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MARKET COVERAGE OF THE EUTR – WHAT SHARE OF WOOD IMPORTS INTO THE EU IS COVERED BY THE EUTR?

Illegal Logging is one of the major global causes of deforestation and degradation of forests. To combat the negative effects of illegal logging, the European Union (EU) introduced various forest related policies and measures. Among them is the EU Timber Regulation (EUTR). The objective of the presented analysis is to identify the percentage share that the EUTR applies to wood and wood-based products. We analysed the imports into the EU by using different reference units: the import value in Euro, the roundwood equivalent and the wood fibre equivalent. Our results show that about 90% of the imported quantities and 74% of the imported values are covered by the EUTR. This means, that in 2013 the EU imported a total wood quantity of 6 million m³ wood fibre equivalents (or 17 million m³ roundwood equivalents, respectively) which is not covered by the EUTR. This amount is almost equally distributed between wood products and paper products. Coverage ratios for further differentiated product groups differ. Typically, raw materials have a higher coverage ratio, and finished products have a lower coverage ratio. The wood quantities that are not covered by the EUTR are highly concentrated between a few commodities like wood charcoal, other articles of wood, recovered paper, printed books and brochures.

Keywords: EUTR, coverage ratio, wood-based products, illegal logging, international trade, reference units

Introduction

Illegal logging is one of the major global causes for deforestation and the degradation of forests. The manufacturing of this illegally logged wood and the ensuing products, as well as the associated trade, negatively affects social and economic interests. To combat the severe effects of illegal logging, the European Union (EU) introduced various forest related policies and measures. The adoption of the EU Action Plan on Forest Law Enforcement, Governance and Trade (FLEGT) in 2003 was a major milestone in this respect. The FLEGT Action Plan proposes various measures for the support of international efforts to

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combat illegal logging and its associate trade in relation to the general efforts of the Union to achieve sustainable forest management [EC 2003]. Since then, two main mechanisms have been implemented in order to achieve the goals of the FLEGT Action Plan: Voluntary Partnership Agreements (VPAs) and the EU Timber Regulation (EUTR). The VPA mechanism is based on agreements between partner countries and the EU, to ensure that only wood products based on legal logging will be exported to the EU Member States. The EU Timber Regulation deals with a different matter: its objective is to ban products made of illegally logged wood from the European market. The EUTR prohibits the placing of "illegally harvested timber or timber products derived from such timber" on the EU internal market. Typically, this placement can either be done by selling removals from European forests or by importing wood and wood-based products into the EU. Other countries also use the ban of imports of products made of illegally logged wood as a measure to combat illegal logging. E.g. in 2008 the United States (U.S.) adopted an amendment to the Lacey Act (LAA). In Australia the Illegal Logging Prohibition Act came into effect in 2012. It also aims at a prohibition policy.

The EUTR came into effect on March 1, 2013. The regulation specifically applies to timber and timber products (EUTR 995/2010). Detailed specifications for the regulation refer to its Annex which has a list of respective commodities. The products are structured according to the trade classification of the Combined Nomenclature (CN). The main focus is on wood and articles of wood (chapter 44 of the CN), on pulp of wood (chapter 47) and on paper and paperboard and articles made thereof (chapter 48). Additionally, some commodity codes for furniture and one code for prefabricated buildings is listed. Certain wood based products are not included in the EUTR, which raises a number of questions: how many wood based products are not covered by the EUTR? To what extent does the regulation apply? And what is the coverage ratio of the EUTR if we are looking at all wood-based products? Several studies have been published regarding illegal logging and the effects on wood markets [e.g., Seneca Creek Associates and Wood Resources International 2004; Li et al. 2008; Dieter 2009; Lawson and MacFaul 2010; Dieter et al. 2012]. Among others, in Iben et al. [2014] publications with a focus on VPAs and timber legality verification can be found. The number of scientific publications on the topic of EUTR, however, is comparatively small.

Geraets and Natens [2013], Fishman and Obidzinski [2014], Jakel [2015] cover legal issues in the context of international trade law and analyse whether the EUTR constitutes an illegal trade barrier.

Some publications want to gain information about the effectiveness of the EUTR. Levashova [2011] analyses the text of the regulation itself. She concludes that the regulation lacks elements that are essential in the fight against illegal logging. Among them, she points out that the product scope of the regulation is too narrow as it omits printed matter. In their analysis of statements

by stakeholders in 15 secondary sources Giurca and Jonsson [2015] reveal and classify the heterogeneity of the roles and their different perception of the EUTR. For example, they identify bureaucracy as an overall issue and evaluate that the EUTR creates a strong market advantage for low-risk countries of illegally logged timber as stakeholders in these countries see the regulation as beneficial for their business. Information about stakeholder opinions is of importance to avoid unwanted side effects of the regulation like the ones pointed out earlier by Giurca et al. [2013]: General uncertainty around the EUTR, interpretation and the cost of compliance with the EUTR may lead to substitution in the EU of tropical timber with timber from low risk countries within Europe and North America or to trade diversion to less regulated markets. Overdevest and Zeitlin [2014] argue that the EUTR might undermine the FLEGT VPA development and the significant improvements (identified by informed observers) in forest governance in signatory countries. This is due to the incentive that FLEGT export licences might still be some years off, and consequently exporters in these countries and European importers pursue private solutions (like certification) to meet the due diligence requirements of the EUTR. This may allow coalitions in the countries behind the VPA to collapse and may let the governments abandon their commitment to difficult reforms in the forest sector. Prestemon [2015] uses a statistical model to analyse the effect of the U.S. LAA on prices and quantities of imported wood products hardwood lumber and hardwood plywood to the U.S. For the analysed products he is able to empirically validate and quantify expected effects from economic theory: higher prices and lower quantities are found in the market equilibrium of the U.S. due to the LAA for the imported commodities. For the EUTR similar effects can be expected, but due to the shorter time span of the EUTR data they are not proven yet. In any case, an impact on wood markets in general and not only on import markets of special tropical hardwood lumber commodities would be desirable.

Jonsson et al. [2015] state in their review of scientific and expert studies which deal with the effectiveness and impacts of EUTR, VPAs and LAA: "It is still too early to be able to draw strong conclusions, in particular quantifiable ones, regarding the impacts of FLEGT and EUTR on reducing illegal logging".

Research methodology

The objective of this analysis is to provide basic data about the EUTR. To the best of our knowledge, there is no coherent information available about how much wood in wood and wood-based products are imported to the EU or how much of this quantity is covered by the EUTR. Hence, our objective is to identify to which share the EUTR applies for wood and wood-based products, and to provide knowledge of trade flows and markets in this regard. The analysis will compare twelve different product groups of wood and wood-based products

in the categories wood products, paper products and other wood-based products. Based on the objective the outline of the report is as follows: This chapter focuses on the research methodology, then the results of the analysis are presented and finally, conclusions are provided.

The analysis of the market coverage of imports of wood and wood-based products to the EU requires the clarification of two main aspects: (1) the definition and scope of wood products and (2) the respective reference units for the calculation of the trade flows in a physical unit.

(1) Wood and wood-based products cover a wide variety of different goods and commodities. These include, for example, wood products such as firewood, sawnwood, pellets or window frames, paper products such as newsprint, sanitary paper, paper for packaging or printed articles. Other products beyond the scope of these traditional goods are also manufactured and have to be considered. Regenerated cellulose or cellulose nitrate can be listed as examples. Additionally, there are a lot of products which also can be made of or contain wood (e.g., toys, chewing gum). Hence, it is essential to define the scope of wood-based products for our analysis. Most of the wood-based products can be attributed to the forest-based sector, which has been described by the European Union in 1999 [EC 1999]. In this definition the forest-based sector consists of the wood working industry, the wood processing industry, the construction industry, the pulp and paper industry and the printing and publishing industry. Based on this, the scope of wood and wood-based products of our analysis can be derived. Table 1 gives an overview and structures the wood-based products in categories and product groups.

The wood-based products can be categorized into raw materials, semi-finished products and finished products. Additionally, they can be subdivided into the following categories: wood products, paper products and other wood-based products. Based on this structure we aggregated the products into twelve product groups for further analysis. The matrix contains all products for which the EUTR applies (EUTR 995/2010). As already mentioned, however, the EUTR does not cover all commodities which have been defined as wood-based products. It can be seen that e.g. products such as wood charcoal, wood marquetry, printed matter or regenerated cellulose are not listed in the annex of the EUTR.

As can be seen in the annex of the regulation, especially further processed wood-based products are not included in the EUTR. Also, another aspect that has to be taken into account is that the EUTR only applies to products as classified in the CN. Hence, the EUTR does not apply for wood and paper products which are already in use as packaging material. Also commodity codes of the CN which are not explicitly defined as goods made of wood, products which only partly consist of wood or contain wood and products which are manufactured in an industry branch outside of the forest based sector are not in

the scope of our analysis. Examples of these products are wooden toys, caravans, chewing gum and musical instruments.

Table 1. Scope of wood and wood-based products

Specification	Wood products	Paper products	Other wood-based products
Raw material	(1) Roundwood (2) Wood processing residues	(8) Wood pulp and recovered paper	
Semi-finished products	(3) Sawnwood (4) Wood-based panels (5) Other semi-finished wood products	(9) Paper and paperboard	(12) Regenerated cellulose, artificial fibres a.o.
Finished products	(6) Finished wood products (excl. furniture) (7) Furniture	(10) Articles of paper or paperboard (11) Printed matter	

(2) The different industries of the forest based sector manufacture a broad variety of different wood-based products. In trade statistics, these products are basically measured in the net mass of the traded volumes and in monetary values. For some products a supplementary unit of the traded quantity is also provided. In the case of some wood-based products this traded volume is also recorded in the supplementary unit of cubic meters. For our analysis we used the trade data of Eurostat [Eurostat 2015]. The analysis is mainly conducted for the year 2013, the year when the EUTR came into force. We also analysed the market coverage for the period 2010 to 2013 in order to recognize a trend in these years. The focus, however, is on the year 2013.

In the Eurostat trade database the bilateral trade of all countries of the EU is recorded. The trade data is provided on the 8-digit level of the Combined Nomenclature. For comparison of the different trade flows, however, neither the given trade volume in tons or in cubic meters is sufficient, as many wood-based products also consist of other materials such as adhesives in panels or minerals and additives in paper and paperboard. We therefore converted all trade data into physical reference units.

In the scope of this analysis, we used three different reference units: the mandatory trade values as a monetary value denoted in Euros, and two physical reference units, the roundwood equivalent and the wood fibre equivalent. Both physical reference units are units of volume. The roundwood equivalent is measured in cubic meters (m^3 (r)). It has been used in various studies for balancing and analysing material flows of wood-based products [e.g. Ollmann 2001; UN 2005; WWF 2008; Dieter 2009; UN 2011; Dieter et al. 2012; Weimar 2014]. The roundwood equivalent expresses the amount of roundwood, which is

needed for the production of one unit of a product. As such, it indicates the required resource input of roundwood for the manufacturing of a product.

The wood fibre equivalent as the second physical reference unit is also measured in cubic meters (m³ (f)). In contrast, however, to the roundwood equivalent it does not focus on the raw material input, but describes the wood fibres which are effectively in the product. It is defined as the equivalent volume of the wood fibres or wood-based fibres that are contained in the product [Weimar 2011]. Hence, the calculated volumes in m³ (f) indicate how much wood fibres have effectively been traded within a given product. The wood fibre equivalent has been used for material flow analysis [Weimar 2011; Bösch et al. 2015]. The volume of the wood fibres is calculated above the fibre saturation point to take into account the swelling and shrinking of the wood fibres below this threshold. For the purpose of this study, we firstly calculated the mass of the wood fibres of the different commodities based on the study by Diestel and Weimar [2014]. We then calculated the volume by using the density by volume of the respective commodity code. In this regard, we had to take into account that most commodity codes of the CN do refer to more than a single wood species. In these cases we had to estimate an average density by volume of the wood species indicated in the description of the commodity code. We calculated the simple arithmetic average as there is no information on the specific share of the individual wood species of traded volumes of a commodity code. Information on the density by volume is taken from Sell [1989], Anon. [1995], Koch and Richter [2009], Koch and Sieburg-Rockel [2011].

For commodity codes where no specific wood species are explicitly mentioned, we also used the arithmetic average of the wood species to which the description applies. This is the case for commodity codes which refer, for example to softwood, hardwood, tropical wood or also if there is no reference to a specific species group. As an example, for the commodity code 44032011 (sawlogs of spruce of the species *Picea abies* Karst. or silver fir *Abies alba* Mill.) we used the arithmetic average of the densities by volume of both wood species. For better illustration table 2 provides some examples of the resulting conversion factors for both physical reference units.

As can be seen in table 2, the two physical reference units represent the possible range of resource impact for the manufacture of a given commodity. The roundwood equivalent implicitly assumes that wood products are exclusively made of roundwood and can as such be interpreted as an input unit. The eventual use of wood by-products or residues in the manufacture of the product is not taken into account. The wood fibre equivalent describes the other side of the spectrum. It only accounts for the wood fibres contained in a given product. Hence, it can be interpreted as an output based unit. For example, for the manufacture of one ton of wood charcoal 6 m³ of roundwood are needed. The mass, however, of one ton of the product only contains 2.5 m³ of equivalent wood fibres. The other parts of the wood are emitted during the production

process, but are not part of the product. Since the use of wood processing residues for further material use is increasing in a lot of countries, the range covered by both physical reference units allows analyses of the full variety of resource demand for the manufacture of wood-based products.

Table 2. Samples of conversion factors for the two physical reference units wood fibre equivalent m³ (f) and roundwood equivalent m³ (r)

CN Code	CN Description (short)	Conversion factor – m³ (f)	Base unit for m³ (f)	Conversion factor – m³ (r)	Base unit for m³ (r)
44029000	Wood charcoal	0.0025	kg	0.0060	kg
44032011	Sawlogs of spruce or silver fir	1.0000	m³	1.0000	m³
44081015	Sheets for veneering	0.0022	kg	0.0045	kg
44101110	Particle board	0.0015	kg	0.0020	kg
44152020	Pallets and pallet collars	0.0015	kg	0.0038	kg
47041100	Unbleached coniferous chemical wood pulp	0.0019	kg 90% sdt*	0.0041	kg
48010000	Newsprint	0.0015	kg	0.0032	kg
48030090	Toilet or facial tissue stock, […]	0.0017	kg	0.0048	kg
48131000	Cigarette paper	0.0012	kg	0.0042	kg
49111010	Commercial catalogues	0.0017	kg	0.0035	kg

*kg 90% sdt: kilogram of substance 90% dry
Source: own calculation

By using the reference units we can aggregate the trade data of the commodities (8-digit-level of combined nomenclature) to product groups and we are able to calculate the EUTR coverage ratio accordingly to the formula below.

$$CR^u = \frac{\sum_k EUTR_k \cdot cf^u_k \cdot X_k}{\sum_k cf^u_k \cdot X_k} \tag{1}$$

where: CR – coverage ratio of EUTR; u – m³ (f), m³ (r) or Euro; k – commodity; $EUTR$ – dummy variable (1 if commodity is covered by EUTR, 0 if commodity is not covered by EUTR); cf – conversion factor per import unit; X – import quantity (in kg, m³ or Euro)

Results

Analysis of global imports to the European Union

Table 3 presents the import quantities to the EU-28 for product groups and product categories expressed in the three reference units. Furthermore, the import quantities are differentiated by EUTR coverage. It should be noted, that trade within the EU-28 is not included in the import quantities.

In 2013, wood and wood-based products were imported to the EU-28 with an import value of 29 billion Euros (see table 3). This is almost equally distributed between wood and paper products. Imports of other wood-based products amount to 1.2 billion Euros. In terms of import value, finished wood

products and furniture are the most important product groups in the wood product category. Roundwood imports contribute only 3% of the total value of imports. In the paper product category all product groups contribute between 10% and 15% to the total import value. About one quarter of the imports, measured by their import value, are not covered by the EUTR. The most important product group in this respect is printed matter. Commodities in the product groups furniture and finished wood products also account for a high share of the import value not covered by EUTR. The products of wood pulp & recovered paper, which are not covered by EUTR, account for 0.2 billion Euros, which equals less than 1% of total import value.

Table 3. Imports of the EU by product groups and by EUTR coverage for import value, roundwood equivalent and wood fibre equivalent

imports, absolute	IMPORT VALUE				ROUNDWOOD EQ.				WOOD FIBRE EQ.			
	covered by EUTR			coverage ratio	covered by EUTR			coverage ratio	covered by EUTR			coverage ratio
	no	yes	total		no	yes	total		no	yes	total	
	[billion Euro]			[%]	[million m³ (r)]			[%]	[million m³ (f)]			[%]
1 roundwood	0.0	1.0	1.0	100	0.0	16.6	16.6	100	0.0	15.4	15.4	100
2 wood processing residues	0.0	0.3	0.3	100	0.0	8.0	8.0	100	0.0	6.7	6.7	100
3 sawnwood	0.0	2.0	2.0	100	0.0	10.8	10.8	100	0.0	8.3	8.3	100
4 wood-based panels	0.0	1.6	1.6	100	0.0	8.7	8.7	100	0.0	4.3	4.3	100
5 other semi-finished wood p.	0.0	0.8	0.8	98	0.1	2.3	2.5	95	0.1	1.1	1.2	92
6 finished wood p.	1.5	2.1	3.6	59	6.7	13.4	20.1	67	2.4	12.5	14.9	84
7 furniture	1.7	2.9	4.6	64	1.4	4.9	6.3	77	0.5	1.4	1.9	74
8 wood pulp & recov. paper	0.2	4.3	4.5	95	4.7	30.0	34.7	86	2.0	12.1	14.0	86
9 paper and paperboard	0.0	3.7	3.7	100	0.0	20.1	20.1	100	0.0	8.0	8.0	100
10 articles of paper & paperb.	0.0	3.0	3.0	100	0.0	4.4	4.4	100	0.0	1.5	1.5	100
11 printed matter	3.0	0.0	3.0	0	2.0	0.0	2.0	0	0.9	0.0	0.9	0
12 reg. cellulose, art. fibres a.o.	1.2	0.0	1.2	0	1.5	0.0	1.5	0	0.2	0.0	0.2	0
13 total wood p. (1 to 7)	3.1	10.7	13.9	77	8.2	64.7	73.0	89	3.0	49.5	52.5	94
14 total paper p. (8 to 11)	3.2	11.0	14.2	77	6.8	54.4	61.2	89	2.9	21.6	24.4	88
15 total other wood-bsd. p. (12)	1.2	0.0	1.2	0	1.5	0.0	1.5	0	0.2	0.0	0.2	0
16 total imports (1 to 12)	7.5	21.8	29.3	74	16.5	119.1	135.7	88	6.0	71.1	77.2	92

Source: own calculation

Looking at physical import quantities of the EU-28, we calculated the actual wood imports by using the reference units roundwood equivalents and wood fibre equivalents. Naturally, by using completely different reference units the structure of import, as well as the coverage ratios will be different. Still, it is useful to compare these structures to get a better understanding of the different reference units and hence the resulting product structures of imports as well as coverage ratios.

Measured in cubic meters of roundwood equivalents (m³ (r)) the EU-28 imported a total of 136 million m³ (r) in 2013 of which 73 million m³ (r) are wood products and 61 million m³ (r) are paper products. Further processed products like furniture or printed matter, which typically have a higher price per m³ (r), contribute less to total import volumes than in the case of import value.

Vice versa product groups that can be classified as raw material like roundwood or wood processing residues as well as wood pulp and recovered paper are more important when using roundwood (or wood fibre) equivalents. These product groups contribute with 60 million m³ (r) (= 44%) to total imports of roundwood equivalents, which is much more than its share of 20% of the total import value.

Also, by using the reference unit of wood fibre equivalents (m³ (f)) the product structure of imports changes compared to the structure when using import value. This is also true for a comparison between m³ (f) and m³ (r) structures. In 2013, the EU-28 imported in total 77 million m³ (f) – of which 53 million m³ (f) were wood products (= 68%) – and 24 million m³ (f) were classified as paper products. Roundwood and wood processing residues account for about 30% of the total wood fibre imports for an even higher share, than measured in roundwood equivalents (18%).

Coverage ratios of the EUTR for all wood-based products are about 90% based on m³ (r) and m³ (f) (88% and 92%). Calculations based on the import value are considerably lower at 74%.

For the category wood products, 94% of imported m³ (f) are covered by the EUTR. Coverage ratios based on m³ (r) and import value amount to 89%, and 77% respectively in this category. Coincidentally the same coverage ratios as for wood products were calculated for paper products based on m³ (r) (89%) and import value data (77%). Measured in m³ (f) 88% of all imported wood fibres in paper products are covered by the EUTR. Regenerated cellulose and artificial fibres are not listed in the annex of EUTR. As this is the only product group in our category of "other wood-based products", the coverage ratios are zero for both the product group and the product category.

Analysis of commodities not listed in the EUTR

The wood volume not covered by EUTR amounts to 6 million m³ (f). It is highly concentrated between a few commodities. About 80% of this volume can be accounted for within ten commodities. Wood charcoal (CN code 44029000) can be identified as the main product which is not covered by the EUTR. Its import volume equates to 1.4 million m³ (f). This accounts for 23% of all imported wood quantities that are not covered by EUTR. In second place are "Articles of wood, not elsewhere specified" (CN code 44219098) which account for another 0.7 million m³ (f). Additionally, there are three other commodities or commodity groups of importance in the top 10. Firstly, six commodities related to recovered (waste and scrap) paper and paperboard (a total of 1.8 million m³ (f) or a 31% share of total imports not covered by EUTR). Secondly, a commodity code related to printed books, brochures, etc. (0.5 million m³ (f)). And thirdly, "upholstered seats with wooden frames" (0.3 million m³ (f)).

Regional analysis

In this section we focus on the geographical origin of imports of wood and wood-based products. For this purpose, we defined nine regions by aggregating the sub-regions which are given by the UN regional classification[1].

In table 4 the regions are listed and it presents the trade flows of wood and wood-based products in wood fibre equivalents into the EU-28 in the year 2013[2]. The largest exporter of wood and wood-based products into the EU-28 in the year 2013 was Russia and Eastern Europe (Non-EU28). The EU-28 imported 25 million m³ wood fibre equivalents from this region, which equals a third of the total imports of wood and wood-based products into the EU-28. The second largest exporter to the EU-28 is North America, being followed by WNS Europe (Non-EU28). These three regions together, account for about 70% of total m³ (f) imports. The least important in terms of total wood fibre imports are the regions of WCS Asia, Africa and Oceania. Imports into the EU-28 from these regions add up to only 4 million m³ (f), which is less than 5% of the total wood fibre imports.

Table 4. Wood and wood-based products: Imports to EU-28 by export region and by EUTR coverage, measured in m³ (f)

	WNS Europe (Non-EU28)	Russia & EE (Non-EU28)	North America	Latin America	WCS Asia	ESE Asia	Africa	Oceania	All Regions
Imports in 1,000 m³ (f)									
not covered by EUTR	1,817	579	571	515	155	1,825	542	3	6,017
covered by EUTR	12,019	24,628	15,696	10,590	683	5,119	2,017	263	71,138
total imports	13,837	25,207	16,267	11,105	838	6,944	2,559	265	77,155
Import share by region									
not covered by EUTR	30%	10%	9%	9%	3%	30%	9%	0.0%	100%
covered by EUTR	17%	35%	22%	15%	1%	7%	3%	0.4%	100%
total imports	18%	33%	21%	14%	1%	9%	3%	0.3%	100%
Regional coverage ratio	87%	98%	96%	95%	81%	74%	79%	99%	92%

Source: own calculation

Coverage ratios vary between regions according to export composition of commodities and product groups. Imports from Oceania and Russia & EE (Non-EU28) are almost completely covered by EUTR (99% and 98%). But one has to be mindful of the associated volumes. In the case of Russia & EE (Non-EU28) this high coverage ratio is associated with a third of the total imports in wood fibre equivalent. The high coverage ratio for Oceania is less important, because

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[1]EU28: European Union with 28 member states; WNS Europe (Non-EU28): "Western, Northern and Southern Europe, excluding EU28 member states"; Russia & EE (Non-EU28): "Russia and Eastern Europe, excluding EU28 member states"; WCS Asia: "Western, Central and Southern Asia"; ESE Asia: "Eastern and South-Eastern Asia"; North Am.: North America; Latin Am.: Latin America.

[2]For further interest, see more detailed results in our working paper Weimar et al. [2015].

the associated trade flows are negligible (0.3%). The region Eastern and South-Eastern Asia has the lowest coverage ratio with 74%. Imports from ESE Asia account for 9% of total wood-fibre imports (7 million m³ (f)).

The regional structure of the products not covered by the EUTR is very different to the regional structure for total wood and wood-based product imports based on m³ (f). The major export regions Russia & EE (Non-EU28) and North America each contribute significantly less (≈10%). On the other side, WNS Europe is almost twice as important for not covered imports as it is for the total imports. It is the source of 30% of all imported wood fibre equivalents which are not covered by EUTR. This is due to high imports of recovered paper commodities. Three other regions triple their shares: WCS Asia with 3%, ESE Asia with 30% and Africa 9% (shares of total imports: 1%, 9% and 3%, respectively). The reason for this increase in ESE Asia is on the one hand the relatively high amount of printed matter that is exported from ESE Asia. In fact, 69% of all imported printed matter into the EU-28 is exported from ESE Asia. On the other hand, relatively high shares of furniture and finished wood products can be seen in their export product structure combined with a low coverage ratio in the finished wood products group. The imports of the EU-28 from Africa which are not covered by the EUTR amount to 9% of all imports not covered by the EUTR. This is mainly due to the import of wood charcoal.

Conclusions

Our results show that about 90% of the imported quantities are covered by the EUTR. This means, the EU-28 imported in 2013 a wood quantity of 6 million m³ wood fibre equivalents (17 million m³ roundwood equivalents) that is not covered by the EUTR. This quantity is almost equally distributed between wood products and paper products. For the twelve wood and wood-based product groups we quantified the wood imports and coverage ratios of EUTR. Coverage ratios for product groups differ. Typically, raw materials have a higher coverage ratio and finished products have a lower coverage ratio. The wood quantities that are not covered by EUTR are highly concentrated on a few commodities like wood charcoal, articles of wood, n.e.s. and printed books and brochures. The regional import structure of EU-28 for all wood and wood-based imports is very different to the structure of imports not covered by EUTR.

When looking at the regional import structure of products that are not covered by EUTR, Russia and Eastern Europe (Non-EU28) are less important, while Eastern and South-Eastern Asia is now the most important region.

If measured in monetary terms, the overall coverage ratio only accounts for 74% of all wood-based imports. This significant drop is mainly because further processed wood-based products typically show an increasing value per unit. As the coverage ratio of the EUTR decreases with increasing stages of processing, this leads to a discrepancy in physical and monetary reference units.

Having a detailed look at the coverage rate of the physical reference units, the ratio of wood products based on m³ (f) are slightly higher than the coverage ratio based on m³ (r). This is due to the combination of two facts: On the one hand, furniture, finished wood products and semi-finished wood products account in m³ (r) for much higher quantities than in m³ (f) as the other product groups in the wood product category. On the other hand, not all commodities in the product groups of furniture, finished wood products and semi-finished wood products are covered by the EUTR. For paper products the coverage ratios are the same between m³ (r) and m³ (f) because the spread of m³ (f) to m³ (r) ratios for these product groups are rather small (between 0.37 and 0.46).

It is obvious that the coverage ratio we calculate in this study mainly depends on the definition and scope of the wood-based products in total. A lot of other commodity codes, however, contain wood or products made of wood. Other products with a minor share in the given commodity code (e.g., caravans) or products with a high content of wood are commingled in a commodity code with products made of other materials (e.g., toys). In this respect wood-based packaging material can also be mentioned for imported products (e.g., cardboard boxes). For these kinds of products the EUTR might not serve as an appropriate measure for combating illegal logging due to limits of practical implementation. Costs for acquisition of necessary information, legal uncertainty and administrative workload come to mind. In this regard, exports of VPA countries might also cover these possible material flows.

According to the regional analysis, an extension of the commodities listed in the EUTR would affect imports from regions differently. For example, (1) an inclusion of printed matter would affect trade relations of the EU-28 and ESE Asia the most, as 69% of imported printed matter originates here. (2) A complete expansion of the EUTR to the same product scope as in this analysis would only marginally affect the trade with Russia & EE (Non-EU28). (3) An inclusion of recovered paper commodities or generally, a complete coverage in the product groups of wood pulp & recovered paper would affect WNS Europe (Non-EU28) the most as it has a very low coverage ratio (22%) in this product group and a significant percentage of exports to EU-28 are in this product group. (4) Finally, an entry of wood charcoal in the Annex of the EUTR would affect Africa and Latin America the most. They are the largest exporters to the EU-28 with around 500 million m³ (f) each.

A deeper analysis of the consequences (if any) on trade relations and import structures, due to an expansion of the commodity list in the EUTR, is not in the scope of this study. It is worth mentioning, however, that at least importers of covered commodities have to engage with their trade partners, so they will provide the necessary information for due diligence actions according to the EUTR. This raises awareness and might positively influence behaviour along the production chain as the continuation of trade relations gives financial incentives. The EUTR can basically be a suitable measure for all wood-based products as

classified in this paper, even if the proposed positive effects of the EUTR (in combination with VPAs) on the forest sector in the wood producing and the wood manufacturing countries have just begun to evolve [Jonsson et al. 2015].

In contrast, measures like the EUTR can have ambiguous effects: For example Prestemon [2015] described in his analyses of the U.S. LAA negative results for consumers and further processing industries as import quantities decrease and prices increase. Also in this context, Giurca et al. [2013] described two possible consequences, especially for tropical timber: substitution by temperate hardwood species and trade diversion from more strictly regulated regions to less regulated markets. Generally, if the EUTR acts as a non-tariff-barrier, a higher level of domestic wood processing and/or consumption in exporting countries or shifts in regional structure of imports in EU-28 are possible effects.

As these examples as well as the results of our analysis show, there is still the necessity for improvement. For example, following the concept of the EUTR it seems logical to include more products and especially more further processed wood-based products in the annex of the EUTR in order to avoid possible leakages in trade.

Typically exports are rather small compared to domestic consumption. Hence, the EUTR alone is unlikely to solve the problem of illegal logging. Also other measures, such as VPAs, by Europe (and other countries) with partners in the producing regions have to be further developed and applied in order to achieve the ambitious goals of the fight against illegal logging in the international community.

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