



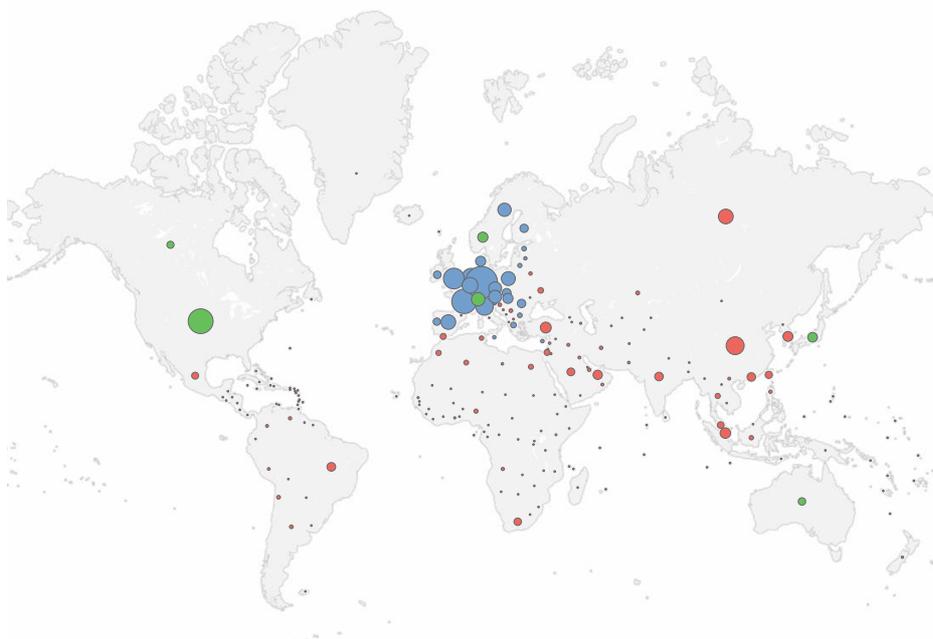
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## Dual-use trade figures and how they combine

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Abstract

Dual-use items are goods and technologies with civil and military uses. In several countries, including the EU Member States, the export of dual-use goods is controlled by national licensing processes as a measure of non-proliferation. Dual-use items relate to a variety of generally high-tech goods falling in diverse categories: nuclear materials, facilities and equipment; special materials and related equipment; materials processing; electronics; computers; telecommunications and information security; sensors and lasers; navigation and avionics; marine; aerospace and propulsion.

In connection to the ongoing review of the EU export control policy, currently based on Regulation 428/2009 and amendments, it is of relevance to know the size of the EU dual-use sector and have a method to assess, in a quantitative way, the impact of export controls on trade. Because the dual-use trade draws from a range of industrial sectors, no single trade statistics exists today to portrait this cross-cutting sector 'as a whole'.

In this report we estimate the total intra- and extra-EU Dual-Use Export Value (DUEV). DUEV is meant to be an indicator of the relevance of the dual-use sector to the EU economy. To estimate DUEV, lower and upper bound values are first derived based on license data provided by EU Member States and on COMEXT export data available from Eurostat. The bounds are then combined in a single estimate to DUEV. As a result, DUEV is estimated to be at most 3.3% of the total intra- and extra-EU export in 2013, equivalent to about 150 Billion of Euros. The report explains the method used to derive these figures by qualitative reasoning on quantitative data.

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## **0. Abstract**

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Dual-use items are goods and technologies with civil and military uses. In several countries, including the EU Member States, the export of dual-use goods is controlled by national licensing processes as a measure of non-proliferation. Dual-use items relate to a variety of generally high-tech goods falling in diverse categories: nuclear materials, facilities and equipment; special materials and related equipment; materials processing; electronics; computers; telecommunications and information security; sensors and lasers; navigation and avionics; marine; aerospace and propulsion.

In connection to the ongoing review of the EU export control policy, currently based on Regulation 428/2009 and amendments, it is of relevance to know the size of the EU dual-use sector and have a method to assess, in a quantitative way, the impact of export controls on trade. Because the dual-use trade draws from a range of industrial sectors, no single trade statistics exists today to portrait this cross-cutting sector 'as a whole'.

In this report we estimate the total intra- and extra-EU Dual-Use Export Value (DUEV). DUEV is meant to be an indicator of the relevance of the dual-use sector to the EU economy. To estimate DUEV, lower and upper bound values are first derived based on license data provided by EU Member States and on COMEXT export data available from Eurostat. The bounds are then combined in a single estimate to DUEV. As a result, DUEV is estimated to be at most 3.3% of the total intra- and extra-EU export in 2013, equivalent to about 150 Billion of Euros. The report explains the method used to derive these figures by qualitative reasoning on quantitative data.

## 1. Introduction

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Dual-use (DU) items are goods and technologies with civil and military uses whose export is controlled in the European Union (EU) by Regulation<sup>1</sup> 428/2009 [1], and amendments (most recent are 388/2012 [2] and 1382/2014 [3]) as a measure of non-proliferation.

Exporting dual-use items requires prior authorisation by the competent national authority in the EU. Authorisation is obtained or denied as a result of an export license application by the exporter. Authorisation is not required though for intra-EU transfers between Member States (MS) of most dual-use goods. Likewise extra-EU exports do not need to be authorised towards a list of destination countries identified as bearing a low risk of diversion.

EU MS implement export controls at national level in terms of legislation, licensing processes and customs controls. Directorate General TRADE in the European Commission is responsible for maintaining the Regulation, for chairing the Dual-Use Coordination Group participated by MS, and for reporting to the Council and the European Parliament about the implementation of the Regulation in the Union.

To the latter goal, DG TRADE first launched in 2011 a Green Paper consultation [4] addressed to the civil society, non-governmental organisations, industry, academia and MS governments to gather views on the detailed provisions of the EU export control framework in order to prepare for its review.

Two questions in the Green Paper were directed to MS licensing authorities in order to collect quantitative data on dual-use exports:

- *What is the value of dual-use exports from your Member State in absolute terms and as a percentage of all your exports?*<sup>2</sup>
- *How many licenses did you issue in 2010 (per type of license)?*<sup>3</sup>

Whilst the second question can be answered by MS by consulting national records on licenses, the first question remains difficult because not all dual-use exports need to be submitted to the licensing process<sup>4</sup>.

For policy making [5][6] and in support to ongoing review of the EU export control system [7], it is of interest to know which fraction of the EU Total Export<sup>5</sup> relates to dual-use goods to assess the impact of the dual-use Regulation on exports from MS.

*In this paper we identify and use data sources to estimate the EU Dual-Use Export Value (DUEV), that is, the value of exports of dual-use items by EU MS intra- and extra-EU, irrespectively of whether these require a license by the dual-use Regulation. Defined in this way, DUEV is meant to be an indicator of the economic relevance of the dual-use sector to the EU economy.*

To estimate *DUEV*, we first derive lower and upper bound values and then combine them in a single estimate. As a result, we estimated *DUEV* to value at most 3.3% of the EU Total Export in 2013, equivalent to about 150B €. The paper explains how we derive these figures by qualitative reasoning on quantitative data.

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<sup>1</sup> For simplicity of language, in this paper we refer in general to the Regulations on dual-use as the 'dual-use Regulation' or the 'Regulation'.

<sup>2</sup> Question nr. 3 in [4].

<sup>3</sup> Question nr. 16 [4].

<sup>4</sup> This is the case for most intra-EU transfers and for exports towards some extra-EU destinations.

<sup>5</sup> The EU Total Export is the intra- and extra-EU export on all commodities.

## 2. Lists of dual-use goods controlled in the EU

The reference list of items subject to export controls in the European Union is specified in Annex I to the dual-use Regulation. Annex I implements internationally agreed dual-use controls including the Wassenaar Arrangement (WA) [8], the Missile Technology Control Regime (MTCR) [9], the Nuclear Suppliers Group (NSG) [10], the Australia Group (AG) [11] and the Chemical Weapons Convention (CWC) [12]. Annex I<sup>6</sup> is structured in 10 Categories as shown in Figure 1. Each Category lists a number of items to be controlled. For example, the number of items listed in Annex I to Regulation 388/2012 was 1687 and is 1825 in 1382/2014.

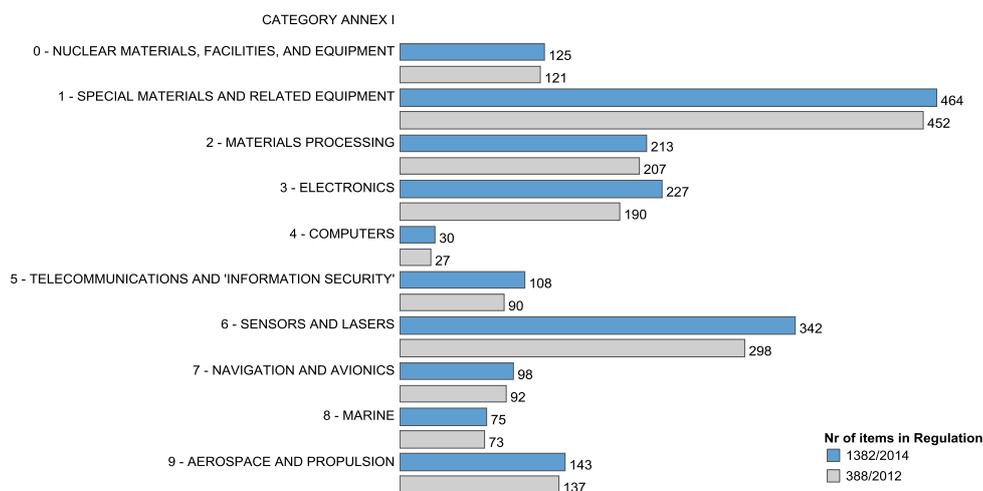


Figure 1 – Categories of dual-use items and their number in Annex I to Regulation 1382/2014 (blue bars) compared to Regulation 388/2012 (gray bars).

Exporting items listed in Annex I requires authorisation<sup>7</sup> by national licensing authorities, with two important exceptions.

- Due to the single market and the free movement of goods in the Union territory, intra-EU transfers of dual-use items listed in Annex I are not controlled, except for strategic items listed in Annex IV<sup>8</sup>. Annex IV contains a subset of Annex I items, for a total of 239 items. These include items of stealth technology, some items of the Community strategic control, including items for cryptography, some items of the MTCR technology, some items of the CWC, some items of the NSG technology.
- No authorisation is needed to export items in Annex I to certain extra-EU destination countries<sup>9</sup> under the Union General Export Authorisation<sup>10</sup> (EU GEA) E001, with the exclusion of items listed in Annex II to Regulation 428/2009. Annex II includes all Annex IV items and 12 more items from Annex I, for a total of 251 items. EU GEA are meant to facilitate the export of dual-use items when the risk of diversion is low. To date seven destinations are listed in E001, in the following referred as E001

<sup>6</sup> Details on the structure of Annex I are presented in Appendix 1.

<sup>7</sup> EC Reg 428/2009 Article 3(1).

<sup>8</sup> EC Reg 428/2009, Article 22(1).

<sup>9</sup> As per Annex II to Regulation 428/2009.

<sup>10</sup> EU GEAs were named Community General Export Authorisations (CGEAs) in EC Reg 428/2009. See EC Reg 428/2009, Article 9(1).

countries. These countries are: Australia, Canada, Japan, New Zealand, Norway, Switzerland and the United states.

Figure 2 gives a view of the world divided in three groupings by main export licensing requirements. The licensing for intra-EU transfers is limited to Annex IV items (countries marked blue). Exports to E001 countries are licensed for Annex II items (countries marked green). For the rest of the world, all items listed in Annex I require an export authorisation (countries marked red).

In this simplified picture we do not consider authorisations required for the export of other items not listed in Annex I, to all or certain destinations, when deemed necessary by MS on grounds of non-proliferation or security concerns<sup>11</sup>. Nor we consider restrictive measures by Regulations other than the dual-use one.

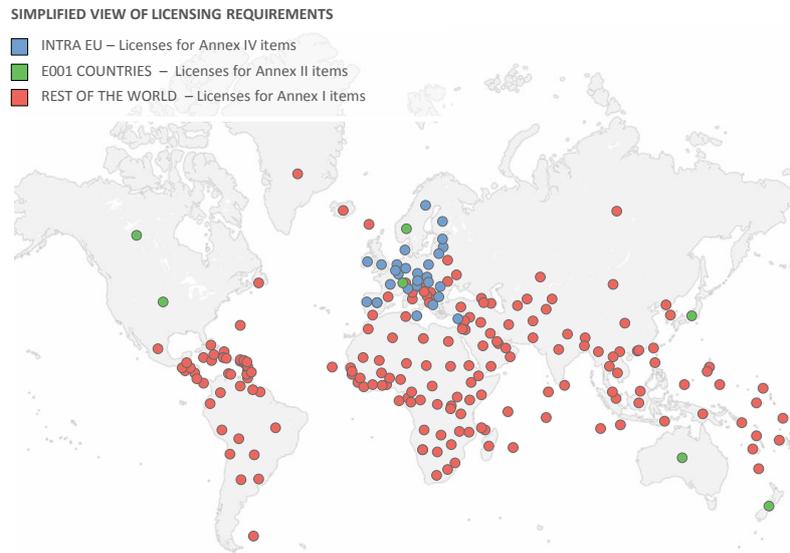


Figure 2 – Countries of the world differentiated by licensing requirements.

### 3. The Dual-Use Licensed Value

For destinations requiring export licenses for items listed in Annex I to the dual-use Regulation (countries marked red in Figure 2), Member States are in a position to measure directly the value of licenses, as this is generally indicated in the license application presented by the exporter. We call this value the *Dual Use Licensed Value (DULV)*:

$$DULV = \text{Dual Use Licensed Value}$$

In 2013 *DULV* represented about 0.94% of the EU Total Export [13], as it resulted from a questionnaire addressed by DG TRADE to MS to gather key data about the implementation of the EU export control system [14].

$$DULV = 0.94\% \text{ of EU Total Export}$$

<sup>11</sup> EC Reg 428/2009, Articles 4(1), 8(1).

Because not all export destinations require a license for the whole of Annex I, this value is expected to be a lower bound<sup>12</sup> to the real *Dual-Use Export Value* which we want to estimate in the end:

$$DULV < DUEV$$

$$DULV = 0.94\% \text{ of EU Total Export} < DUEV$$

How much higher is *DUEV* with respect to *DULV*? To reduce this uncertainty, we shall first derive upper bounds to *DUEV* based on the EU trade data on exported commodities.

#### 4. The EU trade statistics and dual-use items

---

The general EU trade statistics is provided by Eurostat<sup>13</sup> on the basis of COMEXT data [15][16]. COMEXT covers both extra- and intra-EU trade. Extra-EU trade statistics concerns the trading of all goods between MS and a non-member country. Intra-EU trade statistics covers the trading of all goods between MS. The statistical information is derived from customs (extra-EU) and Intrastat (intra-EU) declarations by traders. The data are collected by national authorities in the MS and compiled according to a harmonised methodology before transmission to Eurostat.

In trade statistics, the term 'exports' is used for all outward flows and 'imports' for all inward flows applied to both intra-EU and extra-EU trade. Adhering to this practice of language, we refer in this paper to intra-EU *transfers* of dual-use goods as intra-EU *exports* of dual-use goods.

Trade in goods is described in terms of the Combined Nomenclature (CN) [17] [18] product classification system, a subdivision of the Harmonized System (HS) [19] designed and maintained by the World Customs Organization<sup>14</sup>.

In order to derive an estimate of the *Dual Use Export Value* based on the EU trade statistics we need to refer dual-use items to CN commodities. To this goal we use a Correlation Table<sup>15</sup> (CT) [20] developed by Directorate General TAXUD in the European Commission, recently amended to [21]. The CT maps dual-use items listed in Annex I to CN products (Figure 3).

The CT is a many-to-many relationship between the CN and Annex I to the dual-use Regulation. A DU item may correspond to one or more CN items, and viceversa. This is primarily because the CN language does not identify DU items in a precise way.

For example, machine tools listed in Annex I to the Regulation (i.e., items 2B001 and 2B201) meet certain technical specifications that make them export-controlled. Technical specifications concern, for instance, the number of axes of the machine, its positioning accuracy, and the possibility for the machine to be numerically controlled. These machine tools are described in the Combined Nomenclature in categories of numerically controlled machines which do not necessarily meet all other technical specifications captured in the dual-use Regulation. This means that trade statistics on those CN categories will encompass export-controlled machine tools, but not exclusively.

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<sup>12</sup> A caveat to this assumption is that not all licensed exports do necessarily take place. At present there is no way to quantify at EU level the fraction of exported licensed dual-use items over the total of licenses.

<sup>13</sup> Eurostat is the statistical office of the European Union.

<sup>14</sup> See Appendix 2 for key data about the Harmonized System and the Combined Nomenclature.

<sup>15</sup> Specific information about the Correlation Table is reported in Appendix 3.

HS CHAPTER	HARMONIZED SYSTEM DESCRIPTION	NR COMBINED NOMENCLATURE ITEMS
84	NUCLEAR REACTORS, BOILERS, MACHINERY...	236
85	ELECTRICAL MACHINERY AND EQUIPMENT...	180
28	INORGANIC CHEMICALS; ORGANIC OR INORGANIC COMPOUNDS...	84
72	IRON AND STEEL	76
90	MEASURING, CHECKING, PRECISION, ... INSTRUMENTS AND APPARATUS	67
39	PLASTICS AND ARTICLES THEREOF	41
29	ORGANIC CHEMICALS	39
81	OTHER BASE METALS; CERMETS; ARTICLES THEREOF	38
73	ARTICLES OF IRON OR STEEL	37
27	MINERAL FUELS, MINERAL OILS AND PRODUCTS	33
70	GLASS AND GLASSWARE	21
76	ALUMINIUM AND ARTICLES THEREOF	15
38	MISCELLANEOUS CHEMICAL PRODUCTS	14
88	AIRCRAFT, SPACECRAFT, AND PARTS THEREOF	11
...	...	...

Figure 3 – Some Chapters of the Harmonized System where dual-use items are mapped to by the Correlation Table. In this Figure HS Chapters are sorted by the nr of Combined Nomenclature items falling in the Chapter and related to dual-use items by the Correlation Table.

## 5. The Dual-Use Export Domain

The Combined Nomenclature and the Correlation Table identify a merchandise area that includes the dual-use trade as a part. We call this larger trade area the *Dual Use Export Domain (DUED)*.

*DUED = Dual Use Export Domain*

*DUED* is the EU export value (intra- and extra-EU) corresponding to the set of CN commodities identified by the Correlation Table. *DUED* is an upper bound to the real *Dual Use Export Value*.

$DUED < DUEV$

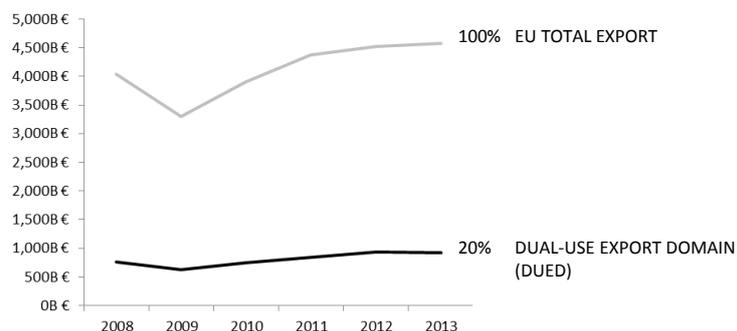


Figure 4 – The Dual-Use Export Domain compared to the EU Total Export (intra-and extra- EU) over time.

Figure 4 shows *DUED* measured on COMEXT data over the period 2008-2013. *DUED* is presented in comparison to the EU Total Export. We find that *DUED* represents about 20% of the EU Total Export over time.

$$DUEV < DUED = 20.17\% \text{ of EU Total Export}$$

We now have a lower and an upper bound for *DUEV*:

$$0.94\% \text{ EU Total Export} = DULV < DUEV < DUED = 20.17\% \text{ EU Total Export}$$

The range between the two bounds is large. This is because of two reasons. Firstly, *DULV* is measured with respect to real dual-use items, while *DUED* is measured with respect to Combined Nomenclature commodities. This issue cannot be resolved because the EU export statistics is expressed only in terms of CN commodities. Secondly, *DULV* is measured towards destination countries that require licensing for the whole of items listed in Annex I to the dual-use Regulation, while *DUED* is measured to all destination countries.

## 6. The Dual-Use Licensing Domain

A refinement to *DUED* is to measure the EU export on the CN commodities of interest *only* towards destinations that require licensing for all items listed in Annex I to the dual-use Regulation, as we do for *DULV*. We call this new quantity the *Dual Use Licensing Domain (DULD)*.

$$DULD = \text{Dual Use Licensing Domain}$$

*DULD* measures the export on CN commodities to the world excluding the EU and E001 destination countries.

Figure 5 and Figure 6 break *DUED* down by destination country. One can see that EU MS and E001 countries rank among top export destinations in the *Dual-Use Export Domain*.

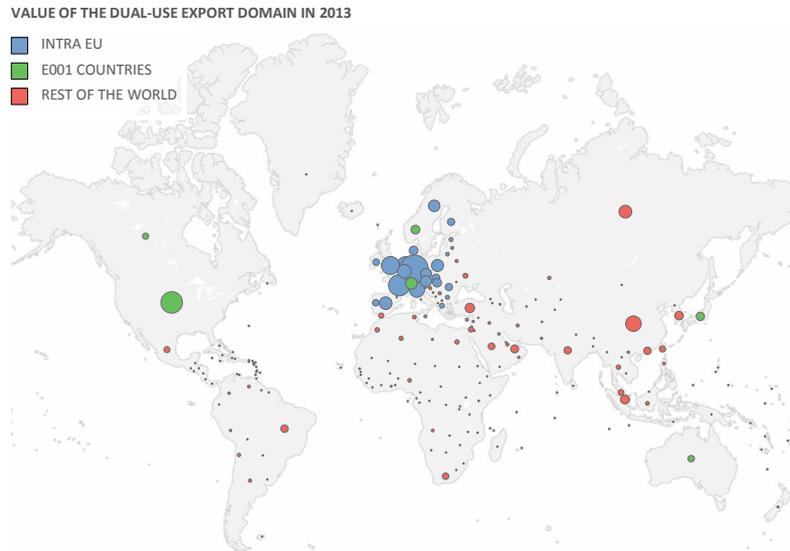


Figure 5 – Map view of destination countries of the *DUAL-USE EXPORT DOMAIN*. Bubble area is proportional to the value of trade.

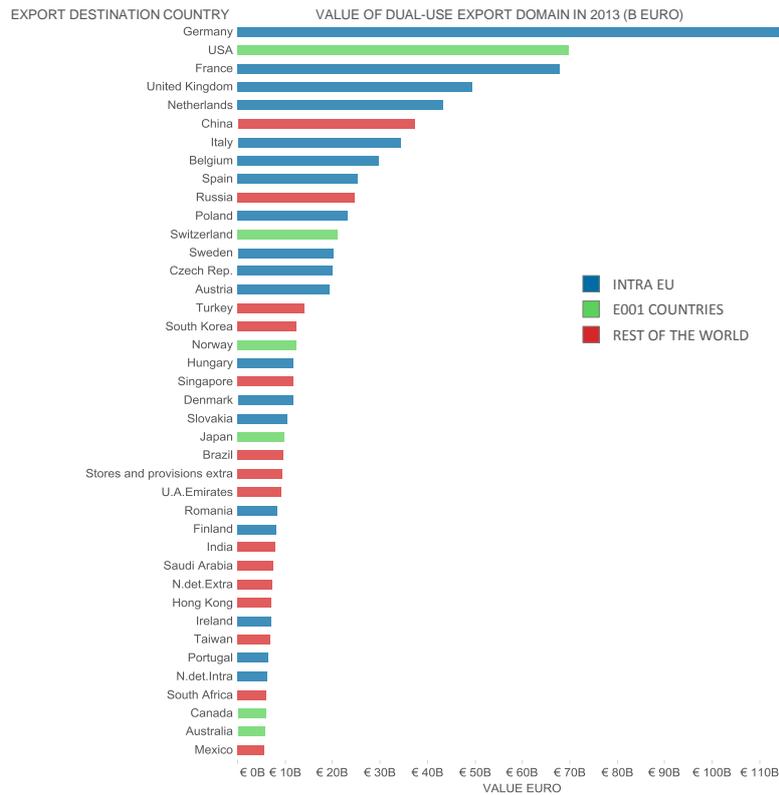


Figure 6 – Top destination countries of the *DUAL-USE EXPORT DOMAIN*.

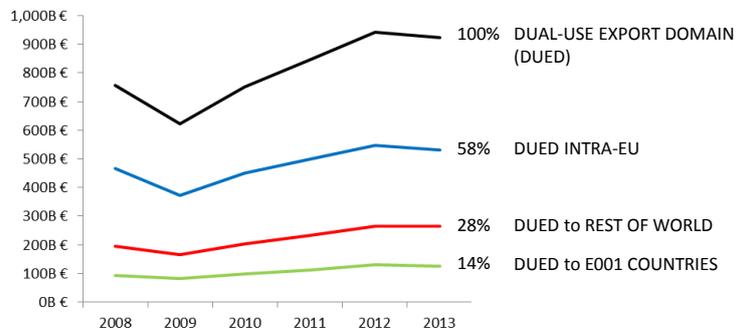


Figure 7 – Breakdown of the *DUAL-USE EXPORT DOMAIN* by licensing-relevant geographical areas.

Specifically Figure 7 indicates that, in 2013, the intra-EU part of *DUED* was 58%, while E001 countries had a share of 14% of *DUED*. Only 28% of *DUED* was exported to destination countries requiring a license for items listed in Annex I. This latter part corresponds to a *DULD*.

$$DULD = 28\% \text{ DUED} = 5.80\% \text{ EU Total Export}$$

The *DULD* figure is comparable in terms of geographical coverage to the *Dual-Use Licensed Value*, *DULV*, as we have defined it. It is though close to 6 times higher: *DULV* values 0.94% of the EU Total Export and *DULD* values 5.80% of the EU Total Export. As noted earlier, this is because the *DULD* export is measured on Combined Nomenclature commodities that are 'larger grain' than the dual-use items they include as an unknown fraction. In other terms,

assuming that  $DULV$  is the true value of licensed exports, we derive that  $DULV$  is amplified about 6 times when measured on trade statistics due to the non-specificity of the CN language with respect to the dual-use context.

## 7. The Dual-Use Export Value

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This insight is relevant to estimate the *Dual-Use Export Value*,  $DUEV$ , under the assumption that  $DULD$  is related to  $DULV$  in the same way as  $DUED$  is related to  $DUEV$ . Like  $DULD$  is the amplified value of  $DULV$  when measured on trade statistics, so  $DUED$  is the amplified value of  $DUEV$  when measured on trade statistics. In other words, we assume the following proportion holds true:

$$DULV : DULD = DUEV : DUED$$

Hence:

$$DUEV = \frac{DUED}{DULD} \cdot DULV$$

We call *gain* the ratio between  $DUED$  and  $DULD$ :

$$gain = \frac{DUED}{DULD}$$

$$DUEV = gain \cdot DULV$$

The above equation states that the *Dual-Use Export Value*,  $DUEV$ , is the *Licensed Value* ( $DULV$ ) amplified by *gain*. Note that *gain* depends only on the structure of the EU export market in the dual-use trade area (that is,  $DUED$ ), and the part of it which is subject to licensing for items listed in Annex I according to the dual-use Regulation (that is,  $DULD$ ).

Then:

$$gain \geq 1$$

To understand this, imagine the limit case where there is no EU single market and no Union General Export Authorisation E001. In that case all exports of dual-use items from MS would need to be licensed.  $DULD$  would become equal to  $DUED$ , and *gain* would value 1.  $DUEV$  would become equal to  $DULV$ , that is, the export value of dual-use items from the Union would be identical to the value of exports licensed by MS authorities.

Because of the single market and GEA E001, *gain* is greater than 1.

Indeed we have:

$$\begin{cases} DUED = 20.2 \% \text{ EU Total Export} \\ DULD = 5.8 \% \text{ EU Total Export} \end{cases} \rightarrow gain = 3.5$$

Hence:

$$DUEV = gain \cdot DULV = 3.5 \cdot 0.94 \% \text{ EU Total Export} = 3.3 \% \text{ EU Total Export}$$

The estimated value for  $DUEV$  assumes that the EU licensed value  $DULV$  is completely exported. This is a simplification in that some licensed exports may not take place in the end.

Because the fraction of the licensed and exported value is unknown, but reaching at most DULV, then an upper bound for *DUEV* is:

$$DUEV \leq gain \cdot DULV = 3.3 \% EU \text{ Total Export} = 149 \text{ B€}.$$

## 8. Conclusive remarks

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Estimating the economic value of the EU dual-use export is challenging due to the cross-cutting nature of this sector over traditional sectors.

International trade statistics can be used to estimate the value of the EU dual-use export by selecting a basket of reference commodities close to strategic goods. However these same commodities do also include goods which are not subject to export controls, and that cannot be excluded from the statistics, leading to a large upper bound estimate for the actual EU dual-use export. On the other side, export license data provide only a lower bound value to dual-use exports in that not all these exports require to be licensed by Member States - because of the single market and because of EU General Export Authorisations.

In this report we proposed a way to combine the two bounds leading to a single estimate of the EU dual-use export value. The underlying method requires measuring the amplification factor (*gain*) that makes the licensed value appear larger when measured on international trade statistics. Using the same factor to de-amplify the dual-use related trade statistics to all destination countries (intra- and extra-EU) leads to an estimate of the actual dual-use trade.

This estimation method is not EU-specific. It can be applied to any country (or group of countries) based on knowing the country's aggregated licensed value, and trade restrictions and facilitations implied by the country's export control legislation. Compiling such a statistics on a global scale would create a quantitative map of the significance of the dual-use trade to countries' exports.

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## References

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- [1] Council Regulation (EC) No 428/2009 setting up a Community regime for the control of exports, transfer, brokering and transit of dual-use items (Recast).  
[http://trade.ec.europa.eu/doclib/docs/2009/june/tradoc\\_143390.pdf](http://trade.ec.europa.eu/doclib/docs/2009/june/tradoc_143390.pdf)
  
- [2] Regulation (EU) No 388/2012 of the European Parliament and of the Council of 19 April 2012 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.  
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:129:0012:0280:EN:PDF>

- [3] Commission Delegated Regulation (EU) No 1382/2014 of 22 October 2014 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.  
[http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:JOL\\_2014\\_371\\_R\\_0001](http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:JOL_2014_371_R_0001)
- [4] Green Paper. The dual-use export control system of the European Union: ensuring security and competitiveness in a changing world. COM(2011) 393 final, 30.6.2011.  
[http://trade.ec.europa.eu/doclib/docs/2011/june/tradoc\\_148020.pdf](http://trade.ec.europa.eu/doclib/docs/2011/june/tradoc_148020.pdf)
- [5] Commission Staff Working Document 7 final. Strategic export controls: ensuring security and competitiveness in a changing world - A report on the public consultation launched under the Green Paper. SWD(2013) 7 final, 17.1.2013.  
[http://trade.ec.europa.eu/doclib/docs/2013/february/tradoc\\_150459.pdf](http://trade.ec.europa.eu/doclib/docs/2013/february/tradoc_150459.pdf)
- [6] Report from the Commission to the Council and the European Parliament on the implementation of Regulation (EC) No.428/2009 setting up a Community regime for the control of exports, transfer and transit of dual-use items. COM(2013) 710 final, 16.10.2013.  
[http://trade.ec.europa.eu/doclib/docs/2013/october/tradoc\\_151857.pdf](http://trade.ec.europa.eu/doclib/docs/2013/october/tradoc_151857.pdf)
- [7] Communication from the Commission to the Council and the European Parliament. The Review of export control policy: ensuring security and competitiveness in a changing world. COM(2014) 244 final, 24.4.2014.  
[http://trade.ec.europa.eu/doclib/docs/2014/april/tradoc\\_152446.pdf](http://trade.ec.europa.eu/doclib/docs/2014/april/tradoc_152446.pdf)
- [8] Wassenaar Arrangement. <http://www.wassenaar.org/>
- [9] Missile Technology Control Regime. <http://www.mtcr.info/>
- [10] Nuclear Suppliers Group. <http://www.nuclearsuppliersgroup.org/en/>
- [11] Australia Group. <http://www.australiagroup.net/en/index.html>
- [12] Chemical Weapons Convention. <http://www.australiagroup.net/en/index.html>
- [13] Versino C., Chardon S. (2015). Exchange of 2013 dual-use licensing data in the European Union. JRC97666. Distribution limited to the EU Dual-Use Coordination Group.
- [14] Report from the Commission to the European Parliament and the Council on the implementation of Regulation (EC) No 428/2009 setting up a Community regime for the control of exports, transfer, brokering and transit of dual-use items. COM(2015) 331 final, 10.7.2015.  
[http://trade.ec.europa.eu/doclib/docs/2015/july/tradoc\\_153612.pdf](http://trade.ec.europa.eu/doclib/docs/2015/july/tradoc_153612.pdf)
- [15] Eurostat. Easy COMEXT consultation site.  
<http://epp.eurostat.ec.europa.eu/newxtweb/>
- [16] Eurostat. Bulk data download site.  
[http://epp.eurostat.ec.europa.eu/NavTree\\_prod/everybody/BulkDownloadListing](http://epp.eurostat.ec.europa.eu/NavTree_prod/everybody/BulkDownloadListing)
- [17] Combined Nomenclature site by DG TAXUD.

[http://ec.europa.eu/taxation\\_customs/customs/customs\\_duties/tariff\\_aspects/combined\\_nomenclature/index\\_en.htm](http://ec.europa.eu/taxation_customs/customs/customs_duties/tariff_aspects/combined_nomenclature/index_en.htm)

[18] Combined Nomenclature download site by Eurostat.

[http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST\\_NOM&StrLanguageCode=EN&IntFamilyCode=&TxtSearch=&IntCurrentPage=2](http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_NOM&StrLanguageCode=EN&IntFamilyCode=&TxtSearch=&IntCurrentPage=2)

[19] The Harmonized System by World Customs Organization.

[http://www.wcoomd.org/home\\_hsoverviewboxes\\_hsharmonizedsystem.htm](http://www.wcoomd.org/home_hsoverviewboxes_hsharmonizedsystem.htm)

[20] EU Correlation Table document by DG TAXUD, updated July 2012.

[http://trade.ec.europa.eu/doclib/docs/2012/july/tradoc\\_149781.pdf](http://trade.ec.europa.eu/doclib/docs/2012/july/tradoc_149781.pdf)

[21] EU Correlation Table document by DG TAXUD, updated January 2015.

[http://trade.ec.europa.eu/doclib/docs/2015/january/tradoc\\_153050.xlsx](http://trade.ec.europa.eu/doclib/docs/2015/january/tradoc_153050.xlsx)

## **Appendix 1: Structure of Annex I to the dual-use Regulation**

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Items listed for export controls in Annex I to dual-use Regulation are grouped in 10 Categories, numbered 0 to 9. Table 1 shows the number of DU items per Category, the total number of items in Annex I to Regulation 388/2012 being 1687.

Each Category contains 5 Sub-categories named by letters A to E (Table 2).

Within Sub-categories, items are identified by a 3-digit number, and eventually by sub-divisions indicated by letters alternated with numbers separated by dots.

Except for Category 0, the first digit to the left indicates the origin of the control as follows:

- 0: Wassenaar Arrangement
- 1: Missile Technology Control Regime
- 2: Nuclear Suppliers Group
- 3: Australia Group
- 4: Chemical Weapons Convention.

The second and third digits are to number items. An item is identified in Annex I by a DU code (Figure 8) obtained by concatenating its category, sub-category, 3-digit number, dot letter dot number etc.

<b>Category ID</b>	<b>Category title</b>	<b>Nr. of items</b>
0	NUCLEAR MATERIALS, FACILITIES, AND EQUIPMENT	121
1	SPECIAL MATERIALS AND RELATED EQUIPMENT	452
2	MATERIALS PROCESSING	207
3	ELECTRONICS	190
4	COMPUTERS	27
5	TELECOMMUNICATIONS AND 'INFORMATION SECURITY'	90
6	SENSORS AND LASERS	298
7	NAVIGATION AND AVIONICS	92
8	MARINE	73
9	AEROSPACE AND PROPULSION	137
	<b>ALL ANNEX I</b>	<b>1687</b>

Table 1 – Categories of dual-use items in Annex I to Regulation 388/2012.

Sub-category ID	Sub-category title
A	Systems, Equipment and Components
B	Test, Inspection and Production Equipment
C	Materials
D	Software
E	Technology

Table 2 – Sub-categories of dual-use items in Annex I to Regulation 388/2012.

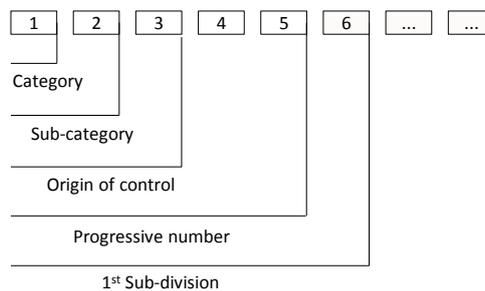


Figure 8 – Structure of dual-use codes in Annex I to Regulation 388/2012. There is an exception for items in Category 0, where the digit in position 3 does not reflect the origin of the control. For Category 0 items the origin of the control is always the NSG.

The DU code is associated to a textual description of the item, possibly including notes and technical notes. Table 3 shows example DU codes and their description.

DU code	DU description
0	NUCLEAR MATERIALS, FACILITIES, AND EQUIPMENT
0C	Materials
0C001	"Natural uranium" or "depleted uranium" or thorium in the form of metal, alloy, chemical compound or concentrate and any other material containing one or more of the foregoing;
0C002	"Special fissile materials" Deuterium, heavy water (deuterium oxide) and other compounds of deuterium, and mixtures and solutions containing deuterium, in which the isotopic ratio of deuterium to hydrogen exceeds 1:5000.
0C003	
...	...

Table 3 – Examples of dual-use codes and their descriptions of items listed in Annex I to Regulation 388/2012.

## Appendix 2: Structure of the Harmonized System and the Combined Nomenclature

The Harmonized System (HS) [19] is the taxonomy of commodities adopted by States adhering to the World Customs Organisation, trade associations and statistical offices in the majority of world countries.

HS is based on about 5,000 commodity groups organized within 22 Sections in a hierarchy made up of:

- Chapters,
- Headings,
- Subheadings.

Each level in the hierarchy is identified by an HS code and a descriptive text. Codes are 2-digit for Chapters, 4-digit for Headings and 6-digit for Subheadings (Figure 9).

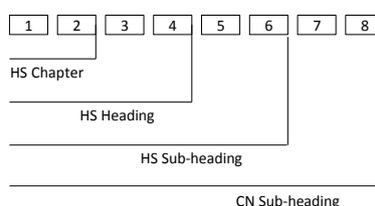


Figure 9 – Structure of the Harmonized System code and its Combined Nomenclature subdivision.

Beyond the HS, national subdivisions of the HS exist at 8, 10, digits or more to describe goods at a finer level of detail.

EU Member States use the 8-digit subdivision named Combined Nomenclature (CN) [17][18] made of 9500 Subheadings. The CN subdivision is relevant here because the EU export data used in this paper are published according to the CN.

	Code	Description
<b>HS</b>	SECTION V	MINERAL PRODUCTS
	26	ORES, SLAG AND ASH
	2612	Uranium or thorium ores and concentrates
	2612.10	Uranium ores and concentrates
<b>CN</b>	2612.10.10	Uranium ores and pitchblende, with a uranium content of > 5% by weight [Euratom]
	2612.10.90	Uranium ores and concentrates (excl. uranium ores and pitchblende, with a uranium content of > 5% by weight)

Table 4 – Examples of HS and CN codes and description of items listed in the Harmonized System and the Combined Nomenclature.

### Appendix 3: The EU Correlation Table

Since the EU trade statistics is reported according to the Combined Nomenclature, this study needs to relate items listed in Annex I to the dual-use Regulation with the CN.

A reference correspondence is provided by the EU Correlation Table (CT) [20][21] developed by DG TAXUD. For example CT [20] maps 583 unique DU codes to 1033 unique CN codes. The table contains 4816 rows of pairs <DU code> <CN code>. Table 5 shows some pairs of the CT.

The CT mapping between export-controlled items and CN items is many-to-many. A DU item may be related to several CN items, and viceversa. CN items introduce a degree of approximation in the description of export-controlled items. For this reason, any trade volume estimated by CN-based data has to be read in general as an upper-bound of the real export-controlled trade.

DU code	DU description	CN code	CN description
0C001	"Natural uranium" or "depleted uranium" or thorium in the form of metal, alloy, chemical compound or concentrate and any other material containing one or more of the foregoing;	2612.10.10	Uranium ores and pitchblende, with a uranium content of > 5% by weight [Euratom]
		2612.10.90	Uranium ores and concentrates (excl. uranium ores and pitchblende, with a uranium content of > 5% by weight)
		2612.20.10	Monazite; urano-thorianite and other thorium ores, with a thorium content of > 20% by weight [Euratom]
		2612.20.90	Thorium ores and concentrates (excl. monazite, urano-thorianite and other thorium ores and concentrates, with a thorium content of > 20% by weight)
		2620.99.95	Slag, ash and residues containing metals or metal compounds (excl. those from the manufacture of iron or steel and those containing primarily zinc, lead, copper, aluminium, nickel, niobium, tantalum, tin or titanium, those containing arsenic, mercury, thallium or their mixtures of a kind used for the extraction of arsenic or those metals or for the manufacture of their chemical compounds and those containing antimony, beryllium, cadmium, chromium or their mixtures)
		2844.10.10	Natural uranium, crude; waste and scrap, of natural uranium [Euratom]
		2844.10.30	Natural uranium, worked [Euratom]
		2844.10.50	Alloys, dispersions incl. cermets, ceramic products and mixtures containing natural uranium with iron or compounds of natural uranium with iron "ferro-uranium"
		2844.10.90	Compounds of natural uranium; alloys, dispersions incl. cermets, ceramic products and mixtures containing natural uranium or compounds of

<b>DU code</b>	<b>DU description</b>	<b>CN code</b>	<b>CN description</b>
			natural uranium [Euratom] (excl. ferro-uranium)
2844.30.11			Cermets containing uranium depleted in U 235 or compounds of this product
2844.30.19			Uranium depleted in U 235; alloys, dispersions, ceramic products and mixtures, containing uranium depleted in U 235 or compounds of this product (excl. cermets)
2844.30.51			Cermets containing thorium or compounds of this product
2844.30.55			Thorium, crude; waste and scrap, of thorium [Euratom]
2844.30.61			Bars, rods, angles, shapes and sections, sheets and strips, of thorium [Euratom]
2844.30.69			Thorium, worked; alloys, dispersions, ceramic products and mixtures containing thorium or compounds of this product [Euratom] (excl. cermets and bars, rods, angles, shapes and sections, sheets and strips)
2844.30.91			Compounds of thorium or of uranium depleted in U 235, whether or not intermixed [Euratom] (excl. thorium salts)
2844.30.99			Thorium salts
2844.40.10			Uranium derived from U 233 and its compounds; alloys, dispersions incl. cermets, ceramic products and mixtures containing uranium derived from U 233 or compounds of these products

Table 5 – Excerpt of the Correlation Table [20] for item 0C001 listed in Annex I to Regulation 388/2012.

**Appendix 4: List of acronyms**

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AG	Australia Group
CN	Combined Nomenclature
CT	Correlation Table
CWC	Chemical Weapons Convention
DUED	Dual-Use Export Domain
DUEV	Dual-Use Export Value
DULD	Dual-Use Licensing Domain
DULV	Dual-Use Licensed Value
DU	Dual-Use
EU	European Union
EU GEA	Union General Export Authorisation
HS	Harmonized System
MS	Member States
MTCR	Missile Technology Control Regime
NSG	Nuclear Suppliers Group
WA	Wassenaar Arrangement

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