Rating Correlations Between Customs Codes and Export Control Lists: Assessing the Needs and Challenges

RENAUD CHATELUS AND PETE HEINE[1]

Abstract

Correlation tables are the linchpin between the customs codes used to classify commodities in international trade and the control lists used for strategic trade control (STC) purposes. While understanding the customs classification system can help the STC community better understand strategic trade flows, better identify which trade operations require permits, and more effectively detect illegal exports, the two systems are different in scope, philosophy, content, and objectives. Many indications point to the limitations of these correlation tables, and it is important to understand the nature of the limitations and the complex underlying reasons to conceive possible improvements. As part of its Strategic Trade and Supply Chain Analytics Initiative, Argonne National Laboratory supported a study with the University of Liège's European Studies Unit of a subset of the European Union's TARIC correlation table. The study included development of a methodology and an approach to rating the quality and relevance of individual correlations. The study was intended as a first step to engage the STC community in deflections and initiatives to improve the conception and use of correlations, and its conclusions illustrate the scope and complex nature of the challenges to overcome. This paper presents the two classification systems, analyzes the needs for correlation tables and the complex challenges associated with them, summarizes key findings, and proposes possible ways forward.

1 Renaud Chatelus is a researcher at University of Liège and senior fellow of the University of Georgia (U.S). He has 20 years of practical and academic experience in non-proliferation, export control, customs and IAEA Safeguards. He was investigator in the French customs before joining the IAEA as weapons inspector and nuclear trade specialist. HE also worked as researcher at the European Commission Joint Research Centre. His recent activities include research on non-proliferation and trade control, as well as national capacity building for a number of international organizations and international assistance programs. Peter Heine is Director of the Center for Strategic Security at Argonne National Laboratory. His has worked on dual-use trade control for over 20 years, particularly in the advancement of effective strategies for identifying high-risk shipments and the establishment of training programs for export control enforcement personnel. Currently, he is also seconded to the World Customs Organization as a Strategic Trade Control Enforcement National Expert.

Keywords:

Export control, strategic trade control, harmonized system, correlation tables, trade data, commodity classification, control list

Introduction

Since the early 1990s, a number of countries have actively participated in multilateral export control arrangements to produce guidelines for strategic trade controls (STC) including lists of dual-use material, components, equipment, and technology to be subject to export control.[2] The EU has consolidated these lists into one integrated dual-use list, creating the most internationally adopted control list for strategic commodities. However, this classification system for strategic trade control did not come in an empty landscape.

Customs services around the world had already established a global and comprehensive system of classification for all commodities to serve as a basis for the determination of import-export obligations, customs duties, and international trade statistics. The Harmonized System Convention, which is now used by 207 countries, territories, or customs or economic unions, defines six-digit codes (HS codes) to which countries can add additional digits for more detailed itemization.[3]

Customs officers, companies' compliance staff, and academics have to work with these two different systems when dealing with trade in strategic goods. Unfortunately, these systems are defined and updated by different sets of people who have different purposes, and for a long time little attention was given by the two communities into making the two systems compatible. On both sides, procedures, political considerations, and heavy international negotiation processes make such mutual adaptation a challenging task. The need to work with both systems for a number of STC related tasks triggered the creation of correlation tables relating the two.

Correlation tables are the linchpin between trade data, customs obligations, and STC. The EU's TARIC correlation table in particular is the most well-known and used beyond EU borders. It correlates hundreds of entries of the EU consolidated control list (Export Control Numbers – ECN)[4] and thousands of Customs codes. Yet, existing correlation tables suffer from several shortcomings. Intrinsic challenges derive from structural differences that are difficult to overcome, but improvements appear possible in view of a close examination of the various aspects of this complex problem.

---

2 The Nuclear Suppliers Group, the Wassenaar Arrangement, the Australia Group, and the Missile Technology Control Regime.

3 "List of Contracting Parties to the HS Convention and countries using the HS," World Customs Organization, <http://www.wcoomd.org/en/topics/nomenclature/overview/list-of-contracting-parties-to-the-hs-convention-and-countries-using-the-hs.aspx>.

4 European Commission Delegated Regulation No. 2420/2015 amending Council Regulation (EC) No. 428/2009 Setting up a Community Regime for the Control of Exports, Transfer, Brokering and Transit of Dual-use Items, Official Journal of the European Union, October 12, 2015.

Taking this perspective, Argonne National Laboratory's Strategic Trade and Supply Chain Analytics Initiative undertook to study a sample of correlations with the support of the European Studies Unit of University of Liège. The objectives were to provide a first indication of the quality of existing individual correlations, investigate the utility of devising a rating scale for the quality of individual correlations, and create a basis for discussion and further studies. The present paper analyzes the various aspects of the correlation challenge, presents the study and, based on its key observations, proposes possible ways to improve correlation tables.

1. Customs Classification Codes as an Essential Element of Strategic Trade Control Implementation

Customs classification codes are essential to different aspects of STC implementation. Any exported or imported item must be classified within one several thousand customs codes defining the kind of item in import-export databases. National customs codes are built upon a comprehensive universal classification system based on international treaties.[5] In contrast, strategic control lists are not comprehensive; they define controls only for strategic commodities and are implemented by some countries with national variations (as multilateral regimes issue only non-legally binding guidelines). However, customs commodity codes do not help sort out which commodity is controlled and which is not. This work remains a cumbersome human process of verification of individual cases. It is based on open text descriptions and technical specifications that are often not available in standard shipping and customs documentation.

The problem is acute for risk management systems used by customs to select the small percentage of shipments that they will have the means to examine, out of an immense volume of exports. Using potentially relevant customs commodity codes is much more practical than a keywords search in commodity description fields of customs declarations. The same is true when companies try to identify which of their products are potentially subject to export control requirements, or when authorities use customs declarations to identify which companies might require outreach efforts or audits.

In these cases, the inability to use HS codes precisely correlated with export control lists means that significant resources are needed to manually identify potentially controlled items, that non-strategic exports are unduly disrupted, and that the risks of illicit exports of strategic items going undetected remain high. The HS is also the basis for international trade statistics. When estimating the economic impact of controls on trade, using relevant HS codes is the main (and often only) way to measure international strategic trade flows.

In the authors' experience, it is common to meet customs practitioners in the public and private sector who do not understand why strategic trade control measures are not directly attached to already defined customs commodity codes. The present paper thoroughly examines why such a simple solution is not an option.

Improving the correspondence between the two systems is therefore essential to the efficiency, efficacy and understanding of strategic trade control. While improvements may be realized on each side, for example by improving the convergence of definitions, changes on both sides are

5 See section 2 below.

costly and slow and require understanding and willingness. In the short term, correlation tables between the two systems will remain essential to enable the use of customs codes for strategic trade control purposes. The accuracy and precision of these tables is therefore a determinant factor of the quality of strategic trade control implementation.

2. Using the HS for Strategic Trade Controls: Correlation Tables

a. The Customs Harmonized System: A Universal Commodity Classification System for International Trade

The Harmonized Commodity Description and Coding System, generally referred to as Harmonized System or simply "HS," is a multipurpose international product nomenclature developed by the World Customs Organization (WCO). The HS is governed by The International Convention on the Harmonized Commodity Description and Coding System, also known as the HS Convention, which entered into force in 1988.[6] The HS Convention has 154 Contracting Parties and is used as the basis for Customs tariffs, for the collection of international trade statistics, and for standardization of trade documentation and the transmission of data by 207 countries and Customs or Economic Unions. Over ninety-eight percent of the merchandise in international trade is classified in terms of the HS.[7]

The HS comprises over 5,000 six-digit commodity codes arranged in a legal and logical structure that is supported by well-defined rules to achieve uniform classification. The HS is organized into twenty-one sections of commodity sectors and ninety-six chapters, accompanied with general rules of interpretation, legal notes, and explanatory notes. The first two digits of the HS code designate chapters, starting with crude and natural products and then manufactured products of increasing complexity. The first four digits are referred to as headings, with the final two digits defining sub-headings, as shown in fig. 1 below. In total, the latest version of the HS (2012) has 1,222 four-digit headings and 5,367 subheadings. In general, trade in a commodity should exceed $50M USD annually to warrant creation of a specific six-digit subheading for that commodity.

Heading	H.S. Code	
39.09		**Amino-resins, phenolic resins and polyurethanes, in primary forms.**
	3909.10	- Urea resins; thiourea resins
	3909.20	- Melamine resins
	3909.30	- Other amino-resins
	3909.40	- Phenolic resins
	3909.50	- Polyurethanes

Figure 1: Example HS Heading and Subheadings (HS Codes)

6 "International Convention on the Harmonized System," World Customs Organization, <http://www.wcoomd.org/en/topics/nomenclature/instrument-and-tools/hs_convention.aspx>.

7 "What is the Harmonized System?," World Customs Organization, <http://www.wcoomd.org/en/topics/nomenclature/overview/what-is-the-harmonized-system.aspx>.

International customs classification has existed since 1931, but the current HS was established in 1988 after sixteen years of preparation and negotiations. It is updated every five years through a complex and rigorous review process. The current fifth edition has been in force since 2012 and a new one will enter into force on January 1, 2017. Proposed modifications currently under consideration may yield new subheadings to facilitate classification of many strategic commodities, but would not be implemented until the next revision in 2022.

States party to the convention can request technical assistance, be members of committees, sub-committees, and working parties, make proposals, raise questions, and vote. These states are also obligated to publish trade statistics, providing the source of trade data used by economists and statisticians around the world.

b. Export Control Lists

Control lists are a more recent creation than customs categorization systems that are used to identify and specify the goods subject to export control. While export controls are administered at the national level, a degree of control list harmonization and standardization is provided by the multilateral export control arrangements, namely the Wassenaar Arrangement, the Missile Technology Control Regime (MTCR), the Nuclear Suppliers Group (NSG), and the Australia Group (AG), as well as by the Schedules of the Chemical Weapons Convention (CWC). Each of the multilateral arrangements provide unique control lists specifying the goods relevant to their interest areas such as conventional weapons, delivery systems, nuclear facilities, and chemical and biological agent production.

By far the most universal of dual-use control lists is that of the European Union, currently Annex I of EC 428/2009, as updated by EU 2015/2420, which brings together the separate control lists of the Wassenaar Arrangement, the MTCR, the NSG, the AG, and the CWC.[8] This control list is used by the EU Member States and serves as a model for the control lists of many other countries, including the United States. The consolidated EU control list is divided into ten technical categories, with each category subdivided into five product groups. A five-character code is used to designate each control, with the first digit denoting the technical category and the second character denoting the product group. The third digit indicates the regime origin of the control, and the last two digits are simply item numbers without inherent meaning. Beyond the five-character code, the export control number (ECN) is often subdivided using a hierarchical outline, for example 1C002.a.1.

c. Correlation Tables

Logically, STC practitioners, private companies, and academics have been looking for a correspondence between items of interest for STC, mainly those defined in control lists, and the HS. This need has led to many efforts to create correlation tables to link the two systems, such as the EU TARIC Correlation Table and many others. They may be available as a tool to help exporters or as an integral part of automated systems triggering export control obligations. Tables typically establish many-to-many relations, meaning one HS code corresponding to

8 European Commission Delegated Regulation No. 2420/2015 amending Council Regulation (EC) No. 428/2009 Setting up a Community Regime for the Control of Exports, Transfer, Brokering and Transit of Dual-use Items, Official Journal of the European Union, October 12, 2015.

many controls and one control corresponding to many HS codes. The EU TARIC correlation table has 6179 lines, connecting 593 dual-use ECNs of the EU consolidated dual-use control list on the one hand,[9] with 1204 of the 9000 customs tariff codes of the EU customs Combined Nomenclature (CN8) on the other hand.[10]

The number of correlations could even be higher if each ECN's hierarchical outline of subdivisions were fully expanded and included. In addition, some dual-use entries describe several items or alternative forms of items, and each could theoretically be individually itemized, leading to even more correlations.

An example of this many-to-many relation is the EU dual-use ECN *2A003.c* covering different types of signal analyzers. In the EU TARIC table, it is correlated with three CN8 codes about instruments. In turn, one of these HS codes, *90308930,* representing *"Electronic instruments, apparatus and machines for measuring or checking, not elsewhere specified in chapter 90*," correlates with twenty-seven ECNs of the dual-use list.

d. Different Rationales for Different Uses

The STC community uses the HS and correlation tables for multiple purposes that can be grouped into three categories: normative, trade evaluation, and identification.

Normative

Determining the nature of commodities in trade, together with their values and origins, is central to customs processing of commercial operations, and Customs use HS-based tariff codification to classify commodities. Thus, the HS is one of the main structuring elements of customs obligations and IT systems. It is therefore not surprising that the first reaction of STC professionals discovering the HS and of customs officers discovering STC is to ask for the HS codes corresponding to the controlled items. From this normative perspective, correlation tables should establish which HS code is correct for each controlled commodity.[11]

Normative correlations should be based on technical definitions and rules governing classification in both systems.

Trade Evaluation

The multilateral export control arrangements stress that they aim to curb WMD proliferation without unduly hindering legitimate trade.[12] On the customs side as well, trade facilitation is as

---

9 This figure it taken from the EU TARIC Correlation table.

10 The CN8 is the eight-digit customs classification system used in the EU, in which two digits have been added to the internationally standard six-digit HS code.

11 In the EU, the TARIC correlation table does not determine when exporters must request a permit, but it does determine when exporters must assess whether their exported commodity requires a permit or not. When the customs tariff number indicates a correlation with the dual-use list, EU exporters must fill in Codes X002 (controlled) or code Y901 (not controlled) in Box 44 of the Single Administrative Document (i.e., the customs declaration).

12 For example, on its website page about objectives, the MTCR stresses "the importance of controlling the transfer of missile-related technology without disrupting legitimate trade." See Missile Technology Control Regime, <http://mtcr.info/>.

important a mandate as are enforcement and revenue collection. The question of the economic impact of STC measures on trade is therefore always part of the equation, for example when controls are proposed, introduced, or reexamined. Policy makers must regularly estimate how much trade will be impacted by STC measures and how great will be the licensing burden associated with controls. Trade statistics based on HS/Tariff classification are needed to estimate how many operations, how many companies, how much trade value, or which economic sectors might be concerned by the regulation.

Trade evaluation can also be used to characterize industrial activities and capabilities. The IAEA, for example, uses trade evaluation to profile countries nuclear-related trade and verify States' declarations.[13] Additionally, STC capacity-building programs like the EU Partner to Partner (P2P) Program or the U.S Department of Energy's International Nonproliferation Export Control Program use trade analysis to help plan and tailor their outreach activities.[14,15,16]

For these trade evaluation purposes, correlation tables are used to extract data from international trade statistics that could serve as a basis for estimating the magnitudes of dual-use trade. However, correlations useful for trade evaluation cannot be solely based on technical correctness. Exporters do not always seek technically and legally exact customs classification. Instead, they rather often select a customs tariff code by habit or by key word search in the tariff database. They also sometimes use single HS codes for shipment of multiple items. Often little attention is paid to correctness of the HS code since customs duties typically apply to imports.

Therefore, from this trade evaluation perspective, correlations should ideally be based on the real practices, regardless of technical correctness and classification rules.

Identification

The third category of use of correlation tables is to identify individual operations potentially subject to export control, in combination with other information.

A large company reassessing its export control compliance or a country implementing export controls will be looking for a way to identify exports that should require a permit. Looking at shipments of commodities with HS codes corresponding to controlled goods is seen as a first step to trigger further research on the nature of the exported commodity.

Along the same line, but taking the process one step further, Customs services look for HS codes to introduce in their risk management system in order to identify (and target for further examination) shipments of goods with the highest probability to require a license. Similarly,

---

13 See for example, Cristina Versino, Erik Wolfart, Guido Renda, and Willem Janssens, "Trade Analysis and Open Source Information Monitoring for Nonproliferation," presented at the INMM 55th Annual Meeting, July 20-24, 2014, in Atlanta, Georgia USA, "Information Analysis Technologies, Techniques and Methods for Safeguards, Nonproliferation and Arms Control Verification," proceedings pp. 173-183.

14 European Union Partner-to-Partner Export Control Programme, <https://export-control.jrc.ec.europa.eu/>.

15 "International Export Control Cooperation," National Nuclear Security Administration, United States Department of Energy, <https://nnsa.energy.gov/aboutus/ourprograms/nonproliferation/controllingwmdmaterialsexpertise/intlexportcontrolcooperation>.

16 A good example of this approach is Cristina Versino and Pete Heine, *Strategic Trade Atlas - Country-Based Views,* (Ispra; Joint Research Centre Technical Report, 2007).

companies trading in commodities falling under these HS codes may be selected for outreach and audit. For these identification purposes, correlation tables should indicate which HS codes correspond to controlled items.

A complication arises when using correlation tables for identification purposes, as one must not only be interested in technically correct correlations or those used in practice, but also in correlations that are wrong, unusual, or too broad but nevertheless possible and of interest when combined with other information. A classic example is the correlation between many technology controls (e.g., EU dual-use list 1D002 "Software" for the "development" of organic "matrix," metal "matrix" or carbon "matrix" laminates or "composites"), and the customs tariff code for DVDs (NC8 85234951).[17] While hardly sensible from a trade evaluation perspective, it may be useful when customs officers know that a technology will be exported in a tangible form within two days by express parcel service.

So-called "residual" HS codes provide a less extreme and more common example. Codes labeled "other" or "not elsewhere specified…." can be found throughout the Harmonized System and are often used by convenience to avoid the work required by a proper customs classification. Problematically, these "residual" HS codes are often the correct classification codes for strategic items, as their low trade volumes have not warranted creation of specific HS codes for them. There are also customs codes intentionally used to avoid detection or deter inspection, such as commodities that are dangerous, difficult to scan or search, or too common. Some of these codes are used as cover for illegal operations. The use of these codes may not be appropriate on their own to indicate an STC fraud. But they can still be useful in certain circumstances, in combination with other elements of information relating, for example, the timing, the item or the parties involved in a specific transaction.

From this identification perspective, correlation tables should indicate which HS codes correspond to controlled items, including loosely related ones, as well as codes relevant to fraud patterns, but it may be useful to include an indication that not all correlations are equally indicative.

e. Insufficient Reliability

As discussed above, different uses may lead to different correlations. Unfortunately, existing correlation tables are generally not explicit about the purpose for which they were built. Even within each table, correlations corresponding to different purposes might co-exist without being identified accordingly. As a result, correlation tables are being used for normative, trade evaluation or commodity identification purposes with a high probability they were never intended for such use. This leaves STC practitioners and observers with a significant chance of using correlations ill-suited for the use they want to make of them.

The possible mismatch between purpose and use of correlation tables is likely one of the reasons why correlations can be seen as not reliable, aside from unreliability of export declarations themselves.

---

17 According to the TARIC Correlation table, see "Integrated Tariff of the European Union: Correlation Table," European Commission, <http://trade.ec.europa.eu/doclib/html/153050.htm>.

The following section provides some indications of the nature and magnitude of the problem. But the most convincing evidences of the confusion around the existing instruments are indirect:

- In the authors' experience, many specialized customs practitioners on the government and on the industry side do not consider correlation tables as reliable tools to support their work;
- Estimates of trade volumes for controlled dual-use goods vary by an order of magnitude, ranging from a few percent to double digits percentage of global export value;[18]
- A comparison of correlation tables established in 2011 for NSG trigger list entries by the German export control authority (BAFA) on the one side (113 lines) and by the European commission DG-TAXUD on the other side (237 lines), shows only fifty-nine lines in common (about 20%).

f. Challenges of Correlating Customs Tariffs and Control Lists

Some HS code descriptions are not far from dual-use control list entries, leaving open the possibility to refine existing HS codes or create more detailed codes that would correspond to the control specifications. Such is the case, for example, for certain chemicals.[19] It is nevertheless much easier to find cases of mismatch than points of compatibility. Many complex challenges hinder the potential to create reliable correlation tables. Before exploring ways of improving these tools, it is first necessary to examine the various challenges of bridging the two systems.

While both the HS and control lists are designed to facilitate the implementation of measures relating to international trade operations by providing global harmonization and transparent criteria, and while both take the form of lists of items and classification criteria, diverging objectives of the customs and trade control communities lead to important structural differences.

A first fundamental difference is that the HS is designed to cover all possible commodities and enable differentiated policies and duties, depending on the type of commodity.[20] The HS is a classification system breaking down global trade into manageable categories.

Conversely, control lists include only specific items of potential strategic utility. Entries in export control lists are based on the associated proliferation risks, potential economic impacts,

---

18 See Cristina Versino, *Dual-use Trade Figures and how they Combine*, (Ispra: JRC Scientific and Policy Reports, 2015).

19 For chemicals, the OPCW and the WCO collaborated in the 1990s to define specific HS codes for thirty-four CWC scheduled chemicals. Other chemicals are also defined in relatively similar terms in both systems, leaving only one criteria (i.e., concentration) as gap to bridge.

20 The WCO describes the harmonized system as a "multipurpose international product nomenclature" and "a universal economic language and code for goods." See "What is the Harmonized System?," World Customs Organization, <http://www.wcoomd.org/en/topics/nomenclature/overview/what-is-the-harmonized-system.aspx>. It remains however mainly designed to facilitate and harmonize the implementation of customs duties and economic regulations on commercial imports.

and practicality of control.[21] The crafting of control language does not consider import duties, anti-dumping rights, or sanitary regulations. Therefore, control lists define objective criteria to subject exports of specific commodities to export control requirements.

There is objectively no reason to expect that the level of detail, type of criteria, specifications, way to group categories, and classification rules of the two lists coincide. Important differences include the following:

- The HS categorizes only physical commodities. Intangible information ("software," "technology") have to be declared according to the media storing them, if there is one;

- Generally, six-digit HS codes are only given to commodities with at least $50M USD worth of annual trade, meaning that the HS provides unique codes for items that are common and pushes rare, specialized ones into residual codes labeled "other" or "not elsewhere specified."[22] Conversely, many control entries are defined as narrowly as possible to capture the very specific equipment/component/material with proliferation risks and avoid unduly impacting high-volume trade in common items. In fact, a control becomes inapplicable when an item is too commonly traded, and items can be de-listed for this reason. For example, digital oscilloscopes (9030.20 in the HS), while still relevant for nuclear testing purposes, were delisted from the NSG control list when they became too common;

- The level of precision varies throughout control lists. It may range from specific electronic devices to very generic "equipment for the production of…." On the other side, HS codes are also diverse in their precision. Commonly, items defined in a generic way on one side are defined specifically on the other side, or worse, items may be defined in generic terms on both sides. The case when items or codes are defined precisely on both sides, in ways that are compatible, is the exception. As an example, ECN 1B115 is derived from a MTCR control on "equipment for the production of propellant and propellant constituents," which may correspond to many different types of equipment. The TARIC correlation table links this ECN with seven CN8 codes, including very generic ones like 84799080: "Parts of Machines and Mechanical Appliances Having Individual Functions, not elsewhere specified;"

- The type of criteria employed varies. Both may use the purpose (e.g., "for use in…"), performances (e.g., "capable of…"), compositions (e.g., "made of…"), or manufacturing process to define items/codes, but not necessarily in the same way. For example, in the control lists, carbon, glass and aramid fibers are grouped under a control for fibrous and filamentary materials, but the HS puts these various fibers into completely different chapters based on the material;

---

21 Paragraph 32 of NSG document INFCIRC/539r6 states that "the NSG Guidelines introduce a degree of order and predictability among suppliers and harmonize standards and interpretation of suppliers' understanding with the aim of ensuring that the normal process of commercial competition does not lead to outcomes that further the proliferation of nuclear weapons. Consultation among NSG participants are also designed to ensure that any possible impediments to international nuclear trade and cooperation are kept to a minimum." See Nuclear Suppliers Group, <http://www.nsg-online.org/en/>.

22 "Other… not elsewhere specified in this section/chapter/heading" is usually the terminology in the HS system.

- The six "General Rules for the Interpretation of the Harmonized System" are central to HS classification, sometimes leading to counterintuitive classifications.[23] Control lists include the notion of "essential elements" but are more focused on technical specifications.[24] Although both systems leave room for interpretation, they may lead to classifications on an entirely different basis. In a recent decision, the HS committee ruled that a specific quadrocopter drone should be classified as a camera rather than as a toy or an aircraft because the camera was giving the aircraft its "essential character."[25]

g. Possible Ways to Address the Problem

In the face of this complexity, simple solutions do not exist. There are different types of challenges calling for different approaches, and none of them completely solve the problems. The dream of an automatic link between categories on both sides is not realistic, and export control systems establishing export license requirements based on Customs tariff codes are likely to either impede trade unnecessarily, create needless administrative costs, or let controlled items slip through the system, if not all three together.

Approaches to solve the problem must be multiple and differentiated. Below are several approaches that may enable design, improvement, or better use of correlation tables.

Disambiguating Correlation Tables

Many improvements could take the form of disambiguation—being aware and explicit about rationale and objectives. In addition to improving the classification and correlation systems, the understanding and use of them can also be improved. For example, the U.S. DOE has developed a "commodity fingerprint" approach based on combining the HS code with other identification indicators associated with specific strategic commodities. Work can also be done on the correlation tables themselves. Below are a few examples of disambiguation efforts that could be undertaken. The study presented further below takes into consideration these clarifications.

- Relevance of individual correlations varies greatly. For almost any use, it is essential for users of correlation tables to have an indication about this relevance, i.e. an understanding (even rough) of the probability that a commodity belongs to corresponding categories in both systems. The correspondence between beryllium compounds (included in ECN 1C230) and the generic "other metal oxides" (HS 282590), cannot be treated like the correspondence

---

23 General Rules of Interpretation (GRI) are essential elements of the Harmonized System. There are six of them. The first four must be applied in sequence, i.e., Rule 2 is to be considered when Rule 1 is not sufficient to classify an item. The last two are to be applied as needed. Any HS classification ruling by the WCO refers to the rule(s) used for that decision. For more on GRI, see "Instruments and Tools," World Customs Organization, <http://www.wcoomd.org/en/topics/nomenclature/instrument-and-tools/hs_nomenclature_2012/~/media/B7BC612CEB3B417BB5183841DA7413CB.ashx>.

24 See General Note 2 of the EU Dual-use regulation's Annex I. European Commission Delegated Regulation No. 2420/2015 amending Council Regulation (EC) No. 428/2009 Setting up a Community Regime for the Control of Exports, Transfer, Brokering and Transit of Dual-use Items, Official Journal of the European Union, October 12, 2015.

25 "Classification Rulings: HS Committee 55th Session," Decision 21,World Customs Organization, March 2015, <http://www.wcoomd.org/en/topics/nomenclature/instrument-and-tools/hs_classification-decisions/~/media/4459C0A917AB4D66A8EE9F76DB395071.ashx>.

between controlled Hydrogen fluoride (7664-39-3) and the HS code for Hydrogen fluoride "hydrofluoric acid" (HS: 2811.11);

- No correlation should be established and used without defining explicitly for which purpose. Opting for one of the three types of correlation purposes defined in paragraph 1.d above will make correlation tables significantly more useful and clear up many misunderstandings between designers and users;
- Correlations might be of very different relevance depending on the direction. One controlled item might need to be always classified under a customs code while being a very marginal part of this code. In such case, the correlation is relevant to identify under which HS the controlled item should be classified, but less useful to find the controlled item through an HS search. The opposite situation might occur as well. Existing correlation tables do not differentiate the direction of correlations, and it is unclear whether correlations were established because they were relevant for one direction only or for both directions. Therefore, correlation tables should give some indication about the direction for which they are most relevant. If one tries to rate the relevance of individual correlations, this rating should be different depending on the direction.

Better Itemization in the Correlation Table

Even if the export control lists and HS could not be modified in any way, the correlation table could be improved by providing correlations at a deeper level of the ECN hierarchy. For example, rather than correlating fifty CN8 codes with 1C010, as the current TARIC correlation table does, more relevant correlations could be provided separately for 1C010a, b, c, d, and e. This may be the easiest fix to implement.

Better Itemization in the Respective Systems Themselves

As noted above, the two systems are not itemized at the same level and the same way for the same items. Here too, a specific approach can in a number of cases bring significant improvements.

- For a number of controlled items and codes, definitions could be more precise on both sides. For some of them, the HS or national derivative could include more precise sub-headings, in line with or compatible with controlled items definitions. Conversely, some generic regime definitions could be itemized by subcategories or by illustrative lists. The better itemized categories are not likely to bring one-to-one correspondence for a range of technical and procedural reasons, but could bring improvements at minimal cost;[26]
- Possibilities are not limited to modifications in the definitions themselves. On both sides, explanatory notes could include considerations regarding the other system and illustrative examples could be made useful, if not compatible, with the other system. For example, the ECN 1B115 about specially designed production equipment for the systems, sub-systems and components of various types of rocket and missile motors could include an illustrative list that would be more immediately accessible and more concrete than explanations of the MTCR handbook.[27]

---

26 See next section on challenges to improvements of the correlation tables.

27 See section 3 below on examples of correlation rating.

Streamlining of Criteria and Thresholds

In some cases, the criteria used are close and could be streamlined. To take the example of Magnesium, both the NSG and the HS take into consideration the purity of the material to isolate highly pure magnesium but they define it differently. The NSG controls magnesium which contains less than 200 parts per million by weight of metallic impurities other than calcium; and contains less than ten parts per million by weight of boron (both conditions must be met). The HS distinguishes between magnesium with at least 99.8% purity (8104.11) and other magnesium (8104.19)

h. Challenges to Improvements of the Correlation Tables

Challenges are numerous and do not allow one solution. Rather, progress can be made through limited multiple improvements in different areas for different sets of correlations.

Several institutional challenges must also be bypassed or overcome to achieve improvements.

- The two systems relate to the control of international trade, but the two work communities have in fact little in common. Not many practitioners on the non-proliferation/licensing side have a good understanding of customs processes, constraints, knowledge, assets and work culture. Conversely, in customs, the community understanding of export control and dual-use goods is often limited to a very small circle of specialized experts, with insufficient awareness of the vast majority of customs officers.[28] The two communities, and even administrations or offices within these communities, might have different perceptions of the importance of certain issues, such as the strategic importance of commercial transit for customs or the strategic and political sensitivity of export control as perceived by the licensing officers. The customs community might be more sensitized than the licensing export control community to the need of addressing the correlation problem;

- Classifying commodities requires an experience and techniques on its own, even more so on the customs side, where classification rules are complex and sometimes counterintuitive. Chemists and engineers can be found on both sides. Customs laboratories and in some cases specialized customs headquarters officers, are the most likely to be at the intersection of the two competences. But dual-use classification experts and customs classification experts work in two different worlds with little interaction. Most customs classification experts at the WCO, in the EU or within countries are focused on the complicated implementation of classification rules to settle disputes related to duties and quotas. Most dual-use classification experts have no knowledge of customs commodity classification. The greatest pool of common expertise however may lie with the private sector, which has to combine customs compliance and export control compliance. There two different cultures sometimes co-exist, but there can also be a separation between engineers and lawyers involved in classifying dual-use products to file license requests and Customs departments processing the customs declarations;

---

28 See Renaud Chatelus, Willem Janssens, Quentin Michel, Andrea Viski and Christos Charatsis, "Non-Proliferation Community: Do We Really Speak the Same Language?," paper delivered at the IAEA Safeguards Symposium, Vienna, Austria, March 23, 2015.

- The two classification systems are decided independently through separate complex international negotiation and experts' discussion processes: the regimes and national licensing offices on the dual-use side; the HS Committee, related subcommittees, and specialized national customs classification departments on the customs side. On both sides, changes are challenging, slow and costly. Interaction between two such complex processes is not likely to be simple. Institutional challenges include also different sets of parties or member states, different processes to introduce and adopt changes and different review cycles (yearly for export control and every five years for the HS).

3. Assessing a Sample of Existing Correlations

In view of the different aspects of the matter described above, especially the institutional forces complicating changes to the HS and to export control lists, improving the design and use of correlation tables may be more expedient and realistic than reforming the systems themselves. The first step in this process is to understand the nature and extent of the problems with the existing correlation tables. A preliminary study was undertaken under Argonne National Laboratory's Strategic Trade and Supply Chain Analytics Initiative. The objective was to provide a first indication of the quality and utility of existing individual correlations and give a basis for discussion and further studies.

A large part of the work was dedicated to defining an approach that would meet the objectives within a limited envelope of working time. The study focused on disambiguating the question, defining a sample to study, developing a rating methodology and explicitly identifying limitations of this approach to avoid misinterpretations. Despite these limitations, the rating exercise illustrated the nature of the challenge and provided an interesting basis for discussions and ideas on how to move forward.

a. Disambiguation

Considering the observations made in the previous paragraphs, the study had to prevent the confusions generated by the existing correlation tables.

Fundamentally, a choice had to be made between normative, trade evaluation, or identification purposes. The choice was essentially normative—to focus on technical definitions and classification rules.

- In a first step, technically incorrect correlations were identified and excluded;

- In a second step, the technically correct correlations were assessed based on detailed examination of the correlated definitions to estimate to what extent each customs code describes a correlated controlled item or how commonly items falling under the control might be classified under a correlated customs code,[29] For example, 4A102 "Hybrid computers" specially designed for modeling, simulation or design integration of space launch vehicles (…) part is not likely to be a large proportion of items traded under the HS code 847130 describing portable computers with keyboards and screen.

29 See paragraphs 2.c and 2.d. below.

A separate correlation rating was made for each *direction*. For each individual correlation assessed as technically correct, two ratings were established:

- To estimate how likely would the controlled item be classified in this HS code, vs. other HS codes (ECN→HS);
- To estimate what proportion of trade under the HS code might the controlled item represent, vs. other controlled and non-controlled items (HS→ECN).

b. Sampling

Data set

The correlation table selected for study was the TARIC correlation table.[30] The version used was the one available as of December 2015.

Sample

The TARIC correlation table includes 6179 lines. The scope of the exercise could only allow the rating of a small subset of this table. The sample chosen for study comprised the set of correlations between controls deriving from the MTCR and customs codes from chapter 84 of the HS (i.e., machinery, mechanical appliances, and parts). This subset provided a sample of 108 correlations at the CN8 level (corresponding to 92 at HS6 level), between thirty-nine ECNs and fifty-three CN8 codes (48 HS6 codes).

The sample did not include controlled raw materials and chemicals, which might be better correlated with customs codes.

Itemization

To be more universal, the customs codes were itemized at the HS6 level rather than the more detailed EU CN8 level. This had only a limited impact on the key observations.[31] On the ECN side, the TARIC table only includes five or six characters of the ECN (e.g., 9A116 or 9A116 d). While many ECNs use levels of hierarchical outline to more precisely identify controlled items, the TARIC correlation table does not take advantage of them.

30 "Integrated Tariff of the European Union: Correlation Table," European Commission, <http://trade.ec.europa.eu/doclib/html/153050.htm>.

31 See 4.e below.

c. Rating Methodology

To isolate technically wrong correlations, the following technical relevance rating was used:

Table 1. Scale Definition for Technical Correctness

Rating	Interpretation
Y	*An item controlled in the ECN could be correctly classified in the correlated HS*
N	*An item controlled in the ECN should not be classified in the correlated HS*
P	*Whether an item controlled in the ECN should or not be classified in the HS is to be assessed with relevant expert*

To assess relevance of technically correct correlations, the following two rating scales were used:

Table 2. Scale Definitions, for Relevance

Rating	HS→ECN I.e., what proportion of trade under this HS code, does the controlled item represent (vs. other controlled and non-controlled items)	ECN→HS I.e., how likely will the controlled item be classified in this HS code (vs. other HS codes)
1	*Finding the controlled commodity in trade flow declared under this HS would be exceptional*	*The controlled commodity is exceptionally categorized in this HS code*
2	*A very marginal fraction of the trade under this HS is made of the controlled commodity*	*The controlled commodity is rarely categorized in this HS code*
3	*A small but noticeable fraction of the trade under this HS is made of the controlled item*	*The controlled commodity is often categorized in this HS code*
4	*A significant part of the trade under this HS is made of the controlled item*	*The controlled commodity is very likely categorized in this HS code*
5	*Most of the trade under this HS code is made of the controlled item*	*The controlled commodity is always be categorized in this HS code*

The scale is not defined by measurable values or percentages. It is a qualitative expert estimate providing a rating in relative terms (i.e., correlations rated one are less relevant than correlations rated three) on the basis of definitions only.[32]

The levels may also be understood as follows:

- Level five means that the correlation can likely be directly used;
- Levels three and four mean that the correlation may be usable in combination with other information;
- Levels one and two mean that the correlation is not likely to be usable outside specific circumstances or combined with very specific additional information.

Sources of Information

To assess the relevance of correlations, several sources were used:

- MTCR control list and notes;[33]

32 See 2.d. below.

33 "MTCR Equipment, Software and Technology Index," MTCR/TEM/2016/Annex, MTCR, March 17, 2016.

- MTCR public guidebook;[34]
- HS codes descriptions;[35]
- CN8 codes descriptions corresponding to the selected HS codes and TARIC chapter notes;[36]
- Technical and commercial Internet resources.

Additionally, the study benefited from the professional multinational experience of the authors in both customs and dual-use classification- commodity identification, licensing processes, customs processes, HS, proliferation, trade analysis, and safeguards.

d. Limitations and Disclaimers

Before examining the key findings of the study, it is essential to outline its limitations to ensure that the results will be well understood and not lead to false interpretations. Below is a list of considerations to take into account for interpretation of the findings:

- The study rates individual correlations (one HS vs. one ECN), but correlation tables are typically many-to-many relations. The rating does not give the chance that an HS includes a controlled item, but only the chance that the HS includes the specific controlled item. Some HS are relevant to many controlled items and might deserve a higher relevance rating from that perspective, even more so when considering the entire tariff and not just the chapter 84. How different the ratings would be in that case was not assessed;

- The study focused on rating an existing correlation table. It did not assess how complete the table might be. It is possible that certain ECN entries (or components of these entries) require correlations that are absent from the TARIC correlation table, and conversely, that certain HS codes which should be there are absent. The study did not assess such cases;

- Establishing correlation is very complex and subject to interpretation. However, the TARIC correlation table does not include explanatory or interpretation notes that would shed light on their rational. In particular, the study was conducted without knowing for which of the three purposes correlations were intended;

- As earlier stated, the rating was established by experts with broad experience including dual-use goods identification and classification and customs classification. However, this varied experience cannot match the expertise of specialized experts on both sides. HS classification rules, rulings and practices are particularly difficult to know and master without a daily exposure to the topic. Inputs by classification experts would bring gains of efficiency and accuracy in the rating exercise;

---

34 *Missile Technology Control Regime (MTCR) Annex Handbook*. 2010, <http://mtcr.info/wordpress/wp-content/uploads/2016/04/MTCR_Annex_Handbook_ENG.pdf>.

35 "HS Nomenclature 2012 Edition," World Customs Organization, 2012, <http://www.wcoomd.org/en/topics/nomenclature/instrument-and-tools/hs_nomenclature_2012/hs_nomenclature_table_2012.aspx>.

36 Commission Implementing Regulation 1101/2014 Amending Annex I to Council Regulation (EEC) No. 2658/87 on the Tariff and Statistical Nomenclature and on the Common Customs Tariff, October 16, 2014, Official Journal of the European Union, October 31, 2015.

- The study was conducted on a relatively small sample of 104 individual correlations out of the 6,179 of the TARIC Correlation table (1.7%). Moreover, the sample relates to a particular type of commodity (chapter 84 of the HS) and only to MTCR controls. A different sample might have given a different result, and a random sample may have been more representative;
- The TARIC correlation links ECN numbers with CN8 customs codes whereas the study rates the correlations at the HS6 level. In theory, this difference might lower the relevance of correlations. However the impact was found to be limited.[37]

4. Examples

Below are three summarized examples of rated individual correlations extracted from the study:

Example 1: Flow forming machines

The correspondence appears to be technically correct. Flow forming machines should be classified under this HS code. However, the HS is not specific to flow forming machines. In the EU TARIC, 846390 specifies three specific CN8 codes for different types of machines, none of which are flow forming. At this eight-digit level, the TARIC correlation table refers to the fourth sub-heading "other."

ECN: **2B109**	Correctness	HS: **846390**
ECN DESCRIPTION Flow-forming machines, other than those specified in 2B009, and specially designed components as follows: N.B.: SEE ALSO 2B209. a. Flow-forming machines having all of the following: 1. According to the manufacturer's technical specification, can be equipped with "numerical control" units or a computer control, even when not equipped with such units; and 2. With more than two axes which can be coordinated simultaneously for "contouring control". b. Specially designed components for flow-forming machines specified in 2B009 or 2B109.a. Note: 2B109 does not control machines that are not usable in the production of propulsion components and equipment (e.g., motor cases) for systems specified in 9A005, 9A007.a. or 9A105.a. Technical Note: Machines combining the function of spin-forming and flow-forming are for the purpose of 2B109 regarded as flow- forming machines	(Y/N/Possibly) **Y**	HS DESCRIPTION "other" "Other machine tools for working metal or cermets, without removing material: "
ECCN→HS: Likelihood that the controlled item be classified in this HS code (vs. other HS codes):		HS→ECCN: Proportion of trade under this HS code which the controlled item represents (vs. other controlled and non-controlled items):
1-exceptionally to 5-likely: **5/5**		*1-exceptionally to 5-predominantly:* **2/5**

37 See 4.e below.

Example 2: Production equipment for various missile propulsion systems

In this case, the correlation links two generic categories, each including a range of items. In the absence of more explicit lists, the correlation is not very good in either direction. The chance that some of the dual-use items be classified under the given HS exists however, but many other possibilities of HS classification are to be expected, including possibly specific HS codes for some equipment subject to the ECN. The present study did not include research in that direction.

ECN: **9B115**	Correctness	HS: **846610**
ECN DESCRIPTION Specially designed "production equipment" for the systems, sub-systems and components specified in 9A005 to 9A009, 9A011, 9A101, 9A102, 9A105 to 9A109, 9A111, 9A116 to 9A120 * *- These entries correspond essentially to various types of rocket propulsion system, jet engines, reentry vehicles and some their key components. **Comment:** The control is not very specific. There might be more specific HS for certain components	(Y/N/Possibly) Y **Comment:** Only parts of machines are mentioned on the HS side. No machine is mentioned.	HS DESCRIPTION "Tool holders and self-opening dieheads" of Parts and accessories suitable for use solely or principally with the machines of headings 8456 to 8465 (machine tools), including work or tool holders, self-opening dieheads, dividing heads and other special attachments for machine tools; tool holders for any type of tool for working in the hand **Comment:** Very generic HS
ECCN -> HS: Likelihood that the controlled item be classified in this HS code (vs. other HS codes):		HS -> ECCN: Proportion of trade under this HS code which the controlled item represents (vs. other controlled and non-controlled items):
1-exceptionally to 5-likely: **3/5**		*1-exceptionally to 5-predominantly:* **1/5**

Example 3: Electronic equipment for reentry vehicles

In this last example, the rationale for linking the ECN sub-category for re-entry vehicles with portable computers including keyboard and screen could not be found. This correlation appears to be technically incorrect.

ECN: **9A116.d**	Correctness	HS: **847130**
ECN DESCRIPTION Reentry vehicles, usable in "missiles", and equipment designed or modified therefor, as follows: d. Electronic equipment specially designed for reentry vehicles.	(Y/N/Possibly) **N** This control is about computers on board missiles and other air vehicles. The rationale for correlation with computer units with keyboards and screens could not be identified	HS DESCRIPTION "Portable automatic data-processing machines, weighing not more than 10 kg, consisting of at least a central processing unit, a keyboard and a display"
ECCN→HS: Likelihood that the controlled item be classified in this HS code (vs. other HS codes):		HS→ECCN: Proportion of trade under this HS code which the controlled item represents (vs. other controlled and non-controlled items):
1-exceptionally to 5-likely: **N/A**		*1-exceptionally to 5-predominantly:* **N/A**

5. Key Findings

a. A Significant Proportion of Technically Incorrect Correlations

The first step of the relevance rating exercise was to identify possibly technically incorrect correlations. Results are shown in figure 2. Only fifty-three of ninety-three correlations were found to be technically correct (58%) and nine (10%) would require further expertise to be assessed. About a third (31/92) appear to be incorrect, or their rationale could not be identified with the expert knowledge base. It is possible that with input from more specialized experts, or a broader analysis taking into account other chapters, this proportion may be decreased. The number is still very high for a correlation system used in the EU and by many countries as a basis to determine exporters' obligations.

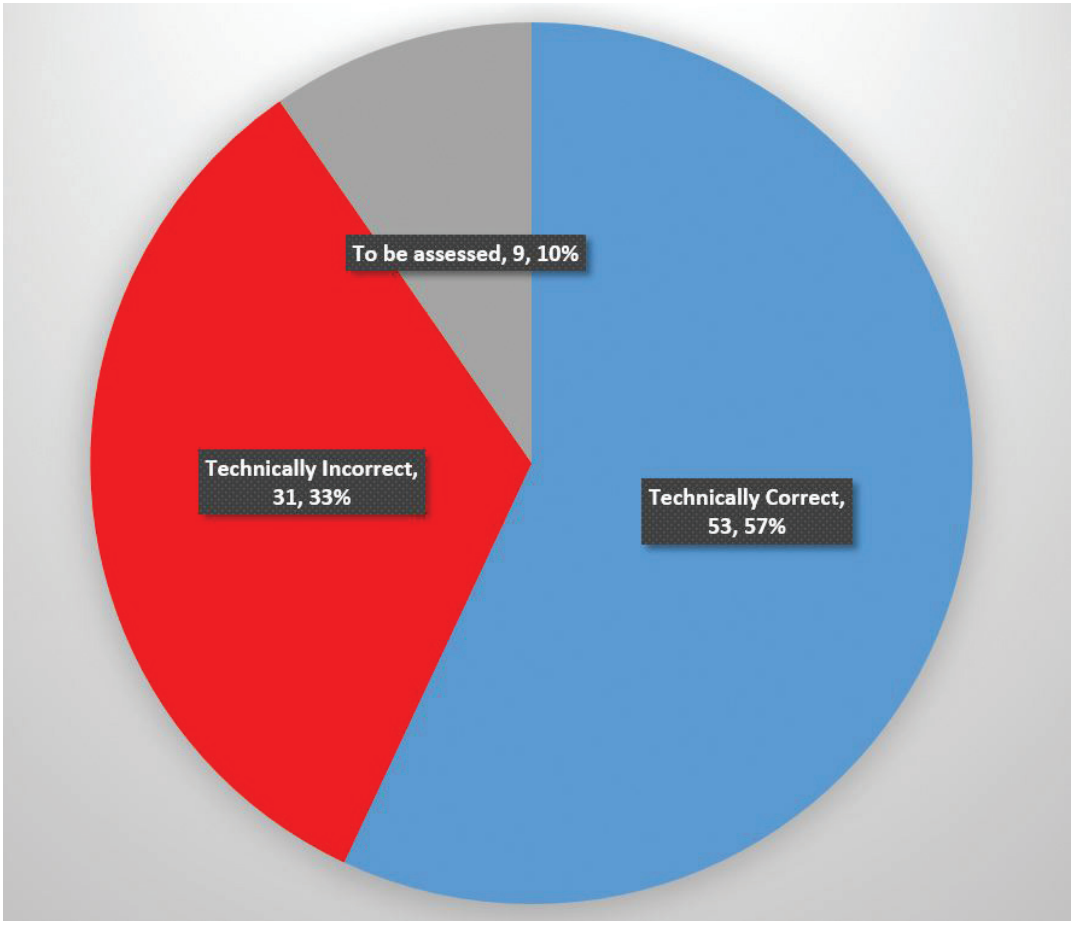

Figure 2: Technically Correct and Incorrect Correlations

Figure 3 shows the distribution of the suspected reasons why thirty-one correlations were classified as incorrect. The majority was estimated as incorrect on the basis of apparent misunderstandings of either the HS or ECN descriptions.

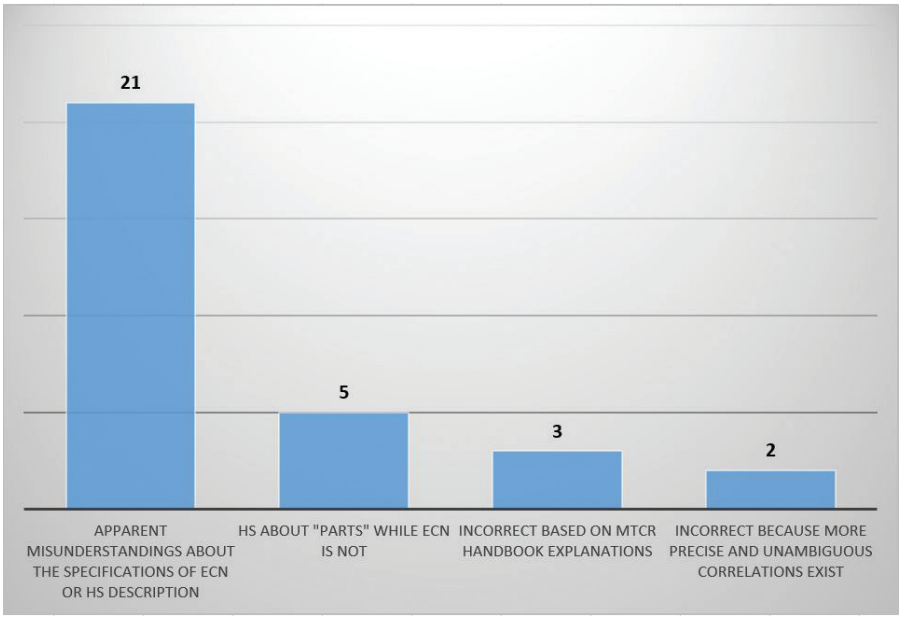

Figure 3: Distribution of the Reasons for Assessing the Correlations as Incorrect

b. Significant Differences between the Two Directions of Correlation

The assessment conducted on the sample confirmed the assumption that the relevance of individual correlations can be very different depending on the direction. In particular, customs classification of dual-use items appears to be less challenging than using HS codes to identify dual-use items. Figure 4 illustrates this observation, representing the distribution of relevance by number of correlations. It clearly shows the distribution of HS→ECN correlations is skewed toward lower ratings (mostly 1-2), while the distribution of ECN→HS correlations is skewed higher (mostly in the 3-5 range).

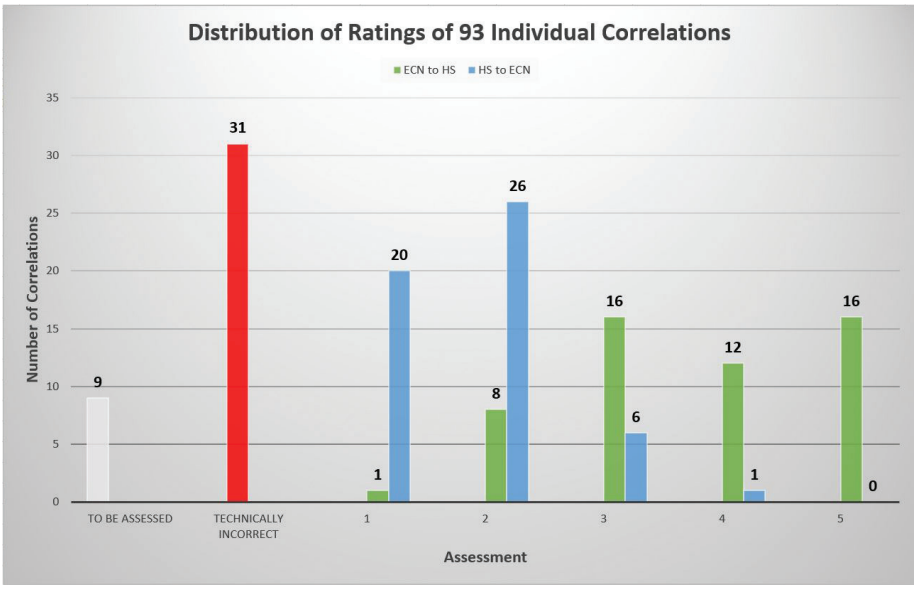

Figure 4: Distribution of Individual Correlations by Level of Relevance from 1-low to 5-high (by numbers of correlations)

c. From ECN to HS: Moderate Relevance of Correlations

Figure 4 includes the distribution of correlations in the direction from ECN to HS according to the five-level scale. Levels three to five (medium to high relevance) represent 83% of the sample. For these ECNs, the correlation table provides a good indication of where in the HS they should be classified. Part of the less relevant correlations relate to broad ECNs describing a diverse range of items that would be classified differently in the HS. In such a case, the correlation table is not explicit about which component of the ECN the correlation is meant for.

d. Low Relevance of HS to ECN Correlations

The relevance of correlations from HS to ECN is much lower. 87% of the technically correct HS are at best marginally relevant to the correlated ECN. The lower relevance of correlations in this direction might be the consequence of HS codes being defined broadly to capture the broader trade flows whereas ECN are designed to designate dual-use items as narrowly as possible.

This finding shows that on this specific sample, the current TARIC correlation table is often not well suited to identify dual-use items from customs codes.

e. Limited Difference in Relevance between Correlations at HS6 Level and at CN8 Level

The correlation was rated at the HS6 level, whereas the correlation table is designed for the more detailed CN8 level. Considering the relatively low level of relevance found, it was important to understand whether rating the correlation at the CN8 level would have made a significant difference. For that purpose, the HS codes of the fifty-three correct correlations at the HS6 level were examined to understand if the derived CN8 codes were more precise or more adapted to control lists definitions. As shown in Figure 5, the CN8 definitions were only marginally better than HS6 definitions (only for 19% of the correlations). Even when CN8 codes are more accurate than HS6 codes, they did not necessarily provide a significantly better rating.

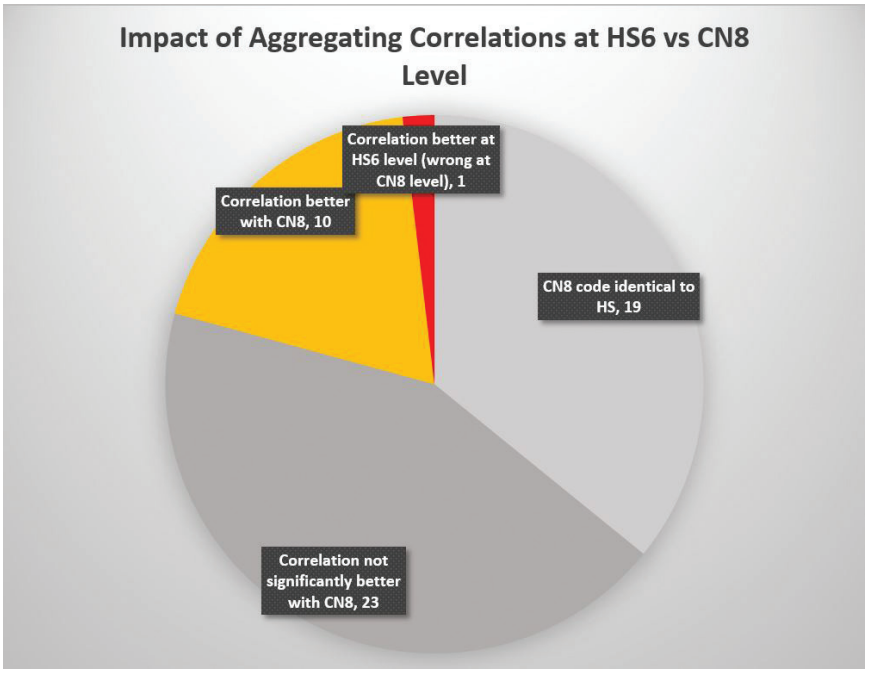

Figure 5: Distribution of Individual Correlations ECN to HS Codes by Relevance Level (percentages)

f. General Lessons Learned from the Study

Due to the heterogeneity of correspondences, the creation, updating, rating or use of correlation tables cannot bypass a detailed examination of correlations, line by line. Knowledge of both lists, technical understanding of their content, and a solid analytical methodology are necessary. Without them, deriving global trade figures from statistics or targeting specific illicit shipments based on the correlation tables alone is not likely to be successful.

The workload necessary to create, correct and/or rate correlations is significant. The rating of ninety-two correlations alone required three person-weeks. Any approach should be realistic in this regard. It should be either scalable to the entire classification system or limited to a subset.

However, correlations are difficult to rate without a global view. Individual ECNs often include items of different natures that are classified in different chapters. Conversely, an HS code may be relevant to many ECNs from different export control regimes. Focusing strictly on a defined sample without considerations for other parts of the classifications might bring some shortcomings. Establishing or rating correlations should be done by HS specialists knowledgeable of the rest of the HS and nonproliferation specialists aware of other regimes' controls.

Notes of the HS or TARIC were only marginally helpful for the correlation rating as they do not relate to dual-use controls and rarely include information about criteria used in control lists.

Rating the relevance of correlations is not sufficient. Identifying and eliminating correlations that are incorrect with regards to certain purposes is also necessary.

Finally, the customs classification of commodities can be as technically challenging as dual-use classification. The technical capacity required for dual-use classification is not uncommon. But proposing correct HS codes for controlled items cannot be done without the contribution of specialists of customs classification. In addition to the legal competence to establish normative HS classifications, the HS classification rules are more complex and require specific knowledge going beyond technical knowledge. Expertise in export control classification or customs classification may be readily found, but combined HS and ECN expertise is rare, and comprehensive expertise of both systems may not exist.

6. Conclusions and Ways Forward

The analysis of the correlations question and the sample study demonstrate that as it is, the TARIC correlation table is not optimized for normative use. The results hint at a possible mismatch between intentions of authors of correlations, which largely remain unknown, and how tables are being used by different stakeholders of the STC community.

Nevertheless, correlation tables and the use of customs tariff codes remain the main and sometimes only tools at hand for a number of aspects of STC work. The relevance of the TARIC table in particular is crucial because is it the basis for EU exporters obligations to state whether their export requires a license or not, and because the EU correlation table, as well as the EU consolidated dual-use list, is used by many non-EU countries around the world.

There are many possible reasons why the relevance of correlations is so uneven and some are difficult to tackle, but it is necessary to improve the conception and use of correlation tables

and/or work on both systems to improve their compatibility. The size of the obstacle does not make it less necessary to overcome. Even if fixing the two systems or making them more compatible is not possible, refining correlation tables and ranking the relevance of correlations, knowing which ones are good and which ones are poor (or wrong), or in which direction(s) they can be relied upon, is already useful.

a. A Range of Actions Rather than a Comprehensive Approach

The scope of the work, but also the various perspectives on it, call for a number of improvements in different areas, possibly in different frameworks. Building from the possible improvements outlined in chapter 1.g above, below are examples of concrete steps that could be taken.

Above all, correlation tables must be disambiguated. Should new correlation tables be created or current ones significantly reviewed, authors should explicitly indicate on which basis or for which purpose they are established. Incorrect correlations should be identified and eliminated. For correct correlations, taking advantage of additional levels of the ECN hierarchy may result in more precise and useful correlations.

Even from a purely technical perspective, the relevance of current correlations varies greatly. Users need to be able to discriminate individual correlations depending on their relevance. Rating the relevance of correlations even imperfectly or partially would make correlation tables more useful for different purposes.

Correlation tables could also be built in a user-friendly format, including items/codes descriptions, notes and other useful information, which are sometimes sufficient to provide users with a first idea of the level of relevance to a specific purpose. In the EU, the TARIC takes essentially the form of a two column table linking specific ECN numbers with specific CN8 codes, or a reference to the dual-use regulations when exporters enter correlated ECN in the export declaration system. Understanding what these codes relate to requires work that many operators do not have the means to conduct for their product and even less for the 6179 correlations of the table. Explicit and user-friendly formats would enhance the ability of users to make their own judgment about the relevance of correlation, at minimal cost.

As earlier indicated, depending on the item, improvements could include more detailed itemization on both sides or simply more detailed (less aggregated) correlations. Certain ECNs could be broken down into more detailed individual items and new HS or CN8 codes could be created to sub-divide existing HS headings and sub-headings.[38]

More informal approaches also could be taken. Control lists could provide more illustrative lists of items for certain controls like in the example above of equipment for the production of missile propulsion systems. When relevant, correlation tables could then correlate HS codes with items of these illustrative lists or more generally, with levels of the ECN hierarchy, deeper than the formal five digits level.

Streamlining of criteria and thresholds would also be useful steps, to be taken by both sides, as illustrated in chapter 1.g above.

---

38 CN8 codes were often identical to HS6 codes (only adding 00) as the two additional digits. The same situation can be found between headings (HS4) and sub-headings (HS6), with no difference in itemization.

b. Which Framework for Which Improvement?

Improvements must be conducted by people and organizations with legal competence, technical capabilities, financial resources, and interest, at the international and at the national levels. No organization can claim to have all these characteristics. Most improvements will need to be collaborative. A few possibilities are listed below.

- Enforcement experts participating in the multilateral export control arrangements could study whether and how correlation could be established or evaluated to be useful to enforcement efforts, for customs risk management efforts;

- Regimes or regime members could work with the customs community to better itemize lists and codes on both sides. Most importantly, regime participating governments could coordinate with their own representatives to the WCO's Harmonized System Committee to bring the export control perspective to the HS context;

- National export licensing specialists, members of the HS Committee, the European Commission's DG TAXUD (in charge of the TARIC system), and the private sector could join efforts to propose normative correlations at the international HS6 level or at the national 8/10 digits level, when appropriate;

- The same community could propose notes in each system, bringing some useful elements for the classification in the other system;

- The European Commission DG-TAXUD could develop an information system adding more contextual information to the correlation table, including rationale for individual correspondences;

- For trade evaluation purposes, national authorities could study which HS codes are used in practice by exporters to declare their licensed exports;

- The WCO could contribute to harmonize the correlation tables established in different parts of the world;

- Members of the WCO's HS Committee could undertake to introduce new HS codes for regime-listed commodities currently relegated to residual classification codes.

NGOs might have a key role to play in triggering and coordinating some of these initiatives. These include the specialized academic and research community (e.g., nonproliferation community, the International Network of Customs Universities (INCU), etc.), industry associations (e.g., logistics industry, nuclear industry, defense-aerospace industry), and professional associations (e.g., the EU Nonproliferation Consortium, European Safeguards Association-ESARDA, etc.). Tackling the issue is of common interest to all stakeholders of strategic trade control.