CROSS-BORDER TRADE FOR CONSTRUCTION PRODUCTS

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Volume I - Main Report

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LIST OF ABBREVIATIONS

CEN	European Committee for Standardisation
CN	Combined Nomenclature
CPD	Construction Products Directive
CPR	Construction Products Regulation
EFTA	European Free Trade Association
ETA	European Technical Assessment
EU	European Union
EUR	Euro
hEN	Harmonised European standard
HS	Harmonized System
NACE	Statistical classification of economic activities
SME	Small and Medium-Sized Enterprise

Executive summary

Objective and methodology

The present study aims to provide the European Commission with a comprehensive and unbiased understanding of the trends of cross-border trade of construction products over the period 2003-2015 and the factors influencing these trends. The study contributes to the assessment of the role of the Construction Products Regulation (CPR) (305/2011/EU) and of harmonised European technical specifications (hENs) as Internal Market instruments to facilitate cross-border trade within the European Union (EU). The role of Small and Medium Enterprises (SMEs) in cross-border trade of construction products is object of specific investigation.

The methodological approach is based on a combination of quantitative and qualitative analysis tools including:

- desk review of existing studies and position papers of business representative associations;
- historical reconstruction and descriptive analysis of production and trade data for a sample of 25 construction products over the 2003-2015 period;
- econometric analysis to determine the factors which have influenced intra-EU trade for the sample of construction products;
- semi-structured interviews to 14 stakeholders, including national business associations and certification bodies;
- on-line survey to enterprises, which allowed to collect the opinion of 131 firms operating in the construction sector, including 61 SMEs (46% of the sample).

Inventory of representative construction products

The construction sector is characterised by a large number of diverse typologies of products. They could be distinguished on the basis of their use in the construction process (from raw materials, products used for structural purposes, finished products, finishing products, plants and systems), or of the basic materials used and value chain to which they belong (including metal, plastic, wood, glass, chemical, ceramic products and others).

The construction market includes not only new construction activities, but also recurrent and non-recurrent repair, demolition, renovation and re-building works. Such variety implies large variability of behaviours, demand and supply models, distribution and trade processes, as well as actors involved (from individual entrepreneurs and micro enterprises, to medium-sized enterprises or large industrial groups involved in big contract projects).

Construction products have been identified by analysing the PRODCOM database. When excluding construction machineries, which are out of the scope of this study, a list of 471 construction products can be identified. A sample of 25 construction products has been selected out of it, representing 5% (25 out of 471) of the total number of construction products identified and 17% in terms of average production share in 2013-14. The sample covers a variety of products widely used and traded in the construction market.

List of 25 products selected for in-depth analysis

Group	Product name	Covered by hENs
Raw materials	1. Cement	Yes
	2. Additives	Yes
	3. Sands	Yes
Products used for structural purposes	4. Bricks	Yes
	5. Aluminium bars	Yes
	6. Copper tubes and pipes	Yes
	7. Steel tubes and pipes	Yes
	8. Wire rod	Yes
	9. Concrete reinforcing bars	Yes
	10. Articles of asphalt	Yes
Finished products	11. Doors and windows in wood	Yes
	12. Doors and windows in plastic	Yes
	13. Prefabricated buildings of plastics, concrete or aluminium	No
Finishing products	14. Ceramic tiles	Yes
	15. Wood parquet flooring	Yes
	16. Textile flooring	Yes
	17. Plasterboards	Yes
	18. Insulating glass	Yes
	19. Insulating materials	Yes
	20. Roofing tiles	Yes
	21. Natural stone coating	Yes
	22. Clay flooring blocks	No
Plants and systems	23. Valves	Yes
	24. Optical fibre cables	No
	25. Electric systems	No

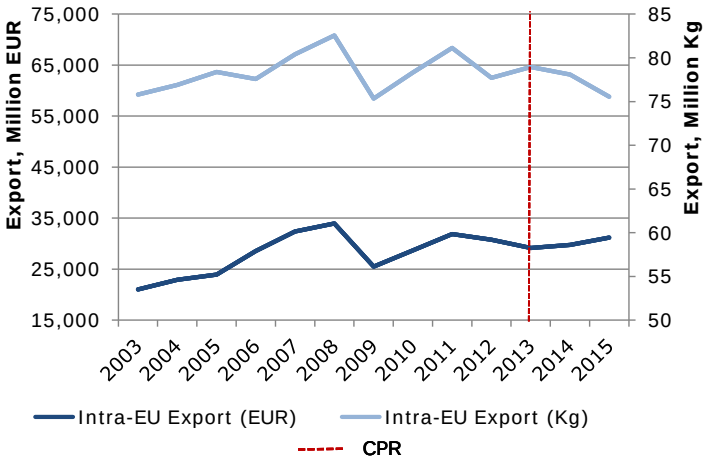
Overview and drivers of intra-EU cross border trade

In the period 2003-2015, the value of intra-EU export of the 25 construction products increased by 48% (from 21 billion EUR in 2003 to 31 billion EUR in 2015) while decreased by 1% in terms of volume (from 59 million ton in 2003 to 58 million ton in 2015). The value of intra-EU trade as a share of production of the selected 25 construction products has increased over the years, moving from 24% in 2003 to 31% in 2015.

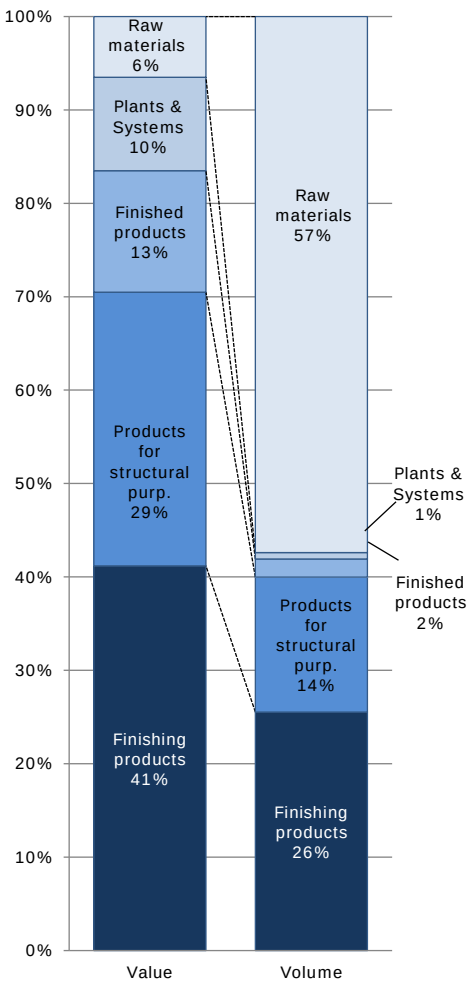
The world financial and economic crisis in 2009 and the following contraction of the real estate market in 2012-2013 had a strong negative effect on production, consumption and trade of cross-border products across the board. The effect of the crisis was only partially counterbalanced by anti-cyclical policy measures introduced in some European countries to stimulate the new construction and renovation markets, and by the infrastructural investment process fuelled by EU funds especially in the new Member States.

Out of the total sample of 25 construction products, products used for structural purposes (such as aluminium alloy bars, rods, profiles and hollow profiles, copper and steel tubes and pipes) and finishing products (such as ceramic tiles and textiles) are associated with the highest value of export in 2015. Raw materials (such as cement and sands), although representing only 6% of the value of construction materials and products considered, cover up to 57% of the total volume of export of construction materials and products.

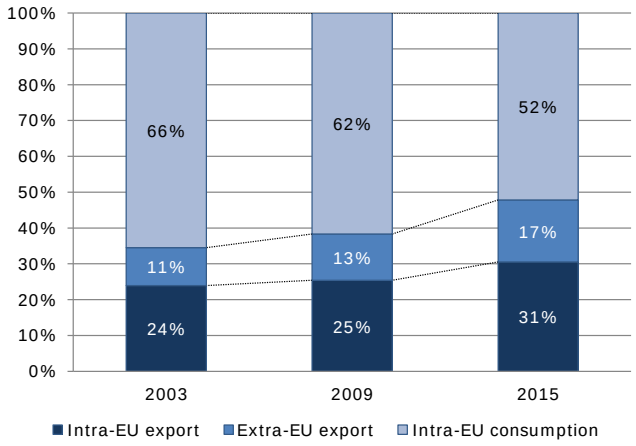
Intra-EU trade for the 25 construction products (2003-2015)



Share of intra-EU export by product group over the total value and volume of construction products - 2015



Value of intra-EU export, extra-EU export and intra-EU consumption[1] as a share of production of 25 construction products (2003, 2009, 2015)



Source: CSIL

Germany is the leading trading country for the market of construction products, both in terms of value and volume of traded goods, especially raw materials, products used for structural purposes and plants and systems. The value of Italian exports are similar to the German ones, but their volume is significantly lower. Italy is a major trader of finishing products, such as ceramic tiles, but also some structural products such as steel tubes and pipes.

Eastern and Central European countries have generally recorded higher growth rates in trade as compared to Western countries. The accession to the EU market has greatly stimulated intra-EU trade from/to Central-Eastern European countries. Indeed, according to the econometric analysis, the accession to the EU of Eastern and Central European countries (in 2004, 2007 and 2013) is associated with an average increase in the value of intra-EU trade by 0.4 percentage points.

The Polish market and trade of construction products significantly expanded in the past years. In 2015 Poland has become the third largest exporter in the EU, representing over 40% of the total value of export of all New Member States (Central and Eastern Europe) and nearly 30%

[1] Defined as production used for internal use.

of the total volume of export in the same countries. The growth of Polish export is visible especially as far as the finished products is concerned.

Slightly less than 50% of intra-EU trade takes place between neighbouring countries, the remainder being between more distant countries. Trade between neighbouring new and old Member States (such as the group of Scandinavian and Baltic countries, or Central European countries) has significantly grown as an effect of the EU enlargement process. Indeed, physical proximity, strengths of logistic connections and the use of the same official language are factors which facilitate cross-border trade. The high level of exchanges between Belgium and the Netherlands and other countries is also determined by the existence of international port hubs in these countries, where large quantities of goods coming from different Member States are shipped to their ultimate destination place.

Impact of the CPR and hENs on cross-border trade

The size of the origin and destination markets as reflected in the GDP and fixed investment in construction, membership in the EU and/or the Eurozone, the distance between countries, the use of a common official language and the currency exchange rate are strong determinants of the level of cross-border trade across all EU-28 Member States and construction products considered. By contrast, the analysis indicates that the CPR had a highly diversified effect on cross-border trade.

After controlling for other influencing factors, the introduction of the CPR in 2013 in replacement of the Construction Products Directive (89/106/EEC), had a negative and statistically significant effect on the value of trade in some older Member States (i.e. Germany, the UK, France, Denmark and Sweden). The effect of the CPR seems positive for a set of New Member States (Poland, Bulgaria, Estonia, Lithuania and Slovenia), the effect of the CPR is more positive) and Portugal. In terms of products, the CPR is associated with an increase in intra-EU trade for the additives, insulating glass and optical fibre cables. A negative effect is found for five products used for structural purposes (copper and steel tubes and pipes, wire rod, concrete reinforcing bars and articles of asphalt), and for two finishing products (roofing tiles and natural stone coating). The effect of the CPR is not statistically significant in the remaining markets.

Interviewees believe that the introduction of new harmonised product standards can be a strong stimulus to the trade of construction products. Yet, the econometric analysis at product level, which looks specifically at the impact of individual standards on the exports of a particular product, shows a diversified scenario, with some standards being positively correlated with export (e.g. EN1326-1 for trade of additives, or EN14251-1 for doors and windows in plastic), and others negatively (e.g. EN13915 for plasterboards).

Even if the impact of the CPR on the level of trade is generally not significant with exceptions for some countries or products, all stakeholders consulted agree that the CPR brought other sorts of benefits to firms. The main benefit is in terms of increased clarity of rules, which, according to around 50% of surveyed firms, may in fact facilitate the movement of goods in the EU. Moreover, 27% of firms believes that European specifications of essential characteristics of products could stimulate product innovation. This is in line with opinions of consulted stakeholders who point to a positive effect of the CPR on product quality, which can translate in an increased competitive advantage for European firms as compared to non-EU competitors.

Barriers to cross-border trade

Since the introduction of the Construction Products Directive in 1989 (89/106/EEC), the creation of the Single European Market in 1993 and development of harmonised European standards over the years, major restrictions on the free movement of construction products have been removed and the EU internal market of construction products has developed.

Nevertheless, both firms consulted through the on-line survey and national business associations interviewed highlight that some barriers are still in place, constraining cross-border trade among European countries. To some extent, national preferences and different traditions and tastes in the kind of construction products used limit the movement of construction products across the whole EU. However, the major obstacle to trade derives from national quality marks. Despite the effort to replace national rules with harmonised European ones, national product requirements among Member States are still existing and have limited so far the potential effectiveness of the CPR and the hENs.

Different interpretation of some requirements of the CPR, not fully uniform testing criteria used by certification bodies across different countries, and the lack of effective market surveillance are seen as further obstacles to the circulation of harmonised construction products.

The role of SMEs

The production and, even more considerably, trade of several construction products are dominated by medium or large size companies, including multinationals. The more concentrated the market and smaller the country, the more trade data recorded at national level are driven by the production and export behaviour of few but larger companies. When considering product variation, SMEs are relatively less involved in the production of raw materials (cement, glass, metals) and semi-finished products, especially those used for structural purposes (such as steel and copper tubes, wire rod and aluminium bars), which require big investment costs and large plants. SMEs have a larger role to play in the production and trade of finished and finishing products, such as doors and windows, as well as flooring products (textile, wood-made or natural stones).

Regulation and administrative costs are the main barriers that hinder smaller enterprises, especially micro-size firms, from trading. SMEs struggle to understand the terms and requirements imposed by legislation. While the CPR has increased clarity and legal certainty, the existence of national different marking systems and requirements raise confusion and uncertainty especially among smaller firms.

The distribution systems of the construction products is relevant to explain the degree of involvement of SMEs in cross-border trade. Some products, in spite of being characterised by a concentrated production, have a highly fragmented distribution chain (including transporting, storing and selling activities) to which SMEs could participate. In countries where big retailers and low cost bricolage retailers dominate the distribution system for a large set of finished products, trade by SMEs is likely to be more limited. SMEs located nearby the borders are more likely to cross-border trade and ensure local installation and post-sale services, thanks to lower transport cost.

The implementation of simplified procedures for micro enterprises, which is foreseen in the CPR, has been positively viewed by stakeholders. Yet, the simplified requirements for smaller firms are unclear and as a consequence they are not yet fully applied. The benefits generated by the CPR for exporter SMEs could increase in the future years as long as national barriers fall down, simplified rules are more effectively implemented and SMEs better organise and equip

themselves to go abroad (e.g. by joining export consortia, or taking advantage from available public grants for internationalisation).

1. Introduction

1.1 Background

The European Commission, Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, awarded CSIL Centre for Industrial Studies, in partnership with CRESME – Economic and Social Research Center of Construction Market, a contract to carry out a study on "Cross-border trade for construction products". The study is part of the assessment of the role of the Construction Products Regulation (CPR) (305/2011/EU) as an Internal Market instrument to facilitate cross-border trade within the European Union (EU). The primary aim of the CPR was to remove technical barriers to the trade of construction products, by harmonizing and clarifying the rules for affixing the CE marking.

Since when the CPR was introduced, no thorough evaluation has been initiated to assess its effects on the EU internal market. Three years after making CE marking rules compulsory to all construction products covered by a harmonised European standard (hEN) or European Technical Assessment (ETA), there is the need to assess whether previous barriers to cross-border trade have been resolved. At the same time, it is important to determine whether new issues and barriers to the free movement of goods have emerged and whether there is the need to introduce harmonised European standards for new types of products. Given the aim of the CPR to stimulate trade especially by Small Medium Enterprises (SMEs), particular attention should be put on assessing the extent to which the Regulation has improved SMEs' participation in cross-border trade within the EU.

This study is meant to address such information needs and inform the process of review of the CPR that is expect to take place in 2018. Thanks to the amount of evidence collected and analysed by the contractor, the Commission will have a clearer picture of the long-term trends of the construction products trade in the EU and the possible effects produced by the EU Regulation.

1.2 Objectives

This study aims to provide the European Commission with a comprehensive and unbiased understanding of the trends of cross-border trade of construction products over the period 2003-2015 and the factors influencing these trends. Specific objectives of the study are:

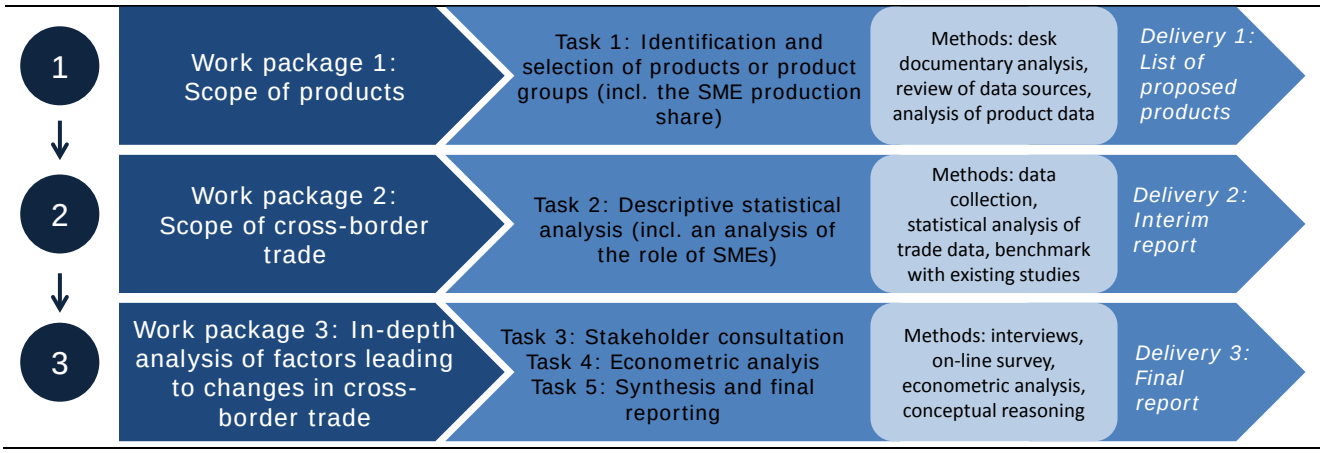
- To make an **inventory of different types of construction products**;
- To provide estimates of the **value and volume of cross-border trade** for a sample of construction products/product groups within the EU market over the period 2003-2015;
- To highlight the specific **role of SMEs** in the cross-border trade of the selected products;
- To identify **factors which influence the cross-border trade** within the EU Internal market of construction products;
- To assess whether and how the introduction of **harmonised European technical specifications and the CPR** has affected the cross-border trade of construction products within the EU.

1.3 Methodology of analysis

The methodological approach is based on a combination of quantitative and qualitative analysis tools that investigate specific dimensions of the cross-border trade of construction products and the effects of the harmonised European technical specifications and the CPR. They include:

- Review of existing studies and position papers of business representative associations;
- Historical reconstruction and descriptive analysis of production and trade data for a sample of 25 construction products over the 2003-2015 period;
- Econometric analysis to determine the factors which have influenced intra-EU trade for the sample of construction products;
- Semi-structured interviews to 14 stakeholders, including national business associations and certification bodies;
- On-line survey to enterprises, which allowed to collect the opinion of 131 firms, including SMEs.

Figure 1. Overview of study and methodological approach



Source: CSIL

Our methodological approach is characterised by the following distinctive ingredients:

- The study is built on a solid evidence-based analysis of existing data and studies on the topic and in-depth understanding of the market dynamics of the EU construction industry;
- Different data sources have been considered in order to ensure validity, completeness and depth of analysis;
- The analysis produced through this study has reached a higher level of detail (in terms of construction products) and depth (in terms of range of products covered, time of analysis and geographical scope) as compared to any other previous study on this topic;
- Emphasis throughout the whole study has been put to investigate the role of SMEs in cross-border trade of construction products;
- Dialogue with stakeholders, including enterprises, was important to analyse the factors influencing cross-border trade and ensure external validation of the analysis;

- Any methodological challenges and issues in data collection and analysis have been openly explained, and all underlying assumptions and methodological choices have been justified.

1.4 Scope and structure of this report

This Final report sets out the key findings of the whole study. It is structured in three volumes, as presented in Table 1.

Table 1. Structure of the report

Volume and Section	Content
Volume I – Final report	
Section 1 – Introduction	The background, the methodology and the objectives of the study are briefly presented in this introductory section.
Section 2 – Inventory of construction products and selected sample	It contains the classification of construction products by groups and product families. The list of 25 products selected for the analysis is presented and justification for their selection is briefly provided. Annex 1 included in Volume III provides more details on the selection process.
Section 3 – Data and sources	This section lays down the data and sources considered to analyse cross-border trade and the role of SMEs. Existing methodological challenges are pointed out. Annex 2 included in Volume III shows the correspondence between product codes which has been adopted by the contractor to build a coherent dataset over the 2003-2015 period.
Section 4 – Overview of cross-border trade	The results of the descriptive statistical analysis of trade data are presented in this section. The objective is to depict trends in cross-border trade over the 2003-2015 period at aggregate and product group level. Volume II includes short product fiches, which present information and data related to each product of the sample. Annex 3 of Volume III shows the bilateral trading network for each of the 28 EU Member States at the beginning of our period of analysis (2003) and at the end (2015).
Section 5 – Analysis of factors determining cross-border trade	By observing the trade flows, descriptive statistics, econometric results and by consulting stakeholder and firms, the drivers of cross-border trade are identified and validated. This includes the impact of the CPR and of the hENs as well as the role of SMEs and factors influencing this specific type of enterprises. This section is accompanied by Annex 4, Annex 5 and Annex 6 included in Volume III (see below).
Section 6 – Conclusion	Synthesis and concluding remarks on the findings are presented in this section.
Volume II – Product fiches	It includes 25 short product fiches, one for each construction product included in the analysis. They are meant to summarise and structure in a common format the main set of information related to the selected products.
Volume III – Annexes	- Annex 1. Steps and criteria for product selection - Annex 2. PRODCOM and COMEXT code tracking across years - Annex 3. Trading networks by country - Annex 4. List of interviewees - Annex 5. Survey on-line: questionnaire and results - Annex 6. Econometric analysis: models and results

2. Inventory of construction products and selected sample

2.1 Inventory

The construction sector is characterised by a large number of diverse typologies of products, which can be classified according to different criteria. In this study we adopt two parallel classifications to define construction products:

- **Product groups** defined by their use in the construction process:
    - Raw materials (e.g. aggregates, cement, stones);
    - Products used for structural purposes (e.g. structural steel, aluminium structures, wood cross-ties);
    - Finished products (e.g. doors, windows, prefabricated buildings of wood);
    - Finishing products (e.g. flooring, wall covering products);
    - Plants and systems (e.g. electric equipment, electrical systems, plumbing, heating and cooling, telecommunication systems);
    - Construction machineries.

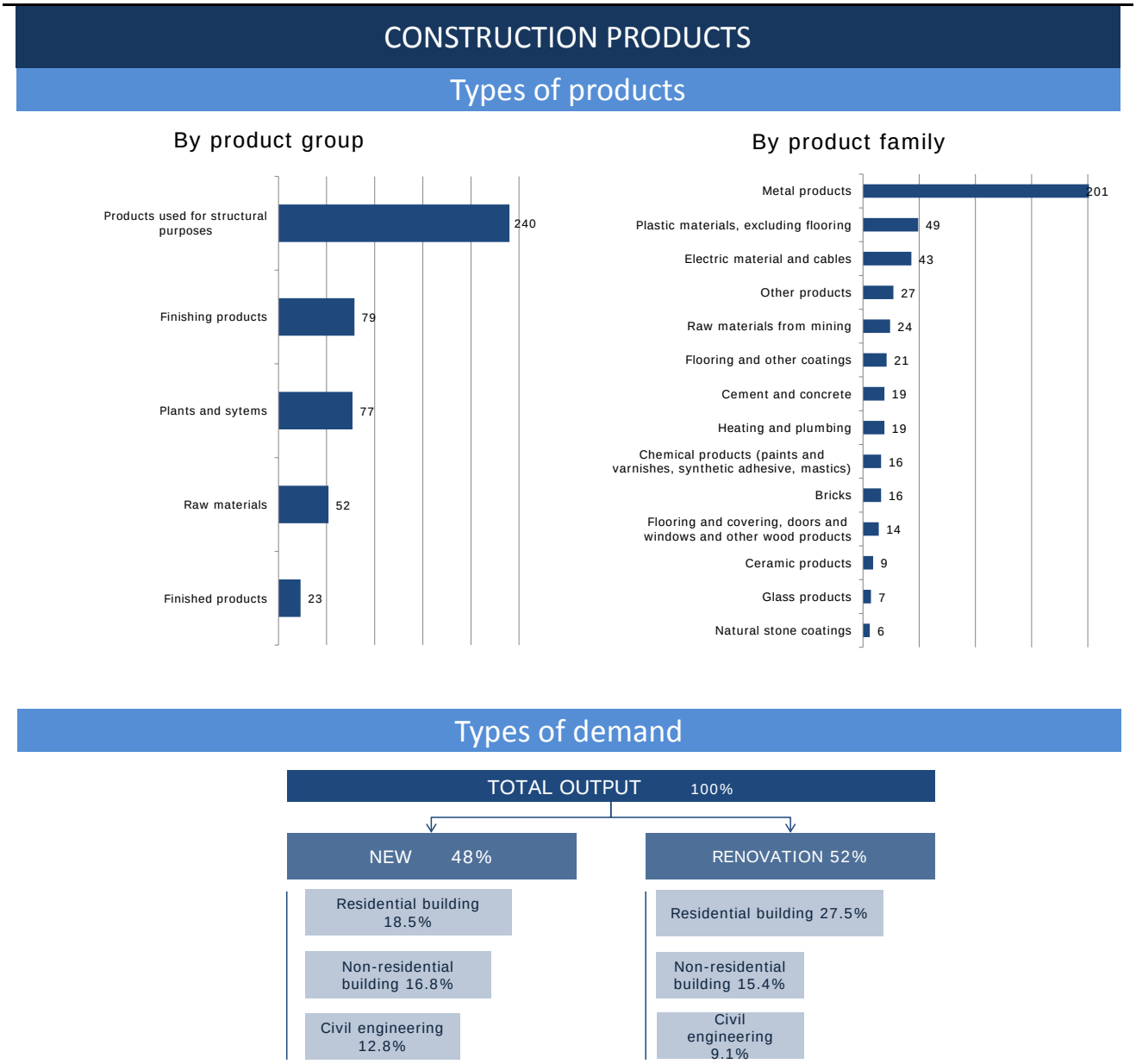
- **Products families**, identified by looking at the materials used and their market proximity and value chains. These families are:
    - Metal products;
    - Construction machineries and equipment;
    - Plastic materials, excluding flooring;
    - Electric materials and cables;
    - Raw materials from mining;
    - Flooring and other coatings;
    - Cement and concrete;
    - Heating and plumbing;
    - Chemical products (paints and varnishes, synthetic adhesive, mastics);
    - Bricks;
    - Flooring and covering, doors and windows and other products made of wood;
    - Ceramic products (tiles and sanitary wares);
    - Glass products;
    - Natural stone coatings;
    - Other products.[2]

Large variability exists also in the demand for construction products, which goes from the micro level demand for current repair (like tap replacing), to the macro-demand for major works, like big infrastructures or urban refurbishment interventions. The construction market covers two main sectors: i) residential and non-residential building and ii) civil engineering. The construction market includes not only construction activities, but also recurrent and non-recurrent repair, demolition, renovation and re-building works. Such variety implies very large variability of behaviours, demand and supply models, distribution and trade processes and actors involved (from the individual entrepreneur to medium-sized enterprises or large industrial groups involved in big contract projects).

[2] This is a residual group including for instance articles of asphalt, bituminous mixtures, chandeliers and other electric ceiling or wall lighting fittings (excluding those used for lighting public open spaces or thoroughfares), or composite materials like boards, sheets, panels, tiles and similar articles of plaster faced or reinforced with paper or paperboard.

To the purpose of this study, construction products have been identified by analysing the PRODCOM database at its most disaggregated level (8 digit product codes). A list of 533 construction products has been produced. The list provides a comprehensive picture of the variety of products used in the construction industry. It covers both civil engineering and building products (for residential, industrial, commercial, public office use), products for new construction as well as renovation and renewal activity. If excluding construction machineries, which are not covered by this study, the number of construction products amounts to 471. The average value of production between 2013 and 2015 for these 471 products is 587 billion EUR.

Figure 2. Numbers of construction products



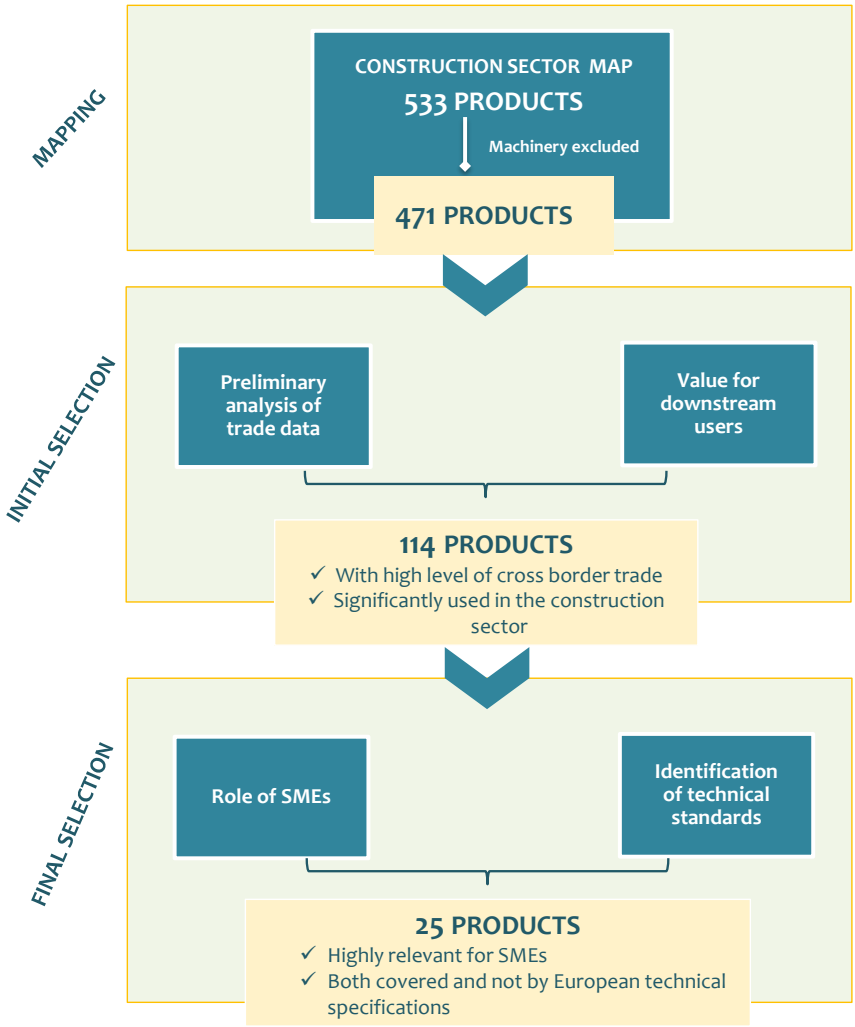
Note: The distribution of the total output of the construction industry between new construction and renovation is based on CRESME estimates referring to 19 European countries which represent about 94% of the total market in 2015.

Source: CSIL and CRESME

2.2 Selected sample

The analysis covers a list of 25 construction products. Starting from the comprehensive mapping of the construction sector illustrated above, products have been selected through a two-step procedure, illustrated in the Figure below and explained in more details in Annex 1 of Vol. III.

Figure 3. Overview of the selection process



Source: CSIL and CRESME

In brief, products were selected so as to satisfy the following criteria:

- **Coverage of different product families**, defined by the product use, materials and market proximity (e.g. metal products, electric material, bricks, ceramic products, etc.), with the exception of machineries, which are out of the scope of analysis according to the study's Specifications;
- **Coverage of different products groups**: raw materials, structural products, finished products, finishing, plants and building systems;
- **Relatively high level of import/export movements** within EU (relative to consumption levels and production) and European **market size**;

- Relevance of the product for the construction industry (**market share**);
- **Relevance of SMEs**, either in the production or distribution phase, or both;
- **Existence of an European Harmonized Standard covered by the CPR**. For finished products, finishing products and plants and systems, examples of products not covered by standards are also included in the sample in order to allow for comparison with products covered by European standards.

In some cases, different products, as defined by PRODCOM, have been grouped together and taken as a single unit of analysis. Two or more products have been gathered together when i) they are covered by the same European standard(s) and ii) belong to a common market niche.

The sample cannot be considered *statistically* representative of the whole construction products market. Products included in the sample cover 5% of the total number of construction products identified (25/471) In terms of production, the average value of production of the 25 products is 102 billion EUR, which represents 17% of the value of production of all the 471 construction products identified (as mentioned above, equal to 587 billion EUR). Indeed, the selection process was not random, but aimed to pick particularly relevant products that are widely used in the construction sector, without any attempt to ensure statistical representatives of the analysis and immediate generalisability of findings to the whole construction industry. Still, the variety of products selected allows us to get a valuable snapshot of the entire market, from raw materials to finishing products.

Table 2. List of 25 products selected for in-depth analysis

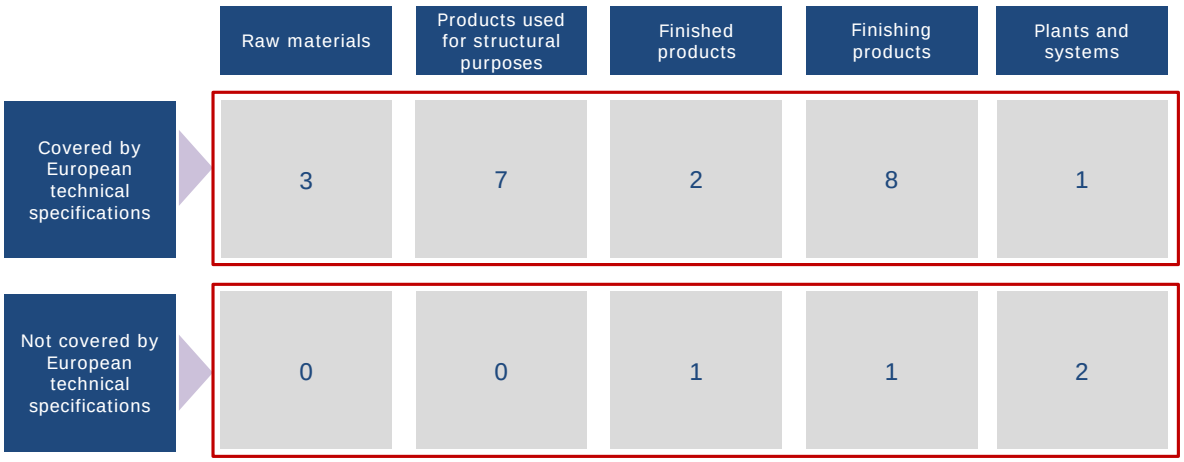
Group	Product label	PRODCOM name and code	European technical standards
Raw materials	1. Cement	Portland cement, Other hydraulic cements (23.51.12(.10 + .90)	EN 197-1 EN 413-1
	2. Additives	Prepared additives for cements, mortars or concretes (20.59.57.50)	EN 934-2 EN 934-3 EN 934-4 EN 934-5 EN 13263
	3. Sands	Construction sands such as clayey sands; kaolinic sands; feldspathic sands (excluding silica sands, metal bearing sands) (08.12.11.90)	EN 13139 EN 12620
Products used for structural purposes	4. Bricks	Non-refractory clay building bricks (excluding of siliceous fossil meals or earths) (23.32.11.10)	EN 771-1
	5. Aluminium bars	Aluminium alloy bars, rods, profiles and hollow profiles (excluding rods and profiles prepared for use in structures) (24.42.22.50)	EN 15088 EN 1090-1
	6. Copper tubes and pipes	Copper tubes and pipes (24.44.26.30)	EN 1057
	7. Steel tubes and pipes	Tubes and pipes, of circular cross-section, welded, of an external diameter ≤ 406,4 mm, of stainless steel (excluding line pipe of a kind used for oil or gas pipelines, and casing and tubing used for oil or gas drilling); Tubes and pipes, of circular cross-section, hot- or cold-formed and welded, of an external diameter ≤ 406,4 mm, of steel other than stainless steel (24.20.33 (.10 +.70))	EN 1123-1 EN 10312

	8. Wire rod	Wire rod used for concrete reinforcing (mesh/cold ribbed bars) (24.10.61.30)	EN 10088-5 EN 10025-1
	9. Concrete reinforcing bars	Hot-rolled concrete reinforcing bars (24.10.62.10)	EN 10025
	10. Articles of asphalt	Articles of asphalt or of similar materials, e.g. petroleum bitumen or coal tar pitch, in rolls (23.99.12.55)	EN 13707 EN 14695 EN 13969 EN 13970 EN 14695 EN 14967
Finished products	11. Doors and windows in wood	Windows, French windows and their frames, of wood; Doors and their frames and thresholds, of wood (16.23.11(.10 + .50)	EN 14351-1 EN 16034
	12. Doors and windows in plastic	Plastic doors, windows and their frames and thresholds for doors (22.23.14.50)	EN 14351-1 EN 16034 EN 13241
	13. Prefabricated buildings of plastics, concrete or aluminium	Prefabricated buildings of plastic, concrete or aluminium (39.99.0.00 z)	Not available
Finishing products	14. Ceramic tiles	Unglazed ceramic and stoneware flags and paving, hearth or wall tiles; unglazed ceramic and stoneware mosaic cubes and the like, whether or not on a backing; Glazed stoneware flags and paving, hearth or wall tiles, with a face of > 90 cm2; Glazed earthenware or fine pottery ceramic flags and paving, hearth or wall tiles, with a face of > 90 cm2; Glazed ceramic flags and paving, hearth or wall tiles excluding double tiles of the spaltplatten type, stoneware, earthenware or fine pottery flags, paving or tiles with a face of not > 90 cm2 (23.31.10(.50 + .73 + .75 + .79)	EN 14411
	15. Wood parquet flooring	Assembled parquet panels of wood for mosaic floors; Assembled parquet panels of wood (excluding those for mosaic floors); Coniferous wood continuously shaped (including strips and friezes for parquet flooring, not assembled) (16.22.10(+.60 + .30)+16.10.21.10)	EN 14342
	16. Textile flooring	Knotted carpets and other knotted textile floor coverings; Woven carpets and other woven textile coverings (excluding tufted or flocked; Tufted carpets and other tufted textile floor coverings; Needlefelt carpets and other needlefelt textile floor coverings (excluding tufted or flocked); Carpets and other textile floor coverings (excluding knotted, woven, tufted, needlefelt) (13.93(.11 + .12 + .13. +.19)	EN 14041
	17. Plasterboards	Boards, sheets, panels, tiles and similar articles of plaster or of compositions based on plaster, faced or reinforced with paper or paperboard only (excluding articles agglomerated with plaster, ornamented) (23.62.10.50)	EN 13915 EN 13950

	18. Insulating glass	Multiple-walled insulating units of glass (23.12.13.30)	EN 1279-5
	19. Insulating materials	Slag wool, rock wool and similar mineral wools and mixtures thereof, in bulk, sheets or rolls; Mixtures and articles of heat/sound-insulating materials n.e.c. (23.99.19(.10 + .30))	EN 13162 EN 14064-1 EN 14303
	20. Roofing tiles	Non-refractory clay roofing tiles (23.32.12.50)	EN 1304
	21. Natural stone coating	Tiles, cubes and similar articles of natural stone, whether or not rectangular (including square), the largest surface area of which is capable of being enclosed in a square the side of which is < 7 cm; artificially coloured granules, chippings and powder of natural stone; Worked monumental or building stone and articles thereof, of granite (excluding tiles, cubes and similar articles, of which the largest surface area is capable of being enclosed in a square the side of which is < 7 cm, setts, kerbstones and flagstones); Worked monumental or building stone and articles thereof (excluding of granite or slate, tiles; cubes and similar articles; of which the largest surface area is capable of being enclosed in a square the side of which is < 7 cm); Worked slate and articles of slate or of agglomerated slate (23.70.12(.30 + .60 + .70 + .80)	EN 1341 EN 1342 EN 1343 EN 1469 EN 12057 EN 12058 EN 12226-1
	22. Clay flooring blocks	Non-refractory clay flooring blocks, support or filler tiles and the like (excluding of siliceous fossil meals or earths) (23.32.11.30)	Not available
Plants and systems	23. Valves	Ball and plug valves (28.14.13.73)	EN 331
	24. Optical fibre cables	Optical fibre cables made up of individually sheathed fibres whether or not assembled with electric conductors or fitted with connectors (27.31.11.00)	Not available
	25. Electric systems	Insulated electric conductors for voltage >1 000 V (excluding winding wire, coaxial cable and other coaxial electric conductors, ignition and other wiring sets used in vehicles, aircraft, ships) (27.32.14.00)	Not available

Source: CSIL and CRESME

Figure 4. Snapshot of the number of products proposed by group



Source: CSIL and CRESME

Table 3. Distribution of selected products by family

Product families	A Total number of construction products identified	B Number of selected products	C = B / A Share of selected products over total products
1. Metal products	201	5	2%
2. Plastic materials, excluding flooring	49	1	2%
3. Electric material and cables	43	2	5%
4. Other products	27	2	7%
5. Raw materials from mining	24	1	4%
6. Flooring and other coatings	21	2	10%
7. Cement and concrete	19	2	11%
8. Heating and plumbing	19	1	5%
9. Chemical products (paints and varnishes, synthetic adhesive, mastics)	16	1	6%
10. Bricks	16	3	19%
11. Flooring and covering, doors and windows and other products made of wood	14	2	14%
12. Ceramic products (tiles and sanitary wares)	9	1	11%
13. Glass products	7	1	14%
14. Natural stone coatings	6	1	17%
Total	**471**	**25**	**5 %**

Source: CSIL and CRESME

Table 4. Distribution of selected products by group

Product families	A Total number of construction products identified	B Number of selected products	C = B / A Share of selected products over total products
1. Raw materials	52	3	6%
2. Products used for structural purposes	240	7	3%
3. Finished products	23	3	13%
4. Finishing products	79	9	11%
5. Plants and systems	77	3	4%
Total	**471**	**25**	**5 %**

Source: CSIL and CRESME

3. Data and sources

3.1 Trade data

After agreeing with the European Commission on the list of proposed products, the team proceeded with the collection of data needed for the statistical analysis and with the construction of a consistent database of European cross-border trade and production of selected construction products. All the data were gathered from the Eurostat data-warehouses.

3.1.1 Data sources and types of data

We have considered production and trade data, relying on two main data sources: PRODCOM for production and trade data, and COMEXT for bilateral trade flow data.

PRODCOM

Raw data on production, export and import have been retrieved from the PRODCOM database and have been obtained through a bulk download.

PRODCOM database provides annual industrial production statistics for mining and quarrying, manufacturing, and electricity, gas and water supply. Annual production is estimated through sampling survey methods carried out within any EU Member States, plus Norway and Iceland, and then harmonised by Eurostat. PRODCOM database does not include data referring to less than 20 employee enterprises. PRODCOM statistics are based on the NACE classification and the classification of products by activity (CPA). They are comparable with external trade statistics adopting the Combined Nomenclature (CN). Products are identified by a 8-digit code.

According to the scope of the study, data have been collected for the period 2003-2015. The dataset features information on the annual production of construction products within the 28 European countries and overall international trade, that is total import and export, of the same products. Data are expressed in economic terms (value in euros) and quantity, the latter depending on the specific product (e.g. square meters, kg, pieces). The following variables are available.

Table 5. Variables included in the PRODCOM database

Code	Description
DECL	Declarant code
PERIOD	Reference year
PRCCODE	Product code
PRODQNT	Production in quantity (specific unit of measure)
PRODVAL	Production in value (euro)
EXPQNT	Export quantity (specific unit of measure)
EXPVAL	Export value (euro)
IMPQNT	Import quantity (specific unit of measure)
EXPQNT	Import value (euro)
QNTUNIT	Unit of measure

COMEXT

Data on international trade have been collected from the COMEXT database. All the monthly data for the period January 2003 to December 2015 have been analysed.

The COMEXT database covers trade data of goods in the EU Member States, Candidate countries and EFTA countries. Intra-EU trade data are collected directly from trade operators, which send a monthly declaration to the relevant national statistical administration; thus data are monthly based and are made available for download every month. The updating process follows a continuous backward revision: every time new monthly data are released previous data are updated. In this situation the updating dates are very important to track the database evolution (e.g. data released on the 19/4/2017 reporting updates since January 2016).

COMEXT contains data on both trade flows (in Euro) and trade volumes expressed in Kg and specific quantity unit. The latter is product specific and, in most of the cases, corresponds to the 'supply unit' variable provided by PRODCOM. Products are classified according to NC-8 codes. The following variables are available.

Table 6. Variables included in the COMEXT database

Code	Description
DECLARANT	Declarant code
PARTNER	Partner code
PRODUCT_NC	Product code (8 digit combined nomenclature)
FLOW	Import or Export
PERIOD	Reference month
VALUE	Trade value (euro)
QUANTITY	Trade weight (kilogrammes)
SUP_QUANTITY	Trade quantity (specific unit of measure)

For both production and cross-border trade data we considered only data for EU28 countries, i.e. the volume and value of construction products produced in EU28 Member States and the volume and volume of exports and imports declared by EU28 countries towards/from any international partner (other EU28 countries and non-EU28).[3]

EFTA countries could not been considered in the analysis, due to less reliable trade and poor market statistics (e.g. Liechtenstein or Iceland) and, especially, because PRODCOM database currently does not provide aggregate statistics for EU28 plus EFTA, thus making not possible to separate internal trade statistics from global trade flows for these countries.

3.1.2 Preliminary data treatment

All the downloaded data have been organised and processed for the statistical analysis. This operation has been carried out on a yearly basis for PRODCOM data (production and trade data) and on monthly basis for COMEXT data. In the latter case, all the data updated according to the new Eurostat release have been taken into account. Monthly data on import and export have then been aggregated on an annual basis for each product, declarant and partner country.

In this phase, a first formal check concerning the type (nature) and variability (volatility) of each variable has been carried out to track and record major changes and possible inconsistencies or missing data. More specifically, *declarants*, *partners* and *products* codes have been carefully analysed in order to verify their stability and identify possible data inconsistencies.

3.1.3 Codes check

Eurostat provides a series of tables and documents describing the structure/nature of codes employed in the two databases (PRODCOM and COMEXT); in particular, a detailed description and explanation of every code is provided (product headings). It must be pointed out that PRODCOM data and COMEXT data do not have the same code structure: the former is organized according to the PRODCOM code (*prccode*) and the latter according to the combined nomenclature (NC-8, *nccode*). Moreover, both codifications are continuously updated;

[3] Even if the analysis focuses on intra-EU cross border trade, we downloaded data also on extra-EU trade for possible comparisons between the two groups.

variations usually concerns the levels of disaggregation of product codes. In order to properly track the dynamic evolution of variables year by year, Eurostat provides three kinds of tables:

1. For both codifications, the list of codes and their description for each year;
2. For both codifications, the list of the code changes from one year to the other;
3. The *prccode* and *nccode* correspondence for every year.

Since continuous changes in product codes may jeopardize the data comparability over time, for the purpose of this study it was necessary to build up an homogeneous coding dataset, by carefully joining PRODCOM codes and CN8 codes into the same database. For instance, the product "Prepared additives for cements, mortars or concretes" which since 2008 is defined by code 20.59.57.50, previously it corresponded to code 24.66.57.510. The full code tracking process is shown in Annex 2 (Vol. III).

After ensuring correspondence of PRODCOM codes over the 2003-2015 years,[4] these codes have been linked to those used in the combined nomenclature of the international trade dataset (nccode). To this purpose we have used the official correspondence tables provided by Eurostat.

3.1.4 Development of the final database

The steps followed to carefully match the PRODCOM and COMEXT databases allowed us to obtain a unique and coherent database for international trade time series at year and country level. The final database includes for every construction product covered by the analysis:

- production data (in value and quantity) for every reporter country;
- yearly trade data (imports and exports, in value and quantity) for every partner, including non-European partners.

PRODCOM import/export annual data have been compared with the COMEXT data and used to validate the matching process described above. The annual import and export data provided by PRODCOM and COMEXT are not always identical to each other, due to approximations and possible differences in the treatment of missing data. However, this discrepancy is rather marginal.

The final database is affected by soma data gaps, particularly in the production time series. For the purpose of the statistical analysis these gaps have not been filled in, and no other data treatment has been carried out.

3.1.5 Caveats

While the team succeeded to ensure correspondence between PRODCOM and COMEXT data, some caution when interpreting the data has to be applied due to the existence of additional methodological challenges.

First, **asymmetries between importers and exporters data exist**. Although intra-EU import and export data are based on common and largely harmonised rules, the intra-EU trade balance is not zero, meaning that the value of intra-EU import does not perfectly match the value of extra-EU export. A perfect match is made impossible first of all by the CIF/FOB

[4] The only product for which it was not possible to reconstruct the full time series is Steel tubes and pipes. This product could be analysed only from 2008 to 2015.

approach used to report the value of export and import in customs declaration: in theory, the import value should be slightly higher than the mirror export value as it includes extra transport costs. However, asymmetries also come from errors in reporting, time lags,[5] or from differences in the concepts and definitions applied by the partner countries (for a list of the most common causes of methodological asymmetries, see Eurostat http://ec.europa.eu/eurostat/statistics-explained/index.php/International_trade_statistics_-_background). In fact, since the introduction of Intrastat for intra-EU trade on 1 January 1993, the value of dispatches (intra-EU exports) has been consistently higher than that of arrivals (intra-EU imports). **Eurostat uses dispatches as the more reliable measure of total intra-EU trade** as, at aggregated levels, total dispatches have better coverage than total arrivals. **We follow the same approach in our analysis**.

Second, **trade flows in some countries may be distorted by the so called 'Quasi-transit' phenomenon**. It occurs when goods are imported by non-residents into the reporting economy from outside the EU and subsequently dispatched to another Member State as well as when the goods exported from a Member State to a non-member country are cleared for exports in another Member State. This phenomenon affects especially the Dutch trade flows: trade flows declared by the Netherlands are over-estimated because goods bound for other EU countries which arrive in Dutch ports, according to EU rules, are recorded as extra-EU imports by the Netherlands (the country where goods are released for free circulation). This in turn increases the intra-EU flows from the Netherlands to those Member States to which the goods are re-exported. The same phenomenon affects to a lesser extent trade data from/to Belgium.

Third, **trade flows may be distorted by financial transfers** taking place among firms belonging to the same corporate group but operating in different countries. In these instances, such transfers may be recorded as foreign sales, even if in fact they do not indicate real movement of goods sold onto the market. This is an intrinsic limitation of trade flow data, which can be relevant especially for products such as *windows and their frames* (i.e. frame produced in a country and assembled in another to manufacture a window), *construction sands* (i.e. different sands mixed together in different plants), *cement* (i.e. cement processed to produce ready-made concrete) and *natural stone coatings*. Instead, this issue is more limited for products whose production process is less likely to be split in different phases taking place in different countries. In any case, the knowledge of the market players and structure for each of the selected construction products is crucial to correctly interpret the trade flows and point out, where relevant, possible distortions in trade data due to the effect of financial transfers.

The caveats here discussed intrinsically affect trade data (not only in the EU, but in general). It is impossible to quantify the impact that these limitation have on the results of our analysis and no systematic correction can be applied to define and determine the "true" value or volume of trade from one country to another. In our analysis, we relied on official data sources and, knowing the different factors that could influence the data, we paid extreme care in giving the correct interpretation to the observed trade flows.

3.2 Data on SMEs

The role of SMEs has been investigated mainly in a qualitative way, since very few and incomplete quantitative data exist on SMEs operating in the construction products market. The team's knowledge of the market and the distribution system of most of construction products in Europe, originating from previous market research and studies,

[5] The same trade operation can be recorded under a different reference period because of transport time or processing delays.

provided the basis to make some preliminary comments on the extent to which SMEs may be involved in cross-border trade. More insights have been retrieved through phone interviews to stakeholders and the on-line surveys to enterprises.

We complemented the qualitative analysis with two indicators which proxy the weight of SMEs in the production of construction products:

- the share of SMEs over the total number of enterprises, by number of employees (SMEs are enterprises with less than 250 employees);
- the share of SMEs over the total number of enterprises, by turnover (SMEs are enterprises with a turnover lower than 50 Million Euro).

These indicators were built by analysing Orbis firm level data in the NACE sectors corresponding to the products under analysis.

Bureau van Dijk's Orbis database contains a vast amount of information on around 21 million industrial companies across Europe, 6.5 million of which are small-sized companies (below EUR 50,000 annual operating revenues). Orbis is the most complete and harmonised database of company data currently available on the market, as it combines data from 30 specialist sources for a long time span.

Specifically, the team has retrieved data on industrial companies with the following characteristics:

- Operating in any of the NACE sectors corresponding to the identified construction products;
- Located either in a EU-28 country or in an EFTA country;
- Data available for at least one year from 2007 to 2015;
- 0 – 10,000,000 employees;
- Exclusion of public authorities, states, governments.

Based on the information collected, the average share of manufacturing SMEs has been determined for each product, NACE sector and country.

Lacking comprehensive information in the literature on the role of SMEs in the construction market, and with no other harmonised source of data on SMEs at the level of specific products, the analysis of Orbis data allowed the team to make some reasonable, although approximate, assumptions on the extent to which SMEs are involved in the production of construction products.

This analysis revealed a number of obstacles in carrying out a quantitative EU-level analysis of industrial data, mainly deriving from issues of data availability and level of data disaggregation:

- Each company is classified in Orbis by its NACE sector (at 4 digit), which is however too aggregate to disentangle specific construction products.[6] National statistical sources

[6] For instance, the NACE sector 2410 'Manufacture of basic iron and steel and of ferro-alloys' includes 10 different products as defined from the PRODCOM classification; as another example, sector 2733 'Manufacture of wiring devices' covers some construction products (e.g. 27.33.13.70 'Connections and contact elements for wires and cables for a voltage <= 1 kV'), but also other products which are not relevant for this study.

may allow a more disaggregated analysis for specific countries only, without however no assurance of data harmonisation at EU level.

- Orbis has some limits in terms of representativeness, as very small enterprises (which are not required to make their balance sheets public) are not included. On average, Orbis covers around 70% of all existing firms.
- Data on export value are available only for 4% of companies in the considered NACE sectors. This prevented the team from determining with some degree of accuracy the share of exporting SMEs by NACE sector.

4. Overview of cross-border trade

In this section we provide a descriptive overview of the cross-border trend of construction products over the 2003-2015 period. We consider official data of the value (Euro) and volume (Kg) of cross-border trade.[7]

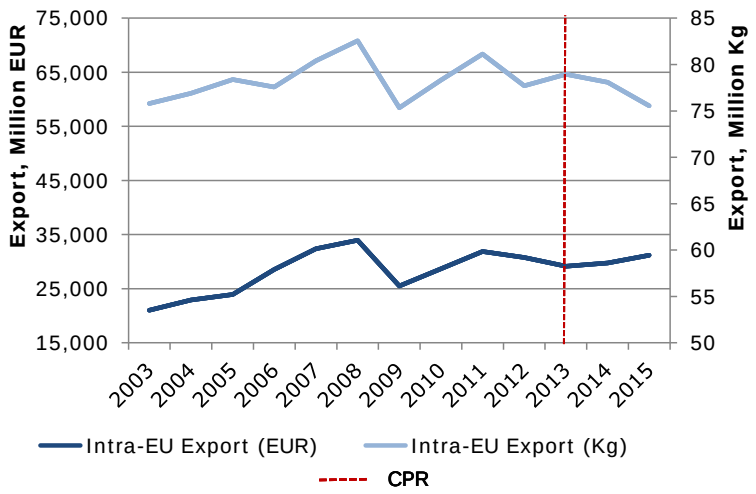
First the analysis is carried out at the most aggregate level, showing the evolution of intra EU-trade of all 25 construction products included in our sample. The main exporters and importers countries and the direction of their trade flows are also examined. Unless otherwise specified, the analysis covers all countries which are part of the EU-28, thus which joined the EU in any year from 2003 onwards. The impact of the accession has been considered and assessed with the econometric analysis (Section 5). Then we look at the five product groups (raw materials, products for structural purpose, finished products, finishing products, plants and system) in order to highlight differences or peculiarities in the level and development of their intra-EU trade of each group as compared to other groups and the total construction market.[8]

Finally, an analysis at product level is realised. Its findings are included in the product fiches which are presented in vol. II.

4.1 Aggregate analysis

The value of cross-border trade of construction products within the European Union has increased over time (Fig. 5). In particular, between 2003 and 2015, the value of intra-EU export of the 25 construction products increased by 48% (from 21 billion EUR in 2003 to 31 billion EUR in 2015) while decreased by 1% in terms of volume (from 59 million Kg in 2003 to 58 million Kg in 2015).

Figure 5. Intra-EU trade for the 25 construction products (2003-2015)



Large fluctuations occurred during the period of interest. Cross-border trade of construction products among Member States has been characterised by a steady growth until 2008, when it reached its highest peak both in value (34 billion EUR) and volume (71 million Kg). In 2009 trade significantly dropped, as an effect of the world financial and economic crisis and the related construction sector crisis.

In 2009 the value and volume of intra-EU export dropped by -25% and -17% respectively as compared to the previous year. A modest recovery started in 2010. Member States resumed their exchanges on the internal market, increasing the value and volume of their import and

[7] No correction for inflation was implemented.

[8] Note that when referring to the total construction market, we refer in fact to the full sample of 25 construction products covered by the analysis.

export. However, the economic crisis hit again the sector in 2011. The volume of intra-EU trade suffered another decline, while their value started increasing again in the latest years.

Figure 6. Value of production, intra-EU export, extra-EU export and consumption of the 25 construction products (2003-2015)

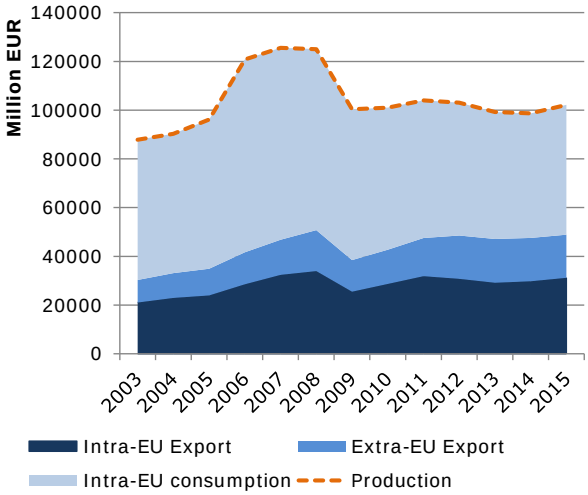
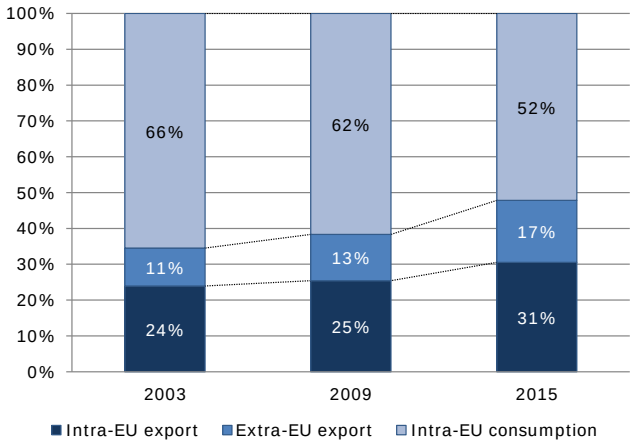


Figure 7. Value of intra-EU export, extra-EU export and intra-EU consumption[9] as a share of production of 25 construction products (2003, 2009, 2015)



The value of production of the selected 25 construction products in all the 28 countries which are currently members of EU ranges between 88 billion EUR in 2003 and 102 billion EUR in 2015. recording a 16% growth rate over this time span (Fig. 6)[10]. The highest value of production was recorded in year 2007, before the start of the economic crisis. The joint analysis of trade and consumption data (Fig. 7) shows that **the value of intra-EU trade as a share of production has increased over the years, moving from 24% to 31% since 2003**. The share of export towards non-EU countries recorded an even stronger growth, nearly doubling its value in 2015 as compared to 2003. By contrast, the share of EU consumption used in the internal market declined from 66% to 52%.

When considering the variation in intra-EU export and import occurred between 2003 and 2015 by country, both in terms of value and volume (Figures 8 to 11 below), the following findings can be highlighted:

- **Eastern European countries have generally recorded higher growth rates as compared to Western countries**. Among them, Lithuania experienced the strongest growth in terms of both export and import, value and volume. The Polish market and trade of construction products also significantly expanded during the 2003-2015 period. The EU enlargement occurred in 2004 (for the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia) and in 2007 (for Romania and Bulgaria) has pushed up cross-border trade for these countries by granting them free access to the EU internal market.

- **A negative change in cross-border trade from 2003 to 2015 is observed in a few countries**. The volume of French and UK intra-EU export has declined. Countries

[9] Defined as production used for internal use.
[10] Without correcting for inflation.

which were strongly affected by the financial and economic crisis, such as Greece, Spain and Ireland, recorded a significant reduction in the volume of imports.

Figure 8. Value of intra-EU export – variation between 2003 and 2015

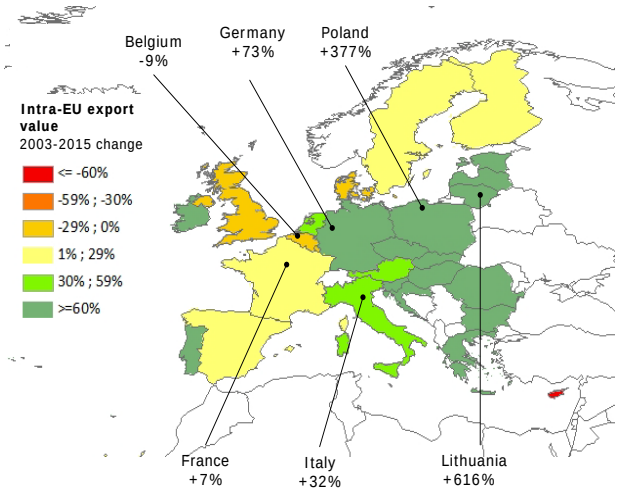


Figure 9. Volume of intra-EU export – variation between 2003 and 2015

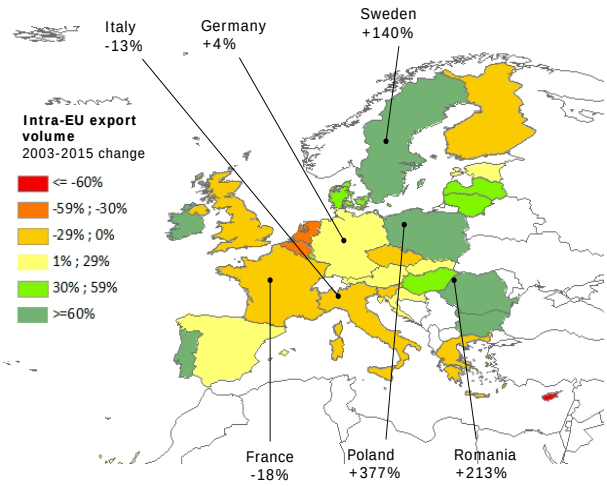


Figure 10. Value of intra-EU import – variation between 2003 and 2015

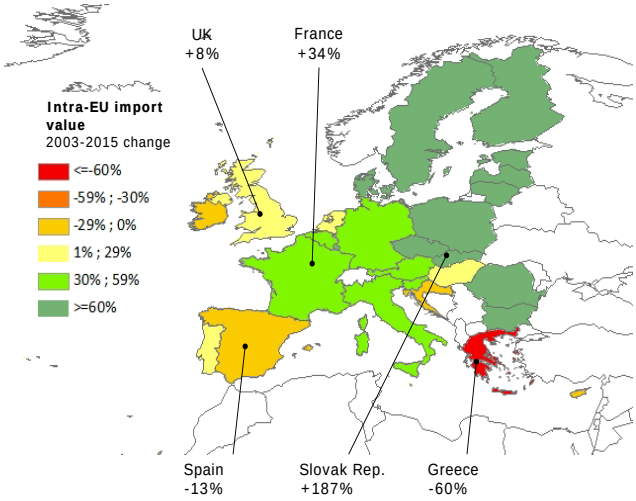
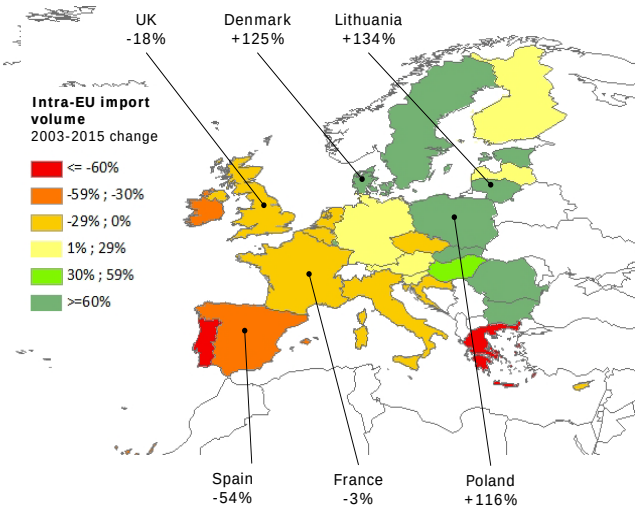


Figure 11. Volume of intra-EU import – variation between 2003 and 2015



The figures below show the evolution of trade for the top five major exporter and importer countries in 2015. Specifically:

- **Germany is the leading trading country for the construction products market** (Fig. 12, 13, 14). After a drop due to the economic crisis, the value of German export started growing again, even if at a slow pace. In terms of volume, German export grew by 4% over the entire period, but considerably decreased starting from 2008. Between 2003 and 2007 its volume increased by about 60% (9 million Kg), but in the following years export dropped by 8.4 million Kg (Fig.12).

- **The value of Italian exports are similar to the German ones, but their volume is significantly lower** (Fig. 13). The volume of Dutch export over the entire period is on average higher than the Italian one. Still, in 2015 Spain is the second largest exporter due to a reduction in the volume of export recorded by the Netherlands in the same year (46% lower as compared to 2014).

- **In 2015 Poland has become the third largest exporter** thanks to the fast growth in the value of exported goods recorded during the period, as shown also in the maps above. In 2015, the value and the volume of Polish export amount respectively to 42% and 27% of the export of all New Member States (Central and Eastern Europe).

- **The value and, especially, volume of imports to Belgium and the Netherland is noteworthy**. These figures are determined by the presence of international port hubs in these countries, where large quantities of goods coming from different Member States are shipped to their ultimate destination place.

- Besides Germany, the Netherlands and Belgium, **France, UK, and Austria are other key importer countries**.

- **The 2009 economic crisis seemingly did not affect the volume of traded goods to a significant extent** (Fig. 13 and 15). By contrast, the effect of the crisis on the value of export is more evident for countries such as Germany, Italy and France, while the impact was marginal for Poland, Belgium and the Netherlands (Fig. 12 and 14).

Figure 12. Value of intra-EU export of top 5 countries (2003-2015)

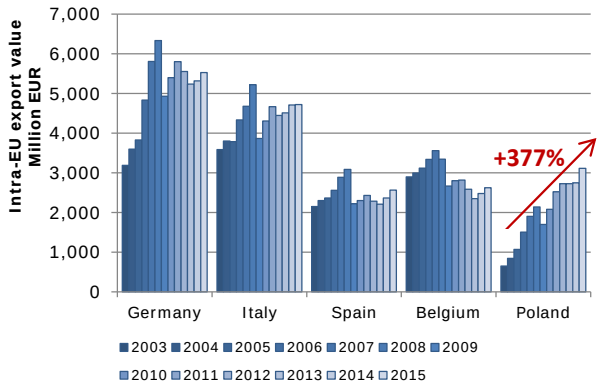


Figure 13. Volume of intra-EU export of top 5 countries (2003-2015)

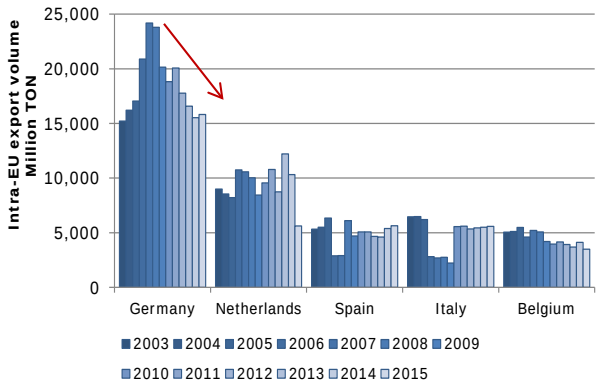


Figure 14. Value of intra-EU import of top 5 countries (2003-2015)

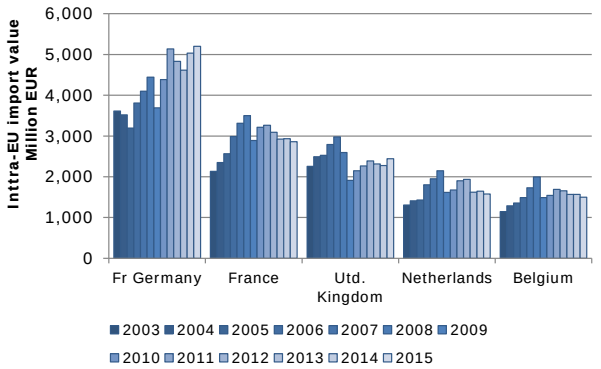
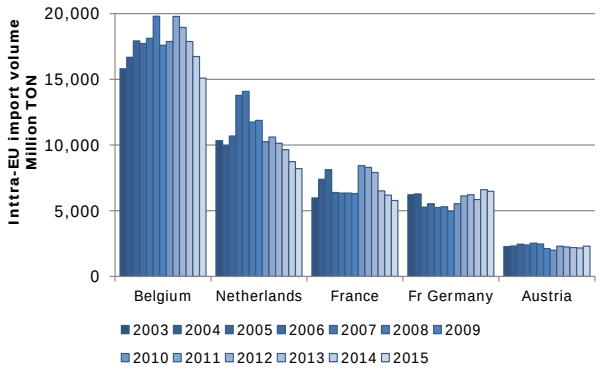


Figure 15. Volume of intra-EU import of top 5 countries (2003-2015)



The share of intra-EU cross border trade taking place between neighbouring countries is nearly 50%. More specifically, around 42% of total intra-EU trade takes place among countries that share a physical border (contiguous countries). When adopting a looser

definition and considering also the existence of an easily accessibly sea-route to define neighbourhood, neighbouring trade reaches 46% of the total.[11]

The following graphs show the directions of trade in the EU at the beginning of our period of analysis (2003) and at the end (2015).

Figure 16. EU28 trading network of 25 construction products: value of intra-EU export (2003)

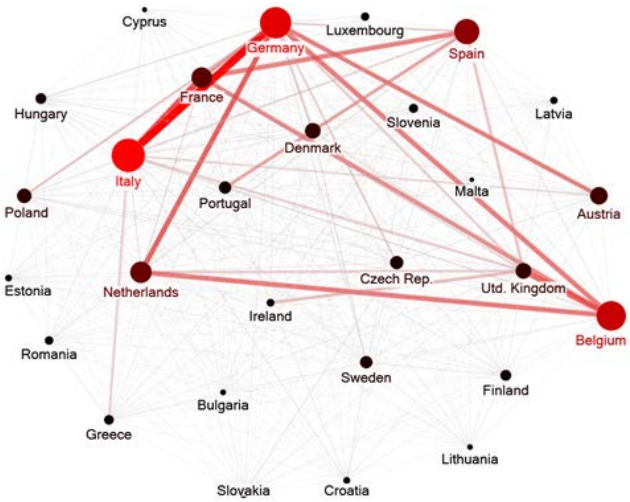


Figure 17. EU28 trading network of 25 construction products: value of intra-EU export (2015)

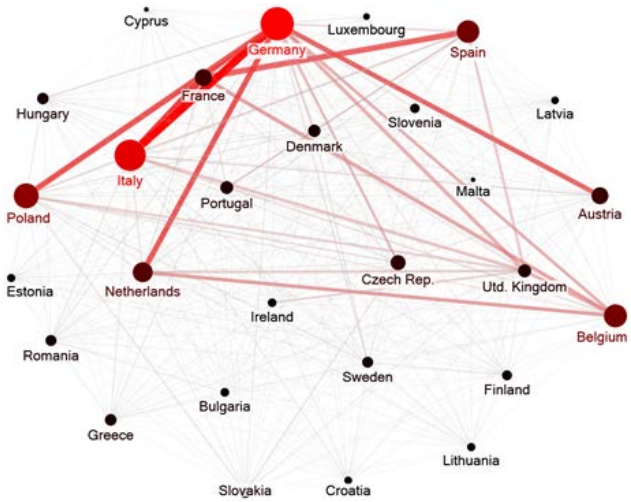


Figure 18. EU28 trading network of 25 construction products: volume of intra-EU export (2003)

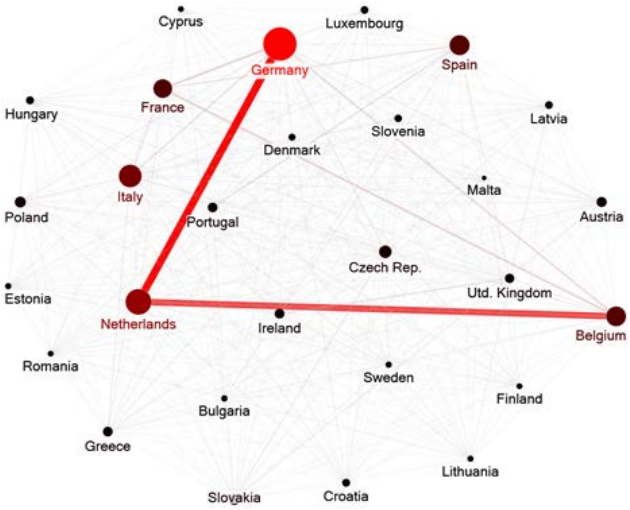
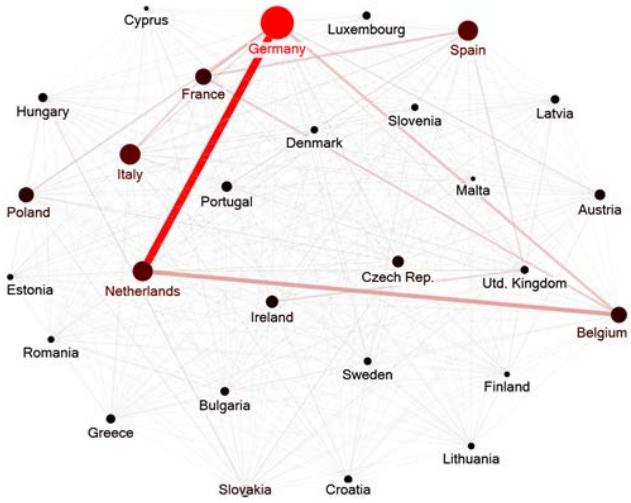


Figure 19. EU28 trading network of 25 construction products: volume of intra-EU export (2015)



- Considering the value of intra-EU trade, the network shows that **the largest exchanges of construction products are between Germany and Italy**. Strong relationships are in place also between France and Spain, France and Italy, Germany and Austria, Germany and the Netherland, Germany and Belgium (Fig.16 and 17).

[11] In addition to physical contiguity, we have considered the following neighbourhood relationships:

- Belgium, France, Netherlands, United Kingdom;
- Estonia, Finland, Latvia, Lithuania, Sweden;
- Cyprus and Malta are considered neighbouring to Greece and Italy.

- Trade between the Netherlands and Belgium is also particularly intense. The comparison between 2003 and 2015 reveals a **slight diminishment of importance of trading to/from Belgium**.

- During the considered period, **the importance of Poland as exporting country has significantly grown and its trading relationship with Germany has reinforced**.

- In terms of volume, trade mostly takes place between Belgium and the Netherlands, and between the Netherlands and Germany.

- Italy used to be an important exporting country (as reflected in the size of its circle in Fig. 18) and **the volume of Italian exports were quite homogenously spread towards different trading partners** (hence arcs connecting Italy to other countries are all thin). The total volume of its exports has not varied to a significant extent in 2015 as compared to 2003.

Given the large weight of German export over the total intra-EU level of export, when German is excluded from the analysis of trading networks the important role played by other major economies is even more emphasized (Fig 20-23). Trade relations are particularly strong between Italy and France. French exports are mainly directed to Italy, Spain, the UK and Belgium. Trade between Netherlands and Belgium is high, especially in terms of volume. The overall increase in the weight of Polish export and the lack of any preferential commercial partner for Poland, expect Germany, is even more evident.

Figure 20. EU27 trading network of 25 construction products: value of intra-EU export (2003, excluding Germany)

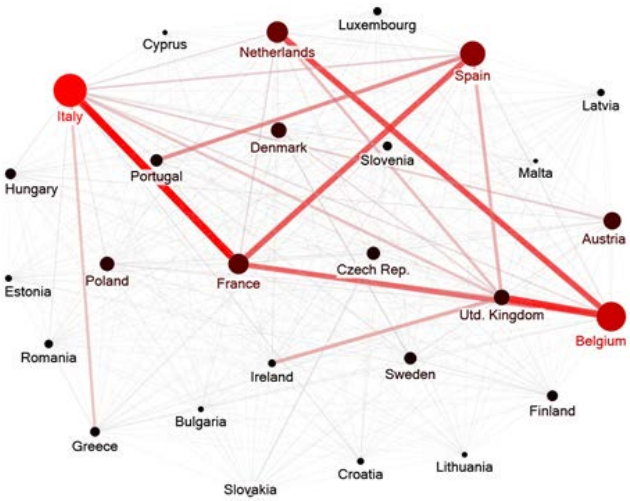


Figure 21. EU27 trading network of 25 construction products: value of intra-EU export (2015, excluding Germany)

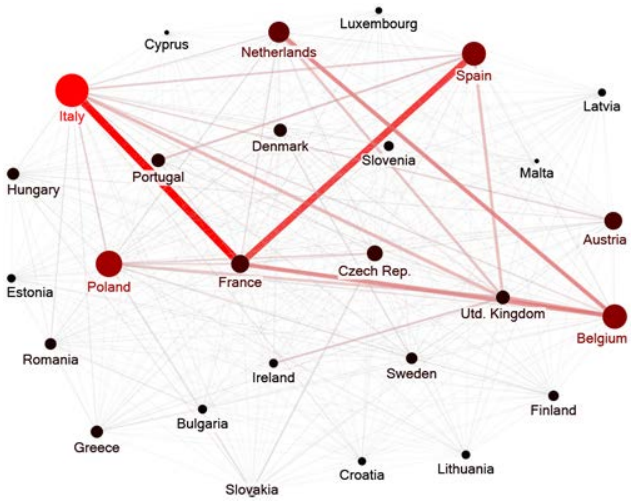


Figure 22. EU27 trading network of 25 construction products: volume of intra-EU export (2003, excluding Germany)

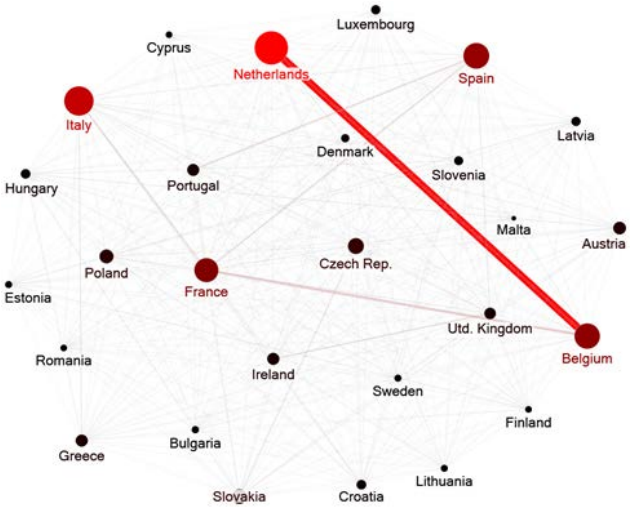
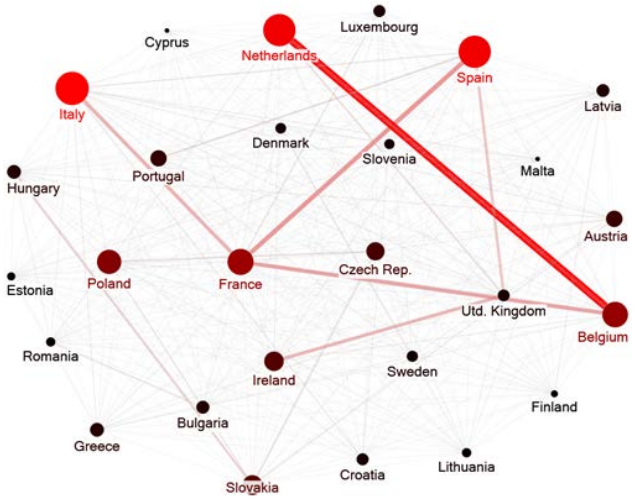


Figure 23. EU2 trading network of 25 construction products: volume of intra-EU export (2015, excluding Germany)



Note: the size of the circle is proportional to the total value or volume of intra-EU export from each country; the thickness of the connecting arcs reflects the relative importance of the value and volume of export over the total

Source: CSIL

4.2 Analysis by product group

In this section we provide a more disaggregated analysis of intra-EU trade, by distinguishing the 25 products covered by the study into five different product groups, namely raw materials, products used for structural purposes, finished products, finishing products, plants and systems (see in Table 2, Section 2, the list of products included in each group).

Figure 25 and 26 illustrate the percentage variation in the value and volume of export of different product groups with reference to the previous year. **The value of intra-EU trade of each product group is generally in line with the trend of the whole construction product market**. The value of trade has been growing fast up to 2007, with two-digit annual growth rates in most of the years. Then trade fell in 2009. After a recovery in 2010-2011 and another drop in 2012, trade growth rates have stabilised and turned positive again. Specifically, the value of raw materials, finished products and plants and systems turned positive in 2013 and further increased in 2014. The export of finishing products recovered in 2014. As to the products used for structural purposes, the value of their export started growing again at positive rate only in 2015. Annual growth rates in the most recent years are however generally lower than those recorded before 2007.

The relative weight of each product group out of the total construction products market has not changed to a significant extent from 2003 onwards. Thus, in Fig. 24 we compare the export share of each product group over the total sample of construction products only for the latest available year, i.e. 2015.

Out of the total sample of 25 construction products, **products used for structural purposes** (such as aluminium alloy bars, rods, profiles and hollow profiles, copper and steel tubes and pipes) **and finishing products** (such as ceramic tiles and textiles) **are associated with the highest value of export** in 2015. Raw materials (such as cement and sands), although representing only 6% of the value of construction materials and products considered, have a much higher weight, as they cover up to 57% of the total volume of export of construction materials and products.

Some variations by product group can however be highlighted. In particular, **the export value of products used for structural purposes has faced the largest variations over the period**. In 2006 the value of their export grew by 37% as compared to the previous year, before falling by 40% in 2009 and growing again at 32% in 2010. From 2012 on, the value of intra-EU exports of this product groups have continued decreasing, until 2015, when a positive, although small (4%), annual growth rate was recorded. This trend was mainly driven by aluminium bars and profiles which account for the largest value share in the sample of structural products (around 60%).

Figure 24. Share of intra-EU export by product group over the total value and volume of construction products - 2015

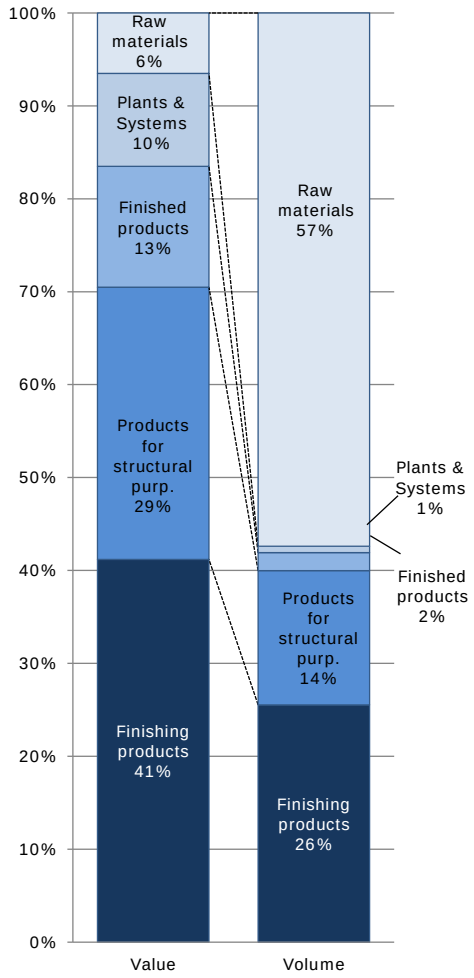


Figure 25. Annual change in the value of intra-EU export of different product groups and the total construction market, 2003-2015

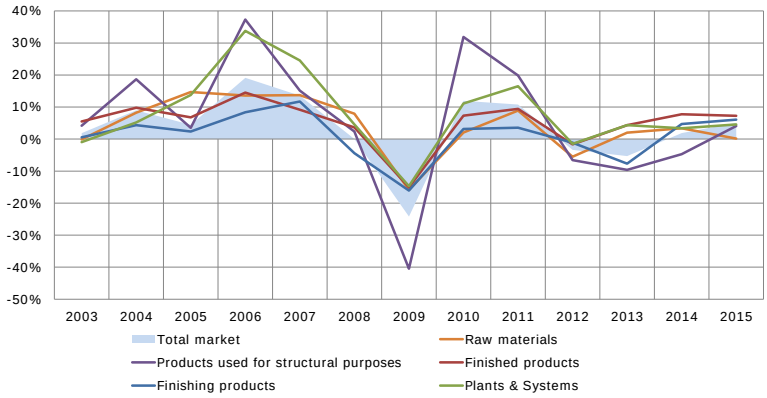
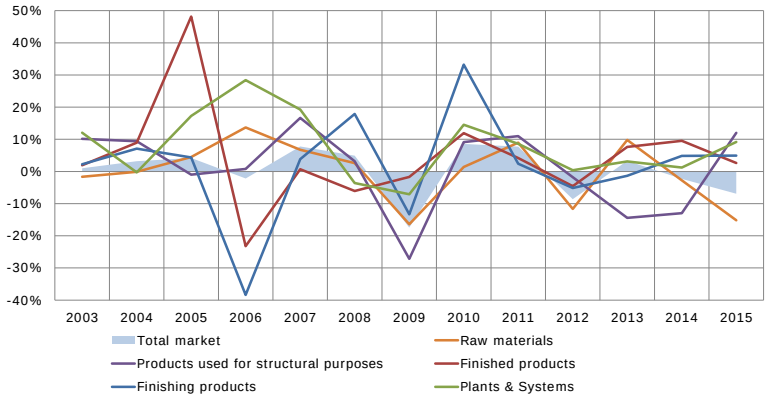


Figure 26. Annual change in the volume of intra-EU export of different product groups and the total construction market, 2003-2015



The impact of the crisis was relatively lower, although still substantial, for other product groups. On average, products included in our sample classified as finished and finishing products, as well as plants and systems have recovered faster from the crisis than other types of products, recording positive growth rates.

In terms of volume of export, **variations across different product groups are much more significant** (Fig. 26). In some cases, they even follow different trends with respect to the trend of export value. It can be noticed, for instance, that the volume of finished products exchanged within the EU faced a huge increase in 2005, but it dropped in 2006 and experienced much lower growth rates after that. This is mainly due to the fall of trade of wood-

made doors and windows. An as much as important drop was observed in the same year for finishing products.

Similar to the growth rates of export in terms of value, growth rates in volume are slowly recovering after 2013. Raw materials are an exception: the volume of intra-EU trade in 2014 and 2015 has been decreasing with respect to the previous year, determined by the negative export trend of sands. Indeed, when excluding sands from the analysis, the group of raw materials is characterised by low but still positive growth rates.

The following two tables show the value and volume of exported construction products for each product group, and in the total sample of 25 construction products, at the beginning and end of the period of analysis. The relative importance of intra-EU trade by country in each year is illustrated through horizontal colour bars. These tables are meant to summarise information on cross border trade by product group and allow for comparison across groups, countries and years. Note that the width of the coloured bars is proportional to the weight of export of each country over the total EU-28 export in the same year.

We can make at least the following remarks:

- As also shown before, **Germany** is the largest trading partner of construction products, both in terms of value and volume; however, this holds especially when considering raw materials, products used for structural purposes and plants and systems.
- **Italy** is the major trader of finishing products and its leading position has remained overall unchanged during the period of analysis. The Italian trade of finishing products is driven by ceramic tiles, which represents around 80% of the export value of the whole finished product group. After the German ones, Italian exports of products used for structural purposes and plants and systems are also particularly important. Trade of these product groups, in particular, is driven by steel tubes and pipes, and valves.
- Besides Italy, **Belgium** is another leading trading country in the market of finishing products, which is determined by the trade of textile flooring, followed by **Spain** where the export of finishing products is driven by the trade of ceramic tiles and natural stones.
- The growth of **Polish** export is visible especially as far as the finished products is concerned, and with specific reference to wood and plastic doors and windows. The value and volume of finished products exported by Poland has significantly grown in 2015 as compared to 2003, while Germany has lost its leading position in this market.
- The volume of construction products exported by **Belgium and the Netherlands** has reduced over the years for almost all product groups, as the Polish export took shares of their markets.
- **Denmark** used to be a major trader of finished products in 2003 (both in value and volume), but in 2015 it has lost its position. This is mainly due to the contraction in the market of wood-made doors and windows.

Table 7. Value of intra-EU export by country and product group – 2003 and 2015 (million Euro)

	Raw materials		Products used for structural purposes		Finished products		Finishing products		Plants & Systems		Total market	
	2003	2015	2003	2015	2003	2015	2003	2015	2003	2015	2003	2015
Austria	28	61	407	644	135	169	380	443	39	53	988	1,371
Belgium	149	141	610	637	162	162	1,913	1,588	65	98	2,899	2,625
Bulgaria	1	6	9	152	1	20	26	95	3	16	40	289
Croatia	29	35	10	6	3	26	51	128	2	18	95	213
Cyprus	6	0	5	1	0	0	0	0	0	0	12	1
Czech Rep.	22	40	192	324	106	172	199	381	23	113	543	1,030
Denmark	5	7	113	194	384	224	192	180	55	73	748	679
Estonia	6	7	3	13	30	125	45	89	5	8	89	243
Finland	1	4	110	176	45	31	148	85	27	113	331	408
Germany	361	582	1,165	2,170	266	592	1,149	1,524	246	659	3,187	5,527
France	69	84	411	567	66	43	535	414	115	168	1,196	1,276
Greece	36	34	152	416	8	3	37	29	11	96	245	578
Hungary	8	17	149	223	78	125	85	161	17	63	337	589
Ireland	51	131	20	19	23	48	38	71	4	12	136	281
Italy	87	117	668	1,653	91	115	2,567	2,450	171	387	3,584	4,721
Latvia	2	27	98	52	4	62	12	58	2	4	117	203
Lithuania	7	8	3	46	13	52	12	144	0	3	35	254
Luxembourg	4	49	96	15	9	19	30	36	0	1	139	121
Malta	0	0	0	0	0	0	0	0	0	0	0	0
Netherlands	86	140	404	590	60	68	858	945	73	176	1,482	1,918
Poland	20	62	111	485	196	1,278	264	1,022	63	267	653	3,114
Portugal	0	4	23	161	22	58	197	271	2	31	244	525
Romania	0	7	88	178	32	146	46	43	3	156	170	531
Slovakia	76	109	32	167	21	120	65	80	7	20	201	497
Slovenia	10	13	84	180	71	64	50	86	6	17	221	359
Spain	83	172	354	722	113	46	1,501	1,411	100	213	2,149	2,564
Sweden	5	35	116	148	60	39	217	209	45	90	444	521
Utd. Kingdom	50	47	145	147	165	79	319	350	82	130	760	752
EU-28	**1,201**	**1,939**	**5,577**	**8,738**	**2,164**	**3,885**	**10,935**	**12,293**	**1,166**	**2,985**	**21,043**	**29,841**

Table 8. Volume of intra-EU export by country and product group – 2003 and 2015 (million kilos)

	Raw materials		Products used for structural purposes		Finished products		Finishing products		Plants & Systems		Total market	
	2003	2015	2003	2015	2003	2015	2003	2015	2003	2015	2003	2015
Austria	165	548	3,494	3,943	24	24	594	365	3	6	1,135	1,337
Belgium	3,256	3,016	12,915	1,964	66	25	422	246	12	10	5,048	3,494
Bulgaria	87	219	229	2,062	1	6	98	426	1	2	210	860
Croatia	454	408	569	800	1	7	102	190	1	6	615	691
Cyprus	127	0	23	2	0	0	0	0	0	0	130	0
Czech Rep.	524	542	5,529	3,600	48	52	631	692	4	24	1,760	1,670
Denmark	42	186	1,917	1,968	90	50	55	76	7	7	387	515
Estonia	320	162	43	233	12	42	50	61	1	2	387	290
Finland	2	12	440	471	15	6	123	76	6	17	190	158
Germany	12,297	11,920	11,377	16,443	84	166	1,605	1,897	28	74	15,151	15,701
France	2,298	2,032	11,438	8,552	26	17	704	519	16	17	4,188	3,441
Greece	834	639	1,312	3,078	2	1	61	80	5	26	1,033	1,054
Hungary	264	415	2,073	1,842	29	43	140	293	5	12	646	948
Ireland	942	1,853	408	168	14	10	55	81	0	0	1,052	1,961
Italy	979	967	9,750	8,847	21	18	4,389	3,632	21	37	6,385	5,538
Latvia	43	449	4,324	1,633	3	26	69	161	0	0	547	799
Lithuania	257	206	79	990	5	10	30	108	0	1	300	424
Luxembourg	65	589	3,437	202	1	6	49	67	0	0	458	682
Malta	0	0	0	0	0	0	0	0	0	0	0	0
Netherlands	8,063	3,457	6,546	14,917	24	30	234	613	5	9	8,981	5,600
Poland	328	772	2,288	5,045	85	383	727	1,373	21	42	1,390	3,075
Portugal	3	48	281	2,216	14	33	320	484	0	7	367	795
Romania	34	162	694	704	22	47	49	74	1	38	176	391
Slovakia	1,503	1,840	502	564	12	31	108	105	2	3	1,675	2,035
Slovenia	162	203	1,787	864	25	18	145	155	1	2	511	465
Spain	1,319	2,215	5,493	5,348	41	16	3,384	2,825	15	32	5,309	5,622
Sweden	25	410	354	324	19	12	152	111	10	14	242	580
Utd. Kingdom	504	249	1,533	1,663	43	49	236	200	5	8	942	672
EU-28	**34,902,176**	**33,516,528**	**8,883,270**	**8,444,268**	**728,026**	**1,129,153**	**14,530,308**	**14,908,746**	**173,653**	**396,384**	**59,217**	**58,395**

Source: CSIL

5. Analysis of factors influencing cross-border trade

5.1 Drivers of cross-border trade

The descriptive analysis of cross-border trade of 25 products at aggregate level, for each product group and individual products (Vol. II) has been complemented with the findings deriving primarily from the econometric analysis[12], complemented with opinions expressed by consulted stakeholders (phone interview[13]) and enterprises (online survey[14]). The objective was to understand the key determinants and driving factors which can explain the observed trends. In this section we discuss possible reasons which explain an increase in cross-border trade in some years, for some countries and products, as well as factors which could justify drops in trade or limited trade flows within the European market. Such factors may relate to market specificities, macroeconomic conditions, or the policy framework.

The specific effect of the CPR and harmonised European specifications on cross-border trade is explored in Section 5.2.

Economic and sector crisis in the EU

The world economic crisis had a strong negative effect on production, consumption and trade of cross-border products across the board. As shown by the descriptive analysis, negative growth rates in intra-EU trade are observed for all considered products in 2008-2009. A second drop in trade took place between 2012 and 2013. This second wave of the crisis is associated with the contraction of the real estate market in the EU, but also a climate of distrust and uncertainty determined by the Greek debt crisis which discouraged consumption.[15] The crises occurred drove many firms out of business and data shows that intra-EU trade of many products is still struggling to recover the pre-crisis level.

The effect of the crisis was relatively less significant in Eastern European countries, where demand for civil engineering investment (e.g. road infrastructure), fuelled by EU funds and aimed to close the gap with Western countries, continued boosting the construction market and counteracted the reduction in national consumption for the residential and non-residential buildings market.

As revealed by interviews, **in some countries the crisis also acted as stimulus to increase export**. As a reaction to the shrinking domestic market in countries severely affected by the crisis and decreasing level of internal consumption, firms increasingly looked abroad to search for new destination markets and thereby exploit their unused production capacity. This trend has been observed for instance in the case of Spanish and Greek companies producing aluminium products, and Austrian producers of doors and windows. The contraction of the (already small) Slovenian market of cement determined an increase of trade flows from Slovenia to Italia and the decision of some companies to relocate their production in Northern Italy.

[12] Annex 6.
[13] Annex 4.
[14] Annex 5.
[15] Some interviewees believe that the BREXIT may have a similar effect in the coming years.

Specific factors in extra-EU countries

Intra-EU trade of construction products is not only affected by the economic scenario in the EU, but **also depends on circumstances and events happening in extra-EU countries**. For instance, the collapse of the Russian rouble and the financial crisis in Russia started in 2014 is making import from Finland less convenient. As a consequence, many Finnish companies which were used to trade with Russia are now shifting, at least partially, their trade towards the intra-EU market.

The effect on intra-EU trade of commercial relations between EU Member States and foreign countries is especially visible when considering the exports and imports recorded by countries where international hub ports are located. **The existence of important hubs significantly influences trade data in Belgium and the Netherlands**, more than for any other EU Member States. The 'quasi-transit' phenomenon explains the high value and volume of trade exchanges between these countries and other EU Member States.

The EU enlargement process

The accession to the EU market has greatly stimulated intra-EU trade from/to Central-Eastern European countries. The accession of Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia in 2004, of Romania and Bulgaria in 2007 and of Croatia in 2013 has automatically increased the overall value and volume of exchanges in the EU. This is confirmed by the econometric analysis (variable $eu28_{ijt}$) which reveals a 0.403 percentage points increase in the value of intra-EU trade as an effect of the enlargement process, *ceteris paribus*.[16]

Thanks to the application of harmonised rules in the EU internal market, the enlargement process has positively affected cross-border trade between new and old Member States, as explained by interviewed stakeholders and reflected in the statistical data (see Tables 9-11). While different rules and product requirements were in force in each country before their accession to the EU, thus posing strong barriers to free trade with EU Member States, after joining the EU those barriers fell down. By joining the EU, New Member States had to apply the Construction Products Directive and adopt common rules and harmonised product standards, which eased trade with other Member States.

The effect of the enlargement process is particularly evident when looking at neighbouring countries. The entry of Estonia, Latvia, and Lithuania is associated with a large increase in their export to and from each other and other Scandinavian counties. The increase of Lithuanian export to Sweden recorded between 2003 and 2015 is particularly remarkable (see Table 9). Trade exchanges in Central European countries have boost too, especially in terms of value. Slovenian trade towards all its neighbouring countries has increased; Austrian export to Slovakia and the Czech Republic recorded a positive growth rate both in terms of value and volume (Table 10). Over the considered period, Greek exports towards Romania increased more than towards its closer neighbour Bulgaria. A huge increase of trade of Bulgaria to Romania can also be noticed. This is especially driven by Bulgarian export of concrete reinforcing bars to Romania (Table 11). Even if consolidated trade relationships were already in place between some of these neighbouring countries, the access in the EU has further stimulated cross-border exchanges.

[16] In other terms, being part of the EU leads to an increase in the value of intra-EU export of 0.403 percentage points.

Table 9. 2003-2015 export growth rates between Scandinavian and Baltic countries

Exporter ⇨ Importer ⇩	Denmark		Sweden		Finland		Estonia		Latvia		Lithuania	
	value	vol.	value	vol.	value	vol.	value	vol.	value	vol.	value	vol.
Denmark			70%	64%	30%	894%	183%	806%	228%	1240%	137%	1193%
Sweden	3%	78%			102%	229%	17%	232%	217%	409%	168%	629%
Finland	-19%	92%	48%	222%			-18%	-18%	38%	-17%	2%	131%
Estonia	102%	196%	374%	805%	102%	-49%			197%	-75%	198%	200%
Latvia	451%	285%	1871%	528%	813%	163%	471%	-40%			174%	-67%
Lithuania	221%	531%	3886%	5130%	98%	-93%	482%	167%	233%	-42%		

Source: CSIL elaboration

Table 10. 2003-2015 export growth rates in Central European countries

Exporter ⇨ Importer ⇩	Austria		Czech Rep.		Slovakia		Hungary		Slovenia	
	value	vol.	value	vol.	value	vol.	value	vol.	value	vol.
Austria			70%	14%	100%	134%	-5%	-77%	82%	-25%
Czech Rep.	68%	-53%			92%	-64%	4%	-74%	-89%	-97%
Slovakia	108%	-85%	56%	-88%			289%	-60%	1440%	495%
Hungary	118%	-18%	216%	229%	774%	-11%			434%	-59%
Slovenia	131%	173%	122%	269%	1077%	846%	142%	-67%		

Source: CSIL elaboration

Table 11. 2003-2015 export growth rates between Greece, Bulgaria and Romania

Exporter ⇨ Importer ⇩	Greece		Romania		Bulgaria	
	value	vol.	value	vol.	value	vol.
Greece			202%	364%	72%	-12%
Romania	-29%	1%			159%	210%
Bulgaria	907%	316%	4831%	290%		

Source: CSIL elaboration

The entry of new players in the construction market displaced trade flows between countries. As suggested by the interviewees, this effect is explained by two concurrent mechanisms: on one hand, the decision of some (large) companies to move production from the Old Member States to the new ones to take advantage from lower labour cost and tax burden caused a change in the direction of trade flows for some products. An example is the decision of a major market player to delocalise the production of wood windows from Denmark to Poland, which can at least partially explain the drop of Danish exports of this product in the latest years. On the other hand, the enlargement has significantly increased price competition and some Eastern European countries gained market shares by offering cheaper products as compared to their competitors in Western Europe.

Poland is the country which benefitted the most from the accession to the EU market. In 2015, the value and the volume of Polish export represent respectively 42% and 27% of the export of all New Member States. The value of Polish trade with other Member States, particularly Germany, significantly increased during the considered period and reached the level of the top European exporting countries.

The adoption of the Euro has also positively influenced cross-border trade. This is suggested by the descriptive analysis of trade data, when considering for instance Slovenian trade of natural stones, which started increasing at a faster pace after 2008, the same year where the single EU currency was adopted. The econometric analysis confirms that the value of trade between two countries increases by 0.242 percentage points if they have the Euro as common currency (variable $eurozone_{ijt}$).

Size of the economy and connections between countries

The size of the economy is linked with higher cross-border trade. The econometric analysis shows on average a statistically significant positive relation between the GDP of one country and the value of its exports. Most of the cross-border trade takes place among the major producing countries, such as Germany and Italy, followed by France, Spain, Belgium, the Netherlands, and the UK. Country rankings in value and volume of trade have not significantly changed in the past decade, with the notable exception of Poland: with its accession into the EU market, the volume of trade flows towards/from this country have increased significantly, making Poland one of the major market players today for a number of products (e.g. doors and windows, wood parquet flooring, concrete reinforcing bars).

Cross-border trade is also particularly high in those countries which are strongly connected with each other, even if their size is relatively small. The most illustrative example is represented by Belgium and the Netherlands. The very strong logistic connections have been acknowledged by interviewees as driver of trade between the two countries. More in general, neighbouring countries are more likely to trade with each other due to lower transport cost and easier and faster connections.[17] 60% of surveyed firms perceived transport cost as a barrier to trade, and almost half of them consider it as a very important barrier. Transport cost are more relevant for producers of heavy / voluminous products, such as cement, concrete and metallic products, and/or low unit-price products (e.g. wood panels).

Having a common language contributes at facilitating exchanges. 40% of surveyed companies admitted that language differences represent a barrier to trade. Language skills are actually important not only to conduct trading transactions, but also to provide, where relevant, product installation and post-sale services. The econometric analysis confirms that if two countries share the same primary language, the value of trade between them is likely to be higher, *ceteris paribus* (variable $language_{ij}$).

Company strategies and market concentration

As discussed more extensively in Section 6, **medium or large size companies, including multinationals, dominate the production and, even more considerably, cross-border trade of many construction products**. The more concentrated the market and smaller the country, the more trade data recorded at national level are driven by the production and export behaviour of few but larger companies. The already mentioned case of the Danish company producing wood windows which moved production to Poland has clearly contributed to determine a contraction of Danish export of this product. As another example, the high increase in the value and the volume of Lithuanian trade of wood parquet flooring is a consequence of the fact that one of the major companies producing parquet has moved production lines from Germany and Austria to Lithuania.

Parallel policies

During the considered economic period, **some national or regional governments have introduced policy measures to stimulate the construction sector**, with a view to counterbalance the effect of the economic crisis as well as to promote energy efficiency.

In France and Italy these measures consist of tax deductions and subsidies for renovations and energy efficiency improvements, with the aim of supporting the demand of products

[17] As previously mentioned, nearly 50% of intra-EU cross border trade takes place between neighbouring countries.

specifically used for this kind of interventions (insulating materials, flooring and in general finished and finishing products for energy efficiency measures or generic renovation). In Italy for example it has been estimated that these measures (incentives for generic renovation and for energy efficiency improvement) led investments per year to increase from about 10 billion Euro in 2007-2008 to a level close to 30 billion Euro in the period 2013-2016. In France the Pinel incentive, based on tax cuts and other forms of incentives, and the PTZ loan (Prêt à taux zero), mainly impacting on the residential existing stock, are sustaining the renovation market. In the UK incentives have been introduced to support new production, such as the so-called Help to Buy (HtB) scheme, that has been boosting the demand for construction materials like cement. Similarly in Ireland it has been launched a package of measures to boost housing supply, with special focus on social housing.

The civil engineering sector has also been boosted by anti-cyclical measures during the crisis in different advanced European countries. Differently, in the Eastern-European countries the civil engineering sector is still absorbing huge demand of products like cement, due the ongoing of infrastructural investment process fuelled by EU funds.

Other EU or national policies can also have affected trade. In particular, during the interviews it was mentioned that EU grants given to firms to promote their internationalisation have pushed some firms to relocate their business in other countries. This has produced some distortionary effects on the market, which is especially visible from national trade data when major players decide to move out from small countries, or highly concentrated markets (see above). Another example is the EU Timber Regulation (Regulation (EU) No 995/2010) which imposes all EU and non-EU based operators to comply with the prohibition on placing illegally harvested timber on the market and the obligation to exercise due diligence along the supply chain. The Regulation entered into application on 3 March 2013. Its impact on both extra-EU and intra-EU trade is still unknown, but in principle it may have affected the import strategies of some companies based in the EU.

National or local preferences

Despite all possible efforts to develop a single market for construction products, **the movement of goods still depends on preferences at national or local level** as revealed by both the survey and the interviews. Countries have different preferences about the types of products used for their constructions. A homogenisation process of tastes is ongoing for some product families (see below), but for others national and local traditions still play a key role, which is likely to continue in the future.

For instance, even if wood-made windows are losing market shares in some countries to the benefit of less expensive PVC windows, consumption of wood windows still holds in Northern Europe. Indeed, more consolidated tradition in the use of wood products but also different climate conditions can explain the preference for this specific product. The choice over competing flooring materials (textile and carpet, rather than wood parquet, or ceramics) can also be explained, at least partially, by different cultures and tastes.

Among surveyed firms, 18% believe that cultural differences and national preferences are very strong barriers to trade. This opinion is shared by companies producing and trading windows, bricks and tiles. Other 30% of surveyed firms perceive national differences in traditions and tastes as quite relevant barriers, although less significant than other factors.

Product-specific characteristics

A large variety of products are used in the construction sector and **different types of products are driven by different market logics**. Raw materials and products for structural purpose are mainly employed by construction companies for both private and public building and civil engineering use. The technical characteristics of those products are key determinants of their use. By contrast, demand related to private and residential construction is more relevant for finished and finishing products. Demand for these products is more likely to be driven by considerations which go beyond the technical specifics, and include local tastes, as well as transitional fashion trends.

Also, **the distribution channels are likely to differ by product**. Some products are more likely to be traded through the large-scale distribution (do-yourself chains), which increases the level of trade and the number of destination countries reached. By exporting in many countries products with very similar characteristics, the development of the large distribution is favouring a process of homogenisation of tastes, especially for finished products. Preferences and tastes of final consumers tend to become similar, thus partially counteracting or reducing the influence of national and local traditions.

The need for service of providing installation locally and post-sale services could limit cross border trade for some products (e.g. windows). This factor is particularly relevant for smaller companies, at least those not localised nearby the border and lacking the ability to speak a foreign language (see more on this below).

Some stakeholders have pointed to the **degree of product diversification and innovation as key drivers of demand and cross-border trade**. The high degree of specialisation and quality of some CE marked products (e.g. Italian valves or ceramics…) are key drivers of their demand from other countries, allowing manufacturer companies better resist the effect of the crisis. By contrast, producers of cement could have partly counteracted the effects of the crisis on the new construction market if they decided to focus on the development of innovative products (not yet covered by CE mark), like the so-called biodynamic cement a product that, having photocatalytic characteristics and high fluidity, could have entered new market niches.

Product innovation can determine changes in the direction of trade flows. For instance, the development of improved materials or products can displace consumption of substitute products and therefore shift trade to the country where the new products are produced. An example is provided by demand for plasterboards which is today increasing its market share and substituting the use of cement for new construction and renovation activities thanks to its improved acoustic insulating properties.

The trade dynamics of some products are strongly influenced by price fluctuations and price differences across countries. As previously mentioned, the process of EU enlargement has increased price competition among companies and partially shifted trade towards cheaper products manufactured in the New Member States. This phenomenon has been observed for example with cement.

In very concentrated markets, such as for cement in countries like Belgium, trade can undergo important fluctuations depending on the price strategies of its market players.

Furthermore, the value of trade of some specific products may have been affected by variations in the international oil price. This is the case especially of additives and asphalt products (see related product fiches in Vol. 2).

5.2 Impact of the harmonised European standards and the CPR

Opinions of stakeholders consulted, perceptions of enterprises surveyed, and the results of the econometric analysis point to different conclusions regarding the impact of harmonised European specifications and the CPR on cross-border trade of construction products. A complex picture emerges, which makes not straightforward to answer questions such as: Has the CPR achieved its objectives? Has cross border trade increased thanks to the hENs and the CPR?

In this section we provide an unified assessment, which combines and critically interprets the outcomes of the different information sources that have been used.

It should be stressed that **the sample of products considered is a particularly critical element of the analysis**. The list of 25 products selected for the analysis, even if highly relevant for the construction market and representing a wide variety of products, cannot be regarded as statistically representative of the entire construction products market. Therefore, it cannot be excluded that the overall impact of the CPR would be different if another sample was selected.

Increase of cross-border trade of construction products

The CPR has not determined significant changes in the overall value and volume of cross-border trade for the considered construction products. An increase in the value or volume of intra-EU trade would result from either an export/import increase for companies that already trade construction products across Europe, or an increase in the absolute number of exporter/importer firms (ceteris paribus).

The descriptive analysis of trade data (Section 4) shows that year 2013 represents a turning point in the trend of cross-border trade in both the overall sample and for most product groups. After a couple of years of negative growth rates, since 2013 trade started recovering in value terms. However, this change cannot be directly attributed to the introduction of the CPR due to a number of possible other influencing factors, related to the improvement of general macroeconomic conditions and the restart of the construction sector. The econometric analysis allowed us to point out the impact that could be directly attributed to the CPR, “net” of the effect of other context or product-related variable that could have influenced trade. **The econometric analysis shows that, on average, the correlation between the CPR and the value of intra-EU trade of 25 construction products between 2003 and 2015, is not statistically significant, after controlling for the effect of other possible influencers**, e.g. GDP and fixed investment in construction of the origin and destination countries, membership in the EU, distance between the countries, and others (Table 12).

This result has been confirmed by all interviewed stakeholders, who share the opinion that the CPR has not changed the behaviour of firms. Those which were used to export/import even before the CPR, continued to do so. And it is unlikely that those which were not trading started as a direct effect of the CPR. National business associations from different countries and representing firms operating with different products agree that the CPR has not stimulated trade. The certification bodies interviewed declared having noticed no particular increase in the number of requests for certification since when the CPR entered into force.

Interviews suggest three possible, not alternative, reasons why the CPR did not have a visible effect on cross-border trade:

- **Market related factors**, such as those discussed in the previous section, **are considered key drivers of trade and companies behaviour, more than legislation**. Even a technical regulation such as the CPR, directly applying to firms and affecting rules and procedures they should comply with, is unlikely to noticeably influence their way of doing business.

- **With the introduction of the CPR, the main foundations of the legislative framework already set by the CPD remained unchanged**. Interviewees acknowledge that the introduction of the Construction Products Directive (Council Directive 89/106/EEC, CPD) actually had an important effect. By fostering the standardisation of the manufacturing of construction products and harmonising national laws with respect to essential requirements of products in terms of health and safety, and introducing the CE marking and certifying bodies, the CPD contributed to the creation of a "testing culture" among firms and harmonised rules across the EU, which, according to the interviewees, had a strong impact on the development of the EU internal market. Manufacturer companies were already accustomed to this framework when the CPR was introduced, which could explain its limited additional impact on trade.

  Even if the CPR introduced some new requirements as compared to the CPD (for instance by making the CE marking compulsory), **firms were generally ready when the new regulation came into force**. Because they had some time to understand the new requirements and equip themselves to comply with them, the CPR did not cause any substantial break in the trade trends after July 2013 and compliance costs for companies were spread over time.

In assessing the impact of the CPR, country differences matter. Even if the econometric analysis indicates a nil average effect of the CPR on the value of intra-EU export, different results are found when investigating the impact of the CPR for specific countries. More in detail, the econometric analysis reveals that, after controlling for all influencing factors, **the introduction of the CPR had a negative and statistically significant effect on the value of trade in Germany** (Table 13). The impact of the CPR on each of the other countries is diversified:

- as compared to Germany, **the effect of the CPR seems even more negative for some others Old Member States and major traders**, i.e. UK, France, Denmark and Sweden;

- **for Portugal and a set of New Member States** (Poland, Bulgaria, Estonia, Lithuania and Slovenia), **the effect of the CPR is more positive**;

- for the remaining countries, the effect of the CPR is not statistically significant.

Table 12. Impact of the CPR and standards on the intra-EU export of 25 construction products

DEPENDENT VARIABLE: Value of export from country *i* to country *j*						
INDEPENDENT VARIABLES		**MODEL'S SPECIFICATIONS**				
Name	**Definition**	**n°1**	**n°2**	**n°3**	**n°4**	**n°5**
CPR	Introduction of the CPR	-0.0316	-0.0542	-0.0408	-0.0385	-0.0447
#interventions	Cumulative number of standards (and their revisions) published for a specific product					0.00577
$Export_{t-1}$	Export value in the previous year	8,660***	8,473***	8,142***	6,551***	6,550***
distance	Distance between origin and destination countries	-1.486***	-1.011***	-1.378***	-1.370***	-1.370***
GDP_i	Gross Domestic Product of the origin country	0.714***	0.293	0.964***	0.873***	0.860***
GDP_j	Gross Domestic Product of the destination country	0.742***	0.679***	-0.322	-0.260	-0.259
Fixed $investment_i$	Fixed investments in the construction sector in the origin country		3.244e+06	-26,695	75,339	89,046
Fixed $investment_j$	Fixed investments in the construction sector in the destination country		-151,479	4.548e+06***	4.536e+06***	4.505e+06***
Contiguity	Origin and destination countries are contiguous		0.652***	0.416***	0.455***	0.455***
Language	Origin and destination countries have the same official language		0.232**	0.759***	0.658***	0.658***
Eurozone	Origin and destination countries are both in the Eurozone		0.0776	0.243**	0.243**	0.242**
EU28	Origin and destination countries are both in the EU		0.580***	0.410**	0.408**	0.403**
Exchange rate	Ratio between the national currency of the origin country and the destination country		-1.436	1.091*	1.012*	1.014*
Constant	Constant variable capturing the residual variability which is not explained by any other independent variable	-12.93***	-14.02***	-13.10***	-12.00***	-11.97***
Product FE	Product fixed effects, capturing the time-invariant variability that is intrinsic to a product	No	No	No	Yes	Yes
Exporter FE	Exporter country fixed effects capture the time invariant variability that is intrinsic in a country	No	No	Yes	Yes	Yes
Importer FE	Importer country fixed effects capture the time invariant variability that is intrinsic in a country	No	No	Yes	Yes	Yes
Observations		195,000	178,800	178,800	178,800	178,800
R-squared		0.382	0.364	0.461	0.600	0.600

Note: The asterisks denote the degree of statistical significance of coefficients. *** p<0.01, ** p<0.05, * p<0.1

Robust standard errors are not reported here for the sake of simplicity, but Annex 6 in Volume III includes all the relevant details.

Source: CSIL elaboration.

Table 13. The impact of the CPR on intra-EU export of 25 construction products by country

DEPENDENT VARIABLE: Value of export from country *i* to country *j*			
INDEPENDENT VARIABLES		**MODEL'S SPECIFICATIONS**	
Name	**Definition**	**n°1**	**n°2**
CPR	Introduction of the CPR in the EU	-0.00509	
$Export_{t-1}$	Export value in the previous year	6,559***	6,544***
distance	Distance between origin and destination countries	-1.371***	-1.374***
GDP_i	Gross Domestic Product of the destination country	0.947***	0.849***
GDP_j	Fixed investments in the construction sector in the destination country	-0.262	-0.306
Fixed $investment_i$	Gross Domestic Product of the origin country	6.50e-07	1.88e-08
Fixed $investment_j$	Fixed investments in the construction sector in the origin country	4.37e-06***	4.68e-06***
Contiguity	Origin and destination countries are contiguous	0.455***	0.453***
Language	Origin and destination countries are both in the Eurozone	0.658***	0.658***
Eurozone	Ratio between the national currency of the origin country and the destination country	0.240**	0.240**
EU28	Origin and destination countries have the same official language	0.398**	0.361**
Exchange rate	Origin and destination countries are both in the EU	1.013*	1.073*
CPR*Austria	Introduction of the CPR in Austria[18]		-0.0637
CPR*Belgium	Introduction of the CPR in Belgium[18]		-0.0260
CPR*Bulgaria	Introduction of the CPR in Bulgaria[18]		0.380***
CPR*Czech Republic	Introduction of the CPR in Czech Rep. [18]		0.0795
CPR*Germany	Introduction of the CPR in Germany	-0.183***	
CPR*Denmark	Introduction of the CPR in Denmark[18]		-0.240***
CPR*Spain	Introduction of the CPR in Spain[18]		-0.0668
CPR*Estonia	Introduction of the CPR in Estonia[18]		0.269***
CPR*Finland	Introduction of the CPR in Finland[18]		-0.109
CPR*France	Introduction of the CPR in France[18]		-0.178***
CPR*United Kingdom	Introduction of the CPR in UK[18]		-0.241**
CPR*Greece	Introduction of the CPR in Greece[18]		0.184
CPR*Hungary	Introduction of the CPR in Hungary[18]		0.0586
CPR*Ireland	Introduction of the CPR in Ireland[18]		-0.0310
CPR*Italy	Introduction of the CPR in Italy[18]		-0.0129
CPR*Lithuania	Introduction of the CPR in Lithuania[18]		0.491***
CPR*Luxembourg	Introduction of the CPR in Luxembourg[18]		-0.724
CPR*Latvia	Introduction of the CPR in Latvia[18]		-0.353
CPR*Netherlands	Introduction of the CPR in the Netherlands[18]		-0.0981
CPR*Poland	Introduction of the CPR in Poland[18]		0.267***
CPR*Portugal	Introduction of the CPR in Portugal[18]		0.140*
CPR*Romania	Introduction of the CPR in Romania[18]		0.115
CPR*Slovakia	Introduction of the CPR in Slovakia[18]		0.0380
CPR*Slovenia	Introduction of the CPR in Slovenia[18]		0.226**
CPR*Sweden	Introduction of the CPR in Sweden[18]		-0.189**
Constant	Constant variable capturing the residual variability which is not explained by any other independent variable	-12.24***	-11.80***
Product FE	Product fixed effects, capturing the time-invariant variability that is intrinsic to a product	Yes	Yes
Exporter FE	Exporter country fixed effects capture the time invariant variability that is intrinsic in a country	Yes	Yes
Importer FE	Importer country fixed effects capture the time invariant variability that is intrinsic in a country	Yes	Yes
Observations		178,800	178,800
R-squared		0.600	0.600

Note: The asterisks denote the degree of statistical significance of coefficients. *** p<0.01, ** p<0.05, * p<0.1

Robust standard errors are not reported here for the sake of simplicity, but Annex 6 in Volume III includes all the relevant details.

Source: CSIL elaboration

[18] With Germany as reference value.

When conducting the econometric analysis at product level, **the CPR is associated with an increase in intra-EU trade for the additives, insulating glass and optical fibre cables**. **A negative effect is found for five products used for structural purposes** (copper and steel tubes and pipes, wire rod, concrete reinforcing bars and articles of asphalt), **and for two finishing products** (roofing tiles and natural stone coating). The effect is not statistically different than 0 for the other analysed products (Table 14).

Similar results are obtained when assessing the impact of harmonised European specifications on trade. Intra-EU trade of the 25 construction products is not correlated with the number of new or updated standards introduced every year from 2003 onwards (Table 12 above, variable *#interventions*). The analysis at product level, which looks specifically at the impact of individual standards on the exports of a particular product, shows a diversified scenario, with some standards being positively correlated with export (e.g. EN1326-1 for trade of additives, or EN14251-1 for doors and windows in plastic), and others negatively (e.g. EN13915 for plasterboards).

Interviewees believe that the introduction of new harmonised product standards can be a strong stimulus to the trade of construction products. As declared by a national business association of companies producing insulating materials, "it is very unlikely that the CPR had any effect on trade, because the most crucial step towards the market harmonisation had been in fact already taken with the introduction of a harmonised standard in 2003[19]." Just as stakeholders recognise that the CPD represented an important stimulus to the development of the internal market, the ongoing standardisation process is seen as equally important to continue the harmonisation of national rules. These expectations are not confirmed by the statistical analysis at aggregate level, and only selectively at product level. The possible reasons for this should be searched in the characteristics of specific standards. Actually, **enforcing the harmonised European standards could be more or less cumbersome and more or less beneficial for enterprises depending on many factors**:

- **Standards which have a more technical nature may be heavier to implement for enterprises**, as they may require significant changes in the production process. The econometric analysis found a negative impact on trade for all those standards whose titles refer to "product marking and labelling" requirements, as for instance the EN 934-2. Specifically, these are standards whose Informative Annex ZA lists or revises process requirements for CE marking and labelling (ZA.3), i.e. tasks for both the manufacturer and the certification bodies for the assessment and verification of performance, are associated with a negative impact on trade. It may be that this kind of standards are more cumbersome to apply and may raise additional cost for firms, as compared to hENs focusing on the definition of essential characteristics of products (ZA.1) or their intended use and applicable procedures for conformity assessment (ZA.2).

- **Standards applying to widely used products are likely to have a stronger and more visible effect** on cross border trade as compared to standards applying in very specific cases. For instance, while it is acknowledged that the standard EN 13500:2003, applying to all thermal insulation products, was the real cornerstone for the harmonisation of the insulating products market,[20] the standard EN 14064-1:2010,

[19] EN 13500: 2003. Thermal insulation products for buildings. External thermal insulation composite systems (ETICS) based on mineral wool. Specification.
[20] Since our analysis starts in 2003, it is not possible for us to detect the impact of the 2003 standard EN 13500.

which provided the harmonised definition of a specific product type (loose-fill mineral wool products before their installation), was considered by the interviewee much less critical. This is confirmed by other experts interviewed and is in line with the econometric analysis which does not find a statistically significant correlation between this standard and the level of export of insulating materials. Likewise, the standards that define the specifications for masonry units (EN 771-1; EN 771-2; EN 771-3; EN 771-4; EN 771-5; EN 771-6) apply to very specific types of products (clay, calcium silicate, aggregate concrete etc.). The econometric analysis revealed that the introduction of EN 771-1 that applies to clay masonry units does not have any significant effect on trade.

- **Too generally defined standards may have a detrimental effect on trade**. Some interviewees have the perception that, if standards leave large room for manoeuvre and interpretation to enterprises, or the possibility for national authorities to set country-specific threshold levels in relation to the essential characteristics of a construction product,[21] the harmonisation effect would be minimal and confusion among enterprises may increase, with negative effect on trade. Similarly, **the way how standards are written is another influencing factor**. According to interviewed stakeholders, standards which are rather unclear or ambiguous, for instance because they do not explicitly cite the Declaration of Performance, generate confusion among firms, which are unsure about how to ensure valid application of EU rules. These issues cannot be confirmed by the statistical and econometric results and would deserve to be further investigated with additional analysis.

[21] An example is a standard applying to some steel products, which impose manufacturers to use the steel approved in country of destination.

Table 14. Summary of CPR and hENs impact on intra-EU export at product level

Group	Product	Effect of the CPR	Effect of the standard	Standard number	Year of publication of the standard	Description of the standard	Note
Raw materials	Cement	Nil					The impact of EN 197-1 and EN 413-1 is captured by the constant of the model because these standards were introduced before 2004.
	Additives	Positive	Positive	EN 13263-1	2005	Silica fume for concrete - Part 1: Definitions, requirements and conformity criteria	
			Nil	EN 934-5	2008	Admixtures for concrete, mortar and grout - Part 5: Admixtures for sprayed concrete - Definitions, requirements, conformity, marking and labelling	
			Negative	EN 934-2	2009	Admixtures for concrete, mortar and grout - Part 2: Concrete admixtures - Definitions, requirements, conformity, marking and labelling	
				EN 934-3		Admixtures for concrete, mortar and grout - Part 3: Admixtures for masonry mortar - Definitions, requirements, conformity and marking and labelling	
	Sands	Nil					The impact of EN 13139 and EN 12620 is captured by the constant because these standards were introduced before 2004.
Products used for structural purpose	Bricks	Nil	Nil	EN 771-1	2011	Specification for masonry units - Part 1: Clay masonry units	
	Aluminium bars and profiles	Nil	Positive	EN 15088	2006	Aluminium and aluminium alloys - Structural products for construction works - Technical conditions for inspection and delivery	
			Nil	EN 1090-1	2010	Execution of steel structures and aluminium structures - Part 1: Assessment and verification of constancy of performance for structural components	
	Copper tubes and pipes	Negative	Positive	EN 1057	2006	Copper and copper alloys - Seamless, round copper tubes for water and gas in sanitary and heating applications	
	Steel tubes and pipes	Negative					The impact of EN 1123-1 and EN 10312 is captured by the constant because these standards were introduced before 2009 which is the first year of analysis for this product.
	Wire rod	Negative	Nil	EN 10025-1	2005	Hot rolled products of structural steels - Part 1: General	
			Nil	EN 10088-5	2009	Stainless steels - Part 5: Technical delivery conditions for bars, rods, wire, sections and bright products of corrosion resisting steels for construction purposes	

	Concrete reinforcing bars	**Negative**	**Nil**	EN 10025-1	2005	Hot rolled products of structural steels - Part 1: General	
	Articles of asphalt	**Negative**	**Nil**	EN 13969	2005	Flexible sheets for waterproofing - Bitumen damp proof sheets including bitumen basement tanking sheets - Definitions and characteristics	
				EN 13970		Flexible sheets for waterproofing - Bitumen water vapour control layers - Definitions and characteristics	
			Positive	EN 14967	2006	Flexible sheets for waterproofing - Bitumen damp proof courses - Definitions and characteristics	
			Negative	EN 13707:2004+A2:2009	2009	Flexible sheets for waterproofing - Reinforced bitumen sheets for roof waterproofing - Definitions and characteristics	
			Positive	EN 14695	2010	Flexible sheets for waterproofing - Reinforced bitumen sheets for waterproofing of concrete bridge decks and other trafficked areas of concrete - Definitions and characteristics	
Finished products	**Doors and windows in wood**	**Nil**	**Nil**	EN 14351-1	2006	Windows and doors - Product standard, performance characteristics - Part 1: Windows and external pedestrian doorsets without resistance to fire and/or smoke leakage characteristics	
			Nil	EN 16034	2015	Pedestrian doorsets, industrial, commercial, garage doors and openable windows - Product standard, performance characteristics - Fire resisting and/or smoke control characteristics	
	Doors and windows in plastic	**Nil**	**Positive**	EN 14351-1	2006	Windows and doors - Product standard, performance characteristics - Part 1: Windows and external pedestrian doorsets without resistance to fire and/or smoke leakage characteristics	The impact of EN 13241-1 is captured by the constant because it was introduced in 2004.
			Nil	EN 16034	2015	Pedestrian doorsets, industrial, commercial, garage doors and openable windows - Product standard, performance characteristics - Fire resisting and/or smoke control characteristics	
	Prefabricate buildings of concrete	**Nil**	**N/A**				
Finishing products	**Ceramic tiles**	**Nil**	**Negative**	EN 14411	2007	Ceramic tiles - Definition, classification, characteristics, evaluation of conformity and marking	
	Wood parquet flooring	**Nil**	**Negative**	EN 14342:2005+A1:2008	2008	Wood flooring and parquet - Characteristics, evaluation of conformity and marking	
	Textile flooring	**Nil**	**Nil**	EN 14041	2005	Resilient, textile and laminate floor coverings - Essential characteristics	
	Plasterboards	**Nil**	**Negative**	EN 13915	2007	Prefabricated gypsum plasterboard panels with a cellular paperboard core - Definitions, requirements and test methods	The coefficient of the CPR captures also the impact of the introduction of EN 13950 because both were introduced in 2013.
	Insulating	**Positive**	**Negative**	EN 13162	2009	Glass in building - Insulating glass units - Part 5:	

	glass					Evaluation of conformity	
	Insulating materials	**Nil**	**Nil**	EN 14064-1	2010	Thermal insulation products for buildings - In-situ formed loose-fill mineral wool (MW) products - Part 1: Specification for the loose-fill products before installation	The coefficient of the CPR captures also the impact of the introduction of EN 13162 and EN 14303 because they were all introduced in 2013.
	Roofing tiles	**Negative**	**Positive**	EN 1304	2005	Clay roofing tiles and fittings - Product definitions and specifications	
	Natural stone coating	**Negative**	**Nil**	EN 1469	2005	Natural stone products - Slabs for cladding - Requirements	
				EN 12057		Natural stone products - Modular tiles – Requirements	
				EN 12058		Natural stone products - Slabs for floors and stairs - Requirements	
			Negative	EN 12326-1	2015	Slate and stone products for discontinuous roofing and external cladding - Part 1: Specifications for slate and carbonate slate	
	Clay flooring blocks	**Nil**	**N / A**				
Plants & systems	**Valves**	**Nil**	**Nil**	EN 331	2011	Manually operated ball valves and closed bottom taper plug valves for gas installations for buildings	
	Optical fibre cables	**Positive**	**N / A**				
	Electric systems	**Nil**	**N / A**				

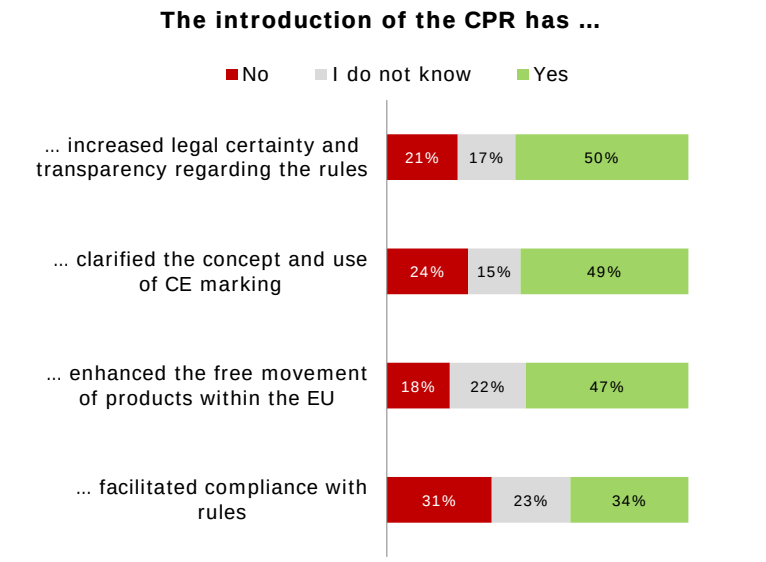
Note: See Annex 6 in Volume III for more details

Source: CSIL elaboration

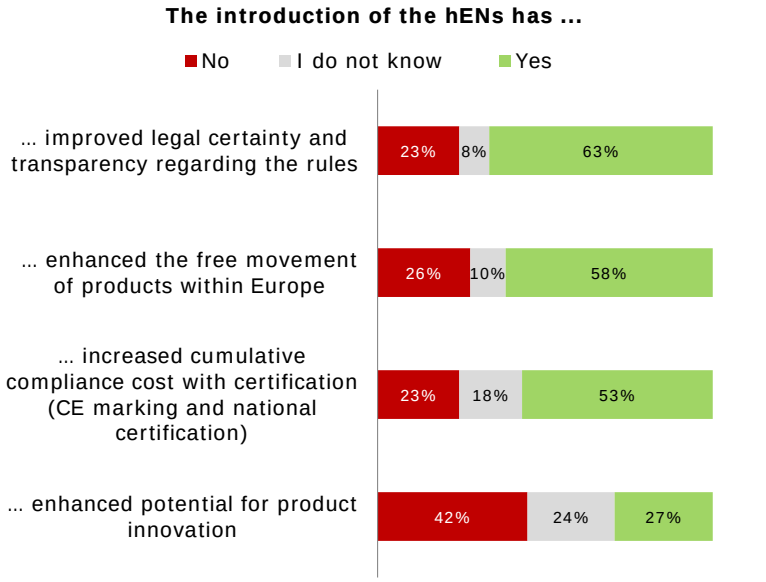
Other benefits for firms

Even if the impact of the CPR on the level of trade is generally not significant with exceptions for some countries or products, all stakeholders consulted agree that the CPR brought other sorts of benefits to firms. **The main benefit is in terms of increased clarity of rules**. The CPR collects in one single document a number of rules previously dispersed in various sources, from the CPD to other communications[22] and guidance documents issued over the years. The CPR provides a unified and clearer legislative framework for the sector.

Figure 27. Effects of the CPR and the hENs according to consulted firms



Source: CSIL elaboration of survey results (115 responses)



Source: CSIL elaboration of survey results (123 responses)

Half of firms participating in the on-line survey believe that the introduction of the CPR has significantly increased legal certainty and transparency of rules, as well as clarified the concept and use of the CE mark. Clarity, in turns, facilitates compliance with rules, as acknowledge by 34% of surveyed firms. These positive effects lead 47% of firms perceive that the CPR has facilitated the free movement of goods in the EU. Even if this is not reflected in the statistical analysis, it however **testifies to a general positive judgement of firms on the regulatory framework defined by the CPR**.

The introduction of harmonised European specifications is considered to have positive effects for even a large share of firms. Unified rules applicable across the EU, rather than country-specific product requirements, are considered to improve legal certainty and enhance free movement for respectively 63% and 58% of consulted firms. However, the duplication of European and national requirements is still perceived as an obstacle by 53% of firms. This issue is more extensively discussed below.

[22] E.g. the Commission communication in the framework of the implementation of Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC - OJ C 076 of 10/03/2017

A smaller share of firms surveyed (27%) believes that European specifications of essential characteristics of products could also stimulate product innovation. This is in line with opinions of different business associations, which highlight that **the CPR encourage firms to focus on product quality** as main competitive advantage. It has been noticed that the high quality standards set by the CPR helped European firms better defend from international competitors. At the same time, export towards non-EU countries may have been negatively influenced by the CPR. By imposing higher quality and security standards than those required by foreign countries, European products may turn out to be less competitive.

Finally, with more than 400 harmonised European standards cited in the European Official Journal, interviewees such as Construction Products Europe, but also the Finnish Association of construction products industries, acknowledge that **the Commission is achieving to create a common technical language** for all operators in the construction products market.

Still existing barriers

Since the introduction of the CPD in 1989, the Single European Market in 1993 and harmonised European standards over the years, major restrictions on the free movement of construction products have been removed and the EU internal market of construction products has developed. Nevertheless, both firms consulted through the on-line survey and national business associations interviewed highlight that some barriers are still in place, constraining cross-border trade among European countries.

Despite the effort to replace national rules with harmonised European ones, **national standards and differences in product requirements among Member States are still existing and represent a major obstacle to trade**. A recent survey to firms by Eurochambers[23] found that different national product rules constrain cross-border trade. Interviews and the on-line survey carried out in the framework of this study confirms this finding. Some countries, like Germany, France, Belgium, Latvia and Estonia, tend to impose additional requirements on the characteristics of construction products entering the national market which raise the certification cost for foreign firms. They may be mandatory or voluntary, but in either cases they are perceived as real challenges for exporting firms.

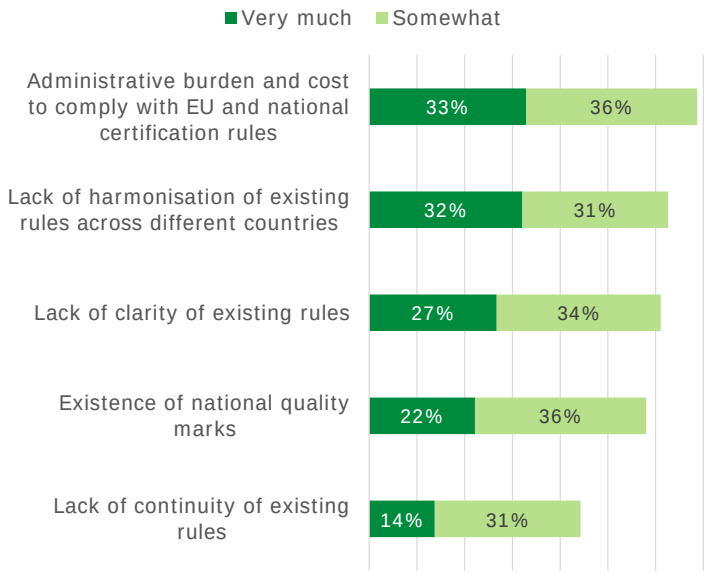
The judgement of the European Court of Justice of 19 October 2014[24] ruled that Member States should refrain from setting additional requirements for effective market access and use of construction products, considering that the harmonised system under the CPR is exhaustive and no space is left for any other marking systems. However, national marking and requirements are still used. In this situation, at least for some construction products the introduction of the CPR or European standards has fostered the perception of increased burden on companies due to the actual duplication of requirements. The existence of national marks has therefore limited the potential effectiveness of the CPR and the hENs, especially for SMEs (see below). **In some cases, this could be one of the reasons why the econometric analysis points to a negative effect of the CPR and some hENs on cross-border trade**.

As emerged from the interviews, **differences in the interpretation of the CPR also raise barriers to cross-border trade**. Some countries may interpret some provisions more strictly than others. In this way they in fact make more difficult for foreign companies to export in their national market. Some interviewees mentioned that **certification bodies in different**

[23] http://www.eurochambres.eu/custom/Internal_Market_Survey_Report_FINAL-2015-00319-01.pdf
[24] Judgement of the Court of Justice in Case C-199/13, Commission v. Germany, 16 October 2014.

countries may interpret and apply the testing criteria more or less strictly. As a result, "*certification bodies may not ensure the same level of certification of the same products across the EU. More time is needed before getting to a common, harmonised European certification system*".[25]

Figure 28. Barriers to trade perceived by consulted firms



Source: CSIL elaboration of survey results (131 responses)

Firms participating in the on-line survey have highlighted that **the CPR has made corrections and specification to the CPD which**, while making rules clearer, have also **generated some additional administrative compliance cost**. As previously mentioned, these additional costs are unlikely to having had an effect on the overall value and volume of trade.

Another important issue relates to **the lack of effective market surveillance**, which **makes the circulation of illegal construction products still possible**. Some products succeed to enter the national markets without fulfilling the legal requirements set by the EU legislation and without providing all the required documentation. Importers may be willing to purchase products even if they do not ensure full compliance with EU marking rules, as long as they are cheaper. In general, avoidance of rules is easier for products for which an auto-certification is required (those falling under the verification systems 3 and 4), and in markets which are not particularly concentrated but are characterised by a large number of exporting firms.

[25] Source: interview.

6. Focus on SMEs

6.1 The role of SMEs in the construction products market

SMEs are the core business in the EU. Up to 95% of construction, architecture and civil engineering firms are SMEs[26]. According to DG GROW data[27], the total number of European construction enterprises operating in sectors F41 'Construction of building', F42 'Civil engineering' and F43 'Specialised construction activities' in the EU-28 amount to 3.28 million in 2015. Out of them, 99.9% have less than 250 employees and 93.9% are micro enterprises with less than 10 employees. In 2015 SMEs produce 82% of the total construction industry's output and employ 88% of the total workforce in the sector.

However, **there are significant country differences in the share of SMEs operating in the construction sector**. Southern European countries (like Italy, Spain and Portugal) are traditionally characterised by a higher proportion of SMEs as compared to Northern European countries, not only in the construction sector. The maps below show the share of SMEs (defined by either their number of employees or their level of turnover) active in the NACE sectors corresponding to the 25 construction products analysed in this study. The cluster analysis confirms the higher percentage of SMEs in the South of Europe. Some Eastern Member States are also characterised by a relatively high number of SMEs, even if their share of turnover is more limited. Large companies operating in the construction sector are more relevant in countries like Germany, the UK and Denmark.

Figure 29. Share of SMEs (<250 employees) over total enterprises active in the construction sector by country – 2007-2016 average

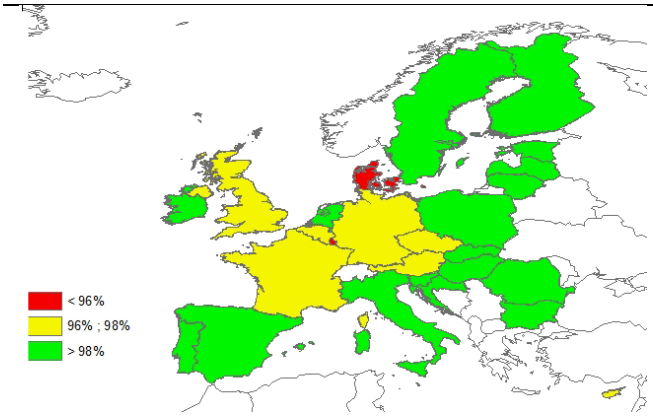
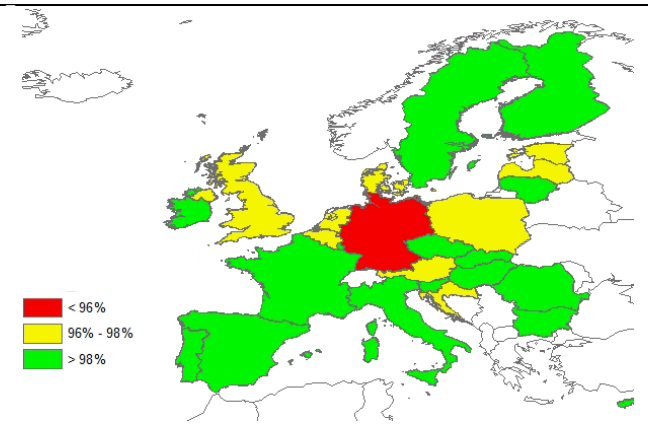


Figure 30. Share of SMEs (<50 million EUR turnover) over total enterprises active in the construction sector by country – 2007-2016 average



Note: data are clustered following the Jenks natural breaks optimization method.

Source: CSIL elaboration of ORBIS data

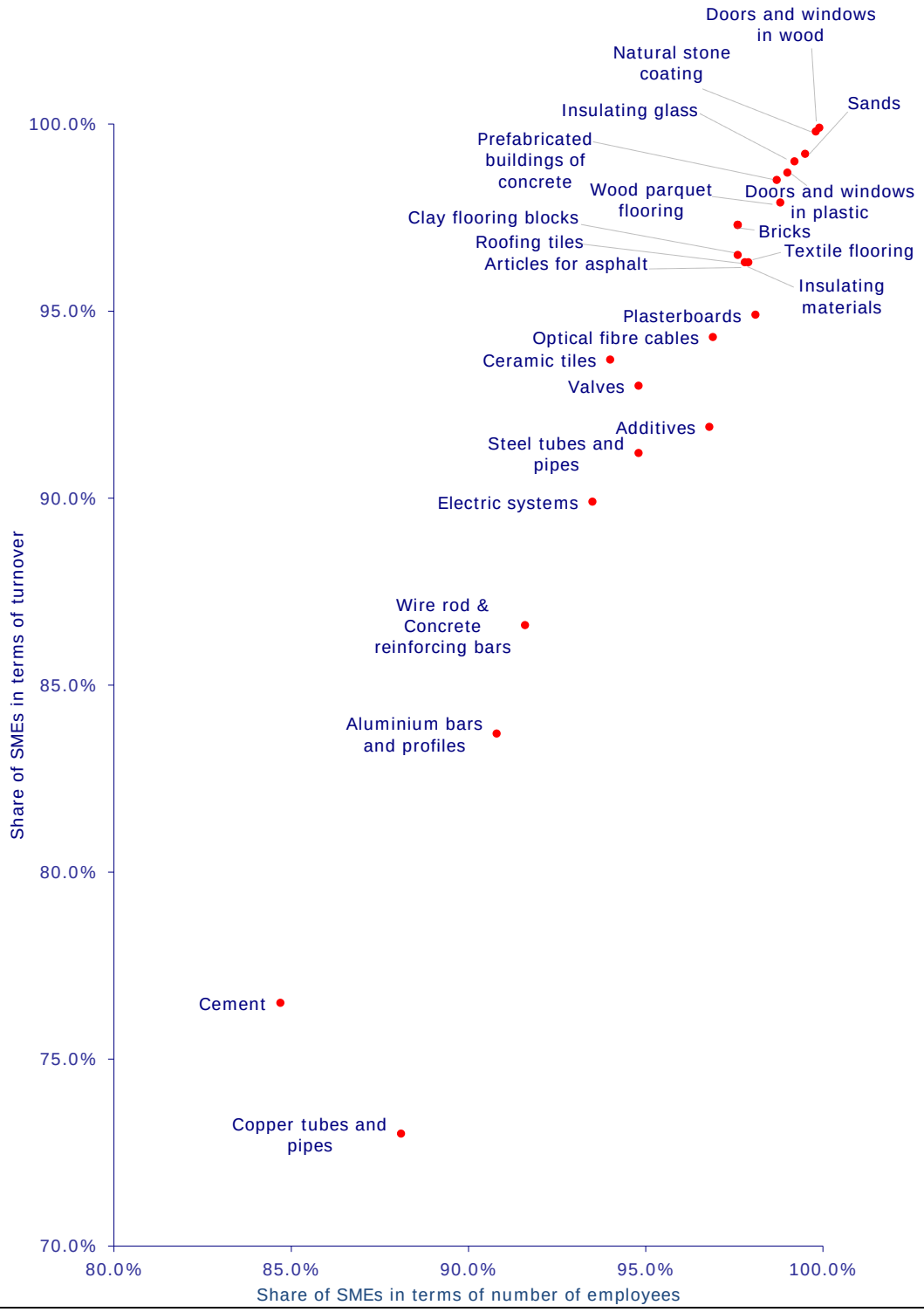
The degree of involvement of SMEs in cross-border trade also largely depends on the type of construction product and market. **SMEs are relatively less involved in the production of raw materials** (cement, glass, metals) **and semi-finished products, especially those used for structural purposes**, such as steel and copper tubes, wire rod and aluminium bars). The production and initial transformation phases of these goods require big investment costs and large plants, which explain why their manufacture is in the hands of big industrial,

[26] https://ec.europa.eu/growth/sectors/construction_it

[27] SME Performance Review 2016 database.

often multinational, corporations. Since SMEs' propensity to generally export is lower than for large enterprises (see also below), large-size manufacturers also drive cross-border trade flows and their market strategies can explain some of the trade trends previously illustrated.

Figure 31. Share of SMEs over total enterprises by construction product – 2007-2016 average



Source: CSIL elaboration of ORBIS data

SMEs have a larger role to play in the production and trade of finished and finishing products, such as doors and windows, as well as flooring products (textile, wood-made or natural stones). Even if glass production is concentrated in few large companies, SMEs are

more extensively involved in the production of the insulating glass semi-finished product. These patterns are confirmed by available data on 140,028 SMEs contained in the ORBIS database and operating in the NACE sectors related to the selected construction products (Fig. 31 above).

The distribution systems of the construction products is relevant to explain the degree of involvement of SMEs in cross-border trade. SMEs may be involved in the on-site installation phase of finished products, like windows, insulating glass, but also valves, electric systems and others. SMEs located nearby the borders are more likely to cross-border trade, thanks to lower transport cost. In countries such as France where big retailers and low cost bricolage retailers dominate the distribution system for a large set of finished products, trade by SMEs is probably more limited. Some products, in spite of being characterised by a concentrated production, have a highly fragmented distribution chain (including transporting, storing and selling activities) to which SMEs could participate. This is the case, for instance, of plasterboards and cement, whose transportation mode is mainly by road and haulages are very small companies.

6.2 SMEs' propensity and barriers to export

SMEs are generally not highly involved in cross border trade. The smaller the size of the enterprise, the smaller the probability it sells its products on the foreign market. Micro and small enterprises usually produce to serve their local market; medium and large enterprises are more export-oriented.

When analysing the responses provided by firms which participated in the on-line survey with respect to the perceived barriers to cross-border trade, SMEs and large enterprises seem not to have substantially different opinions.[28] However, according to interviewees, **regulation and financial burden are the main barriers that hinder smaller enterprises, especially micro-size firms, from trading**. SMEs struggle to understand the terms and requirements imposed by legislation. This challenge is exacerbated by the existence of national different marking systems and requirements, which raise confusion and uncertainty among smaller firms.

Where national marking systems are in place, the administrative but also financial burden for compliance is greater for SMEs. As found by the recent 'Analysis of the implementations of the Construction Products Regulation' (2015),[29] larger companies can rely on their good reputation and resources to gain more accreditation and sell more products. Moreover, the cost for obtaining the certifications pays off if the volume of export is sufficiently high. This is usually hardly the case for SMEs.

The implementation of simplified procedures for micro enterprises, which is foreseen in the CPR, **has been positively viewed by stakeholders, but their application is limited**. Actually, only 10% of surveyed firms admits that the CPR has decreased costs and

[28] A Peason's chi-square test was carried out in order to determine whether the distribution of responses is similar for SMEs and large enterprises. The test compares the distribution of responses of SMEs and those of large firms under the null hypotheses that the two distributions are not statistical different from each other. The test never rejects the null hypothesis, thus indicating that there is no statistically significant difference between SMEs and large enterprises in the perceived obstacles to trade of construction products. In this analysis, SMEs were defined by the number of employees declared by the respondent firm in the survey. We consider SMEs the firms having less than 250 employees; otherwise the firm is classified as large.

[29] Drafted by RPA on behalf of the European Commission, Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, Directorate C - Industrial Transformation and Advanced Value Chains, Unit C1 – Clean technologies and products.

administrative burden for smaller enterprises. The simplified requirements for smaller firms are unclear and as a consequence they are not yet applied across the board. SMEs are in fact fulfilling the same requirements of large enterprises, which is a major challenge for them. Further simplification efforts is demanded by small firms.

All the above mentioned factors make smaller firms less equipped to export than larger ones. The econometric analysis reveals that **SMEs are more likely to trade across the borders especially if**:

- **they are located nearby the borders**: lower transport costs makes them easier to deal with sale and installation of products in the foreign country, as well as providing post-sale services.
- **they can speak a foreign language**, which is also related to their location close to the borders: for instance, firms in the Northern regions of Italy tend to speak French and German and establish trade relation with countries beyond the Alps, more than firms in the South of Italy.

These findings are confirmed by interviewees. In addition to that, stakeholders argue that the probability for SMEs to trade increases if **they cooperate with each other**: export consortia, for instance, provide firms with support to develop long-term internationalization strategies, improve their knowledge of the markets and enhance the sharing of information on applying rules and legislative frameworks.

6.3 Impact of the CPR and hENs on SMEs

SMEs have favourably looked at the introduction of the CPR, which contributed to clarify the legislative framework. In particular, thanks to the CPR the use of the CE mark has been made clearer and its value is now widely understood by market players.

Yet, as previously stressed, the continuous use of national marking systems by some countries for some products is an issue which limits the overall effectiveness of the CPR, and which hits smaller companies hardest. Certification costs continue being high for micro-size enterprises especially.

In the view of some interviewees, **the benefits produced by the CPR could increase in the future years as long as national barriers fall down, simplified rules are more effectively implemented and SMEs better organise and equip themselves to go abroad** (e.g. by joining export consortia, or taking advantage from available public grants for internationalisation).

In order to complement qualitative evidence retrieved from interviews, we carried out a simple econometric analysis of the survey data in order to investigate whether SMEs have different opinions than large enterprises about the effectiveness of hEN and CPR as instruments to stimulate the intra-EU market of construction products.[30] We implemented a set of multinomial logistic regressions where the dependent variables are the distribution of firms' responses to questions C2 (perceived impact of hENs) and question C4 (perceived impact of the CPR). The

[30] The analysis was conducted on 101 responses collected through the on-line survey. SMEs were defined by the number of employees declared by the respondent firm in the survey (question D1). We consider SMEs the firms having less than 250 employees; otherwise the firm is classified as large.

independent variable of interest is the type of enterprises, i.e. whether the respondent is a SME or a large enterprise.[31] Some additional control variables have been included.[32]

Results of this exercise are presented in Tables 15 and 16. Based on this analysis, SMEs agree more than large enterprises that both the hENs and the CPR have improved legal certainty and transparency regarding the rules. This finding is in line with evidence from interviews. Furthermore, **European standards seem to play a stronger stimulus for product innovation for SMEs than for large companies**. As expected, the CPR has clarified the concept and use of CE marking for smaller companies more than for larger ones. Also, SMEs tend to agree more on the positive impact of the CPR on free movements of product within the EU. Even if both SMEs and large enterprises has a similar opinion about the usefulness of the CPR to decrease the cost and administrative burden for smaller enterprises, **SMEs seem more convinced that the CPR contributed to address the needs and problems of firms trading construction products**.

[31] A positive and a statistical significant coefficient of this variable indicates that being a SME increases the probability of receiving a response "Yes" or "I do not know" with respect to a large firm on the specified dependent variable.

[32] The following control variable are included:

- Being part of a group, valuing 1 if the firm belongs to a group and 0 otherwise;
- Annual turnover is 1 if firm declared a turnover per year smaller than € 10 million; 2 if the turnover is between € 10 and € 50 million, and 3 if it is greater than € 50 million;
- Export share on turnover, taking on the value 0 if the firm does not export, 1 if the share is between 1% and 30%, and 2 if the export share is greater than 30%.

Table 15. Multinomial logit: the impact of hENs on trade of construction products. SMEs vs large enterprises

	(1)		(2)		(3)		(4)		(5)	
Dependent variable is…	C2 improved legal certainty and transparency regarding the rules		C2 Enhanced the free movement of products within the EU		C2 increased cumulative compliance cost with certification (CE marking and national certification)		C2 Increased costs and administrative burden for smaller enterprises		C2 enhanced potential for product innovation	
	Yes	I do not know	Yes	I do not know	Yes	I do not know	Yes	I do not know	Yes	I do not know
SMEs	**1.15***	**0.71**	**0.33**	**0.27**	**-1.23***	**0.27**	**0.69**	**0.66**	**2.29*****	**1.17**
	(0.71)	**(1.97)**	**(0.71)**	**(1.97)**	**(0.73)**	**(0.99)**	**(1.08)**	**(1.12)**	**(0.80)**	**(0.95)**
Being part of a group	1.00*	-0.66	-0.56	-1.79	0.34	0.02	-0.81	0.15	-0.29	-0.80
	(0.63)	(1.44)	(0.61)	(1.34)	(0.60)	(0.80)	(0.82)	(0.85)	(0.63)	(0.69)
Annual turnover	0.07	-0.15	0.13	-0.06	-0.27	0.41	0.43	0.54	0.63	0.24
	(0.46)	(0.99)	(0.43)	(1.00)	(0.43)	(0.57)	(0.69)	(0.67)	(0.48)	(0.55)
Export share on turnover	-0.25	-0.67	0.01	-1.51	-0.31	-1.53**	-0.30	-0.52	-0.66	-0.93**
	(0.39)	(0.78)	(0.39)	(0.83)	(0.40)	(0.57)	(0.65)	(0.70)	(0.41)	(0.46)
Constant	0.08	-0.79	0.85	0.69	2.27*	0.08	1.34	-0.07	-1.76	0.10
	(1.35)	(2.93)	(1.28)	(2.94)	(1.27)	(1.62)	(2.09)	(2.17)	(1.39)	(1.59)
McFadden's R2	0.06		0.09		0.09		0.03		0.12	
Log Likelihood	-70.6		-73.6		-88.7		-86.8		-94.7	
Likelihood ratio test (p-value)	0.37		0.09		0.03		0.71		0.00	
Hausman test for IIA										
Test statistic	-0.19	-0.18	14.1	0.00	-1.40	0.17	0.30	-0.25	1.02	-0.84
p-value	-	-	0.01	1.00	-	1.00	1.00	-	0.96	-

Robust standard errors in parenthesis. The asterisks denote the degree of statistical significance of coefficients. *, **, *** denote significance at 10% , 5% and 1% level respectively.

Source: CSIL elaboration of survey results (101 responses).

Table 16. Multinomial logit: the impact of CPR on trade (SMEs vs large enterprises)

	(1)		(2)		(3)		(4)		(5)		(6)	
Dependent variable is…	C4 Increasing legal certainty and transparency regarding the rules		C4 Clarify the concept and use of CE marking		C4 Facilitating compliance with rules		C4 Decreasing costs and administrative burden for smaller enterprises		C4 Enhancing the free movement of products within the EU		C4 Contributing to address the needs and problems of firms trading construction products	
	Yes	I do not know	Yes	I do not know	Yes	I do not know	Yes	I do not know	Yes	I do not know	Yes	I do not know
SMEs	**1.55****	**1.93***	**1.33***	**1.44**	**0.89**	**0.89**	**0.67**	**-0.07**	**1.52***	**0.51**	**1.22***	**1.27**
	(0.90)	**(1.20)**	**(0.83)**	**(1.13)**	**(0.72)**	**(0.74)**	**(0.94)**	**(0.69)**	**(0.93)**	**(1.10)**	**(0.69)**	**(0.80)**
Being part of a group	1.50**	0.78	0.60	-0.28	0.43	-0.99	0.71	0.21	-0.04	0.33	1.16	-0.19
	(0.71)	(0.90)	(0.63)	(0.85)	(0.63)	(0.72)	(0.79)	(0.58)	(0.68)	(0.80)	(0.71)	(0.64)
Annual turnover	-0.07	-0.30	0.39	0.20	-0.26	0.17	-0.01	0.31	0.87	-0.02	-0.16	0.66
	(0.51)	(0.64)	(0.48)	(0.63)	(0.48)	(0.77)	(0.55)	(0.42)	(0.55)	(0.62)	(0.49)	(0.48)
Export share on turnover	-0.34	-0.51	-0.48	0.02	-0.64	-0.77	-0.51	-0.75	-0.37	-0.52	-0.50	-1.37**
	(0.43)	(0.54)	(0.40)	(0.54)	(0.41)	(0.45)	(0.49)	(0.37)	(0.43)	(0.49)	(0.44)	(0.44)
Constant	-0.06	-0.64	-0.49	-1.78	0.92	0.55	-1.59	-0.29	-1.28	0.26	-0.61	-0.47
	(1.52)	(1.89)	(1.39)	(1.84)	(1.34)	(0.89)	(1.57)	(1.19)	(1.57)	(1.78)	(1.41)	(1.37)
McFadden's R2	0.09		0.04		0.10		0.03		0.04		0.10	
Log Likelihood	-86.5		-90.5		-97.4		-94.2		-96.9		-98.5	
Likelihood ratio test (p-value)	0.03		0.04		0.00		0.58		0.49		0.00	
Hausman test for IIA												
Test statistic	-0.35	-0.53	0.57	0.03	0.07	-0.33	0.07	0.09	0.16	2.13	0.15	0.13
p-value	-	-	0.99	1.00	-	-	1.00	1.00	1.00	0.83	1.00	1.00

Robust standard errors in parenthesis. The asterisks denote the degree of statistical significance of coefficients. *, **, *** denote significance at 10% , 5% and 1% level respectively.

Source: CSIL elaboration of survey results (101 responses).

7. Conclusions

The introduction of the Construction Products Regulation 305/2011/EU aimed to simplify and clarify the framework established by Directive 89/106/EEC, and improve transparency and the effectiveness of the existing measures. Its ultimate goal was to remove technical barriers to trade in the field of construction products and enhancing their free movement in the internal market.

Through an in-depth and rigorous analysis of trade data and consultation of national stakeholders and a sample of enterprises producing construction products, **this study finds convergent evidence that these objectives have been achieved only partially**.

More than the CPR by itself, **harmonised European product standards are perceived to be very important to actually stimulate cross-border trade**. In a market where slightly more than 50% of intra-EU trade occurs between non-contiguous or close neighbouring countries, the harmonisation of national laws and marking systems, started with the introduction of the CPD and progressed with the continuous development of new European standards, are viewed by consulted parties as the real fundamental steps for the strengthening of the EU internal market of construction products. **The Regulation contributed to this process by improving clarity and transparency of rules**.

However, when statistically analysing trade data for a sample of 25 construction products, neither the CPR nor European standards in use between 2003 and 2015 are associated with a statistically significant and generalised positive impact on the value of trade exchanges between EU Member States. In contrast, **country and product differences matter a lot**. The net effect of the CPR, after taking into account a number of possible confounder variables, is negative for some big market players such as Germany and France, but also the UK, Denmark and Sweden, while it is more positive for new Member States, such as Poland, Bulgaria, Estonia, Lithuania and Slovenia. As to the effectiveness of harmonised European standards, this varies to a greater extent, most likely depending on the characteristics of standards and the specific benefits and costs that each standard causes on firms.

Despite the EU policy intervention, national standards and differences in product requirements among Member States continue to be in place. This seems to be the main factor that constrains the overall effectiveness of the CPR and the hENs. They create a parallel systems which firms have to conform to when cross-border trading, thus raising financial costs and administrative burden for certification, but also generating confusion and frustration among market operators.

Still existing technical barriers hit smaller enterprises the hardest. Even if limited data are available on the number of SMEs manufacturing construction products, and even less on actually exporting SMEs, there is consistent evidence suggesting that SMEs' propensity to export may benefit from stronger harmonisation and even more clarity about applicable rules.

On the basis of the findings of this study, some methodological considerations could also be highlighted. They should be carefully considered in any subsequent study or ex-post evaluation of the impact of the CPR or hENs.

- **Deep knowledge of the construction market structure *at product level* is needed to correctly interpret the trade figures**. Given the variety of products used in the construction industry, the variety of demand for these products and the variety of market structures (more or less concentrated) and dynamics, it is important to have a

detailed product-specific understanding of the key drivers of trade and be knowledgeable of how the behaviour of larger companies could influence aggregate trade figures.

- In the future, **it may be interesting to extend the analysis to the distribution systems of products**. Large-scale distribution can be an important driver to explain the trade of some types of products. The impact of the CPR and hENs could be assessed not only on manufacturers but also on distributors and retailers. Since the market of some products is quite concentrated and SMEs may be involved only downstream in the value chain, including the distribution system in the analysis may allow for a more complete understanding of the role of SMEs in the construction industry.

- **The analysis would benefit from considering also extra-EU trade patterns**. An analysis at global level would provide a more complete picture of the manifold determinants of trade among EU countries. Such determinants could refer to the financial and economic situation in foreign countries, trade strategies (e.g. import duties or export subsidies), and relocation strategies of European companies outside the EU.

- If the analysis is at product level, more **detailed data on the number, turnover, and export level of SMEs producing and trading specific types of construction products in each country should be searched within the national statistical offices**. Official and harmonised data source on SMEs are available only at the level of the whole construction sector.[33] Data for a more disaggregated unit of analysis could be retrieved from national statistical sources, but this would require an extra effort to ensure data quality and harmonisation at EU level.

- Due to **less reliable and poorer market statistics for EFTA countries**, an analysis of cross-border trade of construction products is to be limited to EU Member States, unless specific data collection and harmonisation actions are performed.

- Finally, **the results of our econometric analysis would benefit for further inquiry on individual European standards**. This study shows that large variability exists in the effect of harmonised European standards on EU trade, which is likely to be imputable to different specific characteristics of the standards. While some possible reasons have been spelled out in this report to explain their diversified effect on trade, more research focusing on the standards' definitions, aim, and implications for firms would be needed.

[33] Produced by the European Commission in the framework of the annual SME Performance Review (Construction is defined by NACE code F).

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