EU Timber Regulation

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Illegal logging and the associated deforestation have serious consequences for biodiversity, the climate, the economy and society. The EU Timber Regulation (EUTR) prohibits the placing of illegally harvested timber or timber products on the market. The objective of this paper is to analyse the recent evolution of EU imports of these products from the international market, in order to check how the transparency index of the supplying countries' institutions and tree cover loss have influenced this trajectory. To that end, a panel data model is estimated with 228 observations from 38 exporting countries between 2012 and 2017. The results show that EU timber imports have a direct association with the transparency index and an inverse relationship with tree cover loss; both these relationships are highly significant at the one-percent level. Other significant factors are the performance of the EU construction sector (as a proxy for timber demand) and timber supply. In the short and medium-term, Voluntary Partnership Agreements (VPAs) signed between the EU and non-EU timber-producing countries have a negative influence on the supply to EU member states. This study presents an analysis of EU timber imports after the implementation of the EUTR, providing specific conclusions that can inform policymakers' efforts to foster sustainable forest management.

Keywords: EU ; timber ; imports ; EU Timber Regulation (EUTR) ; tree cover loss ; forest certification

1. Introduction

Global concerns about the impacts of illegal logging and trade in timber in terms of deforestation and forest degradation prompted the European Commission to adopt the EU Action Plan for Forest Law Enforcement, Governance and Trade (FLEGT) in 2003 [1][2]. The EU is one of the world's largest importers of timber, and its actions can play a role in improving the legality of the production and sale of timber. In 2017, EU countries accounted for more than 35% of total world imports of timber and timber products, and, although almost three-quarters of these trade flows are within the EU [3], purchases from third countries represented 26.35% of the total. Furthermore, part of this trade between EU members is in timber or timber products initially purchased from outside the EU [4]. Between 2012 and 2017, EU imports from non-EU countries registered a cumulative annual growth rate of 5.23%, while those from partner countries recorded a growth rate of 4.73%.

The FLEGT establishes a package of measures to simultaneously influence both the demand and the supply of legally produced timber. The FLEGT represents the EU's first tool for improving forest management and encouraging the trade of legally produced timber [5]. To achieve this objective, Regulation (EU) 2173/2005 and Regulation (EU) 1024/2008 authorised the European Commission to sign Voluntary Partnership Agreements (VPAs) with non-EU countries and implemented timber legality assurance systems in timber-producing countries. VPAs should be developed through an inclusive governance process involving stakeholders and should identify measures to control the illegal production and trade of export timber [6]. The EU subsequently adopted Regulation 995/2010 (the EU Timber Regulation or EUTR), prohibiting the placing of illegally harvested timber and timber products on the EU market [7] and implementing Regulation 607/2012. Such regulations require operators placing timber and timber products on the European market for the first time to check the legality of the imports [8] through a due diligence system (DDS) and stipulates the traceability of timber. The abovementioned legislation, which complements the VPAs, recognises the FLEGT licences as sufficient proof of the legal origin of timber [9].

There is compliance with the regulation entails costs for EU companies of varying amounts, depending on the subsector in question, as has been estimated by the European Commission [10]. Similarly, the application of VPAs and the FLEGT licensing system, like any other certification process, entails a financial cost to the country implementing them, which is partly covered by funding from EU projects and requires the development of capabilities to ensure the reliability and credibility of the process [11]. In return, products certified with the FLEGT licence gain automatic access to the EU market [12]. Public and private contracting policies increasingly stipulate the use of legal timber and the exclusion of illegal or unidentified timber [2][13]. Companies in the timber sector that take part in public tenders—for example, bidding to provide the timber needed for buildings or different types of construction works—must provide proof of the legality of the product offered. According to the European Commission, the trade measures derived from the EUTR are aimed at combating

illegal timber production based on bilateral and voluntary agreements and, therefore, do not pose compatibility problems with the World Trade Organization [14]. These measures are targeted at very precise objectives, applying to individual shipments rather than at company or country level. The aim is to prevent illegal trade flows instead of legitimising them. Moreover, the intention is not to impede exports from less-developed countries to higher income markets but to ensure stricter standards for the protection of the natural environment and forest land [15].

The purpose of this research is two-fold. First, it analyses the recent evolution of EU imports of timber and timber products from the international market and identifies geographical patterns (from 2012, the year in which preparations were being made for the imminent entry into the force of the EUTR and following the effects triggered by the 2008 economic crisis). Second, it examines how certain variables, in-line with the studies of Hurmekoski et al., Paluš et al., Zhang et al. and Rougieux and Damette [16][17][18][19], have conditioned the recent evolution of these imports. Specifically, the analysis focuses on the trade flows of products included under the tariff headings listed in Chapter 44, timber and timber products, as set out in the Combined Nomenclature established in Council Regulation (EEC) 2658/87, summarised in Annex I of the EUTR. However, other products included in this annex (those in Chapters 47 and 48—pulp—and in Chapter 94—wooden furniture and prefabricated buildings—) are not considered. They are classified in other chapters of the tariff system and have significant differences from the products in Chapter 44, which affects trade patterns and complicates the analysis. The documentary and statistical information used is sourced from the European Commission, UN COMTRADE, EUROSTAT, FAOSTAT, Global Forest Watch, Transparency International and Google maps. This research analyses the influence on cross-country trade flows of international regulations that seek to promote the legality of the timber trade. Specifically, this paper enables an approximation of the effect of the EUTR on EU imports of timber and timber products in recent years, drawing specific conclusions that can guide policymakers' efforts to foster sustainable forest management.

Previous studies, such as that by Prestemon [20], have analysed how the regulations implemented by national governments have affected the price and demand for timber in the domestic market. Similarly, Giurca et al. [21], Jonsson et al. [22], Masiero et al. [23] and Pepke et al. [24] have analysed the influence of the EUTR on the intensity of EU imports and the characteristics of these imports in terms of product types and countries of origin, even before it came into effect. This paper seeks to verify the possible link between EU-28 countries' imports of timber and timber products from third countries and various economic and institutional variables. The results of this research contribute to the literature that analyses how international standards aimed at promoting the sustainability of forests affect trade flows between countries. Furthermore, the findings offer an understanding of patterns in imports of timber and timber products in the years following the implementation of the EUTR. By performing a rigorous analysis of the available empirical data, this article seeks to contribute to the knowledge about EU countries' purchases of timber and timber products from non-EU countries. Moreover, the specific conclusions drawn can guide policymakers' actions towards achieving sustainable forest management.

2. Descriptive Analysis

First, a descriptive analysis of the variables is carried out (Table 1). There is a high degree of dispersion in the main variable—imports of timber and timber products—as well as in some of the independent variables, such as the certified forest hectares (CFH) and the timber supply (TS). For the latter, a value of 0 is recorded for certain countries such as Albania, the Democratic Republic of the Congo, Côte d'Ivoire, Equatorial Guinea, Morocco, Myanmar and the Central African Republic. The rest of the variables show less variation—in particular, the EU timber demand (TD).

Table 1. Descriptive statistics of EU imports of timber and timber products and the independent variables between 2012 and 2017.

Variables	Obs	Mean	Std. Dev.	Coef. Var. %	Min	Max
IT	228	233,223.90	374,530.90	1.60	1292.10	1,900,000.00
CPI	228	43.94	20.14	0.45	15.00	91.00
TCL	228	0.53	0.41	0.76	0.05	1.78
CFH	228	8,189,094.00	2.68×10^7	3.27	0.00	1.69×10^8
TD	228	685,725.80	30,739.74	0.04	647,466.60	736,690.00
TS	228	24,778.74	68,347.08	2.75	39.00	418,912.00
D	228	6982.01	4180.36	0.59	670.00	18,711.00
Ag	228	0.73	0.44	0.60	0.00	1.00

The analysis of the independent variable confirms that timber trade is of major importance in the EU. In 2012, following the slowdown in the world timber market due to the economic crisis that began at the end of 2008, purchases of timber and timber products on the international market by all EU countries totalled $37.87 billion, representing 37.01% of the total, as shown in Table 2. China, with imports valued at $14.69 billion and a share of 14.35%, is in second position, followed by the USA (11.54%) and Japan (10.51%). Imports by the rest of the countries amounted to less than $2.5 billion, accounting for 26.59% of the total.

Table 2. Distribution of world imports of timber and timber products by country groups and countries in 2012 and 2017 and variations over the period 2012–2017 (%).

Countries	2012		2017		Var 2012–2017
	Billions of $	%	Billions of $	%	
EU	37.87	37.01	43.24	35.63	14.17
China	14.69	14.35	22.76	18.75	54.96
USA	11.81	11.54	18.49	15.23	56.53
Japan	10.76	10.51	9,15	7.54	−14.93
Republic of Korea	2.35	2.30	3.16	2.61	34.46
Canada	2.84	2.77	2.72	2.24	−4.16
India	2.56	2.50	2.14	1.77	−16.37
Switzerland	1.74	1.70	1.71	1.41	−1.50
Australia	1.33	1.30	1.64	1.35	23.40
Mexico	1.30	1.27	1.50	1.23	15.59
Norway	1.54	1.50	1.45	1.19	−5.84
Egypt	1.66	1.62	1.30	1.07	−21.29
Turkey	1.55	1.52	1.05	0.86	−32.60
Rest of the world	10.35	10.11	11.05	10.80	6.84
Total	102.34	100.00	121.36	100.00	18.59

During the period analysed, the data in Table 2 reveals very uneven dynamics in the imports of timber and timber products by the different countries and the EU as a whole. In particular, the value of the EU's purchases increases by 14.17%, although its share of the world total drops to 35.63%. Compared to this dynamic, China records an annual rate of change of 9.15%, reaching an import volume of almost $3 billion, 54.96% higher than the value recorded five years earlier. Similarly, the USA experiences a marked increase in the value of its purchases on the international market, becoming the destination country for 15.23% of the total. Notable, albeit smaller, increases are registered in the Republic of Korea, Australia and Mexico. In the opposite direction, Japan, Canada, India, Switzerland, Norway, Egypt and Turkey record lower import volumes in 2017 than in 2012.

At the same time, the origin of imports from outside the EU shows very little diversification, as can be seen in Table 3 More than two-fifths of all imports come from three major markets: Russia, China and the United States. These are followed by 15 very heterogeneous economies located on four continents—Europe, Africa, America and Asia—which together account for 50% of the total.

Table 3. Distribution by country of origin of timber and timber product imports from outside the EU-28 and cumulative average growth rate, 2012–2017 (%).

Countries	2012	2013	2014	2015	2016	2017	Var 2012–2017
Russia	17.58	18.41	18.24	16.29	17.12	18.26	6.03
China [2]	15.81	14.10	13.84	14.00	12.45	12.10	−0.25
USA	10.18	11.35	13.28	15.22	15.13	15.03	13.77
Ukraine	5.98	6.33	7.08	7.34	7.96	7.76	10.87

Countries	2012	2013	2014	2015	2016	2017	Var 2012–2017
Norway	4.77	5.39	5.40	5.30	5.09	5.43	8.01
Brazil	5.77	5.06	5.12	5.39	4.41	4.54	0.27
Canada	4.94	6.00	4.30	4.30	4.33	4.07	1.23
Belarus	2.92	3.19	4.09	4.17	5.13	6.70	24.20
Indonesia [1]	4.50	3.87	3.79	4.25	4.10	4.00	2.77
Switzerland	4.74	4.55	4.38	3.82	3.66	3.52	−0.85
Malaysia	4.48	3.88	3.60	3.51	3.09	2.94	−3.31
Cameroon [1]	3.52	2.95	2.68	2.71	3.03	2.33	−3.07
Bosnia Herzegovina	2.07	2.55	2.57	2.40	2.60	2.59	10.05
Gabon	1.79	1.88	1.67	1.67	1.96	1.67	3.77
Chile	1.14	0.90	1.07	1.09	1.01	1.00	2.53
Serbia	0.88	1.05	1.13	0.96	1.03	1.05	9.04
Uruguay	1.24	1.24	0.85	0.85	1.05	0.84	−2.65
Congo [1]	0.68	0.83	0.75	0.74	0.83	0.70	5.67
Ghana [1]	0.52	0.44	0.40	0.31	0.30	0.26	−8.29
Vietnam [1]	0.28	0.30	0.25	0.26	0.24	0.23	1.32
Central African R [1]	0.12	0.09	0.07	0.12	0.14	0.07	−5.73
Liberia [1]	0.14	0.06	0.03	0.03	0.02	0.01	−34.79
Rest of the world	5.94	5.58	5.39	5.26	5.31	4.89	1.22
Total	100.00	100.00	100.00	100.00	100.00	100.00	5.23

The rest of the non-EU trade partners account for a small share: less than 1% in all years. We can observe very uneven dynamics in the markets for suppliers of timber and timber products to the EU between 2012 and 2017; while imports from Belarus, Myanmar and New Zealand present annual average growth rates of over 20%, other countries register a decline in the value of their sales, as is the case with Cameroon, Ghana, the Central African Republic and Liberia, all four of which have signed a VPA.

3. Panel Data Analysis

Table 4 shows the results of the panel data estimations. The model contains information from 38 countries, with a total of 228 observations, for the time period 2012–2017. The panel data methodology is chosen for the analysis in order to capture the influence of unobserved variables that can explain the variation between countries. A series of econometric models are formulated until the optimum model is reached:

Table 4. Panel data estimates.

Dependent Variable: Import Item	PCSE	Tests	Tests Results
CPI	0.034 ***		
	(0.009)	Hausman	Chi^2 (6) = 54.23; prob > chi^2 = 0.0000
TCL	−0.756 ***		
	(0.154)		
CFH	−0.025	Pesaran (*p*) and Frees (F)	*p* = 5.912; Pr = 0.0000
	(0.020)		F = 0.899
TD	2.815 ***		

Dependent Variable: Import Item	PCSE	Tests	Tests Results
	(0.378)	Wooldridge	F(1, 37) = 58.275; prob > F = 0.0000
TS	−0.130 **		
	(0.064)		
D	−3.716 ***	Wald—modified	$Chi^2(38)$ = 4819.54; prob > 0.0000
	(0.660)		
Ag	−0.387 **(0.176)		
Observations	228		
R^2	0.998		
Number of countries	38		

(a) After performing an exploratory analysis of the data, the procedure begins by estimating the model with pooled data and then with random effects. The Lagrangian Multiplier Test is used to compare the two models. To choose between the pooled data model or the random effects model, the Lagrangian Multiplier Test for random effects is implemented under the null hypothesis that the variance of the individual unobservable effect V_{it} is zero. The value of $p = 0$ obtained indicates that the null hypothesis must be rejected (Prob > chi^2 = 0.0000) and that, therefore, the random effects approach should be used. There is, therefore, evidence of significant differences between countries.

(b) Once the pooled data approach is discarded, a choice must be made between fixed effects and random effects. To do so, the Hausman test is performed under the null hypothesis that the two estimators do not differ significantly. If this is rejected, the fixed-effects approach is preferable; otherwise, random effects should be chosen due to their greater efficiency. The two models are compared without time dummies, as it is confirmed that the time effect is not relevant in either the random effects model or the fixed-effects model. The results of the Hausman test indicate that the null hypothesis is rejected; therefore, fixed effects should be chosen.

(c) A series of tests are then run on the fixed-effects estimator to correct for problems (Table 4). The Pesaran and Frees tests are used to check for cross-sectional dependence in the errors, with the rejection of the null hypothesis indicating dependence. In both cases, the null hypothesis is rejected, confirming the existence of this problem. Another problem is the presence of autocorrelation or first-order serial correlation. The autocorrelation is verified with the Wooldridge test under the null hypothesis that there is no autocorrelation. The rejection of the hypothesis indicates that there is autocorrelation that must be corrected. The results (Table 4) confirm the need to correct for both these problems, so a first-order autoregressive term (AR-1) is introduced into the fixed-effects model, referred to as the AR-1 model. In addition, the presence of heteroskedasticity in the data is confirmed by means of the modified Wald test under the null hypothesis that there is no heteroskedasticity in the fixed-effects model. The null hypothesis is rejected in this study, confirming the presence of heteroskedasticity. All these problems, which are fairly common in social sciences research, can be solved by the Prais-Winsten transformation through panel-corrected standard errors (PCSE), which is the one recommended for fixed effects [25]. It is assumed that AR-1 autocorrelation is present within the panels and that the coefficients of this process are specific to each group. It is also assumed that the residuals are by default heteroskedastic. Therefore, the optimum model is the Prais-Winsten transformation correcting the standard errors, with the time effect not proving to be significant.

The data in Table 4 confirm the relationship between the dependent variable and independent variables in all cases, albeit with different levels of significance; the only exception is the variable certified forest hectares, which is not significant. Therefore, hypothesis 3 is not confirmed. At 1% significance and with the expected sign, the Transparency Index, the percentage of tree cover loss, the EU construction sector (as a proxy for timber demand) and the distance between the EU and the exporting country are found to be determining factors, confirming the direct link (association) between the activity of the construction sector and EU timber imports; in addition, the inverse relationship between imports and the distance from the exporting country is confirmed. The timber supply and the trade agreements (at 5%) are found to have a weaker influence on the dependent variable and with the opposite sign to the expected one, meaning that the probability of the EU importing is not influenced by the production capacity of the supplier country or the signing of agreements with the EU.

The panel data analysis shows that the transparency levels, the tree cover loss, the demand, (linked to the construction sector) and the distance from the supplier country are the variables that have the biggest influence.

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