**	**(0.205)**	**(0.364)**	**(0.355)**	**(0.756)**	**(0.893)**	**(0.675)**	**(0.965)**	**(0.871)**	**(0.468)**	**(0.103)**
Fisher	**55289*** **	**8718*** **	**7260*** **	**48267** ** *	**22857** ** *	**1.20e+06*** **	**1251*** **	**1345*** **	**1078*** **	**1475*** **	**81.34** ** *	**394.19** ** *
Instruments	27	27	27	27	27	27	27	27	27	27	27	27
Countries	43	36	46	38	54	26	14	49	13	34	159	163
Observations	215	180	230	190	270	130	70	245	65	170	645	815

***,**,*: significance levels at 1%, 5% and 10% respectively. DHT: Difference in Hansen Test for Exogeneity of Instruments Subsets. Dif: Difference. OIR: Over-identifying Restrictions Test. The significance of bold values is twofold. 1) The significance of estimated coefficients and the Wald statistics. 2) The failure to reject the null hypotheses of: a) no autocorrelation in the AR(1) & AR(2) tests and; b) the validity of the instruments in the Sargan and Hansen OIR tests. HI: High Income countries. UMI: Upper Middle Income countries. LMI: Little Middle Income countries. LI: Low Income countries. CC: Christian countries with Catholic domination. CP: Christian countries with Protestant domination. CO: Christian countries in which another Christian religion apart from Catholicism and Protestantism is dominant. Islam: Islam-dominated countries. Bhu: Bhuddism dominated countries. LL: Landlocked countries. NLL: Not Landlocked countries. UNPKF: United Nations Peace Keeping Force.

Table 2: Persistence in Nuclear and Heavy Weapons with regions and legal origin dynamics

	Dependent Variable: Nuclear and Heavy Weapons											
	Regions						Legal origins					Full
	SA	ECA	EAP	MENA	SSA	LA	NA	Eng.	Frch.	Ger.	Scand.	Social.	Sample
Constant	na	**-0.089***	0.148	**0.593****	-0.009	-0.017	na	0.040	-0.006	-0.011	na	na	0.030
		(0.052)	(0.134)	**(0.013)**	(0.120)	(0.316)		(0.485)	(0.649)	(0.881)			(0.472)
Nuclear weapons (-1)		**1.011*****	**0.971*****	**0.892*****	**1.004*****	**1.007*****		**1.018*****	**1.002*****	**0.991*****			**1.011*****
		(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**		**(0.000)**	**(0.000)**	**(0.000)**			**(0.000)**
Security Officers & Police		-0.004	-0.022	-0.022	0.001	**0.012*****		**0.018***	0.003	0.019			0.004
		(0.772)	(0.308)	(0.487)	(0.231)	**(0.002)**		**(0.059)**	(0.431)	(0.519)			(0.515)
Death from internal conflicts		**-0.013****	**-0.085***	**0.038***	0.0004	-0.002		0.002	-0.006	-0.014			-0.004
		(0.020)	**(0.085)**	**(0.084)**	(0.201)	(0.326)		(0.732)	(0.130)	(0.810)			(0.346)
Military Expenditure		**0.044****	**0.028***	**-0.070***	-0.001	**-0.023*****		**-0.068*****	-0.0008	0.040			**-0.026****
		(0.023)	**(0.073)**	**(0.069)**	(0.168)	**(0.007)**		**(0.000)**	(0.835)	(0.415)			**(0.015)**
Political Instability		-0.006	-0.003	-0.011	0.0009	**0.008*****		0.002	-0.002	-0.036			-0.007
		(0.443)	(0.804)	(0.679)	(0.237)	**(0.001)**		(0.677)	(0.695)	(0.258)			(0.366)
UNPKF		0.007	**0.014*****	-0.040	-0.0004	0.0002		-0.0003	0.001	-0.011			0.003
		(0.223)	**(0.005)**	(0.296)	(0.393)	(0.790)		(0.920)	(0.422)	(0.248)			(0.159)
AR(1)		(0.042)	(0.034)	**(0.161)**	(0.052)	(0.038)		**(0.285)**	(0.020)	**(0.198)**			(0.089)
AR(2)		**(0.254)**	**(0.874)**	**(0.506)**	**(0.802)**	**(0.624)**		**(0.296)**	**(0.448)**	**(0.208)**			**(0.203)**
Sargan OIR		**(0.618)**	**(0.162)**	**(0.001)**	**(0.479)**	**(0.299)**		(0.000)	**(0.151)**	**(0.779)**			(0.000)
Hansen OIR		**(0.748)**	**(1.000)**	**(0.999)**	**(0.591)**	**(0.972)**		**(0.898)**	**(0.266)**	**(0.979)**			**(0.369)**
DHT for instruments (a)Instruments in levels													
H excluding group		**(0.948)**	**(0.109)**	**(0.443)**	**(0.774)**	**(0.459)**		**(0.884)**	**(0.109)**	**(0.913)**			**(0.471)**
Dif(null, H=exogenous)		**(0.463)**	**(1.000)**	**(1.000)**	**(0.396)**	**(0.996)**		**(0.747)**	**(0.524)**	**(0.922)**			**(0.314)**
(b) IV (years, eq (diff)) H excluding group		**(0.538)**	**(0.529)**	**(0.853)**	**(0.654)**	**(0.920)**		**(0.846)**	**(0.672)**	**(0.928)**			**(0.655)**
Dif(null, H=exogenous)		**(0.903)**	**(1.000)**	**(1.000)**	**(0.338)**	**(0.889)**		**(0.701)**	(0.046)	**(0.922)**			**(0.103)**
Fisher		**3824*****	**8000*****	**1003*****	**40608*****	**51896*****		**344.29*****	**4750*****	**7005*****			**394.19*****
Instruments		27	27	27	27	27		27	27	27			**27**
Countries		48	18	20	44	23		50	87	20			163
Observations		240	90	100	220	115		250	435	100			815

***,**,*: significance levels at 1%, 5% and 10% respectively. DHT: Difference in Hansen Test for Exogeneity of Instruments Subsets. Dif: Difference. OIR: Over-identifying Restrictions Test. The significance of bold values is twofold. 1) The significance of estimated coefficients and the Wald statistics. 2) The failure to reject the null hypotheses of: a) no autocorrelation in the AR(1) & AR(2) tests and; b) the validity of the instruments in the Sargan and Hansen OIR tests. ECA: Europe & Central Asia. EAP: East Asia & the Pacific. MENA: Middle East & North Africa. SSA: sub-Saharan Africa. LA: Latin America. NA: North America. Eng: English Common Law countries. Frch: French Civil Law countries. Ger: German Civil law countries. Scand: Scandinavian Civil law countries. Social: Socialists countries. UNPKF: United Nations Peace Keeping Force.

Table 3: Persistence in Weapons Imports with income levels, religious domination and landlockedness

	Dependent Variable: Weapons Imports											
	Income Levels				Religious Domination					Openness to sea		Full
	HI	UMI	LMI	LI	CC	CP	CO	Islam	Bhu	LL	NLL	Sample
Constant	-0.457	**-0.533*** **	-0.057	0.017	0.077	0.033	**-2.084***	0.031	-0.377	0.010	-0.004	-0.032
	(0.515)	**(0.000)**	(0.372)	(0.585)	(0.461)	(0.785)	**(0.066)**	(0.753)	(0.550)	(0.749)	(0.955)	(0.677)
Weapon imports (-1)	**0.945*** **	**1.332*** **	**1.005*** **	**0.981*** **	**1.066*** **	**1.034*** **	**1.101*** **	**1.016*** **	**1.089*** **	**0.945*** **	**1.029*** **	**1.071*** **
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Security Officers & Police	-0.025	-0.047	**0.019*** *	**-0.016***	-0.051	-0.001	**0.432***	0.026	-0.127	-0.016	-0.015	-0.032
	(0.687)	(0.229)	**(0.049)**	**(0.066)**	(0.137)	(0.939)	**(0.056)**	(0.415)	(0.510)	(0.187)	(0.667)	(0.375)
Death from internal conflicts	0.271	0.018	0.010	**0.013*** **	-0.006	0.002	-0.472	-0.002	-0.043	0.003	**0.023*** *	0.014
	(0.671)	(0.129)	(0.174)	**(0.007)**	(0.440)	(0.695)	(0.101)	(0.872)	(0.365)	(0.288)	**(0.012)**	(0.143)
Military Expenditure	-0.091	**0.089*** **	0.023	**0.057*** **	-0.0005	-0.019	**0.738*** *	0.035	0.139	**0.018*** **	0.016	0.024
	(0.169)	**(0.007)**	(0.168)	**(0.000)**	(0.984)	(0.636)	**(0.049)**	(0.146)	(0.477)	**(0.002)**	(0.677)	(0.487)
Political Instability	**0.186*** **	-0.010	-0.020	**-0.015*** *	-0.010	0.004	-0.134	-0.047	0.072	**0.017*** *	-0.034	-0.029
	(0.003)	(0.630)	(0.255)	**(0.026)**	(0.765)	(0.531)	(0.567)	(0.154)	(0.661)	**(0.000)**	(0.242)	(0.225)
UNPKF	**0.181*** **	**0.044*** *	0.004	**-0.007***	-0.0002	-0.002	**0.120***	0.013	0.034	0.0003	0.014	0.012
	(0.000)	**(0.023)**	(0.534)	**(0.054)**	(0.981)	(0.803)	**(0.069)**	(0.526)	(0.489)	(0.937)	(0.298)	(0.330)
AR(1)	(0.024)	(0.048)	(0.015)	**(0.284)**	(0.080)	(0.150)	**(0.247)**	**(0.283)**	**(0.938)**	(0.068)	(0.011)	(0.007)
AR(2)	**(0.712)**	**(0.448)**	**(0.238)**	**(0.962)**	**(0.560)**	**(0.339)**	**(0.906)**	**(0.926)**	**(0.452)**	**(0.216)**	**(0.568)**	**(0.573)**
Sargan OIR	**(0.257)**	(0.032)	(0.099)	**(0.215)**	(0.049)	**(0.999)**	(0.016)	**(0.174)**	**(0.352)**	**(0.712)**	(0.071)	**(0.171)**
Hansen OIR	**(0.826)**	**(0.180)**	**(0.582)**	**(0.863)**	**(0.370)**	**(0.842)**	**(1.000)**	**(0.723)**	**(1.000)**	**(0.377)**	**(0.268)**	**(0.473)**
DHT for instruments												
(a)Instruments in levels												
H excluding group	**(0.285)**	**(0.234)**	**(0.739)**	**(0.605)**	**(0.076)**	**(0.301)**	**(0.515)**	**(0.337)**	**(0.942)**	**(0.055)**	**(0.409)**	**(0.608)**
Dif(null, H=exogenous)	**(0.959)**	**(0.226)**	**(0.405)**	**(0.842)**	**(0.778)**	**(0.957)**	**(1.000)**	**(0.830)**	**(1.000)**	**(0.850)**	**(0.236)**	**(0.355)**
(b) IV (years, eq (diff))	**(0.883)**	**(0.183)**	**(0.406)**	**(0.771)**	**(0.338)**	**(0.930)**	**(0.999)**	**(0.550)**	**(1.000)**	**(0.792)**	**(0.240)**	**(0.286)**
H excluding group												
Dif(null, H=exogenous)	**(0.411)**	**(0.312)**	**(0.788)**	**(0.755)**	**(0.433)**	**(0.315)**	**(1.000)**	**(0.818)**	**(1.000)**	**(0.056)**	**(0.409)**	**(0.831)**
Fisher	**524.85*** **	**371.25*** *	**360.33*** *	**1811*** **	**3102*** **	**7645*** **	**121.70*** *	**275.66*** *	**145.15*** *	**1121*** **	**113.34*** **	**81.13*** **
Instruments	27	27	27	27	27	27	27	27	27	27	27	27
Countries	43	36	46	38	54	26	14	49	13	34	129	163
Observations	215	180	230	190	279	130	70	245	65	170	645	815

***,**,*: significance levels at 1%, 5% and 10% respectively. DHT: Difference in Hansen Test for Exogeneity of Instruments Subsets. Dif: Difference. OIR: Over-identifying Restrictions Test. The significance of bold values is twofold. 1) The significance of estimated coefficients and the Wald statistics. 2) The failure to reject the null hypotheses of: a) no autocorrelation in the AR(1) & AR(2) tests and; b) the validity of the instruments in the Sargan and Hansen OIR tests. HI: High Income countries. UMI: Upper Middle Income countries. LMI: Little Middle Income countries. LI: Low Income countries. CC: Christian countries with Catholic domination. CP: Christian countries with Protestant domination. CO: Christian countries in which another Christian religion apart from Catholicism and Protestantism is dominant. Islam: Islam-dominated countries. Bhu: Bhuddism dominated countries. LL: Landlocked countries. NLL: Not Landlocked countries. UNPKF: United Nations Peace Keeping Force.

Table 4: Persistence in Nuclear and Heavy Weapons with regions and legal origin dynamics

	Dependent variable: Weapon imports											
	Regions							Legal origins					Full
	SA	ECA	EAP	MENA	SSA	LA	NA	Eng.	Frch.	Ger.	Scand.	Social.	Sample
Constant	na	**-0.527*** **	0.754	0.275	-0.002	-0.295	na	0.059	-0.083	**-0.579****	na	na	-0.032
		(0.008)	(0.180)	(0.472)	(0.938)	(0.155)		(0.350)	(0.484)	**(0.038)**			(0.677)
Weapons imports (-1)		**1.024*****	**0.940*****	**0.859*****	**1.014*****	**1.096*****		**1.017*****	**1.014*****	**0.912*****			**1.071*****
		(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**		**(0.000)**	**(0.000)**	**(0.000)**			**(0.000)**
Security Officers & Police		0.061	-0.112	0.135	-0.007	**-0.053***		-0.011	0.052	-0.010			-0.032
		(0.186)	(0.364)	(0.108)	(0.500)	**(0.059)**		(0.650)	(0.142)	(0.865)			(0.375)
Death from internal conflicts		-0.008	-0.120	-0.007	0.002	**0.021****		-0.006	0.002	**0.604****			0.014
		(0.738)	(0.474)	(0.822)	(0.579)	**(0.034)**		(0.555)	(0.838)	**(0.019)**			(0.143)
Military Expenditure		**0.157****	0.129	-0.001	0.009	0.010		0.002	**-0.075****	-0.066			0.024
		(0.041)	(0.302)	(0.968)	(0.393)	(0.769)		(0.916)	**(0.024)**	(0.360)			(0.487)
Political Instability (		-0.025	-0.213	**-0.212****	-0.003	**0.118****		-0.001	0.007	0.058			-0.029
		(0.460)	(0.147)	**(0.027)**	(0.676)	**(0.032)**		(0.924)	(0.821)	(0.433)			(0.225)
UNPKF		**0.052***	0.044	**0.101***	0.0002	0.011		-0.010	0.024	**0.038***			0.012
		(0.090)	(0.247)	**(0.056)**	(0.963)	(0.228)		(0.283)	(0.126)	**(0.074)**			(0.330)
AR(1)		(0.047)	**(0.648)**	**(0.237)**	**(0.153)**	(0.047)		**(0.139)**	(0.092)	**(0.236)**			(0.007)
AR(2)		**(0.335)**	**(0.942)**	**(0.647)**	**(0.214)**	**(0.709)**		**(0.297)**	**(0.555)**	**(0.879)**			**(0.573)**
Sargan OIR		(0.304)	(0.220)	(0.080)	(0.763)	(0.089)		**(0.887)**	(0.002)	**(1.000)**			**(0.171)**
Hansen OIR		**(0.711)**	**(0.986)**	**(0.945)**	**(0.594)**	**(0.424)**		**(0.457)**	**(0.502)**	**(0.938)**			**(0.473)**
DHT for instruments													
(a)Instruments in levels													
H excluding group		**(0.346)**	**(0.596)**	**(0.372)**	**(0.159)**	**(0.230)**		**(0.296)**	**(0.355)**	**(0.970)**			**(0.608)**
Dif(null, H=exogenous)		**(0.810)**	**(0.996)**	**(0.994)**	**(0.866)**	**(0.571)**		**(0.544)**	**(0.550)**	**(0.762)**			**(0.355)**
(b) IV (years, eq (diff)) H excluding group		**(0.625)**	**(0.974)**	**(0.603)**	**(0.415)**	**(0.211)**		**(0.793)**	**(0.449)**	**(0.509)**			**(0.286)**
Dif(null, H=exogenous)		**(0.630)**	**(0.787)**	**(1.000)**	**(0.794)**	**(0.932)**		**(0.090)**	**(0.502)**	**(1.000)**			**(0.831)**
Fisher		**216.2*****	**599.3*****	**107.43*****	**7667*****	**2010*****		**797.38*****	**151.78*****	**421.03*****			**81.13*****
Instruments		27	27	27	27	27		27	27	27			27
Countries		48	18	20	44	23		50	87	20			163
Observations		240	90	100	220	115		250	435	100			815

***,**,*: significance levels at 1%, 5% and 10% respectively. DHT: Difference in Hansen Test for Exogeneity of Instruments Subsets. Dif: Difference. OIR: Over-identifying Restrictions Test. The significance of bold values is twofold. 1) The significance of estimated coefficients and the Wald statistics. 2) The failure to reject the null hypotheses of: a) no autocorrelation in the AR(1) & AR(2) tests and; b) the validity of the instruments in the Sargan and Hansen OIR tests. ECA: Europe & Central Asia. EAP: East Asia & the Pacific. MENA: Middle East & North Africa. SSA: sub-Saharan Africa. LA: Latin America. NA: North America. Eng: English Common Law countries. Frch: French Civil Law countries. Ger: German Civil law countries. Scand: Scandinavian Civil law countries. Social: Socialists countries. UNPKF: United Nations Peace Keeping Force.

Table 5: Persistence in Weapons Exports with income levels, religious domination and landlockedness

	Dependent Variable: Weapons Exports											
	Income Levels				Religious Domination					Openness to sea		Full
	HI	UMI	LMI	LI	CC	CP	CO	Islam	Bhu	LL	NLL	Sample
Constant	**-2.117****	**0.923*****	**0.927*****	**0.991*****	0.450	0.323	0.933	**0.918*****	-0.335	**0.639***	**1.057*****	**1.107*****
	(0.021)	**(0.002)**	**(0.000)**	**(0.000)**	(0.274)	(0.548)	(0.832)	**(0.000)**	(0.952)	**(0.052)**	**(0.000)**	**(0.000)**
Weapons exports (-1)	**0.432*****	**-0.070*****	-0.002	**-0.042*****	0.030	**0.146*****	0.035	-0.001	0.071	**-0.030*****	0.062	0.047
	(0.000)	**(0.000)**	(0.771)	**(0.000)**	(0.137)	**(0.000)**	(0.776)	(0.913)	(0.911)	**(0.000)**	(0.181)	(0.174)
Security Officers & Police	-0.110	-0.047	0.046	0.018	0.093	**0.325****	0.511	**0.140*****	0.166	**0.339*****	-0.055	-0.138
	(0.389)	(0.610)	(0.228)	(0.680)	(0.314)	**(0.010)**	(0.596)	**(0.000)**	(0.686)	**(0.001)**	(0.623)	(0.209)
Death from internal conflicts	**3.874*****	0.028	0.049	0.009	-0.028	-0.072	0.782	-0.015	0.292	0.007	0.032	**0.096***
	(0.000)	(0.176)	(0.197)	(0.753)	(0.584)	(0.488)	(0.208)	(0.399)	(0.655)	(0.871)	(0.508)	**(0.078)**
Military Expenditure	**-0.355****	0.134	-0.061	0.032	**0.194****	0.225	-0.885	**-0.127*****	-0.199	0.064	-0.118	-0.012
	(0.014)	(0.118)	(0.320)	(0.682)	**(0.012)**	(0.305)	(0.386)	**(0.000)**	(0.540)	(0.366)	(0.301)	(0.873)
Political Instability	0.182	0.035	-0.002	-0.012	0.081	-0.067	0.034	-0.006	0.187	**-0.142****	0.154	0.083
	(0.203)	(0.445)	(0.973)	(0.826)	(0.499)	(0.418)	(0.892)	(0.891)	(0.861)	**(0.017)**	(0.128)	(0.293)
UNPKF	0.013	0.008	0.008	-0.004	-0.002	-0.016	-0.311	0.016	0.066	-0.015	-0.011	0.015
	(0.915)	(0.705)	(0.703)	(0.794)	(0.921)	(0.627)	(0.364)	(0.410)	(0.746)	(0.425)	(0.792)	(0.666)
AR(1)	(0.000)	(0.059)	**(0.936)**	**(0.148)**	**(0.614)**	**(0.020)**	**(0.794)**	**(0.563)**	**(0.798)**	**(0.125)**	**(0.187)**	**(0.164)**
AR(2)	**(0.228)**	**(0.309)**	**(0.155)**	**(0.890)**	**(0.234)**	**(0.648)**	**(0.377)**	**(0.361)**	**(0.747)**	**(0.172)**	**(0.211)**	**(0.213)**
Sargan OIR	(0.000)	(0.793)	(0.256)	(0.000)	(0.001)	(0.002)	(0.084)	(1.000)	(0.496)	(0.000)	(0.000)	(0.000)
Hansen OIR	**(0.361)**	**(0.856)**	**(0.875)**	**(0.998)**	**(0.343)**	**(0.855)**	**(1.000)**	**(0.851)**	**(1.000)**	**(0.499)**	**(0.210)**	**(0.176)**
DHT for instruments												
(a)Instruments in levels												
H excluding group	**(0.114)**	**(0.677)**	**(0.386)**	**(0.749)**	**(0.178)**	**(0.282)**	**(0.795)**	**(0.405)**	**(0.905)**	**(0.361)**	(0.032)	(0.005)
Dif(null, H=exogenous)	**(0.667)**	**(0.794)**	**(0.950)**	**(0.999)**	**(0.526)**	**(0.971)**	**(1.000)**	**(0.921)**	**(1.000)**	**(0.541)**	**(0.714)**	**(0.963)**
(b) IV (years, eq (diff))	**(0.162)**	**(0.656)**	**(0.747)**	**(0.988)**	**(0.248)**	**(0.675)**	**(0.874)**	**(0.781)**	**(1.000)**	**(0.678)**	**(0.112)**	**(0.085)**
H excluding group												
Dif(null, H=exogenous)	**(0.951)**	**(0.955)**	**(0.852)**	**(0.962)**	**(0.593)**	**(0.925)**	**(1.000)**	**(0.692)**	**(0.997)**	**(0.195)**	**(0.714)**	**(0.752)**
Fisher	**140.58*****	**147.2*****	**5.32*****	**29.69*****	**4.71*****	**29.43*****	**39.83*****	**8.61*****	**3.21****	**62.79*****	1.01	1.56
Instruments	27	27	27	27	27	27	27	27	27	27	27	27
Countries	43	36	46	38	54	26	14	49	13	34	129	163
Observations	215	180	230	190	270	130	70	245	65	170	645	815

***,**,*: significance levels at 1%, 5% and 10% respectively. DHT: Difference in Hansen Test for Exogeneity of Instruments Subsets. Dif: Difference. OIR: Over-identifying Restrictions Test. The significance of bold values is twofold. 1) The significance of estimated coefficients and the Wald statistics. 2) The failure to reject the null hypotheses of: a) no autocorrelation in the AR(1) & AR(2) tests and; b) the validity of the instruments in the Sargan and Hansen OIR tests. HI: High Income countries. UMI: Upper Middle Income countries. LMI: Little Middle Income countries. LI: Low Income countries. CC: Christian countries with Catholic domination. CP: Christian countries with Protestant domination. CO: Christian countries in which another Christian religion apart from Catholicism and Protestantism is dominant. Islam: Islam-dominated countries. Bhu: Bhuddism dominated countries. LL: Landlocked countries. NLL: Not Landlocked countries. UNPKF: United Nations Peace Keeping Force.

Table 6: Persistence in Weapons Exports with regions and legal origin dynamics

	Dependent Variable: Weapons Exports												
	Regions							Legal origins					Full
	SA	ECA	EAP	MENA	SSA	LA	NA	Eng.	Frch.	Ger.	Scand.	Social.	Sample
Constant	na	-0.556	-0.286	**1.992*** **	**0.633*** **	**0.874***		**0.998*** **	**0.770*** **	1.497	na	na	**1.107*** **
		(0.306)	(0.609)	**(0.001)**	**(0.000)**	**(0.072)**		**(0.000)**	**(0.000)**	(0.328)			**(0.000)**
Weapons exports (-1)		**0.321*** **	**0.082**	0.038	**-0.027*** **	**-0.035** **		**-0.020** **	0.026	**0.104***			0.047
		(0.000)	**(0.280)**	(0.499)	**(0.000)**	**(0.011)**		**(0.048)**	(0.243)	**(0.060)**			(0.174)
Security Officers & Police		**0.407** **	**0.338***	**-0.093***	**0.123** **	**-0.073** **		**0.144** **	-0.068	**0.407** **			-0.138
		(0.029)	**(0.057)**	**(0.085)**	**(0.021)**	**(0.039)**		**(0.042)**	(0.374)	**(0.010)**			(0.209)
Death from internal conflicts		0.179	0.065	0.022	0.013	0.024		**0.085** **	0.015	-0.739			**0.096***
		(0.161)	(0.639)	(0.278)	(0.668)	(0.362)		**(0.040)**	(0.713)	(0.522)			**(0.078)**
Military Expenditure		**0.607***	0.120	-0.101	-0.019	0.186		**-0.086***	-0.037	0.027			-0.012
		(0.095)	(0.570)	(0.193)	(0.545)	(0.307)		**(0.086)**	(0.600)	(0.922)			(0.873)
Political Instability		-0.101	0.019	-0.091	0.035	0.015		**-0.091***	0.134	-0.204			0.083
		(0.367)	(0.906)	(0.350)	(0.291)	(0.836)		**(0.073)**	(0.228)	(0.551)			(0.293)
UNPKF		**-0.245** **	0.069	0.040	0.011	0.010		0.042	0.033	-0.213			0.015
		(0.027)	(0.256)	(0.385)	(0.393)	(0.646)		(0.113)	(0.309)	(0.315)			(0.666)
AR(1)		(0.001)	**(0.184)**	**(0.733)**	**(0.116)**	**(0.186)**		**(0.341)**	**(0.277)**	**(0.100)**			**(0.164)**
AR(2)		**(0.208)**	**(0.623)**	**(0.529)**	**(0.846)**	**(0.476)**		**(0.631)**	**(0.257)**	**(0.234)**			**(0.213)**
Sargan OIR		(0.000)	(0.026)	(0.092)	(0.000)	(0.461)		(0.021)	(0.000)	(0.092)			(0.000)
Hansen OIR		**(0.295)**	**(0.996)**	**(0.893)**	**(0.914)**	**(0.999)**		**(0.714)**	**(0.816)**	**(0.951)**			**(0.176)**
DHT for instruments													
(a)Instruments in levels													
H excluding group		(0.043)	**(0.616)**	**(0.232)**	**(0.667)**	**(0.782)**		**(0.618)**	**(0.710)**	**(0.485)**			(0.005)
Dif(null, H=exogenous)		**(0.794)**	**(1.000)**	**(0.995)**	**(0.889)**	**(0.999)**		**(0.632)**	**(0.717)**	**(0.983)**			**(0.963)**
(b) IV (years, eq (diff)) H excluding group		**(0.193)**	**(0.936)**	**(0.832)**	**(0.851)**	**(0.782)**		**(0.719)**	**(0.827)**	**(0.913)**			(0.085)
Dif(null, H=exogenous)		**(0.636)**	**(1.000)**	**(0.719)**	**(0.758)**	**(1.000)**		**(0.640)**	**(0.486)**	**(0.758)**			**(0.752)**
Fisher		**20.70*** **	**25.64*** **	**6.65*** **	**35.49*** **	**59.07*** **		**4.94*** **	1.48	**4.03*** **			1.56
Instruments		27	27	27	27	27		27	27	27			27
Countries		48	18	20	44	23		50	87	20			163
Observations		240	90	100	220	115		250	435	100			815

***,**,*: significance levels at 1%, 5% and 10% respectively. DHT: Difference in Hansen Test for Exogeneity of Instruments Subsets. Dif: Difference. OIR: Over-identifying Restrictions Test. The significance of bold values is twofold. 1) The significance of estimated coefficients and the Wald statistics. 2) The failure to reject the null hypotheses of: a) no autocorrelation in the AR(1) & AR(2) tests and; b) the validity of the instruments in the Sargan and Hansen OIR tests. ECA: Europe & Central Asia. EAP: East Asia & the Pacific. MENA: Middle East & North Africa. SSA: sub-Saharan Africa. LA: Latin America. NA: North America. Eng: English Common Law countries. Frch: French Civil Law countries. Ger: German Civil law countries. Scand: Scandinavian Civil law countries. Social: Socialists countries. UNPKF: United Nations Peace Keeping Force.

Appendices

Appendix 1: Definitions of variables

Panel A: Variables

Variables	Definitions and sources of variables
Nuclear and Heavy weapons	Nuclear and heavy weapons capabilities The Military Balance, IISS; SIPRI; UN Register of Conventional Arms; IEP
Weapon imports	Volume of transfers of major conventional weapons as recipient (imports) per 100,000 people Stockholm International Peace Research Institute (SIPRI) Arms Transfers Database
Weapon exports	Volume of transfers of major conventional weapons as supplier (exports) per 100,000 people SIPRI Arms Transfers Database
Security Officers & Police	Number of internal security officers and police per 100,000 people UNODC; EIU estimates
Deaths from internal conflict	Number of deaths from organised conflict (internal)International Institute for Strategic Studies (IISS) Armed Conflict Database (ACD)
Military expenditure	Military expenditure as a percentage of GDP The Military Balance, IISS
Political instability	Political instability Qualitative assessment by EIU analysts
United Nations Peacekeeping Funding.	Financial contribution to UN peacekeeping missions United Nations Committee on Contributions; IEP

Panel B: Presentation of countries

"Afghanistan; Albania; Algeria; Angola; Argentina; Armenia; Australia; Austria; Azerbaijan; Bahrain; Bangladesh; Belarus; Belgium; Benin; Bhutan; Bolivia; Bosnia and Herzegovina; Botswana; Brazil; Bulgaria; Burkina Faso; Burundi; Cambodia; Cameroon; Canada; Central African Republic; Chad; Chile; China; Colombia; Costa Rica; Cote d' Ivoire; Croatia; Cuba; Cyprus; Czech Republic; Democratic Republic of the Congo; Denmark; Djibouti; Dominican Republic; Ecuador; Egypt; El Salvador; Equatorial Guinea; Eritrea; Estonia; Ethiopia; Finland; France; Gabon; Georgia; Germany; Ghana; Greece; Guatemala; Guinea; Guinea-Bissau; Guyana; Haiti; Honduras; Hungary; Iceland; India; Indonesia; Iran; Iraq; Ireland; Israel; Italy; Jamaica; Japan; Jordan; Kazakhstan; Kenya; Kosovo; Kuwait; Kyrgyz Republic; Laos; Latvia; Lebanon; Lesotho; Liberia; Libya; Lithuania; Macedonia (FYR); Madagascar; Malawi; Malaysia; Mali; Mauritania; Mauritius; Mexico; Moldova; Mongolia; Montenegro; Morocco; Mozambique; Myanmar; Namibia; Nepal; Netherlands; New Zealand; Nicaragua; Niger; Nigeria; North Korea; Norway; Oman; Pakistan; Palestine; Panama; Papua New Guinea; Paraguay; Peru; Philippines; Poland; Portugal; Qatar; Republic of the Congo; Romania; Russia; Rwanda; Saudi Arabia; Senegal; Serbia; Sierra Leone; Singapore; Slovakia; Slovenia; Somalia; South Africa; South Korea; South Sudan; Spain; Sri Lanka; Sudan; Swaziland; Sweden; Switzerland; Syria; Taiwan; Tajikistan; Tanzania; Thailand; The Gambia; Timor-Leste; Togo; Trinidad and Tobago; Tunisia; Turkey; Turkmenistan; Uganda; Ukraine; United Arab Emirates; United Kingdom; United States of America; Uruguay; Uzbekistan; Venezuela; Vietnam; Yemen; Zambia and Zimbabwe".

Appendix 2: Summary statistics

Variables	Mean	Standard dev.	Minimum	Maximum	Obsers
Nuclear and Heavy weapons	1.498	0.974	1.000	5.000	978
Weapon imports	1.489	0.868	1.000	5.000	978
Weapon exports	1.342	0.932	1.000	5.000	978
Security Officers & Police	2.728	0.911	1.081	5.000	978
Deaths from internal conflict	1.405	0.933	1.000	5.000	978
Military expenditure	1.966	0.824	1.000	5.000	978
Political instability	2.545	1.030	1.000	5.000	978
United Nations Peacekeeping Funding.	2.291	1.164	1.000	5.000	978

Standard dev: Standard deviation. Obsers: Observations.

Appendix 3: Correlation matrix (uniform sample size: 978)

S O & P	DFIC	Military	Pol. Insta.	UNPKF	W. Imports	W. Exports	N & H W.	
1.000	0.031	0.215	0.042	0.0003	0.140	-0.011	0.120	S O & P
	1.000	0.231	0.325	0.093	-0.115	-0.073	0.193	DFIC
		1.000	0.336	-0.013	0.236	0.025	0.262	Military
			1.000	0.402	-0.238	-0.285	-0.102	Pol. Insta.
				1.000	-0.180	-0.210	-0.235	UNPKF
					1.000	0.125	0.098	W. Imports
						1.000	0.370	W. Exports
							1.000	N & H W.

S O & P: Security Officers & Police. DFIC: Death from Internal Conflicts. Military: Military Expenditure. Pol. Insta: Political Instability. UNPKF: United Nations Peacekeeping Funding. W. Imports: Weapons Imports. W. Exports: Weapons Exports. N& H W: Nuclear and Heavy Weapons.

Compliance with Ethical Standards

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