

Economic geographic characteristics in the Finnish paper industry – a case study

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The main purpose of this paper is to reveal the Finnish paper industry from the economic geographic perspectives. There have been many mill and machine line closures especially in Finland after 2001. Therefore, it is interesting to research the development of manufacturing and transportation costs and paper prices during 2001–2008 in a large case mill. The research tradition of economic geography concerning the paper industry is scanty in the Nordic countries, and not many discussions have been published. This paper attempts to narrow the gap between theoretical and empirical discussions concerning the paper industry. The empirical data is obtained from one large integrated mill, and the research data covers cost components from the years 2001–2008. The results show that the economic performance has lowered clearly in the case mill. An interesting finding was that in overseas distant deliveries, transit costs can even decrease due to inexpensive sea transportation and paper prices slightly increase, probably due to lowered competition in the exported paper qualities. Although the mill data has been examined in detail, it only covers one large paper mill with several machine lines. Therefore, the results can only be generalized to some extent to other export-dependent paper industries operating in peripheral areas with minimal local demand. Our study shows that the empiric methods of economic geography offer interesting views highlighting such spatial heterogeneities in the paper industry. The industry's location affects competition through transit costs, and this topic should be included more in location and economic studies.

Keywords: economic geography, paper industry, performance, transportation, costs

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Introduction

Since 2002, Finnish paper mills have been facing particularly challenging times concerning their existence and operation. The paper companies have closed over 20 machine lines, including several paper mills (Oinonen 2008; Tappi 2008; Hetemäki & Hänninen 2009). During the past few years, the economic situation in the Finnish paper industry has been affected by lowering demand (Forestindustries 2009).

The purpose of this empirical case study is to examine in detail the performance and the development of a Finnish paper mill through economic variables during the past years. It is described how

a paper mill's economic factors, like transport costs, behave in a spatial context and how these factors influence the mill's gross margin. This survey, from the viewpoint of the case mill, may help us to better understand the economical transformation in the Finnish paper industry.

The topic of this study, the paper industry, has been examined marginally in Finland from the perspectives of both economy and geography together. Under these disciplines, researchers have published few papers in Nordic research journals (see e.g. Lähtinen 2007; Arlbjørn et al. 2008; Koskinen 2009). Hämäläinen and Tapaninen (2008) found that transportation costs increase in the spatial context in the European market. Later,

Hämäläinen and Tapaninen (2010) showed that there are big monthly variations in paper deliveries at the country as well as the customer level. These variations in customer deliveries are probably one reason for the long and costly warehousing times, which Koskinen and Hilmola (2008) and Koskinen (2009) presented in their papers.

Basically, the Finnish paper industry was derived and developed because of many competitive advantages (see e.g. Diesen 1998; Dieter & Englert 2007): the availability of reasonable priced fiber; inexpensive hydro energy; large, modern and efficient paper machines; skilled personnel; and growing demand in the main markets until the late 20th century. The value of forest products was approximately half of the total export in 1995, and in 2008 it was still around 18% (Forest industries 2009). In many rural areas of Finland, a local paper mill is the only significant employer in the community. Finland is a member of the EU monetary union, and Forslid et al. (2002) stress that a common worry in the Nordic region is that economic integration may lead to the loss of industries and jobs in the peripheral regions (see also Krugman 1991). Therefore, it is interesting to study the paper industry from empirical and economic geographical perspectives. The subject is novel and it is particularly concerned with paper mills operating in peripheral areas with minimal local demand.

The main research objectives are:

- to study the characteristics of the home market and export market through delivered tons and profits;
- to examine the development of economic performance in euro per machine hour;
- to examine the development of paper prices, manufacturing costs and transit costs; and
- to study the correlation between transportation costs vs. gross margin in an example European market.

In this study, the main economic geographical research topic, transportation, is understood as a process in which the packed paper rolls are transmitted from the mill warehouse to the customers with common transportation means. The key economic variables are paper prices, variable and fixed costs and especially transportation costs. The transportation costs include all functions from the mill to the end consignees. The variable costs include timber, fiber, chemicals, energy, and logistics costs during the manufacturing process (including packaging costs). All the costs and prices

and their correlations are calculated at the country level to explore the interesting economic geographic differences. Gross margin is the margin remaining when transportation, variable and fixed costs are subtracted from sales prices.

The structure of the paper is as follows: Theories of economic geography, which contributed to the ideas in this study, are presented in section 2. In section 3, a closer look at the paper mill's value-added functions is taken. The used case study methods, the origin of the data, the data mining and methods are described in section 4. The detailed results, which are based on empirical data analysis, are presented in section 5. Discussion and conclusions are summed up in section 6, and finally, in section 7, some future research topics are introduced concerning the paper industry in the Nordic countries.

Theoretical background

Economic geography as a research method

In this section, economic geography is briefly reviewed from two interesting and relatively novel angles: traditional economic geography and new economic geography (NEG). Both of these research perspectives have contributed to the ideas in this paper. Generally, the term "economic geography" refers to the study of economic activities from a geographical viewpoint (Martin 1999; Scott 2004, 2006). The discipline studies where economic industrial activities are located and why they are located in those areas. Economic geographers generally use multidisciplinary methods, like mathematics and statistics, in order to better understand the processes found locally and globally.

Ever since Weber (1909/1929), there has been a permanent interest in the transportation aspects of the location problem of the firm; transportation facilities are considered a major location factor, and the minimization of total transportation costs is regarded as a basic objective. Isard (1956) has been concerned with the impact of concave transportation costs on the firm location. In economic geography, there is a large number of relevant contributions, such as the so-called German location researchers. These theorists provide general location theories, such as Weber's transportation orientation, market (and purchasing) area theory and Lösch's spatial designs.

Alfred Weber's work (1909/1929) is considered to have grounded the roots of modern location theories. Particularly Weber assumed that firms will choose a location in order to minimize their costs. Weber's model assumes perfect competition, implying a high number of firms and customers and a perfect knowledge of market conditions, both for the buyers and the suppliers. At present, it can be considered that the European paper market is obviously in a state of perfect competition in many qualities due to lowering demand and over-supply (RISI 2009). According to Weber, three main factors influence industrial location; transportation costs, labor costs and agglomeration economies and location thus imply an optimal consideration of these factors. Activities having a high level of use of raw materials tend to locate near supply sources, such as aluminum factories locating near energy sources (electricity) or port sites. Aiura and Sato (2009) show that firms try to differentiate geographically in order to avoid price competition and that firms have an interest in locating in the proximity of the raw material site in order to reduce transportation costs.

The existing paper industry in Finland and other Nordic countries was originally built near hydro energy locations and raw material sources. The material index (Weber 1909/1929) in a paper mill is approximately 1.5–3, as around three tons of timber and other materials are needed for a ton of paper. Later, the Finnish mills were placed near export harbors due to logistics reasons.

The 2008 Nobel Prize winner Krugman (1991, 1995) has stressed that geographic economic issues have been at the periphery of mainstream economics for a long time. Krugman considers that in a world characterized both by increasing returns and transportation costs, there will be an obvious incentive to centralize manufacturing near its largest market. The simple reason is that by locating the production near the largest market, one minimizes transportation costs.

Location and economic geographical characteristics have been regarded as irrelevant factors until now in many theoretical economic studies (Arbia 2001). In a recent study, Behrens et al. (2009) remind that although transportation costs are a key ingredient of economic studies, the transportation sector is usually abstracted, and freight rates are taken in as parametric and are not set by the market. Bullock and Cliff (2004) stress that purely economic discussions say little about geographical space and its relation to the adaptive behavior of

businesses. Essletzbichler and Rigby (2007) point out that the economic performance of regions fluctuates because of differences in their characteristics. Regions, economy and companies are not static entities, and this environment may be radically transformed, especially in foreign trade dependent firms counting on demand development and changes in consuming behaviors. This type of a process can be observed to be happening in the paper industry due to the news media heading in a digital direction and the traditional paper media suffering in the future (Hetemäki & Nilsson 2005).

Kilkenny and Thisse (1999) point out that companies exporting their production outside the region in which they are located must set a price that is high enough to cover trade costs but that is low enough when compared to local competitors. Ottaviano et al. (2003) state that when trade costs are sufficiently low, firms are able to export profitably to a foreign region. The high transportation costs could be naturally surpassed with higher economic efficiency than that of the competitors, which is often neglected in economic geographical studies.

As a summary, it seems there is also a place for traditional geographical examinations that are based on empirical data. It can be noted that economic geographical research methods reveal especially interesting space-linked issues. This empirical orientation also provides some ideas for discussions that put their main effort into explaining the complexity of space with purely theoretical assumptions and models. Empirically oriented approaches might be better compromises for the purposes of studying spatially diffused objects, especially those that have not been examined in detail before.

Some characteristics of paper mill functions

An integrated paper mill consists of manufacturing and a complicated mixture of transportation and cost management functions. Figure 1 presents the value chain factors, which in this paper are understood as covering the process functions from the timber yard to the end customers. Customers order specific machine-based production grades. These qualities have unique production tons per hour, required moisture, surface, gloss, base weight, density, color and predefined roll width for the printing machines. The actual costs are calculated

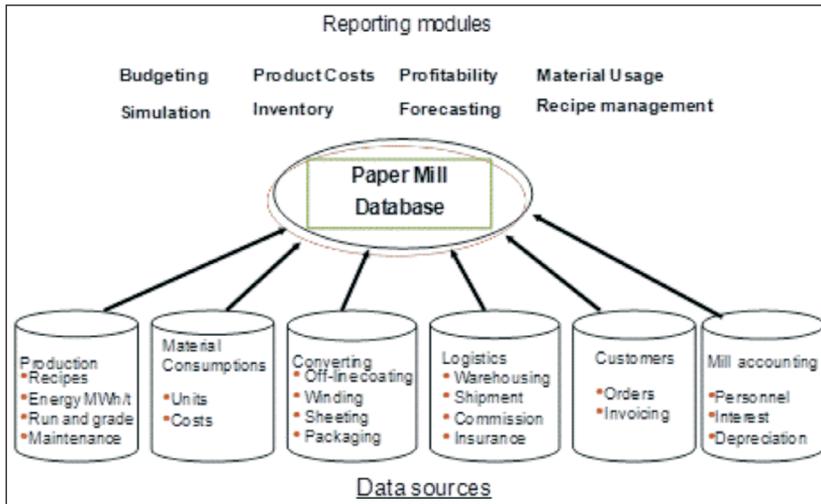


Fig. 1. The origin of the research data: the case mill's basic data sources, the mill database (allocations) and the reporting modules.

by summing up all the manufacturing costs and transportation costs of the sales on a monthly basis. The fixed costs are allocated to the grades by the production performance of the grades in tons per machine hour.

The exporting of the paper products from Finland to the markets occurs in many stages: storing at the mill's warehouse; short domestic truck or train transportation; domestic port transportation; intermediary converting and repackaging; intermediary warehousing; and the final local transportation to the customers. These distribution centers are located abroad, where consignees pick up their rolls. The exported paper qualities are mainly so-called improved grades, which usually have a lower supply and therefore higher prices.

During the 80s and 90s, Finnish paper companies expanded by merging with e.g. European paper producers to acquire market share and to be more competitive closer to the market (Lamberg & Ojala 2006). The key idea was to precisely control the market, supply and prices. The paper mills became more like production units than profit centers. Certain paper grades, e.g. office bulk papers, could be produced not only in one but in many mills and delivered to customers from the closest one. The Finnish paper machines could stay in competition by being efficient with large units.

The export transportation of forest products is a top priority for today's executives of the forest products industry (Hölsä 2005), but the whole supply chain has not been extensively studied us-

ing a holistic approach. Koskinen and Hilmola (2008) believe that logistics does not support the hoped improvements in the paper industry, because paper rolls remain in the inventories for approximately 45 days. There is room for the paper industry to improve its logistics management in order to decrease capital costs during inventories (Gallis 1997). Lehtonen (1999) and Hameri and Lehtonen (2001) also present comparable conclusions in their study. According to them, speedier transit operation easily generates direct cost savings amounting to 2–5% of annual turnover. Transportation problems, especially the long and costly warehousing and slow deliveries that Eloranta et al. (1994) observed in the early nineties, still exist in 2008 (Koskinen & Hilmola 2008).

The Finnish bulk paper mills are usually integrated units that have both fiber and paper machine lines. Due to the high productivity of the machines, especially the fixed costs in euro per paper ton are usually lower than those of the competitors. This has helped Finnish mills to overcome rising distance costs but not the currency challenges, like the relation of the euro to the U.S. dollar and the Swedish krona.

Empirical data and survey methodology

Lewis (1998) considers that case studies offer a potentially efficient means for comparing complex

and disparate operation settings. Their iterative triangulation employs systematic iterations between literary review, interviews, case evidence, and intuition. The case study methods are well suited for producing context-dependent knowledge (Flyvbjerg 2006), and case study research can provide microeconomic discoveries which are not possible to acquire through other methods (McCutcheon & Meredith 1993). Ballou (2001) reminds that the acquisition of correct and reliable data is crucial to the successful practical application of any model. Even the best model, if implemented with incorrect data, will produce false supply/demand chain configurations. According to Baxter and Chua (1998), one of the greatest practical difficulties in conducting case study research is the lack of access to field sites. Yin (2003) emphasizes that the “distinctive need” in conducting case study research lies in the “desire to understand complex phenomena”.

Economic geography with multidisciplinary methods seems to fit well for research purposes where the target is to study how an exporting industrial site functions both spatially and economically. The research ideas of this study are based on theories from microeconomic and transportation geography combined with statistical analysis. The target of the study is a single exporting mill located in Southern Finland, close to an exporting port. The mill manufactures all of its products locally in a certain region, but acts very globally because of the high export dependency and transportation of the final products to dozens of countries. This spatial connection in particular separates economic geographical studies from the purely economic ones.

The empirical data covers exhaustively the period between 1/2001 and 12/2008 (96 months). We obtained the data from the case mill’s cost management SQL database (Fig. 2). This extensive quantitative database holds the mill’s past and present information, which is affirmed by economic controllers and official authorities. The figures have been checked and reported in the mill’s annual economic reviews. The machine hours used in this study are net hours, when the machine has been in production. There are fixed and variable costs as well as spatial aspects, such as transportation costs and paper prices to points of destination. The variable costs also cover transportation costs of timber from forests to the timber yard at the mill. Calculated transportation costs of the final product cover total logistics costs from the

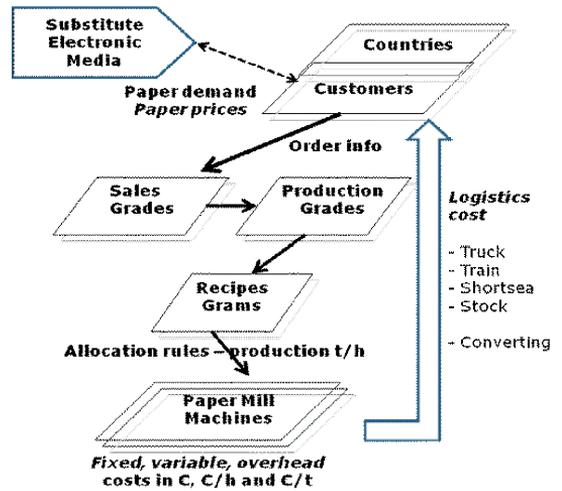


Fig. 2. The paper mill’s demand-supply chain.

mill warehouse to the customers. These figures have been transformed into a single large dataset based on packed net tons and euro. Within the dataset, the processed figures are proportionate, valid and fully intercomparable, and all data is linked to the same time period, 2001–2008. The parameters are calculated mainly in €/t or in percentages, which gives the possibility to make relevant comparisons. The results of the calculations are shown as ratios to maintain business confidentiality, and the key objective was to determine the relevant value-added factors. The research data covers prices, delivered tons and transportation up to 73 countries, tens of different paper grades, and millions of delivered paper tons. From the viewpoint of triangulation, we carried out a number of interviews and discussions with the financial management of the case mill and additionally with mill personnel in other local and foreign mills. These discussions significantly helped us focus our research on the relevant topics.

The research data was transferred into Excel spreadsheets and into Stat 4.1 for statistical correlation analysis. The correlation was calculated to reveal the dependency between the transportation costs and the gross margins. All the economic figures were reported out for research purposes only. Our study attempts to link the industrial and time-based performance values with geographical dimensions, which is not a very common research

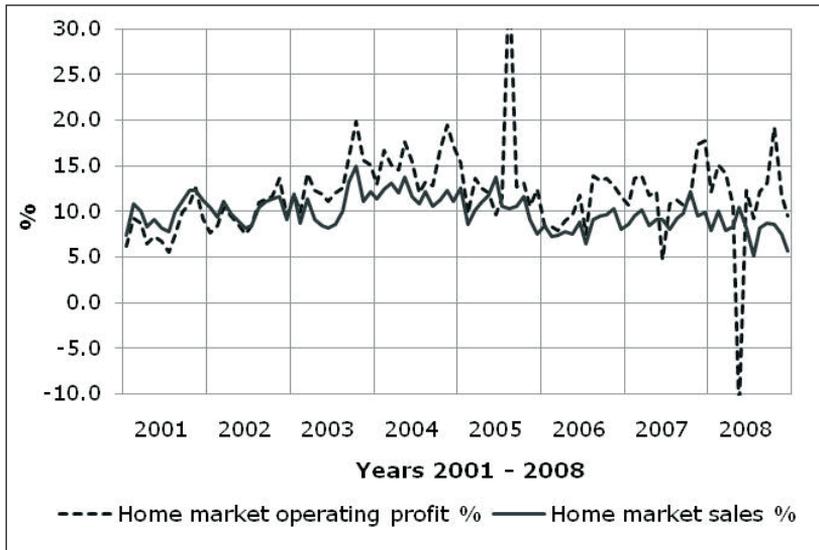


Fig. 3. Share of the home market in percent of total and the home market's monthly share of total profit during 2001–2008.

subject, when considering the Finnish paper industry.

Findings and results

In this section, the research data of the case mill is examined to find some typical and specific economic characteristics of the Finnish paper industry from different perspectives. Firstly, a closer look is taken from the market's point of view, and figure 3 presents the monthly development of both the share of the home market of the total mill sales and the share of the profits during 2001–2008. The case mill is a typical Finnish mill exporting around 90% of its total production. Figure 3 clearly shows that local demand varies between 6 and 14% of the total sales and, during the past years, local sales have decreased slightly. Compared with the local sales, the mill gained operating profit from the local market yearly from 10 to 15% of total operating profits. During the past years, the share of the locally based profit has slightly increased, which shows that the mill has lost its competitiveness in the export markets. Generally, the home market effect in the Finnish paper deliveries has always had a minor impact on the mill's sales and economy. The Finnish mills must adapt to serve long-distance customers, mainly printing houses, in foreign markets as cost-efficiently as possible. If paper demand should decrease in some export

market, new markets and buyers must be searched for continuously in other foreign locations. The Finnish and other European paper markets are matured, and demand will not increase very much, if at all (Hetemäki & Hänninen 2009; RISI 2009). In May 2005, there were strikes and block-outs in Finland, which caused large and severe production disturbances in the paper industry. Paper manufacturing experienced a total shutdown of several weeks. The foreign sales and even deliveries were significantly lowered or even stopped, which essentially decreased profits. The paper mills were only able to deliver normally to local customers. During these strikes, total profits from foreign sales dropped dramatically, and the Finnish mills may have lost customers to foreign mills during the incidence, even permanently.

The peripheral location of the case mill can be easily illustrated by utilizing the transportation costs as presented in figure 4. The Finnish mills lack the clear and measurable cost advantage in transportation costs and delivery times of their local European competitors, which the Finnish mills must adapt to in some way, mainly with scale in production. Figure 4 implicitly supports the earlier studies (e.g. Hameri & Lehtonen 2001; Koskinen 2009); when a Finnish mill exports a large part of its sales, the paper products need local intermediate storage, which produces high logistics costs. The export transportation costs (€/t) are averagely ten times higher than those for deliveries in the

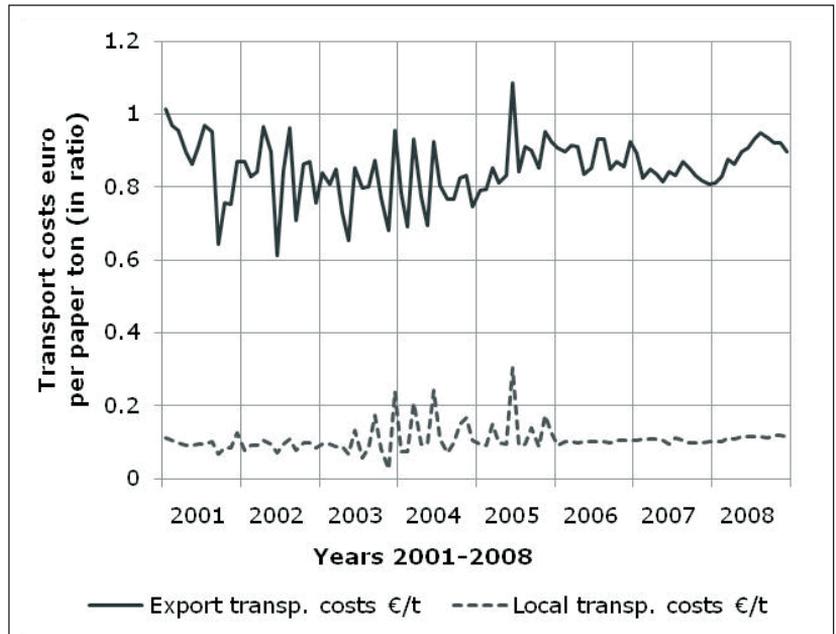


Fig. 4. Average transportation costs in €/t to export and home customers monthly during 2001–2008.

home market. This is one of the key challenges to be solved in the future.

When examining how the mill's economic performance has developed during the past years, three important values have been selected – variable costs (materials and energy), net profit and machine hours – to highlight how the economic efficiency has evolved (Fig. 5). This topic has been neglected in geographical studies earlier. Figure 5 clearly reveals that the mill's economic performance has decreased, costs per machine hour have increased and the mill has made less profit per machine hour. It is highly alarming when economic productivity decreases. This development can also be presented from another perspective, when we look at how the main economic variables have developed during the research period (Fig. 6). Average paper prices have measurably lowered, while manufacturing and transportation costs have increased, lowering incomes. The case mill has not succeeded in compensating the decreasing prices by lowering manufacturing costs. The Finnish mills have obviously lost some part of their competitive advantage in paper markets. This economic development (price–cost relation) has naturally been one of the main reasons for single machine lines, and even for large paper mills, having been closed in Finland and all over Europe. As many

regional and economic geographical scientists from Weber (1909/1929) to Krugman (1995) have discovered earlier, our empirical data shows that at present, transportation and manufacturing costs have a remarkable influence on total costs and, later, inevitably on location in the paper industry. From the 'Weberian' perspective, transportation costs combined with manufacturing costs increase, and lowering paper prices together with decreasing economic performance, presented in figures 5 and 6, presumably will steer the mill location decisions made by paper companies in the future.

Geographical distance affects economic variables differently, as it is highlighted in figure 7. The figure presents the average variable and transportation costs and sales prices to 73 export countries monthly during 2008. The data has been sorted by the estimated transportation distance (km) from Finland to the export countries. The figure shows that geographical distance makes the transportation costs fluctuate heavily. Long sea routes do not seem to increase transportation costs as much as could be expected; in very long-distance deliveries, the average transportation unit costs are even slightly lowering.

Figure 7 shows an interesting finding; a Finnish paper mill can partly compensate its disadvanta-

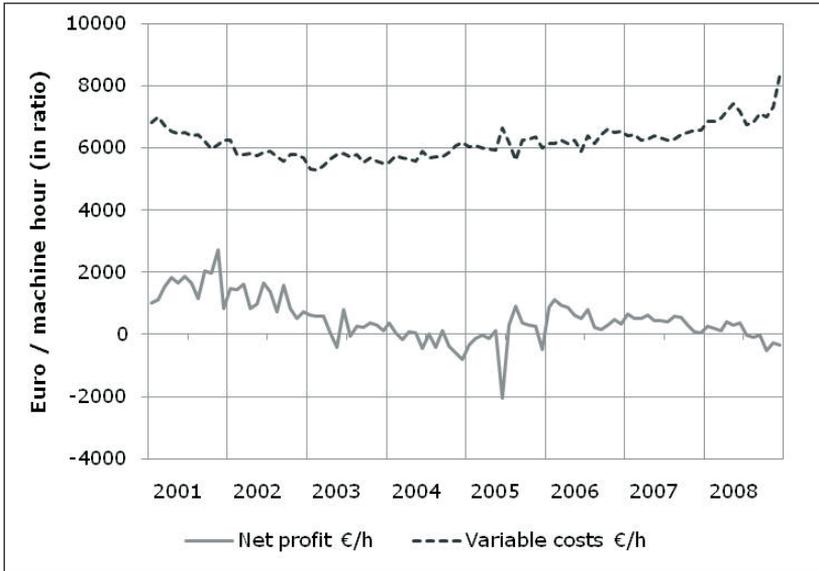


Fig. 5. Development of the economic efficiency calculated in euro per machine hour during 2001–2008.



Fig. 6. Development of the average sales prices, variable and fixed costs and transport costs during 2001–2008 monthly.

geous location from some of the distant markets with slightly higher sales prices. These empirical results partly support Krugman’s (1991) and Kilkenney and Thisse’s (1999) ideas that companies should try to compensate their disadvantageous location with higher sales prices. The results show that the price differences between different countries are large, up to over 30%. Figure 7 highlights

that the local competition in foreign paper markets is country-specific with highly varying sales prices. In every market, there is a unique pricing situation depending on the supply–demand equilibrium. The exported paper qualities are usually so-called improved qualities, which may have a higher demand in foreign markets due to lower competition. The customers’ geographical posi-

Fig. 7. Prices and transportation costs (2008, €/t) to export countries from the mill (N=73). Data was sorted by the estimated distance (km) from Finland to export countries and distance rises from the left to the right.

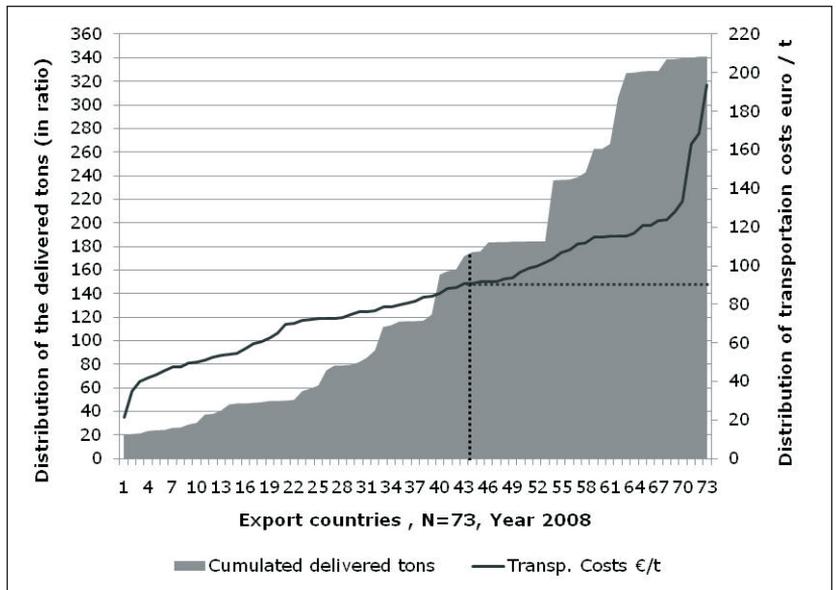
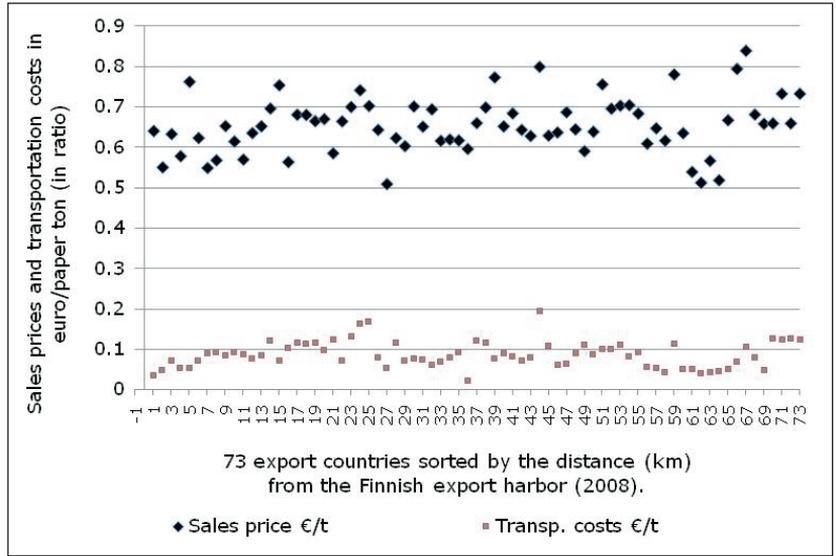


Fig. 8. Distribution of the export transportation costs in €/t to 73 countries and cumulated delivered paper tons during 2008.

tion does not significantly increase the average transportation costs to distant customers, because sea transportation freights, even for heavy bulky products, are relatively inexpensive.

In 2001, the average oil price was about 20 USD per oil barrel and in 2008, at the highest level, about 150 USD per barrel (in 2007 prices). The effect of oil prices on shipping can be directly

translated into increased bunker costs, whereby fuel costs represent as much as 50–60% of the total ship operating costs, depending on the type of ship and services (TSA 2008; WTRG 2008).

Figure 8 shows the distribution of the exported total tons in relation to average transportation costs to 73 different markets. Half of the paper tons (vertical line) from the case mill are delivered

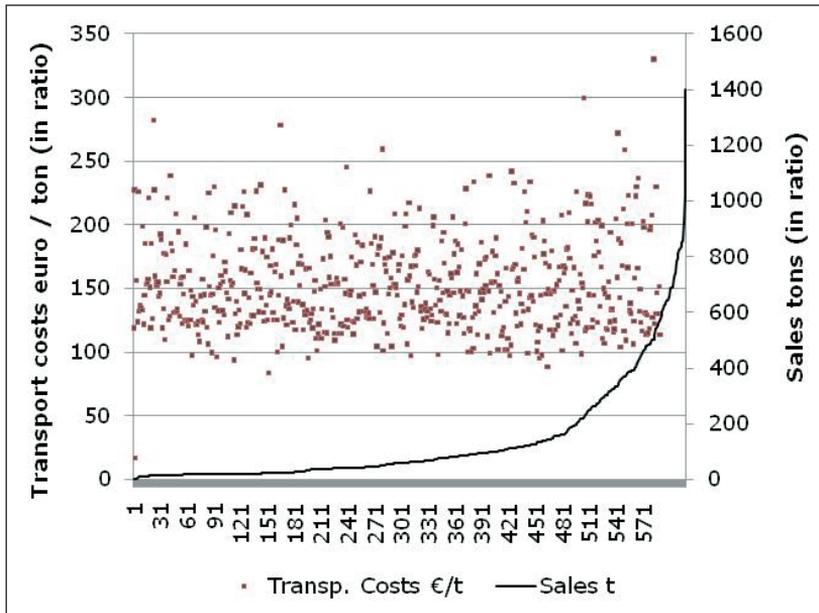


Fig. 9. Relation between transport costs (€/t) and sales tons during 2001–2008. Data is sorted by the sales tons and are based on the all delivered customer orders (N=591) to distant countries (USA, Australia, New Zealand).

mainly to 30 export countries, where the average transportation costs rise to over 90 €/paper ton (horizontal line). Competing in these markets by lowering obligatory transportation costs is not an easy task, especially due to oil prices, which directly affect freight expenses. The lowering paper demand in Europe is a real challenge for the peripherally located mills in the future due to transportation. Paper prices should increase, not lower, in the coming years.

Figure 9 presents all the customer orders delivered to three specific distant countries, namely USA, Australia and New Zealand (a total of 591 orders during 2001–2008). The research mill transports only 10% of its production to distant overseas countries. The data is sorted by customer-based deliveries in tons, which increase from left to right. The empirical data shows that transport costs have large variation and can rise threefold with the same volume of tons, naturally depending on the number of the intermodal (truck–sea–truck) routes. There does not seem to be a relation between larger volumes in tons and lower transportation costs, which could be expected.

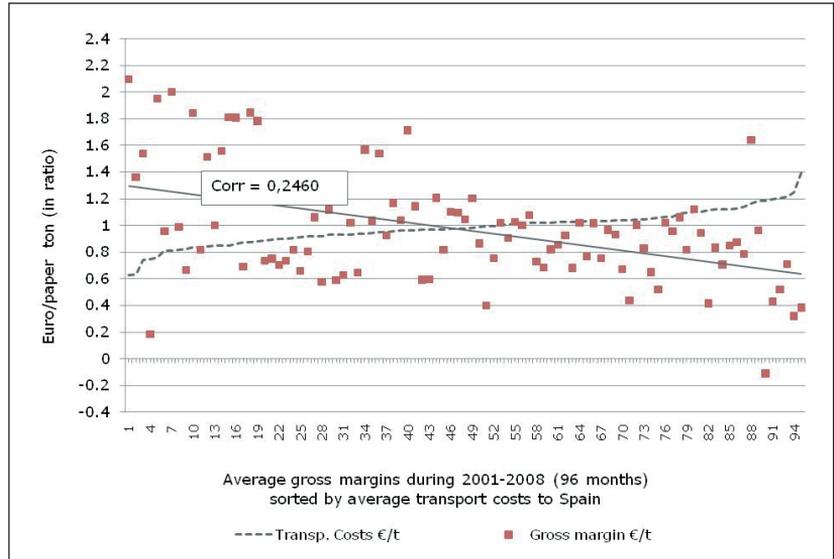
The case mill sells about 80% of its production in the European market; therefore, all large and population-rich countries are important for the mill. Figure 10 presents the statistical dependency

between transportation costs and gross margins in the Spanish market. The higher transportation costs ($r^2 = 0.2460$, $p < 0.05$) seem to have some statistical dependency with lower gross margins. The high volatility in gross margins probably depends on the paper qualities and sizes of deliveries in paper tons (see e.g. Hämäläinen & Tapaninen 2010) and on the very different locations of the end customers in relation to the distribution centers.

The paper market is, according to RISI (2009), under severe competition in Europe, and the printing paper market is hardly growing at all. There is a lot of capacity and oversupply in the European market, which is affecting paper pricing. This makes reliable economic planning and estimations very challenging for the mills.

The empirical material shows that the paper industry is worth exploring with geographical material, and comparing the different countries can reveal interesting and varying results in the economic variables. This study supports the basic ideas of the economic geographers that there must be empirical studies concerning spatial topics to also present the views of real industrial manufacturing. The results of this study can be crystallized in that the economic performance of the case mill has declined in many areas. Location issues are expected

Fig. 10. Correlation between transport costs and gross margins based on the monthly data from 2001–2008. Data is sorted by the transportation costs euro/paper ton based on the paper deliveries to the Spanish market.



to become more central in the coming years due to demand and cost reasons.

Discussion and conclusions

In this paper, the paper industry is examined in a spatial context with empirical economic mill data. The topic of this article was to explore and describe how economic factors – like prices, economic performance per machine hour, transportation and other costs – have developed. The paper industry has been examined somewhat marginally in Finland from the viewpoints of both economy and geography together. The data was obtained from the economic system of a large mill, and the longitudinal data covers the years 2001–2008.

The original idea of this paper was particularly to adapt economic geography through empirical mill data, which seemed to give revealing results. Krugman (1995) argues that transport costs are a key topic in economic geography. Transportation costs, like other costs and paper prices, should be set by the market in the studies, as this examination highlighted. This case study supports what e.g. Weber (1909/1929) and later Krugman (1995) have argued in their theoretical economics geo-

graphical discussions: transportation costs affect economic results. The results show that location and economic geographical characteristics are significant for the paper mills' results, like Arbia (2001) notes.

The falling paper prices and rising costs were presented in figure 6, and in relation to this, the RISI (2009) has forecasted that this trend in the European paper demand and prices will continue. With the present oversupply situation (see e.g. RISI 2009), this may lead to paper companies closing their peripheral mills, simply because paper prices do not cover the high logistics and manufacturing costs. The situation is now more current than in the 1990s, when oil was inexpensive and paper demand and prices were higher. This study brings out interesting findings, which have distinct effects on the existence of the Finnish paper mills. These findings are prioritized below as follows:

1. Printing paper demand has lowered in the European markets, and this increases oversupply and competition and presses down sales prices.
2. Manufacturing costs have increased during past years in the Finnish paper mills.
3. In exports, transportation costs are averagely ten times higher than in local deliveries, and these very high export costs give clear advantage to the local European competitors.

4. Economic performance in relation to machine hours in the older paper machines has lowered significantly during past years, which is an alarming signal.
5. Transportation costs have statistical dependency with gross margins by lowering them.
6. To distant overseas countries, transportation costs do not significantly rise due to relatively inexpensive sea transportation.

The Finnish mills have obviously lost a lot of their ability to compete in the difficult European export markets and, as managerial implications, it can be considered that:

- Paper companies should eliminate oversupply from the market to get paper prices up in order to cover the soaring material and transportation costs.
- Methods to make logistics more cost-efficient should be examined carefully.

These ongoing and quite rapid changes in the paper market can be forecasted to bring out severe challenges for the Finnish paper producers in the coming years. Further paper mill closures can be expected to balance the supply–demand equilibrium. The large global paper companies are obviously already considering relocating bulky and low-profit paper production from the periphery to more affordable places closer to the market in some scale. This study showed that the export-intensive paper industry is worth studying with empirical and geographical mill data to reveal the differences of markets.

Further research

The economic topics on country, customer and grade level are interesting subjects for future examinations. An interesting but challenging subject would be to reveal basic issues affecting delivery and operating profit variations. Additionally, the sales and price estimations and actual deliveries and prices should be examined together in more detail in future studies to reveal the accuracy level of the forecasts. This could help in finding out how the Finnish mills have succeeded in estimating the demand and prices in different main markets.

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