NORGES HANDELSHØYSKOLE

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Valuation of Tomra ASA

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Master Thesis in Financial Economics

NORGES HANDELSHØYSKOLE

Executive Summary

In this thesis Tomra ASA is valued using discounted cash flow. A strategic analysis is first carried out in order to reveal whether Tomra ASA should be expected to earn return on invested capital in excess of its cost. Insight from the strategic analysis is then used to form a base case scenario for future growth, profitability and reinvestment needs for each of the business units in Tomra ASA.

In the strategic analysis it is concluded that in the company's Industrial Processing Technology business unit, there is reason to believe that its capability in innovating electronic sensors can give a sustainable competitive advantage. For the Collection Technology and Material Handling business units there was not found any basis for a competitive advantage.

Based on the strategic analysis a base case scenario is formulated where Tomra ASA's stock is valued at 15,7 NOK per share as of 1st of April 2010. This is 46% less than the closing price on Oslo Stock Exchange this day.

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1. Preface

In this paper Tomra ASA is valued from the perspective of a well diversified investor. The investor's strategy is to identify companies mispriced due to the market's wrong expectations of future cash flows. The investor wants to be market neutral regarding the price of risk.

The valuation approach is based on a belief that the investor is better than the market at understanding the long term forces driving company profitability and cash flows.

Each of the company's divisions will be valued separately. The reason for doing this is to make the assumptions behind the valuation more transparent and easier to challenge by the reader.

The valuation is based on publicly available information as of 1st of April 2010.

I would like to thank Svein-Arne Persson for good advice throughout this process.

I would also like to thank Sverre, Anja and my extended family for the patience and support that has allowed me to finish this thesis.

Thomas Roald

Brattvåg, 15th of June 2010

2. Tomra ASA

Tomra ASA[1] was founded in 1972, and started out as a producer of reverse vending machines (RVMs). Since then the company has grown into a recycling group with products in several parts of the waste disposal value chain and operations in more than 45 countries. For fiscal year (FY) 2009 the group had sales of 3.321 mNOK and a net income of 268 mNOK.

The company is listed on the Oslo Stock Exchange (OSE) with the ticker TOM.

The company's operations are divided into three business segments, Collection Technology, Material Handling and Industrial Processing Technology. Some key figures for the group will be presented below, followed by a more detailed section for each of the three business units.

The graph below shows the group's revenues in the period 2005-2009 split by business unit. Following the introduction of deposits on beverage containers in Germany, the group's revenues reached all time high in 2006 at 3.965 mNOK.

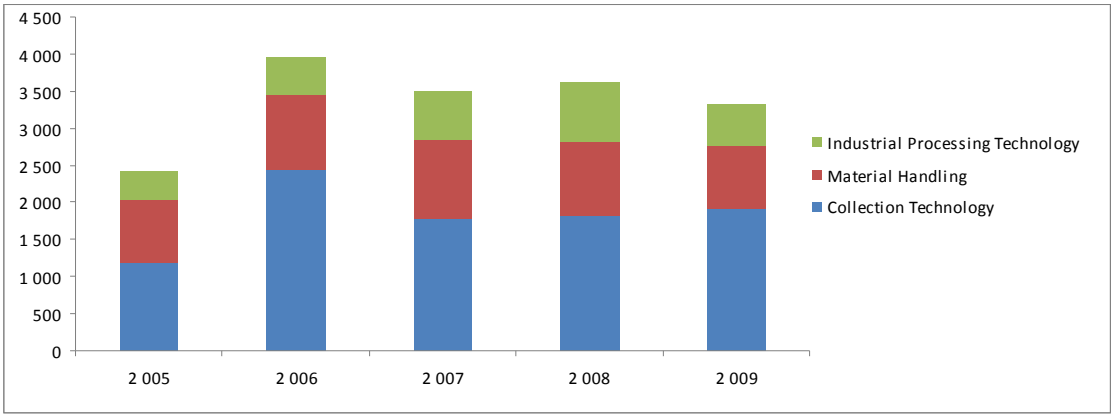

Figure 2-1: Revenue per business segment

[1] The reference for this presentation of Tomra ASA is the company's web site and the FY 2005 – FY 2009 annual reports

The figure below gives an overview of the group's cost structure as a percentage of sales over the period FY 2005 – FY 2009. Direct costs have been at a relatively stable rate of around 35% of sales. In this period average EBIT margin was 11,2% with a low of 5,5% in FY 2005 and a high of 16,5% in FY 2006.

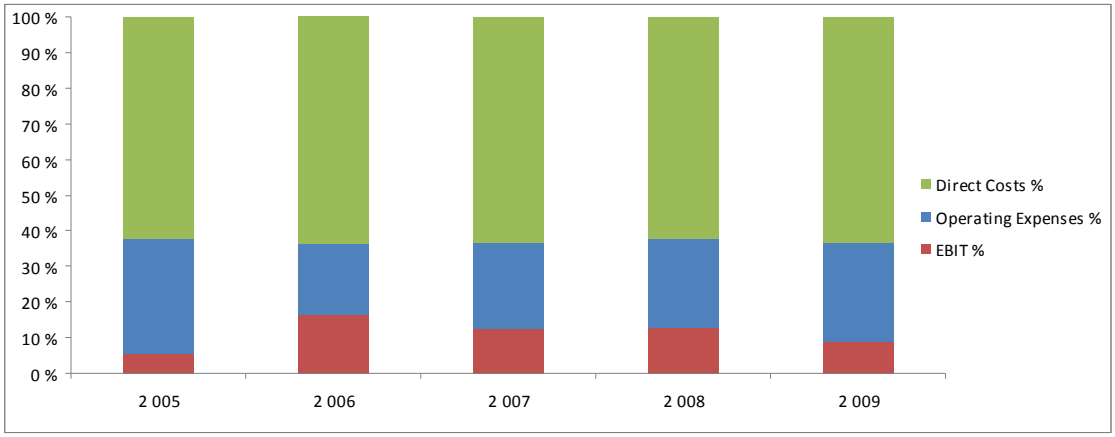

Figure 2-2: Cost Structure as Percent of Sales

Out of the three business units, Collection Technology and Material Handling have had the highest profitability over the period. While Collection Technology has been little impacted by the last years' global financial crisis, Industrial Processing Technology and Material Handling have suffered, as retailers cut back on investments and prices on commodities decreased (Tomra ASA 2009a). The graph below shows EBIT by business unit for the period 2005-2009.

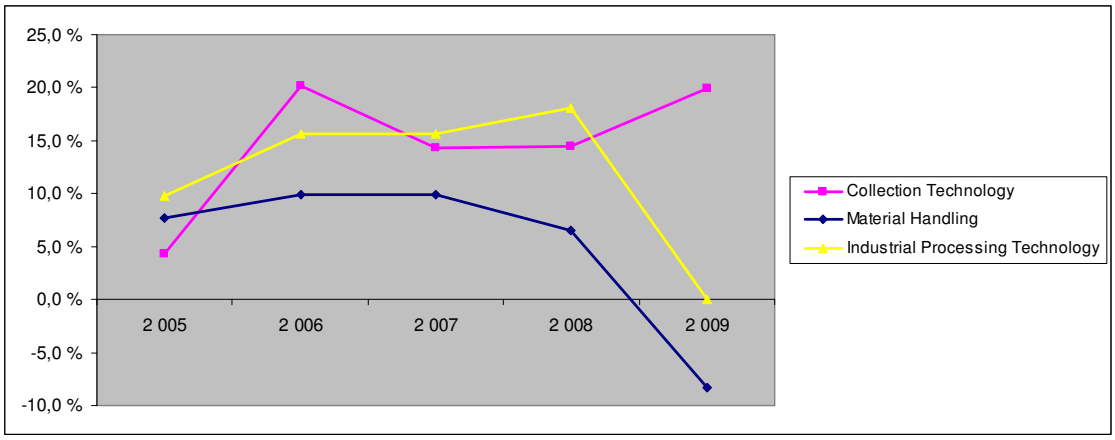

Figure 2-3: EBIT by Business Unit

2.1 Collection Technology

The collection technology business unit delivers products for automatic collection and handling of beverage containers.

Historically operations have been focused on areas where beverage containers are sold with a deposit. During the last years Tomra has also developed products for the return and processing of non deposit containers and packaging. In FY 2009 turnover from non deposit markets was 66 mNOK of the business unit's 3.321 mNOK total.

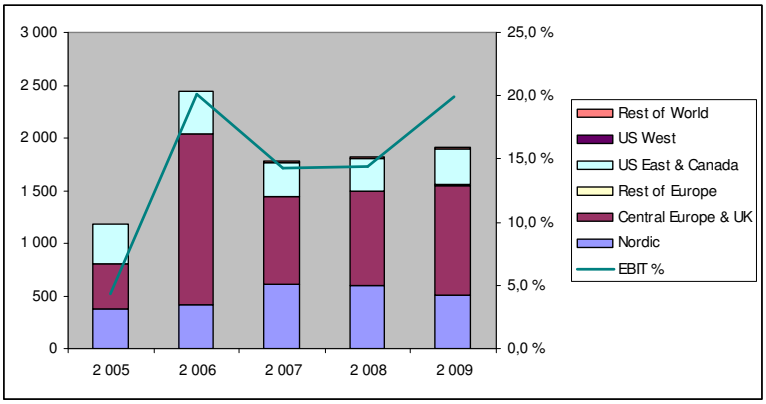

Figure 2-4: Regional Sales and EBIT Margin, Collection Technology

Over the period 2005 – 2009 Collection Technology revenues have benefited strongly from the introduction of deposits on beverage containers in Germany. More than 20.000 of the company's 65.000 installed RVMs are located in Germany. As can be seen from the graph, most of the business unit's revenue is from operations in Europe.

2.2 Material Handling

The Material Handling business segment is providing waste collection and waste processing services to retailers and industry customers in North America. Waste is collected at the customer's premises, prepared for recycling and traded on behalf of the customer. In Europe this service is handled by industry co-operations, but as there were no similar arrangements in the US, Tomra established the Material Handling unit to complement the Collection Technology products. Principal markets are the US East Coast and Canada (Quebec).

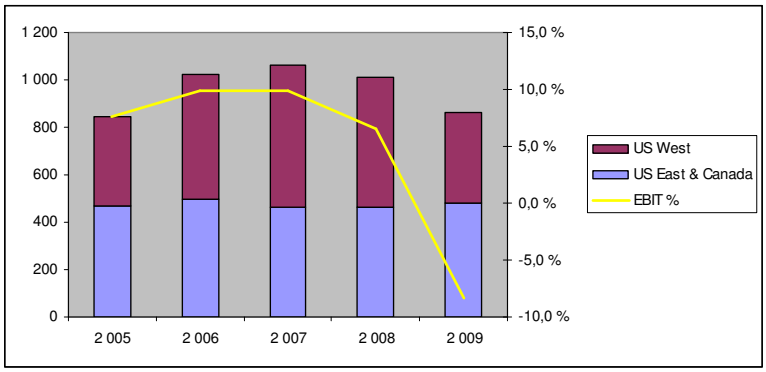

Figure 2-5: Regional Sales and EBIT Material Handling

2.3 Industrial Processing Technology

Industrial Processing Technology is providing solutions for increasing efficiency in handling and processing of non-deposit waste. Tomra's operation in this segment is through the wholly owned subsidiaries TiTech and the Orwak Group AB.

TiTech was acquired in 2004 and specializes in sensor-based sorting systems. The company's systems allow for efficient separation of materials such as paper, plastics, metal, glass and electronic waste. Since that the companies Commodas (acquired in 2006) and UltraSort (acquired in 2008) have been acquired and included in TiTech.

The Orwak group was acquired in 2005 and specializes in compacting solutions through its product line Orwak for the retail segment and Presumia for the industrial segment.

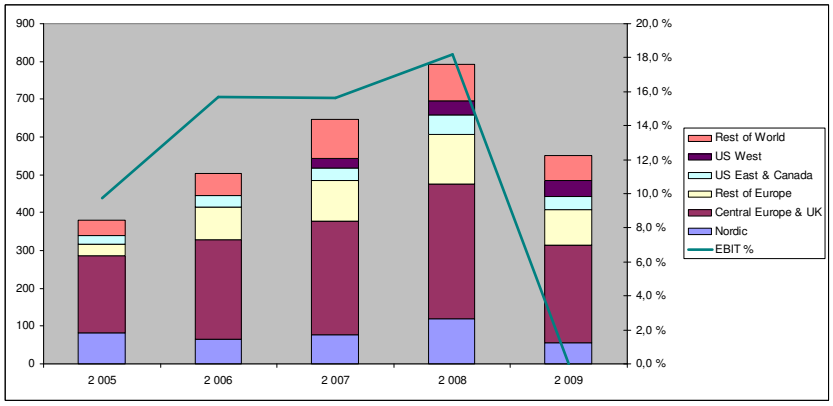

Figure 2-6: Regional Sales and EBIT Industrial Processing Technology

3. Framework for Valuation

3.1 Valuation method

In principle an asset can be valued in two ways. The first is to look at the asset itself and the value that its ownership brings to the owner. This is called an intrinsic valuation. The other way of valuing an asset is to observe the prices of similar assets, and then from this infer the asset's value. This method of valuation is called relative valuation.

The approach used in this paper is intrinsic valuation using a valuation technology called Discounted Cash Flow (DCF). Throughout this valuation a distinction will be made between the company's operating and financing activities. There are two reasons for doing this. The first is that separation of operating items from financing items will provide a more homogenous picture of the company's performance in each of these activities. The second purpose of the distinction is that in most financial statements, financial assets and liabilities are listed at close to fair value. Due to the lack of specification in the notes for these items, the value reported in the financial statement is likely to be a better estimate of fair value than what could be achieved in an intrinsic valuation. Book value will therefore be used as a proxy for fair value in this paper for the company's financial assets and liabilities.

The figure below gives a graphical overview of the valuation framework. The company's operating assets are valued using DCF. Book value of net financial assets is then added to get the value of the enterprise. From enterprise value, minority interests and non equity claims are subtracted to arrive at the value of majority's equity.

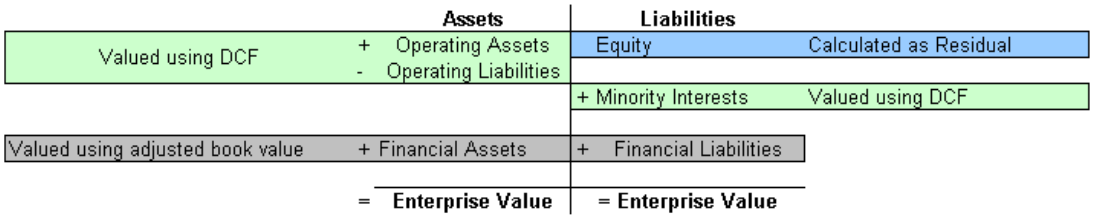

Figure 3-1: Overview of Valuation Framework

As stated in the previous paragraph the company's operating assets are valued using Discounted Cash Flow (DCF). The basis for a DCF valuation is that the value of an asset is equal to the present value of the future cash flow generated by the asset. The cash flow should be discounted at a rate reflecting the timing and riskiness of the cash flow.

$$Value = \sum_{t=0}^{\infty} \frac{CF_t}{(1+k_t)^t}$$

Equation 1: Value in DCF framework

From Equation 1 above it is clear that a DCF valuation can be split into two parts. Firstly insight about the business and its environment must be obtained in order to estimate future cash flows. Secondly an appropriate discount rate needs to be calculated in order to discount these cash flows to present value.

3.2 DCF – The Cash Flow

The first question in a DCF valuation is which cash flow should be discounted. The company has many stakeholders and each stakeholder receives his own cash flow. In principle each of these stakes can be valued using DCF: interest and principal payments discounted to present value will give a value of the company's debt, present value of dividends will yield a value of equity and present value of salary payments to employees will provide a value of the human capital employed in the company's operations. A simple numerical example illustrating the relationship between capital, cash flow, discount rate and value is given in Appendix 1.

Having defined Tomra's operations as the asset being valued, the relevant cash flow is cash received by the owners of Tomra's operations. So what is this cash flow? Principally the figure we are looking for should be the net cash result from all the company's operating activities. It seems intuitive that the cash flow statement should be the basis for estimating this figure; after all it does have a section called "cash flow from operations". Some investment banks in fact use the cash flow statement as basis in their valuation models[2]. In

[2] One example is Credit Suisse, https://www.credit-suisse.com/investment_banking/equities/en/unique_methodology.jsp

practice it is however more common to use the income statement as the starting point for calculating free cash flow. There are two main reasons for this. The first reason is that accounting results are less volatile than cash flows and therefore provide a better basis for projection when the time series being studied is short. The lower volatility of accounting returns is mainly due to the matching principle of accounting. The second reason is that starting from the income statement makes it easier to better separate the results from operating and financing activities. In the cash flow statement items such as interest income and interest expenses are included in cash flow from operations. This is not in line with our intention to get a picture of operations that is as clean as possible.

An argument often seen for using the cash flow statement as the starting point when estimating cash flows, is that they are less exposed to earnings management and accounting treatments. In my option the benefit of less volatile figures in the income statement far outweighs this risk, and in this valuation the income statement will be the starting point when estimating free cash flow.

A common approximation of operating cash flow with basis in the income statement is shown in Equation 2 below. The approximation intuitively makes sense as in the long run it seems reasonable that cash flow from operations will be close to the after tax accounting based result less net investments in operating capital. This is the approximation that will be used in this valuation.

*Free Cash Flow from Operation = EBIT * (1-Tc) – Net Reinvestments in Operating Assets,*

Where

Net Reinvestments in Operating Assets = Investments in Operating Assets – Depreciation

Equation 2: Free Cash Flow from Operations, Damodaran (2002)

Net reinvestment in operating assets is estimated using equation 3 and 4 below. The assumption made is that growth is driven by the reinvestment of capital and that the reinvested capital is generating return equal to total invested capital.

Reinvestment Rate = Expected Growth / Return on Capital

Equation 3: Reinvestment Rate

*Reinvestment = Reinvestment Rate * EBIT * (1-Tc)*

Equation 4: Net Reinvestment

3.3 DCF – The Discount Rate

In section 3.1 it was stated that the cash flow should be discounted by a rate reflecting the riskiness and timing of the cash flow. What is an appropriate discount rate for the company's operating cash flow?

A company's cost of capital can be looked at from both sides of the balance sheet. Consider a company entirely financed with equity and owning only one asset. It is then straight forward that the riskiness of the company's asset is equal to the riskiness of the company's equity. It also seems intuitive that should the company decide to raise debt, this does not affect the riskiness of the company's asset, but will only change the distribution of risk and return between the stakeholders. It can be shown that this intuition not only holds in this example but also in general. The weighted average risk of a company's assets will always be equal to the weighted average risk of the company's liabilities when each capital is weighted by its market value.

In line with the distinction between operating and financing activities from chapter 3.1, a framework for the company's cost of capital is shown in the figure below. The figure shows a "risk balance sheet" emphasising the relationship between riskiness of assets and liabilities and the separation of operating and financial risk. The distinction between operating and financing activities also here makes sense, as a company's operations generally will have a different risk profile than its financial investments.

Assets	**Liabilities**
Cost of capital Operating Assets	Cost of equity
Cost of capital Financial Assets	Cost of debt
	Cost of minority interests
Average cost of capital Firm	*Average cost of capital Firm*

Figure 3-2: Risk Balance Sheet

The Cost of Capital for Equity

In this paper the cost of equity is calculated under the assumptions of the CAPM. The cost of equity can then be found along the security market line with a beta capturing the equity's correlation with the market portfolio. The security market line is shown in equation 5 below.

$$K_E = r_f + (r_m - r_f) * \beta_i \quad \text{where} \quad \beta_i = \frac{\text{cov}_{i,M}}{\delta_M^2}$$

Equation 5: The Capital Market Line

There are several ways of determining a company's beta. For a listed company such as Tomra, at least in theory, the beta can be obtained by regressing the company's stock price on the return of the market portfolio. I would however argue that this approach alone is of little value due to the inevitable high standard deviation of the estimate.

The approach used for calculating the beta in this paper is based on the same method, but in order to reduce the standard deviation of the estimate, the regression is done on a sample of companies and averaged to arrive at an industry operating beta. The averaging across several companies reduces the standard deviation of the estimate. The industry beta is then corrected for structural differences between Tomra and the industry sample and applied in the calculation of the company's cost of equity.

As stated in the preface the investor seeks to be market neutral regarding the price of risk. This means that the investor should use a risk premium equal to the requirement of the marginal investor in the market. In order to find the appropriate market risk premium, a model (2009) and calculations (2010) done by Aswath Damodoran is used. Based on a two-stage dividend discount model and consensus estimates of dividends and dividend growth collected from analysts, Damodoran each month calculates an implied market risk premium (IRP) for the US market. The development of Damodoran's IRP is shown in the figure below.

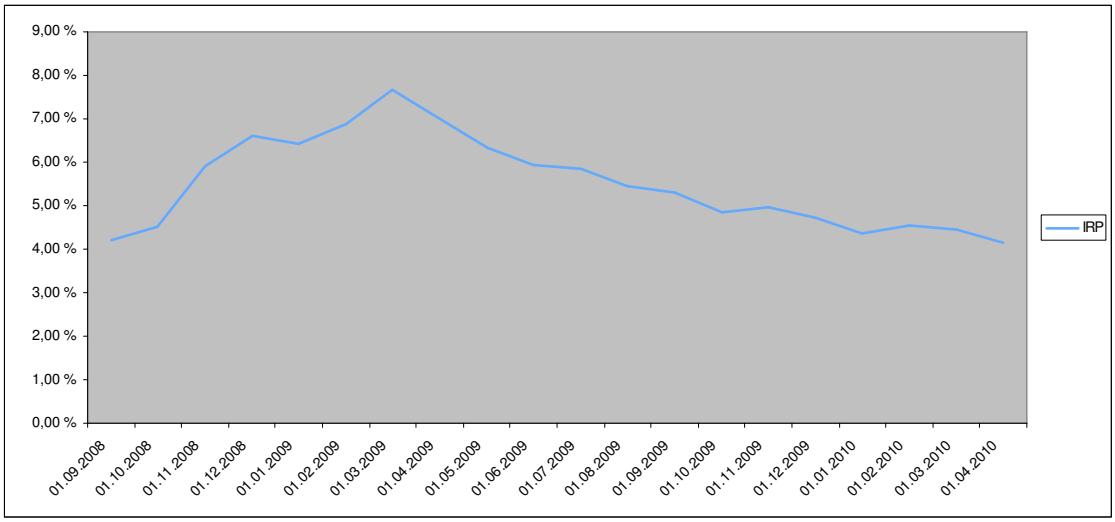

Figure 3-3: Implied Risk Premium

There are several reasons why this model could fail to correctly estimate the risk premium. In my opinion the most significant is that should the market absorb changes in economic conditions more quickly than analysts, it would cause the IRP to be too high in periods where the market is adjusting expectations downwards, and too low when the market is adjusting expectations upwards. Despite this possible flaw, I believe the model provides a robust and compelling method for estimating the market risk premium.

The Cost of Capital for Debt

Often a company's rating from a rating agency such as Moody's or Fitch can be used to determine an appropriate default spread for the company's debt. Tomra ASA is currently not rated by any of the large rating agencies and a synthetic rating is therefore done in order to estimate the company's credit risk. A synthetic rating is done by looking at characteristics of a company's viability and then finding the rating typically assigned by rating agencies to companies with similar characteristics. In this paper interest coverage ratio is being used as the measure of default risk. A more comprehensive approach could for instance be the Altman Z Score or other scoring systems utilising more information in estimating the company's likelihood of default.

The Cost of capital for Minority Interests

Minority Interests are equity invested in one of the group's subsidiaries by someone else than the group's majority. In theory the cost of capital for minority interests should be calculated in the same way as the cost of majority's equity, for instance using the CAPM. However, given the small amount of minority interests in Tomra ASA a shortcut will be made and the group's cost of equity will be used as a proxy for the minority interests' cost of capital.

4. Strategic Analysis

The purpose of the strategic analysis in this chapter is to gain qualitative insight into the company's short term and long term ability to generate profit.

4.1 Framework For the Strategic Analysis

The presentation of the models used in the strategic analysis is based on the presentation in Jay Barney's book *Gaining and Sustaining Competitive Advantage* (Barney 2007).

The model forming the basis for the analysis is the Structure-Conduct-Performance model. The main insight from this model is that financial performance is a result of industry structure and the way that companies conduct business in this industry. An important message is that industry structure imposes limits on the ways that companies can conduct business.

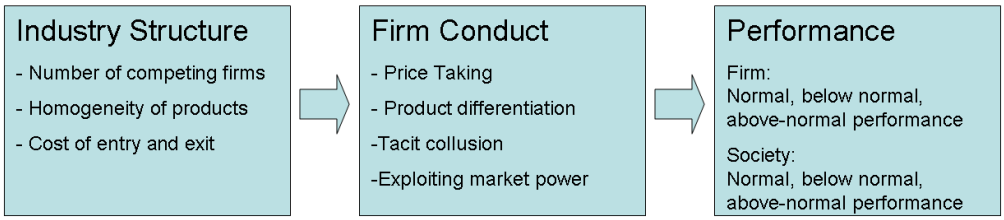

Figure 4-1: The Structure-Conduct-Performance Model

The first section of the analysis will focus on the company's external environment. The model used is Porter's Five Forces. This model provides a framework for identifying and evaluating the various external forces threatening the company's ability to generate profits.

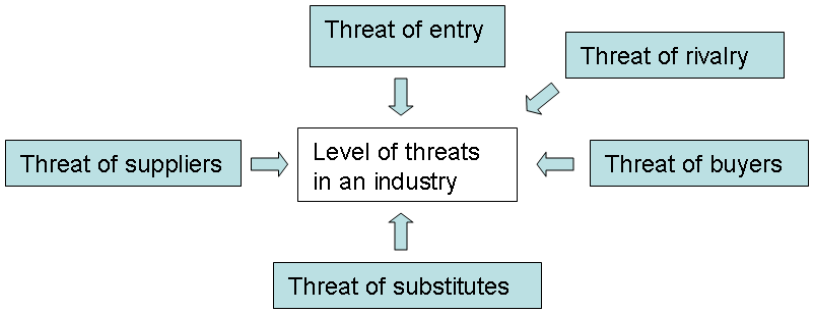

Figure 4-2: Porter's Five Forces

In the second part of the analysis the company's internal strengths and weaknesses are considered in context of the results from the external analysis. The intention is to evaluate whether the company has strengths that allow it to excel in its external environment. The model used for this analysis is the VRIO model.

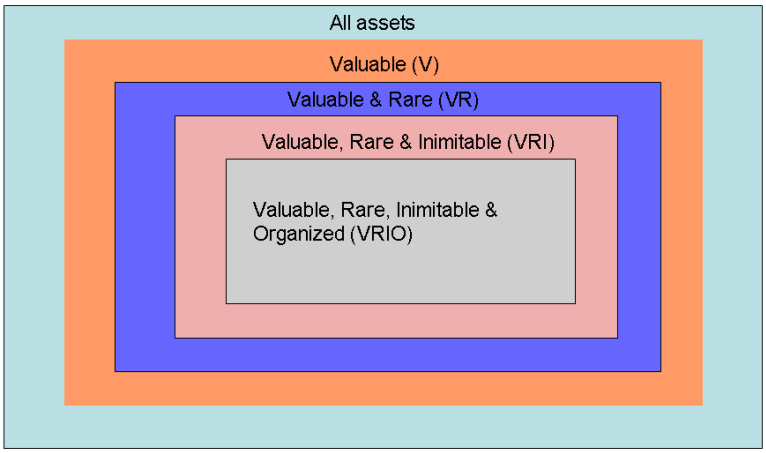

Figure 4-3: The VRIO Model

The model proposes that a company's assets can be described among the dimensions of value, rarity, imitability and organizational compatibility. The idea is that these characteristics determine whether an asset can be a source of competitive advantage or not. The definition of assets includes physical assets but also capabilities, organizational culture and other intangible assets.

The model proposes that only assets helping the company exploit opportunities or neutralize threats in the company's external environment can be considered valuable.

The question of rarity concerns the availability of the asset among the company's competitors. It is intuitive that an asset with high value but which is available to all competitors can not be the basis for a competitive advantage.

An asset's imitability describes the degree to which an asset can be imitated by competitors. The model suggests that resources which are valuable and rare could provide a competitive advantage, but unless the resource is costly or impossible to imitate the competitive advantage will not be sustainable.

The last dimension in the VRIO framework is organizational compatibility. This dimension addresses whether the company is organized in a way that allows valuable asset to be

utilized. For instance can employees with a particularly hands on approach to problem solving be a valuable resource, but unless the company is organized in a way that embraces this quality, it will not provide value for the company.

A tool often used to identify the assets a company possesses is the value chain model. This model provides a framework for analyzing the process of value creation. Several generic value chains have been developed. For this analysis I will use one developed by McKinsey & Company.

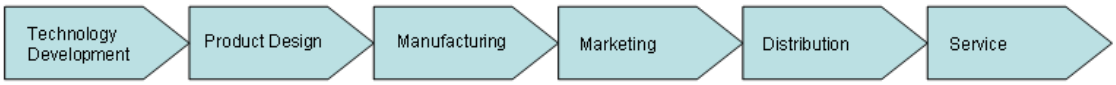

Figure 4-4: McKinsey & Company's Generic Value Chain

This value chain will be used together with the VRIO model in the internal analysis.

4.2 External Analysis

In the following the external environment of each of the company's business units will be studied using the framework of Porter's five forces model.

Threat of Entry

There does not seem to be particularly high barriers of entry to any of the industries where Tomra operates. Material handling has probably the lowest barriers with only minimal requirements for capital and technology.

For RVMs the barriers of entry are a little higher as some technology needs to be developed. A new entrant will probably have to sustain losses for a period of time while the technology and a brand name are being developed. This provides some shield from entry, but should the industry's profitability rise substantially above a fair level it does not seem significant enough to keep entrants out.

Tomra has a significant market share in both collection technology (80%) and in the sorting business (60-70%) (Tomra ASA 2010). Currently there is a legal process ongoing where Tomra has been fined € 24m by the European Commission for preventing competition and abusing its dominant position in the market for RVMs (European Commission 2006). The company has appealed the ruling. After receiving this attention by the regulators it is hardly likely that Tomra will be able to exploit its dominant position to create further barriers of entry.

Buyers

In both the collection technology and material handling segments, the company's main customers are in the food retailing industry. Even though this provides a fairly dispersed customer base globally, the food retail industry in most countries has a few dominant players who can be expected to possess at least moderate bargaining power. The significance of individual customers was demonstrated in 2006 when the German grocery chain Lidl placed an order for 4.000 RVMs (Dagens Næringsliv 2006) representing nearly 10% of the company's installed base at that time.

In the Industrial Processing Technology business unit the main customers are material recovery facilities and retail customers. Globally this provides a large customer base and there are no indications that individual customers have above normal bargaining power.

Threat of Rivalry

Tomra's main competitors in the collection technology segment are Repant, Wincor Nixdorf and Envipco. There seems to be moderate rivalry among these companies as they are present in the same geographical regions and targeting the same customers.

Over the last few years activity in the European region has benefited strongly from the introduction of deposit legislation in Germany in 2006. The European market now seems to be mature and currently there are no new areas where introduction of deposit legislation is imminent. As market growth opportunities become smaller it seems likely that rivalry in the industry will intensify over the coming years.

Threat of Suppliers

The characteristics of Tomra's businesses do not suggest that its suppliers are a substantial threat to profitability.

Threat of Substitutes

For all of the three business units the option of not recycling is a close substitute to their offerings. Should the cost from recycling exceed the gain from handling fees and value extracted from the recycled materials, the value proposition for these products will not be valid. For both the sorting and collection technology businesses more labour intensive approaches are also a substitute.

4.3 Internal Analysis

Collection Technology

Tomra's reverse vending machines (RVMs) are fairly technologically sophisticated. In addition to high requirements for durability the automatic handling of deposits requires a solid system for fraud prevention. Tomra has developed the Tomra Sure Return™ technology to address this (Tomra 200?). The patented solution has several layers of security, such as video surveillance, weighing of the cans and reading of bar codes.

In the framework of the VRIO model this asset is without doubt valuable. But is it rare? Looking at the website of Tomra's competitor Wincor Nixdorf they seem to offer exactly the same method of fraud prevention (Wincor Nixdorf 200?). Also Repant seems to offer a sophisticated system for fraud prevention (Repant ASA 200?).

With this in mind we can conclude that Tomra's advanced fraud prevention system, although valuable, is not rare and can therefore not be the basis of a competitive advantage. It is however likely that this technology is required for Tomra to gain competitive parity.

As a result of the long period Tomra has been in the RVM business and the dominant position that it has had over much of this period, the company has accumulated a substantial installed base of RVMs. The installed base provides a significant distribution channel for value adding services such as maintenance, data management and support. In the VRIO framework this asset can be a valuable resource as it allows the company to charge excess prices to customers locked into buying spare parts and maintenance from the company. No other company in the industry has an installed base the size of Tomra's and the asset is therefore currently also rare. Is the asset hard to imitate? Given the competitive dynamics in the RVM business where other companies are able to supply more or less the same products as Tomra it does not seem likely that exploitation of this opportunity can be sustainable as customers will seek other alternatives and gradually equalize the companies installed bases.

Looking at the value chain for products in the collection technology segment the company does not seem to have any assets or capabilities that can form the basis for a sustained competitive advantage. However in the short term exploitation of the company's significant

installed base could yield high performance. This effect is however not likely to be sustainable.

Material Handling

In the material handling segment Tomra collects, transports and processes waste in North America. This is an operation with low technological intensity and it is hard to see that Tomra should have any assets allowing a competitive advantage to be gained in this industry.

Industrial Processing Technology

Tomra's products in the industrial processing technology business are the compacting solutions by subsidiary Orwak and sorting solutions by TiTech.

The sorting business is fairly technologically advanced and TiTech claims to be way ahead of the competition in sensor based sorting. A current market share of 60% seems to support that there is some credibility to this statement. The company has developed a portfolio of sensor technologies such as NIR, CMYK, VIS, EM, RGB and X-ray (TiTech 200?). These assets are valuable and seem to be rare as the solutions from its main competitors are based on pneumatic and magnetic principles.

As with most technological inventions imitation is not very costly, even if the products are patented. Although not a basis for sustainable competitive advantage the sensors have the potential of supporting a competitive advantage and superior performance in the short run while competitors catch up.

The wide array of sensor based sorting technologies developed inside TiTech and the market share that these solutions have allowed the company to gain, suggests that the company has significant capabilities in these functions. This is definitively a valuable resource as it can allow the company to increase customer value or reduce production cost. The ability to imitate these capabilities is hard to evaluate. One plausible reason why the company can have an edge over the competition in this field is that its significant market share allows the company to be involved in a larger range of projects than its competitors and therefore is stimulated with new problems more intensively than competitors. Based on the success of the products developed from in house research, the company's organization seems to be able

to exploit this resource. TiTech's ability to innovate combined with the company's intense exposure to customers' challenges is a credible basis for a sustainable competitive advantage.

4.4 Conclusions of the Strategic Analysis

Based on the discussion above there do not seem to be strong indications that sustainable competitive advantage can be obtained within the collection technology segment or the material handling segment.

For the industrial processing segment it seems likely that the company's portfolio of electronic sensors can provide a short term competitive advantage. As competitors imitate this technology the competitive advantage for these sensors are likely to disappear. Even if the competitive advantage from its current portfolio of products is temporary, the company's ability to innovate and commercialize new electronic sensors for sorting solutions is a credible basis for a sustainable competitive advantage.

5. The Cost of Capital

In this chapter the cost of capital for equity, debt, minority interests and the weighted average cost of capital are calculated. The costs of capital will be used in chapter 8 where the company is valued.

5.1 Cost of Capital for Equity

As stated in chapter 3 the cost of equity will be estimated using the security market line (SML). The SML is shown in the equation below.

$$K_E = r_f + (r_m - r_f) * \beta_i \quad \text{where } \beta_i = \frac{\text{cov}_{i,M}}{\delta_M^2}$$

Equation 6: The Security Market Line

The parameters required for estimating the cost of equity are the risk free rate, the market's risk premium and the equity's correlation with the market portfolio.

The cost of equity should in theory be calculated separately for each of the future cash flows, this is however not practically feasible.

The Risk Free Rate

In the cost of equity a risk free rate equal to the yield on 10 year government obligations is used. As of 01.04.2010 the yield is 3,83%.

The same risk free rate is used for all future payments.

The Equity Risk Premium

The risk premium used in the valuation is calculated using Aswath Damodoran's implied risk premium model. As of 01.04.2010 the implied risk premium is 4,16%.

The Beta

As stated in the valuation framework in chapter 3, the equity beta is calculated by calculating an unlevered industry beta that is then levered with Tomra's capital structure and tax rate. The unlevered industry beta is calculated using Hamada's equation shown in equation 7 below.

$$\beta un_{levered} = \overline{\beta} * \frac{1}{1 + (1 - \bar{t}) * \overline{\frac{D}{E}}}$$

Equation 7: Unlevered beta

Data for the industry sample is collected from Aswath Damodoran's website where he keeps updated collections of data from the data services Capital IQ and Bloomberg. See Appendix 5 for a list of the 41 companies included in the industry sample. The calculation of the unlevered beta is shown in the figure below.

	Average levered beta comparable firms	0,71
	Average tax rate comparable firms	16,95 %
	Average D/E ratio comparable firms	46,35 %
=	**Unlevered Beta**	**0,513**

Figure 5-1: Calculation Unlevered Beta

The companies on average have a regression beta of 0,71. The unlevered beta using average financial leverage and tax rate (simple average) is 0,513. Solving Hamada's equation formula for the levered beta gives the expression in equation 8. Using this equation Tomra's equity beta is calculated at 0,55. The Tax rate used in the calculation below is found using calculations that will be explained in more detail in section 6.3.

$$\beta_{levered} = \beta_{unlevered} * (1 + \frac{1-t}{D/E})$$

Equation 8: Levered beta

	Unlevered beta	0,513
	Tax rate	0,359
	D/E	0,165
=	**Levered Beta**	**0,57**

Figure 5-2: Calculation Levered Beta

Cost of Equity

Using equation 6 and the variables defined above the company's cost of equity is estimated at 6,2%.

Risk-free rate	3,8 %
Beta	0,57
Equity risk premium	4,2 %
Cost of equity	**6,2 %**

Figure 5-3: Cost of Equity

5.2 The Cost of Capital for Debt

As mentioned in chapter 3.1 a synthetic rating of the company is carried out in order to determine a reasonable default spread for the company's debt. The synthetic rating is done using interest coverage ratio as a proxy for the company's default risk. The procedure is based on Aswath Damodaran's book Investment Valuation (Damodaran 2002). Please see Appendix 4 for the mapping used between interest coverage ratio, rating class and default spread.

		2004	2005	2006	2007	2008	2009
	Operating Profit (EBIT)	128,1	81,3	439,8	293,0	310,3	183,1
/	Financial Cost	2,4	2,0	3,0	19,6	32,8	23,5
=	**Interest Coverage Ratio**	**53,4**	**40,6**	**146,6**	**14,9**	**9,5**	**7,8**
	Estimated Credit Rating	AAA	AAA	AAA	AAA	A+	A+
	Estimated Spread	0,20 %	0,20 %	0,20 %	0,20 %	0,50 %	0,50 %

Figure 5-4: Synthetic Rating Unadjusted Figures

We see that following the establishment of a 500 mNOK credit facility with DnB NOR ASA in October 2006, the interest coverage ratio decreased significantly. The term of the loan was NIBOR + 0.27% with October 2011 maturity. The margin of 0,27% is relatively close to the estimated spread of 0,2%.

In June 2008 another 250mNOK credit facility with DnB NOR ASA was opened. The term of this loan was NIBOR +0,8%. The estimated default spread for 2008 using our model was lower at 0,5%.

One important consideration is that when using the yearly interest coverage ratio, we are assuming that the financial cost for a year reflects the cost of servicing the debt that the

company has as of end of that year. One example to illustrate this example is year 2006 for Tomra. The new DnB credit facility is opened in October. This means that the interest coverage ratio for 2006 is only affected by interest payments for 2-3 months. Everything else equal, the fall in interest coverage ratio is therefore expected to happen in 2007, when the company is paying interest on the loan over the whole year.

A second implicit assumption is that the company is currently using all of its existing credit facilities. An example to illustrate this problem is year 2008 for Tomra. As of end 2008 open credit facilities total 750 mNOK, however only 550 mNOK is actually used. This means that the interest coverage ratio is reflecting a lower leverage than what DnB NOR ASA has granted to the company. It seems reasonable that for a lender the relevant figure would be the interest coverage ratio when all the existing credit facilities are fully used.

An adjusted interest coverage ratio for the period 2004 to 2009 is presented in the table below. The adjustment made is that financial costs have been estimated under the assumption that all available credit facilities are fully used over the entire year.

As can be seen from the table below this adjustment decreases the interest coverage ratio for the years 2006-2009. The estimated credit spread as of end 2008 is now 0,75%, closer to the 0,8% actually received on the second DnB NOR ASA credit facility.

		2004	2005	2006	2007	2008	2009
	Operating Profit (EBIT)	128,1	81,3	439,8	293,0	310,3	183,1
/	Financial Cost	2,4	2,0	17,3	27,0	51,9	22,2
=	**Interest Coverage Ratio**	**53,4**	**40,6**	**25,5**	**10,9**	**6,0**	**8,3**
	Estimated Credit Rating	AAA	AAA	AAA	AA	A-	A+
	Estimated Spread	0,20 %	0,20 %	0,20 %	0,35 %	0,75 %	0,50 %

Figure 5-5: Synthetic Rating Adjusted Figures

In this valuation the rate on 10-year government obligations with an additional default spread of 0,5% (A+ rating) is used as the cost of debt.

5.3 The Cost of Capital for Minority Interests

As stated in chapter 3.3 the cost of equity will be used as a proxy for minority interests' cost of capital. This means that cost of capital assumed for minority interest is 6,1%.

5.4 Weighted Average Cost of Capital

In order to arrive at a cost of capital for the free cash flow from operations the cost of each source of financing is weighted by its market value. Implicit in the use of WACC as the discount rate is the assumption that Tomra will maintain a capital structure where the percentage contribution of each source of capital is constant.

$$WACC=\frac{E}{V}*k_e+\frac{MI}{V}*k_{mi}+\frac{D}{V}*k_d*(1-T_c)$$

Equation 9: Weighted Average Cost of Capital

In the figure below the WACC for operating assets is calculated at 5,8%.

	Kd	4,3 %
*	D/V	12,5 %
*	Tax rate	35,9 %
=	**Debt contribution in WACC**	**0,3 %**
	Ke	6,2 %
*	E/V	75,7 %
=	**Equity part contribution in WACC**	**4,7 %**
	Kmi	6,2 %
*	MI/V	11,7 %
=	**Minority Interest contribution in WACC**	**0,7 %**
=	**WACC**	**5,8 %**

Figure 5-6: Weighted Average Cost of Capital

6. Financial Statement Analysis

In this chapter an analysis of the company's financial statements for FY 2004 - FY 2009 is done. The purpose of the analysis is to gain insight into the company's fundamentals that can be used in chapter 7 when determining the inputs to the valuation.

6.1 Preparing the financial Statement for Analysis

In line with the framework from chapter 3, the financial statement is regrouped to better separate operating items from financing items. Also a reclassification of ordinary items and transitory items is done to be better suited for projection. The regrouped financial statements are based on method taught by Kjell Henry Knivsflå in the class *BUS 424 – Strategic Financial Statement Analysis* at Norwegian School of Economics and Business Administration. In the following section the regrouped and adjusted financial statement is presented and commented briefly.

6.2 Regrouped and Adjusted Financial Statement

Regrouped and adjusted Income Statement

		2004	2005	2006	2007	2008	2009
	Operating Income	2 142	2 413	3 965	3 490	3 622	3 321
-	Operating Cost	1 944	2 280	3 310	3 044	3 166	3 030
=	**Operating Profit Own Company**	**199**	**133**	**655**	**445**	**456**	**292**
-	Operating Tax Own Company	-72	-54	-217	-154	-149	-112
=	**After Tax Operating Profit Own Company**	**127**	**79**	**438**	**291**	**308**	**179**
+	After Tax Profit from associates	1	2	2	2	3	4
=	**Operating Profit**	**128**	**81**	**440**	**293**	**310**	**183**
	Operating Profit	*6,0 %*	*3,4 %*	*11,1 %*	*8,4 %*	*8,6 %*	*5,5 %*
+	Financial income	27	12	4	4	8	10
=	**Net Result to Employed Capital**	**155**	**93**	**444**	**297**	**318**	**194**
-	Financial Cost	-2	-1	-2	-14	-24	-17
-	Result to Minorities	-15	-14	-13	-12	-14	-20
=	**Ordinary Result to Equity (Ordinary Net Income)**	**138**	**78**	**429**	**271**	**281**	**157**
+	Exceptional Operating Income	-86	126	-145	-162	379	-302
+	Exceptional Financial Result	9	-70	-2	9	-3	92
=	**Comprehensive Result to Equity (Net Income)**	**60**	**135**	**282**	**118**	**657**	**-53**
-	Net Distributions to Equity	54	532	476	466	261	122
	Change in equity	**6**	**-398**	**-194**	**-348**	**395**	**-174**

Figure 6-1: Regrouped Income Statement

The regrouped income statement is emphasizing the split between operating and financial items, and the split between ordinary and transitory items. It can be seen that after tax operating profit has ranged from a low of 81 mNOK in 2005 to a high of 440 mNOK in 2006.

In order to explain the change in equity for each period, items adjusted directly against equity and not included in the income statement have here been included. The resulting figure is called comprehensive result to equity. Net distributions to equity are then subtracted from this to get a period change in equity. Items in exceptional operating income are translation differences, share options and other equity settled transactions.

Regrouped and adjusted Balance Sheet

		2004	2005	2006	2007	2008	2009
	Durable Operating Assets	1 294	1 311	1 346	1 210	1 586	1 431
-	Long Term Operating Debt	94	76	40	33	53	52
=	**Net Durable Operating Assets**	**1 200**	**1 235**	**1 305**	**1 177**	**1 532**	**1 378**
+	Current Operating Assets	827	1 006	1 497	1 414	1 724	1 429
-	Short Term Operating Debt	470	616	852	822	866	768
=	**Net Operating Assets**	**1 557**	**1 626**	**1 950**	**1 769**	**2 391**	**2 040**
+	Financial Assets	1 136	677	467	329	284	252
=	**Employed Assets**	**2 693**	**2 302**	**2 418**	**2 097**	**2 675**	**2 292**
	Equity	2 564	2 166	1 972	1 624	2 019	1 845
+	Minority Stake	68	75	66	56	65	58
+	Financial Debt	62	61	380	417	591	389
=	**Employed Capital**	**2 693**	**2 302**	**2 418**	**2 097**	**2 675**	**2 292**

	Equity 01.01	2 564	2 166	1 972	1 624	2 019
+	Complete result to Equity	135	282	118	657	-53
-	Net Distributions to Equity	532	476	466	261	122
=	**Equity 31.12**	**2 564**	**2 166**	**1 972**	**1 624**	**2 019**	**1 845**

Figure 6-2: Regrouped Balance Sheet

The regrouped balance sheet is created in line with the ideas of the valuation framework. Net operating assets are calculated as the net of operating assets and liabilities. This figure represents the net assets tied up in the operation of the business. Below the balance sheet a supporting table is made showing how equity changes each period using the same logic as seen in the income statement. Net distributions to equity include dividends and stock purchases and sales.

Regrouped and adjusted Cash Flow

		2004	2005	2006	2007	2008	2009
	Net Result to Employed Capital		81	440	293	310	183
+	Exceptional Operating Income		126	-145	-162	379	-302
-	Change in Net Operating Assets		68	325	-182	622	-351
=	**Free Cash Flow from Operations to Employed Capital**		**139**	**-30**	**313**	**66**	**232**
-	Financial Cost		1	2	14	24	17
+	Change in Financial Debt		0	319	37	173	-202
-	Result to Minorities		14	13	12	14	20
+	Change in minority stake		7	-9	-10	9	-7
=	**Free Cash Flow to Equity**		**131**	**264**	**314**	**211**	**-13**
-	Net Distributions to Equity		532	476	466	261	122
=	**Free Cash Flow from Operations Available for Financial Investments**		**-401**	**-212**	**-152**	**-50**	**-134**
+	Financial income		12	4	4	8	10
+	Exceptional Financial Result		-70	-2	9	-3	92
=	**Change in Financial Assets**		**-459**	**-209**	**-139**	**-45**	**-32**
+	Financial Assets 01.01		1 136	677	467	329	284
=	**Financial Assets 31.12**		**677**	**467**	**329**	**284**	**252**

Figure 6-3: Regrouped Cash Flow Statement

From the regrouped cash flow statement we can see that free cash flow from operations have varied between -30 mNOK and 313 mNOK over the period 2005 – 2009. It is at first a little surprising to see that 2006 with very high profitability actually provided negative cash flow from operations. From the figures we see that the reason for this is high exceptional operating loss (mainly translation differences and share option costs) and an increase in net operating assets (inventory and receivables).

6.3 Tax

In order to find a reasonable effective tax rate for Tomra's operating income an analysis is done in this section.

Tomra is operating in many different tax regimes. In this analysis it is assumed that tax on financial income is 14% and that tax on financial costs is 28%. Operating tax is then the residual. Using this logic the average tax rate for the period 2004 – 2009 is calculated at 35,9%. This tax rate is used in the calculation of the cost of capital and in the valuation for forecasting future taxes.

		2004	2005	2006	2007	2008	2009
	Ordinary tax	92,9	55,2	216,3	150,6	140,3	122,2
+	Exceptional tax	0,0	0,0	0,0	0,0	0,0	0,0
=	**Reported Tax**	**92,9**	**55,2**	**216,3**	**150,6**	**140,3**	**122,2**
-	Tax on financial income	4,3	2,0	0,7	0,7	1,3	1,7
+	Tax on financial cost	0,7	0,6	0,8	5,5	9,2	6,6
-	Tax on Exceptional financial result	-0,9	0,1	-0,3	1,4	-0,5	14,9
=	**Tax on operating income**	**90,1**	**53,7**	**216,8**	**154,0**	**148,6**	**112,2**
-	Exceptional tax	0,0	0,0	0,0	0,0	0,0	0,0
-	Tax on Exceptional operating result	18,5	0,0	0,0	0,0	0,0	0,0
=	**Tax on Ordinary operating income**	**71,6**	**53,7**	**216,8**	**154,0**	**148,6**	**112,2**
-	Exceptional tax on Ordinary operating income	0,4	6,0	-18,2	-5,7	-15,0	7,6
=	**Ordinary operating tax**	**71,2**	**47,7**	**234,9**	**159,7**	**163,6**	**104,6**
	Average ordinary operating tax 2004-2009	35,9 %					

Figure 6-4: Analysis Tax

6.4 Revenue

In this section the company's revenue is analysed in order to support a forecast of the company's top line in the valuation. This is done subsequently for each of the company's three business units.

Collection Technology

The Collection Technology business is selling, leasing and servicing reverse vending machines (RVMs). The intention of this chapter is to estimate a selling price per RVM and average annual service income per RVM in the installed base.

In order to keep figures for the period 2005-2009 comparable, revenue is adjusted for currency differences. This is done using the average currency rates and the weight of each currency from the notes in the group's annual report. See Appendix 3 for the adjustment factors used. The figure below shows the calculation of the estimated average unit price per RVM.

		2005	2006	2007	2008	2009	Average
	Total Revenue		2 440	1 779	1 819	1 906	
+	Currency Adjustment		80	106	111	0	
=	**Currency Adjusted Revenue**		**2 520**	**1 885**	**1 930**	**1 906**	
-	Currency Adjusted Service Revenue		718	811	885	944	
=	**Currency Adjusted (2009) Non Service Revenue**		**1 803**	**1 075**	**1 045**	**962**	
	Number of Leased Machines	7 799	5 960	7 307	6 935	6 247	
	Number of Installed Machines Total	52 000	57 920	60 000	61 110	62 450	
	Period Change in Installed Base		*5 920*	*2 080*	*1 110*	*1 340*	
-	*Period Change in Leased Base*		*-1 839*	*1 347*	*-372*	*-688*	
=	**New Units Sold in Period**		**7 759**	**733**	**1 482**	**2 028**	
	Sold Unit Equivalents From Lease		573	553	593	549	
+	New Units Sold in Period		7 759	733	1 482	2 028	
+	Replacement Units Sold in Period		2 650	3 000	3 000	3 200	
=	**Sold Unit Equivalents in Period Revenue**		**10 982**	**4 286**	**5 075**	**5 777**	
	Currency Adjusted (2009) Non Service Revenue		1 803	1 075	1 045	962	
/	Total Period Revenue Units		10 982	4 286	5 075	5 777	
=	**Revenue per unit (kNOK)**		**164,1**	**250,7**	**205,9**	**166,5**	**196,8**

Figure 6-5: Estimated Average Selling Price per RVM

First revenue is adjusted to be consistent with 2009 currency rates. Service revenue is then subtracted to arrive at revenue from sale and leasing of RVMs. Service revenue is not reported by segment but an assumption is made that 90% of total service revenue is from the RVM business. This is probably not precisely right but it should not be far from the truth as Tomra states that the Collection Technology business has "Annual recurrent service revenue close to 1 BNOK" (Tomra 2010). Changes in the installed base and the number of leased machines are then used to estimate new units sold in the period. The number of replacement units sold in the period is then added to this figure. Leased machines are converted to sold units equivalents by assuming a life of each RVM of 12 years. The logic is that 120 leased machines with a life of 12 years will generate annual revenue equal to the sale of 120/12 = 10 sold units per year. This approximation is very rough and fails to take account of the interest part of the lease income but in the context of the overall uncertainty in an enterprise valuation it is not significant. Based on this logic the unit price of a RVM is estimated at 197 kNOK.

In the figure below service revenue per installed RVM is estimated. The calculation here is simpler. Service income is divided by installed base as of end of the previous year. The intuition here is that it will take some time before new units sold start to generate service income.

	Revenue	2005	2006	2007	2008	2009	Average
	Service Revenue		717,6	810,7	885,4	944,1	
/	Installed Base t-1		52 000	57 920	60 000	61 110	
=	**Service Revenue / Machine (kNOK)**		**13,8**	**14,0**	**14,8**	**15,4**	**14,5**

Figure 6-6: Average Annual Service Income

Based on the calculation above annual service income per unit of installed base is 14,5 kNOK.

Material Handling

Revenues from the Material Handling business segment are from operations in the US East, US West and in Canada.

The model in the US East and Canada is that Tomra receives a payment for transporting, processing and marketing waste collected through their RVMs. The waste is not acquired by

Tomra and the company is therefore not directly exposed to swings in the commodity markets.

In the US West the company performs the same activities as in the US East & Canada segment, and in addition also operates a network of collection centres. The company takes ownership of the waste collected through these centres and is therefore exposed to fluctuations in the commodity prices. The figure below shows the geographical revenue split between the US West and the US East & Canada region for the years 2005-2009.

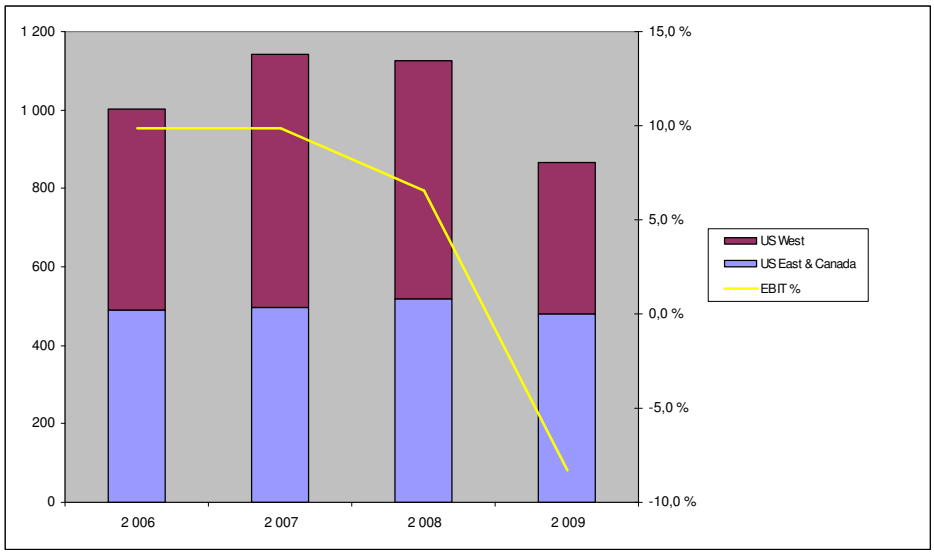

Figure 6-7: Regional Sales and EBIT Material Handling

A reasonable assumption for the development of revenue in the US East & Canada region is that it will vary in line with the US East & Canada Collection Technology turnover. This region has had no growth in the installed base over the last five years and this seems also to fit well with the flat revenue over the period. In the 2009 annual report Tomra states that the main reasons for the fall in turnover in 2009 was the sale of a 51% share of a company called New England Glass, and lower volume processed for third parties.

In the US West region Tomra operates a network of collection centres outside retail stores. The company receives handling fees of approximately 12 mUSD (Tomra ASA 2009b) per year from the Government of California but also takes ownership of the collected waste and generates income from sale of the processed waste. In the 2009 annual report Tomra cites that exclusion of these handling fees and the drop in the aluminium price were the main reasons for the decline in revenues and margins in 2009.

Industrial Processing Technology

Revenues in the Industrial Processing Technology (IPT) segment declined significantly in 2009 as decreasing commodity prices and reduced availability of financing made waste management companies more reluctant to invest in new equipment.

The IPT segment has grown through the acquisition of the companies TiTech (2004, 225 mNOK), Orwak Group (2005, 160 mNOK), Commodas (2006, 100 mNOK) and UltraSort (2008, 160 mNOK).

This segment's revenue is hard to analyze as very little information is provided on product level. A general observation is that at least in the short term activity is strongly influenced by the level of commodity prices.

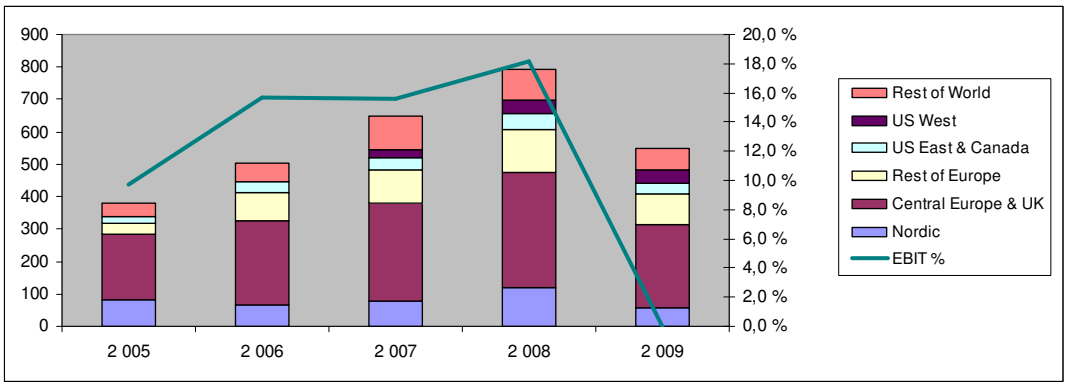

Figure 6-8: IPT Revenue & EBIT%

6.5 Invested Capital

In this chapter invested capital will be analysed on business unit level. The company reports assets and liabilities by business unit, but in order to separate net financial assets from operating assets some additional assumptions have to be made.

The figure below displays the reported total net assets for Tomra split by business unit.

		2005	2006	2007	2008	2009
	Collection Technology	764	997	818	1014	851
+	Material Handling	576	607	564	733	585
+	Industrial Processing Technology	407	584	563	855	799
+	Group Functions	495	-151	-267	-517	-332
=	**Net Assets**	**2242**	**2037**	**1678**	**2085**	**1903**

Figure 6-9: Net Assets by Business Unit

When comparing these figures to the regrouped balance sheet in figure 6-2 the difference is that this figure also includes net financial assets.

		2005	2006	2007	2008	2009
	Net Assets	2 242	2 037	1 678	2 085	1 903
-	Financial Assets	677	467	329	284	252
+	Financial Liabilities	61	380	417	591	389
=	**Net Operating Assets**	**1 626**	**1 950**	**1 767**	**2 392**	**2 040**

Figure 6-10: Reconciliation Net Assets - Net Operating Assets

In order to estimate operating assets per business unit there are now two challenges. The first is that we need to subtract out net financial assets. The second is that assets and liabilities are also reported for an entity called Group Functions. This entity probably has a large share of the financial assets and liabilities, but probably also some common operating assets such as administration facilities and equipment.

Net operating assets by business unit are estimated by doing two adjustments to the reported figures in figure 6-9. The first adjustment is to subtract out net financial assets from the reported numbers. As no split by business unit for net financial assets is provided in the financial reports it has to be estimated. The approach used here is that it is assumed that net financial assets are distributed between the entities in the same proportion as net assets. Figure 6-11 below shows the numbers adjusted for net financial assets.

	Estimated Net Operating Assets	2005	2006	2007	2008	2009
	Collection Technology	554	954	861	1 163	912
+	Material Handling	418	581	594	841	627
+	Industrial Processing Technology	295	559	593	981	857
+	Group Functions	359	-145	-281	-593	-356
=	**Net Operating Assets**	**1 626**	**1 950**	**1 767**	**2 392**	**2 040**

Figure 6-11: Net Operating Assets by Department

Net operating assets are now in line with the regrouped balance sheet in figure 6-2. The second adjustment to the figures is that net operating assets for Group Functions are split out on the other entities. The allocation key used for this is each business unit's share of net operating assets excluding the group functions department. For instance for 2009 -356*(912/(2040-(-356))) = -135mNOK is added to collection technology net assets. The figure below lists the final estimated net operating assets per business unit adjusted using this allocation.

	Estimated Net Operating Assets Business Units	2005	2006	2007	2008	2009
	Collection Technology	711	888	743	932	777
+	Material Handling	536	541	512	674	534
+	Industrial Processing Technology	379	520	511	786	729
=	**Net Assets**	**1 626**	**1 950**	**1 767**	**2 392**	**2 040**

Figure 6-12: Net Operating Assets by Business Unit

7. Valuation Inputs

In this chapter the inputs for the valuation in chapter 8 will be presented.

7.1 Collection Technology

Top line growth in the Collection Technology business is estimated based on the number of installed RVMs. As of end 2009 the installed base is 62.45k units with only limited growth in 2009 (+1.340 units) and 2008 (+1.110 units). Based on the outlook of no new markets where introduction of waste deposits seems imminent, a relatively flat development of the installed base is assumed. Some growth is assumed for 2010-2014 with additional sales to existing markets (mainly in Finland and Germany) and some success in the non deposit market. After 2014 the installed base is assumed to stay flat with sales equal to the replacement rate.

Income per unit sold and service income per unit in the installed base is based on the estimate from chapter 6.4 and is assumed to grow from that level with inflation of 2,5% per year.

It is assumed that replacement units sold as percentage of installed base will increase from the 2009 level of 5,1% to 8,3% during the period 2010-2018. The intuition here is that with an estimated life of 12 years for each RVM the installed base should be replaced with a rate of 1/12=8.3% per year.

Based on the discussion in the strategic analysis it is assumed that there is no basis for a competitive advantage in the RVM business. The return on capital is therefore assumed to be gradually declining from the 2009 level to the cost of capital.

The three figures below summarize the input to the valuation. Yellow cells are input and white cells are calculations.

	Revenue	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	Installed base (machines)	52 000	57 920	60 000	61 110	62 450	63 150	63 600	64 000	64 300	64 500	64 500	64 500	64 500	64 500	64 500
	Leased base (% of installed base)	15,0 %	10,3 %	12,2 %	11,3 %	10,0 %	11,8 %	11,8 %	11,8 %	11,8 %	11,8 %	11,8 %	11,8 %	11,8 %	11,8 %	11,8 %
	Replacement units sold (% of installed base)		4,6 %	5,0 %	4,9 %	5,1 %	5,5 %	5,8 %	6,2 %	6,6 %	6,9 %	7,3 %	7,6 %	8,0 %	8,3 %	8,3 %
	Change in Installed Base		*5 920*	*2 080*	*1 110*	*1 340*	*700*	*450*	*400*	*300*	*200*	*0*	*0*	*0*	*0*	*0*
	Change in Leased Base		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Income per unit sold (kNOK)		164	251	206	166	166,5	166,5	166,5	166,5	166,5	170,7	174,9	179,3	183,8	188,4
	Service income per unit installed base (kNOK)		13,8	14,0	14,8	15,4	14,9	15,2	15,6	16,0	16,4	16,8	17,2	17,7	18,1	18,6
	EBIT %	4,3 %	20,1 %	14,3 %	14,4 %	19,9 %	14,6 %	13,8 %	10,3 %	10,4 %	7,1 %	7,1 %	5,0 %	4,4 %	3,7 %	3,8 %
	Return on captial		44,3 %	18,4 %	22,6 %	24,5 %	20,76 %	20,76 %	15,76 %	15,76 %	10,76 %	10,76 %	7,76 %	6,76 %	5,76 %	5,76 %
	Tax Rate						35,9 %	35,9 %	35,9 %	35,9 %	35,9 %	35,9 %	35,9 %	35,9 %	35,9 %	35,9 %
	Revenue New Units		972	521	229	223	117	75	67	50	33	0	0	0	0	0
+	Revenue Replacement Units		435	752	618	533	576	618	660	701	742	800	860	922	988	1 013
+	Revenue Service Activities		718	811	885	944	928	962	993	1 024	1 055	1 085	1 112	1 140	1 168	1 197
+	Revenues Leased Machines		82	153	119	87	103	104	104	105	105	108	111	113	116	119
+	Currency Effect		-80	-106	-111	0	0	0	0	0	0	0	0	0	0	0
=	**Total Revenue**		**2 126**	**2 131**	**1 739**	**1 787**	**1 724**	**1 759**	**1 824**	**1 881**	**1 935**	**1 992**	**2 082**	**2 175**	**2 272**	**2 329**

Figure 7-1: Valuation Inputs Collection Technology

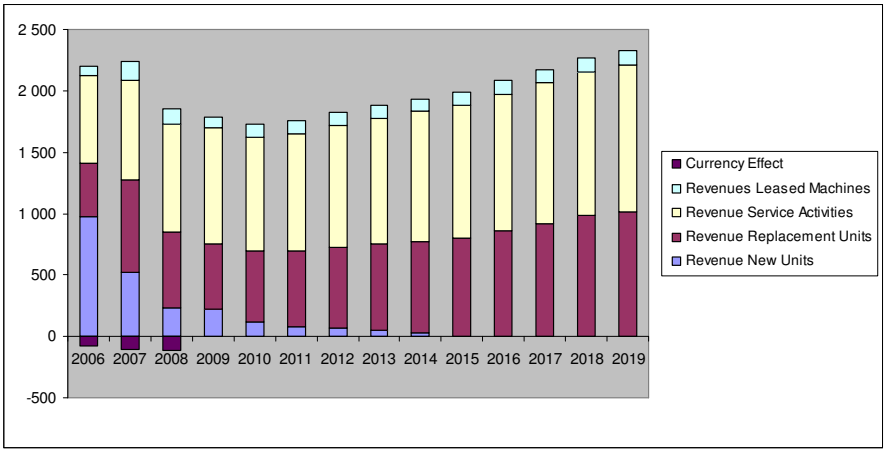

Figure 7-2: Valuation Inputs - Revenue Development

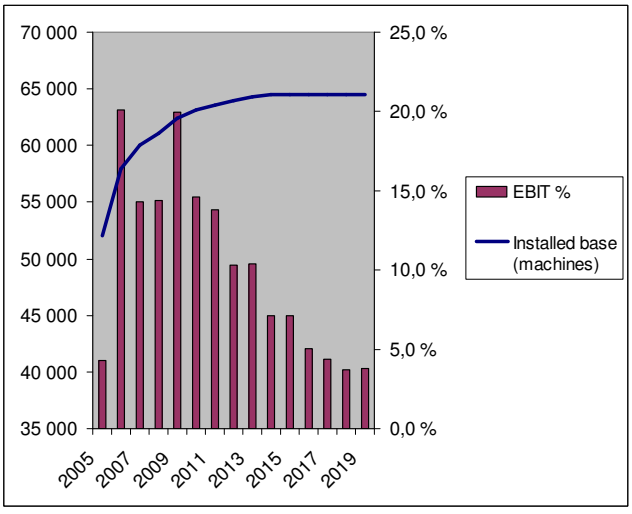

Figure 7-3: Valuation Inputs Installed Base & EBIT

7.2 Material Handling

In the revenue analysis of chapter 6.4 it is suggested that for the US East & Canada region material handling revenues will have a development in line with that of the Collection Technology unit. There has been no net growth in the installed base in this region over the last five years and there is little indication that introduction of new deposit legislation will change this over the foreseeable future. It is therefore the base case scenario in the valuation that revenue will only grow by inflation with 2009 turnover as the base.

For the US West region revenues and operating profit were hit hard by the Californian government's decision to suspend payments of handling fees due to the state's bad financial position as well as very low aluminium prices. The assumption in the base case is that California will refinance the deposit fund and that for 2010 the handling fee will be fully paid. For this part of the business it is therefore assumed that revenue will recover to 2008 levels in 2010 and from there grow with inflation.

In the strategic analysis it was concluded that there is no indications that Tomra will be able to generate excess returns from the Material Handling business unit. Based on this it is assumed in the base case scenario that future return on operating assets will only equal the cost of capital (5,8%). Using net operating assets from chapter 6.5 the EBIT% consistent with this return on capital is 5,4%, 0,3% higher than the 2005-2009 average of 5,1%. The figure below summarizes the inputs to the base case scenario for the Material Handling business unit.

	Revenue	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	Revenue US West	379	521	601	545	385	545	559	573	587	602	617	632	648	664	681
+	Revenue US East & Canada	469	500	463	465	480	492	504	517	530	543	557	571	585	599	614
=	**Revenue Total**	**848**	**1 021**	**1 064**	**1 010**	**865**	**1 037**	**1 063**	**1 089**	**1 117**	**1 145**	**1 173**	**1 203**	**1 233**	**1 263**	**1 295**
	EBIT %	7,7%	9,9%	9,9%	6,5%	-8,3%	4,6%	5,4%	5,4%	5,4%	5,4%	5,4%	5,4%	5,4%	5,4%	5,4%
	Return on captial						5,8%	5,8%	5,8%	5,8%	5,8%	5,8%	5,8%	5,8%	5,8%	5,8%
	Tax Rate						35,9%	35,9%	35,9%	35,9%	35,9%	35,9%	35,9%	35,9%	35,9%	35,9%

Figure 7-4: Valuation Inputs Material Handling

7.3 Industrial Processing Technology

As mentioned in section 6.4 the IPT business unit is hard to analyze as no product level information is provided in the annual reports. The valuation of the IPT business unit will therefore to a greater extent have to rely on broad economic principles.

The expectation in the base case scenario for the IPT business is that it will have a period of high top line growth driven mainly by TiTech's sorting solutions, but also the commercialization of new technologies developed in Commodas and UltraSort. It is not expected that the Orwak Group will support growth above inflation in future periods. After a period of high growth it is expected that revenue will decline and approach the rate of inflation. In the base case scenario it is assumed that revenue recovers to 2008 level in 2010 and then grows by 10% per year over the next 6 years. 2017 is a transition year with lower growth and from 2018 revenue is growing at the rate of inflation (2,5%).

In the strategic analysis it was suggested that the company's ability to innovate in the field of electronic sensors is a credible source of sustainable competitive advantage. It is the assumption in the base case scenario that the company manages to generate a return on invested capital that is 2% higher than the cost of capital. Using the invested capital calculated in section 6.6 EBIT% margins are set to obtain this return on capital. The two figures below summarize the input to the valuation. Yellow cells are input and white cells are calculations.

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	Reinvestment rate						453 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	32 %	32 %
*	Return on captial						9,8 %	10,8 %	10,8 %	10,8 %	8,8 %	7,8 %	7,8 %	7,8 %	7,8 %	7,8 %
=	Revenue growth (% y/y)		33 %	28 %	23 %	-31 %	44,2 %	10,0 %	10,0 %	10,0 %	10,0 %	10,0 %	10,0 %	5,0 %	2,5 %	2,5 %
	Revenue	379	504	647	793	550	793	872	960	1 055	1 161	1 277	1 405	1 475	1 512	1 550
	EBIT %	9,8 %	15,7 %	15,6 %	18,2 %	0,0 %	14,0 %	20,2 %	20,2 %	20,2 %	16,5 %	14,6 %	14,6 %	15,3 %	15,7 %	15,7 %
	Tax Rate						35,9 %	35,9 %	35,9 %	35,9 %	35,9 %	35,9 %	35,9 %	35,9 %	35,9 %	35,9 %

Figure 7-5: Valuation Inputs IPT

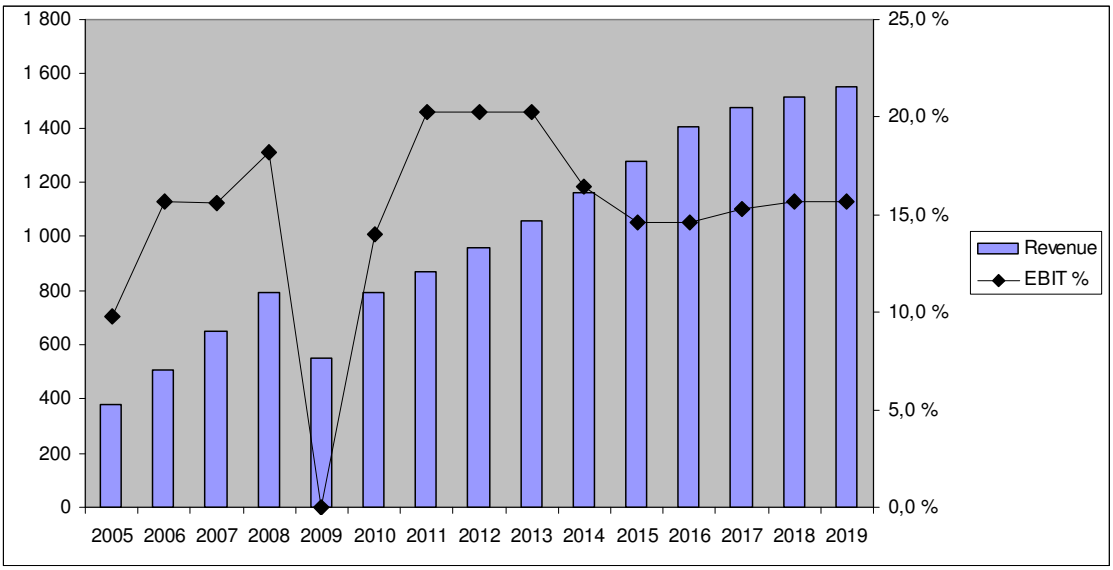

Figure 7-6: Valuation Inputs Revenue & EBIT%

7.4 Summary Input for Valuation

The figure below shows the revenue per year for the period 2005 to 2009 and the forecasted turnover in the base case scenario for 2010 and 2011. Also in the figure are consensus estimates as of 1st of April 2010 (Bloomberg). The base case volumes for 2010 and 2011 are 4,5% and 2,0% higher than consensus.

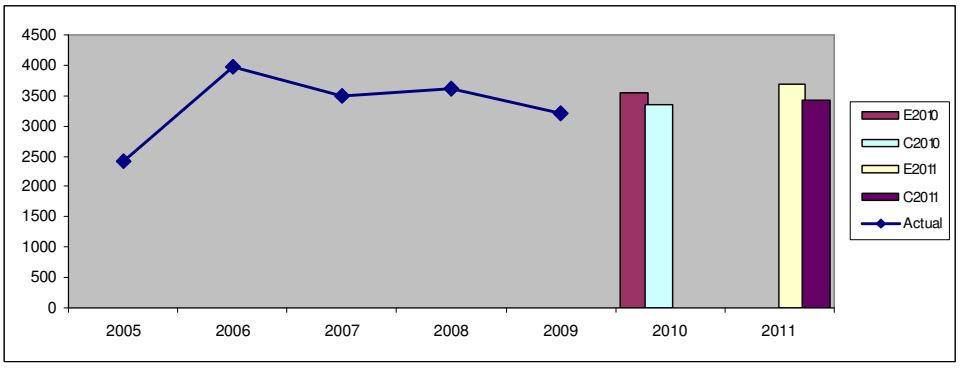

Figure 7-7: Summary Input - Revenue

The figure below shows EBIT less adjusted taxes, EBIT*(1-T), for the period 2005-2009 and estimated figures from 2010-2019. We see that EBIT less adjusted taxes as share of turnover is expected to decline to long run margin of around 5%.

EBIT estimates for 2010 and 2011 are 16,2% and 14,1% higher than consensus estimates as of 1st of April 2010 (Bloomberg).

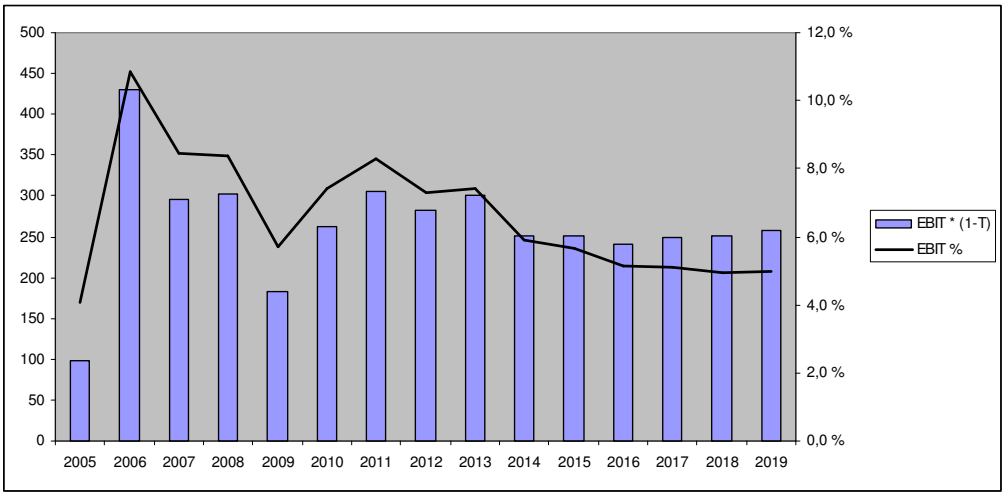

*Figure 7-8: Summary Input EBIT * (1-T)*

8. Valuation

This chapter contains the valuation of Tomra ASA. First each of the three business units is valued. Assets and liabilities not related to operations are then valued followed by section 8.9 where the total enterprise value and value of majority's equity is calculated.

8.1 Collection Technology

The figure below gives an overview of the input that goes into the valuation of the Collection Technology business, as well as calculations needed for the valuation. EBIT% is gradually expected to decrease from 2009 level of 20% to 3,8% as a result of increased competition in the market for RVMs. EBIT margin of 3,8% represents a return on capital equal to the cost of capital. This is consistent with the conclusion in the strategic analysis that no basis for a sustainable competitive advantage could be found. From the figure below it can be seen that excess returns are decreasing from 2009 level and assumed to be fully vanished by 2018.

	Calculation EBIT * (1-T)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	Revenue	1 186	2 440	1 779	1 819	1 787	1 724	1 759	1 824	1 881	1 935	1 992	2 082	2 217	2 272	2 329
*	EBIT %	4,3 %	20,1 %	14,3 %	14,4 %	19,9 %	14,6 %	13,8 %	10,3 %	10,4 %	7,1 %	7,1 %	5,0 %	3,7 %	3,8 %	3,8 %
=	*EBIT*	*51*	*491*	*255*	*262*	*356*	*251*	*243*	*188*	*195*	*137*	*141*	*105*	*81*	*87*	*89*
*	Tax Rate	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %
=	*EBIT * (1-T)*	*33*	*315*	*164*	*168*	*228*	*161*	*156*	*121*	*125*	*88*	*91*	*67*	*52*	*56*	*57*

	Calculation Net Reinvestments	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	Revenue Growth (%)	*-3,5 %*	*2,0 %*	*3,7 %*	*3,1 %*	*2,9 %*	*2,9 %*	*4,5 %*	*6,5 %*	*2,5 %*	*2,5 %*
/	*Return on Capital (%)*	*20,8 %*	*20,8 %*	*15,8 %*	*15,8 %*	*10,8 %*	*10,8 %*	*7,8 %*	*5,8 %*	*5,8 %*	*5,8 %*
=	***Reinvestment Rate (%)***	***-17 %***	***10 %***	***24 %***	***20 %***	***27 %***	***27 %***	***58 %***	***112 %***	***43 %***	***43 %***
*	*EBIT * (1-T)*	*161*	*156*	*121*	*125*	*88*	*91*	*67*	*52*	*56*	*57*
=	**Net Reinvestment**	**-27**	**15**	**28**	**24**	**24**	**25**	**39**	**58**	**24**	**25**

	Return on invested capital	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	EBIT * (1-T)	33	315	164	168	228	161	156	121	125	88	91	67	52	56	57
/	Invested Capital (t-1)		711	888	743	932	777	750	765	793	818	841	866	905	964	988
=	**Return on invested capital**		**44,3 %**	**18,4 %**	**22,6 %**	**24,5 %**	**20,8 %**	**20,8 %**	**15,8 %**	**15,8 %**	**10,8 %**	**10,8 %**	**7,8 %**	**5,8 %**	**5,8 %**	**5,8 %**
-	Cost of capital		5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %
=	**Excess return**		**38,5 %**	**12,6 %**	**16,9 %**	**18,8 %**	**15,0 %**	**15,0 %**	**10,0 %**	**10,0 %**	**5,0 %**	**5,0 %**	**2,0 %**	**0,0 %**	**0,0 %**	**0,0 %**

Figure 8-1: Collection Technology - Calculations and Summary of Input

The figure below shows the final valuation of the business unit. Free cash flow to firm (FCFF) is calculated from after tax EBIT less estimated net reinvestments. FCFF is then discounted at the weighted average cost of capital (WACC) to get present value. Value of cash flows received after 2019 are calculated by assuming growth in FCFF equal to inflation for infinity and using Gordon's growth formula. The value of the Collection Technology business unit is calculated at 1.188mNOK.

	Calculation Value of Division	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	EBIT * (1-T)	161	156	121	125	88	91	67	52	56	57
-	Net Reinvestment	-27	15	28	24	24	25	39	58	24	25
=	**FCFF**	***188***	***140***	***92***	***101***	***64***	***66***	***28***	***-6***	***31***	***32***
*	*Discount Factor*	*0,95*	*0,89*	*0,85*	*0,80*	*0,76*	*0,71*	*0,68*	*0,64*	*0,60*	*0,57*
=	**PV FCFF year**	**178**	**126**	**78**	**80**	**49**	**47**	**19**	**-4**	**19**	
+	**PV Terminal Value**									**597**	
=	**Value of Division**						**1 188**				

Figure 8-2: Valuation - Collection Technology

8.2 Material Handling

Similar to the presentation in section 8.1 a summary of the inputs to the valuation and supporting calculations is presented in the figure below. As stated in section 7.2 revenue for the California operations is expected to recover to 2008 levels in 2009, and from that grow by inflation (2,5%). Return on invested capital is equal to the cost of capital over the entire period.

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	Revenue	848	1 021	1 064	1 010	865	1 037	1 063	1 089	1 117	1 145	1 173	1 203	1 233	1 263	1 295
*	EBIT %	7,7 %	9,9 %	9,9 %	6,5 %	-8,3 %	4,6 %	5,4 %	5,4 %	5,4 %	5,4 %	5,4 %	5,4 %	5,4 %	5,4 %	5,4 %
=	***EBIT***	***65***	***101***	***105***	***66***	***-72***	***48***	***58***	***59***	***60***	***62***	***63***	***65***	***67***	***68***	***70***
*	Tax Rate	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %
=	***EBIT * (1-T)***	***42***	***65***	***67***	***42***	***-46***	***31***	***37***	***38***	***39***	***40***	***41***	***42***	***43***	***44***	***45***

	Calculation Net Reinvestments	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	Revenue Growth (%)	*19,9 %*	*2,5 %*	*2,5 %*	*2,5 %*	*2,5 %*	*2,5 %*	*2,5 %*	*2,5 %*	*2,5 %*	*2,5 %*
/	*Return on Capital (%)*	*5,8 %*	*5,8 %*	*5,8 %*	*5,8 %*	*5,8 %*	*5,8 %*	*5,8 %*	*5,8 %*	*5,8 %*	*5,8 %*
=	***Reinvestment Rate (%)***	***345 %***	***43 %***	***43 %***	***43 %***	***43 %***	***43 %***	***43 %***	***43 %***	***43 %***	***43 %***
*	*EBIT * (1-T)*	*31*	*37*	*38*	*39*	*40*	*41*	*42*	*43*	*44*	*45*
=	**Net Reinvestment**	**106**	**16**	**16**	**17**	**17**	**18**	**18**	**19**	**19**	**20**

	Return on invested capital	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	EBIT * (1-T)	42	65	67	42	-46	31	37	38	39	40	41	42	43	44	45
/	Invested Capital (t-1)		536	541	512	674	534	640	656	673	689	707	724	742	761	780
=	**Return on invested capital**		**12,1 %**	**12,4 %**	**8,3 %**	**-6,9 %**	**5,8 %**	**5,8 %**	**5,8 %**	**5,8 %**	**5,8 %**	**5,8 %**	**5,8 %**	**5,8 %**	**5,8 %**	**5,8 %**
-	Cost of capital		5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %
=	**Excess return**		**6,3 %**	**6,7 %**	**2,5 %**	**-12,6 %**	**0,0 %**	**0,0 %**	**0,0 %**	**0,0 %**	**0,0 %**	**0,0 %**	**0,0 %**	**0,0 %**	**0,0 %**	**0,0 %**

Figure 8-3: Material Handling - Calculations and Summary of Input

The figure below shows the final calculations for the valuation of the material handling business. The business unit is valued at 534 mNOK.

	Calculation Value of Division	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	EBIT * (1-T)	31	37	38	39	40	41	42	43	44	45
-	Net Reinvestment	106	16	16	17	17	18	18	19	19	20
=	**FCFF**	***-75***	***21***	***21***	***22***	***22***	***23***	***24***	***24***	***25***	***25***
*	*Discount Factor*	*0,95*	*0,89*	*0,85*	*0,80*	*0,76*	*0,71*	*0,68*	*0,64*	*0,60*	*0,57*
=	**PV FCFF year**	**-71**	**19**	**18**	**18**	**17**	**16**	**16**	**15**	**15**	
+	**PV Terminal Value**									**471**	
=	**Value of Division**						**534**				

Figure 8-4: Valuation – Material Handling

8.3 Industrial Processing Technology

The figure below summarizes inputs and supporting calculations for the Industrial Processing Technology (IPT) business unit. For 2010 a recovery of revenue to the 2008 level is expected. 2010 is then followed by 6 years of 10% growth. From 2018 growth is expected to be in line with inflation (2,5%). It is expected that the company's superior capability in innovating and commercializing electronic sensors will allow the business unit to earn sustainable excess return on invested capital of 2% per year.

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	Revenue	379	504	647	793	550	793	872	960	1 055	1 161	1 277	1 405	1 475	1 512	1 550
*	EBIT %	9,8 %	15,7 %	15,6 %	18,2 %	0,0 %	14,0 %	20,2 %	20,2 %	20,2 %	16,5 %	14,6 %	14,6 %	15,3 %	15,7 %	15,7 %
=	***EBIT***	***37***	***79***	***101***	***144***	***0***	***111***	***176***	***194***	***214***	***191***	***186***	***205***	***225***	***237***	***243***
*	Tax Rate	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %	36 %
=	***EBIT * (1-T)***	***24***	***51***	***65***	***92***	***0***	***71***	***113***	***124***	***137***	***123***	***120***	***131***	***145***	***152***	***156***

	Calculation Net Reinvestments	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	Revenue Growth (%)	*44,2 %*	*10,0 %*	*10,0 %*	*10,0 %*	*10,0 %*	*10,0 %*	*10,0 %*	*5,0 %*	*2,5 %*	*2,5 %*
/	*Return on Capital (%)*	*9,8 %*	*10,8 %*	*10,8 %*	*10,8 %*	*8,8 %*	*7,8 %*	*7,8 %*	*7,8 %*	*7,8 %*	*7,8 %*
=	***Reinvestment Rate (%)***	***453 %***	***93 %***	***93 %***	***93 %***	***114 %***	***129 %***	***129 %***	***64 %***	***32 %***	***32 %***
*	*EBIT * (1-T)*	*71*	*113*	*124*	*137*	*123*	*120*	*131*	*145*	*152*	*156*
=	**Net Reinvestment**	**322**	**105**	**116**	**127**	**140**	**154**	**169**	**93**	**49**	**50**

	Return on invested capital	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	EBIT * (1-T)		51	65	92	0	71	113	124	137	123	120	131	145	152	156
/	Invested Capital (t-1)		379	520	511	786	729	1 052	1 157	1 273	1 400	1 540	1 694	1 863	1 956	2 005
=	**Return on invested capital**		**13,4 %**	**12,4 %**	**18,1 %**	**0,0 %**	**9,8 %**	**10,8 %**	**10,8 %**	**10,8 %**	**8,8 %**	**7,8 %**	**7,8 %**	**7,8 %**	**7,8 %**	**7,8 %**
-	Cost of capital		5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %	5,8 %
=	**Excess return**		**7,6 %**	**6,7 %**	**12,3 %**	**-5,8 %**	**4,0 %**	**5,0 %**	**5,0 %**	**5,0 %**	**3,0 %**	**2,0 %**	**2,0 %**	**2,0 %**	**2,0 %**	**2,0 %**

Figure 8-5: IPT - Calculations and Summary of Input

From the figure below it can be seen that the business unit is valued at 1.770 mNOK. For reference the acquisition cost price of the four companies making up the IPT business unit was 645 mNOK. The estimated value implies that Tomra has managed to generate a return of 175% from its investment in these companies.

	Calculation Value of Division	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	EBIT * (1-T)	71	113	124	137	123	120	131	145	152	156
-	Net Reinvestment	322	105	116	127	140	154	169	93	49	50
=	**FCFF**	***-251***	***8***	***9***	***10***	***-17***	***-34***	***-38***	***51***	***103***	***106***
*	*Discount Factor*	*0,95*	*0,89*	*0,85*	*0,80*	*0,76*	*0,71*	*0,68*	*0,64*	*0,60*	*0,57*
=	**PV FCFF year**	**-237**	**7**	**7**	**8**	**-13**	**-25**	**-26**	**33**	**62**	
+	**PV Terminal Value**									**1 954**	
=	**Value of Division**						**1 770**				

Figure 8-6: Valuation – IPT

8.4 Group Functions

Group Functions consists of corporate functions at Tomra's head office. For fiscal year 2009 the costs of group functions were 16.4 mNOK. It is assumed that these costs have the same risk as the operating cash flows and are expected to grow with inflation. The value of the Group Functions entity is then calculated using Gordon's growth formula with growth of WACC less inflation. The obligations in the entity are valued at -503 mNOK.

	Operating costs t+1	-16,4
/	Cost of capital – Growth	3,26 %
=	**Present Value**	**-503**

Figure 8-7: Value Group Functions

8.5 Financial Assets

Book value of regrouped financial assets as of end 2009 is 251,6 mNOK. This consists of 68,1 mNOK cash and cash equivalents, 182,7 mNOK long term receivables and 0,8 mNOK other investments. Fair value of cash and cash equivalents and long term receivables are found in the 2009 annual report's notes. Details for the other investments could not be found but it is assumed that fair value is equal to book value.

		Book Value	**Fair Value**
	Cash & cash equivalents	68,1	68,1
+	Long term receivables	182,7	177,9
+	Other investments	0,8	0,8
=	**Total Financial Assets**	**251,6**	**246,8**

Figure 8-8: Financial Assets

8.6 Financial Liabilities

Regrouped financial debt as of end 2009 is 388,9 mNOK. 350 mNOK of this is borrowed on floating rate credit facilities at DnB NOR ASA. This debt is valued at fair value 351,6 mNOK in the notes of the 2009 annual report. Details about the remaining 38,9 mNOK of other current interest bearing debt can not be found in the notes, but it is assumed that fair value is equal to book value.

		Book Value	Fair Value
	Unsecured bank facilities	350	351,6
+	Other current interest bearing liabilities	38,9	38,9
=	**Total Financial Assets**	**388,9**	**390,5**

Figure 8-9: Financial Debt

8.7 Minority Interests

For valuing minority interests a rough approximation is done. The result to minorities for the years 2005-2009 is averaged to get a representative minority cost. From the time series analysis the result to minority interests seems to be relatively stable. It is then assumed that cash flow to minority interests is equal to result to minority interests. The present value of these cash flows are then found using Gordon's growth formula using the cost of minority interests (approximated with cost of equity) and a steady growth equal to inflation. Using this method minority interests are valued at 365mNOK.

		2005	2006	2007	2008	2009	
	Result to Minorities	-15,4	-13,6	-12,7	-12,1	-13,6	-13,48
/	Cost of capital minorities - inflation						3,69 %
=	**Value of Minority Interests**						**-365**

Figure 8-10: Valuation Minority Interests

8.8 Legal Process with the European Commission

As mentioned in section 4.1 Tomra has been fined €24m by the European Commission for preventing competition and abusing its dominant position in the market for RVMs. The company itself has not provided for this cost as they consider it likely that the verdict will be changed following their appeal. For the valuation I will assume that there is a 50% chance that the ruling will not be changed. Expected value of fine and interests is then calculated at 121 mNOK.

	Fine (m€)	24
*	NOK/EUR	8
=	**Fine (mNOK)**	**192**
+	Interests March 2006 - January 2011 (at 5% interest rate)	49
=	**Fine (mNOK) including interests**	**241**
*	Probability of changed ruling	0,5
=	**Expected Cost**	**121**
*	Discount factor	0,96
=	**Present value (1. April 2010)**	**121**

Figure 8-11: Value of European Commission Fine

8.9 Total Group

Adding up the value of each asset and liability from the sections above the total enterprise value is calculated at 3.116 mNOK. Subtracting the value of minority interests and financial debt, the value of equity is 2.360 mNOK or 15,7 NOK per share (150m shares).

	Calculation Equity Value	Value	Per Share
	Value Collection Technology	1 188	7,9
+	Value Material Handling	534	3,6
+	Value Industrial Processing	1 771	11,8
+	Value Group Functions	-503	-3,4
+	Value of Fine from European Commission	-121	-0,8
+	Financial Assets	247	1,6
=	**Value of Enterprise**	**3 116**	**20,8**
-	Minority Interests	-365	-2,4
-	Financial Debt	-391	-2,6
=	**Value of Equity**	**2 360**	**15,7**

Figure 8-12: Valuation Total Entity

9. Sensitivity Analysis

The purpose of this chapter is to study the sensitivity of equity value to changes in key variables. Due to the difficulty in obtaining accurate inputs, there can never be one correct answer from the valuation. The best we can do is to determine a range within which we believe the true value falls. By varying key inputs between sensible ranges we can get a sense of what this range is.

9.1 Beta and the equity risk premium

In this section a sensitivity analysis of equity value with respect to the cost of capital is done.

The figure below shows the calculated equity value per share when beta and the market risk premium are varied. From the table we see that the valuation has low sensitivity to the cost of capital. The main reason for this is the structure of the valuation that was chosen. The return on capital was for each of the business units decided in relation to the cost of capital. For the Material Handling business unit the return on capital was set equal to the cost of capital. The value of this business unit is then entirely unaffected by the cost of capital. For Collection Technology and Industrial Processing Technology the return on invested capital was also set relative to the cost of capital and this reduces the sensitivity.

	Market Risk Premium									
Beta		3,0 %	3,5 %	4,0 %	4,5 %	5,0 %	5,5 %	6,0 %	6,5 %	7,0 %
	0,400	16,12	16,03	15,96	15,89	15,83	15,78	15,73	15,68	15,63
	0,500	16,00	15,91	15,83	15,76	15,70	15,64	15,59	15,54	15,49
	0,600	15,89	15,80	15,73	15,65	15,59	15,53	15,47	15,42	15,37
	0,700	15,80	15,71	15,63	15,56	15,49	15,43	15,37	15,32	15,27
	0,800	15,73	15,63	15,55	15,47	15,41	15,34	15,29	15,23	15,18
	0,900	15,65	15,56	15,47	15,40	15,33	15,27	15,21	15,15	15,10
	1,000	15,59	15,49	15,41	15,33	15,26	15,19	15,14	15,08	15,03
	1,100	15,53	15,43	15,34	15,27	15,19	15,13	15,07	15,01	14,96
	1,200	15,47	15,37	15,29	15,21	15,14	15,07	15,01	14,95	14,90
	1,300	15,42	15,32	15,23	15,15	15,08	15,01	14,95	14,89	14,84

Figure 9-1: Sensitivity Analysis Cost of Capital

9.2 Return on Operating Capital

In this section a sensitivity analysis is done to determine how sensitive equity value is to the assumption on long term return on invested capital. The row and column inputs represent percentage return above the cost of capital. The value 15,7 NOK/share from the base case scenario can be found from the inputs where the IPT business unit is able to generate 2% excess return and the Collection Technology department is able to generate 0% excess return. We see that the valuation is highly sensitive to the degree of excess return.

As of 1st of April 2010 last traded price for the Tomra ASA stock was 29 NOK. From the table below we can see that given the other inputs to the valuation, a stock price of 29 NOK requires an assumption that substantial excess returns will be generated by either one or both of the business units. From the strategic analysis it is hard to see that the company should be expected to generate excess returns of this level.

		Collection Technology										
		0,0 %	1,0 %	2,0 %	3,0 %	4,0 %	5,0 %	6,0 %	7,0 %	8,0 %	9,0 %	10,0 %
IPT	0,0 %	10,0	11,4	12,7	14,0	15,2	16,4	17,7	18,8	20,0	21,2	22,4
	1,0 %	13,0	14,2	15,5	16,7	17,9	19,1	20,3	21,5	22,6	23,8	24,9
	2,0 %	15,7	17,0	18,2	19,4	20,5	21,7	22,9	24,0	25,2	26,3	27,5
	3,0 %	18,4	19,6	20,8	22,0	23,1	24,3	25,4	26,6	27,7	28,8	30,0
	4,0 %	21,0	22,2	23,4	24,5	25,7	26,8	28,0	29,1	30,2	31,4	32,5
	5,0 %	23,6	24,8	25,9	27,1	28,2	29,3	30,5	31,6	32,7	33,8	35,0
	6,0 %	26,2	27,3	28,5	29,6	30,7	31,9	33,0	34,1	35,2	36,3	37,4
	7,0 %	28,7	29,8	31,0	32,1	33,2	34,3	35,5	36,6	37,7	38,8	39,9
	8,0 %	31,2	32,4	33,5	34,6	35,7	36,8	37,9	39,1	40,2	41,3	42,4
	9,0 %	33,7	34,8	36,0	37,1	38,2	39,3	40,4	41,5	42,6	43,7	44,8
	10,0 %	36,2	37,3	38,4	39,6	40,7	41,8	42,9	44,0	45,1	46,2	47,3

Figure 9-2: Excess Returns IPT & CT

10. Other Valuations of Tomra ASA

In this chapter the assumptions and results from this paper is compared to what is found in other valuations of the company. Due to corporate actions such as dividend payments, splits and reverse splits neither enterprise nor equity value is directly comparable across time periods. Because of this I will only comment on how the qualitative assumptions in the base case scenario compare to the findings in other valuations of the company.

In a mater thesis submitted in June 2007 Audun Pål Haugstveit (2007) valued Tomra ASA using fundamental valuation. The thesis focused on the Collection Technology business unit, but also considered the effect on growth and profitability from the other business segments. The main difference from the conclusions by Haugstveit and the conclusions in this paper is that he found that Tomra had a sustainable competitive advantage in the Collection Technology business unit. Tomra's brand name, patented technology and organizational culture were assets mentioned that supported this sustainable competitive advantage.

In a master thesis submitted in 2006 Jan Foldøy Andersen (2006) also concluded that Tomra had a sustainable competitive advantage in the Collection Technology business unit. Brand loyalty, benefits from scale and costs of switching supplier were factors creating a barrier of entry for new competitors.

11. Conclusion and Final Remarks

In the strategic analysis it was concluded that neither the Collection Technology nor the Material Handling business unit had assets that could support a sustainable competitive advantage. For the Industrial Processing Technology business unit it was suggested that the business unit's ability to innovate and commercialize electronic sensors could be the basis for a sustainable competitive advantage.

In the base case scenario a value of 15,7 NOK per share as of 1st of April 2010 was estimated, 46% less than the closing price on Oslo Stock Exchange this day.

The sensitivity analysis revealed that the valuation had low sensitivity to the cost of capital but high sensitivity to the assumptions made about excess return on invested capital.

Appendix 1. A Simple Numerical Example

A simple numerical example is given below to illustrate the point that a company's different invested capitals can be valued consistently by keeping consistency between the cash flow and discount rate.

Consider a company with the following income statement:

	P&L	Amount
	Revenue	10
-	Material Costs	4
-	Salary to Employees	2
-	Interest	2
=	**Result to Equity**	**2**

For simplicity we assume that the company requires no re-investments and will continue to deliver the same income in perpetuity.

Using Equation 1 from chapter 3.1, the Gordon growth model with a growth rate of zero and the required return of each capital from the table below, the value of the capital is calculated:

Capital	Required Return	Value
Human Capital from Employees	2 %	100
Debt	2 %	100
Equity	4 %	50

In order to illustrate the link between cash flow, capital and cost of capital the value of equity is calculated in three different ways:

	CF to equity	2
/	Cost of equity	4 %
=	**Value of equity 1**	**50**

As illustrated in the table above, the value of equity can be calculated directly by discounting the cash flow to equity by the cost of equity.

Capital	Required Return	Share of total capital
Human Capital from Employees	2 %	40 %
Debt	2 %	40 %
Equity	4 %	20 %
Weighted Average Cost of Capital	2,40 %	

	Result to equity, debt and employees	6
/	Weighted average cost of capital	2,40 %
=	**Value of equity, debt and employees**	**250**
-	Value of human capital	100
-	Value of debt	100
=	**Value of equity 2**	**50**

Above, first the value of equity, debt and human capital is calculated using the weighted average cost of that capital. The value of debt and human capital is then deducted in order to arrive at a value for equity. Consistency in cash flow and cost of capital assures consistency between this indirect calculation of equity value and the direct calculation in the previous paragraph.

Capital	Required Return	Share of total capital
Debt	2 %	67 %
Equity	4 %	33 %
Weighted Average Cost of Capital	**2,67 %**	

	Revenue	10
-	Material costs	4
-	Salary	2
=	**Result to equity and debt**	**4**
/	Weighted Average Cost of Capital	2,67 %
=	Value of Equity and Debt	150
-	Value of Debt	100
=	**Value of Equity 3**	**50**

A third way to calculate the value of equity is to discount the cash flow to equity and debt by the weighted average cost of these two capitals.

The examples above clearly illustrate that the value of any capital can be calculated by discounting the cash flow to that capital by a consistent cost of capital.

As stated in the preface, the purpose of this paper is to calculate the value of the company's equity. In order to avoid computational and rhetorical complexity firm value is however calculated first. Value attributable to stakeholders other than equity is then subtracted to arrive at a value of the firm's equity.

For Tomra the capitals with claims on the company's assets are owners of equity, debt and minority interests. In this paper I refer to these capitals as *employed capital.*

Assets	Liabilities
Company's Assets	Equity
	Minority Interests
	Debt
Company Value	*Company Value*

$$\text{Value of Company's Assets} = \text{Value of Equity} + \text{Value of Debt} + \text{Value of Minority Interests}$$

$$\text{Employed Capital} = \text{Equity} + \text{Debt} + \text{Minority Interests}$$

Another important aspect of DCF is that as long as the cash flow and the cost of capital is defined consistently whether cash flow before or after tax is discounted does not matter.

Imagine that a tax of 50% is now implemented and that the owners of each capital face this marginal tax rate. Assume also that the pre tax cost of each capital remains equal to the values in the table above.

The table below illustrates that a pre tax cash flow discounted by a pre tax cost of capital will yield the same value as an after tax cash flow discounted at an after tax cost of capital.

	Revenue	10
-	Material	4
=	Pre tax profit to equity, debt and HC	6
-	Tax	3
=	**Profit after tax**	**3**
	WACC pre tax	2,40 %
	WACC post tax	1,20 %
	Result pre tax	6
/	Pre tax cost of capital	2,40 %
=	**Value of capital**	**250**
	Result after tax	3
/	After tax cost of capital	1,20 %
=	**Value of capital**	**250**

Appendix 2. Tomra's Installed Base of Reverse Vending Machines

Info as of February 2010	
Norway	3 600
Sweden	6 200
Finland	3 400
Denmark	3 000
=Nordics	**16 200**
Estonia	300
Germany	20 300
Netherlands	3 700
Belgium	1 100
Poland	100
Check	1 700
Ukraine	200
Hungary	100
Austria	2 800
Switzerland	700
France	200
Greece	300
Italy	200
Portugal	100
Other EU	300
=Central Europe & UK	**32 100**
California	500
Iowa	150
Michigan	4 200
New York	7 600
Massachusetts	400
Québec	1 300
=US East & Canada	**14 150**
=Grand total	**62 450**

Source: Tomra ASA (2010?)

Appendix 3. Collection Technlogy – Currency Adjustment Factors

	Revenue	2005	2006	2007	2008	2009
	Share of revenue in USD		34 %	37 %	34 %	34 %
+	Share of revenue in EUR		51 %	42 %	42 %	42 %
+	Share of revenue in SEK		7 %	9 %	10 %	8 %
+	Share of revenue in NOK		3 %	3 %	3 %	5 %
+	Share of revenue in OTHER currencies		5 %	9 %	11 %	11 %
=	**Share of revenue total**		**100 %**	**100 %**	**100 %**	**100 %**
	Average annual rate USD		6,414	5,861	5,639	6,29
	Average annual rate EUR		8,047	8,018	8,223	8,730
	Average annual rate SEK		0,87	0,867	0,855	0,822
	Revenue adjustment factor USD		98 %	107 %	112 %	100 %
	Revenue adjustment factor EUR		108 %	109 %	106 %	100 %
	Revenue adjustment factor SEK		94 %	95 %	96 %	100 %
	Revenue adjustment factor NOK		100 %	100 %	100 %	100 %
	Revenue adjustment factor Other		100 %	100 %	100 %	100 %
=	**Revenue adjustment factor weighted**		**103 %**	**106 %**	**106 %**	**100 %**

Appendix 4. Synthetic Rating - Mapping Table

If interest coverage ratio is grater than	**≤ to**	**Rating is**	**Spread is**
-100000	0,5	D	15,00 %
0,5	0,8	C	12,00 %
0,8	1,2	CC	10,00 %
1,25	1,5	CCC	12,00 %
1,5	2,0	B-	4,00 %
2	2,5	B	3,00 %
2,5	3,0	B+	2,50 %
3	3,5	BB	2,05 %
3,5	4,0	BB+	1,70 %
4	4,5	BBB	1,05 %
4,5	6,0	A-	0,75 %
6	7,5	A	0,60 %
7,5	9,5	A+	0,50 %
9,5	12,5	AA	0,35 %
12,5	100 000,0	AAA	0,20 %

Source: Damodaran (200?)

Appendix 5. Industry Sample for Beta Estimate

Company Name	Exchange Ticker	Country
Serco Group plc (LSE:SRP)	LSE:SRP	**United Kingdom**
Rentokil Initial plc (LSE:RTO)	LSE:RTO	**United Kingdom**
Mitie Group plc (LSE:MTO)	LSE:MTO	**United Kingdom**
Lassila & Tikanoja Oyj (HLSE:LAT1V)	HLSE:LAT1V	**Finland**
Shanks Group plc (LSE:SKS)	LSE:SKS	**United Kingdom**
Connaught plc (LSE:CNT)	LSE:CNT	**United Kingdom**
Derichebourg (ENXTPA:DBG)	ENXTPA:DBG	**France**
RPS Group plc (LSE:RPS)	LSE:RPS	**United Kingdom**
Seche Environnement SA (ENXTPA:SCHP)	ENXTPA:SCHP	**France**
Tomra Systems ASA (OB:TOM)	OB:TOM	**Norway**
Interseroh AG (XTRA:ITS)	XTRA:ITS	**Germany**
Befesa Medio Ambiente SA (CATS:BMA)	CATS:BMA	**Spain**
BWT AG (WBAG:BWT)	WBAG:BWT	**Austria**
CNIM SA (ENXTPA:COM)	ENXTPA:COM	**France**
Tricorona AB (OM:TRIC)	OM:TRIC	**Sweden**
Aurea SA (ENXTPA:AURE)	ENXTPA:AURE	**France**
Villa Salmon AS (OTCNO:VILS)	OTCNO:VILS	**Norway**
Groupe Pizzorno Environnement (ENXTPA:GPE)	ENXTPA:GPE	**France**
Hiolle Industries (ENXTPA:HIO)	ENXTPA:HIO	**France**
CHRIST Water Technology AG (WBAG:CWT)	WBAG:CWT	**Austria**
Global EcoPower (ENXTPA:MLGEP)	ENXTPA:MLGEP	**France**
CCR Logistics Systems AG (XTRA:CCR)	XTRA:CCR	**Germany**
Studsvik AB (OM:SVIK)	OM:SVIK	**Sweden**
Biancamano S.p.A. (CM:BCM)	CM:BCM	**Italy**
Augean plc (AIM:AUG)	AIM:AUG	**United Kingdom**
Sadi Servizi Industriali S.p.A. (CM:SSI)	CM:SSI	**Italy**
Environnement, S.A. (ENXTPA:ALTEV)	ENXTPA:ALTEV	**France**
Greenvision Ambiente SpA (CM:VIS)	CM:VIS	**Italy**
Europlasma, SA (ENXTPA:ALEUP)	ENXTPA:ALEUP	**France**
Envio AG (DB:EIO)	DB:EIO	**Germany**
NEAS ASA (OB:NEAS)	OB:NEAS	**Norway**
TEG Group PLC (AIM:TEG)	AIM:TEG	**United Kingdom**
Prodef SA (ENXTPA:PRDF)	ENXTPA:PRDF	**France**
Groupe Dupuy (ENXTPA:MLGRD)	ENXTPA:MLGRD	**France**
Real Aktiengesellschaft (DB:BJU1)	DB:BJU1	**Switzerland**
Citron Holding AG Boswil (BRSE:CIT)	BRSE:CIT	**Switzerland**
Granulatex S.A. (ENXTPA:MLGLX)	ENXTPA:MLGLX	**France**
Parkwood Holdings plc (LSE:PKW)	LSE:PKW	**United Kingdom**
Mercury Recycling Group plc (AIM:MRG)	AIM:MRG	**United Kingdom**
Nviro Cleantech Plc (AIM:NVR)	AIM:NVR	**United Kingdom**
Pilum AB (OM:PIL B)	OM:PIL B	**Sweden**

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