



The 12th International Scientific Conference
**“DEFENSE RESOURCES MANAGEMENT
IN THE 21st CENTURY”**
Braşov, November 9th-10th 2017



**THE ARMS TRADE DEVELOPMENT IN CONTEXT
WITH ECONOMICS AND MILITARY ASPECTS OF
SECURITY ENVIRONMENT**

Jana Boulaouad, Ph.D.

University of Defence / Department of Economics / Brno / Czech Republic

Abstract:

The paper identifies and characterizes the military and economic aspects of the development of the security environment and then analyses their impact on the international trade with arms and military equipment during the period 1990–2015 on selected countries. The paper analyses the security environment impact to arms export to evaluated countries through selected military and economic indicators. The impacts of chosen military and economic indicators on arms trade flows was evaluated by statistical methods. The security environment was evaluated through selected indicators reflecting it on Pakistan and Turkey (one of mains recipients of United States and Great Britain). Indicators were processed through selected statistical methods in relation to accepted flows of weapons and military technology from major arms trade partners. The Statistical data show the relationship between accepted arms flows and military technology and the selected indicators. Based on the assessment the import of arms and military technology from the respective exporter showed a close correlation with a group of selected indicators which varied among individual exporters.

Keywords: Security, security environment, conflict, international arms trade, market of arms production, military equipment, arms.

JEL Code: B22, B52

1. Introduction

Security theory is based on the assumption that higher security leads to a positive signal for foreign and domestic investors. Higher security provided by foreign armies can be understood by domestic economy as a saving of its own expenditure on national defense and security with their allocation to other areas of public life. This effect is called black free riding.[1]

Safety and security environments are difficult to define and the search for a conceptual framework for their investigation is the role of security studies. The contribution needs to be based on the territorial delimitation of the security environment given by the respective state, its borders [2], and security subsequently treated as the absence of an armed conflict in the territory of the State under consideration. For purpose of The contribution needs to be based on the territorial definition of the security environment given by the country itself, respectively its borders, and the security then conceived as the absence of armed conflict on the territory of the state under consideration. [3]

The specificities of the arms market arise from the typical monopsonic position of the central authority at the national level. This monopsonic position leads to the influence of the demand and supply side of the market. The usual economic structure of market with arms and military equipment is therefore monopson on the side of supply and monopoly on

THE ARMS TRADE DEVELOPMENT IN CONTEXT WITH ECONOMICS AND MILITARY ASPECTS OF SECURITY ENVIRONMENT

the side of the buyer, i.e. on the demand. However, the structure may also have the character of central authority as a demand side and oligopoly on the supplier side.

Basic categories of motives for the arms trade presented Keith Krause as: wealth, position of power and victory in the conflict, as reasons for the production and subsequent export of weapons and military equipment. [4] Export of arms and military equipment can also act as a substitute for a direct military presence. There is also an attempt to achieve interoperability.

The export of arms and military technology can therefore act as a source of influence in the importing country. Ensuring the impact of supplier countries in importing country is (by Cassady Craft) possible under the following conditions:

- The recipient is dependent on the import of the respective weapons and military equipment.
- The supplier is the only one or one of the few exporters of the concerned country.
- Provision of a loan for the purchasing the arms should strengthen the influence of state's arms exporter.
- The arms delivery will then ensure the exporter's influence on foreign policy rather than on domestic policy. [5]

International arms trade brings a number of effects to the economies of both – exporting and recipients countries. One of the main ones is the effects and consequences of security. In decisions on arms supplies and the effects of the international arms trade itself, has a number of subjective factors influence:

- Political;
- Diplomatic;
- Society and moral character;
- Historical ties;
- Participation in Alliances,

and their perception and recipients centers selecting with ensuring or preserving regional and global security in there. Subjectivity in the influence of these factors reflects the character of the state; its priorities; strategies and the type of its government; the period in which the economy, the region or the entire world economy passes through (from the point of view of security level). These are anyway evident from the assessment of the global export and import of arms and military technology. The demonstrations of effects or impacts resulting from international arms trade are heavily influenced by their time horizons.

How to explain the impact of security changes on the arms trade flows? The aim of the contribution is to identify and characterize the military and economic aspects of security environment development and to analyze their impact on international arms trade in selected countries during 1990–2015. Hypothesis of article is set as: Changes in the security environment development have a military and economic dimension that affects the international trade in arms and military equipment.

2. Methodology and Data

It was used a several numbers of methods of scientific research. The general scientific methods used for this contribution were analysis; synthesis; description; comparison; deduction; induction and their combinations. The historical method has led to the observation of historical development in time to derive laws by defining individual military-economic indicators of the development of the security environment. It was used the historical-comparative method especially for monitoring individual military and

THE ARMS TRADE DEVELOPMENT IN CONTEXT WITH ECONOMICS AND MILITARY ASPECTS OF SECURITY ENVIRONMENT

economic indicators and comparison of their development and impacts in selected countries as well as in different periods. To assess the possible use of data and data files and the issue of measuring international arms trade the abstraction method was used.

The paper presents a statistical evaluation of the impact of selected indicators of the security environment of selected recipient countries or arms affected by the armed conflict. In addition, multiple regression analyses were used, where the international arms trade was determined as the dependent variable and then correlation analysis. For this purpose, statistical data reflecting the security environment in terms of: conflict; economic; military were chosen.

Other data available for statistical evaluation represent the import of arms and military equipment from chosen major world exporters. The objective was to evaluate the dependence of this trade on a selected set of security environment indicators. It means – finding out if any of the security environment indicator reflected and statistically explained the volume of arms and military equipment exported by main world exporters. For this purpose, for all combinations of exporting countries, a correlation analysis was carried out as the first method. In correlation analysis, bivariate relations between couples of variables were found. Based on the results of the correlation analysis, suitable explanatory variables were selected for the following linear regression model on which the relationship with the arms trade was described.

Emphasis in the results of linear regression models was placed on the significance of the individual involved parameters (presented by selected indicators), their interpretation and on the evaluation of the quality of these models by using the determination index. The evaluation for individual arms trade cases started with the correlation matrix of each indicator of the security environment (in conflict, economic and military aspects). For each example, the table of regression results shows the dependent variable expressed by the respective state expressed in TIV (1990 constant prices) or the percentage of exports to the selected country of the conflict, as a percentage of the total export. The regression table after that summarizes the length of the period that is equal to the reference period i.e. 26 years (1990–2015) with the exception of Russia trade example (due to geographical-political changes is the period 24 years).

- The Student's distribution degree of freedom is subsequently influenced by the length of the period and the number of parameters in regression model.
- The parameter estimations represented by the $\beta_0, \beta_1, \dots, \beta_n$ values enter to the linear regression equation.
- β_0 ...represents the chosen absolute member, ie the import side;
- β_1, \dots, β_n represent the values of the parameters of the selected security environment indicators, which were evaluated according to the correlation analysis as statistically significant and were selected in the regression model.
- For each of the parameters was evaluated the variability of the parameters; the test criterion that entered to the *t-tests* and the value of *p*.
- The *p-value* of less than 0.05 for the relevant parameter then shows that according to the *t-test* it is a statistically significant parameter.
- The level of statistical significance was 5 %.

The following indicators have been chosen for the analysis of the impact of changes in the security environment:

- Battle-Related Deaths per calendar year (data from Uppsala Dataset Program) [6];
- Military expenditure (data from *Stockholm International Peace Research Institute – SIPRI Database*) [7];

THE ARMS TRADE DEVELOPMENT IN CONTEXT WITH ECONOMICS AND MILITARY ASPECTS OF SECURITY ENVIRONMENT

- Military expenditure expressed as a percentage of Gross Domestic Product (GDP) (data from SIPRI Database) [7];
- Military expenditure expressed as a percentage of government expenditure (G) (data from SIPRI Database) [7];
- Military force (number of soldiers);
- GDP (data from World Bank Open Data) [8];
- GDP per capita (data from World Bank Open Data) [8];
- Foreign direct investment (data from World Bank Open Data) [8].

3. Results and Discussion

3.1 Example of Pakistan

Pakistan (Islamic Republic of Pakistan) was (in the evaluated period 1990–2015) one of the major recipients of US weapons and military equipment. Pakistan also performs as one of France's major recipients. Overall, the import of arms and military equipment for 19,628 millions TIV (USD constant 1990 prices) was reported for Pakistan in these 26 years. The arms export was depending on political development. In response to the proclamation of the state of emergency in November 2007 by Pakistani President Pervez Musharaff. Many American congressmen have called for thorough control of US military assistance and suspension of arms exports that were not related directly to the fight against al-Qaeda or against Taliban.

In Pakistan 32 296 people died because of conflict in period under review. The majority has been held since 2007, when the conflicts and the consequence escalated. Pakistan has long-standing disputes with India over the Kashmir region, and both countries are considered to be involved in the arms race. In 1947, India was divided, creating the Islamic Republic of Pakistan and the Republic of India. Pakistan was also involved in the Persian Gulf War and the Pakistani War (also referred to as the War in Northwest Pakistan since 2004), which includes armed government forces and armed rebel groups linked to the Taliban or other Islamist terrorist groups including al-Qaeda or so called East Turkestan movement.

Through correlation analysis can be said, that volumes of import from the United States (US) to Pakistan positively correlated with GDP at current prices, GDP per capita, foreign direct investment and battle-related deaths. Conversely, a negative correlation was found with military spending as a percentage of GDP and with military spending as a percentage of government spending. A variable expressing the number of deaths due to conflict was selected as a suitable variable in the regression model.

	<i>n</i>	26
<i>Degrees of Freedom Student's division</i>		24
<i>b</i>	β_0	β_1
<i>standard error</i>	49,48081	0,06863
	36,99961	0,01638
<i>t(23)</i>	1,337333	4,189756
<i>p-value</i>	0,193651	0,000326

Table 1 Pakistan – US arms Trade Results of regression analysis with import from US as dependent variable

THE ARMS TRADE DEVELOPMENT IN CONTEXT WITH ECONOMICS AND MILITARY ASPECTS OF SECURITY ENVIRONMENT

The linear regression model for import dependency on death-related conflict was given by the equation:

$$y = \beta_0 + \beta_1 x + \varepsilon$$

Where:

- y expresses the import of arms and military equipment from the US to Pakistan in million TIV (USD constant 1990 prices);
- x expresses the number of battle-related death;
- β_0, β_1 expresses are regression parameters;
- ε expresses other effects not included in the model and random errors.

The estimated regression equation is:

$$y = 49,5 + 0,07x$$

Parameter β_1 was evaluated as significant by t-test ($p < 0.05$). The import of arms and military equipment from the US to Pakistan is therefore statistically significantly related to the number of battle-related deaths. Assuming a linear relationship, it can be interpreted that the increase in the number of battle-related deaths by 100 is associated to an increase in US arms imports by 7 million TIV (1990 constant prices). Index of determination was equal to 0.42 – battle-related deaths explain 42 % of the arms import variability, a significant part of the variability. The remainder of the variability (58 %) is due to other influences.

3.2 Example of Turkey

Turkey (Republic of Turkey) is the second largest recipient of German weapons and military technology. Turkey is also one of the major US, French and Great Britain arms trade recipients. Overall, the import of arms and military equipment worth 29,903 million TIV (US \$ constant 1990 prices) during the reporting period. For Turkey, there were 24,079 battle-related deaths over the review period.

Even after 40 years since the launch of large investments in the defense industrial base, Turkey has not achieved the primary objectives of industrialization in the country. However, there is a general perceived significant improvement and belief in the availability of autarkia in the area. The Turkish defense industry is widely supported by local government and there are visible political benefits of defensive industrialization. Geographic location determines Turkey's security issues. Turkey has entered into conflicts with Greece, Cyprus, there are internal problems with the Kurdish community and security implications for the whole region. The atmosphere affecting Turkey's security environment is also a conflict in countries like Iraq, Syria, to which Turkey is directly or indirectly involved. The main issues of Turkey's security environment and conflict-related deaths are evident during 1991–2000. In 1990, Turkey allowed the US coalition to Iraq from Turkish air bases. In 1991 and 1992, armed conflicts between armed forces and armed groups of left-wing rebels took place. In 1992 20,000 members of the defense entered Kurdish safe havens in Iraq in an operation against the PKK (Partiya Karkerên Kurdistan). In 1995, similarly, actions involving almost twice the number of Turkish armed forces against the Kurds in Iraqi blood. In 2005, armed conflicts of left-wing rebels followed, when the Maoist Communist Partisi led an armed struggle with the Turkish government.

Through correlation analysis can be said, that volumes of import from the Great Britain to Turkey negatively correlated with GDP at current prices, GDP per capita, foreign direct investment and battle-related deaths. Conversely and positively correlated with military expenditures at constant prices, as well as military expenditures as percentage of GDP or with the size of the army. The military regimental model has selected military expenditures at constant prices and per capita GDP.

**THE ARMS TRADE DEVELOPMENT IN CONTEXT WITH
ECONOMICS AND MILITARY ASPECTS OF SECURITY
ENVIRONMENT**

Variables expressing military expenditures at constant prices and GDP per capita were selected as suitable variables in the regression model.

	<i>n</i>		
<i>Degrees of Freedom Student's division</i>	26		
	23		
	β_0	β_1	β_2
<i>b</i>	-281,635	0,023	-0,009
<i>standard error</i>	54,1864	0,00322	0,00197
<i>t(23)</i>	-5,1975	7,00429	-4,45228
<i>p-value</i>	0,000029	0,000000	0,000182

Table 2 Turkey – Great Britain arms Trade – Results of regression analysis with import from Great Britain as dependent variable

The linear regression model for arms import dependency on military expenditure in US \$ and on GDP per capita in US \$ was given by the equation:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \varepsilon$$

Where:

- y* expresses the import of arms and military equipment from the Great Britain to Turkey in million TIV (USD constant 1990 prices);
- x₁* expresses the military expenditure in US \$;
- x₂* expresses GDP per capita in US \$;
- $\beta_0, \beta_1, \beta_2$ expresses are regression parameters;
- ε expresses other effects not included in the model and random errors.

The estimated regression equation is:

$$y = -281 + 0,023x_1 - 0,009x_2$$

Both Parameters β_1 even β_2 were evaluated as significant by t-test ($p < 0.05$). The import of arms and military equipment from the Great Britain to Turkey is therefore statistically significantly related to the military expenditure in US \$ and to the GDP per capita in US \$. Assuming a linear relationship, it can be interpreted that the increase of military expenditure by 1 billion US \$ is associated to an increase in Great Britain's arms imports to Turkey by 27 million TIV (1990 constant prices). It can be also interpreted that the increase of GDP per capita by 1 US \$ is associated to a decrease in Great Britain's arms imports to Turkey by 9 thousand TIV (1990 constant prices). Index of determination was equal to 0.73 – military expenditure in US \$ and to the GDP per capita in US \$ explain 73 % of the arms import variability, a significant part of the variability. The remainder of the variability (27 %) is due to other influences.

4. Conclusion

During examining the impact and development of international arms trade, we can observe the effects on the domestic economy. Just as military expenditures – even the active trade balance caused by the arms export, it is part of the demand-side of the economy and so can generate a positive demand effect. Negative displacement effects (which are generally associated with military expenditures) can also be linked to the import and the military expenditure on investment purposes. In the international trade in arms and military equipment, there is also important position of the effects of technological and

THE ARMS TRADE DEVELOPMENT IN CONTEXT WITH ECONOMICS AND MILITARY ASPECTS OF SECURITY ENVIRONMENT

technological progress; the effects of capital spills within economies; effects based on the country's labor capital. These effects can be summed up as supply side effects, as the level of technology, capital, labor and natural conditions are the main factors determining the supply side of the economy. Another important – if not the main, the security effect. The issue of security and threats affecting it has a clear impact on military expenditure [9] and hence on trade in arms and military technology.

The security threats, their structure and their current character are reflected, even in the structure and size of the defense industrial bases and the character of weapons and military technology and technology with reference to the use of military robotics, etc. Many of the above-mentioned effects of arms trade are affected by: political; diplomatic; social and moral perception factors.

The aim of the contribution was to identify and characterize the military and economic aspects of security environment development and to analyze their impact on international arms trade in selected countries during 1990–2015. In the above examples, a connection of statistical significance to one of the selected indicators or their wider structure was found. Hypothesis of article set as: Changes in security environment development have a military and economic, was on selected parts and in the countries surveyed confirmed.

References:

- [1] Krč, M. (2016) Economic Context of the Czech Army Military deployments and export. *Current trends in public sector research 2016*. Brno: Masaryk University, pp. 156-162. ISSN 2336-1239. ISBN 978-80-210-8082-9.
- [2] ZEMAN, Petr (ed.). (2002) *Česká bezpečnostní terminologie: výklad základních pojmů*. Mezinárodní politologický ústav. Brno: Masarykova univerzita, p.186. ISBN 80-210-3037-2.
- [3] EICHLER, Jan. (2009) *Mezinárodní bezpečnost v době globalizace*. Praha: Portál, p. 327 s. ISBN 978-80-7367-540-0.
- [4] KRAUSE K. (1995) *Arms and the State: Patterns of Military Production and Trade*, Cambridge University Press.
- [5] STOHL, R. and GRILLOT S. (2009) *The international arms trade: teorie a praxe*. Malden, MA: Polity, x, 278 p. Business books (CP Books). ISBN 978-074-5641-546.
- [6] Uppsala Dataset Program (n.d.). Retrieved May 4, 2017, from <http://www.pcr.uu.se/research/ucdp/datasets/>
- [7] *Stockholm International Peace Research Institute* Database (n.d.). Retrieved May 4, 2017, from <https://sipri.org/databases>
- [8] World Bank Databank. (n.d.). Retrieved May 4, 2017, from <https://data.worldbank.org/>
- [9] DUNNE, P. (2004) Models Of Military Expenditure And Growth: A Critical Review. *University of the West of England* [online]. Retrieved May 4, 2017 from <http://www.tandfonline.com/doi/abs/10.1080/10242690500167791>