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User Costs of Real Capital

Contents

1. Introduction

User costs of real capital are important variables in order to explain, among other things, the time path of real investments in general equilibrium models. Such models are well suited to analyse tax reforms. An analysis of for instance a capital income tax reform will demand detailed tax corrected user costs of capital.

This document[1] provides an update and extension of the tax corrected user costs of capital in Holmøy et al. (1993). The user costs have been employed in calculation of Effective Rates of Assistance (ERAs), see Fæhn et al. (2001). To fulfil that task, only figures for 1998 are needed. However, this document also presents figures for the period 1995 to 1997. The main differences between this document and Holmøy et al. (1993) are this paper's inclusion of the share discount (aksjerabatt) and the inclusion of some important aspects of the Norwegian 1992 Tax Reform's so-called split model (delingsmodell) (as opposed to the prereform "split model" in Holmøy et al. (1993)). These changes imply that there are now four ways of organising the company instead of two; namely as a listed (børsnotert) limited liability company (aksjeselskap), an unlisted (ikke-børsnotert) limited liability company not subject to the split model, an unlisted limited liability company subject to the split model or as a company directly owned by a self-employed. In Holmøy et al. (1993) the classification is either as a limited liability company or as a company directly owned by a self-employed. This document also introduces specific user cost formulas for forestry, based upon this sector's specific tax rules. This is done as part of work on the ERA project. Names of variables and representation mainly follow Holmøy et al. (1993).

As in Andersen et al. (1997) we do not include any risk premium associated with investment in shares and employ one nominal interest rate calculated as an average of the interest rate on deposits and loans. In Holmøy et al. (1993) there is a risk premium associated with investment in shares. This risk premium is calculated as the difference between the nominal interest rate on loans and the nominal interest rate on bank deposits. This further means that Holmøy et al. (1993) employ one nominal interest rate on loans and one nominal interest rate on deposits (the risk premium giving the difference between the two).

[1] First of all I would like to thank Birger Strøm for helping me implementing the formulas in TROLL and for valuable support. I would also like to thank Taran Fæhn for some useful comments and Håvard Hungnes and Knut Moum for reading and commenting on an earlier draft. I am, of course, fully responsible for remaining errors.

2. Finding an expression for the value of a company

2.1. The value of a listed limited liability company as seen from the representative investor's point of view

The following arbitrage equilibrium is the point of departure when deriving an expression for the value of a listed limited liability company as seen from the representative investor's point of view.

$$\begin{aligned} & (1-t^g)\left[V_{\tau+1}-V_\tau-S_\tau\right]+(1-t^d)D_\tau-t^{wse}V_\tau \qquad (2.1)\\ = \;& (1-t^i)iV_\tau-t^{wb}V_\tau \end{aligned}$$

The symbols have the following meaning:
t^g is the effective personal tax rate on capital gains
t^d is the formal personal tax rate on dividends
t^i is the formal personal tax rate on interest income
t^{wse} is the effective personal tax rate on financial wealth held as shares on the stock exchange
t^{wb} is the formal personal tax rate on financial wealth held as bank deposits
V_τ is the market value of all the shares at the beginning of period τ
S_τ is the emission of new shares in period τ at a fixed rate
D_τ is the total dividend in period τ
i is the nominal interest rate

Symbols for tax rates having a value equal to 0 according to the current Norwegian tax rules are also included. These tax rates will be set equal to 0 when calculating the user cost figures.

Equation 2.1 says that in equilibrium the after-tax returns from holding shares on the stock exchange (the left-hand side of the equation) must be equal to the after-tax returns from holding a bank deposit (the right-hand side of the equation) if both wealth objects are to be held. The different terms have the following interpretations:

1) $(1-t^g)\left[V_{\tau+1}-V_\tau-S_\tau\right]$ is net capital gain, that is gross capital gain in period τ minus the personal capital

gains tax.

2) $(1-t^d)D_\tau$ is net of tax dividend.

3) $t^{wse}V_\tau$ is the wealth tax paid on the value of the shares. In order to simplify, we have assumed that the

value of the shares at the beginning of the period is the basis for wealth taxation, even though the Norwegian

tax rules state that the value of the shares at the end of the period should have been employed.

The formal wealth tax rate on shares on the stock exchange is equal to the formal wealth tax rate on bank

deposits. There are differences concerning the tax base, however. For bank deposits the tax base is the

whole bank deposit while for shares on the stock exchange the tax base is a certain part of the value of the

shares. This is taken into account in equation 2.1 by the introduction of an effective, instead of a

formal, wealth tax rate on shares.

4) $(1-t^i)iV_\tau$ expresses the after-tax nominal interest income in period τ. (An amount equal to V_τ has been

put into the bank at the beginning of period τ.)

5) $t^{wb}V_\tau$ expresses the fact that a wealth tax must be paid on the bank deposit. Again we have assumed that

wealth at the beginning, and not the end, of the period is the basis for the wealth taxation.

In order to get an expression for the value of a listed limited liability company as seen from the representative investor's point of view we use equation 2.1. This is a first-order difference equation. First we put V_τ alone on the left-hand side of the equation.

$$V_\tau = \frac{1}{1+r}\left[C_\tau + V_{\tau+1}\right] \tag{2.2}$$

where

$$C_\tau = \frac{1-t^d}{1-t^g}D_\tau - S_\tau \tag{2.3}$$

and where the discount rate

$$r = \frac{(1-t^i)i + t^{wse} - t^{wb}}{1-t^g} \tag{2.4}$$

2.2 can be solved by forward substitution for $V_{\tau+1}$ and we find

$$V_\tau = \sum_{s=\tau}^{\tau+T}(\frac{1}{1+r})^{s-\tau+1}C_s + (\frac{1}{1+r})^{T+1}V_{\tau+T+1} \tag{2.5}$$

We assume that the transversality condition holds

$$\lim_{T\to\infty}(\frac{1}{1+r})^{T+1}V_{\tau+T+1} \to 0 \tag{2.6}$$

and get the following expression for the market value of a listed limited liability company as seen from the representative investor's point of view (where we have simultaneously inserted equation 2.3 in equation 2.5).

$$V_\tau = \sum_{s=\tau}^{\infty} (\frac{1}{1+r})^{s-\tau+1} \left[\frac{1-t^d}{1-t^g} D_s - S_s \right] \tag{2.7}$$

The market value in period τ is equal to the tax corrected present value of all the payments from the company to the share holder minus the present value of all the payments from the share holder to the company. The discount rate r (defined in equation 2.4) is equal to the after-tax interest rate on bank deposits adjusted for the possible difference in wealth taxation ($t^{wse} - t^{wb}$) and the capital gains tax on shares. The discount rate is lower relative to $(1-t^i)i$ the lower the wealth tax or the capital gains tax on shares.

2.2. The value of an unlisted limited liability company as seen from the representative investor's point of view

The following arbitrage equilibrium is the point of departure when deriving an expression for the value of an unlisted limited liability company as seen from the representative investor's point of view.

$$\begin{aligned} & (1-t^g)\left[V_{\tau+1} - V_\tau - S_\tau\right] + (1-t^d)D_\tau - t^{wnse}\left[VK_\tau^A - B_\tau\right] \qquad (2.8) \\ = \quad & (1-t^i)iV_\tau - t^{wb}V_\tau \end{aligned}$$

Equation 2.8 is equal to equation 2.1, except for the last term on the left-hand side which describes the paying of the personal wealth tax on shares not on the stock exchange. The tax rules say that concerning shares in Norwegian unlisted limited liability companies, the wealth of the company for taxation purposes minus the company's debt, and not the market value of the shares, is the basis for the valuation of the shares concerning wealth taxation. The wealth of the company for taxation purposes is equal to the real capital's "declining balance value" (saldoverdi) for the real capital types cars and machinery. The "declining balance value" of real capital is equal to the value of real capital that follows when the declining balance method (saldometode) for depreciation allowances has been employed (to be explained later on, see equations 3.9 and 3.10). For the real capital types ships and fishing boats and non-residential buildings and constructions the wealth of the company for taxation purposes is given by separate valuation rules. In order to simplify, we have assumed that the "declining balance

value" is the basis for the company's wealth for taxation purposes for these two mentioned capital types as well. The tax rules also say that the value of the shares at the beginning of the year is the basis for the wealth taxation of the investors who possess the shares at the end of the year. Concerning bank deposits, the value at the end of the year is the basis for wealth taxation. In order to simplify, we have assumed that the value at the beginning of the year is the basis for the wealth taxation. The same thing was assumed in equation 2.1.

The new symbols mean the following:

t^{wnse} is the effective personal tax rate on financial wealth held as shares not on the stock exchange

VK_τ^A is the "declining balance value" of real capital at the beginning of period τ

B_τ is the company's debt at the beginning of period τ.

In order to get an expression for the value of an unlisted limited liability company as seen from the representative investor's point of view we use equation 2.8. This is a first-order difference equation. First we put V_τ alone on the left-hand side of the equation.

$$V_\tau = \frac{1}{1+r}\left[E_\tau + V_{\tau+1}\right] \tag{2.9}$$

where

$$E_\tau = \frac{1-t^d}{1-t^g}D_\tau - S_\tau - \frac{t^{wnse}}{1-t^g}(VK_\tau^A - B_\tau) \tag{2.10}$$

and where the discount rate

$$r = \frac{(1-t^i)i - t^{wb}}{1-t^g} \tag{2.11}$$

Employing the same procedure as was the case for the market value of a listed limited liability company, we get the following expression for the value of an unlisted limited liability company as seen from the representative investor's point of view.

$$V_\tau = \sum_{s=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{s-\tau+1}\left[\frac{1-t^d}{1-t^g}D_s - S_s - \frac{t^{wnse}}{1-t^g}(VK_s^A - B_s)\right] \tag{2.12}$$

The market value in period τ is equal to the tax corrected present value of all the payments from the company to the share holder minus the present value of all the payments from the share holder to the company minus the tax corrected present value of the personal wealth tax payments.

The interpretation of the discount rate (defined in equation 2.11) is analogous to the interpretation of the discount rate in equation 2.4. The only exception is that the personal wealth tax rate on shares is not part of the discount rate in equation 2.11 but rather part of the last term in equation 2.12.

3. Finding an expression for the user costs of capital

3.1. Assumptions not mentioned below

a) The profits of the company are large enough to cover deductions for taxation purposes.

b) The representative investor and the manager of the company expect all tax rates and interest rates to be constant over time.

c) Neither the representative investor nor the manager of the company can influence the interest rates.

d) There are no sales of used real capital. Therefore we do not consider the tax rules associated with the selling of used real capital.

3.2. The user cost of capital for all sectors except forestry and dwelling services

3.2.1. The user cost of capital for a listed limited liability company

The manager of the company wishes to maximise the stock holders' utility. This is equivalent to the maximisation of the value of the company's shares as seen from the representative investor's point of view, that is the maximisation of V_τ. This value is given in equation 2.7 which we repeat here.

$$V_\tau = \sum_{s=\tau}^{\infty} \left[\frac{1}{1+r}\right]^{s-\tau+1} \left(\frac{1-t^d}{1-t^g} D_s - S_s\right) \tag{3.1}$$

where

$$r = \frac{(1-t^i)i + t^{wse} - t^{wb}}{1-t^g} \tag{3.2}$$

We need a relationship between the dividend payment to the representative investor and the variables of the company. This is given by the following equation.

$$D_t = \phi_t(K_t) - iB_t - q_t J_t + Q_t + S_t - T_t \tag{3.3}$$

$\phi_t(K_t)$ gives us the maximum profits conditional on the amount of capital, that is profits have been maximised with respect to the variable inputs for a given capital stock.

K_t is the capital stock at the beginning of period t and supplies capital services in period t.

B_t is the company's debt at the beginning of period t.

q_t is the price of the investment good in period t.

J_t is the gross real investment in period t.

Q_t is the new loan the company takes up in period t.

T_t is the total tax payment of the company in period t.

Equation 3.3 says that all that is left of the profit plus the new loan plus the money from the emission of new shares after the paying of interest on the debt, investment expenditures and the paying of taxes is given to the share holders as dividend. The following equations describe the relationship between the stock and flow variables.

$$Q_t = B_{t+1} - B_t \tag{3.4}$$

and

$$J_t = K_{t+1} - K_t + \hat{\delta} K_t \tag{3.5}$$

Equation 3.4 says that the new loan taken up in period t is equal to the debt at the beginning of period t+1 minus the debt at the beginning of period t. Equation 3.5 says that the gross real investment in period t is equal to the capital stock at the beginning of period t+1 minus the capital stock at the beginning of period t plus the replacement investments.

We then need to specify the total taxes paid by the company. The following is based upon the tax rules from 1992 onwards, that is after the Norwegian tax reform of 1992.

$$T_t = T_t^G + T_t^W \tag{3.6}$$

Equation 3.6 says that total taxes paid by the company consist of taxes on the so-called general income (alminnelig inntekt) T^G and taxes on the company's wealth T^W.

The basis for the company's income taxes to the county and to the Tax Distribution Fund is the general income which is profits minus depreciation allowances for taxation purposes minus interest expenses. According to the tax rules, general income from period t-1 is the basis for the company's taxes in period t. This gives us the following equation.

$$T_t^G = (t^c + t^s)\left[\phi_{t-1}(K_{t-1}) - A_{t-1} - iB_{t-1}\right] \tag{3.7}$$

where

t^c is the formal tax rate for the company's taxes to the municipality and the county (kommune- og fylkesskatt)

t^s is the formal tax rate for the company's taxes to the Tax Distribution Fund (fellesskatt til Skattefordelingsfondet)

A_t is the depreciation allowances for taxation purposes in period t.

The tax rules say that the "declining balance value" shall be the basis for the wealth taxation of cars and machines while there are separate valuation rules for ships and fishing boats and non-residential buildings and constructions. We assume that the "declining balance value" is the basis for the wealth taxation of all the capital types. Since limited liability companies pay taxes levied on a preceding year basis (etterskuddspliktige) the wealth at the beginning of period t, and not the beginning of period t+1, is the basis for the wealth taxation in period t. This gives us the following equation.

$$T_t^W = v(VK_t^A - B_t) \tag{3.8}$$

where

v is the company's formal tax rate on wealth.

The "declining balance value" of the capital stock and the depreciation allowances for taxation purposes must be further commented on. They are described by the following equations.

$$VK_{t+1}^A = \sum_{i=0}^{\infty}(1-a)^i q_{t-i} J_{t-i} \tag{3.9}$$

$$A_t = aVK_{t+1}^A \tag{3.10}$$

Equation 3.10 says that the depreciation allowances in period t are equal to the product of the depreciation rate for taxation purposes a and the "declining balance value" of the capital stock at the beginning of period t+1. This is called the declining balance method (saldometode) of depreciation. The depreciation rate for taxation purposes a is often higher than the true economic depreciation rate. The two equations as a whole say that the depreciation allowances for taxation purposes in period t are equal to the depreciation rate for taxation purposes a times the value of the real investments in period t plus a times what is left for taxation purposes of the real investment made in period t-1, that is $(1-a)q_{t-1}J_{t-1}$, plus a times what is left for taxation purposes of the real investment made in period t-2, that is $(1-a)(1-a)q_{t-2}J_{t-2}$, and so on.

Real investments can either be financed by loan, profit retentions or emission of new shares. We assume that total debt is always equal to a proportion β of the value of the capital stock, that is:

$$B_t = \beta q_{t-1} K_t \tag{3.11}$$

This implies that a proportion β of net investments is financed by borrowing. We assume that a proportion 1-β is financed by retained profits. This implies that the emission of new shares S is set equal to 0. Later, we will introduce the costs associated with emission financing into the formula.

As mentioned earlier, the manager of the company maximises the value of the company with respect to the capital stock. Substituting equation 3.3 to 3.8 and equation 3.10 and 3.11 into equation 3.1 yields

$$\begin{aligned} V_\tau &= \frac{1-t^d}{1-t^g}\sum_{s=\tau}^{\infty}(\frac{1}{1+r})^{s-\tau+1}\{\phi_s(K_s) - i\beta q_{s-1}K_s \\ &\quad -q_s(K_{s+1} - K_s + \hat{\delta}K_s) + (\beta q_s K_{s+1} - \beta q_{s-1}K_s) \\ &\quad -(t^c+t^s)[\phi_{s-1}(K_{s-1}) - i\beta q_{s-2}K_{s-1}] + v\beta q_{s-1}K_s \\ &\quad +[(t^c+t^s)a - v]VK_s^A\} \end{aligned} \tag{3.12}$$

Before we derive the first order condition for this expression with respect to K_{s+1}, we examine the last term in equation 3.12 more closely. More specifically, we look at the following expression (where equation 3.9 is also employed):

$$\begin{aligned} Z_\tau &= \sum_{s=\tau}^{\infty}\left[\frac{1}{1+r}\right]^{s-\tau+1}[(t^c+t^s)a - v]\,VK_s^A \\ &= \sum_{s=\tau}^{\infty}\left[\frac{1}{1+r}\right]^{s-\tau+1}[(t^c+t^s)a - v]\sum_{i=0}^{\infty}(1-a)^i q_{s-1-i}J_{s-1-i} \end{aligned}$$

Z_τ is the present value, as seen from period τ, of the tax savings due to depreciation allowances for taxation purposes. Investments from minus infinity to infinity are the basis for these depreciation allowances for taxation purposes. Z_τ also takes into account that the company's wealth tax increases when increases in the real capital stock take place. In other words, investments lead to tax savings concerning the company's tax payments based on the general income while investments lead to tax increases concerning the company's wealth tax payments. After rearranging we get

$$\begin{aligned} Z_\tau &= [(t^c+t^s)a - v]\sum_{i=0}^{\infty}q_{\tau+i}J_{\tau+i}\sum_{j=0}^{\infty}(\frac{1}{1+r})^{j+2+i}(1-a)^j \\ &\quad +[(t^c+t^s)a - v]\sum_{i=0}^{\infty}q_{\tau-1-i}J_{\tau-1-i}\sum_{j=1}^{\infty}(\frac{1}{1+r})^{j}(1-a)^{j+i-1} \end{aligned}$$

In period τ the last term in the above equation is predetermined. We therefore exclude this term in the following. Using the formula for summation of an infinite geometric series we get the following expression:

$$Z_\tau = [(t^c + t^s)a - v] \sum_{i=0}^{\infty} q_{\tau+i} J_{\tau+i} (\frac{1}{1+r})^{i+1} \frac{1}{r+a} \tag{3.13}$$

We then need the following two definitions:

$$\dot{q}_t = \frac{q_t - q_{t-1}}{q_{t-1}} \Rightarrow q_t = q_{t-1}(1 + \dot{q}_t) \tag{3.14}$$

and

$$1 - \delta = (1 - \hat{\delta})(1 + \dot{q}) \tag{3.15}$$

Equation 3.14 defines $\dot{q}_t$ as the relative change in the price of the investment good from period t-1 to t. Equation 3.15 shows that the economic depreciation δ depends both on the physical depreciation $\hat{\delta}$ and the relative change in the price on the investment good $\dot{q}$. Using equations 3.5, 3.14 and 3.15 we can rewrite

$$\sum_{i=0}^{\infty} (\frac{1}{1+r})^{i+1} q_{\tau+i} J_{\tau+i}$$

as

$$\begin{aligned} & \sum_{i=0}^{\infty} (\frac{1}{1+r})^{i+1} q_{\tau+i} \left[K_{\tau+i+1} - K_{\tau+i}(1-\hat{\delta}) \right] \qquad (3.16) \\ = & \sum_{i=0}^{\infty} (\frac{1}{1+r})^{i+1} q_{\tau+i} K_{\tau+i+1} - \sum_{i=0}^{\infty} (\frac{1}{1+r})^{i+1} q_{\tau+i-1}(1+\dot{q}) K_{\tau+i} \frac{1-\delta}{1+\dot{q}} \\ = & \left[1 - \frac{1-\delta}{1+r} \right] \sum_{i=0}^{\infty} (\frac{1}{1+r})^{i+1} q_{\tau+i} K_{\tau+i+1} - \frac{1-\delta}{1+r} q_{\tau-1} K_\tau \end{aligned}$$

Equation 3.13 can then be rewritten as follows.

$$\begin{aligned} Z_\tau = & \frac{1-t^d}{1-t^g} [(t^c + t^s)a - v] \frac{1}{r+a} \{ (1 - \frac{1-\delta}{1+r}) \times \qquad (3.17) \\ & \sum_{i=0}^{\infty} \left(\frac{1}{1+r} \right)^{i+1} q_{\tau+i} K_{\tau+i+1} - \frac{1-\delta}{1+r} q_{\tau-1} K_\tau \} \end{aligned}$$

We are now in a position to derive the user cost of capital for a listed limited liability company. This is done by maximising the value of the company V_τ with respect to the real capital stock K_{s+1}, that is maximising equation 3.12 where equation 3.17 is substituted for the definition of Z. The first order condition becomes:

$$\begin{aligned} & \frac{1}{1+r}\frac{1-t^d}{1-t^g}\left\{-q_\tau+\beta q_\tau\right\}+\frac{1-t^d}{1-t^g}\left[(t^c+t^s)a-v\right]\frac{1}{r+a}\times \\ & \frac{1}{1+r}q_\tau\left[1-\frac{1-\delta}{1+r}\right]+(\frac{1}{1+r})^2\frac{1-t^d}{1-t^g}\times \\ & \left\{\phi'_{\tau+1}-i\beta q_\tau+q_{\tau+1}-q_{\tau+1}\hat{\delta}-\beta q_\tau+v\beta q_\tau\right\} \\ & +(\frac{1}{1+r})^3\frac{1-t^d}{1-t^g}\left\{-(t^c+t^s)\left[\phi'_{\tau+1}-i\beta q_\tau\right]\right\} \\ = \;& 0 \end{aligned} \tag{3.18}$$

where $\phi'_{\tau+1}=\frac{\partial\phi_{\tau+1}}{\partial K_{\tau+1}}$. We then multiply both sides by $\frac{(1+r)^2(1-t^g)}{1-t^d}$, only keep $\phi'_{\tau+1}$-terms on the left-hand side, divide both sides by q_τ, use equation 3.14 and 3.15, subtract and add $\delta\frac{t^c+t^s}{1+r}$ on the right-hand side of the first order condition and divide both sides by $1-\frac{t^c+t^s}{1+r}$. The result is

$$\begin{aligned} \frac{\phi'_{\tau+1}}{q_\tau} &= \beta\left\{i-\frac{v}{1-\frac{t^c+t^s}{1+r}}\right\} \\ &\quad +(1-\beta)\left\{\frac{r}{1-\frac{t^c+t^s}{1+r}}\right\}+\delta \\ &\quad -\frac{\left[(t^c+t^s)a-v\right]\frac{r+\delta}{r+a}-\delta\frac{t^c+t^s}{1+r}}{1-\frac{t^c+t^s}{1+r}} \end{aligned} \tag{3.19}$$

where

$$\frac{t^c+t^s}{1+r}$$

is the company's effective tax rate on ϕ.

The term on the left-hand side is the change in profits due to a small change in the capital stock, divided by the investment good price; that is the term expresses the change in profits per NOK invested in real capital. At the margin this change in profits per NOK invested in real capital must be equal to the cost per NOK invested in real capital. The latter is described on the right-hand side of the

equation. The first term shows the debt costs. A share β of the invested NOK is financed by loan and the cost associated with this loan is the interest rate, i. In addition, it is taken into account that a β NOK increase in debt reduces the wealth tax base by β NOKs. This means that the company saves $\beta \times v$ when paying wealth tax. Since the paying of the wealth tax is not part of the tax base concerning the paying of the tax on general income v is divided by $1 - \frac{t^c+t^s}{1+r}$.

The second term on the right-hand side is the cost associated with equity capital financing, that is financing by retentions in this case since we have assumed that there is no issuing of new shares (but we will introduce the costs associated with the emission of new shares later on). $(1 - \beta)$ of the invested NOK is financed by equity capital and $\frac{r}{1-\frac{t^c+t^s}{1+r}}$ is the cost associated with the financing by retentions. Since the costs associated with financing by retentions are not allowed to be deducted from the general income before the paying of the tax on general income, r is divided by $1 - \frac{t^c+t^s}{1+r}$.

The third term on the right-hand side of the equation shows the economic depreciation δ. The economic depreciation is, as commented on earlier, equal to the physical depreciation rate minus what is left of a unit of capital after physical depreciation multiplied by the relative change in the price of the investment good:

$$\delta = \hat{\delta} - (1 - \hat{\delta})\dot{q}$$

If $\dot{q}$ is positive this is a gain for the company. It is obviously a gain if what is left of the real capital bought by the company is sold after some period of time. We have assumed, however, that it is not allowed to resell real capital. A positive change in the investment good price will then express that expectations concerning what the real capital will yield have changed; the agents believe that (what is left of) the real capital will generate a higher return than what was first thought.

The fourth and last term on the right-hand side expresses the difference between the annualised present value of the tax savings due to depreciation allowances for taxation purposes corrected for the wealth tax, that is $[(t^c + t^s)a - v]\,\frac{r+\delta}{r+a}$ and the tax savings due to the true revaluation of real capital, that is $\frac{t^c+t^s}{1+r}\delta$. The higher the former compared with the latter, the lower the user cost of capital.

Concerning the costs associated with the issuing of new shares, we follow the method described in Holmøy, Nordén and Strøm (1994). Using our earlier notation, the cost for the share holder of financing corporate investment in physical capital by issuing new shares, aksjec, is as follows $\text{aksjec} = r\frac{1-t^g}{(1-t^d)(1-\frac{t^c+t^s}{1+r})}$. As already commented on, the cost for the share holder of financing corporate investment in physical capital by retained profits, now called tilbhc, is equal

to tilbhc $= \frac{r}{1-\frac{t^c+t^s}{1+r}}$. The cost associated with equity capital financing, that is the second term on the right-hand side in equation 3.19, will now be equal to $(1-\beta)$min[tilbhc, aksjec]. The form of equity finance having the smallest cost will be chosen, in other words.

3.2.2. The user cost of capital for an unlisted limited liability company not subject to the split model

The manager of the company wishes to maximise the stock holders' utility. This is equivalent to the maximisation of the value of the company's shares as seen from the representative investor's point of view, that is the maximisation of V_τ. This value is given in equation 2.12 which we repeat here:

$$V_\tau = \sum_{s=\tau}^{\infty} \left(\frac{1}{1+r}\right)^{s-\tau+1} \left[\frac{1-t^d}{1-t^g} D_s - S_s - \frac{t^{wnse}}{1-t^g}(VK_s^A - B_s)\right] \tag{3.20}$$

where $r = \frac{(1-t^i)i-t^{wb}}{1-t^g}$ is the discount rate. Equations 3.3 to 3.11 described above for a listed limited liability company, also apply to the case of an unlisted limited liability company which is not subject to the split model. We assume that the emission of new shares is equal to 0, but the costs associated with this kind of financing will be introduced later. The symbols mean the same as before if not otherwise stated. Substituting equations 3.3 to 3.8 and equation 3.10 and 3.11 into equation 3.20 gives the following:

$$\begin{aligned} V_\tau \;=\; & \frac{1-t^d}{1-t^g} \sum_{s=\tau}^{\infty} (\frac{1}{1+r})^{s-\tau+1} \{\phi_s(K_s) - i\beta q_{s-1} K_s \\ & -q_s(K_{s+1} - K_s + \hat{\delta} K_s) + (\beta q_s K_{s+1} - \beta q_{s-1} K_s) \\ & -(t^c + t^s)[\phi_{s-1}(K_{s-1}) - i\beta q_{s-2} K_{s-1}] + v\beta q_{s-1} K_s \\ & +[(t^c + t^s)a - v] VK_s^A\} - \frac{t^{wnse}}{1-t^g} \sum_{s=\tau}^{\infty} (\frac{1}{1+r})^{s-\tau+1} \left[VK_s^A - \beta q_{s-1} K_s\right] \end{aligned} \tag{3.21}$$

Analogous to the procedure followed for a listed limited liability company, the last term in equation 3.21

$$\begin{aligned} & \frac{t^{wnse}}{1-t^g} \sum_{s=\tau}^{\infty} (\frac{1}{1+r})^{s-\tau+1} \left[VK_s^A - \beta q_{s-1} K_s\right] \\ = \; & \frac{t^{wnse}}{1-t^g} \sum_{s=\tau}^{\infty} (\frac{1}{1+r})^{s-\tau+1} \left[\sum_{i=0}^{\infty} (1-a)^i q_{s-1-i} J_{s-1-i} - \beta q_{s-1} K_s\right] \end{aligned} \tag{3.22}$$

can be divided into a term which is predetermined in period τ and a term which is not predetermined in period τ. The latter will look as follows:

$$\frac{t^{wnse}}{1-t^g}\frac{1}{r+a}\{(1-\frac{1-\delta}{1+r})\sum_{i=0}^{\infty}(\frac{1}{1+r})^{i+1}q_{\tau+i}K_{\tau+i+1} \tag{3.23}$$
$$-\frac{1-\delta}{1+r}q_{\tau-1}K_\tau\}-\sum_{s=\tau}^{\infty}\frac{t^{wnse}}{1-t^g}(\frac{1}{1+r})^{s-\tau+1}\beta q_{s-1}K_s$$

We are then in a position to maximise V_τ with respect to K_{s+1}, that is maximising 3.21 where equation 3.17 is substituted for the definition of Z and equation 3.23 is substituted for the last term in equation 3.21. The resulting first order condition is the following:

$$\begin{aligned}
&\frac{1}{1+r}\frac{1-t^d}{1-t^g}\{-q_\tau+\beta q_\tau\}+\frac{1-t^d}{1-t^g}\left[(t^c+t^s)a-v\right]\frac{1}{r+a}\times \qquad (3.24)\\
&\frac{1}{1+r}q_\tau\left[1-\frac{1-\delta}{1+r}\right]+(\frac{1}{1+r})^2\frac{1-t^d}{1-t^g}\times\\
&\left\{\phi'_{\tau+1}-i\beta q_\tau+q_{\tau+1}-q_{\tau+1}\hat{\delta}-\beta q_\tau+v\beta q_\tau\right\}\\
+\quad&(\frac{1}{1+r})^3\frac{1-t^d}{1-t^g}\left\{-(t^c+t^s)\left[\phi'_{\tau+1}-i\beta q_\tau\right]\right\}-\frac{t^{wnse}}{1-t^g}\frac{1}{r+a}\times\\
&\left\{\frac{1}{1+r}q_\tau(1-\frac{1-\delta}{1+r})\right\}+\frac{t^{wnse}}{1-t^g}\frac{1}{1+r}\beta q_\tau=0
\end{aligned}$$

We then multiply both sides by $\frac{(1+r)^2(1-t^g)}{1-t^d}$, only keep $\phi'_{\tau+1}$-terms on the left-hand side, divide both sides by q_τ, use equation 3.14 and 3.15, subtract and add $\delta\frac{t^c+t^s}{1+r}$ on the right-hand side of the first order condition and divide both sides by $1-\frac{t^c+t^s}{1+r}$. The result is

$$\begin{aligned}
\frac{\phi'_{\tau+1}}{q_\tau} &= \beta\left\{i-\frac{v}{1-\frac{t^c+t^s}{1+r}}\right\} \qquad (3.25)\\
&+(1-\beta)\frac{r}{1-\frac{t^c+t^s}{1+r}}+\delta\\
&-\frac{\left[(t^c+t^s)a-v\right]\frac{r+\delta}{r+a}-\frac{t^c+t^s}{1+r}\delta}{1-\frac{t^c+t^s}{1+r}}\\
&+\frac{\frac{t^{wnse}}{1-t^d}\left[\frac{r+\delta}{r+a}-\beta\right]}{1-\frac{t^c+t^s}{1+r}}
\end{aligned}$$

where

$$\frac{t^c + t^s}{1 + r}$$

is the effective tax rate on ϕ.

The left-hand side of equation 3.25 and the first four terms on the right-hand side have the same interpretation as before (that is the same interpretation as in the case of a listed limited liability company). As mentioned earlier, the discount rate is a bit different than before. There is also a fifth term on the right-hand side now, showing the consequence of having $(VK_s^A - B_s)$ as the basis for the personal wealth tax instead of V_τ. The term $\frac{r+\delta}{r+a}$ shows the annualised increase in VK_s^A followed by a marginal increase in the real capital stock while β shows the accompanying increase in B_s. If $\frac{r+\delta}{r+a}$ is larger than β, a marginal increase in real capital will have a larger positive effect on VK_s^A than on B_s, implying an increase in the paying of the personal wealth tax on shares not on the stock exchange. This in turn means that the user cost of capital increases.

Analogous to the case of a listed limited liability company the costs associated with the issuing of new shares, aksjec, are equal to aksjec $= \frac{r(1-t^g)}{(1-t^d)(1-\frac{t^c+t^s}{1+r})}$. The cost for the share holder of financing corporate investment in physical capital by retained profits, now called tilbhc, is equal to tilbhc $= \frac{r}{1-\frac{t^c+t^s}{1+r}}$. Equation 2.11 defines r. The costs associated with equity capital financing, that is the second term on the right-hand side in equation 3.25, will now be equal to $(1 - \beta)$min[tilbhc, aksjec]. The form of equity finance having the smallest cost will be chosen, in other words.

3.2.3. The user cost of capital for an unlisted limited liability company subject to the split model

The split model is a mechanical way of separating the labour income of a self-employed from the total income of the company. There is a need for such a model since the self-employed has an incitement to let labour income look like capital income because of the much higher tax rate on the former. The split model applies to self-employed and also to limited liability companies where one or more of the owners of the limited liability company work in the company and at the same time possess more than 2/3 of the shares or have a claim on more than 2/3 of the dividend. The expression for the personal income (personinntekt) which follows from the use of the split model is like this:

$\phi_t(K_t)$+ capital income/capital gain $-iB_t-$ capital losses $- A_t$ −capital income/capital gain + capital expenses +capital losses − (rate of return on capital × the basis for return on capital) − wage deduction = calculated personal income − negative personal income carried forward = calculated personal income for taxation purposes or carried forward if negative.

The calculated personal income is subject to the member's premium to the National Insurance Scheme and the top tax. (A calculated personal income higher than 34G, where G is the basic amount in the National Insurance Scheme, is not subject to any member's premium to the National Insurance Scheme or any top tax, however.) We have simplified the expression for the personal income in the following way: a) We assume that the wage deduction is equal to 0 and b) that the calculated personal income is positive (or that the negative personal income carried forward is equal to 0). Concerning a): The wage deduction is intended to express the return on the organisation capital in the company, meaning returns in excess of the returns the employees' wages represent. These excess returns are due to the interaction between the employees in the company, the so-called organisation capital. The wages of the persons for whom we are calculating the personal income are not included in the wage deduction since the point is to extract everything not associated with these persons work from the income of the company.

Instead of equation 3.6 the following equation will now hold:

$$T_t = T_t^G + T_t^W + T_t^P \tag{3.26}$$

Compared with equation 3.6, there is now a third term present, T_t^P. This expresses the paying of the top tax and the member's premium to the National Insurance Scheme, where the basis for these taxes is the calculated personal income from the split model. Andersen, Husum and Sannarnes (1997) have incorporated the split model for a limited liability company with active owners in a similar way. Our expression for T_t^P is

$$T_t^P = (t^t + t^f)[\phi_{t-1}(K_{t-1}) - A_{t-1} - \alpha_{t-1} V K_{t-1}^A] \tag{3.27}$$

where t^t is the formal top tax rate, t^f is the formal member's premium to the National Insurance Scheme and α_{t-1} is the stipulated rate of return on capital in period t-1[2]. The rest of the symbols means the same as before.

[2]Strictly speaking, the rules state that the basis for the return on capital in period t-1 is the average of the value of the real capital at the end of period t-2 and the value at the beginning of period t-2.

A point worth mentioning is that the stipulated rate of return on capital includes a risk premium. Since our model does not incorporate any risk, it perhaps would have been appropriate to adjust the stipulated rate of return on capital downwards or to introduce risk into the model.

The tax rules say that the calculated personal income from a limited liability company in period t-1 is taxed in period t. Therefore the term in the second parenthesis in equation 3.27 is lagged one period. It is the capital at the beginning of period t-1 which produces services in period t-1 ($\phi_{t-1}(K_{t-1})$) and therefore it seems reasonable to have the value of the real capital at the beginning of period t-1 as the basis for the return on capital. The company has opportunities of choosing between different methods of valuation concerning the basis for return on capital. Choosing the "declining balance value" is one possibility. We assume that the "declining balance value" is the chosen form of valuation. Concerning the rate of return on capital, it seems reasonable to date this at t-1 since we are interested in the return on capital in this year. It is assumed that the representative investor and the manager of the company expect this stipulated rate of return on capital to be constant over time.

As mentioned earlier, the manager of the company wishes to maximise the stockholders' utility. This is equivalent to the maximisation of the value of the company's shares as seen from the representative investor's point of view, that is the maximisation of V_τ. When the company is subject to the split model the manager of the company will take into account that the personal income of the active owners will change as a result of a real investment. The inclusion of the T_t^P-term describes this. This does not correspond to the assumption that the manager of the company wishes to maximise the stock holders' utility. Shareholders not working in the company (passive owners) will not gain any utility from the fact that the manager takes into account that the personal income of the active owners changes as a result of a real investment. On the other side, the active owners possess more than 2/3 of the shares or have a claim on more than 2/3 of the dividend so at least the manager of the company maximises the utility of a group possessing most of the shares. We assume that the active owners possess all of the shares.

The value of the company will look as before, that is as equation 3.21, but extended by the following term:

$$-\frac{1-t^d}{1-t^g}\sum_{s=\tau}^{\infty}\left[\frac{1}{1+r}\right]^{s-\tau+1}(t^t+t^f)\{\phi_{s-1}(K_{s-1})-A_{s-1}-\alpha VK_{s-1}^A\} \qquad (3.28)$$

Analogous to before, the term

$$\sum_{s=\tau}^{\infty}\left[\frac{1}{1+r}\right]^{s-\tau+1}(t^t+t^f)A_{s-1}$$

can be divided into a term which is predetermined in period τ and a term which is not predetermined in period τ, where the latter term is as follows:

$$\frac{(t^t+t^f)a}{r+a}\{\left[1-\frac{1-\delta}{1+r}\right]\sum_{i=0}^{\infty}\left(\frac{1}{1+r}\right)^{i+1}q_{\tau+i}K_{\tau+i+1}-\frac{1-\delta}{1+r}q_{\tau-1}K_{\tau}\} \tag{3.29}$$

The term

$$(t^t+t^f)\alpha\sum_{s=\tau}^{\infty}\left[\frac{1}{1+r}\right]^{s-\tau+1}VK_{s-1}^{A} \tag{3.30}$$

can also be divided into a term which is predetermined in period τ and a term which is not predetermined in period τ. The latter can be written as follows:

$$\frac{(t^t+t^f)\alpha}{r+a}\{\left[1-\frac{1-\delta}{1+r}\right]\sum_{i=0}^{\infty}\left(\frac{1}{1+r}\right)^{i+2}q_{\tau+i}K_{\tau+i+1}-(\frac{1}{1+r})^2(1-\delta)q_{\tau-1}K_{\tau}\} \tag{3.31}$$

We maximise the new term 3.28 with respect to K_{s+1}, simultaneously employing 3.29 and 3.31 and get the following:

$$\begin{aligned}&\frac{1-t^d}{1-t^g}(t^t+t^f)a\frac{1}{r+a}\left\{\left[1-\frac{1-\delta}{1+r}\right]\frac{1}{1+r}q_{\tau}\right\} \\ &+\left[1-\frac{1-\delta}{1+r}\right]q_{\tau}(\frac{1}{1+r})^2\frac{1}{r+a}\alpha(t^t+t^f)\frac{1-t^d}{1-t^g} \\ &-\frac{1-t^d}{1-t^g}(\frac{1}{1+r})^3(t^t+t^f)\phi_{\tau+1}^{'} \\ =\;&0\end{aligned} \tag{3.32}$$

We then multiply both sides by $\frac{(1+r)^2(1-t^g)}{1-t^d}$, only keep $\phi_{\tau+1}^{'}$-terms on the left-hand side and divide both sides by q_{τ} and get the following:

$$\begin{aligned}-\frac{\phi_{\tau+1}^{'}}{q_{\tau}}\frac{t^t+t^f}{1+r} &= -(t^t+t^f)a\frac{r+\delta}{r+a} \\ &\quad -\frac{r+\delta}{1+r}\frac{1}{r+a}\alpha(t^t+t^f) \\ &= -(t^t+t^f)\frac{r+\delta}{r+a}\left[a+\frac{\alpha}{1+r}\right]\end{aligned} \tag{3.33}$$

Combining 3.33 and 3.24 gives us the user cost of capital for an unlisted limited liability company subject to the split model:

$$\begin{aligned}\frac{\phi'_{\tau+1}}{q_\tau} &= \beta\left\{i\frac{1-\frac{t^c+t^s}{1+r}}{1-\frac{t^c+t^s+t^t+t^f}{1+r}}-\frac{v}{1-\frac{t^c+t^s+t^t+t^f}{1+r}}\right\} \\ &+(1-\beta)\frac{r}{1-\frac{t^c+t^s+t^t+t^f}{1+r}} \\ &+\delta\frac{1-\frac{t^c+t^s}{1+r}}{1-\frac{t^c+t^s+t^t+t^f}{1+r}} \\ &-\frac{\left[(t^c+t^s)a-v\right]\frac{r+\delta}{r+a}-\frac{t^c+t^s}{1+r}\delta}{1-\frac{t^c+t^s+t^t+t^f}{1+r}} \\ &+\frac{\frac{t^{wnse}}{1-t^d}\left[\frac{r+\delta}{r+a}-\beta\right]}{1-\frac{t^c+t^s+t^t+t^f 1}{1+r}} \\ &-\frac{(t^t+t^f)\frac{r+\delta}{r+a}\left[a+\frac{\alpha}{1+r}\right]}{1-\frac{t^c+t^s+t^t+t^f}{1+r}}\end{aligned} \tag{3.34}$$

where

$$\frac{t^c+t^s+t^t+t^f}{1+r}$$

is the effective tax rate on ϕ.

As we see, the difference from equation 3.25 is that now the tax rates t^t+t^f are present in the relevant denominators and not just the tax rates t^c+t^s. For example, the term $\beta\frac{v}{1-\frac{t^c+t^s+t^t+t^f}{1+r}}$ will now have the following interpretation: a β NOK increase in debt reduces the wealth tax base by β NOKs. This means that the company saves $\beta\times v$ when paying wealth tax. Since the paying of the wealth tax is neither part of the tax base concerning the paying of the tax on general income nor the tax base concerning the paying of the tax on personal income βv is divided by $1-\frac{t^c+t^s+t^t+t^f}{1+r}$. (The company shall not pay any taxes on the tax savings concerning the wealth tax.) In addition, there is a sixth term also capturing the effect of the split model. This term (the last term in equation 3.34) expresses the tax savings due to the subtraction of depreciation for taxation purposes $(t^t+t^f)\frac{r+\delta}{r+a}a$ and subtraction of the return on capital based on a "declining balance value" of capital $(t^t+t^f)\frac{r+\delta}{r+a}\frac{\alpha}{1+r}$ when calculating the personal income.

Analogous to the case of an unlisted limited liability company not subject to the split model, the costs associated with the issuing of new shares, aksjec, are equal to aksjec $= \frac{r(1-t^g)}{(1-t^d)(1-\frac{t^c+t^s+t^t+t^f}{1+r})}$. The cost for the share holder of financing corporate investment in physical capital by retained profits, now called tilbhc, is equal to tilbhc $= \frac{r}{1-\frac{t^c+t^s+t^t+t^f}{1+r}}$. Equation 2.11 defines r. The costs associated with equity capital financing, that is the second term on the right-hand side in equation 3.34, will now be equal to $(1-\beta)$min[tilbhc, aksjec]. The form of equity finance having the smallest cost will be chosen, in other words.

3.2.4. The user cost of capital for a self-employed

In this case, the discount rate r is equal to

$$r = (1-t^i)i - t^{wb} \tag{3.35}$$

The symbols mean the same as before if not otherwise stated. Equation 3.35 says that instead of using 1 NOK for real investment in the company, the self-employed could have put this NOK into the bank. Then the after-tax interest income would have been $(1-t^i)i$. The last term t^{wb} expresses the fact that the self-employed must pay more wealth tax since the bank deposit of 1 NOK is subject to wealth taxation. If the self-employed has net debt instead of net outstanding claims the self-employed could have paid 1 NOK of his debt instead of using it for real investment in the company. Then the self-employed avoids the further paying of interest on this NOK, the term $1 \times i$. On the other side, he loses $t^i i$ and t^{wb} when considering tax savings since, respectively, the interest outlays are reduced and since the debt is reduced.

The net cash flow for a self-employed is:

$$D_t = \phi_t(K_t) - iB_t - q_t J_t + Q_t - T_t \tag{3.36}$$

The net cash flow is, in other words, defined as profits $\phi_t(K_t)$ plus the new loan Q_t minus interest outlays iB_t minus real investment outlays $q_t J_t$ minus total taxes T_t.

The definition of debt increase (see equation 3.4) and the relationship between investments and the stock of capital (see equation 3.5) also apply here. A self-employed has two ways to finance a real investment - taking up a loan or using retained profits. As before, we assume that debt is a fixed ratio of the value of the capital stock, see equation 3.11.

The self-employed pays taxes on income associated with the company, more specifically tax on general income and tax on personal income, and on the company's wealth.

$$T_t = T_t^G + T_t^P + T_t^W \tag{3.37}$$

The total taxes a self-employed pays in period t are based upon income and wealth in period t as opposed to the case for a limited liability company described earlier. Taxes paid on general income look like this.

$$T_t^G = (t^c + t^s)\left[\phi_t(K_t) - A_t - iB_t\right] \tag{3.38}$$

The tax base is the profits $\phi_t(K_t)$ minus the depreciation allowances for taxation purposes A_t minus the interest outlays iB_t.

Concerning taxes paid on personal income an extraction of the self-employed's labour income is necessary.

$$T_t^P = (t^t + t^f)\{\phi_t(K_t) - A_t - \alpha_t V K_t^A\} \tag{3.39}$$

This is the same expression as for a limited liability company subject to the split model; the only difference is that a self-employed does not pay taxes levied on a preceding year basis.

Taxes paid on the company's wealth are:

$$T_t^W = v(VK_{t+1}^A - B_{t+1}) \tag{3.40}$$

As before, the wealth tax rate is v and the tax base is the "declining balance value" of real capital minus debt.

The self-employed wishes to maximise the discounted sum of future incomes V_τ:

$$V_\tau = \sum_{s=\tau}^{\infty}\left[\frac{1}{1+r}\right]^{s-\tau+1} D_s \tag{3.41}$$

Putting equations 3.4, 3.5, 3.10, 3.11 and 3.36 to 3.40 into equation 3.41 gives the following:

$$\begin{aligned} V_\tau \;=\; & \sum_{s=\tau}^{\infty}\left(\frac{1}{1+r}\right)^{s-\tau+1}\{\phi_s(K_s) - i\beta q_{s-1}K_s - q_s(K_{s+1} - K_s + \hat{\delta}K_s) \\ & +\beta(q_s K_{s+1} - q_{s-1}K_s) - (t^c + t^s)[\phi_s(K_s) - aVK_{s+1}^A - i\beta q_{s-1}K_s] \\ & -(t^t + t^f)[\phi_s(K_s) - aVK_{s+1}^A - \alpha VK_s^A] - v[VK_{s+1}^A - \beta q_s K_{s+1}]\} \end{aligned} \tag{3.42}$$

Before we derive the first order condition for this expression with respect to K_{s+1}, we examine the following expression (which is part of equation 3.42) more closely:

$$\sum_{s=\tau}^{\infty}(\frac{1}{1+r})^{s-\tau+1}[(t^c+t^s)a-v]VK_{s+1}^A \tag{3.43}$$

Analogous to before, this expression can be divided into a term which is predetermined in period τ and a term which is not predetermined in period τ, where the latter is as follows:

$$[(t^c+t^s)a-v]\frac{1}{r+a}\{\sum_{i=0}^{\infty}(\frac{1}{1+r})^i q_{\tau+i}K_{\tau+1+i}\left[1-\frac{1-\delta}{1+r}\right]-q_{\tau-1}(1-\delta)K_\tau\} \tag{3.44}$$

We then look closer at the following expression (also part of equation 3.42):

$$(t^t+t^f)\sum_{s=\tau}^{\infty}\left[\frac{1}{1+r}\right]^{s-\tau+1}\left[aVK_{s+1}^A+\alpha VK_s^A\right] \tag{3.45}$$

Analogous to before, this expression can be divided into a term which is predetermined in period τ and a term which is not predetermined in period τ, where the latter can be written as follows:

$$\begin{aligned}&\frac{(t^t+t^f)a}{r+a}\left\{\sum_{i=0}^{\infty}(\frac{1}{1+r})^i q_{\tau+i}K_{\tau+1+i}\left[1-\frac{1-\delta}{1+r}\right]-q_{\tau-1}(1-\delta)K_\tau\right\} \\ &+\frac{(t^t+t^f)\alpha}{r+a}\left\{\sum_{i=0}^{\infty}(\frac{1}{1+r})^{i+1} q_{\tau+i}K_{\tau+1+i}\left[1-\frac{1-\delta}{1+r}\right]-\frac{1-\delta}{1+r}q_{\tau-1}K_\tau\right\}\end{aligned} \tag{3.46}$$

We then maximise equation 3.42 with respect to K_{s+1}, simultaneously employing equations 3.44 and 3.46 and get the following first order condition:

$$\begin{aligned}&\frac{1}{1+r}\left[q_\tau(-1+\beta+v\beta)\right]+\left[(t^c+t^s)a-v\right]\frac{1}{r+a}\left[1-\frac{1-\delta}{1+r}\right]q_\tau \\ &+\left[(t^t+t^f)a\right]\frac{1}{r+a}\left[1-\frac{1-\delta}{1+r}\right]q_\tau \\ &+(t^t+t^f)\alpha\frac{1}{r+a}\left[1-\frac{1-\delta}{1+r}\right]\frac{1}{1+r}q_\tau \\ &+(\frac{1}{1+r})^2[\phi'_{\tau+1}-i\beta q_\tau-q_{\tau+1}(-1+\hat{\delta})-\beta q_\tau-(t^c+t^s)\phi'_{\tau+1}\end{aligned} \tag{3.47}$$

$$
\begin{aligned}
&+(t^c+t^s)i\beta q_\tau-(t^t+t^f)\phi'_{\tau+1}] \\
= \;& 0
\end{aligned}
$$

We then multiply both sides by $(1+r)^2$, only keep $\phi'_{\tau+1}$-terms on the left-hand side, divide both sides by q_τ, use equation 3.14 and 3.15, subtract and add $\delta(t^c+t^s)$ on the right-hand side of the first order condition and divide both sides by $1-(t^c+t^s+t^t+t^f)$. The result is

$$
\begin{aligned}
\frac{\phi'_{\tau+1}}{q_\tau} \;=\; & \beta\left\{i\frac{1-(t^c+t^s)}{1-(t^c+t^s+t^t+t^f)}-\frac{v(1+r)}{1-(t^c+t^s+t^t+t^f)}\right\} \\
& +(1-\beta)\frac{r}{1-(t^c+t^s+t^t+t^f)} \\
& +\delta\frac{1-(t^c+t^s)}{1-(t^c+t^s+t^t+t^f)} \\
& -\frac{(1+r)\left[(t^c+t^s)a-v\right]\frac{r+\delta}{r+a}-(t^c+t^s)\delta}{1-(t^c+t^s+t^t+t^f)} \\
& -\frac{(t^t+t^f)\frac{r+\delta}{r+a}\left[a(1+r)+\alpha\right]}{1-(t^c+t^s+t^t+t^f)}
\end{aligned}
\tag{3.48}
$$

where

$$t^c+t^s+t^t+t^f$$

is the effective tax rate on ϕ.

The interpretation of equation 3.48 is analogous to the earlier interpretations of the different terms. Since self-employed do not pay taxes levied on a preceding year basis, it is as though the effective tax rates for limited liability companies have been multiplied by $(1+r)$.

3.3. The user cost of capital for forestry

The user cost formulas described above are general. For the sector forestry specific tax rules apply. These are as follows:

i) Appropriation to the forest tax account (avsetning til skogavgiftskonto): The tax rule states that the forest owner can deduct appropriations to the forest tax account when calculating general income. If the appropriations are spent on forest cultivation (skogkultur) the forest owner must only add 65 to 95 per cent of the paid out amount from the forest tax account to his income. The tax rule will therefore both imply a tax credit and a tax exemption if the forest owner merely spends the paid out amounts from the forest tax account on forest cultivation.

The tax rule will imply a tax credit if the forest owner merely spends the paid out amounts from the forest tax account on other purposes than forest cultivation.

ii) Expenses for forest roads (utgifter til skogsveier): These can be directly deducted from the tax base even if the general tax rules state that such kind of expenses should have been the object of the ordinary depreciation rules. This arrangement implies a tax credit for the sector forestry.

iii) Average assessment (gjennomsnittslikning): The tax base of the forest owners is an average of the last five years surplus. This rule also implies a tax credit.

In the following these three specific tax rules are introduced into the general formulas described earlier. As the case was for the general formulas, a user cost of capital for a listed limited liability company, an unlisted limited liability company not subject to the split model, an unlisted limited liability company subject to the split model and a company directly owned by a self-employed will be calculated. (The share of self-employed in forestry is set equal to 0.82 so the formula for a self-employed will be the most important one for forestry.)

3.3.1. The user cost of capital for a listed limited liability company

As a result of the tax rule concerning appropriations to the forest tax account (i), equation 3.7 which describes tax on general income for a listed limited liability company will be changed to

$$T_t^G = (t^c + t^s) \begin{array}{l} \{\phi_{t-1}(K_{t-1})[1 - t^{fot}(1 - \frac{\rho\theta}{(1+r)^n} - \frac{1-\rho}{(1+r)^n})] \\ \qquad -A_{t-1} - iB_{t-1}\} \end{array} \tag{3.49}$$

There are four new symbols:

t^{fot} is the effective forest tax rate

ρ is the share of the paid out appropriations from the forest tax account spent on forest cultivation

θ is the rate at which the forest owner must add the paid out appropriations from the forest tax account spent on forest cultivation to his income

n is the number of years the appropriation to the forest tax account "spends on the account". The new components may be explained as follows:

$-t^{fot}\phi_{t-1}(K_{t-1})$ shows the forest tax. The forest tax is to be deducted from the tax base. The tax rules state that the forest tax is equal to the activity's gross production (that is the income stemming from the sale of timber) multiplied by a formal forest tax rate. Since $\phi_{t-1}(K_{t-1})$ represents net income we have transformed the formal forest tax rate into an effective one, having net income as the tax base.

$t^{fot}\phi_{t-1}(K_{t-1})(\frac{\rho\theta}{(1+r)^n} + \frac{1-\rho}{(1+r)^n})$ shows how appropriations to the forest tax account are added to the taxable income. As already mentioned ρ represents the share of the paid out appropriations from the forest tax account spent on forest cultivation. Only when spent on forest cultivation the paid out appropriations from the forest tax account shall be added to income by a rate lower than 1. θ represents this lower rate. The inclusion in income (inntektsføring) of the paid out forest tax is discounted to the year of payment by the factor $(1+r)^n$ in the denominator. The tax advantage is higher the higher ρ and n and the lower θ.

The user costs are calculated for different kinds of real capital. The tax rule concerning expenses for forest roads (ii) will only apply to the capital type buildings and constructions. Equation 3.49 for buildings and constructions will then look as follows

$$T_t^G = (t^c + t^s) \begin{array}{c} \{\phi_{t-1}(K_{t-1})[1 - t^{fot}(1 - \frac{\rho\theta}{(1+r)^n} - \frac{1-\rho}{(1+r)^n})] \\ -\eta q_{t-1} J_{t-1} - A_{t-1} - iB_{t-1}\} \end{array} \tag{3.50}$$

where

$$A_t = a\sum_{i=0}^{\infty}(1-a)^i(1-\eta)q_{t-i}J_{t-i} \tag{3.51}$$

There is only one new symbol, namely

η which is the gross real investments in forest roads as a share of the gross real investments in buildings and constructions.

The new component $-\eta q_{t-1}J_{t-1}$ represents the direct deduction of expenses for forest roads. Since expenses for forest roads are directly deducted they shall not be part of the basis for depreciation for taxation purposes, see equation 3.51.

The tax rule concerning average assessment (iii) will change equation 3.50 as follows (we use equation 3.50 in the following representation even though equation 3.50 only holds for buildings and constructions. Tax bases and user costs of capital for other kinds of capital will then result from setting η equal to 0):

$$\begin{aligned} T_t^G &= \frac{t^c + t^s}{5}\sum_{i=0}^{4}\{\phi_{t-1-i}(K_{t-1-i})[1 - t^{fot}(1 - \frac{\rho\theta}{(1+r)^n} - \frac{1-\rho}{(1+r)^n})] \\ &\quad -\eta q_{t-1-i}J_{t-1-i} - A_{t-1-i} - iB_{t-1-i}\} \end{aligned} \tag{3.52}$$

In order to derive an expression for the user cost of capital for a listed limited liability company, the same procedure as described earlier is employed but now using equation 3.52 instead of equation 3.7. The result is

$$\begin{aligned}\frac{\phi'_{\tau+1}}{q_\tau} &= \frac{\beta\left\{i\left[1-\frac{t^c+t^s}{5}\sum_{j=1}^{5}\left(\frac{1}{1+r}\right)^j\right]-v\right\}}{1-t^{cs}} \\ &+\frac{(1-\beta)r}{1-t^{cs}}+\frac{\delta\left(1-\frac{t^c+t^s}{1+r}\right)}{1-t^{cs}} \\ &-\frac{\left\{\frac{t^c+t^s}{5}a(1-\eta)\frac{r+\delta}{r+a}\right\}\sum_{j=0}^{4}(\frac{1}{1+r})^j-v\frac{r+\delta}{r+a}-\delta\frac{t^c+t^s}{1+r}}{1-t^{cs}} \\ &-\frac{\frac{t^c+t^s}{5}\eta\left[\delta\sum_{j=1}^{5}(\frac{1}{1+r})^j+\left(1-(\frac{1}{1+r})^5\right)\right]}{1-t^{cs}}\end{aligned} \tag{3.53}$$

where

$$t^{cs}=\frac{t^c+t^s}{5}\left[1-t^{fot}\left(1-\frac{\rho\theta}{(1+r)^n}-\frac{1-\rho}{(1+r)^n}\right)\right]\sum_{j=1}^{5}(\frac{1}{1+r})^j \tag{3.54}$$

is the effective tax rate on ϕ.

The interpretation of the first four terms on the right-hand side is analogous to the interpretation of the four terms on the right-hand side of equation 3.19. The fifth term on the right-hand side is new and expresses the tax savings due to the direct deduction of expenses for forest roads.

Analogous to the general case of a listed limited liability company, the costs associated with the issuing of new shares, aksjec, are equal to aksjec $= \frac{r(1-t^g)}{(1-t^d)(1-t^{cs})}$. The cost for the share holder of financing corporate investment in physical capital by retained profits, now called tilbhc, is equal to tilbhc $= \frac{r}{1-t^{cs}}$. Equation 2.4 defines r. The costs associated with equity capital financing, that is the second term on the right-hand side in equation 3.53, will now be equal to $(1-\beta)$min[tilbhc, aksjec]. The form of equity finance having the smallest cost will be chosen, in other words.

3.3.2. The user cost of capital for an unlisted limited liability company not subject to the split model

The three specific tax rules for the sector forestry lead to the same changes in taxes on general income as was the case for a listed limited liability company. The user cost of capital for an unlisted limited liability company not subject to the split model is then as follows

$$
\begin{aligned}
\frac{\phi'_{\tau+1}}{q_\tau} &= \frac{\beta\left\{i\left[1-\frac{t^c+t^s}{5}\sum_{j=1}^{5}\left(\frac{1}{1+r}\right)^j\right]-v\right\}}{1-t^{cs}} \\
&+\frac{(1-\beta)r}{1-t^{cs}}+\frac{\delta\left(1-\frac{t^c+t^s}{1+r}\right)}{1-t^{cs}} \\
&-\frac{\left\{\frac{t^c+t^s}{5}a(1-\eta)\frac{r+\delta}{r+a}\right\}\sum_{j=0}^{4}(\frac{1}{1+r})^j-v\frac{r+\delta}{r+a}-\delta\frac{t^c+t^s}{1+r}}{1-t^{cs}} \\
&+\frac{\frac{t^{wnse}}{1-t^d}\left[\frac{r+\delta}{r+a}-\beta\right]}{1-t^{cs}} \\
&-\frac{\frac{t^c+t^s}{5}\eta\left[\delta\sum_{j=1}^{5}(\frac{1}{1+r})^j+\left(1-(\frac{1}{1+r})^5\right)\right]}{1-t^{cs}}
\end{aligned}
\tag{3.55}
$$

where

$$
t^{cs}=\frac{t^c+t^s}{5}\left[1-t^{fot}\left(1-\frac{\rho\theta}{(1+r)^n}-\frac{1-\rho}{(1+r)^n}\right)\right]\sum_{j=1}^{5}(\frac{1}{1+r})^j \tag{3.56}
$$

is the effective tax rate on ϕ for an unlisted limited liability company not subject to the split model.

The interpretation of the first five terms on the right-hand side of equation 3.55 is analogous to the interpretation of the five terms on the right-hand side of equation 3.25. The sixth term on the right-hand side expresses the tax savings due to the direct deduction of expenses for forest roads.

Analogous to the general case of an unlisted limited liability company not subject to the split model, the costs associated with the issuing of new shares, aksjec, are equal to aksjec $= \frac{r(1-t^g)}{(1-t^d)(1-t^{cs})}$. The cost for the share holder of financing corporate investment in physical capital by retained profits, now called tilbhc, is equal to tilbhc $= \frac{r}{1-t^{cs}}$. Equation 2.11 defines r. The costs associated with equity capital financing, that is the second term on the right-hand side in equation 3.55, will now be equal to $(1-\beta)$min[tilbhc, aksjec]. The form of equity finance having the smallest cost will be chosen, in other words.

3.3.3. The user cost of capital for an unlisted limited liability company subject to the split model

The three specific tax rules for the sector forestry lead to the same changes in taxes on general income as was the case for a listed limited liability company.

In addition the three specific tax rules will change equation 3.27 which describes taxes on personal income into the following

$$\begin{aligned} T_t^P &= (t^t + t^f)\{\phi_{t-1}(K_{t-1})[1 - t^{fot}(1 - \frac{\rho\theta}{(1+r)^n} - \frac{1-\rho}{(1+r)^n})] \\ &\quad -\eta q_{t-1} J_{t-1} - A_{t-1} - \alpha_{t-1} \sum_{j=0}^{\infty} (1-a)^j (1-\eta) q_{t-2-j} J_{t-2-j}\} \end{aligned} \tag{3.57}$$

where

$$A_t = a \sum_{i=0}^{\infty} (1-a)^i (1-\eta) q_{t-i} J_{t-i} \tag{3.58}$$

The changes compared with equation 3.27 are due to the following:

a) The forest tax also applies to the calculation of personal income based on the split model.

b) Direct deduction of expenses for forest roads also applies to the calculation of personal income based on the split model.

c) There are opportunities of choosing between different methods of valuation concerning the basis for return on capital. Choosing the "declining balance value" is one possibility. We have assumed that the "declining balance value" is the chosen form of valuation. Having buildings and constructions with the exception of forest roads as the basis for return on capital therefore seems reasonable.

d) Average assessment of the calculated personal income only applies to sole owners of forests. It therefore seems unreasonable to apply average assessment of the calculated personal income to a limited liability company.

The user cost of capital for an unlisted limited liability company which is subject to the split model will look as follows

$$\begin{aligned} \frac{\phi'_{\tau+1}}{q_\tau} &= \frac{\beta\left\{i\left[1 - \frac{t^c+t^s}{5}\sum_{j=1}^{5}\left(\frac{1}{1+r}\right)^j\right] - v\right\}}{1 - t^{cstf}} \\ &\quad + \frac{(1-\beta)r}{1-t^{cstf}} + \frac{\delta\left(1 - \frac{t^c+t^s}{1+r}\right)}{1-t^{cstf}} \\ &\quad - \frac{\left\{\frac{t^c+t^s}{5} a(1-\eta)\frac{r+\delta}{r+a}\right\}\sum_{j=0}^{4}(\frac{1}{1+r})^j - v\frac{r+\delta}{r+a} - \delta\frac{t^c+t^s}{1+r}}{1-t^{cstf}} \\ &\quad + \frac{\frac{t^{wnse}}{1-t^d}\left[\frac{r+\delta}{r+a} - \beta\right]}{1-t^{cstf}} \end{aligned} \tag{3.59}$$

$$
\begin{array}{l}
-\dfrac{(t^t+t^f)(1-\eta)\frac{r+\delta}{r+a}\left[a+\frac{\alpha}{1+r}\right]}{1-t^{cstf}} \\
-\dfrac{\frac{t^c+t^s}{5}\eta\left[\delta\sum_{j=1}^{5}(\frac{1}{1+r})^j+\left(1-(\frac{1}{1+r})^5\right)\right]}{1-t^{cstf}} \\
-\dfrac{(t^t+t^f)\eta\left[\frac{1}{1+r}\delta+(1-\frac{1}{1+r})\right]}{1-t^{cstf}}
\end{array}
$$

where

$$
\begin{aligned}
t^{cstf} &= \frac{t^c+t^s}{5}\left[1-t^{fot}\left(1-\frac{\rho\theta}{(1+r)^n}-\frac{1-\rho}{(1+r)^n}\right)\right]\sum_{j=1}^{5}\left(\frac{1}{1+r}\right)^j \\
&\quad +\frac{t^t+t^f}{1+r}\left[1-t^{fot}\left(1-\frac{\rho\theta}{(1+r)^n}-\frac{1-\rho}{(1+r)^n}\right)\right]
\end{aligned} \tag{3.60}
$$

is the effective tax rate on ϕ.

The interpretation of the first six terms on the right-hand side of equation 3.59 is analogous to the interpretation of the six terms on the right-hand side of equation 3.34. The seventh and eighth term express the tax savings due to the direct deduction of expenses for forest roads concerning respectively tax on general income and tax on personal income.

Analogous to the general case of an unlisted limited liability company subject to the split model, the costs associated with the issuing of new shares, aksjec, are equal to aksjec $= \frac{r(1-t^g)}{(1-t^d)(1-t^{cstf})}$. The cost for the share holder of financing corporate investment in physical capital by retained profits, now called tilbhc, is equal to tilbhc $= \frac{r}{1-t^{cstf}}$. Equation 2.11 defines r. The costs associated with equity capital financing, that is the second term on the right-hand side in equation 3.59, will now be equal to $(1-\beta)$min[tilbhc, aksjec]. The form of equity finance having the smallest cost will be chosen, in other words.

3.3.4. The user cost of capital for a self-employed

The three specific tax rules for the sector forestry lead to the same changes in taxes on general income as was the case for a listed limited liability company. The personal income will be calculated as the personal income for an unlisted limited liability company subject to the split model with the exception that average assessment now also will apply. Equation 3.38 will be changed as follows

$$T_t^G = \frac{t^c + t^s}{5} \sum_{i=0}^{4} \{\phi_{t-i}(K_{t-i})[1 - t^{fot}(1 - \frac{\rho\theta}{(1+r)^n} - \frac{1-\rho}{(1+r)^n})] \quad (3.61)$$
$$-\eta q_{t-i} J_{t-i} - A_{t-i} - iB_{t-i}\}$$

where

$$A_t = a \sum_{i=0}^{\infty} (1-a)^i (1-\eta) q_{t-i} J_{t-i} \quad (3.62)$$

Equation 3.39 will look as follows

$$T_t^P = (t^t + t^f)\{\frac{1}{5} \sum_{i=0}^{4} [\phi_{t-i}(K_{t-i})(1 - t^{fot}(1 - \frac{\rho\theta}{(1+r)^n} - \frac{1-\rho}{(1+r)^n})) \quad (3.63)$$
$$-\eta q_{t-i} J_{t-i} - A_{t-i}] - \alpha \sum_{j=0}^{\infty} (1-a)^j (1-\eta) q_{t-1-j} J_{t-1-j}\}$$

where A is given in equation 3.62. The user cost of capital for a self-employed will then look as follows:

$$\frac{\phi'_{\tau+1}}{q_\tau} = \frac{\beta \left\{ i \left[1 - \frac{t^c+t^s}{5} \sum_{j=0}^{4} \left(\frac{1}{1+r} \right)^j \right] - (1+r)v \right\}}{1 - t^{cstf}} \quad (3.64)$$
$$+ \frac{(1-\beta)r}{1-t^{cstf}} + \frac{\delta\,(1-(t^c+t^s))}{1-t^{cstf}}$$
$$- \frac{\left\{ \frac{t^c+t^s}{5} a(1+r)(1-\eta) \frac{r+\delta}{r+a} \right\} \sum_{j=0}^{4} (\frac{1}{1+r})^j - v(1+r)\frac{r+\delta}{r+a} - \delta(t^c+t^s)}{1-t^{cstf}}$$
$$- \frac{(t^t+t^f)(1-\eta)\frac{r+\delta}{r+a} \left[\frac{a(1+r)}{5} \sum_{j=0}^{4} (\frac{1}{1+r})^j + \alpha \right]}{1-t^{cstf}}$$
$$- \frac{\frac{t^c+t^s}{5}\eta \left[\delta \sum_{j=0}^{4} (\frac{1}{1+r})^j + \left(1 + r - (\frac{1}{1+r})^4 \right) \right]}{1-t^{cstf}}$$
$$- \frac{\frac{t^t+t^f}{5}\eta \left[\delta \sum_{j=0}^{4} (\frac{1}{1+r})^j + (1 + r - (\frac{1}{1+r})^4) \right]}{1-t^{cstf}}$$

where

$$t^{cstf} = \frac{t^c + t^s + t^t + t^f}{5}\left[1 - t^{fot}\left(1 - \frac{\rho\theta}{(1+r)^n} - \frac{1-\rho}{(1+r)^n}\right)\right]\sum_{j=0}^{4}(\frac{1}{1+r})^j \quad (3.65)$$

is the effective tax rate on ϕ. The interpretation of the first five terms on the right-hand side of equation 3.64 is analogous to the interpretation of the five terms on the right-hand side of equation 3.48. The sixth and seventh term express the tax savings due to the direct deduction of expenses for forest roads concerning respectively tax on general income and tax on personal income.

4. Data used in the calculation of the user costs of capital

4.1. Tax rates

All the formal tax rates for limited liability companies and persons are taken from Statistics Norway's model LOTTE. The tax rules are found in "Lignings-ABC"s from 1995 to 1998.

4.1.1. Formal tax rates for a limited liability company

The following table shows the formal marginal tax rates for a limited liability company.

Table 4.1. Formal marginal tax rates for a limited liability company. 1995 to 1998. Per cent

	1995	1996	1997	1998
Tax rate, municipality and county	8.25	7.25	6.75	6.75
Tax rate, Tax Distribution Fund	19.75	20.75	21.25	21.25
Wealth tax rate	0	0	0	0

Concerning taxes paid to the municipality and the county, the municipality and the county can choose whether to use a minimum tax rate, a maximum tax rate or something in between. We have chosen to use the maximum tax rate since this actually is the one being used by the municipalities and counties.

4.1.2. Formal personal tax rates

The following table shows the formal marginal personal tax rates.

Table 4.2. Formal marginal personal tax rates, 1995 to 1998. Per cent

	1995	1996	1997	1998
Tax rate, municipality and county	19.25	18.75	18.25	17
Tax rate, Tax Distribution Fund	8.75	9.25	9.75	11
Top tax	13.7	13.7	13.7	13.7
Member's premium to the NIS	10.7	10.7	10.7	10.7
Wealth tax rate	1.5	1.5	1.5	1.1
Tax rate on interest income	28	28	28	28
Tax rate on realised capital gains	28	28	28	28
Tax rate on dividends	0	0	0	0

where NIS stands for National Insurance Scheme.

Concerning taxes paid to the municipality and the county, there is a minimum rate and a maximum rate in this case, too. We have chosen the latter since this is the one actually being used by the municipalities and counties.

Concerning taxes paid to the Tax Distribution Fund, there is a lower tax rate for the most northern part of the country (Finnmark and Nord-Troms). We have not taken this into account.

The top tax is calculated on the basis of the personal income. In 1995 (for tax class 1) the tax rate is 0 percent for the first 212 000 NOK, 9.5 percent for the next 27 000 NOK and 13.7 percent for the excess. We have assumed that the highest rate is the most relevant in our model. For persons in the most northern part of the country (Finnmark and Nord-Troms) the tax rate is 0 for the first 212 000 NOK and 9.5 percent for the excess. We have not taken this into account.

Concerning the member's premium to the National Insurance Scheme there are three different tax rates; a low one, a medium one and a high tax rate. The low tax rate is relevant for such personal income as pensions and personal income earned by a social security recipient below 17 years or above 67 years. This tax rate is not relevant in our case. The medium tax rate applies to wages, personal income due to agriculture, forestry and fishing and for personal income higher than 12 times the basic amount (grunnbeløp) in the National Insurance Scheme. The high tax rate applies to personal income not covered by the rules for the low or medium rate. We have chosen to use the high tax rate for all sectors except agriculture, forestry and fishing. For the three mentioned sectors we employ the medium tax rate.

The wealth tax rate to the state is differentiated, more specifically it depends upon the value of the net wealth. For tax class 1 in 1995 the wealth tax rate

is 0 concerning the first 120 000 NOK, 0.1 percent concerning the next 115 000 NOK, 0.3 percent concerning the next 295 000 NOK and 0.5 percent concerning the excess. We have chosen to use the highest wealth tax rate.

Concerning the wealth tax rate to the municipalities, there is a minimum and a maximum tax rate. In addition, (in 1995) the wealth tax rate is 0 for the first 120 000 NOK. We have chosen to use the maximum tax rate since this is the one used by the municipalities.

Interest income is taxed using the tax rates concerning taxes to the municipality and county and taxes to the Tax Distribution Fund.

Concerning capital gains, that is changes in the price of the shares, the tax rules are the following: Capital gains are to be taxed when realised, independent of the time which passes before the investor sells the shares. However, if part of the capital gain is due to retained dividend, this part is not to be taxed (RISK - Regulering av Inngangsverdi av Skattlagt Kapital). Ignoring the fact that part of the capital gain may be due to retained dividend, the formal marginal tax rate on realised capital gains is equal to 28 per cent. (The tax rate on unrealised capital gains is equal to 0.) The appropriate size of the effective marginal capital gains tax probably lies somewhere in the interval between 0 and 0.28 when taking the RISK-rules into account and the fact that a representative share will not be sold at once.We assume that the effective marginal capital gains tax is equal to 0.28.

In practice, persons do not pay taxes on received dividend since the company has already done that. This arrangement shall avoid double taxation of dividends.

4.2. Depreciation for taxation purposes

The declining balance method is used when the company calculates the depreciation allowances for taxation purposes. The constant share of the real capital which is to be depreciated every year is found in the "Lignings-ABC". The real capital is divided into 8 different classes (each having their own depreciation rate for taxation purposes): a) office machines, b) acquired business value (ervervet forretningsverdi), c) trailers, delivery vans and the likes, d) personal cars, machines, furniture (inventar) and the likes, e) ships, rigs and the likes, f) aeroplanes, helicopters, g) buildings and constructions, hotels and the likes and f) commercial buildings. There are two different depreciation rates for g) buildings and constructions, hotels and the likes. The highest rate (10 per cent) can be used for buildings having a short life, that is buildings having such a simple construction that it is reasonable to assume that it will not be used for more than 20 years after construction. We have chosen to use the low rate in our calculations (5 per cent). There are also two different rates for h) commercial buildings. The highest

rate (4 per cent) can be used for commercial buildings in the districts when the commercial building is situated in a county or part of a county which is covered by the geographical scope of regional political instruments (det geografiske virkeområdet for distriktspolitiske virkemidler). We have chosen to use the lowest rate (2 per cent).

The calculated user costs reported in this document are made in accordance with the real capital classes in Statistics Norway's model MSG-6. These classes do not exactly coincide with the classes in the "Lignings-ABC". More specifically, the calculated user costs are classified as follows: 1) machinery, 2) cars, 3) ships and fishing boats, 4) aeroplanes and helicopters and 5) dwellings, cottages, non-residential buildings and constructions. In order to attain a depreciation rate for taxation purposes for machinery we have calculated a weighed average of the rates for respectively office machines and machines. The weights are taken from the National Accounts in 1994. The tax depreciation rate for cars is calculated as a weighed average of the depreciation rate for trailers and delivery vans and the depreciation rate for personal cars. The weights are the personal cars' share of the total real capital of transport equipment exclusive of ships and planes in all the private sectors and 1 minus the just mentioned weight. The numbers for real capital are taken from the National Accounts for the year 1995. The sector transport by railways and tramways is not included in the calculation of the just mentioned weights since almost all of the capital type locomotives is situated in this sector and the figures for this capital type are quite large. The sector transport by railways and tramways will then have a sector specific depreciation rate for taxation purposes (equal to the depreciation rate for trailers, delivery vans and the likes). Concerning the tax depreciation rate for dwellings, cottages, non-residential buildings and constructions we have used the tax depreciation rate for buildings and constructions, hotels (g) for all the sectors with the exception of other private services and fish farming. For the sector other private services we have used the tax depreciation rate for commercial buildings (f) and for fish farming we have used a tax depreciation rate equal to 18 per cent (as in MSG-6) since some constructions in this latter sector are to be depreciated as machines.

4.3. Other variables

Since the interest rate in the earlier described equations both represents the company's interest rate on loans and the alternative rate of return (which can be the interest rate on deposits) and since there exists an interest rate differential in the data we have chosen to employ the calculated average of the interest rate on loans and the interest rate on deposits as a measure of our interest rate. Andersen et al.

(1997) do the same thing. Numbers for the interest rate on deposits and numbers for the interest rate on loans are found in Penger og Kreditt.

The "physical" depreciation rates are taken from Todsen (1997) where these rates are calculated on the basis of National Account numbers.

The price of investment goods exclusive of the investment levy and the value added tax is taken from the National Accounts. This is the relevant price measure for the variable $\dot{q}$ above. This price index varies across capital types.

The price of investment goods inclusive of the investment levy and the value added tax is the relevant price measure for q in the earlier described equations. This price index will vary across sector and capital type. We do not employ this variable in our calculations since we report user costs per NOK invested instead of user costs.

The share of equity capital for a limited liability company, and thereby the share of debt, is found in Statistics Norway's Accounts statistics for the years 1995 to 1997. For the year 1998 we have employed some preliminary numbers. We have used numbers by industry section (næringshovedområde) (the primary industry is one unit, though) so the share of equity capital varies across broad sectors. Financial companies are not covered by the mentioned statistics. Numbers for the sector Finance and Insurance for 1995 to 1997 are calculated on the basis of numbers found in Statistics Norway's Accounts statistics for financial companies. For the year 1998 we base the calculation on numbers from Statistics Norway's Bank- og kredittstatistikk and Norges Banks Finansstatistikk. These statistics do not separate the numbers for limited liability companies and self-employed. The share of limited liability companies for the sector Finance and Insurance was equal to 1 in 1989, however, and we continue to use this number.

For self-employed we have not found any corresponding numbers, that is we have not found any numbers which vary across sectors. Instead we use the share of equity capital which applies to self-employed in mining and industry for all the different sectors in our model. This share of equity capital is also found in Statistics Norway's Accounts statistics and applies to large companies. We have numbers for the year 1995. Since we do not have any numbers for 1996 to 1998 we employ the 1995 number for these years also.

The stipulated rate of return on capital, α, is taken from LOTTE.

When calculating the personal wealth tax base, a discount applies to the valuation of shares in listed limited liability companies. This means that only a certain part of the market value of the person's shares is the basis for the personal wealth tax. The tax rules, found in the "Lignings-ABC", are the following: For shares in companies on the Main-list (Hovedliste) (and also for Primary Capital Certificates), a 25 per cent discount applies for the years 1995 to 1997. There is

no discount any more for the year 1998. For shares in companies on the "SMB-list" (Small and Medium sized Businesses), a 70 per cent discount applies for the years 1995 to 1997. For the year 1998 a 35 per cent discount applies. In the model described above, the limited liability companies are classified as either being listed or unlisted. In other words, we do not have any own category for a company on the Main-list or on the "SMB-list". We have therefore calculated a weighed discount for a listed limited liability company the following way:

$$\begin{aligned} D &= \frac{MVSMB \times SHNMVSMB}{MVTOT \times SHNMVTOT} \times DSMB \\ &\quad + \left[1 - \frac{MVSMB \times SHNMVSMB}{MVTOT \times SHNMVTOT}\right] \times DREST \end{aligned}$$

where

MVSMB = market value of companies on the SMB-list

SHNMVSMB = the Norwegian private investors' share of the market value of companies on the SMB-list

MVTOT = total market value on the Oslo Stock Exchange

SHNMVTOT = the Norwegian private investors' share of the total market value

DSMB = discount associated with SMB-shares

DREST = discount associated with the rest of the shares on the Stock Exchange.

The numbers are found in the Oslo Stock Exchange Monthly Bulletin and in Oslo Børs Statistics.

When calculating the personal wealth tax base, a discount also applies to the valuation of shares in Norwegian unlisted limited liability companies. This discount is found in the "Lignings-ABC".

As described earlier, we have calculated a user cost of capital for a listed limited liability company, an unlisted limited liability company not subject to the split model, an unlisted limited liability company subject to the split model and a company directly owned by a self-employed. We then aggregate these four user costs. In this respect, we have used numbers for the "declining balance value" of real capital per 01.01.1995 from "Inntekts- og formuesundersøkelsen for aksjeselskaper" and "Inntekts- og formuesundersøkelsen for personlig næringsdrivende" (the actual numbers are not reported in these publications). We have then calculated the share of total real capital for respectively listed limited liability companies, unlisted limited liability companies not subject to the split model, unlisted limited liability companies subject to the split model and companies di-

rectly owned by a self-employed. Unfortunately, these numbers do not vary across sectors.

Another point worth mentioning is that the numbers for self-employed do not include the sectors agriculture and forestry. Based upon the share of companies directly owned by a self-employed in Holmøy et al. (1993), we notice that the mentioned sectors are very different from the others, however, having a lot of companies directly owned by a self-employed. The numbers for real capital ("declining balance value") in limited liability companies in agriculture and forestry are therefore probably not very large so we can approximately think of the calculated shares as holding for all the sectors with the exception of the two mentioned ones. The resulting numbers are as follows

Table 4.3. Share of total real capital ("declining balance value") for different types of companies

Type of company	Share
Listed limited liability company	0.10
Unlisted limited liability company ND	0.64
Unlisted limited liability company D	0.17
Company directly owned by a self-employed	0.08

where ND stands for not subject to the split model and D stands for subject to the split model.

The above discussion implies that we do not have any shares for agriculture and forestry. We have chosen to use the share of companies directly owned by a self-employed from Holmøy et al. (1993) for the two mentioned sectors. The shares within the group limited liability companies are then still unknown since Holmøy et al. (1993) do not distinguish between different types of limited liability companies. We have chosen to use the above mentioned numbers for the "declining balance value" of real capital for the different types of limited liability companies when calculating the shares within the group limited liability companies. When comparing the shares from Holmøy et al. (1993) with the shares based upon the "declining balance value" of real capital, there is one sector differing a lot from the others, namely fishing. We have chosen to use the share from Holmøy et al. (1993) for this sector, too, and the numbers for the "declining balance value" of real capital for the different types of limited liability companies when calculating the shares within the group limited liability companies. For the sector finance and insurance it also seems reasonable to use the share of limited liability companies from Holmøy et al. (1993), where this share is equal to 1.

4.4. Data specific to the calculation of the user costs of capital for forestry

The following variables are specific to the calculation of the user cost of capital for the sector forestry:

t^{fot}: the effective forest tax rate

ρ: the share of the paid out appropriations from the forest tax account spent on forest cultivation

θ: the rate at which the forest owner must add the paid out appropriations from the forest tax account spent on forest cultivation to his income

n: the number of years the appropriation to the forest tax account "spends on the account"

η: the gross real investments in forest roads as a share of the gross real investments in buildings and constructions.

We have not calculated (or used) numbers for the just mentioned variables for other years than the ones specified in the subsequent description.

4.4.1. Numbers for t^{fot}

The tax rules state that the forest tax is calculated the following way

$$SA = t^{ffot}BV \tag{4.1}$$

where

SA is the appropriations to the forest tax account

BV is the activity's gross production, that is the income from the sale of timber

t^{ffot} is the formal forest tax rate.

Concerning the size of the formal forest tax rate, the tax rules state that the forest owner may choose a rate between 5 and 25 per cent of the activity's gross production. If the sale is based on a standing forest the forest owner may choose a rate between 20 NOK and 100 NOK per cubic meter. The tax rate is set equal to 10 per cent (32 NOK per cubic meter) if the forest owner does not choose any tax rate himself. Based upon numbers for 1998, from the Ministry of Agriculture, for appropriations to the forest tax account and the activity's gross production, we calculate a formal average forest tax rate equal to 9.4 per cent. As mentioned earlier $\phi(K)$ represents net, and not gross, income. Therefore we have transformed the formal forest tax rate into an effective one having net income as the tax base.

$$SA = t^{fot}\lambda BV \Leftrightarrow t^{fot} = \frac{SA}{\lambda BV} \tag{4.2}$$

λ is the net income's share of the gross income.

$$\lambda = \frac{X - H - PL * L}{X} \tag{4.3}$$

where

X is gross production in forestry measured in producer prices

H is material inputs in forestry measured in purchaser prices

PL is wage cost per hour in forestry

L is the number of man-hours in forestry. Based upon numbers from the National Accounts for the year 1995, λ is equal to 0.5. Equation 4.2 then implies that the effective forest tax rate is equal to 18.7 per cent.

4.4.2. Numbers for ρ

ρ is calculated the following way

$$\rho = \frac{USKK}{USKK + USKIK} \tag{4.4}$$

where

USKK is paid out forest tax spent on forest cultivation

USKIK is paid out forest tax not spent on forest cultivation.

Based upon numbers from the Ministry of Agriculture for the year 1998, ρ is equal to 0.71.

4.4.3. Numbers for θ

The part of the paid out appropriations to the forest tax account spent on forest cultivation must be added to the forest owner's income according to the following rates:

65 per cent of the first 50 000 NOK

75 per cent of the next 50 000 NOK

90 per cent of the next 400 000 NOK

95 per cent of the excess.

θ is calculated like this:

$$(USKK - SKL) = \theta \times USKK \Leftrightarrow \theta = \frac{USKK - SKL}{USKK} \tag{4.5}$$

where SKL is the amount of the paid out appropriations to the forest tax account spent on forest cultivation not subject to any taxes. Based upon numbers for USKK and SKL from the Ministry of Agriculture for the year 1998, θ is equal to 0.68. This means that on average an amount a bit in excess of 50 000 NOK of the paid out appropriations to the forest tax account is spent on forest cultivation.

4.4.4. Numbers for n

We have not got any exact number for this variable. The Ministry of Agriculture has given a "qualified guess" equal to 2-3 years and we employ n equal to 2.

4.4.5. Numbers for η

Based upon numbers from the National Accounts for the year 1996 for respectively gross real investments in forest roads and gross real investments in buildings and constructions (purchaser prices), η is equal to 0.56.

5. The user cost of capital for dwelling services

The formula for the user cost of capital for dwelling services is as in Berg (1989). We have not changed this formula. The property tax rate is set equal to 0, however, since this tax rate is optional for the municipalities and since not all of the municipalities choose to employ it. In addition, we have updated the value of the dwelling capital for taxation purposes as a share of the market value from 0.2 to 0.25.

6. Results

6.1. Comparing the calculated user costs of capital across time, sector and capital type

Tables A1 to A5 in appendix A show sectorial user costs of capital per NOK invested for the capital types a) Dwellings, Cottages, Non-Residential Buildings and Constructions, b) Ships and Fishing Boats, c) Cars, d) Machinery and e) Aircraft. These user costs may be compared across 1) time, 2) sector and 3) capital type. When comparing the user costs across sector or capital type it is more convenient to employ the marginal pre-tax **net** rates of return instead of the marginal pre-tax **gross** rates of return. Therefore tables B1 to B5 in appendix B show the net rates of return, that is the user costs of capital per NOK invested

minus economic depreciation. (The net returns will also be equal to the social rates of return.)

The inclusion of some important aspects of the Norwegian 1992 Tax Reform's split model is a difference between this document and Holmøy et al. (1993). Therefore, tables C1 to C5 in appendix C show user costs of capital per NOK invested when the split model is not included. The main result is that the user costs of capital increase somewhat when excluding the split model.

The size of the effective capital gains tax is a subject of discussion. Therefore tables D1 to D5 in appendix D show user costs of capital per NOK invested when the capital gains tax is set equal to 0 (the split model is included). The main impression is that the user costs increase but not as much as when excluding the split model.

1) Time: The relative change in investment prices shows most variation over time and there is also some variation in the nominal interest rate. Generally, the user costs of capital in appendix A seem to follow the time pattern of the relative change in investment prices.

2) Sector: Five sectors stand out from the rest, namely dwelling services, agriculture, fishing, forestry and finance and insurance, see appendix B. The first four sectors have somewhat lower net rates of return than the others while the latter has somewhat higher net rates of return.

Concerning dwelling services the lower net rate of return is due to favourable tax rules concerning the valuation of dwelling capital for taxation purposes and a relatively low stipulated rate of return for taxation purposes. The difference between the net rate of return concerning dwellings and building capital in other sectors is not very large, however; it lies in the interval 0.4 to 0.7 percentage points. This difference will be somewhat larger when excluding the split model or setting the capital gains tax equal to 0 since both these exercises generally increase the user costs of capital for all sectors with the exception of dwelling services (neither the split model nor the capital gains tax have any influence on the user cost of capital concerning dwellings).

Given our formulas and numbers, the user costs of capital for companies directly owned by a self-employed and for unlisted limited liability companies subject to the split model are lower than the user costs of capital for listed limited liability companies and unlisted limited liability companies not subject to the split model. Since the share of self-employed is very high in agriculture, more specifically it is set equal to 99 per cent, this may explain why the user cost of capital is lower in this sector than in others.

The sum of the share of companies directly owned by a self-employed and of unlisted limited liability companies subject to the split model is relatively high

for fishing, too (equal to 68 per cent) and may therefore explain why this sector also has lower net rates of return than other sectors.

The sum of the share of companies directly owned by a self-employed and of unlisted limited liability companies subject to the split model is equal to 85 per cent for forestry. Since the ranking of user costs concerning way of organising the company is the same for forestry as for agriculture these facts can explain the lower net rates of return for forestry than for other sectors.

The reason for the somewhat higher net rates of return concerning finance and insurance is that this sector's calculated debt share is much higher than other sectors' debt share. Since the costs associated with debt financing are higher than the costs associated with equity capital financing, a higher user cost, and thereby a higher marginal return, is the result.

3) Capital type: The main impression is that the net rates of return are quite equal across capital type, see appendix B. Forestry is one exception, though. In this sector the net rate of return associated with buildings and constructions is higher than the net rate of return associated with cars and machinery. Intuitively, one would expect the opposite since expenses for forest roads (forest roads are part of buildings and constructions) may be directly deducted from the tax base. This implies a tax credit for the capital type buildings and constructions and therefore should have resulted in a lower net rate of return than for cars and machinery. Inspecting the formulas a bit closer reveals that the direct deduction rule both has positive and negative impacts on the user cost of buildings and constructions. Given our numbers the direct deduction rule in fact implies a higher user cost of buildings and constructions than without the rule. If we exclude the possibility of direct deduction of expenses for forest roads the net rate of return concerning buildings and constructions still is higher than the net rate of return associated with cars and machinery. This must be due to the split model-terms, that is the terms $-\frac{(t^t+t^f)(1-\eta)\frac{r+\delta}{r+a}\left[a+\frac{\alpha}{1+r}\right]}{1-t^{cstf}}$ and $-\frac{(t^t+t^f)(1-\eta)\frac{r+\delta}{r+a}\left[\frac{a(1+r)}{5}\sum_{j=0}^{4}(\frac{1}{1+r})^j+\alpha\right]}{1-t^{cstf}}$ since the depreciation rate for taxation purposes, a, is much higher for cars and machinery than for buildings and constructions and since these terms have a relatively large weight in the user costs of capital because of the large share of companies directly owned by a self-employed and unlisted limited liability companies subject to the split model. The same pattern across capital type is visible for agriculture; though less distinct. This may be due to differences between the two sectors concerning "physical" depreciation rates, and thereby different economic depreciation δ, and the fact that there are tax rules specific to forestry.

6.2. Comparing the calculated user costs of capital with the user costs in Holmøy and Vennemo (1995)

In order to compare the user costs of capital in this document with the user costs of capital in Holmøy et al. (1993) it is more convenient to compare the degree of non-neutrality between the two cases, that is compare the difference between the social rate of return concerning real investment and the social rate of return concerning financial investment (where the latter is equal to the nominal interest rate) in the two cases. Social rates of return across sector, based upon the user costs of capital in Holmøy et al. (1993), are reported in Holmøy and Vennemo (1995) and we wish to compare their post-reform (that is after the Norwegian Tax Reform in 1992) numbers with our numbers for 1995. In appendix E the social rates of return from appendix B are aggregated across capital type for the year 1995. Generally, the degree of non-neutrality is largest when the formulas and numbers in this document are employed. An exception is dwelling services, however, where the degree of non-neutrality is much higher in Holmøy and Vennemo (1995). As a representative example we look at manufacture of metals. The social rate of return concerning real investment for this sector is equal to 6.8 per cent and the nominal interest rate is equal to 8 per cent in Holmøy and Vennemo (1995). Employing our formulas and numbers we get a social rate of return concerning real investment equal to 3.6 per cent and an interest rate equal to 5.9 per cent.

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Table A1. User cost of real capital per NOK invested. Per cent. Dwellings, Cottages, Non-Residential Buildings and Constructions

Production sector	1995	1996	1997	1998
Agriculture	1.3	2.7	2.2	2.4
Forestry	2.3	3.9	3.4	3.1
Fishing				
Fish Farming	6.9	8.3	7.8	7.3
Manufacture of Other Consumption Goods	2.7	4.2	3.6	3.3
Preserving and Processing of Fish	2.6	4.1	3.6	3.2
Manufacture of Meat and Dairy Products	2.7	4.2	3.7	3.3
Manufacture of Textiles and Apparel	2.7	4.2	3.6	3.3
Manufacture of Wood and Wood Products	2.8	4.3	3.7	3.4
Manufacture of Pulp and Paper Articles	2.7	4.2	3.7	3.3
Printing and Publishing	2.5	4.0	3.5	3.1
Manufacture of Industrial Chemicals	2.7	4.2	3.7	3.3
Petroleum Refining	2.8	4.3	3.8	3.4
Manufacture of Chemical and Mineral Products	2.5	4.0	3.5	3.1
Manufacture of Metals	2.6	4.1	3.6	3.2
Manufacture of Metal Products, Machinery and Equipment	2.8	4.3	3.8	3.4
Building of Ships	2.8	4.3	3.7	3.4
Manufacture of Oil Prod. Platforms	2.8	4.3	3.7	3.3
Construction, excl. of Oil Well Drilling	2.9	4.4	3.9	3.4
Wholesale and Retail Trade	2.5	4.1	3.6	3.1
Land Transport	2.0	3.5	2.9	2.5
Air Transport	2.0	3.5	3.0	2.5
Transport by Railways and Tramways	1.5	3.0	2.5	2.0
Coastal and Inland Water Transport	2.6	4.1	3.5	3.2
Postal and Tele-communication Services	2.3	3.9	3.3	2.9
Finance and Insurance	2.4	4.0	3.5	2.7
Dwelling Services	0.6	2.1	1.7	1.3
Other Private Services	1.7	3.3	2.8	2.5

Table A2. User cost of real capital per NOK invested. Per cent. Ships and Fishing Boats

Production sector	1995	1996	1997	1998
Agriculture				
Forestry				
Fishing	12.6	4.4	1.1	13.5
Fish Farming	14.6	6.4	3.1	15.2
Manufacture of Other Consumption Goods				
Preserving and Processing of Fish				
Manufacture of Meat and Dairy Products				
Manufacture of Textiles and Apparel				
Manufacture of Wood and Wood Products				
Manufacture of Pulp and Paper Articles				
Printing and Publishing				
Manufacture of Industrial Chemicals				
Petroleum Refining				
Manufacture of Chemical and Mineral Products				
Manufacture of Metals				
Manufacture of Metal Products, Machinery and Equipment				
Building of Ships				
Manufacture of Oil Prod. Platforms				
Construction, excl. of Oil Well Drilling				
Wholesale and Retail Trade				
Land Transport				
Air Transport				
Transport by Railways and Tramways				
Coastal and Inland Water Transport	14.3	6.0	2.6	14.8
Postal and Tele-communication Services				
Finance and Insurance				
Dwelling Services				
Other Private Services				

Table A3. User cost of real capital per NOK invested. Per cent. Cars

Production sector	1995	1996	1997	1998
Agriculture	19.4	23.1	22.6	19.3
Forestry	15.8	19.5	19.2	15.4
Fishing				
Fish Farming	17.3	21.3	20.9	16.4
Manufacture of Other Consumption Goods	15.1	19.1	18.8	14.1
Preserving and Processing of Fish	15.9	19.8	19.5	14.9
Manufacture of Meat and Dairy Products	19.7	23.5	23.1	18.9
Manufacture of Textiles and Apparel	16.9	20.8	20.5	16.0
Manufacture of Wood and Wood Products	15.2	19.2	18.9	14.2
Manufacture of Pulp and Paper Articles	15.6	19.6	19.3	14.6
Printing and Publishing	19.3	23.1	22.7	18.5
Manufacture of Industrial Chemicals	21.4	25.0	24.6	20.6
Petroleum Refining	10.8	15.0	14.8	9.6
Manufacture of Chemical and Mineral Products	16.1	20.0	19.7	15.1
Manufacture of Metals	9.2	13.5	13.3	7.9
Manufacture of Metal Products, Machinery and Equipment	18.5	22.3	21.9	17.6
Building of Ships	16.3	20.3	20.0	15.4
Manufacture of Oil Prod. Platforms	15.0	19.0	18.7	14.0
Construction, excl. of Oil Well Drilling	13.1	17.3	17.0	11.9
Wholesale and Retail Trade	15.9	19.9	19.6	14.9
Land Transport	17.7	21.6	21.2	16.8
Air Transport				
Transport by Railways and Tramways	3.3	7.9	7.8	1.6
Coastal and Inland Water Transport				
Postal and Tele-communication Services	15.8	19.8	19.4	14.8
Finance and Insurance	15.8	19.9	19.6	14.5
Dwelling Services				
Other Private Services	14.2	18.3	18.1	13.3

Table A4. User cost of real capital per NOK invested. Per cent. Machinery excl. of Oil Drilling Rigs

Production sector	1995	1996	1997	1998
Agriculture	14.6	16.3	15.7	14.6
Forestry	14.4	16.1	15.5	14.3
Fishing	21.6	23.3	22.6	21.7
Fish Farming	21.1	22.8	22.2	20.8
Manufacture of Other Consumption Goods	16.3	18.0	17.4	15.7
Preserving and Processing of Fish	15.5	17.3	16.8	15.0
Manufacture of Meat and Dairy Products	16.9	18.6	18.1	16.4
Manufacture of Textiles and Apparel	17.1	18.8	18.2	16.5
Manufacture of Wood and Wood Products	16.0	17.7	17.2	15.4
Manufacture of Pulp and Paper Articles	10.5	12.4	12.0	9.7
Printing and Publishing	16.3	18.0	17.5	15.8
Manufacture of Industrial Chemicals	15.9	17.7	17.1	15.4
Petroleum Refining	11.3	13.2	12.8	10.6
Manufacture of Chemical and Mineral Products	16.2	17.9	17.4	15.6
Manufacture of Metals	10.5	12.4	11.9	9.6
Manufacture of Metal Products, Machinery and Equipment	16.0	17.7	17.2	15.4
Building of Ships	16.7	18.4	17.9	16.2
Manufacture of Oil Prod. Platforms	15.1	16.9	16.4	14.5
Construction, excl. of Oil Well Drilling	20.2	21.8	21.2	19.7
Wholesale and Retail Trade	22.6	24.2	23.6	22.3
Land Transport	17.1	18.8	18.2	16.6
Air Transport	15.5	17.2	16.6	14.8
Transport by Railways and Tramways	17.6	19.3	18.7	17.1
Coastal and Inland Water Transport	18.0	19.7	19.0	17.5
Postal and Tele-communication Services	16.8	18.5	17.9	16.2
Finance and Insurance	37.3	38.6	37.7	37.4
Dwelling Services				
Other Private Services	18.0	19.7	19.2	17.7

Table A5. User cost of real capital per NOK invested. Per cent. Aircraft

Production sector	1995	1996	1997	1998
Agriculture				
Forestry				
Fishing				
Fish Farming				
Manufacture of Other Consumption Goods				
Preserving and Processing of Fish				
Manufacture of Meat and Dairy Products				
Manufacture of Textiles and Apparel				
Manufacture of Wood and Wood Products				
Manufacture of Pulp and Paper Articles				
Printing and Publishing				
Manufacture of Industrial Chemicals				
Petroleum Refining				
Manufacture of Chemical and Mineral Products				
Manufacture of Metals				
Manufacture of Metal Products, Machinery and Equipment				
Building of Ships				
Manufacture of Oil Prod. Platforms				
Construction, excl. of Oil Well Drilling				
Wholesale and Retail Trade				
Land Transport				
Air Transport	14.3	11.5	21.3	14.5
Transport by Railways and Tramways				
Coastal and Inland Water Transport				
Postal and Tele-communication Services				
Finance and Insurance				
Dwelling Services				
Other Private Services	10.8	7.9	18.4	11.0

Table B1. Net (social) rate of return. Per cent. Dwellings, Cottages, Non-Residential Buildings and Constructions

Production sector	1995	1996	1997	1998
Agriculture	2.6	2.3	1.4	3.5
Forestry	3.2	3.1	2.2	3.8
Fishing				
Fish Farming	3.7	3.4	2.5	3.9
Manufacture of Other Consumption Goods	3.7	3.4	2.4	4.1
Preserving and Processing of Fish	3.7	3.4	2.5	4
Manufacture of Meat and Dairy Products	3.6	3.4	2.5	4
Manufacture of Textiles and Apparel	3.7	3.4	2.5	4.1
Manufacture of Wood and Wood Products	3.7	3.4	2.5	4.1
Manufacture of Pulp and Paper Articles	3.7	3.4	2.5	4
Printing and Publishing	3.7	3.4	2.5	4
Manufacture of Industrial Chemicals	3.7	3.4	2.5	4
Petroleum Refining	3.7	3.4	2.5	4.1
Manufacture of Chemical and Mineral Products	3.6	3.4	2.5	4
Manufacture of Metals	3.6	3.4	2.5	4
Manufacture of Metal Products, Machinery and Equipment	3.7	3.4	2.5	4
Building of Ships	3.7	3.5	2.5	4.1
Manufacture of Oil Prod. Platforms	3.7	3.5	2.5	4
Construction, excl. of Oil Well Drilling	3.8	3.6	2.7	4.1
Wholesale and Retail Trade	3.6	3.5	2.6	4
Land Transport	3.6	3.4	2.4	3.9
Air Transport	3.6	3.3	2.4	3.9
Transport by Railways and Tramways	3.6	3.3	2.4	3.9
Coastal and Inland Water Transport	3.7	3.4	2.4	4
Postal and Tele-communication Services	3.6	3.4	2.4	4
Finance and Insurance	4.1	3.9	3	4.2
Dwelling Services	3.2	2.9	2.1	3.6
Other Private Services	3.6	3.4	2.5	4.2

Table B2. Net (social) rate of return. Per cent. Ships and Fishing Boats

Production sector	1995	1996	1997	1998
Agriculture				
Forestry				
Fishing	3.1	2.7	1.9	3.9
Fish Farming	3.7	3.3	2.4	4.2
Manufacture of Other Consumption Goods				
Preserving and Processing of Fish				
Manufacture of Meat and Dairy Products				
Manufacture of Textiles and Apparel				
Manufacture of Wood and Wood Products				
Manufacture of Pulp and Paper Articles				
Printing and Publishing				
Manufacture of Industrial Chemicals				
Petroleum Refining				
Manufacture of Chemical and Mineral Products				
Manufacture of Metals				
Manufacture of Metal Products, Machinery and Equipment				
Building of Ships				
Manufacture of Oil Prod. Platforms				
Construction, excl. of Oil Well Drilling				
Wholesale and Retail Trade				
Land Transport				
Air Transport				
Transport by Railways and Tramways				
Coastal and Inland Water Transport	3.7	3.1	2.2	4.1
Postal and Tele-communication Services				
Finance and Insurance				
Dwelling Services				
Other Private Services				

Table B3. Net (social) rate of return. Per cent. Cars

Production sector	1995	1996	1997	1998
Agriculture	2.2	1.8	0.7	3.4
Forestry	2	1.5	0.5	3
Fishing				
Fish Farming	3.7	3.4	2.4	4.2
Manufacture of Other Consumption Goods	3.6	3.2	2.3	4
Preserving and Processing of Fish	3.7	3.2	2.3	4
Manufacture of Meat and Dairy Products	3.7	3.3	2.3	4.2
Manufacture of Textiles and Apparel	3.6	3.2	2.3	4.1
Manufacture of Wood and Wood Products	3.6	3.2	2.3	4
Manufacture of Pulp and Paper Articles	3.6	3.3	2.3	4
Printing and Publishing	3.7	3.3	2.3	4.2
Manufacture of Industrial Chemicals	3.7	3.3	2.3	4.2
Petroleum Refining	3.5	3.2	2.3	3.8
Manufacture of Chemical and Mineral Products	3.7	3.2	2.3	4
Manufacture of Metals	3.5	3.2	2.3	3.7
Manufacture of Metal Products, Machinery and Equipment	3.7	3.3	2.3	4.1
Building of Ships	3.6	3.3	2.3	4.1
Manufacture of Oil Prod. Platforms	3.6	3.2	2.3	4
Construction, excl. of Oil Well Drilling	3.7	3.4	2.5	3.9
Wholesale and Retail Trade	3.6	3.3	2.4	4
Land Transport	3.6	3.3	2.2	4.1
Air Transport				
Transport by Railways and Tramways	3.4	3.1	2.3	3.3
Coastal and Inland Water Transport				
Postal and Tele-communication Services	3.6	3.3	2.2	4
Finance and Insurance	4.3	4	3.1	4.4
Dwelling Services				
Other Private Services	3.4	3.1	2.2	3.9

Table B4. Net (social) rate of return. Per cent. Machinery excl. of Oil Drilling Rigs

Production sector	1995	1996	1997	1998
Agriculture	2.4	1.9	0.9	3.4
Forestry	2.1	1.7	0.7	3
Fishing	3.0	2.7	1.7	4.1
Fish Farming	3.8	3.5	2.5	4.4
Manufacture of Other Consumption Goods	3.7	3.3	2.3	4.1
Preserving and Processing of Fish	3.6	3.3	2.3	4.1
Manufacture of Meat and Dairy Products	3.7	3.2	2.3	4.1
Manufacture of Textiles and Apparel	3.7	3.3	2.3	4.1
Manufacture of Wood and Wood Products	3.7	3.3	2.4	4.1
Manufacture of Pulp and Paper Articles	3.5	3.2	2.3	3.8
Printing and Publishing	3.6	3.2	2.3	4.1
Manufacture of Industrial Chemicals	3.6	3.3	2.3	4.1
Petroleum Refining	3.5	3.2	2.4	3.9
Manufacture of Chemical and Mineral Products	3.7	3.2	2.3	4.1
Manufacture of Metals	3.6	3.2	2.3	3.8
Manufacture of Metal Products, Machinery and Equipment	3.7	3.3	2.4	4.1
Building of Ships	3.6	3.2	2.3	4.1
Manufacture of Oil Prod. Platforms	3.6	3.2	2.3	4
Construction, excl. of Oil Well Drilling	3.9	3.4	2.5	4.3
Wholesale and Retail Trade	3.8	3.5	2.5	4.5
Land Transport	3.6	3.2	2.2	4.1
Air Transport	3.7	3.2	2.2	4
Transport by Railways and Tramways	3.7	3.3	2.3	4.2
Coastal and Inland Water Transport	3.7	3.3	2.2	4.2
Postal and Tele-communication Services	3.7	3.3	2.3	4.1
Finance and Insurance	5	4.7	3.5	5.9
Dwelling Services				
Other Private Services	3.5	3.2	2.3	4.2

Table B5. Net (social) rate of return. Per cent. Aircraft

Production sector	1995	1996	1997	1998
Agriculture				
Forestry				
Fishing				
Fish Farming				
Manufacture of Other Consumption Goods				
Preserving and Processing of Fish				
Manufacture of Meat and Dairy Products				
Manufacture of Textiles and Apparel				
Manufacture of Wood and Wood Products				
Manufacture of Pulp and Paper Articles				
Printing and Publishing				
Manufacture of Industrial Chemicals				
Petroleum Refining				
Manufacture of Chemical and Mineral Products				
Manufacture of Metals				
Manufacture of Metal Products, Machinery and Equipment				
Building of Ships				
Manufacture of Oil Prod. Platforms				
Construction, excl. of Oil Well Drilling				
Wholesale and Retail Trade				
Land Transport				
Air Transport	4	3.5	2.5	4.7
Transport by Railways and Tramways				
Coastal and Inland Water Transport				
Postal and Tele-communication Services				
Finance and Insurance				
Dwelling Services				
Other Private Services	3.7	3.2	2.5	4.4

Table C1. User cost of real capital per NOK invested. Per cent. Without the split model. Dwellings, Cottages, Non-Residential Buildings and Constructions

Production sector	1995	1996	1997	1998
Agriculture	1.9	3.9	3.4	3.0
Forestry	2.5	4.3	3.8	3.3
Fishing				
Fish Farming	7.2	8.6	8.1	7.6
Manufacture of Other Consumption Goods	3.0	4.7	4.1	3.6
Preserving and Processing of Fish	2.9	4.6	4.0	3.5
Manufacture of Meat and Dairy Products	3.1	4.7	4.2	3.6
Manufacture of Textiles and Apparel	3.0	4.6	4.1	3.6
Manufacture of Wood and Wood Products	3.1	4.8	4.2	3.7
Manufacture of Pulp and Paper Articles	3.0	4.7	4.1	3.6
Printing and Publishing	2.8	4.5	3.9	3.4
Manufacture of Industrial Chemicals	3.0	4.7	4.2	3.6
Petroleum Refining	3.1	4.8	4.2	3.7
Manufacture of Chemical and Mineral Products	2.8	4.5	3.9	3.4
Manufacture of Metals	2.9	4.6	4.1	3.5
Manufacture of Metal Products, Machinery and Equipment	3.2	4.8	4.3	3.7
Building of Ships	3.1	4.7	4.2	3.7
Manufacture of Oil Prod. Platforms	3.1	4.7	4.2	3.7
Construction, excl. of Oil Well Drilling	3.2	4.9	4.4	3.7
Wholesale and Retail Trade	2.8	4.5	4.0	3.4
Land Transport	2.2	3.9	3.3	2.7
Air Transport	2.3	3.9	3.4	2.8
Transport by Railways and Tramways	1.7	3.4	2.8	2.2
Coastal and Inland Water Transport	2.9	4.6	4.0	3.5
Postal and Tele-communication Services	2.6	4.3	3.7	3.2
Finance and Insurance	2.6	4.3	3.8	2.9
Dwelling Services	0.6	2.1	1.7	1.3
Other Private Services	2.0	3.9	3.4	2.8

Table C2. User cost of real capital per NOK invested. Per cent. Without the split model. Ships and Fishing Boats

Production sector	1995	1996	1997	1998
Agriculture				
Forestry				
Fishing	13.9	4.9	1.2	14.4
Fish Farming	15.3	6.7	3.3	15.7
Manufacture of Other Consumption Goods				
Preserving and Processing of Fish				
Manufacture of Meat and Dairy Products				
Manufacture of Textiles and Apparel				
Manufacture of Wood and Wood Products				
Manufacture of Pulp and Paper Articles				
Printing and Publishing				
Manufacture of Industrial Chemicals				
Petroleum Refining				
Manufacture of Chemical and Mineral Products				
Manufacture of Metals				
Manufacture of Metal Products, Machinery and Equipment				
Building of Ships				
Manufacture of Oil Prod. Platforms				
Construction, excl. of Oil Well Drilling				
Wholesale and Retail Trade				
Land Transport				
Air Transport				
Transport by Railways and Tramways				
Coastal and Inland Water Transport	14.9	6.2	2.7	15.3
Postal and Tele-communication Services				
Finance and Insurance				
Dwelling Services				
Other Private Services				

Table C3. User cost of real capital per NOK invested. Per cent. Without the split model. Cars

Production sector	1995	1996	1997	1998
Agriculture	22.2	26.3	25.9	21.1
Forestry	18.1	22.3	22.0	17.0
Fishing				
Fish Farming	18.0	22.1	21.8	16.8
Manufacture of Other Consumption Goods	15.7	19.9	19.6	14.5
Preserving and Processing of Fish	16.5	20.6	20.3	15.3
Manufacture of Meat and Dairy Products	20.5	24.4	24.1	19.4
Manufacture of Textiles and Apparel	17.6	21.7	21.4	16.5
Manufacture of Wood and Wood Products	15.8	20.0	19.7	14.6
Manufacture of Pulp and Paper Articles	16.3	20.4	20.1	15.1
Printing and Publishing	20.1	24.0	23.7	19.0
Manufacture of Industrial Chemicals	22.2	26.1	25.7	21.2
Petroleum Refining	11.3	15.7	15.4	9.9
Manufacture of Chemical and Mineral Products	16.7	20.8	20.5	15.5
Manufacture of Metals	9.6	14.1	13.9	8.2
Manufacture of Metal Products, Machinery and Equipment	19.2	23.2	22.9	18.1
Building of Ships	17.0	21.1	20.8	15.8
Manufacture of Oil Prod. Platforms	15.6	19.8	19.5	14.4
Construction, excl. of Oil Well Drilling	13.7	18.0	17.7	12.3
Wholesale and Retail Trade	16.6	20.7	20.5	15.4
Land Transport	18.4	22.5	22.1	17.3
Air Transport				
Transport by Railways and Tramways	3.4	8.2	8.1	1.8
Coastal and Inland Water Transport				
Postal and Tele-communication Services	16.4	20.6	20.2	15.2
Finance and Insurance	16.2	20.5	20.2	14.8
Dwelling Services				
Other Private Services	14.9	19.1	18.9	13.8

Table C4. User cost of real capital per NOK invested. Per cent. Without the split model. Machinery excl. of Oil Drilling Rigs

Production sector	1995	1996	1997	1998
Agriculture	16.8	18.7	18.2	16.1
Forestry	16.5	18.4	17.9	15.8
Fishing	23.8	25.5	24.9	23.1
Fish Farming	22.1	23.8	23.2	21.4
Manufacture of Other Consumption Goods	17.0	18.8	18.2	16.2
Preserving and Processing of Fish	16.2	18.0	17.5	15.4
Manufacture of Meat and Dairy Products	17.7	19.4	18.9	16.9
Manufacture of Textiles and Apparel	17.8	19.6	19.0	17.1
Manufacture of Wood and Wood Products	16.7	18.5	17.9	15.9
Manufacture of Pulp and Paper Articles	11.0	13.0	12.5	10.1
Printing and Publishing	17.0	18.8	18.3	16.3
Manufacture of Industrial Chemicals	16.6	18.4	17.9	15.8
Petroleum Refining	11.8	13.8	13.3	10.9
Manufacture of Chemical and Mineral Products	16.9	18.7	18.2	16.1
Manufacture of Metals	10.9	12.9	12.4	10.0
Manufacture of Metal Products, Machinery and Equipment	16.7	18.5	17.9	15.9
Building of Ships	17.5	19.2	18.7	16.7
Manufacture of Oil Prod. Platforms	15.8	17.6	17.1	15.0
Construction, excl. of Oil Well Drilling	21.0	22.7	22.2	20.3
Wholesale and Retail Trade	23.5	25.2	24.6	23.0
Land Transport	17.9	19.6	19.0	17.1
Air Transport	16.1	18.0	17.4	15.3
Transport by Railways and Tramways	18.3	20.1	19.5	17.6
Coastal and Inland Water Transport	18.7	20.5	19.9	18.0
Postal and Tele-communication Services	17.5	19.3	18.7	16.7
Finance and Insurance	38.5	39.7	38.9	38.1
Dwelling Services				
Other Private Services	18.8	20.6	20.1	18.2

Table C5. User cost of real capital per NOK invested. Per cent. Without the split model. Aircraft

Production sector	1995	1996	1997	1998
Agriculture				
Forestry				
Fishing				
Fish Farming				
Manufacture of Other Consumption Goods				
Preserving and Processing of Fish				
Manufacture of Meat and Dairy Products				
Manufacture of Textiles and Apparel				
Manufacture of Wood and Wood Products				
Manufacture of Pulp and Paper Articles				
Printing and Publishing				
Manufacture of Industrial Chemicals				
Petroleum Refining				
Manufacture of Chemical and Mineral Products				
Manufacture of Metals				
Manufacture of Metal Products, Machinery and Equipment				
Building of Ships				
Manufacture of Oil Prod. Platforms				
Construction, excl. of Oil Well Drilling				
Wholesale and Retail Trade				
Land Transport				
Air Transport	15.3	12.2	22.9	15.1
Transport by Railways and Tramways				
Coastal and Inland Water Transport				
Postal and Tele-communication Services				
Finance and Insurance				
Dwelling Services				
Other Private Services	11.6	8.5	19.7	11.5

Table D1. User cost of real capital per NOK invested. Per cent. Capital gains tax = 0. Dwellings, Cottages, Non-Residential Buildings and Constructions

Production sector	1995	1996	1997	1998
Agriculture	1.3	2.7	2.2	2.4
Forestry	2.3	3.9	3.5	3.1
Fishing				
Fish Farming	7.2	8.5	8.0	7.6
Manufacture of Other Consumption Goods	2.9	4.4	3.8	3.5
Preserving and Processing of Fish	2.9	4.3	3.7	3.4
Manufacture of Meat and Dairy Products	3.0	4.4	3.8	3.5
Manufacture of Textiles and Apparel	2.9	4.4	3.8	3.5
Manufacture of Wood and Wood Products	3.0	4.5	3.9	3.6
Manufacture of Pulp and Paper Articles	3.0	4.4	3.8	3.5
Printing and Publishing	2.8	4.2	3.6	3.3
Manufacture of Industrial Chemicals	3.0	4.4	3.8	3.5
Petroleum Refining	3.1	4.5	3.9	3.6
Manufacture of Chemical and Mineral Products	2.8	4.2	3.7	3.3
Manufacture of Metals	2.9	4.3	3.7	3.4
Manufacture of Metal Products, Machinery and Equipment	3.1	4.5	3.9	3.6
Building of Ships	3.0	4.4	3.9	3.6
Manufacture of Oil Prod. Platforms	3.0	4.4	3.9	3.6
Construction, excl. of Oil Well Drilling	3.2	4.6	4.1	3.6
Wholesale and Retail Trade	2.8	4.3	3.8	3.4
Land Transport	2.3	3.7	3.1	2.7
Air Transport	2.3	3.7	3.1	2.8
Transport by Railways and Tramways	1.8	3.2	2.7	2.2
Coastal and Inland Water Transport	2.9	4.3	3.7	3.4
Postal and Tele-communication Services	2.6	4.0	3.4	3.1
Finance and Insurance	2.7	4.2	3.7	3.0
Dwelling Services	0.6	2.1	1.7	1.3
Other Private Services	1.9	3.4	2.9	2.6

Table D2. User cost of real capital per NOK invested. Per cent. Capital gains tax =0. Ships and Fishing Boats

Production sector	1995	1996	1997	1998
Agriculture				
Forestry				
Fishing	12.7	4.6	1.3	13.6
Fish Farming	14.9	6.7	3.4	15.4
Manufacture of Other Consumption Goods				
Preserving and Processing of Fish				
Manufacture of Meat and Dairy Products				
Manufacture of Textiles and Apparel				
Manufacture of Wood and Wood Products				
Manufacture of Pulp and Paper Articles				
Printing and Publishing				
Manufacture of Industrial Chemicals				
Petroleum Refining				
Manufacture of Chemical and Mineral Products				
Manufacture of Metals				
Manufacture of Metal Products, Machinery and Equipment				
Building of Ships				
Manufacture of Oil Prod. Platforms				
Construction, excl. of Oil Well Drilling				
Wholesale and Retail Trade				
Land Transport				
Air Transport				
Transport by Railways and Tramways				
Coastal and Inland Water Transport	14.5	6.3	2.9	15.1
Postal and Tele-communication Services				
Finance and Insurance				
Dwelling Services				
Other Private Services				

Table D3. User cost of real capital per NOK invested. Per cent. Capital gains tax = 0. Cars

Production sector	1995	1996	1997	1998
Agriculture	19.4	23.1	22.6	19.3
Forestry	15.9	19.6	19.2	15.4
Fishing				
Fish Farming	17.6	21.4	21.0	16.6
Manufacture of Other Consumption Goods	15.3	19.3	18.9	14.4
Preserving and Processing of Fish	16.1	20.0	19.6	15.2
Manufacture of Meat and Dairy Products	19.9	23.6	23.1	19.1
Manufacture of Textiles and Apparel	17.1	21.0	20.6	16.2
Manufacture of Wood and Wood Products	15.4	19.4	19.0	14.5
Manufacture of Pulp and Paper Articles	15.8	19.8	19.4	14.9
Printing and Publishing	19.5	23.2	22.8	18.7
Manufacture of Industrial Chemicals	21.5	25.1	24.7	20.8
Petroleum Refining	11.1	15.3	15.0	9.9
Manufacture of Chemical and Mineral Products	16.3	20.2	19.8	15.4
Manufacture of Metals	9.5	13.8	13.5	8.3
Manufacture of Metal Products, Machinery and Equipment	18.7	22.4	22.0	17.8
Building of Ships	16.6	20.4	20.1	15.6
Manufacture of Oil Prod. Platforms	15.3	19.2	18.8	14.3
Construction, excl. of Oil Well Drilling	13.4	17.5	17.2	12.2
Wholesale and Retail Trade	16.1	20.1	19.7	15.2
Land Transport	17.9	21.7	21.3	17.1
Air Transport				
Transport by Railways and Tramways	3.7	8.2	8.0	2.1
Coastal and Inland Water Transport				
Postal and Tele-communication Services	16.0	19.9	19.5	15.1
Finance and Insurance	16.0	20.1	19.7	14.8
Dwelling Services				
Other Private Services	14.5	18.5	18.2	13.6

Table D4. User cost of real capital per NOK invested. Per cent. Capital gains tax = 0. Machinery excl. of Oil Drilling Rigs

Production sector	1995	1996	1997	1998
Agriculture	14.6	16.3	15.7	14.6
Forestry	14.4	16.1	15.6	14.3
Fishing	21.7	23.3	22.6	21.7
Fish Farming	21.3	22.9	22.3	20.9
Manufacture of Other Consumption Goods	16.5	18.2	17.6	16.0
Preserving and Processing of Fish	15.8	17.5	16.9	15.2
Manufacture of Meat and Dairy Products	17.1	18.8	18.2	16.6
Manufacture of Textiles and Apparel	17.3	18.9	18.3	16.8
Manufacture of Wood and Wood Products	16.2	17.9	17.3	15.7
Manufacture of Pulp and Paper Articles	10.8	12.7	12.2	10.1
Printing and Publishing	16.5	18.2	17.6	16.0
Manufacture of Industrial Chemicals	16.2	17.8	17.3	15.6
Petroleum Refining	11.6	13.4	12.9	10.9
Manufacture of Chemical and Mineral Products	16.4	18.1	17.5	15.9
Manufacture of Metals	10.8	12.6	12.1	10.0
Manufacture of Metal Products, Machinery and Equipment	16.2	17.9	17.3	15.7
Building of Ships	16.9	18.6	18.0	16.4
Manufacture of Oil Prod. Platforms	15.4	17.1	16.5	14.8
Construction, excl. of Oil Well Drilling	20.3	22.0	21.3	19.9
Wholesale and Retail Trade	22.7	24.3	23.6	22.5
Land Transport	17.3	19.0	18.3	16.8
Air Transport	15.7	17.4	16.8	15.1
Transport by Railways and Tramways	17.8	19.4	18.8	17.3
Coastal and Inland Water Transport	18.2	19.8	19.1	17.7
Postal and Tele-communication Services	17.0	18.6	18.0	16.5
Finance and Insurance	37.2	38.5	37.6	37.4
Dwelling Services				
Other Private Services	18.2	19.9	19.3	17.9

Table D5. User cost of real capital per NOK invested. Per cent. Capital gains tax = 0. Aircraft

Production sector	1995	1996	1997	1998
Agriculture				
Forestry				
Fishing				
Fish Farming				
Manufacture of Other Consumption Goods				
Preserving and Processing of Fish				
Manufacture of Meat and Dairy Products				
Manufacture of Textiles and Apparel				
Manufacture of Wood and Wood Products				
Manufacture of Pulp and Paper Articles				
Printing and Publishing				
Manufacture of Industrial Chemicals				
Petroleum Refining				
Manufacture of Chemical and Mineral Products				
Manufacture of Metals				
Manufacture of Metal Products, Machinery and Equipment				
Building of Ships				
Manufacture of Oil Prod. Platforms				
Construction, excl. of Oil Well Drilling				
Wholesale and Retail Trade				
Land Transport				
Air Transport	14.4	11.6	21.2	14.6
Transport by Railways and Tramways				
Coastal and Inland Water Transport				
Postal and Tele-communication Services				
Finance and Insurance				
Dwelling Services				
Other Private Services	11.0	8.1	18.4	11.2

Table E1. Social rate of return.
1995. Per cent. Sector

Production sector	Social rate of return
Agriculture	2.5
Forestry	3.1
Fishing	3.0
Fish Farming	3.7
Manufacture of Other Consumption Goods	3.7
Preserving and Processing of Fish	3.7
Manufacture of Meat and Dairy Products	3.6
Manufacture of Textiles ans Apparel	3.7
Manufacture of Wood and Wood Products	3.7
Manufacture of Pulp and Paper Articles	3.6
Printing and Publishing	3.6
Manufacture of Industrial Chemicals	3.7
Petroleum Refining	3.6
Manufacture of Chemical and Mineral Products	3.6
Manufacture of Metals	3.6
Manufacture of Metal Products, Machinery and Equipment	3.7
Building of Ships	3.7
Manufacture of Oil Prod. Platforms	3.7
Construction, excl. of Oil Well Drilling	3.8
Wholesale and Retail Trade	3.7
Land Transport	3.6
Air Transport	3.9
Transport by Railways and Tramways	3.5
Coastal and Inland Water Transport	3.7
Postal and Tele-communication Services	3.7
Finance and Insurance	4.2
Dwelling Services	3.2
Other Private Serv.	3.6

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