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Asymmetry in price transmission between the producer and the consumer prices in the wood sector and the role of imports: The case of Greece

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ABSTRACT

The present paper studies the existence of asymmetry in the price transmission mechanism between the producer and the consumer prices in the sector of forest products. In particular, the research is focused on the round wood of long length (>2 m). For the study of the asymmetry, the Johansen cointegration analysis was used while at the same time two dynamic models were estimated: The Error Correction Model (ECM Model), and the LSE–Henry general to specific model (GETS model). With the assistance of the cointegration technique, we surveyed the existence of a long-run relationship between the producers and the consumers in the Greek round wood market, while the application of the Granger causality test has shown that the consumer price Granger causes the producer price whereas the reverse is not valid. Furthermore, the application of the GETS model confirmed the existence of asymmetry in the price transmission mechanism within the round wood market. Finally, the role of imports in the determination of the producer prices is vital and is confirmed by the findings of the cointegration technique and the Granger causality test.

1. Introduction

The price is considered to be the principal mechanism connecting the different stages of market. The prices of wood and generally of forest products have not been till now a subject of extended study in the case of Greek wood market. Regarding the formation of the consumer price index, the theory of the Purchasing Power Parity is considered to be the dominant theory (Cassel, 1918, 1922; Taylor and Taylor, 2004; Zafeiriou et al., 2004). As far as the producer prices are concerned the profit maximization of the producer is considered to be their determinant mechanism.

The asymmetric price transmission implies that a group is not benefiting from a price reduction (buyers), or increase (sellers) that would under conditions of symmetry have taken place sooner and/or have been of greater magnitude than observed (Meyer and v. Cramon-Taubadel, 2004). This of course affects the distribution of welfare, given that it alters timing or size of the welfare changes connected with price changes. Furthermore, Peltzman (2000), based on his empirical findings, argues that the asymmetry is the rule and not the exception in the markets, implying the existence of gaps in the economic theory.

In most cases the asymmetry in the price transmission (APT) mechanism is expected to be positive, thus any price movement that squeezes the margin is transmitted more rapidly and/or completely than the equivalent movement that stretches the margin (Meyer and v. Cramon-Taubadel, 2004). The negative ATP on the other hand implies that any price movement that stretches the margin is transmitted more rapidly and/or more quickly than a movement that squeezes it. This result has also been observed in real markets (Peltzman, 2000).

The round wood products in most cases are being subject to process and additionally they are not perishable goods of the same degree like food products. Those two features result in a price transmission mechanism of lower speed. Studying the asymmetry in the price transmission mechanism, the operation of the market can become predictable based on the rational behavior of the economic agents (Reziti and Panagopoulos, 2008). Aiming at the empirical study of the asymmetric price transmission, different empirical models have been used. In our study, the ECM–EG approach and the LSE–Hendry general-to-specific approach was applied. The GETS model has not been applied before in the sector of agricultural products (Reziti and Panagopoulos, 2008). In the case of the agricultural products, the models mainly used are the Vector Error Correction Model (VECM), and the autoregression vectors (VAR models).

The GETS approach is not considered a popular methodology, and is less preferable than VAR and cointegrating VAR approaches (Rao and Rao, 2005a,b). However, Hoover and Perez (1999, 2004), confirm with the assistance of the Monte Carlo test that GETS is a useful approach given that it is used properly.

The GETS model is being criticized quite often (Hendry, 1993) because the prices used are considered to be cointegrated under

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assumption, without having been tested before. Additionally, GETS is being subject to criticisms for mixing $I(0)$ to $I(1)$ variables. This argument is not valid given that GETS model accepts the existence of the relationship between the dependent and the explanatory variables in their levels. Due to this fact, the levels of the variables are regarded as cointegrated and consequently their linear combination is $I(0)$ (Hendry, 1993; Hendry and Krolzig, 2005).

The asymmetric price transmission mechanism is possibly related to the high volume of imports, necessary to satisfy the increasing demand for round wood products. The low market share of the domestic production leads to particularities in the domestic round wood market. To be more specific the domestic producers behave as price takers due to the existent market conditions. The domestic producers thus, cannot impose a pricing policy based on the profit maximization condition given that they have to comply with the pricing policy determined by the countries that export in the Greek round wood market in order the domestic products to be competitive. What has also to be mentioned is that the supply of the domestic production is taking place through auctions. The participants of the auctions through which the producer prices are formatted in Greece are middlemen who also have the potential to import the needed quantities a fact that provides them the possibility to choose as suppliers the producers who offer the best price (either domestic or foreign producers). That is a significant obstacle for the domestic producers to impose their own pricing policy without having in mind potential losses in market share.

Consequently, in the market under preview the existence of asymmetry in the price transmission mechanism is an expected result. The objective of this paper is to confirm or to reject the existence of ATP in the Greek round wood market with the estimation of the two models described above. Furthermore, the present paper surveys the role of imports with the application of the cointegration technique, while it implements a Vector Error Correction Model in order to determine the speed with which the system is moving to the long-term equilibrium. Finally, the Granger causality test was applied in order to examine the direction of the causality between the imported volume of round-wood and the consumer and the producer prices.

The paper is organized as follows;

Section 2 describes the situation in the Greek wood sector, Section 3 gives an insight to the literature review, Section 4 refers to the data and methodology applied for the empirical study, Section 5 describes the results of this study and finally Section 6 concludes.

2. Forests and wood market in Greece

In Greece only one national forest census (the first) was realized, based on scientific methods while its results were published in 1992 (Ministry of Agriculture, 1992). According to this census, forests cover 3,358,000 ha in Greece, which corresponds to 25.4% of the total area of the country. 42.57% of this area is covered with coniferous species while the remaining 57.43% is covered with broadleaved forests. Regarding the proprietary regime, approximately 2/3 or 65.4% are state and the rest 34.6% are non-state forests and belong to private entities, local authorities, monasteries and other social welfare organizations (Ministry of Agriculture, 1992; Philipou and Lefakis, 1997; Ioannou et al., forthcoming; Arabatzis, 2005). The productivity of the Greek forests is low, compared to the average productivity of other forests in Europe. Their status regarding density, height and stock volume quality is not in a satisfactory level, mainly due to man-made interventions on the environment, such as forest fires, illegal logging, and also due to lack of systematic forest cultivation (Ministry of Agriculture, 2000).

Within the last decades the fires constitute the biggest threat to Greek forests causing a number of negative effects to them and especially to the drought resistant forest species of the Mediterranean vegetation zone (Ministry of Agriculture, 2000). The most important negative effect is timber value reduction affecting consequently the prices of the wood products. The size of this problem is presented in Table 1.

Table 1
Areas of forest and other wooded land destroyed by fires

	Total forest area (ha)
1976–1985 (ha)	403,809
1987–1996	491,366
1997–2005	365,207

Source; Ministry of Agriculture, 2000; Ministry of Rural Development and Food, 2006.

According to the results given above there has been a significant increase in the areas destroyed by fires within the second period studied. On the contrary within the last decade studied the area destroyed by fire has been limited (Ministry of Agriculture, 2000; Ministry of Rural Development and Food, 2006).

Consequently, fires as well as other factors have lead to a significant decrease in the wood production of Greek forests. To be more specific in 2005 the total wood production reaches the amount of 1,601,000 transformed in cubic meters of round wood against the 2,789,000 cubic meters of round wood in 1988. The quantity of the raw material produced by the Greek forests for further processing and the supply of the forest industries does not overcome during the last decades the 30–35% of the total quantity used (Ministry of Rural Development and Food, 2006). Thus, the imports in wood and wood products have affected strongly the trade balance (Ministry of Rural Development and Food, 2006; Albanis et al., 1985).

The industrial wood production within the time period 1922–1960 was in levels lower than 0.5 millions cubic meters while after the year 1960 it was ranged within an interval 0.5 and 1 million cubic meters. Within the current decade the production has returned in level of 0.5 millions cubic meters. The apparent consumption in the last decade overcomes the 1.5 millions cubic meters. This implies that the greater percentage of consumption was covered by imports throughout the whole time period from 1922 till today. To be more specific the imports in industrial wood until the middle of 1980 were estimated to 1.0 cubic meters after the year 1986 have reached to 1.5 millions cubic meters. Obviously, the country's dependence on foreign wood products is extremely great (Ministry of Rural Development and Food, 2006; Stamou, 2006).

Regarding the supply of the wood products in Greece and consequently of the round wood, three main systems are in valid. The first system involves self-supervision of the cultivation and supply process (logging, harvesting and others) by the local Forest Services (State Forest Farms), within the framework of the State Forest Exploitation (KED, from the Greek acronyms), the second one involved leasing of the forest's production (timber logging) to forest labor cooperatives, or following an auction with interested parties. Finally, the third system was introduced in the year 1986 (P.D.126/86), according which the exploitation of state forests is conceded to Rural Forest Cooperatives that pay a certain rate based on the selling price of the forest products, irrespective of product type (Tororis, 1994). Today, all the three systems are in valid regarding the supply of the wood products.

The State Forest Farms that conduct the auctions of the quantities of wood take place in different locations of Greece. The mean prices are determined in the aforementioned auctions (by the State Forest Farms) are negotiating prices and involve the supply of wood either from non-state forests or for the wood that is logged, harvested and traded by the Rural Forest Cooperatives (Anagnos and Stamou, 1981). The price of wood that is supplied by the State Forest Farms is formatted through the free competition among the candidate buyers and takes place through auctions that are organized by the Regional Forest Services (Stamou, 1985).

Within the framework of the European Union a number of regulations, decisions and directives were issued regarding the modernization of the wood processing and trade, the classification of raw wood and others. Furthermore, in Greece, the development of the wood sector is