

Prospects of building an agenda for technology transfer policy advocacy in Brazil from international experience

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ABSTRACT

The process of developing technological skills, especially for late developing countries such as Brazil, is characterized by high cost and long maturation. The objective of this paper is to support the formulation of local policies related to the transfer of technology through compensation mechanisms, mainly technological, offset type. Although the offset mechanisms are not new in the field of technological public policies between countries, they have different forms of structuring that modify between countries and between sectors of the economy. The present study aims to focus on the offset policies in the defense sector, from selected countries (Sweden, Spain, United Kingdom, Italy, India and Canada) seeking to observe issues such as investment maturation period, focus, legal framework between others. From this it is sought to consider the best practices among selected countries.

Keywords: offset policy, national defense, technology transfer

INTRODUCTION

This paper seeks to describe and contextualize the issue of "offset policy" in Brazil. For this, the strategic importance of the technological agenda for the defense sector in the countries, especially the countries of late development and of important economic importance, stands out. Two important and complementary aspects of the Brazilian defense industry should be highlighted: i) the role of the defense industry in Brazil, as a highlight of the industry's export potential, ii) the need for technological autonomy for the defense sector, considering national defense agenda. In this context, the history and the trajectory of the defense industry in the country and the use of the offset policy, highlighting the aeronautical sector, as a mechanism of technological induction are verified.

METHODOLOGY

The proposal for the construction of this work was structured in four parts. Initially we looked for a historical perspective of the production numbers of the defense sector in Brazil and in the world. The sources and data are several: (i) secondary data from the work of researchers in Brazil, the Stockholm International Peace Research Institute (SIPRI) and Columbia University's Institute of War and Peace (SIWPS); ii) Primary data from the Ministry of Science, Technology and Innovation (MCTI), Ministry of Development Industry and Commerce (MDCI) and Ministry of Defense (MD).

In the next section, the international experience, the objective is to observe how some selected countries deal with the "offset policy" agenda. For the selection of countries, issues related to the importance of countries in the context of active technology transfer will be considered.

Having exhausted the observation of the selected countries, in the third stage a matrix was constructed to compare the "offset policies" adopted by these countries. The variables were selected after the data collection phase.

Finally, in the last section, the conclusions of the study are drawn which indicate the need to construct a policy of "technological offset" for the defense area that can make feasible the increase of capacity, and competence, technique of small and medium enterprises, as well as serve as a mechanism of induction in the relations between University and Company. In this sense, it is possible to observe that some countries adopt this option without prejudice to the construction of industrial and commercial policies.

INTERNATIONAL DEFENSE MARKET

International trade in defense equipment peaked in 1982, with \$ 46.4 billion traded. With the decline of the Soviet Union and the end of the Cold War, there was a significant reduction in defense investments, with exports dropping to \$ 17.9 billion in 2002. Since then there has been a re-stocking of the military in several countries, with exports reaching a value of \$ 30 billion in 2011, an increase of 55.75% compared to 2002 (SIPRI, 2008).

It is important to highlight that the practice of offset extrapolates the standard relations of international cooperation of science and technology that by themselves have very peculiar and complex characteristics (Silva, 2007). A characteristic of defense products and equipment is that they are not restricted to a specific sector, so they can not be easily identified from classifications normally used in international trade, such as the Harmonized System Code or the Mercosur Common Nomenclature (NCM).

Historically, it is possible to see that Brazil occupied a prominent position among the countries that produce defense equipment. Currently, the table shows that the export of arms and ammunition jumped from US\$60 to US\$ 292 million from 1997 to 2011, with a growth of 274.13%, maintaining a significant positive balance (DAGNINO and CAMPOS FILHO, 2007) . Radar equipment was the one that represented the greatest impact on imports, driven by the Amazon Surveillance System (SIVAM). For other equipment the numbers are relatively low, both in import and export.

DISCIPLINES OF THE WORLD TRADE ORGANIZATION CONCERNING OFFSET

The World Trade Organization (WTO) in Article XVI of the Government Procurement Agreement (GPA) prohibits, as a general rule, the use of offsets. The Agreement, however, opens two important exceptions to this prohibition, authorizing the practice of offset in the following cases:

- I. Special and differential treatment for developing countries. According to Article XVI: 2 of the GCA, developing countries may negotiate conditions for the use of offsets at the time of their access to the Agreement, ensuring that they will only be used as qualification to participate in the procurement process, and not as a concession criterion of contracts;
- II. Government purchases related to national security, or for defense purposes, as spelled out in Article XXIII: 1.

The international community's understanding of permitting under the ACG's offset practice for the defense industry is common. It is important to point out, however, that the ACG, despite emanating from the Uruguay Round, is a plurilateral agreement (not part of the "single-undertaking" of the Round), and Brazil is not a signatory to the Agreement.

"Offering" offset policy - The International Initiative to limit the adverse effects of offsetting on defense purchases

In 2004, the US government established an inter-ministerial working group to initiate a process of dialogue with other countries and international organizations to discuss the adverse

impacts of offset on defense purchases. The main objectives of this initiative were: (i) to promote a global understanding of how different types of offset impact the industrial base; (ii) encourage the development of global principles to limit the negative impacts of offsets; and (iii) encourage countries to give maximum flexibility in meeting offset requirements.

United States and Offset

The US Government's antitrust policy considers offset to be an "economically inefficient and trade-distorting" practice, and prohibits any US government agency from directly encouraging or engaging US firms in any offset arrangement in connection with the sale of defense articles or services to governments of other countries. However, in practice, US firms argue that in reality the business market competing in international defense processes, offsets are generally required to realize the sale (Neuman, 2010).

According to data from the "16th Report on Offset in Defense Trade" prepared by the United States Department of Commerce during the period 1993 to 2010, 52 US companies reported having participated in 763 offset contracts related to the export of goods and services defense, worth US \$ 111 billion, with 47 countries. The offset agreements associated with the contracts accounted for 78 billion.

Year	Contract Value (\$ millions)	Offset Agreement Value (\$ millions)	Percent of Offset Agreement to Contract Value	U.S. Firms (Number)	Agreements (Number)	Countries (Number)
1993	\$13,935.00	\$4,784.43	34.33%	17	28	16
1994	\$4,792.42	\$2,048.72	42.75%	18	49	20
1995	\$7,529.92	\$6,102.58	81.04%	20	47	18
1996	\$3,119.67	\$2,431.62	77.94%	16	53	19
1997	\$5,925.47	\$3,825.53	64.56%	15	60	20
1998	\$3,029.20	\$1,768.15	58.37%	12	41	17
1999	\$5,656.62	\$3,456.89	61.11%	10	45	11
2000	\$6,576.21	\$5,704.81	86.75%	10	43	16
2001	\$7,116.00	\$5,549.55	77.99%	12	35	13
2002	\$7,406.23	\$6,094.81	82.29%	12	41	17
2003	\$7,293.05	\$9,110.44	124.92%	11	32	13
2004	\$4,927.51	\$4,329.69	87.87%	14	40	18
2005	\$2,259.87	\$1,464.13	64.79%	8	25	18
2006	\$5,088.53	\$3,573.91	70.23%	14	46	21
2007	\$6,735.74	\$5,437.57	80.73%	11	44	19
2008	\$6,286.16	\$3,664.43	58.29%	15	53	17
2009	\$10,700.53	\$6,696.44	62.58%	13	57	21
2010	\$3,209.39	\$2,038.48	63.52%	12	24	12
Total	\$111,587.54	\$78,082.20	69.97%	52	763	47

Source: BIS Offset Database
 Note: Due to rounding, totals may not add up exactly. Figures for certain previous years have been revised to reflect offset data recently submitted by U.S. firms.

European Union and Offset

In August 2011 a Directive on Government Procurement of Defense entered into force in the European Union. The directive aims to bring trade into the defense sector to the aegis of the European Union Agreement. Although the Directive does not explicitly use the term "offset", guides published by the EC attest that offsets would not be allowed on purchases made under the rules of the Directive. If a Member State wishes to impose offset obligations on the purchase of defense articles, it will have to invoke Article 346 of the Treaty on European Union (national security exception). It is considered that the entry into force of the Directive could potentially reduce the use of offset in Europe.

In addition, the European Defense Agency (EDA) in 2009 established a "Code of Conduct for Offset", signed by all its members, except for Romania. This Code applies when a member invokes Article 346 of the Treaty on European Union, a situation in which the directive on government procurement of defense is no longer applied. According to the Code, offsets required or accepted by member states may not exceed the limit of the value of the contract (limit of 100% for offset). In addition, it provides that offsets should have a lower weight in bidding bids (or used as subsidiary criteria in same-weight bids) to ensure that the purchase decision is based on the best available solution that brings greater economic benefits. Finally, the Code provides that Member States will allow international bidders to select their offset partners or recipients within the purchasing country, providing fair and open competition within supply chains. Although the Code is non-binding, according to EDA its members generally adopt the provisions established by the Agency.

"Claimant" offset policy

The analysis of the offset policy was structured based on the verification of the practices adopted by the selected countries (see Tables 1 to 3). The variables considered are organized as follows: Table 1 - legal basis, responsible authority, objectives and period of execution; Table 2 - requirements, multipliers, direct / indirect offset, eligible activities; Table 3 - eligible sectors, receiver selection, monitoring.

Table 1

With regard to the legal basis, it is possible to verify that all selected countries, with the exception of Italy, have a specific legal framework for the agenda related to offset. In some cases (eg Canada and the United Kingdom) the legal framework seeks to converge with the country's industrial policy. It is noteworthy that, with the exception of Canada, the policy-making authority of all the countries mentioned, linking their offset policies with their Defense Ministries, sometimes acting in convergence with other departments linked to industrial and technological policies, as an example it is possible to highlight the UK in the relationship between Ministry of Defense and Department of Trade and Investment. The proximity between defense ministries and industrial development agencies is clear from the objectives described by policies that focus primarily on strengthening the local defense industry through access to technology or access to new external markets. For the duration of the contract, in most cases, with the exception of India, the duration of the contract is respected.

Table 1 - Comparative Offset Policies - selected countries (part 1)

	Canada	Spain	India	Italy	United Kingdom	Sweden
Legal base	Industrial Policy and Regional Benefits for Large Crown Projects.	Directive of the Secretary of State for Defense	Revised Defense Offset Guidelines, published in-2011	There is no formal offset policy. Internal directives of the General Secretariat of Defense. Offsets applied to each bid on a case-by-case basis.	Industry Participation Policy (2003).	Government Procurement Law; Industrial Participation Program (1999).
Responsible Authority	Ministry of Industry (Industry Canada) together with regional development agencies	Ministry of Defense (National Armaments Director) with the support of the Industrial Cooperation Agency.	Ministry of Defense - Defense Offsets Management Wing and Acquisition Wing	Ministry of Defense (National Director of Armaments)	Ministry of Defense (responsible for policy) and Department of Trade and Investment.	Ministry of Defense (FMV). The Ministry is obliged to consult the Armed Forces to decide on the application of the offset in specific defense bidding processes.
Goals	Long-term industrial development; small business development; regional development	Develop an industrial base of competitive defense; Encourage and consolidate national security of supply and the entire life cycle.	Develop the Indian defense industry by (i) encouraging business development; (ii) increased research and development capacity; (iii) encourage the development of sectors such as the civil aerospace sector and the internal security sector.	Maintain and strengthen the capacity, knowledge and export potential of the Italian defense industrial base.	Encourage the creation of work and business opportunities for UK companies and ensure their access to external markets through the establishment of long-term partnerships with foreign companies.	Support the long-term protection of Sweden's basic defense and security interests. Ensure the participation of the domestic manufacturing industry. Promote the transfer of advanced technologies to the defense industry. Increase exports of Swedish defense-related products, systems and advanced technologies.
Period of execution	Usually the contract period.	Usually the contract period.	It may be extended for up to two years after completion of the main contract.	Negotiated case by case	Usually the contract period.	Usually the contract period.

Source: Author's elaboration

Table 2

When checking the requirements it is possible to verify that there is a variation of 30% to 100% of the contract, in some cases (Canada and Spain) space is opened to reduce these percentages. In the issue of multipliers there is a greater diversity of positions, Canada directs the action in the relations between University and Research Institutes with a ceiling of 5%. Spain, on the other hand, generally does not use it, India and Italy, in turn, take a more aggressive stance. Italy focuses on three aspects: (i) technology already possessed by the domestic industry, (ii) technology partially owned by the domestic industry, (iii) technology is entirely new. The United Kingdom does not consider the issue. Sweden, in turn, seeks to look at issues that focus on the need for strengths and in the promotion of small and medium-sized enterprises and R & D activities. Regarding the issue of offset, direct and indirect, there is no divergence since all the countries selected consider its adoption. In the eligible activities it is verified that, in general, they are considered co production, technical assistance, marketing and R & D activities. Attention is again drawn to the case of Sweden which considers transfer of technology and know-how, cooperation / collaboration in technology and R & D, purchase of defense products and services, investments that enhance the competitiveness of the defense industry, collaborative activities for greater access to markets for Swedish products.

Table 2 - Comparative Offset Policies - selected countries (part 2)

	Canada	Spain	India	Italy	United Kingdom	Sweden
Requirements	Normally 100% of the value of the contract; only the value of Canadian content is computed; obligatorily new economic activities; regional distribution of benefits is important; causality must be proven.	Generally 100% of the contract value. A reduction can be negotiated.	Usually 30% of the contract value. The Defense Acquisition Council may establish higher standards or accept the non-application of offset in special cases.	Determined by negotiation, rotating around 75% to 100% of the contract value.	There is no pre-established percentage, but up to 100% of the contract value. Bidders proposes the level that will be negotiated.	Minimum of 100% of the contract value. Offsets are not required from companies in countries that do not have an offset policy.
Multipliers	Usually used only for offset activities involving Canadian universities or research institutes, up to a maximum of 5%.	They are generally not used.	Multiplier of 1.5 is allowed in cases where micro, small and medium-sized companies are Indian offset partners.	(a) technology already owned by the domestic industry (1); (b) technology partly owned by the domestic industry (2); c) technology is totally new (3)	none	They are usually not applied. They can be considered for R & D unrelated to the contract, which is developed in Sweden for the participation of small and medium-sized enterprises, and in support of priority areas for the Armed Forces.
Direct / indirect	Both categories are accepted, but preference for direct offset	Both categories are accepted, but there is preference for direct offset. Required proportion varies from contract to contract.	Both categories are accepted.	Both categories are accepted. There is a preference for direct offset.	Direct benefits as well as indirect intellectual property are acceptable.	Both categories are accepted.
Eligible activities	Direct participation of Canadian companies in the production and support of the equipment being bid.	Coproduction (licenses and patents), purchases of domestic products and services; collaboration in R & D; provision of equipment, tools and	a) Direct purchase of products or services from Indian companies; b) Foreign direct investment in joint ventures with Indian companies.	Participation in the development, production and assistance of the equipment being purchased. Transfer of technology of	Contracts for the development or production of defense equipment. Contracts related to R & D in the defense sector;	Transfer of technology and know-how; cooperation / collaboration in technology and R & D; purchase of defense products and services;

		software; technical management, production-related and integrated logistics support.		interest from the Ministry.	Technology transfer; marketing assistance.	investments that increase the competitiveness of the defense industry; activities that collaborate for greater access to markets for Swedish products.
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Source: Author's elaboration

Table 3

Regarding the eligible sectors, it is verified that the central focus of the countries is the Defense area. Regarding the selection of receivers the process is at the discretion of the bidders, always following the previous requirements (example: requirements, objectives, etc). Monitoring is carried out by the responsible development agencies involved in the process.

Table 3 - Comparative Offset Policies - selected countries (part 3)

	Canada	Spain	India	Italy	United Kingdom	Sweden
Eligible Sectors	It can be targeted at all high technology sectors: defense, aerospace, automotive, information technology.	Preference for defence or civil with a suitable dual-use technology content.	Defense	Defense	Defense	Defense only (since 2004)
Selection of receivers	Industry Canada and regional development agencies will work with bidders to identify potential Canadian companies.	Bidders have complete freedom to choose domestic partners and suppliers.	Bidders are free to choose the Indian partner, provided that this partner has not previously been barred from doing business with the Ministry of Defense.	Bidders are free to choose partners in the domestic defense industry.	Bidders can choose the UK companies with whom they will establish offset activities.	The bidder is expected to select the most cost-effective option when choosing Swedish partners or suppliers.
Monitoring	Annual evaluation conducted by Industry Canada of contracts with active offset commitments	Periodic meetings between the bidder and the Industrial Cooperation Agency.	Bidders are required to provide semiannual reports to Defense Offset Management Wing.	Contractors are required to submit bi-annual progress reports to the MoD.	They must submit semiannual reports.	Bidders are required to submit annual progress reports.

Source: Author's elaboration

CONCLUSION

Table 4 seeks to list the best practices, among those presented, by the selected countries. The variables listed are the same as those presented in Tables 1, 2 and 3. It is important to highlight that the selection of these "best practices" was based on criteria that sought to observe: 1) an interaction and penetration of the defense sector in the adoption of offset, 2) convergence of the compensatory policies with the local technological development from the relations between University / Research Institutes / local companies, 3) construction of policies based on synergies between ministries and industrial and technological secretariats.

Table 4 - Best practices

	Countries	Practices
Legal base	United Kingdom	Industry Participation Policy (2003), revised in accordance with the Industrial Defense Strategy (2007).
Responsible Authority	All quite similar	Inter ministerial with special focus on defense
Goals	All quite similar	Strengthen the Industrial Defense Base
Period of execution	All quite similar	Contract period
Requirements	Sweden	Minimum of 100% of the contract value. Offsets are not required from companies in countries that do not have an offset policy.
Multipliers	Sweden	They are usually not applied. They can be considered for R & D unrelated to the contract, which is developed in Sweden for the participation of small and medium-sized enterprises, and in support of priority areas for the Armed Forces.
Direct / indirect	All quite similar	Both categories are accepted.
Eligible activities	Sweden	Transfer of technology and know-how; cooperation / collaboration in technology and R & D; purchase of defense products and services; investments that increase the competitiveness of the defense industry; activities that collaborate for greater access to markets for Swedish products.
Eligible Sectors	All quite similar	Preferably Defense
Selection of receivers	All quite similar	At the discretion of the bidders
Monitoring	All quite similar	Responsible development agencies involved in the process

Source: Author's elaboration

In spite of a strong similarity in the forms of action between the countries, it is possible to affirm that the "Swedish model" has a greater synergy with the criteria adopted for the selection of "best practices". It is in favor of this model that a strong interaction between small and medium-sized companies is sought, in convergence with the needs of the armed forces.

This process seeks to deconcentrate the investments of large national groups and pulverize them in small and medium-sized technology-based companies. It also makes clear the importance of transferring technology and know-how to participating companies.

Some cases, such as India, make clear their strategic technological options for technology acquisition through offset. This type of policy option, to make explicit the support and the need to adopt support mechanisms for the defense sector, is very interesting once it makes clear to society the State's intentions with the adoption of mechanisms for the technological development of the Defense sector.

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