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Trade in Raw and Semi-Finished Wood Products of Hungary and Slovenia with Austria

Ungarischer und Slowenischer Handels von Rohprodukten und Halbfertigwaren aus Holz mit Österreich

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Key words: Trade in raw and semi-finished wood products, price competition, quality competition, two-way trade, one-way trade, trade stability, Central Europe

Schlagworte: Handel von Rohprodukten und Halbfertigwaren aus Holz, Preis- und Qualitätswettbewerb, bi- und unidirektionaler Handel, Handelsstabilität, Mitteleuropa

Summary

The paper investigates price, quality, and non-price competition of Hungarian and Slovenian trade with Austria focusing on trade in raw and semi-finished wood products during the period 1993-2003. Trade in raw and semi-finished wood products takes a significant share in the agro-food, raw and semi-finished wood products trade of Hungary and Slovenia, respectively, with Austria. Hungary is a net exporter of raw and semi-finished wood products to Austria at lower export-to-import unit values of similar raw and semi-finished wood products in trade between the same countries. Slovenia is a net importer of raw and semi-finished wood products from Austria at higher export-to-import unit values of similar raw and semi-finished wood products between the same countries. In Hungarian matched two-way trade in raw and semi-finished wood products with Austria the prevalence is on trade surplus at lower export-to-import unit value. In Slovenian matched two-way wood trade in raw and semi-finished wood products with Austria

the prevalence is on trade deficit at higher export-to-import unit value. The results imply the importance of factors of comparative trade advantages or disadvantages in particular raw and semi-finished wood products trade groups that are related to natural forest factor endowments and wood industry restructuring and marketing chain modernization.

Zusammenfassung

Das Papier untersucht Preise, Qualitäten und nicht preislichen Wettbewerb des ungarischen und slowenischen Handels von Roh- und Halbfertigwaren aus Holz mit Österreich im Zeitraum von 1993-2003. Für beide Länder hat dieser Warenaustausch mit Österreich einen bedeutenden Anteil am Handel mit Gütern der Agrar- und Ernährungswirtschaft. Die Handelsströme zwischen Ungarn und Österreich haben einen bidirektionalen Charakter. Ungarn ist ein Netto-Exporteur von Rohstoffen und Halbwaren aus Holzprodukten nach Österreich. Beim intra-industriellen Handel, d. h. Handel mit ähnlichen Produkten, sind allerdings Preisunterschiede zu Ungunsten Ungarns festzustellen. Auch der Handel von Holzprodukten Slowenien und Österreich ist bidirektional. Slowenien ist allerdings ein Netto-Importeur von Holzprodukten. Im Gegensatz zu Ungarn kann Slowenien beim intra-industriellen Handel aber höhere Preise für exportierte Güter erzielen als es für den Import zahlt. Die Ergebnisse implizieren, dass der Handel entsprechend der komparativen Kosten vor- und Nachteile erfährt. Diese resultieren sowohl aus der natürlichen Faktorausstattung als auch aus der Umstrukturierung der Holzindustrie einschließlich der Einführung moderner Marketingstrategien innerhalb der Wertschöpfungskette.

1 Introduction

During the recent years one of the strengths in applied trade literature is in investigating trade competition and trade comparative advantages in order to analyze the extent of trade specialization, price competition and quality competition, significance and directions of one-way trade (see GREENAWAY, et al., 1994; AIGINGER, 1997; GEHLHAR and PICK, 2002; IVANKOVIC, et al., 2005; BOJNEC and FERTO, 2008, 2012). In Central Europe, such research has been stimulated by investigating the catching-up process in successful trade competition between new and old European Union (EU) member states (see BOJNEC and FERTO, 2007). While one might expect that trade opening, free trade and association agreements, and economic integration in EU would have determined substantial changes in structures of trade flows and trade competition, there are rare studies on trade compe-

tition potentially caused by these processes (see BOJNEC and FERTO, 2006a and 2006b).

The objective of this article is to investigate trade competition between old and new EU-members states, focusing on Austrian bilateral trade in raw and semi-finished wood products with Hungary and Slovenia, respectively. Except for the study by DIETER and ENGLERT (2007) on Germany's competitiveness in the global forest industry trade, there is no study to investigate wood international trade competition between old and new EU-members states. The research goal is to identify possible similarities and differences in competition in Austrian bilateral trade in raw and semi-finished wood products with Hungary and Slovenia, respectively. Raw and semi-finished wood products are selected because they are a consistent part of the EU-COMMISSION'S (1999) definition of agro-food, raw and semi-finished wood products (AFWPs) trade, which is also important for agro-food, forestry and wood sectors in rural development.

To investigate trade competition, we combine literature on intra-industry trade (GREENAWAY at al., 1994) with literature on export-to-import unit values and trade balance approach (AIGINGER, 1997; ULFF and NIELSEN, 2000; GEHLHAR and PICK, 2002; BOJNEC and FERTO, 2008). Export-to-import unit values indicate price or quality product differences between exported and imported products, while trade balance indicates successful/unsuccessful international trade competition.

Several studies have investigated the determinants of international trade developments (e.g. KRUGMAN, 1980; LANGE, 1989; LUNDBECK and TORS- TENSSON, 1998; FERTO, 2004 and 2005). Theory suggests that among the determinants of international trade between pairs of countries there is geographical proximity with common history and borders (see KRUGMAN, 1991; DAVIS and WEINSTEIN, 1996; EICHENGREEN and IRWIN, 1998; MAN- CHIN and PINNA, 2003). Even in a global world, most of trade is often between the neighbouring countries within the region. This is the reason why we select the neighbouring countries, i.e., Austria, Hungary and Slovenia, which in-depth are analyzed for trade competition in raw and semi-finished wood products.

However, both the historical reasons and geographical proximity for trade specialization and trade development between these three Central European countries were interrupted for several decades of the 20th century (particularly during the years 1945-1989), but have been re-established largely since the beginning of the 1990s, the period which is covered by our empirical analysis. Trade patterns and trade competition are analyzed in the

case of trade in raw and semi-finished wood products of Austria with Hungary and Slovenia, respectively. With institutional changes and structural adjustment policies, trade in raw and semi-finished wood products might occur as a significant exported product. Exports in lower quality products might be from a less wood-processing developed country, while imports in higher quality products might be from a more wood-processing developed country.

We first present the methodology and data used to investigate competition in two-way trade and one-way trade structures and their dynamics. This approach to trade competition measures is used because our focus is on trade competition developments in terms of trade balance and price gaps, rather than on relative trade comparative advantage measures (e.g. DIETER and ENGLERT, 2007). The duration of trade competition over time is analyzed by the survival analysis, using the nonparametric Kaplan-Meier product limit estimator (JENKINS, 2005). Next, we empirically investigate the magnitude and dynamics of trade in raw and semi-finished wood products of Hungary and Slovenia, respectively, with Austria, during the transition liberalisation processes that in Hungary and Slovenia were associated with institutional changes in privatisation, restitution and structural adjustment policies as well as their adjustments for EU membership. We analyze trade competition focusing on the most significant raw and semi-finished wood products in bilateral trade. Due to institutional changes in Slovenia and Hungary and the forest land restitution to the former owners, these processes may encourage more intensive cutting of forest before the restitution. So it may lead to an increase of trade in raw and semi-finished wood products with the neighbouring Austria. This can be also encouraged by the liberalization of trade for wood products, as well as by the entry of foreign direct investors in wood processing and marketing chains in Hungary and Slovenia. Following this, the survival analysis is conducted to assess the survival and duration in trade competition for Hungary and Slovenia, respectively, with Austria. Finally, we summarize the main findings and derive policy implications of relevance for policy makers, traders, and processors as well as for domestic and international raw and semi-finished wood products marketing businesses.

2 Methodology and Data Used

Trade competition in this paper is analyzed by trade competition types and their duration over time by employing unit values of exports and imports and trade balance by-products and the Kaplan-Meier estimator of the survival function. Following AINGINGER (1997), GEHLHAR and PICK (2002), and BOJNEC and FERTO (2008), we employ the unit export-to-import value dif-

ference and the trade balance by raw and semi-finished wood products to categorize trade flows in four competition categories in the matched two-way trade flows:

Category 1. Successful price competition: $TB_{i,j} > 0$ and $UVD_{i,j} < 0$.

Category 2. Unsuccessful price competition: $TB_{i,j} < 0$ and $UVD_{i,j} > 0$.

Category 3. Successful quality competition: $TB_{i,j} > 0$ and $UVD_{i,j} > 0$.

Category 4. Unsuccessful quality competition: $TB_{i,j} < 0$ and $UVD_{i,j} < 0$.

The symbols denote: the trade balance (TB) is the difference between the value of the i -th raw and semi-finished wood product exports from a home country (in our case Hungary and Slovenia, respectively) to the j -th partner country (in our case Austria) ($X_{i,j}$) and the value of the i -th raw and semi-finished wood product imports to the home country from the j -th partner country ($M_{i,j}$). The unit export-to-import value difference (UVD) is calculated as the difference between the export unit value and the import unit value for raw and semi-finished wood products. Trade balances indicate successful or unsuccessful competition in bilateral trade, and export-to-import unit value differences determine price or quality competition advantages in the two-way matched bilateral trade, i.e. the successful or unsuccessful means for a certain product bilateral trade between countries i and j . The main reasons for this successful or unsuccessful competition can be different, including for example the non-availability of raw and semi-finished wood products in an importing country j , which can import the same product also from other countries in the world, not only from an exporting country i . Therefore, on the market of the importing country j the exporting country i can face competition from other countries in the world, which can substitute this export from a country i to a country j .

The four competition categories (categories from 1 to 4) are applied only on the two-way trade flows satisfying the simultaneous conditions of the unit export-to-import value difference and the trade balance by raw and semi-finished wood product. In the two-way trade flows, in the first and third categories the home country i is successful in price competition (trade surplus at lower export than import unit value) and in quality competition (trade surplus at higher export than import unit value), respectively, and vice versa in the second and fourth categories, where the home country is unsuccessful in price competition (trade deficit at higher export than import unit value) and in quality competition (trade deficit at lower export than import unit value).

In addition, we also present the one-way trade, which can be either one-way export or one-way import:

Only export category: $TB_{i,j} > 0$ (or $X_{i,j} > 0$, $M_{i,j} = 0$).

Only import category: $TB_{i,j} > 0$ (or $X_{i,j} = 0$, $M_{i,j} > 0$).

We also focus on the duration of successful trade competition categories (successful price competition category 1 and successful quality competition category 3) and one-way export over time by the survival function analysis (JENKINS, 2005). The duration analysis of trade competition categories is estimated by the survival function, $S(t)$, by using the nonparametric Kaplan-Meier product limit estimator of the survival function. We assume that a sample contains n independent observations denoted $(t_i; c_i)$, where $i = 1, 2, \dots, n$, t_i is the survival time, and c_i is the censoring indicator variable C taking a value of 1 if failure occurred, and 0 otherwise of observation i . We define the failure when a country has lost its trade competition for a particular product group, e.g. Hungary lost its successful price competition position in raw and semi-finished wood products. We also assume that there are $m < n$ recorded times of failure. The rank-ordered survival times are denoted as $t_{(1)} < t_{(2)} < \dots < t_{(m)}$, while n_j denotes the number of subjects at risk of failing at $t_{(j)}$, and d_j denotes the number of observed failures. The Kaplan-Meier estimator of the survival function is then:

$$\hat{S}(t) = \prod_{t^{(j)} < t} \frac{n_j - d_j}{n_j}$$

with the convention that $\hat{S}(t)=1$ if $t < t_{(1)}$. Given that many observations are censored, we then note that the Kaplan-Meier estimator is robust to censoring and uses information from both censored and non-censored observations. To check the equality of survival functions, the Wilcoxon non-parametric log-rank test is used (CLEVES et al., 2004). To conduct the empirical analysis on trade competition types for bilateral trade in raw and semi-finished wood products of Austria with Hungary and Slovenia, respectively, we use detailed trade data from the Organisation for Economic Cooperation and Development (OECD) by the years 1993-2003. The trade in raw and semi-finished wood products is defined by EU-COMMISSION (1999) together with the AFWPs trade at four-digit level in the Standard International Trade Classification (SITC) system. More specifically, the AFWPs sample consists of 255 items at four-digit level in the SITC system.

3 Empirical Results

3.1 Trade by Competition Types

Trade in raw and semi-finished wood products by EU-COMMISSION (1999) definition is presented together with AFWPs trade. Therefore, we first present developments in trade patterns in AFWPs of Austria with Hungary and Slovenia, respectively, by price and quality competition categories and one-way trade. The raw and semi-finished wood products trade is analyzed together with AFWPs trade to underline the importance of these trades in overall AFWPs trade, which are important for the agro-food, forestry and wood sectors in rural developments.

Looking at bilateral AFWPs trade, Hungary experiences surplus, whereas Slovenia experiences deficit in this trade with Austria. We analyze both two-way trade and one-way trade. The two-way trade dominates in Hungarian and Slovenian, respectively, bilateral trade with Austria, but the proportion of the two-way trade for Hungary with Austria is slightly higher than for Slovenia with Austria (BOJNEC and FERTO, 2006a). This is also confirmed by the recorded results on export/import developments and on the distribution of trade competition types in Tables 1 and 2. Trade competition categories from 1 to 4 are presented with Hungary and Slovenia, respectively, as the base trade destinations.

There are cyclical oscillations in the Hungarian AFWPs exports to Austria, whereas the similar imports from Austria to Hungary have declined. This indicates an increase in the Hungarian trade surplus, particularly due to the increase of exports caused by the successful quality competition (category 3) and to a lesser extent by the one-way exports. However, the successful price competition (category 1) deteriorated during the 1990s, but recovered slightly during the most recent analyzed year. In the Hungarian imports from Austria, the unsuccessful price competition (category 2) has become more significant than the unsuccessful quality competition (category 4), which is the least significant category in Hungarian two-way trade with Austria. There is also an increase in the one-way imports from Austria to Hungary.

Therefore, Hungarian trade with Austria has been catching-up in the successful quality competition (category 3) in the two-way trade flows. Within the Hungarian two-way trade with Austria, there is a shift away from successful price competition (category 1) towards successful quality competition (category 3), which has increased over time and thus has strengthened its significance.

Table 1: Competition Categories in Agro-Food, Raw and Semi-Finished Wood Products (AFWPs) Trade of Hungary with Austria, 1993-2003.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total AFWP exports (million dollars)											
Category 1	143.0	66.2	70.5	47.6	87.0	73.7	83.3	84.4	70.5	70.8	105.9
Category 2	6.9	2.5	10.7	5.8	1.7	6.7	1.8	2.7	11.0	7.8	12.2
Category 3	25.6	75.4	80.8	110.8	98.9	90.7	93.6	85.8	82.8	90.3	85.2
Category 4	3.8	4.0	3.0	3.5	8.9	10.4	8.9	9.5	3.1	5.6	1.3
One-way exports	24.6	24.7	16.0	17.9	9.6	3.4	16.2	18.5	20.0	23.9	38.1
Total AFWP exports	204.0	172.9	180.9	185.6	206.1	184.8	203.8	200.9	187.4	198.3	242.7
Total AFWP imports (million dollars)											
Category 1	13.6	12.3	16.2	9.1	6.4	4.6	15.0	7.7	3.9	3.7	5.0
Category 2	35.6	29.9	43.7	35.0	13.4	20.3	14.7	8.2	23.4	16.2	26.8
Category 3	5.6	4.8	5.4	20.4	12.1	9.0	8.2	5.7	5.8	6.5	12.3
Category 4	32.7	24.6	20.0	24.0	28.4	31.7	22.0	25.1	17.0	18.1	7.3
One-way imports	6.3	16.6	18.9	8.9	8.8	8.1	11.9	9.1	5.8	9.3	12.7
Total AFWP imports	93.8	88.2	104.3	97.4	69.1	73.7	71.7	55.8	55.8	53.7	64.1
Export share (in %)*	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Category 1	70.1	38.3	38.9	25.6	42.2	39.9	40.9	42.0	37.6	35.7	43.6
Category 2	3.4	1.5	5.9	3.1	0.8	3.6	0.9	1.3	5.9	3.9	5.0
Category 3	12.6	43.6	44.7	59.7	48.0	49.1	45.9	42.7	44.2	45.6	35.1
Category 4	1.9	2.3	1.6	1.9	4.3	5.6	4.4	4.7	1.6	2.8	0.5
One-way exports	12.1	14.3	8.8	9.7	4.6	1.8	7.9	9.2	10.7	12.0	15.7
Import share (in %)*	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Category 1	14.5	14.0	15.6	9.4	9.3	6.3	20.9	13.8	6.9	6.9	7.8
Category 2	38.0	33.9	41.9	35.9	19.4	27.5	20.5	14.8	41.9	30.2	41.8
Category 3	5.9	5.4	5.2	20.9	17.5	12.3	11.4	10.2	10.3	12.0	19.2
Category 4	34.9	27.9	19.2	24.6	41.0	42.9	30.7	44.9	30.5	33.6	11.4
One-way imports	6.7	18.8	18.1	9.2	12.7	11.0	16.7	16.3	10.3	17.3	19.8
* Export share in % of total AFWP exports. Import share in % of total AFWP imports. Source: Own calculations based on OECD database.											

Table 2: Competition Categories in AFWPS Trade of Slovenia with Austria, 1993-2003.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total AFWP exports (million dollars)											
Category 1	10.5	8.2	8.5	6.2	7.6	14.4	12.6	11.5	11.8	11.4	16.0
Category 2	6.0	4.6	4.3	2.7	3.9	4.3	3.6	2.3	2.5	2.2	2.9
Category 3	1.0	4.3	3.0	4.9	3.0	0.4	2.1	0.2	2.4	3.6	3.9
Category 4	2.1	1.5	2.2	1.7	2.0	3.4	1.9	1.1	1.8	1.7	2.4
One-way exports	2.2	1.1	1.9	1.8	0.5	0.7	8.1	6.1	0.0	0.0	3.9
Total AFWP exports	21.7	19.7	20.0	17.5	17.0	23.2	28.3	21.2	18.4	18.9	29.1
Total AFWP imports (million dollars)											
Category 1	2.7	2.0	1.8	1.5	1.9	3.0	3.0	3.0	2.6	3.1	5.5
Category 2	35.5	29.1	48.6	36.8	53.4	43.9	55.0	49.0	62.8	72.2	90.3
Category 3	0.5	1.4	0.6	1.0	0.2	0.2	0.5	0.1	0.3	1.8	1.7
Category 4	18.1	30.4	33.8	23.3	26.2	40.6	25.7	14.5	14.7	17.5	16.0
One-way imports	36.7	67.6	37.2	57.7	54.7	37.5	45.1	48.3	50.7	53.3	38.9
Total AFWP imports	93.6	130.5	122.0	120.3	136.4	125.2	129.2	114.9	131.1	147.9	152.3
Export share (in %)*	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Category 1	48.1	41.4	42.8	35.8	44.6	61.9	44.5	54.2	64.0	60.4	55.0
Category 2	27.7	23.3	21.6	15.7	23.0	18.7	12.6	10.8	13.7	11.4	10.1
Category 3	4.7	21.9	15.0	28.2	17.4	1.5	7.4	1.1	12.8	19.1	13.4
Category 4	9.5	7.8	11.0	9.9	11.8	14.7	6.8	5.4	9.5	9.1	8.2
One-way exports	10.0	5.5	9.6	10.5	3.2	3.2	28.6	28.6	0.1	0.1	13.3
Import share (in %)*	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Category 1	2.9	1.5	1.5	1.3	1.4	2.4	2.3	2.6	2.0	2.1	3.6
Category 2	38.0	22.3	39.8	30.6	39.2	35.1	42.6	42.6	47.9	48.8	59.3
Category 3	0.6	1.1	0.5	0.9	0.2	0.1	0.4	0.1	0.2	1.2	1.1
Category 4	19.3	23.3	27.7	19.4	19.2	32.4	19.9	12.6	11.2	11.8	10.5
One-way imports	39.3	51.8	30.5	47.9	40.1	30.0	34.9	42.1	38.7	36.0	25.5
* Export share in % of total AFWP exports. Import share in % of total AFWP imports. Source: Own calculations based on OECD database.											

These development patterns of successful quality competition in category 3 occurred when the Hungarian trade surplus was achieved under a higher

export than import unit value pertaining to the higher quality of exported than imported similar products.

In AFWPS trade between Slovenia and Austria there is the significantly increasing gap between the much larger Slovenian imports from Austria than the Slovenian exports to Austria. In the Slovenian AFWPs exports to Austria the most significant factor is the successful price competition (category 1), whereas the unsuccessful price competition (category 2) is the most significant in the Slovenian imports from Austria. The successful quality competition (category 3) is relatively less significant in Slovenian AFWPs exports to Austria, indicating difficulties in the Slovenian AFWP sectors to find quality and niche export products in the neighbouring Austrian markets. Yet, the unsuccessful quality competition (category 4) is much more significant than the successful quality competition (category 3) in the Slovenian two-way trade with Austria.

3.2 Importance of Trade in Main Raw and Semi-Finished Wood Products

The impacts of institutional changes, transition and structural adjustment policies on forest management, forests and wood trade have been largely observed in different transition and third world debt countries (see REED, 1996; KAHN and MCDONALD, 1998; KAIMOWITZ et al., 1998; YUNUSOVA, et. al., 2003). Transition factors might be one of the reasons that have determined the raw and semi-finished wood products trade of Austria with Hungary and Slovenia. The raw and semi-finished wood products trade plays important role in the overall AFWPs trade of Hungary and Slovenia, respectively, with Austria. Among the five most significant single traded AFWPs in the four-digit SITC product groups of Austria with Hungary and Slovenia, respectively, are raw and semi-finished wood products (BOJNEC and FERTO, 2007).

In Hungarian AFWPs in exports to Austria, there are ranked three raw and semi-finished wood related products among the five most significant four-digit SITC exported products: the most significant, but tending to decline over time, is SITC 2475 - wood, non-coniferous, in the rough, not treated, which is included due to successful price competition (category 1). Then there is SITC 2474 - wood, coniferous species, in the rough, not treated, which is included due to successful price competition (category 1); and SITC 2450 - fuel wood (excluding wood waste) and charcoal due to one-way exports, which is tending to decline. Hungarian raw and semi-finished wood products in imports from Austria are less significant than exports, but they are indeed among the five most significant four-digit SITC imported products. However, this trade is not in the same product categories, but in SITC 2482

- wood of coniferous species, sawn, sliced, thickness greater than 6mm. This trade has deteriorated over time. Initially, this trade occurred in the competition category 2 of unsuccessful price competition, but most recently in successful price competition category 1, which indicates price competition improvements in Hungarian raw and semi-finished wood industry products as a result of forest and wood industry restructuring and wood industry modernization.

These Hungarian raw and semi-finished wood products trade developments during the country's transition process from a central planning to a market economy and adjustment to the EU membership between Hungary and Austria, on the one hand, can be explained by the initial more intensive Hungarian exports of raw and semi-finished wood products, which can be due to institutional and policy changes in Hungary, such as the restitution process of forest land to the former owners. On the other hand, Hungarian imports of higher quality raw and semi-finished wood products can be a result both of consumer demands and of the appearance of Austrian and western wood supply chains for raw and semi-finished wood products on the Hungarian markets.

Similarly to the Hungarian raw and semi-finished wood products trade developments with Austria, the first five most significant four-digit SITC AFWP groups have changed across time, but raw and semi-finished wood products have remained among the most significant product categories in bilateral Slovenian-Austrian AFWPs trade. Among the five most significant four-digit SITC AFWPs in the Slovenian exports to Austria are three raw and semi-finished wood related products: SITC 2482 - wood of coniferous species, sawn, sliced, thickness greater than 6mm in the category 2 of unsuccessful price competition as a reason that this trade has deteriorated significantly over time; SITC 2484 - non-coniferous wood, sawn lengthwise, thickness greater than 6mm in the category 1 of successful price competition as a reason for its significant increase over time; and SITC 2474 - wood, coniferous species, in the rough, not treated, which shifts from successful price competition category 1 to successful quality competition category 3 as a reason for its increase over time. On the Slovenian import side from Austria, SITC 2482 - wood of coniferous species, sawn, sliced, and thickness greater than 6mm is due to unsuccessful Slovenian price competition category 2, which is far the most significant single product group among imported traded AFWPs from Austria. This import is encouraged by consumer and construction demands that are also related to the occurrence of foreign wood supply chains and supermarkets on the Slovenian markets such as Bauhaus and Baumax. This finding is consistent with Rauch (2005) on the importance of supply chain management and inter-organisational process orientation in

the supply chain as a key factor for business competitiveness in multi-stage value chains.

Comparison of Tables 1 and 3 clearly reveals the significance of raw and semi-finished wood products in Hungarian AFWPs exports to Austria. There is a decline for the most significant product groups SITC 2475 – wood, non-coniferous, in the rough, not treated, as well as for SITC 2450 – fuel wood (excluding wood waste), but a more stable level is found for SITC 2474 – wood, coniferous species, in the rough, not treated, and a slight increase is found for SITC 2482 – wood of coniferous species, sawn, sliced, thickness greater than 6mm. The latter raw and semi-finished wood product group appears also among the most significant imports, but since 1999 and except for 2002 at the levels than exports.

The ratio of export-to-import unit values is less than one, and tends to decline further for SITC 2474 – wood, coniferous species, in the rough, not treated. The deterioration in export-to-import unit values is also seen for the most significant product group SITC 2475 – wood, non-coniferous, in the rough, not treated, as well as for SITC 2482 – wood of coniferous species, sawn, sliced, thickness greater than 6mm. These patterns in price or quality developments indicate that, except for some years, Hungary exported raw and semi-finished wood products to Austria at lower prices than those for importing them from Austria, indicating a lower quality of Hungarian raw and semi-finished wood product exports than imports. Lower quality and thus cheaper raw and semi-finished wood products exports from Hungary to Austria can be structurally driven by the surplus of low raw and semi-finished wood products quality in Hungary in exchange for higher quality of imports from Austria to Hungary. On the supply side in Hungary, this may be caused by excessive forest cutting, but on the demand side demands may also be driven by better supply chain management by emerging wood supply chains and supermarkets and special raw and semi-finished wood products shops for diversified customer needs.

By raw and semi-finished wood products trade size, the Slovenian raw and semi-finished wood products exports to Austria are lower than the Hungarian raw and semi-finished wood products exports to Austria. However, Slovenia is a significant importer from Austria of SITC 2482 – wood of coniferous species, sawn, sliced, thickness greater than 6mm, which is increasing. These Slovenian imports from Austria at lower import than export values from Slovenia to Austria indicate a higher quality of Slovenian exports than similar imports, but vice versa hold for SITC 2484 – non-coniferous wood, sawn lengthwise, thickness greater than 6mm. It is interesting to note that for SITC 2482 – wood of coniferous species, sawn, sliced, thickness greater

than 6mm, for these wood products in exports to Austrian markets Slovenia achieved in some years higher and in some years lower prices than Hungary, but Slovenia imported from Austria much cheaper similar raw and semi-finished wood products than did Hungary, which suggests differences in quality, but also possible efficiency differences in international wood raw and semi-finished products' marketing.

Table 3: Competition Categories in Raw and Semi-Finished Wood Products Trade of Hungary and Slovenia with Austria, 1993-2003.

Hungary-Austria	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Export values (million dollars)											
2474: Wood, coniferous species, in the rough, not treated	8.6	6.3	4.9	-	7.7	6.0	8.0	8.1	9.4	9.3	9.1
2475: Wood, non-coniferous, in the rough, not treated	19.8	11.9	13.9	22.6	13.2	13.1	12.7	14.2	12.0	12.7	13.4
2450: Fuel wood (excluding wood waste) and charcoal	8.1	7.8	5.7	6.4	7.4	6.5	5.8	5.8	5.7	5.6	5.2
2482: Wood of coniferous species, sawn, sliced, thickness > 6mm	1.1	0.7	0.8	0.6	0.7	1.6	1.8	2.4	1.6	1.2	5.3
Import values (million dollars)											
2474: Wood, coniferous species, in the rough, not treated	1.4	0.2	0.1	0.3	0.3	0.02	0.01	0.01	0.01	0.06	0.01
2475: Wood, non-coniferous, in the rough, not treated	0.5	0.01	0.5	0.02	0.0	0.0	0.1	0.1	0.3	0.1	0.1
2450: Fuel wood (excluding wood waste) and charcoal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2482: Wood of coniferous species, sawn, sliced, thickness > 6mm	8.7	7.1	8.5	8.9	3.8	2.0	1.8	1.5	1.2	1.3	1.7
Export-to-import unit values											
2474: Wood, coniferous species, in the rough, not treated	0.62	0.60	0.61	0.00	0.55	0.36	0.22	0.40	0.41	0.29	0.24
2475: Wood, non-coniferous, in the rough, not treated	0.91	3.24	0.39	2.62	4.07	0.82	1.19	0.76	0.47	0.58	0.60
2450: Fuel wood (excluding wood waste) and charcoal	-	-	1.32	-	0.09	0.58	-	-	-	-	-
2482: Wood of coniferous species, sawn, sliced, thickness > 6mm	1.43	0.85	0.89	1.10	1.08	1.22	0.53	0.51	0.67	1.10	0.92

Slovenia-Austria see next page.

Slovenia-Austria	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Export values (million dollars)											
2482: Wood of coniferous species, sawn, sliced, thickness> 6mm	4.8	3.5	3.0	1.9	1.6	1.3	1.2	1.1	1.1	1.3	2.0
2484: Non-coniferous wood, sawn lengthwise, thickness>6mm	2.2	3.0	5.1	3.7	2.9	3.4	4.5	4.8	3.7	3.3	4.5
Import values (million dollars)											
2482: Wood of coniferous species, sawn, sliced, thickness> 6mm	22.9	17.0	26.1	24.6	28.5	21.0	23.5	30.7	29.4	37.4	32.3
2484: Non-coniferous wood, sawn lengthwise, thickness>6mm	1.1	1.1	1.0	0.9	1.1	1.1	1.4	1.2	1.2	1.8	2.2
Export-to-import unit values											
2482: Wood of coniferous species, sawn, sliced, thickness> 6mm	1.55	1.33	1.64	1.48	1.64	1.76	1.71	1.56	1.65	1.43	1.50
2484: Non-coniferous wood, sawn lengthwise, thickness>6mm	0.65	0.49	0.41	0.40	0.57	0.48	0.58	0.66	0.63	0.69	0.67
2482: Ratio of Slovenia vs. Hungary											
Ratio of export unit values	0.66	0.95	1.11	0.70	0.71	0.79	1.38	1.34	1.30	0.77	1.01
Ratio of import unit values	0.61	0.61	0.60	0.52	0.47	0.55	0.43	0.43	0.53	0.59	0.62
Source: Own calculations based on OECD database.											

3.3 Survival Analysis

We test the duration of trade competition categories over time using the Kaplan-Meier survival functions together for AFWPs trade. Table 4 reports the Kaplan-Meier survival rates for the years 1, 6 and 11 for successful price competition (category 1), successful quality competition (category 3), and one-way exports.

Our results confirm that the survival rates for Hungary are higher than for Slovenia, indicating a longer duration of Hungarian successful competition categories than Slovenian ones. The duration of successful price competition (category 1) is longer than the duration of the successful quality competition (category 3) and one way export categories for both countries, which is related to factors of comparative advantages and trade competitiveness, such as factor endowments and structural determinants for long-term sustainability of successful trade competition. The Wilcoxon test shows that the survival functions differ statistically only for aggregated successful com-

petitiveness (sum of categories 1 and 3 and one-way trade) and separately for successful price competition (category 1).

Table 4: Kaplan-Meier Survival Rates for Successful Trade Competition Categories and One-Way Export.

Hungary	1 year	6 year	11 year
Categories 1 and 3 and One-way export	0.946	0.608	0.076
Category 1	0.928	0.523	0.018
Category 3	0.916	0.490	0.011
One-way export	0.919	0.492	0.012
Slovenia			
Categories 1 and 3 and One-way export	0.921	0.492	0.009
Category 1	0.914	0.471	0.005
Category 3	0.911	0.463	0.002
One-way export	0.914	0.466	0.002
Category 1 – successful price competition and Category 3 – successful quality competition. Source: Own calculations based on OECD database.			

4 Conclusions and policy implications

Hungary and Slovenia experienced the two-way AFWPs trade (export and import of similar products at the same time) with Austria, which is more significant than the one-way trade (only exports or only imports for a certain product category). Raw and semi-finished wood products are among the most significant single traded AFWPs of Hungary and Slovenia with Austria. This stylized empirical fact suggests the significant role that the forestry, raw and semi-finished wood industry plays in bilateral trade as well as in multifunctional development in rural areas of these three analyzed neighbouring countries.

Within the two-way AFWPs trade for Hungary with Austria, the prevalence is on the first category of successful price competition (trade surplus at lower export-to-import unit value) and on the third category of successful quality competition (trade surplus at higher export-to-import unit value). Hungary experienced a certain catching-up in successful quality competition in AFWPs trade, suggesting improvements in qualitative comparative

advantages as a result of restructuring, investment and modernization.

For Slovenian AFWPs trade with Austria, the second category of un-successful price competition (trade deficit at higher export-to-import unit value) is more significant than the first category of successful price competition (trade surplus at lower export-to-import unit value). This suggests possible costs and price disadvantages for Slovenian AFWP sectors in trade with Austria. Within the quality competition categories, the fourth un-successful quality competition category (trade deficit at lower export-to-import unit value) is more significant than the third successful quality competition category (trade surplus at higher export-to-import unit value), suggesting a lack of quality competition in the Slovenian AFWP sector in similar trade with Austria.

Hungary is a net exporter of raw and semi-finished wood products to Austria at lower export-to-import unit values (successful price competition category 1). Hungarian raw and semi-finished wood products in exports to Austria significantly increased prior to the implementation of forest land restitution, but stabilized later when there was a slight increase of imports of higher quality raw and semi-finished wood products from Austria to Hungarian markets. Price and quality competition developments indicate that, except for some years, Hungary exported raw and semi-finished wood products to Austria at lower export unit values than were the import unit values for Hungarian imports of similar products from Austria.

Slovenian raw and semi-finished wood products in exports to Austria are at lower absolute sizes than for Hungary, and vice versa for raw and semi-finished wood products imports. Slovenia is a net importer of raw and semi-finished wood products from Austria at higher export-to-import unit values (unsuccessful price competition category 2). The Slovenian raw and semi-finished wood products in exports to Austria increased for product groups with successful price competition (category 1 with trade surplus at lower export-to-import unit value) and/or successful quality competition (category 3 with trade surplus at higher export-to-import unit value), but considerably deteriorated for product groups with unsuccessful price competition (category 2) due to the significant increase of raw and semi-finished wood products in imports from Austria to Slovenia at lower import than export unit values, and thus much cheaper imports occurred than similar exports.

The duration of AFWPs trade competition categories in trade with Austria is higher for Hungary than for Slovenia, indicating the longer duration and robustness of Hungarian trade competition categories than Slovenian ones. This holds for successful price competition, which is more sustainable than the successful quality competition. The stability of successful price and qua-

lity competition implies comparative AFWPs trade advantages for Hungary as the issue of long-term structural trade sustainability. Business trade dynamics and trade flexibility are an issue of short- and medium-term business performance and restructuring. The importance of raw and semi-finished wood products in Hungarian and Slovenian bilateral trade with Austria is of relevance for forest and wood production, processing and marketing as potential niches in Central European forest, raw, semi-finished and other wood products chains regional markets. Finally, it is worth mentioning at least three issues as worth considering in future research. First, to employ some other methodological approaches for empirical trade analyses and also to apply a greater connection between the forest and wood product analysis and the trade competition types' analysis. Second, to separately analyse only wood trade and to expand wood trade from raw and semi-finished wood products also to include other wood product categories of higher level of processing and value added supply chains such as final furniture products. Third, to update trade data analysis on more recent years, which covers the post-2004 EU accession period, adoption of the euro in Slovenia in 2007, and the most recent period of the economic recession after 2008.

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References

- Aiginger, K. (1997). The Use of Unit Values to Discriminate between Price and Quality Competition. *Cambridge Journal of Economics*, Vol. 21, 571-592.
- Bojnec, Š. and Ferto, I. (2006a). Catch-up in Agro-Food Trade of Hungary and Slovenia with Austria. *Ländliche Betriebe und Agrarökonomie auf neuen Pfaden*, 16. Jahrestagung der Österreichischen Gesellschaft für Agrarökonomie, Tagungsband 2006, Wien, 28. – 29. September 2006. Wien: Universität für Bodenkultur, 83-84.
- Bojnec, Š. and Ferto, I. (2006b). The Pattern of Agricultural Trade between Hungary and Slovenia. *Jahrbuch der Österreichischen Gesellschaft für Agrarökonomie*, Vol. 15, 1-9.
- Bojnec, Š. and Ferto, I. (2007). The Catching-Up Process of European Enlargement: Hungarian and Slovenian Agricultural, Food and Forestry Trade. *Eastern European Economics*, Vol. 45 (5), 5-34.
- Bojnec, Š. and Ferto, I. (2008). Price Competition vs. Quality Competition: The Role of One-Way Trade. *Acta Oeconomica*, Vol. 58 (1), 61-89.
- Bojnec, Š. and Ferto, I. (2012). Complementarities of Trade Advantage and Trade Competitiveness Measures. *Applied Economics*, Vol. 44 (4), 399-

408.

- Cleves, M.A., Gould, W.W. and Gutierrez, R.G. (2004). *An Introduction to Survival Analysis Using STATA*. College Station, TX: Stata Press.
- DAVIS, D.R. and WEINSTEIN, D.E. (1996). Does Economic Geography Matter for International Specialization? NBER Working Paper 5706.
- DIETER, M. and ENGLERT, H. (2007). Competitiveness in the Global Forest Industry Sector: An Empirical Study with Special Emphasis on Germany. *European Journal of Forest Research*, Vol. 126 (3), 401-412.
- EU-COMMISSION (1999). *The Agricultural Situation in the European Community. 1998 Report*. Brussels: European Commission.
- EICHENGREEN, B. and IRWIN, D. (1998). The Role of History in Bilateral Trade Flows. In: Frankel, J. (ed.). *The Regionalization in the World Economy*. Chicago: University of Chicago Press.
- FERTO, I. 2004. *Agri-Food Trade between Hungary and the EU*. Budapest: Századvég.
- FERTO, I. (2005). Vertically Differentiated Trade and Differences in Factor Endowment: The Case of Agri-food Products between Hungary and the EU. *Journal of Agricultural Economics*, Vol. 56 (1), 117-134.
- GEHLHAR, M.J. and PICK, D.H. (2002). Food Trade Balances and Unit Values: What Can They Reveal about Price Competition?. *Agribusiness*, Vol. 18 (1), 61-79.
- GREENAWAY, D., HINE, R.C. and MILNER, C.R. (1994). Country-Specific Factors and the Pattern of Horizontal and Vertical Intra-Industry Trade in the UK. *Weltwirtschaftliches Archiv*, Vol. 130 (1), 77-100.
- IVANKOVIC, M., BOJNEC, Š. and KOLEGA, A. (2005). Competitiveness of Wine Production: The Case of Bosnia and Herzegovina. *Die Bodenkultur*, Vol. 56 (4), 193-203.
- JENKINS, S.P. (2005). *Survival Analysis*. Colchester, UK: Institute for Social and Economic Research, University of Essex.
- KAHN, J.R. and MCDONALD, J.A. (1998). Third-World Debt and Tropical Deforestation. *Ecological Economics*, Vol. 12 (2), 107-123.
- KAIMOWITZ, D., ERWIDODO NDOYE, O., PACHECO, P. and SUNDERLIN, W.D. (1998). Considering the Impact of Structural Adjustment Policies on Forests in Bolivia, Cameroon, and Indonesia. *Unasylva*, Vol. 49 (149), 57-64.
- KRUGMAN, P.R. (1980). Scale Economies, Product Differentiation, and the Pattern of Trade. *American Economic Review*, Vol. 70, 950-959.
- KRUGMAN, P.R. (1991). *Geography and Trade*. Cambridge, Mass.: MIT Press.
- LANGE, D. (1989). Economic Development and Agricultural Export Pattern: An Empirical Cross-Country Analysis. *European Review of Agricultural Economics*, Vol. 16, 187-202.
- LUNDBECK, E.J. and TORSTENSSON, J. (1998). Demand, Comparative Advantage and Economic Geography in International Trade: Evidence from the OECD. *Weltwirtschaftliches Archiv*, Vol. 134, 230-249.

- MANCHIN, M. and PINNA, A. M. (2003). Border Effects in the Enlarged EU Area. Evidence from Imports to Applicant Countries. Working Paper. Center for European Policy Studies.
- RAUCH, P. (2005). Business Networking in the Timber Supply Chain. *Austrian Journal of Forest Science*, Vol. 122 (4), 185-204.
- REED, D. (Ed.). (1996). *Structural Adjustment, the Environment, and Sustainable Development*. London: Earthscan Publications.
- ULFF, J. and NIELSEN, M. (2000). Price-Quality Competition in the Exports of the Central and Eastern European Countries. *Intereconomics*, (March/April): 94-101.
- YUNUSOVA, I., BUTTOUD, G. and GRISA, E. (2003). Reforming Forest Policy in Kyrgyzstan: Impediments and Success of the Process in Extreme Ecological and Unstable Socio-Economic Environment. *Austrian Journal of Forest Science*, Vol. 120 (1), 73-82.

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