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Department of Business Administration

Accounting

Investments and value creation

Case pulp and paper industry

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ABSTRACT

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This study analyzes the connection between the investments strategy and value creation of selected 49 PPI companies from 1996 to 2005. The theoretical part of this study gives an overview of valuation techniques and investments' effect on value and value creation. The empirical part is both descriptive and explanatory. Building up the value of a company is examined yearly with economic value added (EVA[®]). Results are exhibited yearly according to companies' business orientation or country of origin. Investment strategies are classified, according to the growth model, into R&D, capital expenditures, and acquisitions. The results of the growth model are exhibited at the company level. Empirical results of this thesis show that only a few pulp and paper companies have been able to create value for shareholders. Moreover, results show that value creation depends largely on the business cycle. It seems that companies have carried out very similar investment strategies during the research period. The chosen strategy of some smaller players differs from the actions of mainstream companies. A further analysis showed that capital expenditures for organic growth improved profitability, when measured by EBITDA percentage, and acquisitions weakened profitability. When EVA[®] was used to measure value creation, investments in fixed assets improved value creation, while acquisitions proved to be value destroying. The findings are in line with previous empirical studies concerning value creation.

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Tämä tutkimus analysoi 49 sellu- ja paperiteollisuusyrityksen investointistrategioiden ja yrityksen arvon välistä yhteyttä vuosien 1996 ja 2005 välillä. Teoriaosa luo katsauksen arvonmäärittämenetelmiin ja investointien vaikutuksesta yrityksen arvoon ja arvonluontiin. Empiirinen osa on sekä kuvaileva, että selittävä. Yrityksen arvon kehittyminen mitataan vuosittain lisäarvomallilla (EVA[®]). Toteutetussa analyysissä yritykset on ryhmitelty joko liiketoimintaorientaation tai maantieteellisen alueen mukaan. Yritysten investointistrategiat jaoteltiin kasvumallin mukaisesti T&K:hon käyttöomaisuusinvestointeihin ja yritysostoihin. Kasvumallin tulokset ovat raportoitu yritystasolla. Tulokset osoittavat, että harvat sellu- ja paperiteollisuusyritykset ovat pystyneet arvonluontiin. Arvonluonti riippuu merkittävästi talouden suhdanteista. Yritysten investointistrategiat ovat olleet hyvin identtisiä tarkastelujakson aikana ja alan suurimpien yritysten investointistrategiat kuvaavat hyvin koko toimialan kehitystä. Pienempien yritysten investointistrategiat eroavat valtavirran toimista. Jatkoanalyysi osoitti, että investoinnit käyttöomaisuuteen parantavat kannattavuutta, mitattuna EBITDA-%:lla ja yritysostot heikentävät sitä. Mitattaessa arvonluontia EVA[®]:lla käyttöomaisuusinvestoinneilla on positiivinen vaikutus arvonluontiin, kun taas yritysostot tuhoavat arvoa. Havainnot tukevat aikaisempia empiirisiä tutkimustuloksia.

PREFACE

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1 INTRODUCTION

Companies in the pulp and paper industry (PPI) have faced changes in the competitive environment. Changes have occurred in both resources and the demand of end products. The change in resources means the use of fibers from plantations (Väliskauppi et al., 2006). At the same time demand for paper and board products has changed in a way that supply and demand do not meet each other. The unbalance between supply and demand in mature market areas has led to excess capacity, whereas growth in demand occurs in emerging market areas, like China and India. (Kirjonen et al., 2006) The unbalance between supply and demand in certain market areas makes it difficult to do profitable business, because the unbalance has a negative impact on the price of paper. This is important since the price of paper and board is the key factor with the most powerful impact on the operating profit (UPM-Kymmene 2006). In the light of these fundamentals, the competitive environment of PPI companies has not been very favorable for making profit, which can also be seen from the financial reports of publicly traded companies.

Based on theory value maximization, the fundamental aim of executives is to maximize the value of a company, and value maximization of a company leads to value maximization from the shareholders' point of view. The success of value creation for shareholders is usually measured by market value and changes in the market value. The market value of a company can be seen as a result of operations made by the company. At the same time, market value reflects the company's future expectations. As the expectations change, the market value changes as well. But where does the value come from? Theoretically, the origin of value comes from investments made by the company. It can be said that investments are its source. Measuring value creation by changes in the market may give us a myopic result. Staring merely at the market value ignores resources that have been needed to achieve a certain market value.

The resources are hidden in the cash flow statement, which reveals where the money has come from and where it has been used. The use of cash flow reveals how executives of a company have managed the investment strategy and created growth opportunities for the company. Therefore, it is reasonable to research investment strategies of PPI companies and how a different strategy has led to value creation from the shareholders' perspective.

A recent study by Cenatempo & McNutt (2005) examined the state of the North American pulp and paper industry and considered also investment activities of North American companies. Long term strategic orientation of global forest industry companies was examined by Lamberg et al. (2005, 257-286) whose study gives an extensive outlook of the financial performance of selected companies and analyzes the investment strategies of the biggest players company by company.

Previous research on the financial performance of PPI companies is based on financial statement analysis. The value creation perspective has not been as widely used as the financial ratio analysis. The connection between the investment strategy and value creation has not achieved as much attention. Therefore, it is reasonable to combine financial performance with the investment strategy.

In the empirical part of this study, economic value added and the growth model are used to measure value creation. Economic value added has its roots in Ohlson's (1995) model and it has been further developed by the consulting agency Stern Stewart & Co. Usually, a money based measure is used to calculate the economic value added. The other measure for value creation in this study is the growth model that compares capital expenditures with the change of the company's market value.

1.1 Research problem

The purpose of this study is to measure the value creation of selected PPI companies in 1996–2005. The selection of companies is based on a list of 100 biggest PPI companies in 2004 (Tonalid 2004). Value creation is measured by two different measures: economic value added and the growth model. Economic value added gives a longitudinal view of the value creation; whereas, the growth model combines the chosen investment strategy to value creation. Both measures are also used in a cross-sectional analysis where value creation is measured at the end of the period as an outcome of a chosen strategy by the growth model and as yearly by economic value added.

The main research problem of this study is:

What types of investment strategies of PPI companies have led to value creation in 1996–2005?

The research problem can be opened up into the following steps:

- To measure the value creation of selected companies during the research period by business orientation or geographical area
- To identify the riskiness of companies by business orientation
- To indentify diffrences in the capital structure by geographical area
- To investigate differences between the investment strategies of companies classified by business orientation and geographical location
- To identify the relationship between the investment strategy and value creation
- To examine whether there is a cause and effect between different chosen investment strategies in 1996–2005 and value creation measured by economic value added

1.2 Limitations

The theoretical framework of this study consists of the finance theory and especially the theory about the company's value. Value creation measures, namely economic value added and the growth model are both based on the theory of value maximization and derive from the fundamentals of value framework. The period for the analysis is ten years from 1996 to 2005. The basic sample for research was based on an article by Tonal (2004) in which 100 biggest PPI companies, measured with turnover in the year 2004, were collected together. The basic sample also included companies whose sales come mainly from other operations than pulp, paper and converting products (eg. Procter & Gamble), and such companies were excluded. As this study tries to analyze the relationship between real investment and value creation, the asset structure became a significant limitation for this study. Companies without their own production capacity are outlined, because it is not reasonable to compare the investments of a merchant and the investments of a pulp company. Own production capacity is one condition for a sample company, and therefore converting companies without their own production capacity are ignored. Because the market value of a company is needed for both in the beginning and at the end of the period analyzed, the companies without a market value cannot be assessed.

This research relies on the financial theory's assumption of efficient markets, and information from financial markets is regarded as biased. The financial market of each country is regarded as a biased market despite the differences in the development stage. All values are evaluated as nominal values and the inflation rate of each country is ignored and also corporate taxes were ignored.

The currency used in this study is Euro (EUR), and currency conversions were done automatically by Thomson One Banker database in the data search stage. Missing values were primarily searched from the company's

web site or annual reports, and the needed currency conversions were made in accordance with the average exchange rate in a particular year. The estimation of the company's cost of capital was made based on values, returns, and rates of local currencies because some information was available only in local currencies. The origin of a company was defined by the address country, and values used for estimating the cost of capital were based on financial market data.

1.3 Structure

This thesis is divided into six parts. The first part gives an introduction to this study including the research problem and sub-problems. Limitations are described in Chapter 1.

Chapter 2 introduces the theoretical framework of value and valuation techniques. It represents valuation techniques that are used especially in the valuation of stocks or companies. Literature concerning the capital structure gives a wider view of limitations used to define capital structure. The concept of value creation is derived from the capital structure theory and valuation theory of a company. Comprehension of the theoretical definitions gives a background to follow the empirical part of this study and explains the chosen measures.

Chapter 3 introduces the indicators of value creation used in the empirical part. The theoretical definitions for the two measures are explained in this chapter. First, the value creation measure is defined based on the difference between return on capital and cost of capital. The growth model which is used to identify the investment strategy combines elements from the cash flow statement and compares the sum of investments with the market value of a company. Results from these measures are shown in the empirical part. Specific definitions for both measures are shown in Appendices 4 and 8.

Chapter 4 summarizes the results from the empirical study on the investments' effects on the market value. Investments are classified according to the definition based on the growth model. Investment decisions are classified into R&D, fixed assets, and acquisitions. Research and development activities contain increase announcements in R&D. Capital expenditures mean additions in fixed assets, like plant and property. Acquisition activities combine both aspects, obtaining assets through acquisitions and asset sales. Empirical studies about the market value of a company are mainly based on stock returns as a consequence of an investment announcement. The investments' effect on economic value added is related to acquisition activities.

Chapter 5 exhibits investment strategies and results from value creation measures. The investment strategies of analyzed companies are shown by business orientation and geographical area. Thereafter, value creation of selected companies in a different time span is shown and analyzed company by company. Results from the peer measure are reported by business orientation and by geographical area. The riskiness of companies by business orientation is shown as well. Further research tries to analyze a cause and effect between the investment strategy and value creation.

2. THE BASIC CONCEPTS OF VALUE CREATION

Chapter 2 introduces the theoretical framework of value and valuation techniques. It represents valuation techniques that are used especially in the valuation of stocks or companies. Literature concerning the capital structure gives a wider view of limitations used to define capital structure. The concept of value creation is derived from the capital structure theory and valuation theory of a company. Comprehension of the theoretical definitions gives a background to follow the empirical part of this study and explains the chosen measures.

2.1 Introduction to value

The capitalization of the income method of valuation states that the intrinsic value of any asset is based on the discounted value of future cash flows, that the investors expect to receive in the future from to owe the asset. The method is used in the valuation of both stocks and bonds. In valuing bonds, coupon payments represent cash flow and are known beforehand. Dividends from a common stock represent cash flow from the company to the shareholder and valuation is based on capitalization of dividend payments. When cash flows are expected to be received, the cash flows are adjusted by a discount rate to reflect not only the time value of money but also the riskiness of the cash flows. (Baily et al. 1998, 386-523; Penman, 2001, 74-97)

The time value of money is based on three principles. Firstly, a consumer is supposed to gain benefit from consumption; and the sooner a consumer is able to consume, the greater the benefit is. Secondly, the time value of money is caused by inflation. To postpone the consuming, consumers require compensation for weakened purchasing power.

Thirdly, there is uncertainty of future cash flows, and therefore a compensation of risk bearing has to be achieved already today. (Ross et al., 2005, 60; Brealey & Myers 2003, 20-21)

The intrinsic value of an asset is equal to the sum of the present value of the asset's expected cash flows. Equally to calculating value with the capitalization method, the net present value (NPV) is used. NPV is calculated as a difference between each asset's intrinsic value and the cost of purchasing the asset. The NPV concept is very essential in corporate finance, because investment decisions should be made according to the NPV rule. If an investment decision is made according to the NPV rule, the value of a company should increase by the extent of the net present value. (Brealey & Myers 2003, 119-140)

2.1.1 Irrelevance theorem of capital structure

The most fundamental approach to the company's capital structure was introduced by Miller & Modigliani (1958). Their theory is based on the valuation of securities and principles of capital structure, and cost of capital. They showed that these three components are related to each other. They made several assumptions concerning the financial market and actors in financial markets. These assumptions were the perfect financial market, free information without any lags, and taxless economy. Also, companies and individual persons were assumed to be able to borrow money at risk free rate without any limitations.

Miller & Modigliani started to prove their theory of capital structure and cost of capital by valuing a company based on the expected profit. The market value of a company was defined by a sum of the market value of debts and market value of common shares. The market value of a company was calculated by capitalizing the expected return at the appropriate rate of each risk class. As a conclusion, the market value of a

company is independent of its capital structure, and the value of a company is determined by capitalizing the expected return at the appropriate rate. The company's cost of capital is assumed to be independent of the capital structure as well. The cost of capital is defined as a ratio between expected return to the market value of a company, debt, and equity.

The relationship between the expected return, cost of capital and value of a company has to be sustained. If the relationship between these factors did not hold, there would be a possibility for arbitrage. Arbitrage can occur when the value of a levered company with the same expected return and the same risk class is bigger than the value of an unlevered company. The return for the shareholder of a levered company is a fraction from the total income less interest charge from the income. The investor could sell a fraction of the levered company and buy a fraction of the unlevered company. The investor could borrow a same amount of money than the levered company had. As a result, the investors would have a bigger proportion of the unlevered company than before and a bigger income stream from the unlevered company, even after interest rates. There is a possibility for arbitrage until the market value of the levered company is bigger than the value of the unlevered company. Due to the arbitrage process, the value of the levered company starts to decline until the value is equal to that of an unlevered company and, consequently there is not an opportunity for arbitrage.

Miller & Modigliani (1958) explained why the value of a levered company starts to decline in comparison to the value of an unlevered company. The expected return of a company depends on leverage. The expected yield of a company is the appropriate capitalization rate, which is defined according to the pure equity streams in a certain risk class plus a premium related to the financial risk. The premium depends on the debt-to-equity ratio and is calculated by multiplying the debt-to-equity ratio by the spread between the required return of capital and required return of debt.

The theory about the capital structure and the cost of capital became a cornerstone in corporate finance. These theories have become the theoretical foundation for further research concerning the capital structure and the determinants that have an effect on it.

2.2 Earlier research on capital structure

Several researches concerning capital structure have been made since Miller & Modigliani introduced their article concerning capital structure. Although the original theory assumed that the value of a company is independent of the capital structure, further research does not completely agree with the original assumption about the irrelevance of the capital structure and value of a company. Further research gives support to the second proposition about the capital structure and company's cost of capital.

As noted earlier, debt has an effect on the cost equity and the cost of company's capital. Warner's study (1977) reveals that the use of debt affects the cost of financial distress which is known as bankruptcy costs, defined as a percentage of the market value. The cost of bankruptcy can be divided into direct and indirect costs. Direct costs include fees and other payments for lawyers in case of bankruptcy, and indirect costs include for example costs like lost sales and lost profits. These costs are usually distinguished from each other because of the nature of these costs. The cost of bankruptcy was measured as a percentage of market value before bankruptcy. The magnitude of cost varied depending on the time before bankruptcy. The average cost of bankruptcy varied between one and five percent of sales depending on the time before bankruptcy. The study reveals that the risk of bankruptcy causes extra costs when it occurs, and therefore cost of bankruptcy sets limits for the proportion between equity and debt.

Myers (1984) found that cost caused by financial distress affects the use of equity and debt. The study stated that the riskiness of the company's business has an impact on leverage. Risky companies ought to borrow less than safer companies, when other factors are constant. On the other hand, companies with tangible assets-in-place are willing to borrow less than companies with high growth opportunities. This theory concerning the use of financial sources is called pecking order theory. According to the pecking order theory, companies prefer internal finance and as a consequence they target dividend payout ratios matching the investment opportunities. Dividends are paid niggardly and target payout ratios are gradually adjusted to reflect the company's investment opportunities. In uncertain circumstances internally-generated cash flow is used to finance investments and for liquidity: for example, marketable securities are used as a source of finance. In case external financing is needed, the usage order is quite clear so that the safest securities are issued first. External financing is supposed to start with debt and then hybrid instruments, like convertible bonds. Equity based financing is used as a last resort if debt financing is not possible.

The role of the information in capital markets has been one of the key concepts, and the markets' efficiency has a significant role in research about financial markets. Leland & Pyle (1977) stated that informational asymmetry affects the company's capital structure decision. They stated that entrepreneurs are supposed to have inside information, which is not available to outsiders. Asymmetry of information was supposed to exist between borrowers and lenders, so that the borrowers are supposed to have more information than the lenders. As a consequence, entrepreneurs' willingness to invest in their own projects gives a signal of the project quality and is affected by a moral hazard.

Informational asymmetry was also examined by Ross (1977) who stated that it affects the company's capital structure. The chosen capital structure gives a signal for financial markets, and the phenomenon is known as the

signalling hypothesis. Therefore, the issue of securities and debt gives signals to investors who are not insiders. These signals concerning the capital structure are supposed to notify in the financial markets, and such actions are supposed to strengthen publicly reported information.

2.3 Valuation models

This chapter introduces the most commonly used valuation techniques in the valuation of stocks or corporations. The approach of valuation techniques is based on a classification made by Palepu et al. (1997, 11). Valuation is based on dividend discount models, the discounted cash flow method, and discounting of abnormal earnings. Valuation based on multiples is ignored, because it is quite familiar to the financial ratio analysis.

2.3.1 Dividend discount models

Dividend discount models are based on discounting dividends that represent cash flows from a company. The valuation of common stocks is done by discounting dividends that represent the cash flow from the company to shareholders.

Because stocks do not have a fixed lifetime like bonds have, the dividends have to be forecasted infinite. Such forecasting would be next to impossible, and therefore more specific models were developed for the valuation of stocks based on dividend payments. The basic model used in valuation is called the zero-growth model in which future dividends are supposed to remain at a fixed level in a certain currency. The zero growth model for valuation is shown in the next page.

$$V_0 = \frac{D_1}{r}, \text{ where}$$

V_0 = value of a stock at present time

D_1 = dividend in year 1

r = required return on capital

A more developed dividend discount model is the constant-growth model that assumes that dividends will grow from period to period at the same rate infinitely. The model assumes that dividends that were paid in the previous year are expected to grow at a growth rate g . Such tendency in the growth of dividends is assumed to continue in the future at the same growth rate. The formula used for calculating the value of a stock with continuously growing dividends is shown below. Symbols in a constant growth model are similar to the previous formula, with the exception of the growth rate g .

$$V_0 = \frac{D_1}{(r-g)}$$

These dividend discount models illustrate the basic principles of valuation concerning the capitalized income method. A profound model for dividend discounts is the multiple-growth model, which gives a possibility for dividends to grow with different growth stages, which are not merely based on the assumption of zero growth or constant growth. This model combines basic principles from both previously presented models. (Baily et al., 1998, 525-530)

A very essential variable in valuation models is the growth rate. Of course the growth rate could be estimated without any theoretical fundamentals, but if it is made according to the theoretical model, estimation becomes more uniform and more easily adaptable to be used widely.

According to Ross et al. (2005, 116-117), the growth rate of earnings is estimated so that the next year's earnings are expected to be the same as earnings this year, unless a net investment is made. In case a company's total investments are equal to depreciation, net investments are not made. If total investments equal depreciation, the firm's physical plants are maintained and remained constant with no growth in earnings. The income finance for investment will be positive only if some earnings are not paid out as dividends. Expected earnings are calculated by multiplying the sum of retained earnings and earnings in the current year by return on retained earnings.

Because the forthcoming projects are not public information, it is challenging to estimate the expected return precisely. Therefore, it is assumed that the projects carried out this year have the same return than the previous years' projects, which is expressed as a return on retained earnings. Return on retained earnings is equal to return on equity, or expressed as ROE. Return on equity represents return on the company's entire equity, which is the return on the accumulation of all the company's past projects. Estimation of the growth rate is based on plowback ratio, which is purely based on equity finance. The use of debt finance enables, however, larger growth possibilities than relying only on equity financing.

Dividend irrelevance theorem

Dividend discount models assume that a dividend is paid out instead of keeping it in the company. The payout policy determines whether the company pays dividends or not. The fundamental approach to payout policy and valuation of shares was introduced by Miller & Modigliani (1961). They stated that the higher the dividend payout in any period, the more new capital has to be raised. The amount of raised capital is the amount of which investments exceed retained earnings. Because paid dividends have to be financed with raising new capital, it vitiates the dividends used in valuing a certain company.

Therefore, a certain payout policy does not have an effect on the company's value. The value of a company is based on expected earnings, investment policy, and cost of capital.

Further research by DeAngelo & DeAngelo (2005) examined the dividend irrelevance theorem. They stated that the payout policy is irrelevant only if free cash flow is assumed to pay out completely. The original assumption of the payout policy excluded feasible payout policies, and they assumed that capital is raised in the form of stock issues. When the retention of cash flow is allowed, the payout policy has an effect on value because feasible payout policies distribute less than the full present value of free cash flow. Concentrating on the investment policy as a source of value ignores the company's ability to distribute cash to shareholders. Because of the contradiction between the payout policy decision, more sophisticated methods are needed for valuing a company.

2.3.2 Free cash flow

The dividend discount model attempts to forecast forthcoming dividends precisely. Dividends may also vary yearly, and valuation based on dividends would therefore be challenging. The accrual basis in financial reporting revenues from operations are divided into several periods depending on the nature of goods produced. Expenses are registered in the same accounting period, when these factors of production are received. Therefore, the reported return of accounting differs from the real cash flow received in the company. The received cash flow is a key driver concerning the company's survival and an important determinant to be used in valuation as well. (Kallunki & Niemelä, 2004, 107-108; Palepu et al., 1997, 3-1-3-2).

The financial statement includes a cash flow statement. The form of representation of the cash flow statement is regulated in the standards of financial reporting, like most commonly adopted IAS and US GAAP. Both standards permit companies to report cash from operations either directly by major categories of gross cash receipts and payments or indirectly. An indirect form of representation means reconciling accrual-based net income to cash flow from operating activities.

Cash flow in the cash flow statement is divided into three groups: cash flow from operations, investing, and financing. Net value of cash flow represents the change in cash and cash equivalents during a certain period. Cash flow from operating activities measures the cash generated or used as a result of production and sales. Cash flow of investing activities represents the amount of cash used in capital projects and acquisitions as well. The last part of the cash flow statement is cash flow from financing activities. This section represents consequences based on the company's capital structure. Payments for equity and debt holders are described in this section of the cash flow statement. (Fried et al., 2003, 74-75)

The free cash flow (FCF) represents the amount of cash flow that a company can pay out to investors after paying for all the investments necessary to growth. To calculate FCF, the income statement has to be reorganized, which is shown in Figure 1. The first item needed for FCF is the net operating profit less adjusted taxes (NOPLAT) which represents the total after-tax operating income that is available to both equity and debt holders. Because, NOPLAT represents the total after-tax operating income for equity and debt holders, interest is not subtracted from the operating profit. Interest should be considered as a payment to the company's financial investors. After this adjustment, NOPLAT is made independent of the company's capital structure.

€ million			
Accountant's income statement		NOPLAT	
	Year n		Year n
Revenues	1000	Revenues	1000
Operating costs	-700	Operating costs	-700
Depreciation	-20	Depreciation	-20
Operating profit	280	Operating profit	280
Interest	-20	Operating taxes ¹	-70
Nonoperating income	4	NOPLAT	210
Earnings before taxes	264	After-tax nonoperating income ¹	3
Taxes	-66	Total income to all investors	213
Net Income	198	Reconciliation with net income	
		Net income	198
		After-tax interest ¹	15
		Total income to all investors	213

¹Assumes a flat tax of 25% on all income

Figure 1. Calculation of NOPLAT (Goerhart et al. 2005, 163)

Non-operating income and gains or losses generated from assets have to be excluded as well. Such adjustments are made because these non-operating items are excluded from the invested capital. This is done because NOPLAT has to be kept focused only on operations.

Figure 2 shows differences between the accountant's cash flow statement and free cash flow. The accountant's cash flow exhibits the allocation of cash flow to three different categories as explained in the previous chapter. The calculation of free cash flow requires reorganizing the income statement and cash flow statement. The example of cash flow illustrates the components of free cash flow. First, depreciation is added to NOPLAT which represents the gross cash flow. Thereafter, Figure 2 illustrates changes in the working capital. Increase in the working capital reduces gross cash flow, whereas, decrease in the working capital has a positive effect on the magnitude of cash flow. Capital expenditures represent the amount of cash used in additions to fixed assets.

€ million			
Accountant's cash flow statement		Free cash flow	
	Year n		Year n
Net income	198	NOPLAT	210
Depreciation	20	Depreciation	20
Decrease (increase) in inventory	-25	Gross cash flow	230
Increase (decrease) in accounts payable	25		
Cash flow from operations	218	Decrease (increase) in inventory	-25
		Increase (decrease) in accounts payable	25
Capital expenditures	-70	Capital expenditures	-70
Decrease (increase) in equity investments	-10		
Cash flow from investing	-80	Free cash flow	160
Increase (decrease) in interest-bearing debt	-25		
Increase (decrease) in common stock	0		
Dividends	-113		
Cash flow from financing	-138		

Figure 2. An example of Free Cash Flow (Goedhart et al., 2005, 165)

Valuation by free cash flows is based more distinctly on the capitalization of the income method than valuation overall. When the value of a company is determined by the free cash flow method, the required return on capital is expressed with a weighted average cost of capital. The value represents value for both the equity and debt holders. The most frequently used application of the free cash flow model is a model where company's value is determined for equity holders by deducting the value of debt from the corporate value. (Rappaport 1998, 33-35; Morin & Jarrell 2000, 107-115)

A more sophisticated model for free cash flow is the model which combines growth measured with the growth of NOPLAT, cost of company's capital, and return on invested capital. This model combines the key drivers of the economic value, the growth, ROIC and the cost of capital. Similarly to other valuation models, this model also has its weaknesses because of several assumptions of constant growth. (Goedhart et al. 2005, 61-63)

2.3.3 Extension of valuation

The value based on dividends or cash flow depends on the estimation of cash flow and risk adjusted return of those cash flows. These valuation models cannot separate the relationship between the required return on capital and invested capital, except for a further application of the free cash flow method. A further developed valuation model, introduced by Ohlson (1995), combines future earnings, the book value of equity and dividends together. This extended valuation technique is based on the surplus relation between earnings, the book value, and dividends.

Especially significant is the role of dividends, because dividends do not go through the income statement and this principle was ignored in the accounting data. The model shows the relevance of abnormal earnings as a variable that influences a company's value. This measure is defined by earnings minus a charge for the use of capital. Capital is measured as a book value at the beginning of the period, and the charge is calculated by multiplying the book value by the cost of capital. Owner's equity decreases by the same amount of money as dividends are paid. Such an action does not have an effect on current earnings. The value of a company defined according to abnormal earnings is a present value of future abnormal earnings and the current book value, or precisely, the book value of equity. Valuation based on abnormal earnings is a device to take the required return of shareholders and the invested capital of shareholders in the valuation. Another commonly used methods takes the required return into account in the cost of company's capital, but the comparability between resources and the required return is not as clear.

Valuation techniques are divided into three main techniques, based on the discounting of dividends, free cash flow, and abnormal earnings. The order of superiority of these valuation methods was examined by Penman & Sougiannis (1998). They compared the forecasting accuracy of each valuation method based on reported earnings from a certain period to

predict the value of a stock. Estimates were compared with actual values at the infinite horizon. The result of the study indicated that the most accurate estimate of valuation can be gathered by using discounting of abnormal earnings.

The whole concept of valuation is fundamentally based on return and cost of a certain instrument. This principle is expressed in each presented techniques, namely the dividend discount model, free cash flow and the abnormal earnings model. Despite similarities between the basic principles of valuation techniques, the usefulness of these measures varies. A critical approach to the dividend discount model was presented by Fairfield (1994) when he stated that the use of accounting data and dividends cause limitations to the use of dividend discount models.

Valuation based on free cash flow observes only cash flows from and into the company and ignores accounting earnings and dividends. The free cash flow model is essential because the use of free cash flow is essential to shareholders either if the cash flow is paid out as dividends or used for investments to improve the company's market value. Valuation based on abnormal earnings brings a value creation based view to valuation according to which smaller than required earnings do not lead to value creation and negative results lead to the declining of common equity.

2.3.4 The usefulness of book value as the market value of debt

In defining the company's value, the market value of equity in publicly traded companies can be defined daily from stock exchange; by contrast, market values of debt are not available as easily. In valuation, book value of debt is commonly used as an estimate of the market value of debt.

A study by Bowman (1980) examined the importance of the market value of debt used in calculating the company's leverage. The principal finding of the study was that the accounting measures of debt were statistically indistinguishable from the market value measures of debt. An implication of his study was that it is not necessary to determine the market value of debt when debt to equity is examined.

A further study of the market value measurement of debt was published by Mulford (1985), where he re-examined the study of Bowman made five years earlier. Mulford examined the importance of the market value measurement of debt in leverage ratios. It was previously known that positive relationships exist between financial leverage and systematic risk, and therefore relationship between equity and debt is significant. The market rate of interest is an important determinant of the market value of debt. A change in the market rate of interest influences the market value of debt depending on credit rates, coupon rates, and maturity dates. In some cases small changes in the market rate can cause sizable fluctuations in the market value of debt.

The purpose of Mulford's study was to examine the relationship between leverage and beta to find out if it would be possible to use the book value of debt to replace its market value. The study implicated, that accounting measures may not provide a good surrogate for the market value of debt unless the debt issues have either short maturity horizons or, coupon rates which are nearly the market rate, or both.

3. MEASURES USED IN ESTIMATING VALUE CREATION IN THIS STUDY

Chapter 3 introduces the indicators of value creation used in the empirical part. The theoretical definitions for the two measures are explained in this chapter. The value creation measure is defined based on the difference between return on capital and cost of capital is defined first. The growth model which is used to identify the investment strategy combines elements from the cash flow statement and compares the sum of investments with the market value of a company. Results from these measures are shown in the empirical part. Specific definitions for both measures are shown in Appendices 4 and 8.

3.1 Value creation based on abnormal earnings

Economic value added (EVA[®]) is maybe the most widely used concept for measuring value creation for shareholders. Economic value added is usually expressed as monetary based measure, which is based on residual income. The consulting firm Stern Stewart & Co. exhibited their version of economic value added and it is expressed as periodic performance (Stewart, 1991, 136-140).

The valuation concept presented by Ohlson (1995) which combines earnings, invested capital and required rate of return was originally introduced a couple of years earlier than the periodic measure of Stern & Stewart. The economic value added used in this study is based on the periodic performance measure, introduced by Stern Stewart & Co. The definition for economic value added is shown below.

$$\text{EVA} = \text{Net Operating Profit After Taxes} - (\text{Capital} \times \text{The Cost of Capital})$$

The economic value added concept introduced by Stern Stewart & Co. is defined as a net operating profit minus an appropriate charge for the opportunity cost of all the capital invested in an enterprise. The results give an estimate of whether the investments exceed or fall short of the required minimum rate of return that shareholder and lenders could get by investing in other securities of comparable risk. (Stern Stewart 2006)

Despite the wide use of economic value added as value creation performance, the literature also provides a more critical approach to economic value added. De Villiers (1997) stated that inflation, or more precisely, ignoring the inflation causes distortion in economic value added. Inflation distorts both returns on revenue and the value of assets. De Villiers stated that especially an inflation adjusted measure would need to adjust the accounting revenues to represent the true revenue. According to Prober (2000), accounting based determinants require adjustments used in calculating the measures which weakens the reliability of the measure. The usability of EVA[®] across different type of industries was examined by Kramer & Peters (2001) when they compared EVA[®]'s ability to serve as an estimate of market value added. They found that the usability of economic value added does not depend on the industry.

In this study, the EVA[®] is not expressed as a monetary based measure, because the size of the analyzed companies varies remarkably. Therefore, a proportional measure is used to eliminate the magnitude difference between companies. The concept of economic value added concept is defined as a difference between return on capital and the cost of capital (ROIC-WACC). This kind of measure as economic value added has been used, for example, by Maxton & Wormald (2004, 219-220). In this study, ROIC is equal to pretax income divided by total capital, and a more specific definition is shown in Appendix 4. The definition for the weighted average cost of capital is shown below.

$$\text{WACC} = \left(\frac{E}{V}\right) \times r_e + \left(\frac{D}{V}\right) \times r_d, \text{ where}$$

WACC = weighted average cost of capital

$V = (E + D)$

V = value of equity and debt

E = equity

D = debt

r_e = cost of equity

r_d = cost of debt

Detailed information about variables used in calculating the required return on capital are shown in Appendices 4 and 5. Required return on equity was defined according to the capital asset pricing model (CAPM). The definition for the capital asset pricing model is shown below. Market return from each financial market is based on longitudinal data from each market. The length of the period used in defining the market return varies country by country, because a fixed period would have given a biased estimate of the market return.

$$r_e = r_f + \beta(r_m - r_f), \text{ where}$$

r_e = required return on equity

r_f = risk free rate

β = beta coefficient of a company

r_m = market return

Market returns are annualized and the equity indices by address countries are shown in Appendix 4. A maturity of the risk free rate of each financial market was one year. Theoretically, longer rates like ten-year rates should have been used as a surrogate for the risk free rate, but so long rates have not been available for emerging markets.

The betas of companies are calculated based on monthly returns corresponding to the same index as market return was estimated. Beta values were gathered from the DataStream database and the returns were calculated in the local currency. It is reasonable to define betas by years and by companies, although previous studies give a guideline of the level of beta value. According to Diesen (1998, 109), beta values for forest industry companies have been 1.1–1.2, but such estimates are based on return before 1998. It can be assumed that the riskiness of forest industry companies could have been changed during the last decade, because of changes in the structure of the industry.

A study by Lie & Faff (2003) gave a longitudinal perspective to industry betas, examining global industry betas from 1975 to 1994. The time span was divided into five sub periods with the length of four years each. During the research period, the industry beta for paper and forest product companies declined from 1.3 to 0.88. The trend of the beta coefficient was declining during the whole research period. Betas were defined based on global industry indices and the global stock market index. On the other hand, the estimation of beta can be complicated as shown by Kaplan & Peterson (1998). They stated that beta values of companies that operate in multiple industries may differ from companies which operate in a strict industry. Findings from the study indicate that full-information betas are smaller than betas of companies purely with a certain industry.

This study has tried to define the betas of each company based on daily returns in relation to the MSCI-World index, but several betas were negative, although some were positive as well. Finally, the betas were calculated in relation to the stock market index of each company's address country, as shown in Appendix 4. The other estimation of beta in yearly terms may give biased returns if financial performance of some company has been extraordinary poor or successful.

There was an effort to estimate the cost of debt based on annual reports and from a summary of long-term debt, but such an estimation would have been possible for only half the sample and therefore the cost of debt was estimated based on interest expenses to debt. The estimation was gathered from the Thomson One Banker database, and it was based on the interest expenses' relation to liabilities.

3.2 Growth model

The measure used to determine the investment strategy and value creation of investments was introduced by Jensen (1993). Measuring the return to shareholders by the change in the company's market value over time ignores the efficiency of capital expenditures. In a case where a company provides dividends and capital gains to shareholders over a ten-year period that equal the cost of capital, the share value remains constant as from the beginning of the period. If a company had used contemporaneously, for example, €100 M for capital expenditures without no returns, shareholders would have lost an opportunity loss. Opportunity loss is equal the value that shareholders could have created if the company had paid dividends and owners had invested the cash in equivalent, risky projects. The model illustrates the investment strategy as a use of cash flow. The definition of cash flow in the growth model differs from free cash flow and from the cash flow statement presented in the financial statement, although it is based on the same theoretical framework. Both equity and debt are allowed to be used for investments and are not based on the use of free cash flow.

According to the model, the investments of a company can be divided into three alternatives. These three opportunities are investments in I) research and development, in II) fixed assets, and in III) acquisitions. Investment opportunities are regarded as real investments, except for research and development investments. Investments for securities and other financial

assets are ignored, because the value of a company is assumed to be based on real investments. The definition and calculation of the symbols is shown in Appendix 8. Definition for the cash flow and a variation of the model is shown below.

$$C_t = R_t + K_t + d_t + b_t + a_t, \text{ where}$$

C_t = cash flow used for investment activities

R_t = R&D expenditures

K_t = capital investment

d_t = payments to shareholders

b_t = payments to debt holders

a_t = acquisitions

A measure of performance was defined as a difference between the total value of the current investment strategy and benchmark strategy. The value of the current investment strategy is the sum of the market values of equity and debt at the end of a period. The market value of a company is created by its investment strategy in R&D, fixed assets, and acquisitions. The value of a company in the assessing period is the market value of equity and debt plus the compounded value of payments to equity holders and payments to debt holders, which are assumed to be reinvested at the return on equity and risk free rate.

According to the model, the shareholder is assumed to reinvest all payouts from the company at the return of equity, and the debt holder is assumed to reinvest all payouts at the risk free rate. The return on equity was defined as a book return of equity, expressed as ROE. Return on equity in an average from yearly values of ROE. The magnitude of the risk free rate was defined according to the US government bond with ten-year maturity. Naturally, the rate for a ten-year bond varies yearly and the risk free rate is not a precise value. The level for the risk free rate was defined as five percent per annum to be constant during the total period.

Despite differences in inflation and the exchange rate risk, the risk free return and opportunity cost of capital were defined to be similar for every company. The value of the current investment strategy is shown below, with taxes being ignored according to the limitations. The definition for the symbols is shown in Appendix 8.

$$\text{Current value} = V_n + \sum d_t (1+r_e)^{n-t} + b_t (1+r_f)^{n-t}, \text{ where}$$

V_n = value of a company at the end of period ($E_n + D_n$)

E_n = market value of equity at the end of the period

D_n = market value of debt at the end of the period

d_t = payments to shareholders

b_t = payments to debt holders

r_e = cost of equity

r_d = risk free rate

A benchmark investment strategy assumes similar payments for equity holders and raises the same amount of outside capital. The difference between the current investment strategy and benchmark strategy is that benchmark strategy assumes that investments in R&D, fixed assets and acquisitions in excess of depreciation are invested at the opportunity cost of capital. The benchmark investment strategy assumes that zero investments are sufficient to maintain the original value of equity. The model presupposes that investments made by the company should improve the value of equity more than investments would have been improved, if invested at the opportunity cost of capital.

Some guidelines for estimating the opportunity cost of capital were gathered from a book written by Diesen (1998, 109-130). The estimation of the cost of equity is based on an industry specific risk factor, as noticed previously. The cost of equity for forest industry companies is usually estimated to lie between 11.5 to 13.2 percent.

The assumption is based on a certain risk free rate and market premium. He also exhibited estimates of required returns from different types of projects in the forest industry. The estimates were expressed by internal rate of return (IRR). Required return varies depending on the project. In a large paper machine or pulp mill project, the required rate should be at least 13% and in a large modernization project at least 18%. Therefore, the opportunity cost of capital should be a little bit lower than these internal rates. The opportunity cost of capital was defined to be 10% for all the analyzed companies, and was assumed to remain similar during the whole research period. Of course, such an estimation includes many of weaknesses, but standardizing has to be done. The value between investment strategies is calculated as a difference between the value of a current investment strategy and an benchmark one. The definition of an benchmark investment strategy is shown below.

$$\text{Benchmark value} = E_0 + D_n + \sum (R_t + K_t + a_t) \times (1 + \text{oc.c.})^{n-t} + \sum d_t (1 + r_e)^{n-t} + d_t (1 + r_f)^{n-t}, \text{ where}$$

E_0 = market value of equity in the beginning of the period

D_n = market value of debt at the end of the period

R_t = R&D expenditures

K_t = capital investment

a_t = acquisitions

oc.c = opportunity cost of capital

d_t = payments to shareholders

b_t = payments to debt holders

r_e = return on equity

r_f = risk free rate

Results can be expressed by a money based measure or as an index by dividing the value of a current strategy by that of a benchmark one. The required data for calculations were gathered from the Thomson One Banker database. The definition for items, which were used in the calculations are shown in Appendix 8.

3.3 Comparison of EVA[®] and growth model

Economic value added and the growth model have a different orientation to value measurement. Economic value added combines three aspects of value creation. At first, capital is needed to finance real investments, which are needed to generate revenues. Moreover, both sources of finance have costs. The cost of debt is defined in loan terms as percentages of the amount borrowed. The cost of equity is defined by the market model, based on the riskiness of the company in financial markets. The revenue generated by the real investments is compared with the cost of financial sources of capital. The concept of value creation measured by economic value added is based on revenues from business operations, the magnitude of sources of finance, and required return from both financial sources. This concept of value creation is fundamentally derived from the Ohlson's valuation concept of the abnormal earnings.

The orientation of the growth model towards value creation is largely based on the NPV concept. The growth model relies on the theory of value maximization, where executives of a company seek investment opportunities to improve the company's market value. The market value of a company should increase at least by the amount of investments made or even more than the value of the investment. The investment opportunities are supposed to generate returns more than expenses. Cash flow from investment activities reveals the magnitude of money used for investment opportunities. These opportunities are divided into capital expenditures and acquisitions.

Research and development expenses are deducted as operating expenses, and therefore such items cannot be gathered from the cash flow statement. The investments made create growth opportunities for the company, and the market value should improve through investments. The market value based on purely future expectations would not serve a long time without any results from improvements. On the other hand, the level of return is compared with required return, and a low rate of return does not improve the value of a company. From this perspective, the growth model has a connection with economic value added.

When compared with valuation techniques, economic value added is quite comparable to discounting abnormal return. Both concepts combine the invested capital, return, and required return. Similarities to dividend discount models and free cash flow model depend on the profitability and required return as well. The free cash flow method and growth model contain analogous elements between each other. According to the free cash flow method, investment activities are key drivers to improve profitability and free cash flow. Capital expenditures in excess of depreciation decrease the free cash flow and value of a company, if these investments do not lead to growth and improved profitability. The improvement of free cash flow by declining investments below depreciation level is not a sufficient driver to increase free cash flow. The desired effect of acquisitions should be equal to normal real investments. Acquisition activities are exceptional investments rather than normal activities, and free cash flow does not merely cover a big investment. An additional source of finance for acquisitions is gathered either with equity or debt. The effect on acquisitions should be noticed with improved net income and therefore an increase in free cash flow, rather than a bigger depreciation level. The connection between the growth model and dividend discount model and the abnormal earnings model is based on revenues and required return.

4. EARLIER RESEARCH ABOUT THE EFFECTS OF INVESTMENTS ON THE MARKET VALUE

Chapter 4 summarizes the results from empirical research about the investments' effects on the market value. Investments are classified according to the definition based on the growth model, and investments decisions are classified into R&D, fixed assets, and acquisitions. Research and development activities contain increase announcements in R&D. Capital expenditures mean additions in fixed assets, like plant and property. Acquisition activities combine both aspects, obtaining assets through acquisitions and asset sales. Empirical studies about the market value of a company are mainly based on stock returns as a consequence of an investment announcement. The investments' effect on economic value added is related to acquisition activities.

4.1 How investment actions affect market value

The early studies of Tobin & Brainard (1977) state that corporate investment is based on the assumption that managers seek to maximize the value of the company. Their assumption is based on the concept of net present value and claims that investment project is acceptable only if the project exceeds its costs. The net present value concept is introduced in the theoretical framework of this study. If returns from the project exceed its cost, the company's share price will rise. The effect of investment in relation to the market value of a company is usually measured by the event study method where stock return is compared with the normal returns of a stock before and after the announcement. Studies concerning capital expenditure announcements illustrate how the market value of a company changes after an announcement. Studies concerning returns from shorter time periods give an empirical perspective on how announcements affect the market value of a company.

The time span of the studies concerning relationship between the market value and capital expenditure announcement varies from one day to several years. An early study concerning capital expenditure decisions and the market value of the company was conducted by McConnell & Muscarella (1985). They found that the capital expenditure announcement affects the market value of a company according to the value maximization hypothesis. The study submits that the value of the company increases, if the company is assumed to have positive net present value investment opportunities. The announcement of decrease in extended capital expenditure has a negative effect on the market value of a company. McConnell & Muscarella noticed that the market value of industrial companies changed according to the value maximization hypothesis. Capital expenditure decisions of public utility companies had no significant positive or negative effect on the market value of a certain company. The relationship between the company's market value and capital expenditure announcement has been explained since the early study by McConnell & Muscarella.

The research by Chung et al. (1998) examined the affiliation between industry characteristics and the effect of capital expenditure announcement on the market value of a company, and claimed that the quality of a company's investment opportunities is the primary determinant of market reactions to capital expenditure decisions. They stated that the industry affiliation does not determine the value of a company, because investment opportunities depend on the company even if companies would operate in the same industry. A study by Jones et al. (2004) examined market reactions of UK companies after the investment announcement. Findings were similar to those of previous studies. They stated that the market reacts more favorably to investments that create future investments opportunities, than to investments which can be regarded as existing investment opportunities. Furthermore, the project size has a significant positive impact on the level of abnormal returns.

These studies concerning the market value of a company are in line with the theoretical framework of this study. The company's investment opportunities matter more than the industry when market reaction is compared to investment announcements.

In the light of these studies, a positive market reaction seems to be stating the obvious. A recent study conducted by Titman et al. (2004) states that market reaction is negative after the capital expenditure announcement. Such a result is contradictory to the preceding findings. Companies that increase their level of capital expenditures seem to generate negative abnormal returns. Market expectation has a significant role in explaining the results of an investment announcement. The announcement is favorable in a situation where the company is supposed to be able to create growth opportunities by investments. Some investment actions can be seen as overinvestments which do not drive the company's financial performance.

Results from previous studies reveal that the financial market does not react favorably to an investment announcement. Market reaction is affected by industry characteristics and market belief in the company's future expectations. Most recent studies point out the managerial effect on investment decisions which is an indicator of how announcements are assessed in financial markets.

Some companies in the pulp and paper industry have downsized their asset base by divesting and closing down plants and product lines. Several companies have made such decisions. How do these decisions affect the market value of the company? The literature review concerning the company's market value and plant closings reveals that these actions have an effect on the market value. However, no specific studies concerning the pulp and paper industry were found. Divesting and plant closings are different actions, and therefore these are not compared with each other.

When a plant closing is done, the net expenditures are depreciated or amortized away from the balance sheet. A Pure divestiture means the sale of an asset or a business unit and is considered a different investment in the company's investment strategy. The next section provides an outlook of studies concerning plant-closing decisions, and thereafter the impact of divestitures on the market value is examined in the light of previous research.

4.1.1 The effect of plant closure on the market value

Blackwell et al. (1990) examined plant-closing decisions and the market value of a company. They found that the plant-closing decision has a negative effect on the company's market value and that negative return can be the result of weakened investment opportunities or a poor decision by the management, and therefore closing decreases the company's market value.

A study of Bartov et al. (1998) shows similar results as previous studies concerning the market reaction to plant closure announcements. They also found that the difficulties of plant-closing companies are noticed in financial markets before the announcement is published. The difficulties of plant closing companies were also noticed in a study of Gambola & Tsetsekos (1992) in which the stock market reaction to the plant-closing decision was negative.

A study by Chalos & Chen (2002) examined the effect of employee downsizing strategies on the market value of a company. They also included the plant closing decision in their analysis and stated that, in a situation of excess capacity, a plant closing decision may have a positive effect on the value of a company. The results of the plant-closing decision, however, had a negative effect on the company's value.

4.1.2 The effect of divestitures on the market value

The concept of divestiture comprises several types of transaction for liquidating a part of an asset from a company. Public transactions include initial public offering, carve-out, and spin-off; whereas, private transactions include trade sales and joint ventures, where an asset is sold to a strategic or financial investor or combined with other industry players. (Goedhart et al. 2005, 467) Divestitures as a concept encompass several versions depending on the manner how such an action is carried out. However, the most relevant divestiture type in this study is asset sales that can be seen from the cash flow statement. Asset sales are viewed as an opposite of acquisition. Sub-chapter 4.1.3 gives a short summary about the divestitures' wealth effect.

A study concerning the effects of divestitures on value was conducted by Afshar et al. (1992) where they found that divestment has a positive effect on the value of a company and the impact is more significant, the greater, the magnitude of the divestment. An interesting approach to acquisition and divestitures by Kaplan & Weisbach (1992) shows that acquiring companies seem to divest the target after few years. In the light of the study, such an action is profitable in cases where the acquired company is related to previous business. Diversification through acquisitions does not succeed as well as acquisitions related to previous business. The sale of an acquired unit bought for diversification does not lead to value creation. The idea that focusing creates value was examined by Daley et al. (1997) when they found that spin-offs can create value which leads to improving operating performance. The study examined the market reactions to spin-offs and found a positive return after spin-off announcement when the assets of unrelated business were divested. Daley et al. stated that an increased corporate focus through spin-offs creates value.

A study of Lang et al. (1995) examined the causes of asset sales and stock market reaction after the sales. Their study revealed that managers sell assets, when the sale of asset provides the cheapest source of finance in some pursuits, instead of operating efficiency reasons. Usually companies selling assets have poor financial performance and high leverage. For such companies, successful asset sale is good news and increases the market value. A study conducted by Mulherin & Boone (2000) gives empirical evidence about the divestures' potential to create value. In their research, the market returns of divestures and acquisitions were compared. The concept of divestiture comprises spin-offs, carve-outs, and asset sales. Their study revealed that all types of divestitures had a positive impact on the share price after the announcement date. A review of studies concerning divestitures and the value of a company indicated that divestment decision has a positive effect on the shareholder value, and there are also more motives for divesting than the improvement of shareholder wealth.

4.1.3 The effect of research and development investments on the market value

The pulp and paper industry has been criticized for the shortage of research and development activities, when such expenses are measured in relation to sales of a certain company. R&D activities among pulp and paper companies have been incremental improvements in production efficiency, and research activities mainly relate to machinery.

A significant improvement concerning research and development in the Finnish forest industry cluster was introduced by the Finnish forest industries federation. The new research strategy aims to multiply research and development expenses by the year 2030. (Metsäteollisuus ry, 2006, 16) The strategy will change the intensity of research activities, but results will be seen in the future.

However, a short literature review gives an outlook of how research and development announcements are interpreted in financial markets.

Studies concerning research and development expenditures and the share value gives empirical evidence on how financial markets react to research expenses. Chan et al. (1990) examined share price responses to the announcements of increased research and development expenditures. In the beginning they divided the analyzed companies into two groups based on the magnitude of R&D expenses. They found a positive stock-price response for high-tech companies and a negative effect with low tech companies. The finding is very remarkable because the reaction indicates that the assurance of return of those research expenses does not assure investors in financial markets.

Zantout & Tsetsekos (1994) examined the effect of R&D announcement on rival companies. According to their study, the announcement of increasing research and development activities has a positive effect on the announcement's value and respectively negative value for the rival's value. Szewczyk et al. (1996) found similar stock market reactions as Chan et al. six years earlier. They found that R&D announcements of high technology companies have a positive effect on the share price, and with low-technology companies the effect is vice versa. The effect of R&D expenditure announcement on the shareholder value is interesting because industry characteristics influence how an announcement changes the market value.

4.2 Acquisitions and value creation

The literature review about studies concerning acquisitions and the shareholder value is divided into two sections. Studies cover the effect of acquisitions for several industries. The first paragraph concludes research concerning financial market reactions to acquisition announcements.

These primary studies examined abnormal stock returns in the long term. The second paragraph provides an overview of previous research concerning post acquisition financial performance, especially with economic value added. Because there is little research about the acquisitions' impact on EVA[®], the profitability aspect is included into the analysis.

A long term study of post-merger performance of acquiring companies was conducted by Agrawal et al. (1992), examining the long-run performance of acquiring companies. They found that the shareholders of acquiring companies suffered a wealth loss of about ten percent over five years after the merger completion date. The cause for negative return for the shareholders was not the company size effect or beta estimation, because company size and beta were adjusted to eliminate their effect on returns. The assessing period was subdivided into a sample of sub periods, according to decades. In the fifties, sixties and eighties, cumulative abnormal return was negative. During the seventies, abnormal return for shareholders after acquisition was positive, but not statistically significant.

The method of acquisition has an effect on post-acquisition performance according to the research made by Rau & Vermaelen (1998). Acquisition completed by a merger led into underperformance of the financial market in relation to peer portfolios. If a tender offer was used as a method of payment, the return was positive in relation to control portfolio. Market reaction was estimated three years after acquisition. Rau & Vermaelen found that market returns between the companies with low and high book-to-market ratios are different. High market-to-book companies, referred to as value companies, perform better than low book value companies after acquisition. The method of payment in acquisition did not affect the post acquisition performance of value companies.

Moeller et al. (2005) compared the shareholder return after acquisitions in the US market in two mergers in the 1980s and a merger wave in

1998–2001. They found that the aggregate value of acquisitions was positive until the year 1997. Thereafter acquisitions wiped out the gains from earlier succeeded acquisitions. The study reveals that companies with successful acquisitions are willing to grow further by acquisitions until they make a big unsuccessful move. Recovery from failed acquisition takes a long time, and meanwhile the company underperforms in the financial market compared to the industry portfolio. Gains from acquisitions are usually measured by stock returns in a certain time period.

A study of Fuller et al. (2002) investigated the return of acquiring firms that were divided into two groups, namely private and public companies depending on their ownership. The results of the study indicate that bidder shareholders gain when the bidding company buys a private company or a subsidiary of a public company. The return is negative when the bidder buys a public company, the bigger the target is, and if the bidder uses stocks as a payment, the greater the return is.

Private companies are acquired from an illiquid market, and therefore the valuation of those assets reflects the liquidity discount and that may have a positive effect on the results. According to the study of Fuller et al. (1992), the return for acquirer's shareholders is affected by the ownership status of the target company. The results of the study indicated that bidder shareholders gain when the bidding company buys a public company or a subsidiary of a public company. The effect on the shareholders' wealth was opposite, when the acquired company was a public company. They also noticed that the gain or loss was greater when measured in absolute values, when the target was larger.

The previously presented studies measured value creation with the market and changes in the market value after an acquisition. An alternative for value measurement is economic value added; however, the literature is rather limited on research concerning post acquisition performance with such a measure.

A study by Yook (2004) examined post-acquisition performance of acquiring companies measured with Stern Stewart's EVA[®] which is defined as a monetary based measure. The use of an industry adjusted measure takes into account factors that similarly influence on each industry and business cycle as well. Performance was measured as a difference between pre-acquisition and post-acquisition EVA[®]. The result suggested that overall performance deteriorated significantly after acquisition. The results from industry adjusted EVA[®] are similar, but not as significantly as without industry adjusting. Industry adjusted measures also indicate the deterioration of value creation after an acquisition, but not as significantly as without industry adjusting. Performance after acquisition does not differ from industry counterparts, because poor performance may not differ from industry counterparts. Such a finding may indicate that poor operating performance encourages takeovers.

4.2.2 Earlier research on post-acquisition profitability

Post-acquisition financial performance is analyzed because studies on value creation after acquisition have not been examined very much. The review of studies concerning financial performance after post-acquisition performance gives an outlook of how such an action affects profitability, because it has been submitted that post acquisition performance has an effect on the ability to create value.

For example, Fowler and Schmidt (1988) examined the financial performance of manufacturing companies after acquisition. The results of the study indicate that on the average financial performance declined after acquisition compared with a similar time span before acquisition. Expected returns from acquisition did not realize as managers expected them to. However, some companies were able to improve their financial performance despite the fact that acquisitions do not lead to value creation in general.

Quite similar results were found by Ravenscraft & Scherer (1987), although their study was not based on any specific type of company. Acquiring companies seem to underperform their industry peers.

Strategic orientation is usually combined with acquisitions and seen as a reason for such activity. Healy et al. (1997) examined differences between strategic and financial acquisitions. Strategic acquisition was defined as a friendly overlapping of similar businesses and financial acquisition as a hostile takeover. The results of their study showed that acquiring companies did not generate any additional cash flows that were needed to pay the premium. However, the type of transaction and the profitability of takeover are related. Friendly takeovers outperform hostile takeovers, and the method of payment has an impact on financial performance after acquisition. The use of stock or debt to finance acquisition leads to better results than the use of cash as a payment method. The results indicate that companies with overlapping businesses perform better after acquisition than in acquisitions of unrelated businesses.

The use of measuring the market return relies on an efficient market hypothesis, and market reaction toward certain information is regarded as biased. Mitchell & Stafford (2000) examined long term stock returns and corporate events. They stated that measuring long term stock performance is not necessarily caused by corporate events. Such a finding weakens the reliability of results from long term stock market reactions.

4.3 Contradiction between shareholders and managers

The literature review presented previously in this chapter provides results of how a certain type of investment affects the market value of a company and value creation as the shareholders' point of view. But why does the aim of shareholders not actualize? Some negative outcomes could be explained by an unfavorable business cycle or other contemporary

conditions. The contradiction between shareholders and managers is usually described with the agency theory, introduced by Jensen & Meckling (1976). The theory examines the relationship between two persons, a principal and an agent. The contradiction in the actions of these two actors is explained with the utility maximizing theory, which assumes that both the agent and principals are utility maximizers. The agency problem occurs when the agent does not act according to the shareholders' interests. Principals can establish incentives for agents to ensure that their interests meet each other. The purpose of incentives is to minimize contradiction between principals and agents. Agents require compensation for their efforts used to drive managers' objectives. This arrangement creates a cost, which is known as agency cost. However, creating incentives should lead into a better result than agents would achieve when acting according to their utility maximization principle.

The agency theory has been a fundamental approach to examining the relationship between shareholders and managers since it was introduced by Jensen & Meckling. According to Jensen (1986), a conflict can arise with the use of free cash flow. When resources under the management's control increase the management's monitoring cost increase as well. Resources are regarded as retained earnings that can be used for dividend payments and free cash flow. This kind of positive problem occurs when a company generates free cash flow in excess of investment opportunities. From the shareholder's point of view, there is a danger that managers would spend the cash flow in unprofitable investments opportunities.

Empirical evidence from takeovers show, which companies in a mature industry with excess capacity and low growth opportunities are likely to carry out acquisitions and unprofitable investment opportunities. Usually, such actions do not lead to gain the shareholder value.

The cash flow hypothesis and investment decision have been studied widely since the theory of value destructive investments was introduced. For example, a study of by Vogt (1994) showed empirical evidence about the relationship between cash flow and capital expenditure decisions. Especially large companies with a low payout ratio use cash flow for capital expenditures more than dividend payments. Companies were classified according to Tobin's Q ratio, and low Q were more apt to spend cash flow for capital expenditures than high Q companies.

However, the results of a recent study conducted by Aggarwal & Samwick (2006) contradict the assumption of the agency model. They found that private benefits do not motivate managers as was assumed before. Because overinvestment was based on private incentives, the managers' interest towards making extensive investments disappears.

On the other hand, according to Richardson (2006) the agency problem and overinvestments exist among companies. The research on publicly traded US companies and the use of cash flow reveal that overinvestment is typical for companies with a high level of free cash flow. He noticed that the governance structure has an impact on the investment mania. The control and active presence of shareholders mitigate overinvesting the free cash flow.

The results of previously presented studies show that the agency problem exists and it is commonly examined with the use of free cash flow. Problems between interest groups occur within the investment decision, which has a remarkable contribution to long term performance. The use of cash flow is a key driver, which can be seen in the valuation framework. The investment decision has both the short and long term aspect in free cash flow, which is seen in the amount of capital expenditures and more significantly in the net income.

5. VALUE CREATION AND INVESTMENT STRATEGIES OF PPI COMPANIES 1996–2005

Chapter 5 collects the results concerning value creation and investment strategies. Value creation is measured by economic value added (Chapter 5.1) and the growth model (Chapter 5.2). The value creation and investment strategies are explained by geographical area and business orientation. Further research tries to analyze a cause and effect between the investment strategy and value creation.

The economic value added is measured by ROIC-WACC and not by a more typical residual income type measure in this analysis. The reasons for this are explained in Chapter 3.1. Value creation depends on both the revenues and cost of capital. The market risk affects the required return on equity, and capital structure decisions has their impact on required return. Therefore, also these indicators are collected by business orientation and geographical area and presented in Chapter 5.1. More detailed figures concerning ROIC-WACC are shown in Appendices 4, 6 and 7.

Growth model as a measure includes the following parameters of the investment strategy: I) R&D investments, II) capital expenditures and III) company acquisitions. Since R&D investments are very modest in the pulp and paper industry we only give some illustrative facts about the most research intensive companies in the industry. Capital expenditures and acquisitions are analyzed by geographical area and business orientation. Findings of the growth model are analyzed at the company level. The results of economic value added and the growth model are analyzed in a cross sectional analysis, where the outcome of the growth model is compared with the year 2005 ROIC-WACC.

The following colors indicate company's business orientation: converting – pink; diversified – red; paper & board – blue; pulp – light green.

The division according to the geographical areas is illustrated by the following colours: Asia Pacific – green; Europe & Africa – grey; North America – blue; Scandinavia – turquoise; and South America – red. The classification of the companies by business orientation and geographical area are exhibited in Appendices 2 and 3.

5.1 Data description

The required data was gathered from the Thomson One Banker database. Information on financial markets, rates, and the market and equity returns were retrieved from the DataStream database. The basic population for the study was 100 companies, and reasons for eliminating a company and the number of eliminated companies are shown in Table 1 and the list of companies in Appendix 1. The sample was based on the situation in the end of the year 2005.

Table 1. Sample selection process of analyzed companies

Reason for elimination from the sample	Number of companies
Basic population	100
Eliminated because of company's sales based on PPI products is low	3
Eliminated because of merger, acquisition or missing data from database	23
Useable sample	74
Privatization of company has not been listed as the beginning of the period	19
Eliminated because require data were not available neither in database or company's website	6
Total sample size	49

5.1 EVA[®] and determinants for cost of capital

The results from EVA[®] are shown by business orientation or by geographical areas. After economic value added, the market risk of companies is presented by business orientation. This is done because the business risk affects the required return of equity remarkably. Capital structures are opened by geographical areas to find out how they differ by geographical areas.

5.1.1 Value creation by business orientation

Figure 3 presents the value creation by business orientation measured by the difference between return in capital and the weighted average cost of capital. The vertical axis illustrates the spread between return and cost of capital. Where the horizontal axis cuts the vertical axis, value is not created or destroyed. The industry's average shows the sensitivity of the branch to economic fluctuations.

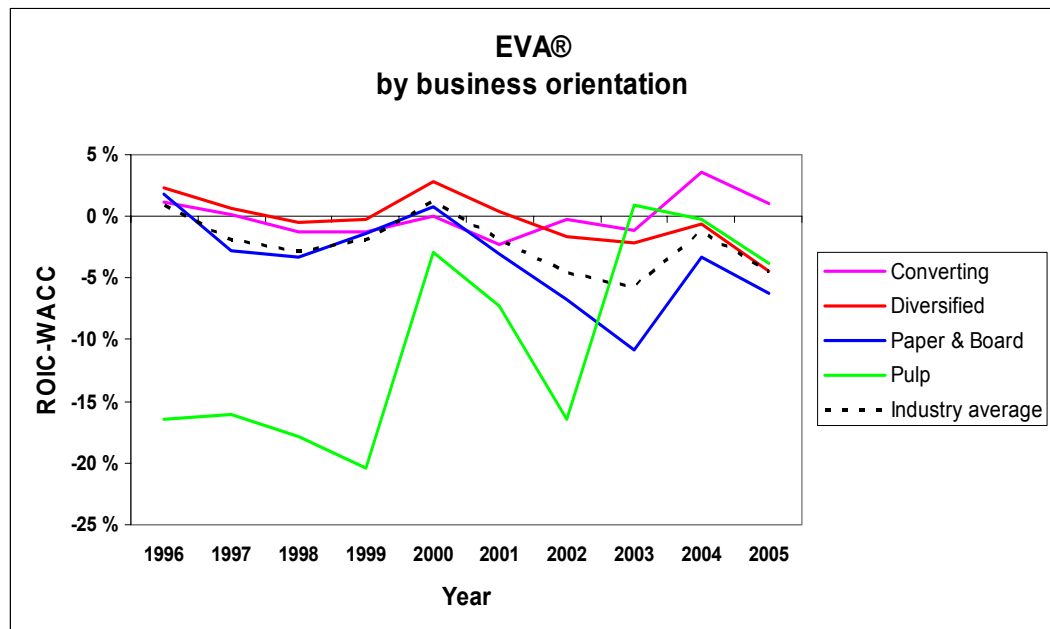


Figure 3. EVA[®] by business orientation 1996–2005

The pulp companies' ability to create value varies more than the spread of other business orientation groups. Differences between industry groups are small, although diversified and converting companies outperformed the industry's average during the assessment period. Value creation of paper and board companies represented the industry's average until the year 2000.

In 2000–2005, paper and board companies performed worse than the industry's average. A very interesting fact is that the PPI companies' ability to create value did not improve despite the economic growth after a slowdown period in 2003–2005. Explanation for the inability to create value can be found from poor profitability rather than the cost of capital. Both the level of interest rates and business risk affects value creation through the cost of capital. Interests are shown yearly by countries in Appendix 4. The riskiness of companies is based on the market model and measured by the beta coefficient; and the beta values are shown in Chapter 5.1.3.

The ability to create value largely depends on the company. Only Nampak, Kimberly-Clark, Mayer-Melnhof, and Schweitzer Mauduit created value during the entire research period. Value destroyers during the whole ten-year period were International Paper and Potlach. Big players among the paper & board companies seemed to be value destructive companies. Such companies' ability to create value depends heavily on the business cycle. Good examples of such companies are Sappi and Stora Enso. Among the diversified companies, the value creation of M-real and Weyerhaeuser seemed to follow the business cycle most strictly. The ability of companies classified as diversified to create value seemed to be less dependent on the business cycle than the paper & board companies.

Converting companies were less dependent on the business cycle than companies in other positions in the value chain, although the number of

such companies was moderately low compared to the number of paper & board companies. The pulp companies' ability to create value depended heavily on the business cycle.

5.1.2 Value creation by geographical areas

Value creation with economic value added is opened up by geographical areas in Figure 4. European companies created value nearly the whole research period. Differences between the companies' ability to create value were remarkable: for example Sappi from South Africa destroyed value except for one year. By contrast, Nampak from the same country created value for ten years. The financial performances of European companies have been better than in some other geographical areas. The North American companies' ability to create value remained above the industry's average until the year 2000. Thereafter, their ability to create value declined at the level of the industry's average and fell below the average after the year 2003.

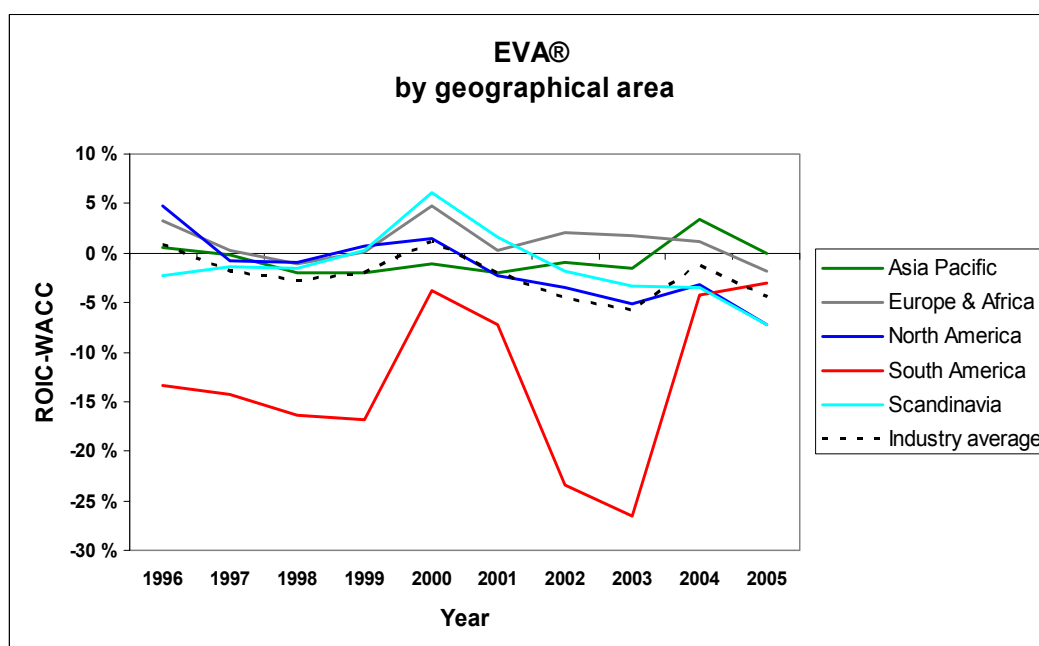


Figure 4. EVA[®] by geographical area 1996–2005

The state of the North American companies is very contradictory. In addition to value creators mentioned in the previous chapter, there are companies, like Sonoco and Greif who outperform other players in the same geographical area.

Scandinavian companies outperformed the industry's average nearly the whole period, although their aggregate return on capital declined under the level of aggregate cost of capital after 2001. Scandinavian companies differ remarkably from each other. The group of best performers consists of Holmen, SCA, and from UPM-Kymmene. The others M-real and Stora Enso perform weaker than the group of best performers.

The South American companies' capability to create value varied heavily during the research period. However, these companies have improved their financial performance during the whole research period, and in the near future it may be possible for these companies to shift to become value creators. In the year 2005 the South American companies reached a level equal to the industry's average, although the spread was negative. It is noteworthy, that value creation seems to be independent of the geographical area. The financial performance of Aracruz seemed to be better than other South American companies.

Asian companies performed above the average except for the period 1999–2001. From the Asian Pacific companies, Daio, Lintec and Hokuetsu have outperformed their peer companies in the same geographical area. Instead, Tokai and Mitsubishi have not succeeded as well in value creation.

Both the cost of debt and equity vary by geographical areas. For example, the required return on equity for Japanese companies has been very low because of the financial crises of the country. Respectively, companies in emerging market areas have a higher required return on equity and debt than companies in emerged markets.

5.1.3 Market risk of companies by business orientation

Betas were needed in estimating the company’s cost of equity according to the Capital Asset Pricing Model (CAPM). Value betas were calculated from monthly returns of each stock in relation to market return. Market returns and indices used in defining the beta coefficient are shown in Appendix 5. The beta tells how much the average stock price has changed for each additional one-percent change in the market index. Stocks with beta value above 1.0 indicate a higher risk than the market index, and vice versa with beta below 1.0. Figure 5 presents the aggregate betas of companies grouped according to the business orientation and industry mean. The industry’s average beta declined slightly during the years from 0.83 to 0.73. The betas on companies at different positions in the value chain also changed in the ten years. Smaller beta values reduce the company’s cost of equity, when other factors are constant. The aggregate required return for equity for PPI companies declined during the research period. The intersection of the horizontal and vertical axes describes the risk equal the market risk or 1.0.

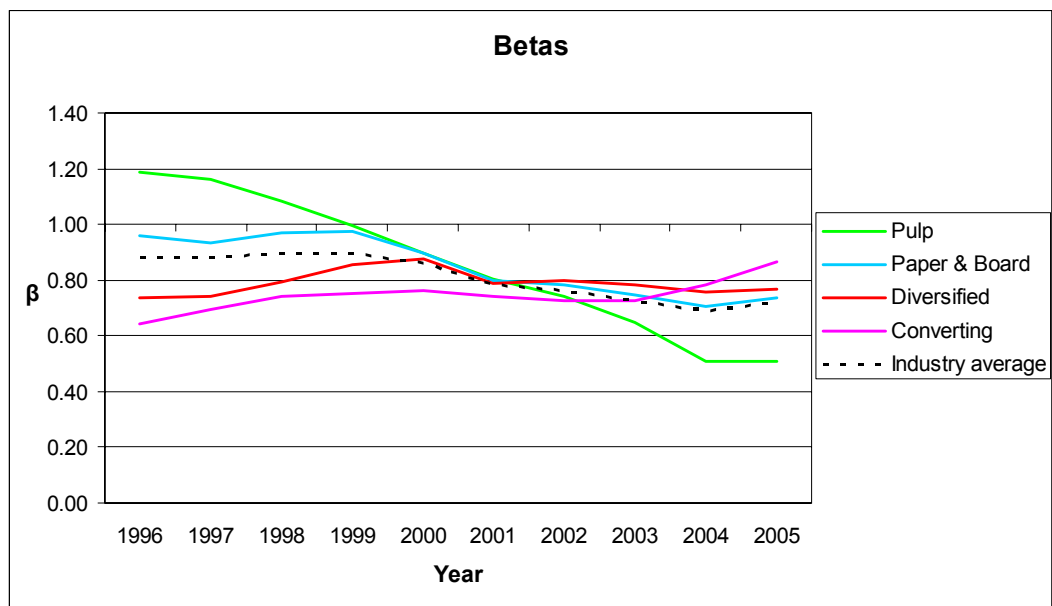


Figure 5. Betas by business orientation 1996–2005

The risk of pulp companies' stock has changed remarkably during the assessment period. The beta coefficient is about half the value it was in the beginning of the period. Paper and pulp companies represent quite well the industry's average in beta values during the whole period. The risk of the diversified companies' stock was lower than the average until the year 2000. Beta of diversified companies remained above the industry mean until the end of the assessment period. Converting companies were far below the industry's average measured by aggregate beta. The shift occurred in 2003 when the beta value reached the industry's average.

It is quite interesting how beta values of companies have changed during the research period. The betas of pulp companies declined by nearly a half from the value in 1996. The change occurred in all geographical areas: in North America, Europe, and South America. It would be dangerous to make any conclusions about the riskiness of pulp companies because of a small number of such companies. The trend in betas of other business orientation groups is similar. The beta value of a certain business orientation group declined or rose in US, Canada, and Scandinavia. A remarkable shift happened in the aggregate beta value of Canadian PPI companies. In ten years the aggregate beta declined from 1.07 to 0.7. This means that the cost of equity has declined, and on the other hand forest industry stocks have not risen or declined with the market index. Overall, to get a more reliable view of the riskiness of PPI companies, the beta should be defined so that R^2 is gathered as well. Thereafter, the market risk and unique risk could be distinguished from each other.

5.1.4 Capital structure by geographical areas

Analyzed PPI companies operate in different geographical areas, although each company's cost of capital is defined according to the address country. Because the company's capital is affected by capital structure, the capital structure decision is shown in Figure 6.

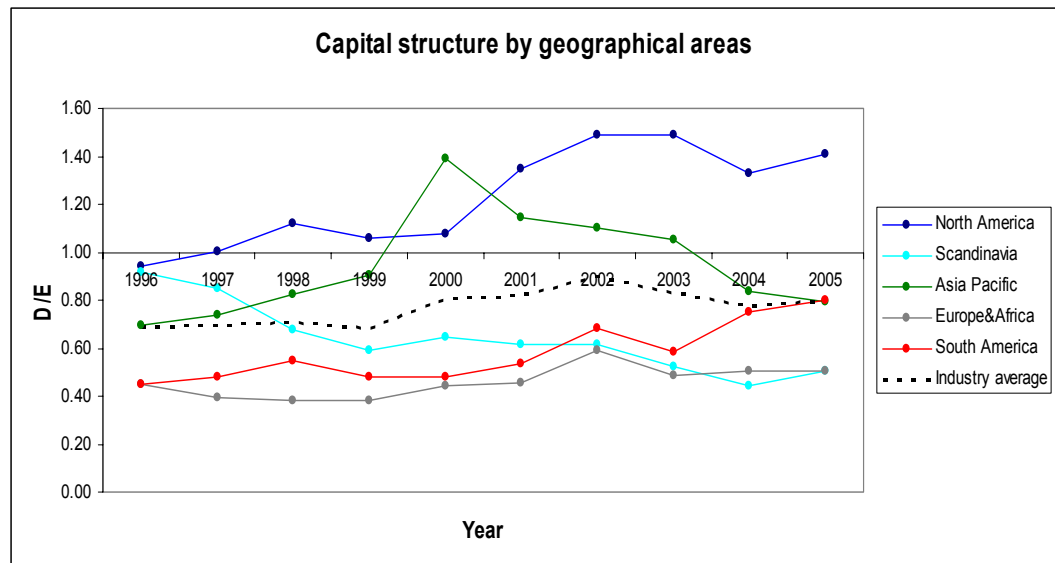


Figure 6. Debt to equity by geographical areas 1996–2005

Quite an interesting fact is that North American and Asian companies have used debt financing more than the industry's average during the entire research period. The debt to equity ratio of North American companies has been above 1.0 since 1997, and the ratio has increased since those times. Scandinavian companies have relied on equity finance more than the industry's average since 1998.

European companies, including South African companies, have also relied more on equity finance than debt. South American companies relied on equity finance rather than debt. It could be explained by the high interest rate level in South America which has driven companies to prefer equity finance.

What affects debt-to-equity decisions of companies in different geographical areas? The North American companies are a good example of capital structure decisions. Have these companies made a conscious choice or has the debt been necessary because equity providers have not considered PPI as an attractive investment target?

However, both alternatives may suit these companies. A more favorable alternative explanation for the use of debt would be that North American companies have used leverage to improve return to equity holders. Scandinavian and European companies seem to rely on equity finance instead of using debt. Such a capital structure raises the company's cost of capital because equity finance is more expensive than the use of debt.

5.2 Investment strategy and the growth model

Opening up the investments strategies in the pulp and paper industry starts with the description of research and development activities. Research activities are included in the growth model, but as their role in the pulp and paper industry is modest, they are only described in this chapter. Following Chapters 5.2.2–5.2.4 open up the other components of the growth model, capital expenditures, and acquisitions. Results of the growth model by companies are exhibited in Appendix 10.

5.2.1 Research and development orientation

Research and development expenses for some companies were not available either from the database or the companies' web sites. The missing values were estimated on the basis of the last or previous available one. In other cases the magnitude of the industry's average R&D was used as an estimate of such activities. Figure 3 presents the industry mean of R&D expenses to sales for five companies that have invested the most in research activities from the analyzed 49 companies.

The magnitude of R&D expense to sales differs from zero to 2.7 percent. The companies whose R&D expenses exceed the industry's average operate in different positions in the value chain. The amount of money used in explorative investments is very low among PPI companies.

Any significant differences between companies with different business orientations were not found, although companies in the beginning of the value chain did not allocate resources to R&D at all. The Asian and namely Japanese companies seem to differ from other companies. Nearly all the Japanese companies allocate money for R&D more than the industry's average. SCA's relative research orientation declined remarkably during the last decade. The company's resources fell to one third of the level in 1996. Only Lintec slightly increased their R&D expenses to sales. The product portfolio may affect how much money is allocated for improving products and product lines.

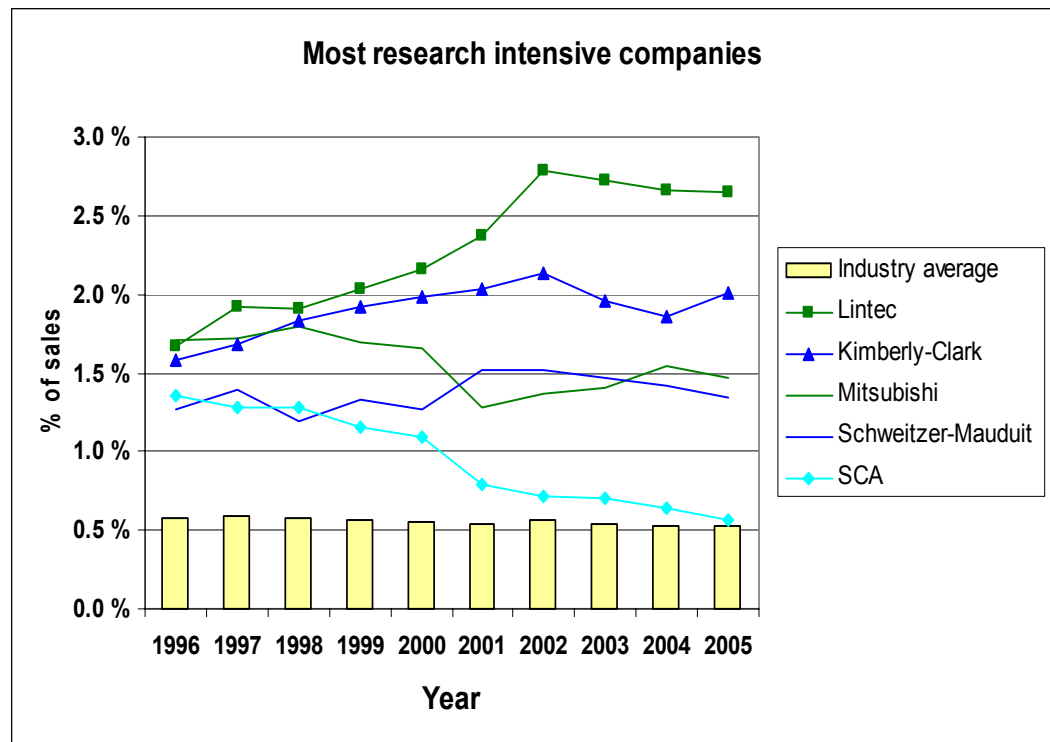


Figure 7. Five most research intensive companies 1996–2005

An announcement of the increased research activities in mature businesses has a negative effect on the market value, as examined by Chan et al. (1990) and Szweczyk (1996). The magnitude of R&D expenses shows that such actions cannot be reported very actively, compared with the money used in machinery. Activity in informing about

research expenses cannot be the cause for poor performance in financial markets, or have you ever read a stock exchange release about increased R&D expenditures in a PPI company? Of course, there have been announcements considering R&D centers. On the other hand, low expenses to create new products or customer solutions do not create competitive advantage. More detailed information about R&D expenditures at the company level is shown in Appendix 9.

5.2.2 Capital expenditures by business orientation

In a capital intensive industry, capital expenditure strategies play an important role. The company can be considered growing organically when capital expenditures exceed depreciations. Figure 8 exhibits capital expenditures in relation to the depreciation level, from 1996 to 2005 by business orientation. Values in the vertical axis are defined by dividing yearly capital expenditures by the yearly depreciation level. The value 1.0 represents a neutral level where depreciations are equal to capital expenditures and the current assets base is maintained but not expanded. The value above 1.0 indicates positive investments in the assets base, and respectively values below 1.0 downsizing the asset base. The results between value chain groups are comparable to each other, because capital expenditures are divided by the depreciation level. The group of pulp producers consists of five companies. The aggregate level of capital expenditures of pulp companies was lower than the depreciation level between 1996 and 2000. In 2000, 2003 and 2004 investments exceeded the depreciation level. An interesting fact is that the aggregate capital expenditure level remained the same as the aggregate level of depreciation in 1996–2005. However, there were differences between the analyzed companies: Aracruz and Canfor expanded their assets base by real investments. By contrast, Pope & Talbot, Portucel and Tembec downsized while others invested in their asset base.

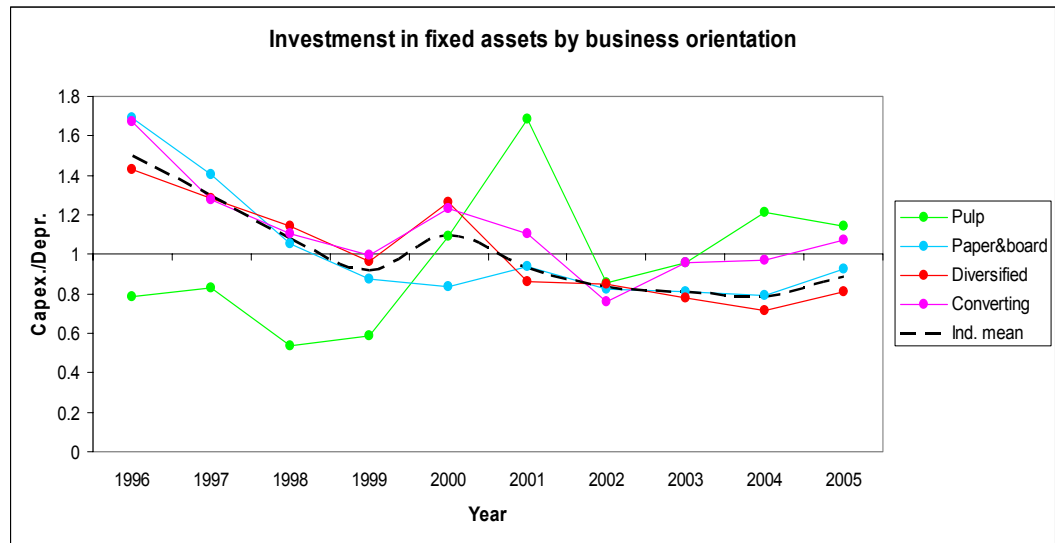


Figure 8. Capital expenditures by business orientation 1996–2005

Paper and board companies orchestrated their asset base remarkably differently than pulp companies. The investments of pulp and paper companies in fixed assets are shown in Figure 8. Paper and board companies invested actively in 1996–1997, and the asset base expanded remarkably. However, during the next eight years capital expenditures declined radically. As a result, cumulative capital expenditures were 95% of cumulative depreciations at the end of the period. All companies did not act similarly during the period. While most of the companies downsized, Empresas Cmpc, Holmen, and Votorantim continued to expand their assets base.

At the same time, Abitibi-Consolidated, Stora Enso and UPM-Kymmene decreased their capital expenditures level below the depreciation level. Cumulative investments in relation to depreciations were quite identical with UPM and Stora Enso, worth 0.86 and 0.88. The proportional downsizing of Abitibi-Consolidated was even more powerful, as the capital expenditures of the company covered only 60 percent of the depreciation level.

Nearly half of the paper and board companies continued to downsize while others invested in organic growth. There were big players belonging to both expanders and downsizers.

The investment styles of diversified companies are also shown in Figure 8. Their investment activities were the most active until the year 2001, and remained at least in the industry's average or above it. Active capacity expanding was wiped away in 2001–2005. The aggregate value of capital expenditures in 1996–2005 was quite close to the depreciation level, although slightly under. This group also contains the big players of the pulp and paper industry. One third of diversified big players had positive investments in fixed assets during the research period. For example, the capital expenditures ratio of Kimberly-Clark is at the level of 1.3 and for M-Real as high as 1.8. Meanwhile, International Paper, Smurfit-Stone Container, and Weyerhaeuser downsized their asset base by avoiding making real investments. With International Paper, the capital expenditures level represents three quarters of the aggregate amount of depreciations. For Smurfit-Stone Container the ratio is even lower 0.64 and for Weyerhaeuser 0.84. It is quite interesting that International Paper started to downsize already in 1997, namely few years before other big players started to make cutbacks.

The only business orientation group that increased their asset base by real investments were the converting companies. Only one fifth of these companies depreciated more than used capital expenditures. This kind of investment behavior led to a 10% increase in their asset based through conventional capital expenditures. The downsizers were Caraustar and Temple Inland. The magnitude of downsizing varied from one quarter to one fifth as cumulative values during the research period. Over 20-percent increase through real investments was achieved by Amcor, Nampak, and Longview Fibre Company. Investment styles measured by the difference between capital expenditures and depreciations were very identical between business orientation groups. Only the investment style of pulp

and converting companies differed slightly from the industry's average. As a conclusion, the industry's aggregate money used for capital expenditures was about 12percent below the depreciation level.

5.2.3 Capital expenditures by geographical area

Investment strategies by geographical areas are shown in Figure 9. Definitions for the relationship between capital expenditures and depreciations are provided similarly as the investment strategy was analyzed by business orientation.

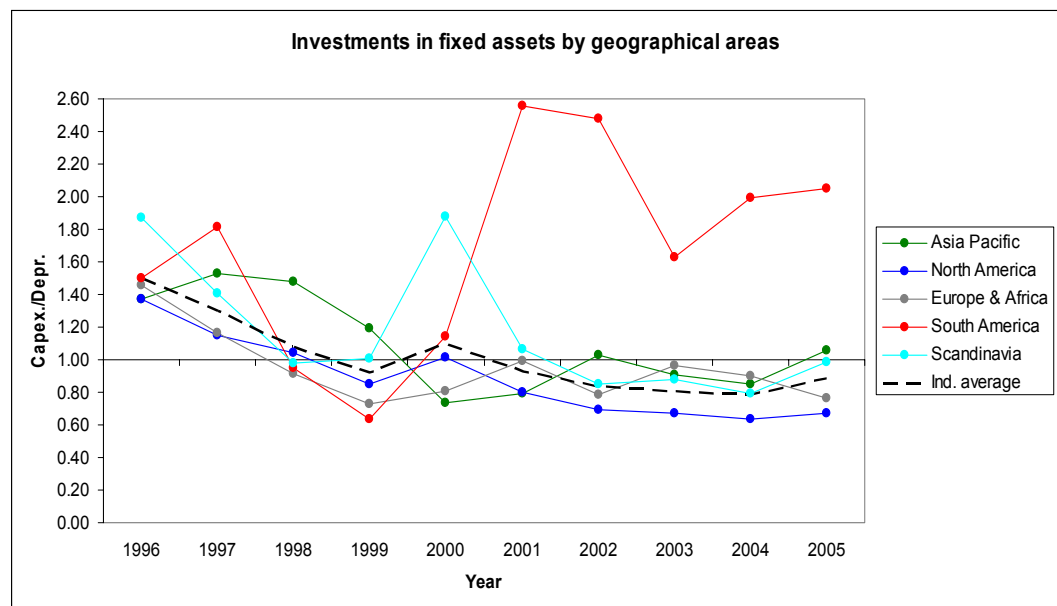


Figure 9. Capital expenditures by geographical areas 1996–2005

From Figure 9 it can be seen that investment strategies vary remarkably by geographical areas. The North American companies' investment activity is below the industry average during the entire ten-year period, and the gap between industry average and North American companies even widened by the end of the period. As a cumulative value, such a situation states that capital expenditures are fifteen percent below the depreciation level.

Scandinavian companies follow very closely the industry's average, except for the year 2000. However, the difference between the industry's average and these companies is very slight. For Scandinavian companies, the investment styles led into a 10-% increase in asset base during the research period.

Asian Pacific companies seem to follow a similar investment style as the companies in Scandinavia and Europe. Differences between these companies are seen as a difference between the cumulative sum of capital expenditures. European companies declined by ten percent, while Asian companies expanded their assets base slightly by four percent. Only South American companies used a remarkable amount of money in relation to depreciations. These companies stated a significant expansion with capital expenditures after the year 2000. A cumulative sum of capital expenditures exceeds the depreciations by 70 percent.

5.2.4 Acquisition activity by business orientation

Acquisition activity by business orientation is shown in Figure 10. The proportional scale on the vertical axis is defined by dividing the disposal of fixed assets by the amount used in acquisitions. The measure is reverse for the logic used with investments in fixed assets. The use of similar logic would have caused a significantly different scale than with this style. By using this measure differences can be noticed easier.

The intersection of the horizontal and vertical axes illustrates the neutral level in acquisitions where values from assets sales and acquisitions are on the same level. Values below the zero level indicate that acquisition exceeds asset sales. Respectively, value above 1.0 indicates that value of asset sales is bigger than money used for acquiring companies. The industry total represents the relationship between these two items for the whole industry. An illustration of the acquisition activity reveals similarities

between companies grouped according to the business orientation. Especially paper & board manufacturers and diversified companies seem to follow the industry trend in investment activities. The acquiring activity seems to differ from the position in the value chain. In the beginning of the value chain, capacity expanding is done by real investments, and in the end with acquisitions.

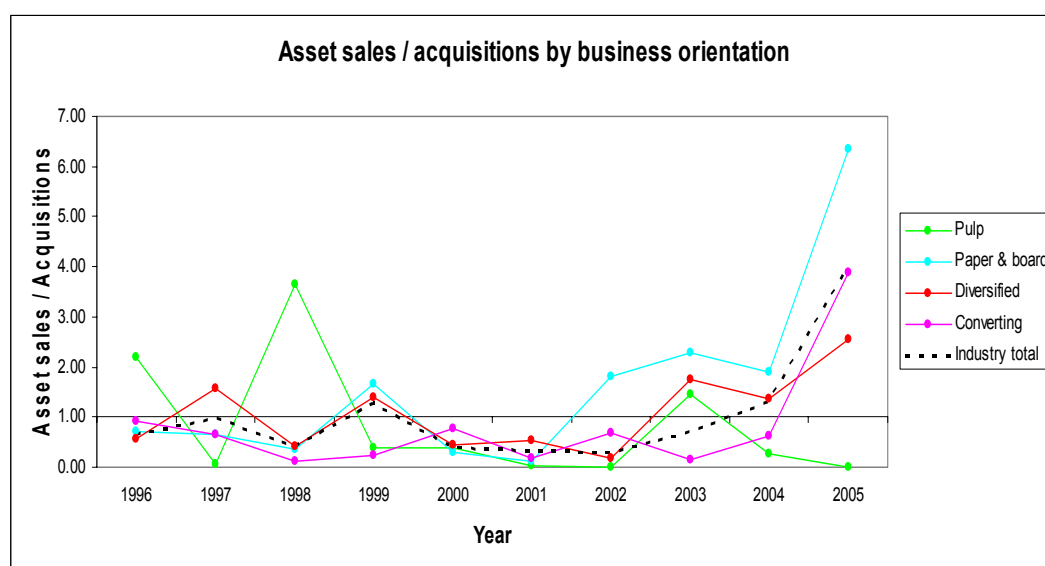


Figure 10. Asset sales to acquisition by business orientation 1996–2005

The problem with the chosen measure is that it can affect heavily a relative big company, especially when neither asset sales nor acquisitions in a certain year are made. For instance, Tembec is the only company among pulp companies that has made significant acquisitions.

It is quite interesting that further processing companies used acquisition as a device for growth. Despite the last year, converting companies carried out acquisitions more than asset sales. It would be interesting to study what kinds of companies the converters have acquired. The magnitude of money used in acquisitions was three times bigger than generated from asset sales. The acquisition activity of paper and board companies followed the industry average until the year 2001.

Thereafter, these companies avoided acquisitions and concentrated on asset sales. The relation between the asset sales of paper and board companies and acquisitions exceeded the industry's average and all other business orientation groups. Despite the active asset sales in 2001–2005, the cumulative sum of acquisitions from the total period exceeded asset sales by about 50 percent. For diversified companies, the cumulative sum of acquisitions was 70 percent higher than money generated from asset sales. The remarkable shift was caused by the small amount of money used for acquisitions between 2001 and 2005.

5.2.5 Acquisition activity by geographical areas

Figure 11 shows acquisition activity by geographical areas. The acquisition activity is measured similarly as in the previous chapter. The zero level in acquisitions is exhibited with a horizontal line at the value of 1.0. Geographical location seems to affect the acquisition activity. In Asia, growth by acquisitions seems to vary more than the industry average describes.

Also, European and South African companies are not very active in acquiring activities. South American companies seem to carry out a different strategy than companies in the industry's average. Individual companies can have a serious effect on the results if they have carried out either massive acquisitions or assets sales. Such actions do not occur definitely in the same year. Especially acquisitions of Asian Pacific companies are mainly carried out by Amcor, while Japanese companies have not made acquisitions.

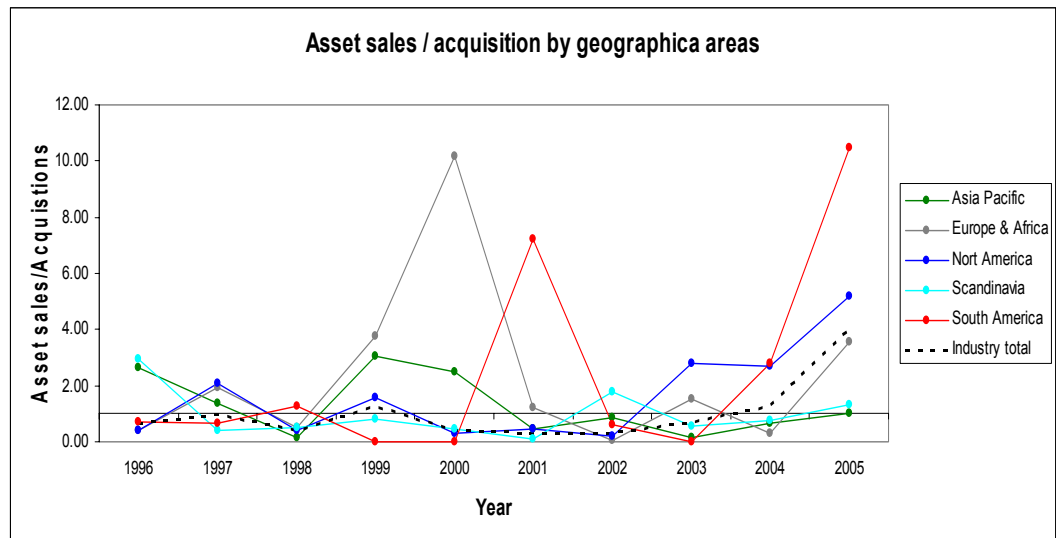


Figure 11. Asset sales to acquisition by geographical areas 1996–2005

Scandinavian and North American companies again seem to follow quite identical styles of investing. North American companies are located quite near the industry's average; although they are bigger than companies on average in the industry, their asset sales compared with acquisitions are close to the average.

The change in the acquisition activity seems to have started by North American companies a few years earlier than within other geographical areas. Scandinavian companies were carrying out quite a similar strategy as North American companies. Scandinavian companies have expanded their asset base by acquisitions except in 1996 and 2002. The timing of acquisitions was quite identical with the industry in general.

The shift towards assets sales of Scandinavian companies occurred a few years later than with the North American companies. Despite the quite identical investment styles between the analyzed companies, the individual companies could behave quite differently from the average of the measured groups, i. e. by business orientation or geographical area.

Which one leads to better results: following a similar strategy as the industry on average or carrying out a diverging strategy? Analyzing the growth model by company level reveals how companies have created value with the chosen investment strategy during the last decade. This will be clarified in the next chapter.

5.3 Investment strategy and value creation at company level

The connection between the investment strategy and value creation by companies is shown in Figure 12. The investment strategy is defined according to the growth model, and the results are exhibited in Appendix 10. The vertical axis represents the cumulative sum of net investments in fixed assets from 1996 to 2005 divided by each company's total assets in the beginning of the period in 1996. The concept of net investment is defined yearly as a difference between capital expenditures to fixed assets and depreciations.

The horizontal axis represents the cumulative sum of net acquisitions from 1996 to 2005 divided by total assets for the beginning period. Net acquisitions are defined as a difference between money used for acquisitions and cash generated from assets sales.

Monetary based results of these both investment activities are divided by total assets at the beginning of the period to make results comparable between companies of different size. The results are exhibited either value creation or value destruction. Colors in the following figure indicate either value creation as green or value destruction as red. Companies are shown in Figure 12 and classified into four groups according to their investment styles. The value creation is calculated as a difference between the value of a current investment strategy and a benchmark one.

In square 1, there are seven companies from the total sample that have expanded their asset base both by investing in fixed assets and by acquisitions. Kimberly-Clark is the only one from the big players with this kind of expanding strategy, although the proportional expansion by acquisitions is the lowest one within this group. The magnitude of Schweitzer-Mauduit's investments in fixed assets is distinguished from other players, and in comparison to the total sample, the value is the second highest after M-Real. Greif and Rock Tenn carried out massive acquisitions during the ten years, and the cumulative amount represents more than the value of total assets in 1996. In the light of this figure, the asset base expansion by using either investments in fixed assets or acquisitions has not led to value creation, because none of the players in square 1 succeeded to drive the shareholder value.

Many of the major PPI companies are located in square 2. This indicates that they have quite similar investment strategies. Square 2 includes companies whose growth is based on acquisitions rather than capacity expansion by capital expenditures. Most remarkable downsizers seem to be North American companies, like Abitibi-Consolidated, Bowater, and Domtar. All these companies downsized more than one third of the value of total assets compared with the total assets in 1996. Lack of organic growth opportunities were replaced by acquisitions. When comparing cumulative acquisitions to the asset base for the beginning period, Domtar was the most active company. Companies in this square represent all positions in the value chain. In square 2, one third of all the companies were value creators, whereas in square 1 all the companies were value destroyers.

Companies in square 3 are downsizers by both measures. Cumulative depreciations of these players exceed capital expenditures in production plants. One fifth of the total number of companies are located in this downsizers' square. Japanese companies have not made big structural changes in their asset base during the research period.

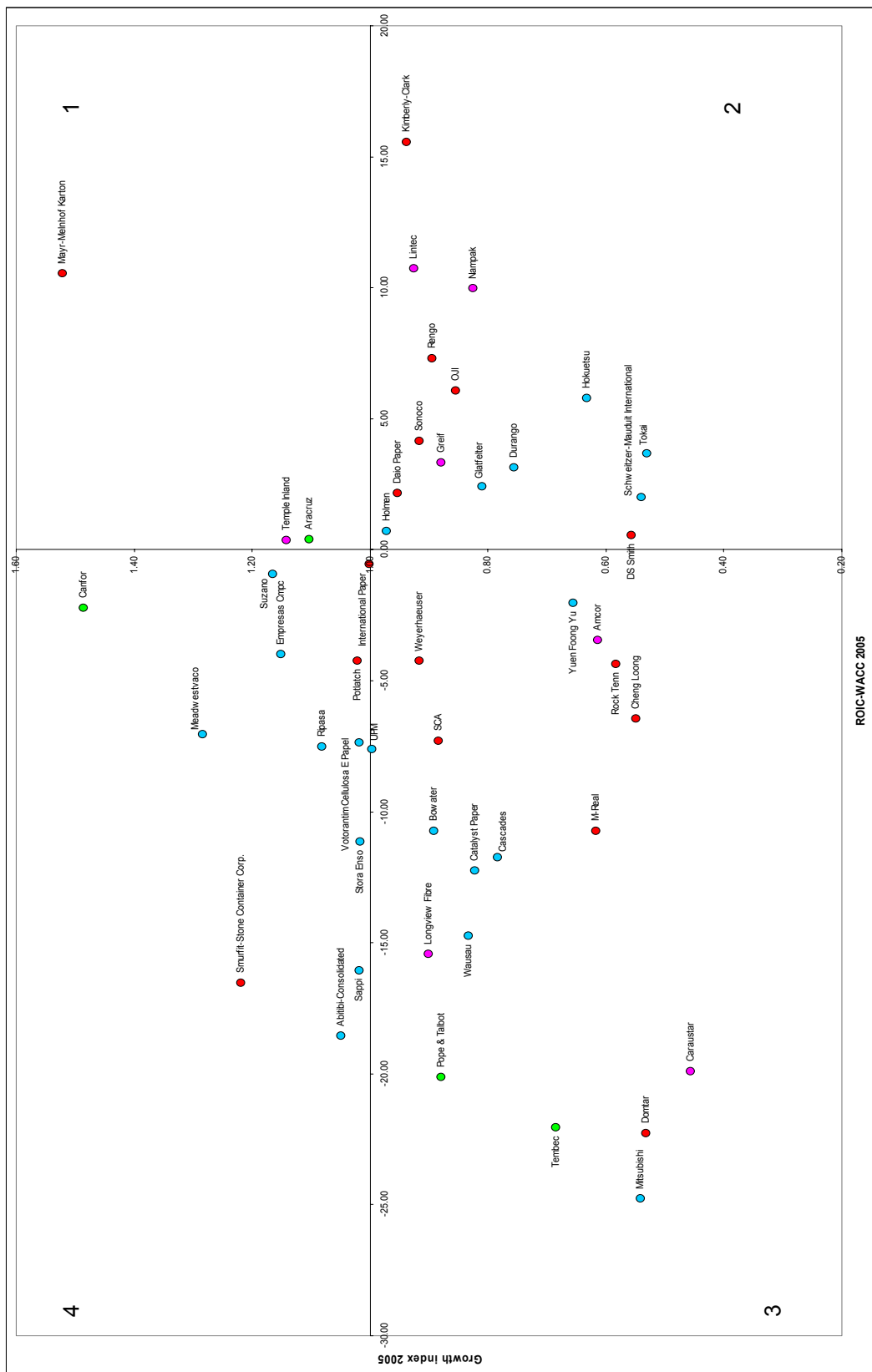
Such small changes have not lead into value creation. A radical change made by MeadWestvaco and Smurfit-Stone Container has led into value creation measured by the growth model. Two thirds of the companies belonging in this square succeeded in value creation, which is a bigger share than in square 2.

The fourth square is an exceptional combination of companies that have invested in organic growth and contemporaneously carried out more asset sales than acquired. A typical feature for these companies is a very low share of cumulative acquisitions when compared with the magnitude of real investments. A remarkable fact is that by investing some players have been able to create value. Value creators seem to be South American companies, whereas destroyers come from Scandinavia and Japan. The share of value creators is similar as in square 3, namely three thirds of the total sample.

5.4 Value creation comparison at company level

Figure 13 presents results of value creation illustrated with economic value added concept used in this study and with the growth model. The horizontal axis represents economic value added, and the vertical axis the outcome of the growth model. The index of the growth model was calculated by dividing the value of the current investment strategy with the value of benchmark investment strategy. The zero point for both measures is located in the origin, where value is neither created nor destroyed with both measures. More detailed information of the growth model is exhibited in Chapter 3.2 and in Appendices 8 and 10. Economic value added represents the value in the year 2005.

Colors in the figure represents each company's business orientation as follows: converting – pink; diversified – red; paper & board; blue; pulp – light green.



ROIC-WACC 2005

Figure 13. EVA[®] and growth index at company level 2005

Portucell as an outlier is excluded from the figure, in order to achieve better scaling. Portucell's index value of growth is 3.32 and the spread -0.4%.

Square 1 exhibits companies, which are creating value with both measures. Only three of the total sample belong to this square. Every company in this square operates in a different geographical area and in a different position in the value chain.

Opposite this value creators' square is square number 3, where the companies' investment activities have led to value destruction when measured by both measures. Companies belonging to square 3 have destroyed value by both measures. This group includes some of the big players of the industry, like SCA, Weyerhaeuser, and UPM-Kymmene. The situation for companies that are located in square 3 is very challenging. ROIC-WACC exhibits value destruction, because of negative or insufficient return on invested capital. When the spread is negative by more than eight percent, return on invested capital is negative as well. The challenge is for these companies at least to improve the financial performance and try to increase the company's market value.

The position of companies in square 4 is better than those in square 3, although their ability to do profitable business is nearly as poor as companies in square three. The majority of big players are located in this square, since they have recognized that downsizing could be a way for value creation. Downsizing can indeed be a way to create value in short term. In the long run, downsizing leads to shrinking the value of the company rather than to increasing it. A positive aspect of the downsizing is that, without the cutbacks, the results would have been even worse.

Square 2 illustrates the challenge for companies in financial markets. Value is created by an EVA[®]-based measure but destroyed by the growth model. It can be said that these companies have not been able to affirm investors of their growth opportunities.

Operating performance can be at a high level, but still these companies are not able to improve the market value. Several Japanese companies belong to this group, and because of a long lasting financial crisis the relative valuation may be low.

On the other hand, these companies are supposed to have lower cost of capital because of low rate of interest and cost of equity as well. The position of Kimberly-Clark describes the situation of the companies in square 2. Despite the good profitability and ability to create value, these companies seem to be undervalued in the financial markets. They have not been able to assure the markets of growth opportunities for the future. An alternative for these companies could have been a strategy to avoid investments. If the market value without investments was at the same level, the position of these companies would be in square one.

As a summary, it can be said that only few companies have been able to create value during the research period. An investment strategy based on downsizing does not lead to value creation, and the effect of acquisition is value destructive. Acquisition activities are usually justified by taking positions in lucrative market areas or by efficient capacity controlling. It seems that these actions have not led to value creation.

Investment strategies' reflections on profitability and value creation have been examined superficially, and therefore a statistical analysis was made to look at the relationship between the investment strategy and profitability and value creation as well as. Measuring the investment strategy is based on the growth model.

5.5 Statistical analysis of relationship between investment strategy and value creation

5.5.1 Variables and descriptive statistics

Two different regression models were used to explain the connection between the investment strategy and value creation. The regression was made by the enter method.

Investment strategies were identified with the growth model. R&D as an investment strategy was ignored because the magnitude of such an investment is very low when compared with other investment activities. The effect of research activities was examined, but they had no explanatory power on value creation. A further analysis considers explaining profitability and value creation by investments in fixed assets and by acquisitions. Investments in fixed assets are calculated as nominal values, when acquisitions are expressed as gross values. Investments in fixed assets are used as net values, which is capital expenditures less depreciations and acquisitions as gross value without asset sales. Definitions for the variables used are shown in Table 2.

Table 2. Variables in the OLS-model

Independent variables	
FAInv96-05	Cumulative sum of net investments in fixed assets (M€) 1996-2005 / Total assets 2005
Acq96-05	Cumulative sum of gross acquisitions (M€) 1996-2005 / Total assets 2005
FAInv96-00	Cumulative sum of net investments in fixed assets (M€) 1996-2000 / Total assets 2005
FAInv01-05	Cumulative sum of net investments in fixed assets (M€) 2001-2005 / Total assets 2005
Acq96-00	Cumulative sum of gross acquisitions (M€) 1996-2000 / Total assets 2005
Acq01-05	Cumulative sum of gross acquisitions (M€) 2001-2005 / Total assets 2005
Dependent variables	
EBITDA05	Earnings before interest, taxes, depreciation and amortization (M€) 2005 / Sales (M€) 2005
ROIC-WACC	(Pretax income [M€] 2005 / Total Capital (M€) 2005) - Weighted average cost of capital 2005

These cumulative sums are divided by the total assets of the period's end for controlling the effect of size of the variables. This procedure gives the first two independent variables (FAInv96-05 and Acq96-05) used in model a for both regression analyses.

The next step is to divide the assessing period into two sub periods, namely 1996-2000 and 2001-2005, in order to find out whether the investment period affects profitability or value creation. The variables FAINv96-00, FAINv01-05, Acq96-00, Acq01-05 are used in model b in both regression models.

Profitability is measured of earnings before interest, taxes and amortizations to sales (EBITDA percentage). To measure profitability with the EBITDA percentage weakens the effect of accounting principles on the financial performance. Value creation is measured by the economic value added concept as ROIC-WACC.

Table 3 presents all descriptive statistics for the variables used in regression analysis. Descriptive statistics exhibit differences in investment strategies of the analyzed companies. Zero values of in acquisition activities are due to gross values of acquiring activities. For investments in fixed assets, investments are analyzed as net investments.

Table 3. Descriptive statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
FAInv96-05	49	-0.247	0.460	0.021	0.144
Acq96-05	49	0	0.634	0.146	0.165
FAInv96-00	49	-0.053	0.476	0.040	0.087
FAInv01-05	49	-0.254	0.295	-0.020	0.116
Acq96-00	49	0	0.440	0.067	0.096
Acq01-05	49	0	0.507	0.079	0.119
EBITDA05	49	-0.031	0.551	0.133	0.109
ROIC-WACC	49	-0.247	0.156	-0.046	0.097
Valid N (listwise)	49				

5.5.2 Investment strategy's effect on profitability

Results from the first model are shown in Table 4 where the dependent variable measuring profitability is the EBITDA percentage of the year 2005. Independent variables in model 1a are cumulative net investments in fixed assets (FAInv96-05) and cumulative gross acquisitions (Acq96-05). The time period for these investments is the entire ten-year period. According to model 1a, investments strategies explain 20% of the variation of the profitability. Cumulative investments in fixed assets have a significant and positive effect on profitability, whereas acquisitions have a negative effect on profitability, although it is not statistically significant.

Table 4. Investment strategy's effect on profitability

Dependent variables: EBITDA -% 2005		
	Model 1 a	Model 1b
Constant		
FAInv96-05	0.322*	
Acq96-05	-0.261	
FAInv96-00	-	-0.134
FAInv01-05	-	0.549
Acq96-00	-	-0.054
Acq01-05	-	-0.204
Area dummies	not included	not included
R²	0.23	0.44
Adj. R²	0.20	0.38
n	49	49

***p<0,05, **p<0,01, ***p<0,001**

Model 1b was made to find out whether the time period of investments have an effect on profitability. By dividing investments into sub-periods, investment strategies are able to explain 43% of the variation of the profitability. The time period of investment activities has an impact on profitability. Investments in fixed assets made in the latter half of the period have a positive and significant impact on profitability. Whereas, the earlier investments in fixed assets have a negative effect on profitability.

Acquisitions have a negative effect on profitability despite the time period, when carried out. The influence of acquisitions is not statistically significant.

5.5.3 Investment strategy's effect on value creation

Results from model 2 used for explaining value creation by the ROIC-WACC concept are shown in Table 5. In model 2a, independent variables are the cumulative sum of investments in fixed assets and acquisitions. These activities are able to explain 7.8% of the variation of the ROIC-WACC. Investments in fixed assets have a positive effect on value creation as in previous model on profitability. In this model, the effect is not statistically significant. The effect of acquisitions has a negative effect on value creation as well as on profitability, although the effect is not significant in either case.

Table 5. Investment strategy's effect on value creation

Dependent variables: ROIC-% - WACC-% 2005		
	Model 2 a	Model 2b
Constant		
FInv96-05	0.226	
Acq96-05	-0.182	
FInv96-00	-	-0.031
FInv01-05	-	0.319*
Acq96-00	-	-0.086
Acq01-05	-	-0.119
Area dummies	not included	not included
R²	0.12	0.16
Adj. R²	0.08	0.09
n	49	49

*p<0,05, **p<0,01, ***p<0,001

In model 2b, both investment types are divided according to the time period. The results indicate that only the latter period's investments have a positive effect on value creation, and the effect is statistically significant. Earlier investments in fixed assets have a negative effect on value creation, although not statistically significant. When investments were divided into two time periods these variables were able to explain 8.7% of the variation in value creation. Acquiring activities have a negative effect on both sub periods, although the effect is not statistically significant.

Findings from the further analysis provide more support for the previous empirical findings of this study. Investments in organic growth lead to improved profitability and value creation. The review of the investment strategies of the analyzed companies reveal that a major part of companies have downsized during the last decade. Streamlining has been a popular device for pulp and paper companies to improve financial performance. According to the results of this study streamlining, does not lead to improved profitability or value creation for shareholders. However, it may provide temporary improvement in financial performance, but as a long term strategy it is destructive.

The effect of acquisitions is contradictory compared to that of investments in fixed assets. Acquiring activities have a negative impact on both profitability and value creation. These findings are in line with previous studies, where the effect on profitability and value creation has been examined. Although the results are not statistically significant, such findings strengthen acquisitions' value destructive effect.

This study did not find any overwhelming investment strategies although results are in line with previous empirical results. It seems that company-based factors have their own effect on profitability and value creation. Such factors could be related to product lines and production equipments.

5.6 Discussion

The shareholders of several pulp and paper companies have suffered an opportunity loss from owning value destructive companies. In the worst cases such a situation has lasted for several years. This finding is a clear indicator of an agency problem between the executives and shareholders of numerous companies, because insufficient financial performance has continued years without any improvements. Acquisition activity give another signal of the contradiction between shareholders and executives. Especially acquisitions were carried out contemporaneously. This discovery is in line with the empire building theory and insufficient use of capital. The agency problem occurs with real investments as well, when capacity is expanded by investing assets the returns of which are lower than the cost of capital. Such a statement includes lots of hindsight, but what would improve the return on new investment activity, if the style of investments remains similar and returns from previous investments have been below their cost?

In the results it surprises how identical the investment strategies are between companies. International Paper could be described as a trendsetter among the PPI companies. The company started the tendency of downsizing a few years before other big players. During the active acquisition period, International Paper was a very active player and the next trend in the paper and pulp industry seems to be asset sales, if the status of International Paper as a trendsetter remains. As the results of this study indicate, the drivers for value creation are organic growth, downsizing, and avoiding acquisitions.

These findings are in line with previous empirical studies concerning value creation. Value creation by downsizing indicates the fact how value destructive some product lines or production plants have been. According to the valuation framework, downsizing and asset sales as a driver of value creation may sound contradictory.

Nevertheless, it is in line with EVA[®]-based valuation framework, but downsizing cannot be a driver for value creation in long term. Rather, it can be seen as a result of acquisition mania.

The results of this study reveal that none of the analyzed companies have carried out overwhelming investment actions. The finding may indicate that none of these companies have such technology or business competence that would lead to overall value creation, as measured in this study. There are very profitable companies, but these companies have not been assure the financial markets of future earnings and growth. Lack of lucrative investment opportunities seems to be a driver for acquisitions. The investment styles of companies in emerging markets give evidence of this approach, as is the case with South America.

Changes in the assets base have been quite incremental, which can be explained by the production capacity's quite a long life time. Structural changes in a competitive environment have changed the assumption used in investment appraisal. The investment strategy for the future cannot anymore rely on production plants designed to last a century as before. Major events during the last few years have pointed out that radical changes can occur in a decade. The challenge for the future is to create a new concept of making real investments; otherwise investment can become a device of value destruction instead of value creation.

As noted earlier, the results of this research indicate value destruction as a shareholders' point of view. It would be interesting to find out the ownership structure of these companies and examine if there is a connection between the ownership structure and value creation. A more precise view of investments, either under- or overinvestment could be assessed with the use of free cash flow, when this study examined investment strategy and not the source of finance.

Investment action and the effects on shareholder value provide several opportunities for further research. It would be interesting to gain information on how the stock market reacts to announcements released by PPI companies. Especially interesting information could be generated from investment and plant closure announcements, which are both used in trying to improve financial performance.

It could also be interesting to examine value drivers at the company level to find out where value is created or destroyed. An extended analysis from the value drivers could be conducted at the business orientation level.

6. CONCLUSIONS

The purpose of this study was to examine the relationship between the investment strategy and value creation of 49 publicly traded pulp and paper companies from 1996 to 2005. Value creation was measured yearly by EVA[®] and with the growth model. The growth model was used to identify the companies' investment strategies and to measure value creation defined as a difference between the chosen investment strategy and a benchmark one. Investment strategies were defined by I) R&D, II) capital expenditures, and III) acquisitions. Later in the study, R&D was described individually and left out from the analysis, since the PPI companies' R&D activities were so modest: nevertheless the values were taken into account in the analysis.

The results of this study were analyzed at three levels: the company level, the business orientation or geographical level and on a general level with the regression analyses. The empirical part consisted of descriptive and explanatory sections.

When value creation was measured by EVA[®] the analyzed companies seemed to have destroyed value rather than created it during the research period. Companies in the emerging market areas improved their financial performance during the period, but had not become value creators. The tendency of companies in emerged market areas has not been able to reach a positive shift upwards in value creation. The reason for a poor ability to create value is caused by poor profitability rather than increased cost of companies' capital. In the financial market, the riskiness of PPI companies has declined during the past decade, and such a decrease in the market risk lowers the required return for equity. The capital structure of companies seemed to differ by geographical areas. The North American companies seemed to rely on debt finance rather than equity, unlike the

companies in other geographical areas. Scandinavian, European and African, and South American companies rely more on equity finance.

An outlook of investment strategies reveals their similarities between business orientation groups. Assessing the investment strategies by geographical areas shows remarkable differences between mature and emerging market areas. The companies in North America, Scandinavia and Europe have used less money in real investment than they make depreciations. Acquisitions and asset sales activity differs significantly by geographical areas. The South American and Asian Pacific companies avoided acquisitions, while the North American and Scandinavian companies grew by acquisitions. After acquisition mania began, asset sales started in the North American companies. Companies in other geographical areas seemed to follow the example of the North American companies with a few years' lag.

When cumulative sums of money used for different types of investments were proportionalized, the results indicated that acquisition did not lead to value creation. Instead, value is created by investing in fixed assets or by asset sales. A cross-sectional analysis using the growth model and ROIC-WACC revealed that only a few companies were able to create value when examined by both measures. Therefore, a further analysis was decided upon in order to find out the relationship between the investment strategy and value creation. Two regression models were completed to explain profitability and value creation with investment styles.

The first model showed that investments in fixed assets have a positive effect on profitability measured by EBITDA percentage to sales in the year 2005, whereas acquisitions were negative. The second regression model confirmed the effect of different investments in value creation, measured by EVA[®] in the year 2005. Value can be created by investments in fixed assets, when acquisitions lead to value destruction.

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Databases

Datastream

Thomson ONE Banker

Appendix 1. The 49 companies analyzed in the study

Abitibi-Consolidated Inc	Sonoco Products Company
Amcors Limited	Stora Enso OYJ
Aracruz Celulose SA	Suzano Bahia SUL Papel E Celulose SA
Bowater Inc	Svenska Cellulosa SCA AB
Canfor Corp.	Tembec Inc I
Caraustar Industries	Temple Inland Inc
Cascades Inc	Tokai Pulp & Paper Company
Catalyst Paper Corp(NorskeCanada)	UPM-Kymmene Corp.
Cheng Loong Company Limited	Wausau Paper Corp.
Corporacion Durango SA	Weyerhaeuser Company
Daio Paper Corp.	Votorantim Cellulosa E Papel
Domtar Inc	Yuen Foong Yu Paper Manufacturing
DS Smith PLC	
Empresas Cmpc SA	
Glatfelter	
Greif Inc	
Hokuetsu Paper Mills Limited	
Holmen AB	
International Paper Company	
Kimberly-Clark Corp.	
Lintec Corporation	
Longview Fibre Company	
Mayr-Melnhof Karton AG	
Meadwestvaco Corp.	
Mitsubishi Paper Mills Limited	
M-Real Corp.	
Nampak Limited	
OJI Paper Company	
Pope & Talbot Inc	
Portucel Empresa	
Potlatch Corp.	
Rengo Company Limited	
Ripasa SA	
Rock Tenn	
Sappi Limited	
Schweitzer-Mauduit International	
Smurfit-Stone Container Corp.	

Appendix 2. Companies by business orientation

Pulp

Aracruz Celulose SA
Canfor Corp.
Pope & Talbot Inc
Portucel Empresa
Tembec Inc

Converting

Amcor Limited
Caraustar Industries
Greif Inc
Lintec Corporation
Longview Fibre Company
Nampak Limited
Temple Inland Inc

Paper & Board

Abitibi-Consolidated Inc
Bowater Inc
Cascades Inc
Catalyst Paper Corp.(NorskeCanada)
Corporacion Durango SA
Empresas Cmpc SA
Glatfelter
Hokuetsu Paper Mills Limited
Holmen AB
Meadwestvaco Corp.
Mitsubishi Paper Mills Limited
Ripasa SA
Sappi Limited
Schweitzer-Mauduit International
Stora Enso OYJ
Suzano Bahia SUL Papel E Celulose SA
Tokai Pulp & Paper Company
UPM-Kymmene Corp.
Wausau Paper Corp.
Votorantim Cellulosa E Papel
Yuen Foong Yu Paper Manufacturing

Diversified

Cheng Loong Company Limited
Daio Paper Corp.
Domtar Inc
DS Smith PLC
International Paper Company
Kimberly-Clark Corp.
Mayr-Melnhof Karton AG
M-Real Corp.
OJI Paper Company
Potlatch Corp.
Rengo Company Limited
Smurfit-Stone Container Corp.
Svenska Cellulosa SCA AB
Weyerhaeuser Company

Appendix 3. Companies by geographical areas

Europe & Africa

DS Smith PLC
Mayr-Melnhof Karton AG
Nampak Limited
Portucel Empresa
Sappi Limited

Asia Pacific

Amcor Limited
Cheng Loong Company Limited
Daio Paper Corp.
Hokuetsu Paper Mills Limited
Lintec Corporation
Mitsubishi Paper Mills Limited
OJI Paper Company
Rengo Company Limited
Tokai Pulp & Paper Company

South America

Aracruz Celulose SA
Corporacion Durango SA
Empresas Cmpc SA
Ripasa SA
Suzano Bahia SUL Papel E Celulose SA
Votorantim Cellulosa E Papel

Scandinavia

Holmen AB
M-Real Corp.
Stora Enso OYJ
Svenska Cellulosa SCA AB
UPM-Kymmene Corp.

North America

Abitibi-Consolidated Inc
Bowater Inc
Canfor Corp.
Caraustar Industries
Cascades Inc
Catalyst Paper Corp.(NorskeCanada)
Domtar Inc
Glatfelter
Greif Inc
International Paper Company
Kimberly-Clark Corp.
Longview Fibre Company
Meadwestvaco Corp.
Pope & Talbot Inc
Potlatch Corp.
Schweitzer-Mauduit International
Smurfit-Stone Container Corp.
Tembec Inc
Temple Inland Inc
Wausau Paper Corp.
Weyerhaeuser Company

Appendix 4. Variables for calculating ROIC-WACC

Symbol	Definition of the symbol
D =	Total long term debt (03251) + Other liabilities (03273)
E =	Total common equity (03501)
V =	D + E
r_e =	Cost of equity (required return on equity)
r_d =	Cost of debt (Interst rate - estimated average (05356))
r_e =	$r_f + \beta (r_m - r_f)$
r_f =	Risk free rate
β =	Beta coefficient
r_m =	Market return
β =	$\ln X / \text{Lag } X \text{ 1M } \ln Y / \text{Lag } Y \text{ 1 M}$, where
X =	Total return index of equity
Y =	Return on market index
WACC =	Weighted average cost of capital
WACC =	$(E/V * r_e) + (D/V * r_d)$
ROIC =	PretaxROI

LONG TERM DEBT (03251)

Total long term debt represents all interest bearing financial obligations, excluding amounts due within one year. It is shown net of premium or discount.

OTHER LIABILITIES (03273)

Other liabilities represent all other liabilities of the company besides current liabilities, long term debt, provision for risk and charges and deferred taxes.

COMMON EQUITY (03501)

Shareholders' Equity Data, All Industries:

COMMON EQUITY represents common shareholders' investment in a company.

It includes:

(1)Common stock value

- (2) Retained earnings
- (3) Capital surplus
- (4) Capital stock premium
- (5) Cumulative gain or loss of foreign currency translation, if included in equity per FASB 52 treatment
- (6) For Non-U.S. Corporations preference stock which participates with the common/ordinary shares in the profits of the company
- (7) For Non-U.S. Corporations, if shareholders equity section is not delineated then the following additional accounts are included:
 - (8) Appropriated and unappropriated retained earnings
 - (9) Net income for the year, if not included in retained earnings (majority share of income is only included)
 - (10) Compulsory statutory/legal reserves without specific purpose
 - (11) Discretionary Reserves if other companies in that country include in their delineated shareholders' equity
 - (12) Negative Goodwill

It excludes:

- (1) Common treasury stocks
- (2) Accumulated unpaid preferred dividends
- (3) For U.S. Corporations, excess of involuntary liquidating value for outstanding preferred stock over stated value is deducted
- (4) Redeemable common stock (treated as preferred)

INTEREST RATE - ESTIMATED AVERAGE (05356)

INTEREST RATE ESTIMATED AVG = Interest Expense on Debt / (Short Term Debt & Current Portion of Long Term Debt + Long Term Debt) * 100

PRETAXROI, quoted in this study as ROIC

$(\text{IncomeBeforeIncomeTaxes}/\text{TotalCapital}) * 100$

Income before income taxes represents all income/loss before any federal, state or local taxes. Extraordinary items reported net of taxes are excluded.

For U.S. corporations, equity in earnings of unconsolidated subsidiaries and minority interest are not included, unless the company specifically states that they are pretax. For non-U.S. corporations, this item is usually reported before taxes.

Total capital represents the total investment in the company. It is the sum of common equity, preferred stock, minority interest, long-term debt, non-equity reserves and deferred tax liability in untaxed reserves. For insurance companies policyholders' equity is also included.

Indices and market return by countries

Address Country	Index	Years	return p.a. (r m)
Australia	ASX ALL	1993-2005	8.71
Austria	ATX - AUSTRIAN	1987-2005	9.65
Brazil	BRAZIL BOVESPA	2000-2005	11.84
Canada	S&P/TSX COMPOSITE	1986-2005	7.02
Chile	CHILE GENERAL	1993-2005	9.81
Finland	OMX HELSINKI CAP (OMHCAP)	1992-2005	12.98
Japan	NIKKEI 225 STOCK AVERAGE	1981-2005	3.35
Mexico	MEXICO IPC (BOLSA)	1993-2005	17.38
Portugal	PORTUGAL PSI-20	1993-2005	8.46
South Africa	FTSE/JSE ALL SHARE	1996-2005	12.49
Sweden	OMX STOCKHOLM (OMXS)	1986-2005	12.74
Taiwan	TAIWAN SE WEIGHTED	1981-2005	10.35
United Kingdom	FTSE ALL SHARE	1986-2005	7.4
United States	S&P 500 COMPOSITE	1986-2005	9.29

The risk free rates

Risk-free rates (r f p.a.)	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
AUSTRALIA, DEPOSIT, 1, YEAR	5.95	4.90	4.45	5.45	5.40	4.30	4.50	5.50	5.40	5.10
AUSTRIA, VIBOR, 12, MONTH	3.45	4.13	3.21	3.88	4.75	3.34	2.75	2.31	2.36	2.84
BRAZIL SELIC TARGET RATE	20.84	37.99	30.22	19.94	15.61	19.12	25.50	16.72	18.01	17.51
CANADA, TREASURY, BILL, 1, YEAR	3.69	4.99	4.78	5.65	5.40	2.15	2.86	2.62	2.7	3.94
CHILE INFL.ADJ.NOTES + COUPON 1 Y	6.74	6.57	6.86	7.35	6.52	6.23	*6.23	*6.23	*6.23	*6.23
FINLAND, INTERBANK, FIXING, 12, MONTH	3.37	4.08								
EURIBOR, 12, MONTH			3.21	3.88	4.75	3.34	2.75	2.31	2.36	2.84
TOKYO, INTERBANK, JP, YEN, 1 Y	0.62	0.98	0.76	0.27	0.58	0.11	0.10	0.11	0.12	0.12
MEXICO, CETES, 364, DAY	28.98	19.85	31.00	18.67	17.01	10.08	8.38	6.95	8.58	7.92
PORTUGAL, LISBOR, 1, YEAR	**3.89	**3.89	**3.89	3.89	4.78	3.37	2.75	2.31	2.36	2.84
SOUTH, AFRICAN, JIBAR, 1, YEAR	**11.75	**11.75	**11.75	11.75	11.01	10.46	13.02	7.84	7.41	7.35
SWEDEN, TREASURY, BILL, 360, DAY	3.96	5.01	3.52	4.02	4.29	3.94	3.55	2.72	2.37	2.21
TAIWAN, DEPOSIT, 12, MONTH	5.95	6.00	5.40	5.00	5.00	2.45	1.85	1.40	1.53	1.89
UK INTERBANK 1 YEAR	7.00	7.69	5.41	6.59	5.75	4.44	3.94	4.38	4.91	4.52
US, TREASURY, CONSTANT, MATURITIES, 1 YR	5.51	5.51	4.53	5.98	5.32	2.17	1.32	1.26	2.75	4.38

* estimated rate as last available

** estimated as first available

Appendix 5. Betas of the companies 1996-2005

β	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Aver.
Abitibi-Consolidated	1.17	1.22	1.36	1.53	1.27	1.03	1.02	0.91	0.64	0.81	1.10
Amcor Limited	0.87	0.97	1.15	1.14	1.16	1.09	1.00	0.82	0.84	0.81	0.99
Aracruz Celulose SA	0.82	0.82	0.80	0.80	0.86	0.86	0.79	0.69	0.29	0.30	0.70
Bowater Inc	1.29	1.46	1.33	1.13	1.01	0.81	0.68	0.65	0.68	0.80	0.98
Canfor Corp.	1.18	1.20	1.13	1.18	1.14	0.86	0.87	0.85	0.65	0.65	0.97
Caraustar Industries	0.40	0.44	0.22	0.51	0.60	0.91	0.75	0.81	0.85	1.17	0.67
Cascades Inc	0.87	0.84	0.83	0.93	0.67	0.47	0.40	0.22	*0.22	*0.22	0.57
Catalyst Paper Corp.	1.19	1.00	0.86	0.88	0.75	0.69	0.82	0.87	0.91	1.07	0.90
Cheng Loong	0.77	0.75	0.72	0.74	0.76	0.77	0.79	0.90	0.95	0.97	0.81
Corporacion Durango SA	1.71	1.60	1.49	1.37	1.06	0.94	0.87	0.83	0.77	0.49	1.11
Daio Paper Corp.	0.66	0.70	0.56	0.39	0.37	0.36	0.39	0.43	0.49	0.46	0.48
Domtar Inc	0.64	0.70	0.77	0.98	0.88	0.60	0.68	0.62	0.37	0.44	0.67
DS Smith PLC	1.03	0.81	0.95	1.37	1.26	1.28	1.26	1.15	0.93	0.99	1.10
Empresas Cmpc SA	0.99	1.00	1.17	1.22	1.30	1.27	1.26	1.14	0.92	0.98	1.13
Glatfelter	0.35	0.10	0.43	0.67	0.48	0.23	0.34	0.44	0.41	0.70	0.42
Greif Inc	0.19	0.64	0.68	0.58	0.48	0.40	0.53	0.64	0.90	1.14	0.62
Hokuetsu Paper Mills	1.10	1.04	0.98	0.86	0.72	0.59	0.54	0.46	0.42	0.50	0.72
Holmen AB	0.52	0.73	1.30	1.18	0.82	0.63	0.61	0.55	0.54	0.67	0.76
International Paper	0.80	0.91	1.11	1.02	1.18	0.99	0.93	0.88	0.96	0.84	0.96
Kimberly-Clark Corp.	0.98	0.89	0.71	0.82	0.84	0.51	0.39	0.39	0.39	0.39	0.63
Lintec Corporation	0.45	0.47	0.51	0.44	0.40	0.39	0.39	0.41	0.44	0.53	0.44
Longview Fibre Company	1.03	0.87	0.93	0.86	0.79	0.61	0.67	0.72	0.89	1.07	0.84
Mayr-Melnhof Karton AG	0.89	0.93	0.99	0.97	0.84	0.86	0.78	0.60	0.42	0.54	0.78
Meadwestvaco Corp.	0.98	0.80	0.93	0.83	1.10	1.10	1.12	1.18	1.29	1.17	1.05
Mitsubishi Paper Mills	1.10	1.21	1.42	1.26	1.13	1.02	1.03	0.96	1.07	1.09	1.13
M-Real Corp.	0.98	1.10	1.03	0.99	0.90	0.82	0.87	0.87	0.79	0.77	0.91
Nampak Limited	0.79	1.05	1.14	0.97	0.96	0.90	0.83	0.72	0.58	0.46	0.84
OJI Paper Company	0.58	0.61	0.59	0.66	0.57	0.49	0.46	0.44	0.34	0.40	0.51
Pope & Talbot Inc	1.65	1.66	1.47	1.16	0.94	0.96	0.80	0.66	0.63	0.57	1.05
Portucel Empresa	1.22	1.06	1.08	0.91	0.82	0.78	0.79	0.67	0.66	0.71	0.87
Potlatch Corp.	0.75	0.69	0.69	0.74	0.80	0.73	0.75	0.81	0.91	0.92	0.78
Rengo Company Limited	0.76	0.72	0.87	0.93	0.88	0.79	0.76	0.64	0.61	0.64	0.76
Ripasa SA	0.82	0.81	0.87	0.72	0.82	0.86	0.84	0.79	0.74	0.66	0.79
Rock Tenn	0.15	0.46	0.19	0.44	0.47	0.66	0.84	0.98	1.08	1.34	0.66
Sappi Limited	0.68	0.68	0.68	1.17	1.20	1.26	1.29	1.28	1.03	0.93	1.11
Schweitzer-Mauduit	**0.84	0.84	0.33	0.33	0.33	0.33	0.33	0.26	0.52	0.67	0.48
Smurfit-Stone Container	0.40	0.63	1.01	1.01	1.34	1.19	1.20	1.11	1.18	1.05	1.01
Sonoco Products	0.79	0.43	0.56	0.75	0.96	0.90	0.91	0.96	0.98	0.89	0.81
Stora Enso OYJ	1.07	1.02	1.00	1.08	1.07	0.93	0.91	1.01	0.94	0.96	1.00
Suzano Bahia	**0.23	**0.23	**0.23	0.23	0.30	0.39	0.41	0.45	0.47	0.50	0.34
SCA AB	0.62	0.80	0.90	0.87	0.75	0.62	0.66	0.67	0.60	0.64	0.71
Tembec Inc	1.06	1.05	0.94	0.94	0.74	0.55	0.46	0.37	0.30	0.32	0.67
Temple Inland Inc	0.79	0.43	0.56	0.75	0.96	0.90	0.91	0.96	0.98	0.89	0.81
Tokai Pulp & Paper	1.10	1.06	1.25	1.28	1.19	1.14	1.00	0.63	0.38	0.34	0.94
UPM-Kymmene Corp.	1.37	1.20	1.15	1.07	0.94	0.80	0.85	0.91	0.95	1.02	1.02
Wausau Paper Corp.	1.05	1.13	1.16	1.27	1.17	0.80	0.71	0.66	0.61	0.75	0.93
Weyerhaeuser Company	1.00	0.73	1.06	1.06	1.23	1.08	1.09	1.07	1.08	0.97	1.04
Votorantim	0.98	0.89	0.88	0.67	0.73	0.72	0.67	0.57	0.43	0.34	0.69
Yuen Foong Yu	0.72	0.70	0.73	0.80	0.81	0.82	0.78	0.89	0.87	0.87	0.80
Average	0.87	0.86	0.89	0.91	0.87	0.79	0.78	0.75	0.71	0.74	

* Estimated as last $\beta > 0,1$

** Estimated as first $\beta > 0,1$

Appendix 6. ROIC (Pre-Tax) of companies 1996-2005

Company	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Abitibi-Consolidated	8.51	-3.76	-1.96	-7.02	6.82	4.98	-2.58	0.27	-3.72	-9.59
Amcor	10.75	0.27	2.18	10.00	10.22	8.87	15.69	8.03	6.92	3.82
Aracruz	1.34	0.71	-3.72	2.71	19.75	7.92	-1.84	24.29	13.92	13.17
Bowater	16.97	4.39	0.49	4.66	7.42	4.91	-6.40	-7.11	-3.82	-2.57
Canfor	-2.17	-2.48	-4.29	13.03	15.40	0.11	-0.04	4.88	19.43	4.30
										-
Caraustar	25.93	18.90	16.97	8.04	0.97	-1.95	-3.90	-6.75	-4.23	11.15
Cascades	12.28	5.76	5.20	5.74	6.78	8.50	9.88	3.35	0.90	-6.18
Catalyst Paper	12.76	-2.53	-6.39	1.77	9.23	1.82	-9.90	-7.92	-3.27	-3.99
Cheng Loong	0.88	1.60	0.65	6.05	6.23	2.45	5.82	6.99	7.09	1.78
										-
Durango	13.52	9.68	0.89	10.86	9.28	7.21	46.05	133.47	-5.86	13.26
Daio Paper	5.30	4.33	2.55	0.64	2.76	5.15	2.51	1.98	6.48	4.03
										-
Domtar	-6.43	1.44	4.02	9.68	13.55	3.11	3.94	-6.08	-2.46	15.86
DS Smith	19.94	14.65	7.42	2.16	8.31	9.37	4.38	11.62	9.01	7.28
Empresas Cmpc	4.71	3.93	9.16	2.80	7.39	3.41	3.60	5.84	7.45	4.86
Glatfelter	20.35	15.00	8.78	9.87	10.19	2.32	9.97	3.29	14.46	9.76
Greif	15.99	6.65	8.53	9.03	12.92	10.31	2.99	1.13	5.86	12.62
Hokuetsu	9.15	5.72	3.38	0.68	2.84	8.15	3.82	3.80	7.30	7.41
Holmen	14.17	9.24	9.93	11.46	22.97	15.18	14.62	12.62	9.89	9.34
International Paper	4.37	0.09	2.17	2.09	3.12	-4.90	1.57	1.47	3.12	6.19
Kimberly-Clark	30.95	19.49	26.43	31.00	30.26	24.27	24.69	20.81	21.99	21.16
										-
Lintec	4.16	8.17	4.66	3.86	4.25	16.67	1.05	4.01	14.90	12.60
Longview Fibre	9.69	2.06	-1.47	3.44	6.39	3.90	0.35	0.96	2.59	-6.29
Mayr-Melnhof Karton	8.98	11.66	12.94	12.83	14.77	18.91	19.30	18.19	17.96	16.74
Meadwestvaco	8.45	5.99	6.23	7.22	6.32	-2.92	-0.29	-0.57	-5.88	2.36
										-
Mitsubishi	7.20	5.19	1.10	-3.34	-6.79	-0.89	-0.84	-14.18	3.02	22.19
M-Real	4.55	9.27	8.39	8.60	10.92	6.83	5.74	-2.05	-0.26	-2.72
Nampak	31.94	29.15	26.24	25.85	22.14	14.06	15.11	23.64	22.76	20.72
OJI	8.14	5.53	4.33	-3.44	1.59	2.62	-3.53	3.08	5.41	7.49
										-
Pope & Talbot	0.86	3.27	12.02	6.98	16.41	10.95	-9.17	-10.35	3.67	13.36
Portucell	-0.90	3.76	0.76	3.64	13.09	7.70	6.58	3.54	2.65	4.83
Potlatch	5.31	3.26	3.54	4.07	-3.37	-7.55	-7.93	7.40	2.51	4.59
Rengo	2.25	4.68	3.69	3.23	5.35	3.02	0.88	-1.50	3.65	8.95
Ripasa	-3.88	-4.22	-6.74	8.66	17.70	11.91	7.82	10.88	7.46	5.80
Rock Tenn	16.88	4.35	9.26	8.57	0.07	7.15	7.01	5.55	1.73	1.93
Sappi	3.06	3.01	4.75	6.14	17.89	5.20	9.78	5.28	2.09	-6.28
Schweitzer-Mauduit	28.00	29.69	17.20	20.77	16.48	18.69	21.87	15.77	15.04	9.12
Smurfit-Stone Container Corp.	12.44	0.73	-3.77	4.99	5.38	2.45	1.49	-4.99	-1.66	-8.32
Sonoco	16.36	4.12	22.51	16.83	16.77	10.40	12.67	7.28	10.04	12.04
Stora Enso	4.52	3.32	2.94	9.94	10.66	8.04	-2.81	2.13	5.21	-2.03
Suzano	-8.02	-8.26	-7.41	-8.15	10.89	4.80	6.36	23.43	17.28	11.44
SCA	7.41	8.77	9.13	8.30	14.93	11.59	10.49	10.36	6.87	0.57
										-
Tembec	-2.81	-0.72	5.88	2.90	13.66	3.19	-7.57	-1.13	2.64	15.00
Temple Inland	4.25	2.50	3.09	8.18	9.46	4.83	1.63	-1.61	3.88	4.20
Tokai	3.19	3.99	3.07	0.54	1.79	4.15	-0.97	-2.33	3.90	4.93
UPM	3.94	11.25	16.57	15.47	20.01	11.40	6.54	5.02	4.56	1.89
Wausau	21.03	20.25	12.57	11.07	0.18	2.75	7.06	4.91	6.24	-7.13
Weyerhaeuser	7.93	6.03	4.95	7.87	10.85	3.70	1.83	2.17	9.69	4.74
Votorantim Cellulosa E Papel	-0.94	1.05	-0.20	7.34	13.62	12.42	6.73	17.24	15.09	7.21
Yuen Foong Yu	1.05	1.57	-2.38	3.86	2.69	2.15	4.28	11.09	10.17	5.13

Appendix 7. WACC (Pre-Tax) of companies 1996-2005

Company	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Abitibi-Consolidated	7.77	7.31	6.77	7.78	6.88	7.66	7.79	7.52	7.05	8.94
Amtcor	8.14	7.87	7.94	8.64	9.16	7.82	8.10	7.76	7.19	7.25
Aracruz	16.96	14.04	16.27	29.11	18.09	17.30	27.58	20.57	11.82	12.75
Bowater	9.94	10.06	8.02	9.06	8.23	7.08	6.84	6.76	7.56	8.13
Canfor	7.07	6.79	7.71	6.24	7.22	7.14	7.19	6.88	6.34	6.51
Caraustar	6.22	6.91	5.94	6.65	7.44	8.28	7.21	8.13	8.33	8.74
Cascades	7.15	6.23	7.27	7.40	7.14	6.03	5.28	5.42	4.87	5.55
Catalyst Paper	8.05	7.03	6.70	6.86	6.55	4.14	7.39	8.10	8.19	8.22
Cheng Loong	8.32	8.11	8.08	7.55	7.66	6.80	8.71	8.87	8.94	8.19
Durango	13.13	14.27	11.27	15.07	14.58	15.23	15.43	14.75	15.42	10.08
Daio Paper	3.59	3.15	2.71	2.24	2.36	2.05	1.94	1.96	1.89	1.83
Domtar	8.43	7.00	7.17	8.24	7.92	5.28	6.70	6.62	6.33	6.40
DS Smith	7.64	7.15	6.82	7.59	7.66	7.87	7.59	7.39	6.08	6.70
Empresas Cmpc	10.07	9.10	9.80	9.99	10.30	10.27	9.88	9.54	8.76	8.83
Glatfelter	6.60	5.70	6.35	6.88	6.29	4.52	5.17	5.16	5.80	7.32
Greif	6.06	7.86	6.80	7.32	7.22	5.93	7.27	7.31	9.15	9.28
Hokuetsu	3.54	2.82	2.34	2.34	2.26	2.09	1.81	1.59	1.40	1.61
Holmen	8.55	10.24	14.54	13.53	11.35	9.20	8.38	8.08	7.45	8.59
International Paper	7.38	7.47	8.62	8.16	6.64	7.32	6.26	6.55	6.83	6.73
Kimberly-Clark	9.05	8.40	7.87	8.59	8.21	5.78	4.40	4.39	4.91	5.56
Lintec	2.16	2.20	2.23	1.86	1.78	1.71	1.33	1.43	1.54	1.83
Longview Fibre	7.95	7.33	7.47	7.83	7.73	6.53	7.24	7.71	8.07	9.10
Mayr-Melnhof Karton	7.82	8.07	8.57	8.07	8.10	8.17	7.63	6.40	5.14	6.16
Meadwestvaco	7.70	8.10	8.72	8.01	9.03	8.44	8.49	8.84	9.43	9.38
Mitsubishi	3.48	3.28	3.34	2.92	2.78	2.71	2.53	2.26	2.59	2.56
M-Real	9.18	9.44	9.47	9.14	8.05	9.22	9.18	9.13	9.72	7.99
Nampak	12.28	12.88	12.58	12.45	11.28	11.12	11.19	12.58	10.68	10.73
OJI	2.53	2.01	2.15	2.08	1.96	1.73	1.59	1.53	1.32	1.39
Pope & Talbot	9.57	9.12	8.61	10.06	8.26	8.12	7.78	7.94	8.00	6.76
Portucell	9.13	8.83	8.74	7.32	7.28	5.42	4.67	4.08	3.78	5.27
Potlatch	8.02	7.37	7.70	7.56	7.36	6.99	8.10	7.90	10.23	8.79
Rengo	2.89	2.71	2.83	2.79	2.51	2.29	1.97	1.70	1.63	1.63
Ripasa	15.67	16.66	18.38	20.41	17.91	17.83	15.06	13.75	13.86	13.29
Rock Tenn	6.49	6.10	6.31	6.82	6.99	7.20	6.79	6.83	7.22	6.28
Sappi	11.57	12.51	10.38	11.59	12.75	11.31	9.99	11.16	9.87	9.74
Schweitzer-Mauduit	7.71	7.52	5.75	6.36	6.43	4.91	4.77	3.26	5.56	7.10
Smurfit-Stone Container Corp.	10.78	9.89	4.74	11.20	10.21	9.65	8.17	8.03	8.50	8.18
Sonoco	7.35	7.15	7.11	7.19	8.03	6.96	7.66	8.50	7.36	7.85
Stora Enso	9.69	9.20	9.95	10.52	9.77	9.98	9.60	10.38	9.89	9.07
Suzano	16.91	17.50	17.71	24.70	18.04	16.00	26.17	18.95	12.65	12.33
SCA	7.94	8.96	9.37	8.84	9.98	8.39	8.10	8.29	7.20	7.84
Tembec	8.39	8.44	8.50	7.91	7.65	6.27	7.19	6.99	6.81	7.04
Temple Inland	5.07	4.35	4.23	3.86	3.82	2.99	2.66	2.91	3.04	3.79
Tokai	3.59	3.32	3.07	3.03	2.97	3.31	2.52	1.66	1.29	1.24
UPM	10.65	10.86	11.13	10.75	9.82	8.41	8.64	9.18	9.44	9.48
Wausau	8.91	8.52	8.59	8.49	8.62	7.75	6.87	6.47	6.60	7.60
Weyerhaeuser	8.35	8.12	8.37	7.98	9.07	8.44	7.47	8.00	8.67	8.95
Votorantim Cellulosa E Papel	15.63	16.37	18.47	30.94	19.59	15.44	25.94	14.56	15.41	14.52
Yuen Foong Yu	8.00	8.11	8.80	8.24	8.36	7.90	7.40	7.92	7.38	7.14

Appendix 8. Definition of variables in growth model

Definitions	Codes in Thomson ONE banker
Definition for cash flow used for investing (C t)	
(+) R&D	
(+) K	
(+) a	
(=) Cash flow used in investment activities	
Definition of R&D (R&D)	
	01201 x 01001
(=) Research and development expenses/Sales*100	01201 x 01001
Definition of investments in fixed assets (K)	
	04601 - 04051
(+) Capital expenditures	04601
(-) Depreciation, Depletion, Amortizations	04051
(=) Net investments in fixed assets	
Definition of acquisition (a)	
	04355 - 04351
(+) Acquisitions	04355
(-) Disposal of fixed assets	04351
(=) Net investment of acquisitions	
Payments for debt holders	
	(04401 - 04701) + 01251
(+) Issue of long term debt	04401
(-) Reduction in long term debt	04701
(+) Interest expense on debt	01251
(=) Payment for debt holders	
Payments for equity holders	
	(04551 + 04751) - 04251
(+) Cash dividends	04551
(+) Purchase of common and preferred stocks	04751
(-) Issue of common and preferred stocks	04251
(=) Payments for equity holders	
V n = E n + D n	
E n = Year end market capitalization at year n	08001
D n = Long term debt + Other liabilities	03251 + 03273
r e = Return on equity (average of returns)	01651
r f = Risk free rate (5 %)	
oc.c. = opportunity cost of capital (10 %)	

NET SALES OR REVENUES (01001)

Represent gross sales and other operating revenue less discounts, returns and allowances.

RESEARCH AND DEVELOPMENT EXPENSES (01201)

Research and development expenses represent all direct and indirect costs related to the creation and development of new processes, techniques, applications and products with commercial possibilities.

These costs can be categorized as:

1. Basic research
2. Applied research
3. Development costs of new products

It includes:

- (1) Software Expense
- (2) Amortization of Software Expense
- (3) Design and Development Expense

It excludes:

- (1) Customer or government sponsored research
- (2) For oil, gas, coal, drilling and mining companies, purchase of mineral rights
- (3) Engineering Expense
- (4) Contributions by government, customers, partnerships or other corporations to the company's research and development expense

CAPITAL EXPENDITURES (04601)

Capital expenditures represent the funds used to acquire fixed assets other than those associated with acquisitions.

It includes:

(1) Additions to property, plant and equipment

(2) Investments in machinery and equipment

DEPRECIATION, DEPLETION AND AMORTIZATION (04051)

Depreciation represents the process of allocating the cost of a depreciable asset to the accounting periods covered during its expected useful life to a business.

Depletion refers to cost allocation for natural resources such as oil and mineral deposits.

Amortization relates to cost allocation for intangible assets such as patents and leasehold improvements, trademarks, book plates, tools & film costs.

This item includes dry-hole expense, abandonments and oil and gas property valuation provision for extractive companies.

This item excludes amortization of discounts or premiums on financial instruments owned or outstanding and depreciation on discontinued operations.

NET ASSETS FROM ACQUISITIONS (04355)

Net assets from acquisitions represent assets acquired through pooling of interests or mergers. It does not include capital expenditures of acquired companies.

Data for this field is generally not available prior to 1989.

It includes:

(1) Net assets of acquired companies

(2) Additions to fixed assets from acquisitions

(3) Working capital of companies acquired (if shown as both a source and a use, both numbers are netted against each other)

(4) Excess of cost of acquired companies

(5) Discount on acquisitions

DISPOSAL OF FIXED ASSETS (04351)

Disposal of fixed assets represent the amount a company received from the sale of property, plant and equipment.

It includes:

(1) Net long term assets from discontinued operations

(2) Book value of property disposals

(3) Sale of property

(4) Proceeds from businesses sold

(5) Proceeds from significant asset dispositions

(6) Sale/leaseback of property, plant or equipment

(7) Liquidation of net assets of discontinued operations

(8) Retirements of property, plant and equipment

Footnote Codes:

A. Includes sale of investments

B. Net of additions

LT DEBT ISSUANCE (04401)

LT debt issuance represents the amount received by the company from the issuance of long term debt, (convertible and non-convertible), increase in capitalized lease obligations, and debt acquired from acquisitions.

Footnote Codes:

A. Includes reduction in long term debt

B. Includes increase in short term borrowings

C. Includes proceeds from stock

D. Includes other long term liabilities

REDUCTION IN LONG TERM DEBT (04701)

Reduction in long term debt represents funds used to reduce long term debt, capitalized lease obligations and includes decrease in debt from the conversion of debentures into common stock.

Footnote Codes:

- A. Includes common and preferred, redeemed, retired or converted
- B. Includes reduction of short term debt
- C. Includes other long term liabilities
- D. Includes increase in long term debt

INTEREST EXPENSE ON DEBT (01251)

Interest expense on debt represents the service charge for the use of capital before the reduction for interest capitalized. If interest expense is reported net of interest income, and interest income cannot be found the net figure is shown.

It includes:

- (1) Interest expense on short term debt
- (2) Interest expense on long term debt and capitalized lease obligations
- (3) Amortization expense associated with the issuance of debt
- (4) Similar charges

Footnote Codes:

- A. Net expense
- B. Similar charges are included
- C. Other financial charges may be included
- D. Net interest expense and similar charges may be included
- J. Includes other income or expense
- L. Includes income taxes

CASH DIVIDENDS PAID – TOTAL (04551)

Cash dividends represent the total common and preferred dividends paid to shareholders of the company.

It excludes:

(1) Dividends paid to minority shareholders

Footnote Codes:

A. Included in other sources or uses

B. Includes bonuses to directors

C. Prior year's proposed dividend

PURCHASE OF COMMON AND PREFERRED STOCK (04751)

Purchase of common and preferred stock represents funds used to decrease the outstanding shares of common and/or preferred stock.

It includes:

(1) Purchase of treasury shares

(2) Repurchase of stock

(3) Conversion of preferred stock into common stock

(4) Retirement of preferred stock

(5) Exchange of common stock for debentures

SALE OF COMMON AND PREFERRED STOCK (04251)

Sale of common and preferred stock represents the amount a company received from the sale of common and/or preferred stock. It includes amounts received from the conversion of debentures or preferred stock into common stock, exchange of common stock for debentures, sale of treasury shares, shares issued for acquisitions and proceeds from stock options.

Footnote Codes:

A. Includes proceeds from stock options

B. Includes long term borrowings

MARKET CAPITALIZATION (08001)

Stock Data, All Industries:

Year end market capitalization = Market Price-Year End * Common Shares Outstanding

If Common Shares Outstanding is not available for the current year or prior year, then Common Shares Outstanding-Current is used.

For companies with more than one type of common/ordinary share, market capitalization represents the total market value of the company.

RETURN ON EQUITY (01651)

$(\text{IncomeBefPreferredDividends} - \text{PreferredDividends}) / \text{TotalCommonEquity} * 100$

LONG TERM DEBT + OTHER LIABILITIES (See Appendix 4)

Appendix 9. R&D to sales

Company	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Abitibi-Consolidated	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Amcors	0.65	0.93	1.15	0.51	0.34	0.26	0.48	0.42	0.45	0.36
Aracruz	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bowater	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Canfor	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Carastar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cascades	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Catalyst Paper	0.21	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Cheng Loong	0.55	0.69	0.78	0.79	0.73	0.76	0.81	0.69	0.41	0.50
Daio Paper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Domtar	0.57	0.57	0.57	0.57	0.57	0.48	0.63	0.55	0.59	0.58
DS Smith	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Durango	0.11	0.07	0.04	0.05	0.05	0.04	0.08	0.05	0.07	0.05
Empresas Cmpc	0.13	0.14	0.13	0.16	0.12	0.12	0.12	0.12	0.12	0.12
Glatfelter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Greif	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hokuetsu	0.59	0.66	0.69	0.66	0.55	0.49	0.63	0.64	0.81	0.79
Holmen	1.02	1.09	0.49	0.49	0.49	0.49	0.57	0.33	0.64	0.61
International Paper	0.56	0.50	0.46	0.36	0.33	0.35	0.31	0.29	0.27	0.26
Kimberly-Clark	1.58	1.69	1.83	1.92	1.98	2.03	2.13	1.96	1.85	2.01
Lintec	1.67	1.92	1.91	2.03	2.16	2.37	2.79	2.73	2.67	2.65
Longview Fibre	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Mayr-Melnhof Karton	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Meadwestvaco	1.21	1.21	1.21	1.21	1.21	1.21	1.26	0.94	0.90	0.81
Mitsubishi	1.71	1.72	1.79	1.70	1.65	1.29	1.37	1.41	1.54	1.47
M-Real	0.61	0.44	0.43	0.40	0.56	0.39	0.40	0.45	0.51	0.46
Nampak	0.16	0.16	0.21	0.23	0.12	0.12	0.04	0.03	0.15	0.16
OJI	1.04	1.04	1.04	1.04	1.04	1.04	1.09	1.06	1.02	0.99
Pope & Talbot	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Portucel	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Potlatch	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rengo	0.56	0.60	0.56	0.52	0.57	0.53	0.61	0.54	0.47	0.32
Ripasa	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rock Tenn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sappi	0.44	0.41	0.35	0.35	0.32	0.31	0.54	0.44	0.44	0.54
SCA	1.27	1.39	1.19	1.33	1.27	1.52	1.52	1.46	1.41	1.34
Schweitzer-Mauduit	0.07	0.07	0.07	0.07	0.07	0.06	0.07	0.06	0.11	0.12
Smurfit-Stone										
Container	0.63	0.63	0.63	0.63	0.52	0.54	0.49	0.52	0.49	0.42
Sonoco Products	0.61	0.67	0.76	0.79	0.73	0.68	0.72	0.73	0.66	0.67
Stora Enso	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Suzano	1.36	1.28	1.28	1.16	1.10	0.79	0.72	0.71	0.64	0.57
Tembec	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Temple Inland	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tokai	0.48	0.48	0.48	0.48	0.48	0.47	0.48	0.53	0.46	0.52
UPM	0.77	0.41	0.43	0.50	0.46	0.45	0.44	0.48	0.48	0.53
Wausau	0.25	0.26	0.35	0.24	0.42	0.43	0.23	0.22	0.18	0.17
Weyerhaeuser	0.49	0.50	0.53	0.45	0.35	0.38	0.28	0.26	0.24	0.27
Votorantim Cellulosa	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Yuen Foong Yu	0.14	0.21	0.13	0.15	0.22	0.26	0.21	0.28	0.20	0.38
Average	0.63	0.64	0.63	0.61	0.60	0.58	0.62	0.58	0.58	0.58

NA = Not available, (estimated as 0.5% of sales)

Appendix 10. Results of growth model (M €)

Company	V e 1996	V e 2005	Σ R&D 96-05	Σ K 96-05	Σ a 96-05	Result in M €	Index
Portucell	391	1289	34	-261	-40	1150	3.322
Mayr-Melnhof Karton	462	1301	55	-33	12	741	1.521
Canfor	461	1389	74	81	-19	722	1.485
Meadwestvaco	2384	4311	241	-795	-1792	2748	1.284
Smurfit-Stone Container	1403	3059	305	-1117	-971	2685	1.219
Suzano	138	1214	21	257	-7	765	1.165
Empresas Cmpc	1694	4205	65	1184	-137	898	1.151
Temple Inland	2361	4219	189	-464	508	1069	1.142
Aracruz	1379	3479	33	777	-29	904	1.104
Ripasa	56	480	17	220	-1	88	1.081
Abitibi-Consolidated	1298	1488	150	-1369	329	328	1.049
Potlatch	976	1269	71	-44	-35	66	1.021
Sappi	1072	2203	190	-141	175	166	1.018
Votorantim	545	2006	36	876	-59	108	1.018
Stora Enso	1936	9021	537	-1084	3678	380	1.016
International Paper	9565	13973	1090	-3420	1362	71	1.002
UPM	4340	8662	465	-1017	2373	-104	0.996
Holmen	1966	2370	100	832	-897	-208	0.971
Daio Paper	1095	820	141	-252	-45	-209	0.953
Kimberly-Clark	21109	23338	627	1820	272	-2998	0.938
Lintec	805	848	57	42	-41	-83	0.925
Sonoco	1829	2492	128	-58	389	-458	0.917
Weyerhaeuser	7392	13789	715	-1328	5981	-2789	0.917
Longview Fibre	737	901	38	128	-32	-221	0.900
Rengo	1079	907	135	-105	-107	-257	0.895
Bowater	1214	1494	110	-811	660	-806	0.891
SCA	3150	7385	414	-652	3570	-1693	0.884
Greif	501	1277	61	43	467	-268	0.879
Pope & Talbot	167	115	25	-43	-43	-73	0.879
OJI	5211	4377	469	-318	-272	-1666	0.854
Wausau	515	513	41	-60	52	-227	0.832
Nampak	1715	1388	77	140	-171	-585	0.825
Catalyst Paper	1315	478	47	-269	-13	-684	0.822
Glatfelter	602	531	28	-48	54	-277	0.810
Cascades	248	589	93	54	363	-562	0.783
Durango	236	71	30	-25	139	-598	0.756
Tembec	242	146	73	-199	444	-805	0.685
Yuen Foong Yu	725	453	31	31	-17	-432	0.655
Hokuetsu	1063	743	54	209	-9	-1002	0.633
M-Real	807	1385	248	2898	-1549	-3781	0.617
Amcor	3366	3711	229	886	2242	-4537	0.613
Rock Tenn	511	411	63	39	527	-870	0.583
DS Smith	1138	868	100	142	395	-1316	0.556
Cheng Loong	435	229	23	197	-47	-474	0.548
Mitsubishi	1489	396	93	-18	-295	-1209	0.541
Domtar	1002	1121	122	-585	1981	-2935	0.532
Tokai	587	181	22	20	-16	-477	0.530
Schweitzer-Mauduit	399	322	24	171	72	-531	0.528
Caraustar	655	212	39	-100	379	-1135	0.456