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Corporate Effective Tax Rates: Model Description and Results from 36 OECD and Non-OECD Countries

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SUMMARY

This paper presents the new OECD model for the calculation of forward-looking effective tax rates and provides first empirical results based on an OECD survey, conducted in 2016, collecting comparable cross-country information on corporate tax provisions from 36 OECD and Selected Partner Economies.

The empirical results discussed in this paper highlight that an accurate assessment of investment incentives across countries needs to build on a consistent methodological framework capable of covering not only corporate statutory tax rates but also many different rules that affect the tax base such as fiscal depreciation and other deductions or allowances.

The OECD corporate effective tax rate model described in this paper provides such a framework; it builds on the theoretical model developed by Devereux and Griffith (1999, 2003) and currently covers 10 asset categories and 36 different corporate tax systems. Empirical results are based on two different macroeconomic scenarios, showing that effective average and marginal tax rates vary widely across asset categories, countries and sources of finance.

In addition to the cross-country comparative analysis presented below, the OECD model also enables researchers to conduct further cross-country and within-country analyses of the incentive effects of corporate and personal income taxation. The appendix describes in detail how the OECD model can be used for policy analysis. It includes several examples and illustrates how country-specific policy evaluations can be conducted.

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CORPORATE EFFECTIVE TAX RATES: MODEL DESCRIPTION AND RESULTS FROM 36 OECD AND NON-OECD COUNTRIES

1. Overview

This paper presents the new OECD model for the calculation of forward-looking effective tax rates (ETRs) and provides first empirical results based on an OECD survey, conducted in 2016, collecting comparable cross-country information on corporate tax provisions from 36 OECD and Selected Partner Economies[1].

The empirical results discussed in this paper highlight that an accurate assessment of investment incentives across countries needs to build on a consistent methodological framework capable of covering not only corporate statutory tax rates but also many different rules that affect the tax base such as fiscal depreciation and other deductions or allowances. The OECD corporate effective tax rate model described in this paper provides such a framework; it builds on the theoretical model developed by Devereux and Griffith (1999, 2003) and currently covers 10 asset categories and 36 different corporate tax systems. Empirical results are based on two macroeconomic scenarios, showing that effective average and marginal tax rates vary widely across asset categories, countries and sources of finance. In addition to the cross-country comparative analysis presented below, the OECD model also enables researchers to conduct further cross-country and within-country analyses of the incentive effects of corporate and personal income taxation.

The paper is structured as follows. Section 2 introduces the main concepts and discusses earlier contributions to the methodology as well as more recent applications in policy analysis. In addition, it offers a short description of other publicly available ETR databases, highlighting some of the differences to the OECD model. Section 3 contains a formal description of the model based on the standard approach developed by Devereux and Griffith (1999, 2003). Section 4 discusses country-specific corporate tax features that have been implemented in some countries but not necessarily in the all participating countries. Finally, Section 5 presents the ETRs for the full set of 36 countries based on tax rules as of July 2015.

Appendix A describes in detail how the new OECD model can be used for policy analysis. It includes several examples, illustrating the necessary steps for two typical policy evaluation exercises, highlighting similarities to ETRs available from other public sources, e.g., the Oxford Centre for Business Taxation (CBT) and the Centre for European Economic Research (ZEW). Appendix B summarises the input parameters used as a basis for the calculations, while Appendix C provides screenshots from the model files.

2. The Main Concepts and their Use for Policy Analysis

Statutory tax rates on corporate income, including central and sub-central government rates, are available in the OECD Tax Database.2 However, variations in the definition of the tax bases across countries and other provisions can have large effects on the effective tax burden on investors. For instance, corporate tax systems differ across countries with regard to several important features such as, for example, tax depreciation, investment tax credits or tax incentives for research and development (R&D). To capture the

[1] Responses to the survey were received from Australia, Austria, Belgium, Canada, Chile, Costa Rica, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

[2] http://www.oecd.org/tax/tax-policy/tax-database.htm

effects of these provisions on the cost of capital and effective tax burdens, it is necessary to go beyond cross-country comparisons of statutory tax rates.

Backward-looking average effective tax rates, defined as tax payments over pre-tax profits, measure the combined effect of several features of the tax system, e.g., accounting for depreciation allowances, investment tax credits and other tax incentives. At the firm level,3 this backward-looking measure can be calculated on the basis of tax returns or accounting data. Irrespective of the time period for which they are measured, however, backward-looking effective tax rates reflect the cash flows associated with past decisions, i.e. various investment projects which are currently ongoing for a given firm. Backward-looking rates therefore do not give indications about incentives to invest. In addition, projects may vary with regard to duration, asset composition and financing sources, making it more difficult to isolate the effects of specific tax parameters within this framework.

Forward-looking effective tax rates represent an alternative measure capturing information on tax rates and bases as well as other relevant provisions within a comparable framework. A well-established methodology exists to calculate ETRs on the basis of prospective, or hypothetical, investment projects. In contrast to backward-looking rates this framework has the advantage of capturing the incentives for future investment decisions within the tax system.

Early theoretical contributions of Jorgenson (1963) and Jorgenson and Hall (1967) developed the standard model of investment behaviour leading to the concept of the cost of capital, defined as the minimum required rate of return on a marginal investment to break even. King and Fullerton (1983) analysed the effects of tax on the cost of capital, introducing a methodology for calculating forward-looking marginal effective tax rates and applying the concept in a comparative analysis of four OECD countries. OECD (1991) further extended the methodology to calculate effective marginal tax rates on domestic and international investment for the manufacturing industry in 24 OECD countries. Devereux and Griffith (1999, 2003) studied the effects of tax on infra-marginal investments earning more than just the cost of capital. Expanding the analysis of the previous literature, they introduced the concept of average effective tax rates and presented a formal discussion of the relationship between marginal effective tax rates, average effective tax rates and statutory tax rates.

Building on this literature, the standard approach for the ETR calculation combines information on tax rules (e.g., tax depreciation and incentives) with a set of asset-specific information and other economic assumptions (e.g., rates of return and economic depreciation).Two types of effective tax rates have to be distinguished:

- Effective marginal tax rates (EMTRs) measure the extent to which taxation increases the pre-tax rate of return required by investors to break even. This indicator is used to analyse investment decisions at the intensive margin, that is, to assess how taxes affect the incentive to expand investment given a fixed location. The EMTR is the tax component of the user's cost of capital.

- Effective average tax rates (EATRs) measure the effect of taxation on investment projects earning economic rents; it is based on a comparison of the net present value of pre-tax and post-tax cash flows. This indicator is used to analyse investment decisions at the extensive margin, that is, location decisions, e.g., when a multinational enterprise (MNE) decides to locate a plant in one of many jurisdictions, or make one of a number of technology choices.

3 A similar approach may also be used to directly calculate backward-looking average tax rates at the country level on the basis of macroeconomic data, e.g. from the OECD revenue statistics and other sources.

The main advantage of this approach is therefore that it allows for cross-country comparisons of the effect of policy changes on the incentive to expand investment (EMTR) and on the incentive to locate investment in a specific jurisdiction (EATR). There are two more outcome variables of interest which can also be calculated.

- The cost of capital (CoC) is defined as the real pre-tax rate of return required to generate a zero post-tax economic rent; as such it is linked to the EMTR but also accounts for the interest rate and the rate of economic depreciation of the asset.

- The net present value of capital allowances (*A*), measured as percentage of the initial investment, is another important tax policy measure which can be calculated on the basis of the approach proposed below. It is of high policy relevance since it provides comparable information on the generosity of tax depreciation rules for specific assets.

The new OECD model allows the user to calculate all four measures, the EATR, the EMTR, the CoC as well as the net present value (NPV) of capital allowances, for a wide range of possible cases. As discussed in more detail below, the measures provide a powerful tool for cross-country analyses along the following dimensions.

- Neutrality across assets: To match the detail of domestic tax codes, ETRs are typically calculated at the asset level, e.g., for a specific type of structure, machinery or intangible. Asset-level ETRs can be used to analyse the neutrality of corporate taxation within a given country or across countries, giving indications about the existence and magnitude of tax-induced biases.

- Neutrality across sources of finance: The model can also be used to analyse the potential bias across sources of finance. This approach can be used, for example, to quantify the extent of the debt bias arising from interest deductibility. In addition, it allows for an evaluation of the impact of various policy measures such as the Allowance for Corporate Equity (ACE) or interest limitation rules.

With additional information, the model could be expanded in the following ways:

- Aggregation to business- or industry-level: One possible application of the model would be to extend the calculation of asset-specific ETRs to take into account business- or industry-specific asset mixes. Such asset mixes can be derived from publicly available aggregate or firm-level data. The comparison of such ETRs gives indications about how the tax system affects investment incentives across different businesses or industries.

- Evaluation of changes over time: Time-series or panel datasets of forward-looking ETRs can be constructed by calibrating the model to a specific set of years and countries. This approach could make use of historical data series on interest rates, inflation and other economic variables, allowing for empirical analyses of the relation between investment incentives and capital formation.

- Evaluation of policy proposals: The effects of counterfactual policy reforms can be evaluated *ex-ante*. A comparison of ETRs before and after the implementation of a given reform, e.g. investment incentives or accelerated depreciation, can provide insights into the expected effects on investment and economic performance more generally.

- Evaluation of international investment incentives: The framework can be extended to cover different financing arrangements between parent firms and subsidiaries, withholding taxes on international dividend and interest payments, tax treatment of foreign source income as well as the effects of bilateral (or multilateral) tax treaties. For example, bilateral ETRs on inbound FDI can

be used as a basis for empirical analyses of observed investment flows including the effects of tax treaties and free trade zones.

Given the wide range of possible policy applications, it is not surprising that ETRs have been widely used in many different contexts. For instance, the US Congressional Budget Office has recently used the ETR methodology to analyse various domestic policy proposals (CBO, 2014, 2017). Mintz and Chen (2014) calculate EMTRs for the United States for the period 2005 to 2013 and present a discussion of the historical trends.

Previous OECD research produced significant contributions to the development of the methodology as well as highly policy relevant empirical results. For instance, OECD (1991) was one of the first publications which presented empirically calibrated EMTRs for a wide range of countries. OECD (2003) calculated EMTRs and EATRs on international investment for a set of OECD countries over the time period 1991 to 2001. Since relevant tax parameters vary across country pairs due to tax treaties and differences in the treatment of foreign source income, resulting bilateral ETRs on inward FDI are typically averaged across home countries. Analysing variation in bilateral ETRs on inward FDI, OECD (2003) finds that effective tax burdens differed across host countries by up to 28 percentage points on marginal investments and 22 percentage points on infra-marginal investments.

More recently, several OECD publications used ETRs to analyse taxes on investments in R&D and non-R&D based knowledge-based capital (KBC). OECD (2013) investigated the implications of domestic and international tax treatment of investment in R&D aimed at creating KBC, focusing specifically on the tax planning of MNEs. OECD (2014) expanded this approach to non-R&D investments in KBC, such as e.g., computerised information or economic competencies, and examines the choice between internal and external development in a domestic tax context.

ETRs comparable at the country-level have been made publicly available by the Oxford Centre for Business Taxation[4] (CBT) and the Centre for European Economic Research (ZEW). The CBT database covers 43 OECD and G20 countries over the period 1983 to 2016 and is based on various data sources including the OECD Tax Database, the International Bureau of Fiscal Documentation, and the EY Worldwide Corporate Tax Guide. Calculations include only corporate taxation. Three generic asset types are considered: buildings, machinery and intangibles; as well as the treatment of inventories. In terms of depreciation methods the approach accounts for straight line and declining balance depreciation as well as some combinations of the two methods. While calculations are all based on the Devereux-Griffith methodology, only composite variables are publicly available. Asset-level ETRs are combined into a weighted average using empirical asset shares for each of the countries and years. Similarly, different rates are calculated for debt and equity financed investments and then weighted by the respective shares based on information from the ORBIS database. Using this approach a time series of composite EMTRs and EATRs is constructed for each of the countries in the sample.

The second publicly available set of ETRs has been developed by the ZEW within a project commissioned by the European Commission (ZEW, 2015). The final report, published in 2015, contains all relevant input parameters, illustrative examples as well as outcome variables and it covers a total of 35 countries, including EU member states, Canada, the Former Yugoslavian Republic of Macedonia, Japan, Norway, Switzerland, Turkey and the United States over the period 1998 to 2015. As with the CBT approach, a limited set of generic assets is considered: buildings, machinery, financial assets, intangibles and inventories. Depreciation is either based on the straight line or declining balance method. Again, the calculations strictly follow the Devereux-Griffith approach, but the ZEW refrains from building composite outcome variables and instead produces a comprehensive set of results which are all available in the final

[4] See http://www.sbs.ox.ac.uk/faculty-research/tax/publications/data.

report. The report includes all three measures, EATR, EMTR and the CoC, computed for each country, year and asset, accounting for personal income taxation of three different types of shareholders and distinguishing also between domestic investments financed by retained earnings, new equity and debt. In addition, the report also covers ETRs on international investments (similar to OECD, 2003) as well as specific tax provisions for small and medium-sized enterprises (SMEs).

The approach developed in this paper is different in so far as it is neither aimed at producing a full set of ETRs for all policy relevant scenarios, nor a composite indicator summarising disaggregated information. Instead, it describes the methodology and application of two accessible and easy-to-use model files (described in Appendix A) allowing researchers, on the one hand, to reproduce the main results from the CBT and ZEW databases and, on the other hand, to develop comparable analyses for a wide range of additional cases which are not covered by existing databases. This flexible approach therefore allows for an incremental development of the model and extension of the tax provisions covered in the calculations. Future analyses could include, for instance, additional country-specific depreciation methods or tax provisions, R&D tax incentives, international investment incentives or expanded analyses to include a range of non-OECD countries which have not participated in previous surveys. Taken together, the OECD model constitutes a powerful and flexible tool for policy analysis which can be easily adapted to new research questions as they arise.

3. Theoretical Model

Possible uses of the ETR measures for policy analysis, distinguishing between EATR, EMTR and the CoC, have been discussed in Section 2. This section gives a formal description of the standard approach based on the Devereux-Griffith methodology (which is also the basis for the rates computed by the CBT and the ZEW); to facilitate understanding it will closely follow the notation introduced by Devereux and Griffith (1999).

EATRs measure the effect of taxes on profitable investments earning more than just the CoC. Independent of the pre-tax rate of return, it can be calculated as the ratio of the pre-tax NPV of the investment minus its post-tax NPV divided by the NPV of income net of variable costs and economic depreciation. In contrast, the EMTR is defined as the tax rate on a marginal investment which just breaks even. For investment to be marginal, the pre-tax rate of return must be equal to the CoC so that no economic rents arise; the EMTR is thus defined for a specific level of the pre-tax rate of return while EATRs can be calculated for any level of profitability.

Devereux and Griffith (2003) illustrate the relation between the two rates by plotting the EATR against the pre-tax rate of return. Their analysis shows that, for low levels of the pre-tax rate of return, the EATR approaches the EMTR up to the point where it is equal to the CoC; the two effective tax rates thus coincide when the pre-tax rate of return is such that investors just break even. If shareholder-level taxation is excluded from the analysis, increasing the pre-tax rate of return beyond the CoC implies that the EATR approaches the statutory corporate tax rate. Since economic rents are taxed at the statutory rate, increasing the profitability of the investment implies that the relative importance of the statutory rate increases while the definition of the tax base has less and less impact on the EATR.

Like most of the literature on the investment effects of taxation, the standard approach is based on a one-period perturbation of the capital stock; that is to say, the value-maximising firm increases its capital stock in the first period by one unit and decreases it at the end of the second such that it is again equal to its initial level.

Three sources of finance are typically considered: retained earnings, new equity and debt. If the investment is financed by retained earnings the cost of the investment from the perspective of the shareholder

is one unit of foregone dividends in the first period; if it is financed by new equity the cost to the shareholder for purchasing new shares in the first period is also one unit. In the second period new shares, issued in the first period to finance the investment, are repurchased such that the total number of outstanding shares is unaffected; remaining funds are distributed to the shareholder as dividends. Correspondingly, excluding personal income taxation from the analysis implies that there is no difference between the two types of equity finance. In the case of debt finance the cost to the shareholder is zero and outstanding debt including interest is repaid at the end of the second period; as in the case of new equity finance, remaining funds are again distributed as dividends.

Derivation of the Main Equations

Following the above definition, the EATR can be written as the ratio of the pre-tax NPV of the investment, R^*, minus its post-tax NPV net of accrual-equivalent capital gains tax[5] z, $(1-z)R$, over the NPV of the income stream in the absence of tax. Keeping in mind that we are considering a one-period perturbation of the capital stock, the present value of the income stream equals $p/(1+r)$, where p is the pre-tax rate of return and r is the real interest rate.

$$EATR = \frac{R^* - (1-z)R}{p/(1+r)} \tag{1}$$

While the pre-tax economic rent, R^*, simply equals $(p-r)/(1+r)$, the post-tax economic rent is the key parameter in the following analysis, as it captures the effects of corporate and personal income taxes at the shareholder level; it is derived from the capital market equilibrium condition stating that shareholders must be indifferent between purchasing the equity of the firm and lending the same amount at the market rate of interest. In equilibrium, the value of the firm at time t, V_t, must therefore satisfy the following condition.

$$\left(1+\left(1-m^i\right)i\right)V_t = \frac{(1-m^d)(1-w^d)}{1-c}D_t - N_t + V_{t+1} - z(V_{t+1} - V_t - N_t) \tag{2}$$

The left hand side of equation (2) is equal to the returns from lending V_t at the market rate of interest i net of taxation of interest income at the shareholder level m^i. The right hand side summarises the shareholder's income from investing in the firm net of personal and corporate income taxes. It consists of dividends, D_t, net of withholding taxes on dividends at the firm level, w^d, taxation of dividends at the shareholder level, m^d, and accounting for the rate of tax credits available on distributed dividends, c; new equity issues and repurchases are denoted by N_t and capital gains are taxed at the accrual-equivalent rate z. Rearranging equation (2) yields an expression for the value of the firm at time t.

$$V_t = \frac{[\gamma D_t - N_t + V_{t+1}]}{1+\rho} \tag{3}$$

$$\textit{Where} \quad \rho = \frac{\left(1-m^i\right)i}{1-z} \tag{4}$$

$$\textit{and} \quad \gamma = \frac{(1-m^d)(1-w^d)}{(1-z)(1-c)} \tag{5}$$

[5] See below for a derivation of the accrual-equivalent capital gains tax.

In equation (3) the effects of personal income taxation at the shareholder level have been summarized by two new parameters: ρ, the shareholders discount rate, and γ, measuring the opportunity cost of retained earnings in terms of foregone (gross) dividends.

From equations (4) and (5), it can be seen that, in the absence of personal income taxes, the shareholders discount rate will be equal to the nominal interest rate, $\rho = i$, and $\gamma = 1$ since dividends as well as capital gains will not be subject to additional taxes. The nominal interest rate, in turn, is determined by the real interest rate and inflation: $(1 + i) = (1 + r)(1 + \pi)$. Taking ρ and γ as given, equation (3) can be used to express the economic rent, R, which is equal to the change in value of the firm over a given time period.

$$R = (1 + \rho)dV_t = \sum_{s=0}^{\infty} \frac{\gamma dD_{t+s} - dN_{t+s}}{(1 + \rho)^s} \tag{6}$$

As discussed above, three sources of finance are considered in the standard model. In each case, dividend payments are determined as the residual. Since sources and uses of funds must be equal in each period, dividends generally follow equation (7).

$$D_t = Q(K_{t-1})(1 - \tau) - I_t + B_t - \big(1 + i(1 - \tau)\big)B_{t-1} + \tau\varphi(K_{t-1}^T) + N_t \tag{7}$$

Looking at each of the terms on the right hand side of equation (7) in turn shows that sources of funds include the value of output based on capital of the previous period, $Q(K_{t-1})$, net of corporate tax τ; debt issued in period t, B_t; the value of depreciation allowances[6] which is calculated based on rate φ times the tax-written-down value of capital in the previous period, K_{t-1}^T. On the other hand, funds are used for investment, I_t, and to repay debt from the previous period, B_{t-1}, including tax deductible interest payments. As before, new equity issues and repurchases are captured by N_t.

Based on this equation the economic rent, R, is derived, for the retained earnings case, by analysing how a one-period investment affects the value of the firm, dV_t, under the assumption that debt and equity issues are zero, $dB = dN = 0$. Using this and substituting (7) into (6) yields a general expression for the economic rent under retained earnings finance.

$$R^{RE} = \sum_{s=0}^{\infty} \gamma \frac{dD_{t+s}}{(1 + \rho)^s} = \gamma \left[\sum \frac{dQ(K_{t-1+s})(1 - \tau)}{(1 + \rho)^s} - \sum \frac{dI_{t+s}}{(1 + \rho)^s} + \tau\varphi \sum \frac{dK_{t-1+s}^T}{(1 + \rho)^s} \right] \tag{8}$$

Since the analysis is based on the one-period investment case, equation (8) can be used to derive the relevant cash flows for each of the two periods. In the retained earnings case, the firm generates funds by reducing dividends in the first period and paying out the returns from investment as dividends in the second period. All cash flows are thus multiplied by γ to capture the effects of personal income taxation. In the first period, the firm invests one unit of capital ($dI_t = 1$); however, the initial cost of the investment is reduced by the net present value of tax allowances, A, which is captured by the last term on the right hand side of equation (8). In the second period, the investment yields a financial profit of $dQ(K_{t+1}) = (p + \delta)(1 + \pi)$, where economic depreciation is denoted by δ and inflation by π. One-period investment implies that the

[6] Remaining capital and investment for tax purposes, I_t^T, have to be accounted for separately in order to allow for different tax rules regarding the taxation of excess depreciation on sold assets. See Klemm (2008) for a discussion of this issue. In general, the capital stock and the tax-written-down capital stock are given by the following equations of motion: $K_t = (1 - \delta)K_{t-1} + I_t$ and $K_t^T = (1 - \varphi)K_{t-1}^T + I_t^T$.

capital stock is then sold[7] at the end of the second period at its remaining value $dI_{t+1} = -(1-\delta)(1+\pi)$. Substituting into equation (8) and rearranging the terms yields the following expression for the economic rent financed by retained earnings.

$$R^{RE} = -\gamma(1-A) + \frac{\gamma}{1+\rho}[(p+\delta)(1+\pi)(1-\tau) + (1-\delta)(1+\pi)(1-A)] \tag{9}$$

As this expression shows, the net present value of tax allowances, A, can be derived separately, for any particular depreciation scheme, and then included in the calculations; more detail on the calculation of A under various depreciation schedules is provided below.

To determine the economic rents for investments financed by new equity and debt the costs of raising finance externally, relative to the retained earnings case, have to be considered. In general, external financing costs are summarized as follows.

$$F = \gamma dB_t \left[1 - \frac{1+i(1-\tau)}{1+\rho}\right] - (1-\gamma)dN_t \left[1 - \frac{1}{1+\rho}\right] \tag{10}$$

In both cases a one unit investment has to be finance in the first period. In the case of debt finance, repayment in the second period includes tax deductible interest payments $(1+i(1-\tau))$; returns to the investment are distributed as dividends so these cash flows are again multiplied by γ. In the case of new equity finance, repurchases make up exactly one unit in the second period and cash flows are pre-multiplied by $(1-\gamma)$, reflecting the fact that γ measures the degree of discrimination between new equity and distributions.

To finance a one unit investment the firm needs to raise the same amount of funds. Expressions for the cost of additional finance for the two additional cases can thus be derived by setting dB_t and dN_t accordingly; $dB_t = 1$ and $dN_t = 0$ for the debt finance case, $dB_t = 0$ and $dN_t = 1$ for the new equity case. Substituting these terms into (10) and denoting the debt (DE) and new equity finance (NE) by the respective superscripts, all three cases can be summarised by equation (11).

$$R = R^{RE} + F \tag{11a}$$

$$F = \begin{cases} 0 & Retained\ Earnings \\ F^{NE} & New\ Equity \\ F^{DE} & Debt \end{cases} \qquad \begin{aligned} F^{NE} &= \frac{-\rho(1-\gamma)}{1+\rho} \\ F^{DE} &= \frac{\gamma}{1+\rho}(\rho - i(1-\tau)) \end{aligned} \tag{11b}$$

Having derived the economic rent, R, in the presence of taxation for each source of financing, setting all taxes to zero then yields the corresponding rent in the absence of tax:[8] $R^* = (p-r)/(1+r)$. Substituting

[7] Using asset pools to calculate capital allowances implies that excess depreciation of sold assets is not taxed at the time of a sale. However, while not all countries use pooled depreciation, those using asset-level depreciation apply different methods to determine the amount of excess depreciation of sold assets which has to be refunded. Cross-country differences with regard to these provisions may have an impact on effective tax rates which is not captured by the standard approach (see Klemm, 2008, for a discussion).

[8] Note that in the absence of taxes $\gamma = 1$ and $\rho = i$; with $(1+i) = (1+r)(1+\pi)$.

R^* and R, from equation (11), into the definition in equation (1) yields a general expression for the EATR which will be used in the model files below.

$$EATR = \frac{\left(\frac{p-r}{1+r}\right)}{\left(\frac{p}{1+r}\right)} - \frac{(1-z)\left\{\frac{\gamma}{(1+\rho)}\left[(p+\delta)(1+\pi)(1-\tau) - \left((1+\rho)-(1-\delta)(1+\pi)\right)(1-A)\right] + F\right\}}{\left(\frac{p}{1+r}\right)} \tag{12}$$

As discussed above, the EMTR is defined as the effective tax rate on marginal investments. To obtain a similar general expression it is thus sufficient to set R equal to zero and solve for the corresponding rate of return. Since this is the rate at which no economic rents are earned it is, in fact, equal to the CoC, denoted by $\tilde{p}$.

$$\tilde{p} = \frac{(1-A)(\rho + \delta(1+\pi) - \pi)}{(1+\pi)(1-\tau)} - \frac{F(1+\rho)}{\gamma(1-\tau)(1+\pi)} - \delta \tag{13}$$

Substituting the cost of capital back into the previous equations and rearranging the terms then yields the following general expression for the EMTR, where s is the post-tax rate of return to the shareholder which generally depends on personal income taxes but is equal to the real interest rate, r, in their absence.

$$EMTR = \frac{\tilde{p} - s}{\tilde{p}} \tag{14}$$

$$s = \frac{\left(1 - m^i\right)i - \pi}{1+\pi} \tag{15}$$

Equation (14) shows that the EMTR can also be interpreted as the proportion of the marginal investment tax wedge, $\tilde{p} - s$, to the CoC.

Fiscal Depreciation

For most assets, capital allowances are typically calculated either on the basis of the straight line or declining balance method, while some countries use a declining balance method with a switch to straight line, as explained below. All three methods are modelled within a standard theoretical framework. Given the capital allowance rate, φ, and the discount rate, ρ, the NPV of capital allowances per unit of investment calculated by the declining balance (DB) and straight line (SL) method are given by the following expressions.

$$A^{DB} = \frac{\tau\varphi}{1+\rho}\left[1 + \left(\frac{1-\varphi}{1+\rho}\right) + \left(\frac{1-\varphi}{1+\rho}\right)^2 + \left(\frac{1-\varphi}{1+\rho}\right)^3 + \cdots\right] = \frac{\tau\varphi}{\varphi+\rho} \tag{16}$$

$$A^{SL} = \tau\varphi\left[\left(\frac{1}{1+\rho}\right) + \left(\frac{1}{1+\rho}\right)^2 + \cdots + \left(\frac{1}{1+\rho}\right)^T\right] = \frac{\tau\varphi}{\rho}\left(1 - (1+\rho)^{-\frac{1}{\varphi}}\right) \tag{17}$$

Using the declining balance method with a switch to straight line (DBSL), the per period allowances as a proportion of the remaining value of the investment for tax purposes are determined as the product of an additional parameter, b, and the capital allowance rate, φ. The combined rate is denoted by $\beta = b\varphi$ and determines the amount to be deducted in each period. As with DB depreciation, allowances decrease each period in line with reductions of the remaining tax value of the investment. The switch to SL depreciation

occurs in the period when the capital allowance falls below the allowance which would be granted on the basis of SL depreciation over the remaining years in the tax life of the asset. To calculate the NPV of capital allowances under this method, the optimal switching period has first to be determined. Noting that the tax life of the asset under SL depreciation is equal to $T = 1/\varphi$, the optimal switching period is $T^* = T(1 - 1/b)$; using T, T^* and β the NPV of capital allowances under DBSL is expressed as follows.

$$A^{DBSL} = \tau\left[\frac{\beta}{1+\rho}\left(1 + \frac{(1-\beta)}{(1+\rho)} + \frac{(1-\beta)^2}{(1+\rho)^2} + \cdots + \frac{(1-\beta)^{T^*-1}}{(1+\rho)^{T^*-1}}\right) + \frac{(1-\beta)^{T^*}}{(T-T^*)}\left(\frac{1}{(1+\rho)^{T^*+1}} + \cdots + \frac{1}{(1+\rho)^{T}}\right)\right] \tag{18}$$

The calculation of A can generally be adapted to capture the effects of other depreciation methods as well as specific provisions for accelerated or enhanced[9] depreciation (see Appendix A). However, it is straightforward to include first-year allowances (or bonus depreciation) in equations (16) and (17). Assuming that a proportion of the total investment, $\Phi^{FY} = 1 - \Phi^{REST}$, can be deducted in the first year of the investment, these equations can be rewritten as follows.

$$A^{DB} = \frac{\tau}{1+\rho}\left(\frac{\rho\Phi^{FY} + \varphi}{\rho + \varphi}\right) \tag{19}$$

$$A^{SL} = \tau\left(\frac{\Phi^{FY}}{1+\rho} + \frac{1-\Phi^{FY}}{(1+\rho)(T-1)}\left(\frac{1-(1/1+\rho)^{T-1}}{\rho}\right)\right) \tag{20}$$

The corresponding expression for equation (18) is more complex as capital allowance rates need to be adjusted so as to compensate for the effects of the first-year allowance. For combinations of DBSL depreciation with additional tax incentives, it is therefore more convenient to derive the NPV of capital allowances based on the period-by-period calculations discussed in Appendix A.

Accrual-equivalent Taxation of Capital Gains

Capital gains are typically taxed on realisation, making it possible to defer tax payments to later periods. However, to account for capital gains tax within the two-period model the statutory capital gains tax rate, z^* has to be converted into an accrual-equivalent capital gains tax denoted by z. To do this the standard approach described by King and Fullerton (1983) is followed, assuming that investors sell 10% of their remaining holdings in each period after an increase in the value of the asset. Denoting the proportion of accumulated accrued gains realised by investors in each period by $\lambda = 10\%$ and discounting by the net-of-tax market interest rate, $(1 - m^i)i$ the accrual-equivalent capital gains tax can be derived as the NPV of tax payments for a one-unit increase in the value of the asset.

$$z = \frac{\lambda z^*}{1 + (1-m^i)i}\left[1 + \left(\frac{1-\lambda}{1+(1-m^i)i}\right) + \left(\frac{1-\lambda}{1+(1-m^i)i}\right)^2 + \cdots\right] = \frac{\lambda z^*}{\lambda + (1-m^i)i} \tag{21}$$

4. Additional Tax Policy Parameters

The set of equations outlined in Section 3 allows the calculation of ETRs capturing the main features of corporate tax systems, including fiscal depreciation as well as the effects of financing decisions and economic rents. This section discusses several corporate tax provisions which will be relevant for the

[9] With an enhanced depreciation allowance, firms are allowed to claim total deductions for the cost of qualifying capital that exceed the original investment cost, i.e., (market) price at which it is acquired.

calculation of the ETRs in Section 5. It is worth noting that not all of the provisions discussed here are relevant for each of the countries analysed in Section 5. Additionally, several other corporate tax provisions exist which are outside the scope of this paper.

In order to keep the notation as simple as possible, each provision is discussed separately. That is to say, equations from Section 3 are taken as a starting point and adjusted so as to capture a particular tax policy feature. This approach is intended to help the reader understand the intuition and the effects of a particular policy tool without, at the same time, having to keep track of all possibly relevant provisions.

Half-year Convention

In some countries a half-year convention is used to better align fiscal depreciation with economic depreciation. That is to say, fiscal depreciation assumes that assets were purchased in the middle of the first year, implying that only half of the full capital allowance can be deducted in the first year. The remaining value is then deducted at the end of the asset's tax life. For SL and DB depreciation systems, these types of provisions can easily be captured by adjusting the first-year allowance discussed in Section 3, accordingly.

For example, if an asset has a value of 100 and is depreciated over 10 years based on the SL method, a half-year convention implies that only 5 units can be deducted in the first year. To capture this effect the first-year allowance can be set accordingly, i.e., $\varphi^{FY} = 5$ and $\varphi^{REST} = 95$. Fiscal depreciation can then be calculated on the basis of equations (19) or (20), depending on the type of method that is used.

However, if assets are depreciated based on the DBSL method, a half-year convention implies that the capital allowance rate has to be adjusted as well. Keeping the optimal switching period fixed, the NPV of capital allowances is then calculated by adapting equation (18); the corresponding expression is given in equation (22). As mentioned in Section 3, further combinations of DBSL depreciation with additional tax incentives are derived on the basis of period-by-period calculations discussed in Appendix A.

$$A_{HYC}^{DBSL} = \tau\left[\frac{\beta}{1+\rho}\left(\frac{1}{2} + \frac{(1-\beta/2)}{(1+\rho)} + \frac{(1-\beta/2)(1-\beta)}{(1+\rho)^2} + \frac{(1-\beta/2)(1-\beta)^2}{(1+\rho)^3} + \cdots + \frac{(1-\beta/2)(1-\beta)^{T^*-2}}{(1+\rho)^{T^*-1}}\right) + \frac{(1-\beta/2)(1-\beta)^{T^*-1}}{(T-T^*)}\left(\frac{1}{(1+\rho)^{T^*+1}} + \cdots + \frac{1}{(1+\rho)^{T}} + \frac{1}{2}\frac{1}{(1+\rho)^{T+1}}\right)\right] \tag{22}$$

Real Estate Taxation

Taxation of real estate and/or corporate wealth can be accounted for by introducing a tax, h, levied on the initial investment in the first period of the project. It increases the cost of the investment in the first period, implying that fewer funds are available for distribution. Taking into account the opportunity cost of retained earnings, γ, the post-tax economic rent, as expressed originally in equation (9), is adjusted in equation (23) to include the effective real estate tax, h.

$$R_h^{RE} = -\gamma(1-A) - \gamma h + \frac{\gamma}{1+\rho}[(p+\delta)(1+\pi)(1-\tau) + (1-\delta)(1+\pi)(1-A)] \tag{23}$$

Since this implies that additional funds have to be raised in the first period, the tax also affects the cost of finance equations in (11b). Additional financing requirements are now $dB_t = (1+h)$ and $dN_t = 0$ for

the debt finance case, $dB_t = 0$ and $dN_t = (1+h)$ for the new equity case. In general, cost of finance can now be written as follows.

$$R_h = R_h^{RE} + F_h \tag{24a}$$

$$F_h = \begin{cases} 0 & Retained\ Earnings \\ F_h^{NE} & New\ Equity \\ F_h^{DE} & Debt \end{cases} \qquad \begin{aligned} F_h^{NE} &= \frac{-\rho(1-\gamma)}{1+\rho}(1+h) \\ F_h^{DE} &= \frac{\gamma(1+h)}{1+\rho}(\rho - i(1-\tau)) \end{aligned} \tag{24b}$$

Using equations (24) and following the same steps as outlined above then shows that the CoC, as originally defined by equation (13), is now adjusted accordingly.

$$\widetilde{p_h} = \frac{(1-A)(\rho + \delta(1+\pi) - \pi) + (1+\rho)h}{(1+\pi)(1-\tau)} - \frac{F_h(1+\rho)}{\gamma(1-\tau)(1+\pi)} - \delta \tag{25}$$

However, in the case of real estate taxation, capital allowances are typically zero implying that the term drops out and equations (24) and (25) can be simplified accordingly.

Inventory Valuation

Calculating effective tax rates on investments in inventories implies that different methods of inventory valuation have to be accounted for. The most common approaches are to use either the first-in, first-out (FIFO) or the last-in, first-out (LIFO) method; alternatively, some countries also use a weighted average between these two methods. Using the FIFO method corresponds to the assumption that the first unit to enter the inventory is also the first one to be sold; rising prices, thus, imply that the value of the remaining inventory is relatively high and the cost of goods sold is relatively low. Using the LIFO method, on the other hand, assumes that the last unit to enter the inventory is the first one to be sold, implying that the cost of goods sold is relatively high. If inflation is greater than zero, taxable income will be higher under the FIFO method, reflecting the taxation of nominal price increases.

To capture these effects within the theoretical model, an additional parameter, $v = \{0, 0.5, 1\}$ is introduced. It takes on three values: zero in case the LIFO method is used, one in case of the FIFO method and 0.5 if the average between the two inventory valuation methods is used. As in the case of real estate taxes, the expression for the post-tax economic rent, equation (9), and the CoC, equation (13), have to be adjusted such that the taxation of nominal price increases under the FIFO method, $\pi\tau$, is incorporated.

$$\begin{aligned} R_v^{RE} = &-\gamma(1-A) \\ &+ \frac{\gamma}{1+\rho}[(p+\delta)(1+\pi)(1-\tau) - v\pi\tau + (1-\delta)(1+\pi)(1-A)] \end{aligned} \tag{26}$$

$$\widetilde{p_v} = \frac{(1-A)(\rho + \delta(1+\pi) - \pi) + v\pi\tau}{(1+\pi)(1-\tau)} - \frac{F(1+\rho)}{\gamma(1-\tau)(1+\pi)} - \delta \tag{27}$$

Allowance for Corporate Equity

Interest deductibility is a standard feature of corporate taxation. However, the fact that dividends are not tax deductible implies that financing decisions at the corporate level may be biased towards debt and against equity finance. However, this effect may be counterbalanced by personal income taxation at the

shareholder level which is typically higher for interest income. The extent and prevalence of an overall bias across different financing sources therefore depends on the combined effect of personal and corporate taxation. One way to address a potential debt bias is by introducing an Allowance for Corporate Equity (ACE). Under such a system, firms obtain an additional allowance equal to a notional return from their equity stock, implying that effective taxation is aligned across sources of finance. This allowance is typically determined by multiplying a notional interest rate, approximated e.g., by the rate on government bonds, with the equity stock of the previous fiscal period or the change in a specific period of such equity stock.

If the notional interest rate is correctly chosen, i.e., in line with the nominal interest rate, the ACE ensures that the tax system is neutral across financing sources and investments. In addition, depreciation rules become irrelevant because changes in equity stocks are offset, in terms of NPV, by the ACE. Drawbacks of this system include the fact that it represents a significant narrowing of the tax base, implying that the statutory tax rate would have to be increased in order to neutralise revenue effects. Although only economic rents are taxed in ACE systems, higher statutory rates may be seen as disadvantageous in the context of tax competition for mobile profits.

In the standard model, the effects of an ACE can be captured by adding a correction term to the cost of financing under retained earnings and new equity. Taking R^{RE} and F as defined by equations (9) and (11b), the economic rent in an ACE system is given by equations (28) and (29).

$$R_{ACE} = R^{RE} + F + F_{ACE} \tag{28}$$

The correction term, F_{ACE}, reflects the change in financial flows due to the ACE; it is non-zero only if the investment is equity-financed, ideally increasing the post-tax economic rents so that the effect of interest deductibility is neutralised. Without any offsetting adjustment in the statutory rates this implies that ETRs under equity finance would be brought down to equal the rates on debt-financed investments. However, in practice this property depends on how closely notional interest approximates the nominal interest rate. As long as it is below nominal interest, the adjustment will only partially make up for the benefits of interest deductibility; if it is above the nominal rate it may lead to an equity bias.

Equation (29) defines the correction term, denoting the notional interest rate by $\hat{\imath}$ and the tax rate applicable to the notional return by $t \in [0; 1]$. Assuming that the cost of equity finance is fully deductible, $t = 0$, the ACE is equal to notional interest, $\hat{\imath}$, times the equity stock of one unit, allowing firms to reduce their taxable base in the second period. In the first period, firms therefore need to raise fewer funds. Discounting gains from the second period by $(1 + \rho)$ and accounting for opportunity costs γ this implies that post-tax economic rents on equity-financed investments increase by $\tau\hat{\imath}\gamma/(1 + \rho)$.

$$F_{ACE} = \begin{cases} 0 & Debt \\ \hat{\imath}(\tau - t)\dfrac{\gamma}{1+\rho} & Retained\ Earnings\ or\ New\ Equity \end{cases} \tag{29}$$

Limitations on Interest Deductibility

The expression for the cost of debt finance, equation (11b), is based on the assumption that interest expense is fully deductible. As can be seen from equation (10), loans repaid in the second period generally include the effect of full tax deductibility: $(1 + i(1 - \tau))$. However, several countries limit the amount of interest expenses that can be deducted from the corporate tax base. While the main rationale for interest limitation rules is to address BEPS risks, they can also help to reduce the debt bias. In the model, these rules can be captured by introducing a parameter, θ determining the upper limit on interest deductions.

$$F^{DE} = \begin{cases} \frac{\gamma}{1+\rho}(\rho - i(1-\tau)) & if \;\; 0 \leq i \leq \theta \\ \frac{\gamma}{1+\rho}(\rho - i + \tau\theta) & if \;\; i > \theta \end{cases} \tag{30}$$

Limitations on interest deductibility, as captured by θ, could be determined in various ways depending on country-specific tax rules. One possibility would be to define θ in relation to the pre-tax rate of return, p. For example, a fixed-ratio rule limiting interest deductions to 30% of EBIDTA could be approximated by setting $\theta = 0.3 * p$.

5. Effective Tax Rates in 36 OECD and Non-OECD Countries

The following empirical analysis provides comparable cross-country results for 36 OECD and Selected Partner Economies. These results are based on a survey of country delegates of the OECD's Working Party No.2 (WP2), conducted in 2016, which collected a consistent set of corporate tax parameters as of July 2015. The focus of the analysis is limited to a core set of corporate tax provisions, covering country-specific tax depreciation rules as well as other provisions such as half-year conventions or the Allowance for Corporate Equity (ACE). In line with this focus, several other possibly relevant features have not been included in the empirical analysis.

First, as described in the theoretical part above, the taxation of interest, dividends and capital gains as well as the integration of corporate and personal taxes at the shareholder level affect ETRs and thus also investment incentives. However, the following calculations do not cover personal income tax provisions and the results presented in Tables 2 to 8 should therefore be understood as reflecting investment incentives at the corporate level rather than at the level of the shareholder. Appendix A describes in detail how personal income tax parameters can be included in the calculations based on the OECD model. Nonetheless, addressing the effects of country-specific personal income tax provisions is beyond the scope of the empirical analysis.

Second, the effects of targeted tax incentives, e.g., for R&D expenditures or environmentally related investments, are not covered by the empirical analysis. Again, the OECD model allows researchers to analyse the effects of a wide range of different tax incentives (cf. Appendix A), including credits and allowances among others. While relevant data on R&D-related tax incentives is available within OECD, this information has not been included in the empirical analysis. The results referring to scientific R&D expenditures in the following tables therefore reflect only the effects of standard tax rules for investments in acquired intangible assets.

Third, tax rules pertaining to specific types of businesses, such as e.g., SMEs, are not taken into account. Although it is straightforward to include related provisions in the model, tax rules typically differ considerably across countries, implying that such an analysis would have to be based on additional surveys or other data collection efforts.

Fourth, statutory corporate tax rates have been taken from the OECD corporate tax database. Calculations are generally based on the combined central and sub-central corporate tax rate as presented in the database. However, specific issues arising from taxation at lower levels of government, e.g. due to local business taxes in Spain or Hungary, which are not modelled explicitly. The same applies to other country-specific provisions that are not specifically mentioned in Section 4, such as the profit periodization reserve in Sweden.

Input Parameters and Assumptions

The corporate ETRs presented in this section provide a detailed picture of fiscal depreciation rules in all participating countries. In contrast to previous studies, the analysis is more disaggregated in so far as it covers not only 3 to 5 broad asset categories but a set of 10 distinct assets. As a consequence, survey respondents did not have to summarise depreciation rules for broader asset categories such as buildings or machinery, but could match the specific assets, as defined in the survey, to the relevant category in their domestic tax code. Based on the survey data, depreciation rules for the 10 specific assets were divided into the following three common asset categories.

- Non-residential structures: (1) manufacturing plants and (2) office buildings
- Machinery and Equipment: (3) manufacturing, (4) transportation, (5) communication, (6) power generation, (7) solar power and (8) end-user computers
- Intangibles: (9) acquired R&D assets and (10) pre-packaged software

Country-level tax parameters are taken from the OECD survey and responses have been cross-checked with additional data sources derived from the International Bureau of Fiscal Documentation (IBFD), EY Worldwide Corporate Tax Guide (2016) and ZEW (2015); in some cases, missing data have been replaced. In some countries, calculation of capital allowances is based on a half-year convention. Wherever this is the case, these provisions have been included in the calculations. Similarly, provisions for the ACE, which were in effect in 2015 in Belgium, Italy and Turkey, have also been accounted for. Economic depreciation rates are taken from the US Bureau of Economic Analysis (Fraumeni, 1997; BEA, 2003; Party, 2007; Li, 2012). A summary of the input parameters is provided in Appendix B.

The empirical analysis is conducted for two different macroeconomic scenarios. The first scenario assumes a 5% real interest rate and 2% inflation, in line with other publications based on similar methodologies such as ZEW (2015) among others. The second scenario is based on cross-country average values in 2015, assuming a 2% real interest rate and 0.73% for inflation.

In the first scenario the notional interest deduction (NID) rates used to determine the ACE have been set equal to the rates announced by the respective governments in 2015: 1.63% for Belgium and 4.5% for Italy. In the case of Turkey the long term government bond rate for 2015 was used and adjusted so as to include a provision limiting the ACE to 50% of the change in the equity stock (4.55%). However, given the conceptual framework outlined above, the NID rate has to be interpreted in relation to the nominal interest rate as defined in the theoretical model. In the first scenario, the nominal interest is 7.1% implying that the ACE will not be sufficiently high, in all three countries, to reduce the ETRs on equity-financed investments such that they equal those under debt finance. As a result, there remains a difference between equity- and debt-financed ETRs despite the ACE in all three countries in this scenario. In the second scenario, nominal interest is 2.74% implying that the official NID would be much higher in Italy and Turkey. Since this would imply that an arbitrary bias towards equity-financed investments is introduced, the NID rates are set equal to the worldwide nominal interest rate in all three countries in the second scenario.

Two countries, Italy and Belgium, provided ranges of possible tax parameters for several of the 10 assets, reflecting the fact that tax depreciation rules do not prescribe a specific rate for the respective asset. In these cases, calculations have been carried out for minimum as well as maximum values and the reported figures are based on the unweighted average. Estonia only taxes profits when they are distributed; retained earnings remain untaxed. This system is covered by setting the CIT rate to zero and adjusting the parameter γ, which measures the opportunity cost of retained earnings in terms of foregone dividends, by a factor of one minus the tax rate levied on distributed profits.

The economic parameters for both scenarios are summarised in Tables 1-A and 1-B; they are kept constant throughout each of the two macroeconomic scenarios. The first scenario was chosen mostly for reasons of comparability. In particular, real interest and inflation rates equal those in ZEW (2015), thus reducing the scope for variation in empirical results across different studies and facilitating comparison. However, certain differences remain due to the following reasons. First, ZEW (2015) accounts for real estate and net wealth taxes as well as limitations to interest deductibility which are all not covered in the following analysis. Second, for some countries, notably Spain and Hungary, ZEW (2015) includes specific models of local taxes which are often levied on different tax bases. Third, the results presented below cover a more fine-grained set of assets; as the majority of countries use fairly differentiated asset categories for depreciation purposes this detailed approach allows for a more accurate match between assets and tax rules. Given these qualifications, domestic ETRs at the corporate level can provide a useful comparison, especially for investments in machinery and equipment which are not subject to real estate tax.

While there was considerable variation in long-term interest and inflation rates across participating countries in 2015, the values chosen for the second scenario are very close to those observed in most of the participating countries. However, since macroeconomic conditions in the remaining countries varied considerably, country-specific assumptions would be necessary to account for the respective macroeconomic environment; in order to preserve comparability across the entire set of participating countries this type of domestic or regional analysis is left for future projects.

Table 1-A: Economic Parameters in Scenario 1

Economic Parameters	Excel	Units	Value
Pre-tax real rate of return	p	%	20.0
Real interest rate	rr	%	5.00
Inflation rate	pi	%	2.00
Nominal interest rate	i	%	7.10
Net SH income per unit-increase in dividends	gamma	*monetary*	1.00
Nominal SH discount rate	rho	%	7.10

Table 1-B: Economic Parameters in Scenario 2

Economic Parameters	Excel	Units	Value
Pre-tax real rate of return	p	%	20.0
Real interest rate	rr	%	2.00
Inflation rate	pi	%	0.73
Nominal interest rate	i	%	2.74
Net SH income per unit-increase in dividends	gamma	*monetary*	1.00
Nominal SH discount rate	rho	%	2.74

Empirical results

As discussed in Sections 3 and 4, ETRs provide a consistent framework for comparing the effects of a wide range of tax provisions. As such, they contain much more information, related to the definition of the tax bases, than statutory tax rates. However, they are based on a prospective investment project that is built on a set of assumptions about interest and inflation rates as well as the pre-tax rate of return. Although different macroeconomic environments can, at least to a certain degree, be captured through the two scenarios defined in Table 1, further country-specific variation had to be ignored in order to enable cross-country comparisons. The empirical results presented in Tables 2 to 15 should therefore be interpreted in the context of the assumptions described in the previous subsection.

The interest and inflation rates are two of the main economic parameters of relevance. Both parameters interact with each other as well as with tax parameters and financial flows. Since the underlying effects may be countervailing and ambiguous in size, overall impacts on ETRs cannot be determined without reference to other characteristics of the tax system. However, several main effects, which are all captured within the OECD model, are at work.

First, corporate tax is levied on nominal returns, irrespective of the underlying real return. Increases in nominal returns due to inflation, which are not matched by corresponding increases in real returns, therefore increase effective tax rates. Second, depreciation allowances are determined by the acquisition costs of the asset. While inflation increases nominal returns, depreciation allowances are deducted over the lifetime of the asset at non-inflated values, thus increasing effective taxation relative to real returns. Third, the NPV of depreciation allowances depends on the shareholder's discount rate which is, in turn, driven by the nominal interest rate. In the OECD model, the nominal interest rate is determined by real interest rates and inflation. If either of the two variables increases the discount rate rises and the NPV of tax depreciation allowances decreases, again leading to an increase in effective taxation. Fourth, interest payments can be deducted from the tax base at the nominal rate. Thus, increases in inflation or real interest rates increase the nominal interest rate and the corresponding deductions from the corporate tax base, implying lower effective taxation.

The results for the first scenario, corresponding to higher interest and inflation rates, are shown in Tables 2 to 8 and are discussed in the remainder of this subsection with a general focus on the underlying mechanisms rather than on country- or asset specific results. The second scenario corresponds to a macroeconomic framework with lower interest and inflation rates; these results are shown in Tables 9 to 16 although the discussion in this subsection refers to them only selectively in order to avoid repetition.

The pre-tax rate of return is another important economic parameter affecting, in particular, the EATR but not the EMTR; it has been fixed at 20% throughout all calculations. The difference between the EMTR and EATR is driven by the share of economic rents in total profits. For investing in a marginal project, where the pre-tax rate of return is such that the project just breaks even, investors earn only the normal return to capital and no economic rent. As a consequence, the EMTR and the EATR coincide in this particular case. However, as the pre-tax rate of return increases, economic rents arise and the EATR diverges from the EMTR. Because economic rents are always taxed at the statutory rate whereas normal returns are taxed at the EMTR, increases in the pre-tax rate of return imply that the share of total profits taxed at the EMTR decreases and the EATR approaches the statutory rate. Therefore, the EATR can be expressed as a weighted sum of the EMTR and the statutory rate, with the weight being determined by the exogenous pre-tax rate of return. Both rates, the EMTR and the EATR, are reported for debt- and equity-financed investments and for each of the two interest rate and inflation rate scenarios.

Given the focus on taxation at the corporate level, the effects of fiscal depreciation are one of the main drivers of differences in ETRs across assets and countries. Their generosity is summarised by the NPV of capital allowances expressed in percent of the initial investment (*A*). However, to understand its effects on the ETRs it has to be interpreted in relation to economic depreciation. If the tax rules allow for faster depreciation compared to the true economic decay of a given asset, ETRs will, all else equal and assuming zero inflation, be lower than the statutory rate; this case is referred to as accelerated depreciation. If tax depreciation is decelerated or slower than economic depreciation, the ETRs will, again assuming all else is held constant and inflation is equal to zero, exceed the statutory rate. Table 2 shows the corresponding results for all 10 assets and 36 countries for the first scenario corresponding to 5% real interest and 2% inflation. Several important observations can be made.

There is wide variation in the generosity of tax depreciation across assets and countries, as the NPV of capital allowances *A* varies from zero to around 97%. Since tax policymakers typically aim at aligning fiscal and economic depreciation, this observation reflects, on the one hand, variation in economic depreciation

across assets. On the other hand, it may also reflect policy choices intended to stimulate investments in particular assets. Reflecting these two motives, levels of *A* are fairly different across asset categories. In particular, tax depreciation is considerably less generous for non-residential buildings compared to other asset categories. While some countries do not provide capital allowances for structures, minimum and maximum values of *A* across countries are lower than for other assets. Correspondingly, the mean value of *A* for non-residential structures across countries is comparatively low: 45.5% for manufacturing plants and 33.2% for office buildings.

Specific patterns emerge when comparing asset-level results. For instance, tax depreciation rules for conventional power generation assets show particularly strong variation as *A* varies between 17.4% and 87.3% across countries whereas minimum values for other machinery and equipment assets are 52.6% or higher. This result may, at least in part, be related to a policy intent favouring renewable power generation technologies. Comparison with the results for solar power generation assets suggests that this may indeed be the case as the corresponding values of *A* have a higher mean: 74.6% for solar power generation technologies compared to 69.5% for conventional power generation.

Tax depreciation rules tend to treat three types of assets similarly: manufacturing, transportation and communication equipment. This can be seen in the mean values for *A* which range between 76.1% and 80.9% for these three types of assets, as well as in the minimum values which tend to be around 58% for manufacturing and communication and at 71.7% for transportation. Maximum values are at or just below 90% for all three of these assets. Computers are generally subject to fairly generous depreciation rules. For this asset, *A* varies between 69.9% and 93.7% with a mean of 83.7%. Depreciation rules for pre-packaged software are similarly generous, varying between 52.6% and 93.4% with a mean of 85%. Capital expenditures on R&D, used e.g., for the acquisition of an intellectual property asset, are subject to more variation: in this case, *A* varies between 33% and 96.7% with a mean of 78.1%. However, R&D activities often benefit from targeted tax incentives, which have so far not been taken into account.

In the second scenario, interest and inflation rates are both lower, that is at 2% and 0.73%, respectively. This combination gives rise to counteracting effects on the NPV of tax depreciation allowances as lower inflation decreases *A* while a lower interest rate increases the relative value of cash flows in future periods. As can be seen from Table 9, the resulting values for *A* are somewhat higher than in the first scenario while the general patterns discussed above remain the same.

Tables 3 and 4 show EATRs and EMTRs, respectively, for equity-financed investments based on the first macroeconomic scenario. The results show that EATRs tend to be lowest for the two power generating assets, varying from around 10.5% to 31.8% and 34.4% for solar and conventional power respectively. Again, results for manufacturing, transportation and communication machinery are in the same range as EATRs for investments in those three assets vary between around 12-13% and 35-37%. Similarly, EATRs for non-residential structures vary between 12% and 39%. However, EATRs for investments in end-user computers, acquired R&D assets and pre-packaged software show much larger variation. While the lowest EATRs for these types of investments are at 14.6%, investments in computers and R&D assets are in some cases subject to EATRs of up to around 45%; the maximum EATR for investments in software is even higher, reaching 65.2% due to larger differences between fiscal and economic depreciation.

The EATR is a weighted sum of the EMTR and the statutory rate where the weight is determined by the pre-tax rate of return. Consequently, the EMTRs depicted in Table 4 show a similar pattern as the EATRs; however, in most cases the EMTRs are considerably lower than the EATR due to the increased relative weight of accelerated depreciation. In some cases EMTRs are negative. That is to say, generous tax depreciation rules (or deductibility of the cost of debt finance) can imply that marginal projects, which would not be profitable in the absence of taxation, become profitable due to a quasi-subsidisation through the tax system. In particular, cross-country average EMTRs are lowest for investments in solar (10.1%) and

conventional (10.9%) power generation assets. Investments in manufacturing, transportation and communication machinery are taxed, on average, at an EMTR of around 18-22%; for non-residential structures the cross-country average EMTR is around 20-22%. Acquired R&D assets are, on average, subject to an EMTR of 21%; only end-user computers and pre-packaged software are taxed at higher average EMTRs, that is, at 31.7% and 35.3% respectively.

As discussed above, the degree to which tax depreciation is accelerated (or decelerated) relative to economic depreciation is one of the main determinants of both ETRs. To better understand these effects EATRs and EMTRs can be compared to the statutory rate. Across all 36 participating countries the statutory rates vary between 12.5% and 39% with both the mean and median being around 25%. For investments financed entirely through equity, differences between the ETRs and the statutory rate are driven by two factors: fiscal depreciation and inflation. While accelerated fiscal depreciation reduces the ETRs, deceleration or increases in inflation have an increasing effect. In a scenario without inflation both ETRs would therefore be equal to the statutory rate if fiscal depreciation precisely follows economic depreciation; however, since inflation is above zero in both scenarios both ETRs would exceed the statutory rate if fiscal and economic depreciation were aligned. Given that inflation is lower in the second scenario, the corresponding results give better indications as to the accelerating (or decelerating) properties of the tax depreciation rules.

Rather than assuming a specific mix of financing sources the ETRs are calculated separately for equity- and debt-financed investment. While observed shares of debt and equity finance lie in between these extreme cases, the two sets of results can be interpreted as an upper and lower bound to the distribution of ETRs affecting firms with different financing options. Debt-finance generally reduces ETRs on the corporate level. Since interest can be deducted from the corporate tax base, both ETRs, presented in Tables 6 and 7 for the first macroeconomic scenario, are considerably lower than in the equity-financed case. This effect is stronger in the first macroeconomic scenario because interest is deductible at the nominal rate which, in turn, increases with inflation. However, it is important to emphasise that, since personal income taxation is not accounted for, the results reported here provide only an incomplete picture. A comprehensive assessment of tax neutrality across sources of finance would have to address several related issues such as, for instance, imputation which typically eliminates differences in ETRs across sources of finance at least for domestic investors.

Tables 6 and 7 show EATRs and EMTRs for debt-financed investments. While asset-specific patterns are again driven by fiscal depreciation rules, ETR-levels are now considerably lower. In particular, EATRs vary between 6.2% and 21.2% for the two power generation assets, between 7.8% and 26.3% for non-residential structures and between 7.6% and 25.1% for manufacturing, transportation and communication machinery. For the remaining three assets, computers, acquired R&D assets and software, variation is much larger as EATRs range between 10.3% and 54.9%. EMTRs are again substantially lower. Specifically, cross-country average EMTRs are lowest for solar (-49.7%) and conventional (-47.7%) power generation assets and somewhat higher but still negative for most of the remaining assets: -26.2% for manufacturing machinery, -21.6% for manufacturing plants, -20.6% for communication equipment, -16.9% for office buildings, -15.9% for transportation machinery and -15.7% for acquired R&D assets. Cross-country averages turn positive only for computers (5.9%) and software (13.9%).

The empirical results discussed in this section highlight how ETRs can be used to analyse the effects of country-specific tax rules within a comparable framework. As discussed throughout this subsection, the results are driven by the interacting effects of different tax provisions and macroeconomic assumptions about inflation and interest rates. Data on relevant tax provisions has been collected for a set of 36 participating countries. The empirical analysis has focussed on EMTRs and EATRs computed at the level of the corporation, excluding effects of personal income taxation. The effects of fiscal depreciation have been

studied across a set of 10 different assets and two different macroeconomic scenarios taking account of equity as well as debt finance.

The results highlight the fact that the definition of the tax base, that is, fiscal depreciation rules and other corporate tax provisions, is crucial for comparative analyses of effective taxation. That is to say, for a correct assessment of the investment incentives of corporate tax systems across countries it is necessary to account for tax bases and rates within a consistent framework. The ETRs derived through the new OECD model provide such a framework, incorporating a wide range of generic and country-specific tax provisions. The OECD model, therefore, enables researchers to conduct cross-country and within-country, as well as cross-asset analyses aimed at many relevant policy questions, such as for example, the evaluation of how the tax system provides incentives to invest in one type of asset versus another.

Table 2: Net Present Value of Capital Allowances, Higher Inflation/Interest Scenario, 2015

	Manufacturing plants	Office buildings	Manufacturing	Transportation	Communications	Power Generation	Solar Power Generation	Computers	Scientific R&D	Software
Austria	46.2	32.9	71.5	86.5	83.2	60.9	60.9	89.4	81.9	87.0
Australia	38.0	27.3	57.6	79.5	81.8	61.6	52.6	87.2	69.9	87.2
Belgium	52.6	38.0	76.5	76.5	76.5	76.5	76.5	69.9	87.3	81.8
Canada	56.5	44.3	84.7	78.2	71.4	51.2	84.7	85.6	75.3	90.3
Chile	17.5	27.3	60.3	76.7	79.2	69.9	69.9	79.2	79.2	-
Costa Rica	27.3	27.3	69.9	81.8	69.9	61.6	61.6	81.8	32.9	81.8
Czech	52.3	39.1	83.9	83.9	88.0	75.4	52.6	88.0	87.3	87.3
Denmark	46.2	0.0	84.5	84.5	84.5	79.5	79.5	84.5	93.4	93.4
Estonia	-	-	-	-	-	-	-	-	-	-
Finland	49.6	36.0	77.9	77.9	77.9	77.9	77.9	77.9	69.9	87.3
France	41.3	41.3	83.3	83.3	83.3	83.3	83.3	-	81.8	-
Germany	38.0	38.0	57.6	79.5	81.8	61.6	52.6	87.2	81.8	87.2
Greece	46.2	46.2	69.9	73.5	69.9	69.9	69.9	81.8	87.3	81.8
Hungary	27.3	27.3	87.2	81.8	87.2	77.0	77.0	77.0	90.3	-
Iceland	57.6	38.0	80.9	83.1	83.1	83.1	83.1	83.1	81.8	81.8
Ireland	46.2	0.0	74.4	74.4	74.4	74.4	74.4	74.4	61.6	74.4
Israel	27.3	27.3	69.9	81.8	77.5	61.6	84.5	87.2	74.4	87.2
Italy	62.9	56.4	83.6	88.4	90.1	76.0	69.1	83.6	96.7	92.7
Japan	35.0	27.3	75.7	88.2	83.6	64.5	64.5	88.2	-	81.8
Luxembourg	46.2	46.2	66.4	73.8	58.5	49.6	52.6	82.3	87.3	87.2
Mexico	52.6	52.6	64.9	84.5	84.5	52.6	93.4	86.4	87.7	52.6
Netherlands	81.8	81.8	81.8	81.8	81.8	81.8	81.8	81.8	93.4	81.8
New Zealand	66.3	0.0	70.9	75.7	70.9	61.6	70.9	88.8	65.8	88.8
Norway	36.0	22.0	73.8	73.8	80.9	17.4	58.5	80.9	-	80.9
Poland	69.9	32.9	69.9	81.8	69.9	80.3	80.3	86.4	81.8	90.3
Portugal	52.6	27.3	81.8	81.8	87.3	52.6	84.5	87.3	84.5	87.3
Singapore	0.0	0.0	87.3	87.3	87.3	87.3	87.3	93.4	81.8	93.4
Slovak	52.6	32.9	79.2	84.5	84.5	79.2	79.2	84.5	81.8	-
Slovenia	38.0	38.0	81.8	81.8	81.8	81.8	81.8	90.3	69.9	90.3
South Africa	81.8	52.6	86.3	81.8	60.4	86.3	89.1	87.3	52.6	87.2
Spain	38.0	27.3	73.5	78.5	81.8	52.6	69.9	84.5	52.6	87.2
Sweden	46.2	27.3	80.9	80.9	80.9	80.9	80.9	80.9	80.9	80.9
Switzerland	53.0	36.0	80.9	84.9	84.9	84.9	90.3	84.9	84.9	84.9
Turkey	76.5	76.5	82.5	82.5	82.5	82.5	82.5	-	67.9	-
UK	0.0	0.0	71.7	71.7	71.7	71.7	71.7	71.7	79.2	90.8
USA	33.7	33.7	79.3	83.5	79.3	62.4	83.5	83.5	93.6	84.6

Table 3: Effective Average Tax Rates, Higher Inflation/Interest Scenario, 2015 (Equity Finance)

	Manufacturing plants	Office buildings	Manufacturing	Transportation	Communications	Power Generation	Solar Power Generation	Computers	Scientific R&D	Software
Australia	25.1	25.5	26.9	25.0	23.3	22.2	23.5	25.9	26.9	28.3
Austria	29.1	30.0	29.1	27.4	27.5	26.7	27.2	29.7	28.4	34.2
Belgium	29.4	30.7	29.9	33.9	32.0	26.1	26.5	45.9	27.8	41.5
Canada	24.7	25.6	23.2	27.1	27.7	24.7	21.7	28.7	27.2	27.8
Chile	24.4	23.0	23.8	23.2	21.6	19.3	19.6	27.4	22.0	-
Costa Rica	31.4	30.7	29.5	29.1	31.5	26.6	27.1	34.8	44.3	38.9
Czech	17.9	18.6	16.6	17.9	16.5	15.9	17.9	19.4	16.9	21.5
Denmark	22.8	26.4	20.4	22.0	21.3	19.3	19.6	25.8	19.3	22.3
Estonia	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Finland	19.1	19.8	18.4	20.4	19.4	16.6	16.8	25.0	21.5	22.6
France	37.6	36.8	33.4	36.2	34.8	30.8	31.0	-	36.0	-
Germany	30.3	29.6	32.5	30.1	28.1	26.8	28.4	31.3	28.6	34.2
Greece	25.2	24.7	25.5	27.8	27.3	22.3	22.6	30.2	23.1	33.7
Hungary	19.9	19.4	16.1	18.4	16.7	15.8	16.0	24.1	16.3	-
Iceland	18.5	19.6	18.0	19.1	18.4	16.2	16.4	22.6	19.0	25.9
Ireland	12.1	14.0	11.8	13.3	12.6	10.5	10.7	16.6	14.6	19.0
Israel	27.7	27.1	26.0	25.7	25.8	23.5	21.5	27.5	27.2	30.0
Italy	23.3	23.7	24.7	24.2	23.8	20.6	22.4	31.8	23.1	33.1
Japan	32.6	32.8	30.1	28.7	29.3	28.1	28.7	32.7	-	41.6
Luxembourg	28.3	27.8	29.5	31.2	34.0	27.1	27.5	33.6	25.9	33.1
Mexico	28.3	27.8	30.6	28.1	27.2	27.6	23.3	31.7	26.5	65.2
Netherlands	20.6	20.5	22.3	24.3	23.3	20.4	20.6	29.0	20.5	32.4
New Zealand	24.8	31.5	27.3	29.2	29.1	24.8	24.3	28.1	31.4	30.4
Norway	27.3	28.1	25.7	28.8	25.4	28.2	24.8	31.9	-	35.7
Poland	16.6	19.0	18.7	18.4	20.0	15.6	15.8	20.1	18.0	19.8
Portugal	27.8	30.1	26.3	28.6	25.9	27.1	24.0	30.6	27.1	33.4
Singapore	19.7	19.1	14.4	15.4	14.9	13.5	13.6	15.3	16.1	16.1
Slovak	20.7	22.0	20.0	20.6	19.9	18.1	18.3	24.2	20.8	-
Slovenia	17.0	16.7	15.1	16.5	15.8	13.9	14.0	16.5	18.3	17.7
South Africa	23.1	26.0	23.5	27.2	32.1	22.4	22.2	34.8	40.9	31.7
Spain	28.1	28.6	26.7	28.3	26.1	25.7	24.4	30.8	35.4	31.7
Sweden	21.3	22.5	19.7	21.6	20.7	18.0	18.2	26.0	21.1	29.1
Switzerland	19.9	20.9	18.5	19.7	19.0	17.0	16.7	28.3	20.6	25.4
Turkey	12.5	12.4	13.4	14.9	14.2	11.9	12.1	-	17.6	-
UK	23.1	22.5	19.4	21.9	20.7	17.0	17.3	27.8	19.5	20.5
USA	39.7	38.8	35.4	37.0	37.2	34.4	31.8	43.6	31.9	47.2

Table 4: Effective Marginal Tax Rates, Higher Inflation/Interest Scenario, 2015 (Equity Finance)

	Manufacturing plants	Office buildings	Manufacturing	Transportation	Communications	Power Generation	Solar Power Generation	Computers	Scientific R&D	Software
Australia	25.2	26.6	30.4	24.9	19.5	15.4	20.3	27.7	30.3	33.8
Austria	27.3	30.0	27.3	21.9	22.3	19.3	21.2	29.1	25.1	40.1
Belgium	19.1	23.9	20.9	33.6	28.0	3.5	5.8	55.3	12.1	49.3
Canada	20.5	23.3	14.7	27.8	29.4	20.2	8.2	32.1	28.1	29.8
Chile	28.0	24.0	26.2	24.7	19.5	11.0	12.3	35.3	20.8	-
Costa Rica	33.7	31.8	28.5	27.5	34.0	19.0	20.9	41.3	55.5	48.4
Czech	15.4	17.6	10.4	15.4	10.2	7.6	15.2	20.3	11.4	26.3
Denmark	21.2	31.5	12.8	18.8	16.0	8.2	9.2	30.1	8.1	19.6
Estonia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Finland	17.0	19.3	14.6	21.1	18.1	7.3	8.2	33.3	24.6	27.6
France	36.9	34.9	24.0	33.2	29.1	12.7	14.1	-	32.6	-
Germany	30.4	28.6	36.1	30.1	23.9	19.1	24.8	33.2	25.5	39.8
Greece	23.5	22.0	24.6	31.1	29.7	13.1	14.5	36.6	16.2	43.4
Hungary	21.7	20.3	8.5	17.2	10.7	7.1	8.0	32.8	9.0	-
Iceland	14.7	18.8	12.9	17.0	14.4	5.7	6.3	27.5	16.5	35.3
Ireland	11.1	17.6	10.2	15.1	12.8	5.0	5.6	24.8	19.2	30.5
Israel	29.9	28.2	25.1	24.2	24.5	16.5	8.2	29.4	28.6	35.6
Italy	-1.8	0.4	4.8	3.9	0.9	-20.4	-7.6	32.6	-2.8	34.8
Japan	33.3	34.0	26.2	21.4	23.7	19.3	21.2	33.6	-	50.8
Luxembourg	26.6	24.9	30.0	34.4	40.7	22.8	23.9	39.7	18.5	38.7
Mexico	24.9	23.3	31.7	24.4	21.0	22.4	4.4	34.5	18.6	70.9
Netherlands	9.0	8.3	15.8	22.7	19.5	7.9	8.9	35.4	8.7	42.1
New Zealand	17.6	36.7	25.9	31.4	31.1	17.5	15.4	28.2	36.6	34.4
Norway	27.8	30.1	23.0	32.0	22.1	30.3	19.8	39.0	-	45.9
Poland	10.3	19.0	17.9	17.2	22.0	6.2	6.9	22.4	15.6	21.5
Portugal	24.4	31.3	19.0	27.0	17.5	22.0	9.4	32.4	22.0	38.9
Singapore	25.0	23.4	7.4	11.2	9.4	3.6	4.0	10.9	13.9	14.0
Slovak	17.9	22.0	15.3	17.5	14.9	7.7	8.6	28.3	18.2	-
Slovenia	17.1	16.0	10.3	15.3	13.0	5.0	5.7	15.2	21.1	19.3
South Africa	10.3	21.6	12.1	25.6	38.1	7.1	6.4	43.4	52.5	37.4
Spain	28.2	29.7	24.1	28.8	22.1	20.8	15.8	35.2	44.5	37.4
Sweden	19.8	23.5	14.3	20.7	17.8	7.1	8.0	32.7	19.0	39.3
Switzerland	17.0	20.4	11.6	16.4	13.9	5.4	4.0	38.6	19.5	32.7
Turkey	-14.0	-15.0	-8.9	-0.5	-4.4	-18.3	-17.2	-	11.4	-
UK	28.9	27.2	17.9	25.5	22.0	9.1	10.2	38.9	18.4	21.6
USA	40.8	38.7	28.9	33.7	34.5	25.4	14.4	48.6	15.1	54.1

Table 5: Cost of Capital, Higher Inflation/Interest Scenario, 2015 (Equity Finance)

	Manufacturing plants	Office buildings	Manufacturing	Transportation	Communications	Power Generation	Solar Power Generation	Computers	Scientific R&D	Software
Austria	6.9	7.1	6.9	6.4	6.4	6.2	6.3	7.1	6.7	8.3
Australia	6.7	6.8	7.2	6.7	6.2	5.9	6.3	6.9	7.2	7.6
Belgium	6.2	6.6	6.3	7.6	7.0	5.2	5.3	11.2	5.7	9.9
Canada	6.3	6.5	5.9	6.9	7.1	6.3	5.4	7.4	7.0	7.1
Chile	6.9	6.6	6.8	6.6	6.2	5.6	5.7	7.7	6.3	-
Costa Rica	7.5	7.3	7.0	6.9	7.6	6.2	6.3	8.5	11.2	9.7
Czech	5.9	6.1	5.6	5.9	5.6	5.4	5.9	6.3	5.6	6.8
Denmark	6.3	7.3	5.7	6.2	6.0	5.4	5.5	7.1	5.4	6.2
Estonia	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Finland	6.0	6.2	5.9	6.3	6.1	5.4	5.4	7.5	6.6	6.9
France	7.9	7.7	6.6	7.5	7.0	5.7	5.8	-	7.4	-
Germany	7.2	7.0	7.8	7.1	6.6	6.2	6.6	7.5	6.7	8.3
Greece	6.5	6.4	6.6	7.3	7.1	5.8	5.8	7.9	6.0	8.8
Hungary	6.4	6.3	5.5	6.0	5.6	5.4	5.4	7.4	5.5	-
Iceland	5.9	6.2	5.7	6.0	5.8	5.3	5.3	6.9	6.0	7.7
Ireland	5.6	6.1	5.6	5.9	5.7	5.3	5.3	6.7	6.2	7.2
Israel	7.1	7.0	6.7	6.6	6.6	6.0	5.4	7.1	7.0	7.8
Italy	4.9	5.1	5.4	5.2	5.1	4.2	4.7	7.4	4.9	7.8
Japan	7.5	7.6	6.8	6.4	6.5	6.2	6.3	7.5	-	10.2
Luxembourg	6.8	6.7	7.1	7.6	8.4	6.5	6.6	8.3	6.1	8.2
Mexico	6.7	6.5	7.3	6.6	6.3	6.4	5.2	7.6	6.1	17.2
Netherlands	5.5	5.5	5.9	6.5	6.2	5.4	5.5	7.7	5.5	8.6
New Zealand	6.1	7.9	6.7	7.3	7.3	6.1	5.9	7.0	7.9	7.6
Norway	6.9	7.2	6.5	7.3	6.4	7.2	6.2	8.2	-	9.2
Poland	5.6	6.2	6.1	6.0	6.4	5.3	5.4	6.4	5.9	6.4
Portugal	6.6	7.3	6.2	6.8	6.1	6.4	5.5	7.4	6.4	8.2
Singapore	6.7	6.5	5.4	5.6	5.5	5.2	5.2	5.6	5.8	5.8
Slovak	6.1	6.4	5.9	6.1	5.9	5.4	5.5	7.0	6.1	-
Slovenia	6.0	5.9	5.6	5.9	5.7	5.3	5.3	5.9	6.3	6.2
South Africa	5.6	6.4	5.7	6.7	8.1	5.4	5.3	8.8	10.5	8.0
Spain	7.0	7.1	6.6	7.0	6.4	6.3	5.9	7.7	9.0	8.0
Sweden	6.2	6.5	5.8	6.3	6.1	5.4	5.4	7.4	6.2	8.2
Switzerland	6.0	6.3	5.7	6.0	5.8	5.3	5.2	8.1	6.2	7.4
Turkey	4.4	4.3	4.6	5.0	4.8	4.2	4.3	-	5.6	-
UK	7.0	6.9	6.1	6.7	6.4	5.5	5.6	8.2	6.1	6.4
USA	8.4	8.2	7.0	7.5	7.6	6.7	5.8	9.7	5.9	10.9

Table 6: Effective Average Tax Rates, Higher Inflation/Interest Scenario, 2015 (Debt Finance)

	Manufacturing plants	Office buildings	Manufacturing	Transportation	Communications	Power Generation	Solar Power Generation	Computers	Scientific R&D	Software
Australia	16.4	16.9	18.4	16.6	15.0	13.6	14.9	18.0	18.4	20.3
Austria	18.8	19.7	18.9	17.6	17.6	16.4	16.9	20.0	18.4	24.4
Belgium	20.4	21.7	21.1	25.1	23.2	17.3	17.7	37.1	19.7	33.0
Canada	15.7	16.4	15.1	18.5	18.9	15.6	13.6	20.7	18.5	21.0
Chile	16.6	15.2	16.0	15.6	14.0	11.6	11.9	19.9	14.4	-
Costa Rica	21.0	20.3	19.3	19.3	21.4	16.4	16.9	25.0	34.0	29.1
Czech	11.3	12.0	10.0	11.3	9.9	9.3	11.3	12.8	10.7	15.3
Denmark	14.7	18.2	12.7	14.3	13.6	11.5	11.7	18.1	13.1	16.0
Estonia	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Finland	12.2	12.9	11.8	13.8	12.8	10.0	10.2	18.4	14.7	16.1
France	24.6	23.9	21.0	23.8	22.4	18.3	18.6	-	23.8	-
Germany	19.8	19.2	22.2	20.2	18.3	16.5	18.0	21.9	18.7	24.7
Greece	16.2	15.8	16.7	19.1	18.5	13.5	13.8	21.6	14.8	25.1
Hungary	13.3	12.8	9.9	12.1	10.5	9.4	9.6	17.7	10.3	-
Iceland	11.6	12.7	11.4	12.6	11.9	9.7	9.9	16.1	12.3	19.2
Ireland	7.8	9.7	7.6	9.0	8.3	6.2	6.4	12.3	10.3	14.7
Israel	18.5	17.9	17.0	17.0	17.0	14.4	12.9	19.1	18.3	21.6
Italy	19.4	19.7	20.9	20.5	20.1	16.7	18.5	28.0	19.8	29.6
Japan	21.5	21.7	19.3	18.4	18.8	17.2	17.7	22.4	-	31.2
Luxembourg	18.3	17.7	19.7	21.6	24.2	17.2	17.5	24.4	16.8	23.9
Mexico	18.0	17.5	20.4	18.5	17.5	17.3	16.0	22.2	17.1	54.9
Netherlands	12.3	12.2	14.0	16.0	15.0	12.1	12.3	20.8	14.0	24.1
New Zealand	15.3	21.7	17.8	19.9	19.7	15.3	14.8	19.4	21.9	21.8
Norway	18.0	18.8	16.8	19.9	16.8	18.8	15.6	23.3	-	27.1
Poland	10.1	12.4	12.2	12.1	13.5	9.2	9.4	13.9	11.6	13.8
Portugal	17.7	19.9	16.6	19.0	16.6	17.0	14.5	21.3	17.6	24.1
Singapore	13.8	13.2	8.8	9.8	9.3	7.9	8.0	10.4	10.4	11.2
Slovak	13.2	14.4	12.7	13.4	12.7	10.7	11.0	17.0	13.5	-
Slovenia	11.2	10.8	9.4	10.8	10.1	8.1	8.3	11.1	12.5	12.3
South Africa	13.3	16.4	14.3	18.0	22.5	13.2	13.0	27.8	33.9	24.7
Spain	18.4	18.9	17.3	19.0	16.9	16.1	14.9	21.7	25.8	22.9
Sweden	13.7	14.9	12.6	14.5	13.6	10.8	11.0	18.8	13.9	22.0
Switzerland	12.7	13.6	11.6	13.0	12.3	10.3	10.1	21.5	13.9	18.7
Turkey	10.1	9.9	10.9	12.5	11.7	9.5	9.6	-	15.1	-
UK	16.2	15.5	12.7	15.1	13.9	10.3	10.6	21.0	12.8	14.3
USA	26.3	25.4	22.6	24.5	24.4	21.2	19.3	31.1	23.6	35.4

Table 7: Effective Marginal Tax Rates, Higher Inflation/Interest Scenario, 2015 (Debt Finance)

	Manufacturing plants	Office buildings	Manufacturing	Transportation	Communications	Power Generation	Solar Power Generation	Computers	Scientific R&D	Software
Australia	-14.1	-11.0	-2.1	-12.7	-24.7	-37.7	-25.7	-4.4	-1.8	7.8
Austria	-27.2	-19.4	-26.0	-39.3	-39.4	-53.6	-46.7	-16.4	-30.9	9.8
Belgium	-44.3	-30.3	-37.0	-3.1	-17.1	-98.9	-89.5	41.3	-54.4	31.4
Canada	-30.9	-24.3	-36.4	-8.8	-6.7	-32.2	-53.8	3.8	-9.0	5.1
Chile	-1.3	-9.5	-4.5	-6.8	-17.3	-37.1	-34.2	13.5	-14.6	-
Costa Rica	-9.4	-14.6	-22.1	-22.3	-6.7	-53.8	-47.0	12.5	39.6	27.3
Czech	-16.9	-12.8	-26.6	-16.8	-27.2	-32.4	-16.9	-7.7	-21.5	4.9
Denmark	-18.3	3.0	-34.3	-20.7	-26.9	-47.2	-44.8	2.6	-31.4	-9.0
Estonia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Finland	-16.0	-11.9	-19.0	-6.7	-12.3	-33.7	-31.9	14.4	-1.5	5.3
France	-33.6	-42.8	-94.1	-43.7	-64.3	-190.2	-175.1	-	-43.7	-
Germany	-19.0	-24.3	-2.5	-16.4	-33.4	-54.5	-35.7	-4.6	-28.8	10.8
Greece	-21.4	-25.3	-17.7	-2.3	-5.7	-48.4	-44.2	10.2	-33.9	23.3
Hungary	-5.0	-7.6	-27.2	-12.0	-22.9	-31.7	-30.0	14.5	-24.5	-
Iceland	-20.7	-12.9	-21.9	-13.5	-18.3	-35.8	-34.4	5.4	-15.8	17.5
Ireland	-7.8	1.4	-9.0	-1.8	-5.2	-16.8	-15.9	11.9	3.9	19.6
Israel	-7.8	-12.0	-18.2	-18.6	-18.6	-42.0	-61.0	-4.4	-9.2	8.7
Italy	-33.0	-29.4	-21.4	-21.1	-25.9	-65.2	-42.7	21.0	-27.1	24.6
Japan	-18.0	-16.3	-39.3	-50.1	-45.6	-68.7	-60.4	-11.2	-	29.5
Luxembourg	-26.0	-30.9	-14.0	-1.7	11.3	-36.5	-33.7	12.3	-41.2	10.2
Mexico	-34.5	-39.7	-13.3	-29.8	-40.1	-42.6	-59.2	-1.6	-44.1	64.9
Netherlands	-52.0	-53.9	-34.0	-17.1	-24.7	-54.9	-52.3	9.6	-33.7	22.3
New Zealand	-46.0	3.8	-21.5	-6.8	-7.9	-46.7	-52.4	-9.6	4.6	4.1
Norway	-14.2	-8.8	-23.2	-1.8	-23.5	-8.5	-34.1	14.2	-	27.3
Poland	-25.9	-9.9	-11.4	-12.0	-4.0	-33.3	-31.8	-2.0	-14.8	-2.2
Portugal	-33.5	-14.2	-45.6	-21.7	-45.5	-41.2	-77.1	-4.9	-34.8	10.1
Singapore	4.6	2.0	-23.3	-16.7	-19.8	-30.2	-29.4	-12.9	-12.8	-8.0
Slovak	-20.6	-12.1	-24.6	-18.9	-24.4	-41.8	-39.7	2.3	-18.0	-
Slovenia	-8.3	-10.4	-19.1	-10.4	-14.4	-28.6	-27.5	-8.8	-1.3	-2.2
South Africa	-74.2	-34.8	-59.7	-20.1	7.9	-77.0	-79.6	27.4	41.8	17.2
Spain	-16.8	-13.1	-25.9	-12.6	-29.5	-37.3	-51.1	3.9	21.0	9.6
Sweden	-16.6	-9.2	-25.0	-11.7	-17.8	-40.8	-38.9	10.7	-15.3	21.9
Switzerland	-19.3	-12.9	-27.9	-17.1	-22.0	-39.7	-41.2	22.3	-11.0	12.5
Turkey	-32.5	-33.9	-25.5	-14.4	-19.5	-38.1	-36.6	-	0.5	-
UK	5.6	2.5	-13.3	0.7	-5.6	-30.7	-28.5	23.2	-12.5	-3.6
USA	-23.5	-32.8	-75.7	-44.7	-45.0	-109.9	-185.3	11.4	-57.2	28.9

Table 8: Cost of Capital, Higher Inflation/Interest Scenario, 2015 (Debt Finance)

	Manufacturing plants	Office buildings	Manufacturing	Transportation	Communications	Power Generation	Solar Power Generation	Computers	Scientific R&D	Software
Austria	3.9	4.2	4.0	3.6	3.6	3.3	3.4	4.3	3.8	5.5
Australia	4.4	4.5	4.9	4.4	4.0	3.6	4.0	4.8	4.9	5.4
Belgium	3.5	3.8	3.7	4.9	4.3	2.5	2.6	8.5	3.2	7.3
Canada	3.8	4.0	3.7	4.6	4.7	3.8	3.3	5.2	4.6	5.3
Chile	4.9	4.6	4.8	4.7	4.3	3.6	3.7	5.8	4.4	-
Costa Rica	4.6	4.4	4.1	4.1	4.7	3.3	3.4	5.7	8.3	6.9
Czech	4.3	4.4	3.9	4.3	3.9	3.8	4.3	4.6	4.1	5.3
Denmark	4.2	5.2	3.7	4.1	3.9	3.4	3.5	5.1	3.8	4.6
Estonia	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Finland	4.3	4.5	4.2	4.7	4.5	3.7	3.8	5.8	4.9	5.3
France	3.7	3.5	2.6	3.5	3.0	1.7	1.8	-	3.5	-
Germany	4.2	4.0	4.9	4.3	3.7	3.2	3.7	4.8	3.9	5.6
Greece	4.1	4.0	4.2	4.9	4.7	3.4	3.5	5.6	3.7	6.5
Hungary	4.8	4.6	3.9	4.5	4.1	3.8	3.8	5.8	4.0	-
Iceland	4.1	4.4	4.1	4.4	4.2	3.7	3.7	5.3	4.3	6.1
Ireland	4.6	5.1	4.6	4.9	4.8	4.3	4.3	5.7	5.2	6.2
Israel	4.6	4.5	4.2	4.2	4.2	3.5	3.1	4.8	4.6	5.5
Italy	3.8	3.9	4.3	4.1	4.0	3.0	3.5	6.3	3.9	6.8
Japan	4.2	4.3	3.6	3.3	3.4	3.0	3.1	4.5	-	7.1
Luxembourg	4.0	3.8	4.4	4.9	5.6	3.7	3.7	5.7	3.5	5.6
Mexico	3.7	3.6	4.4	3.9	3.6	3.5	3.1	4.9	3.5	14.3
Netherlands	3.3	3.2	3.7	4.3	4.0	3.2	3.3	5.5	3.7	6.4
New Zealand	3.4	5.2	4.1	4.7	4.6	3.4	3.3	4.6	5.2	5.2
Norway	4.4	4.6	4.1	4.9	4.0	4.6	3.7	5.8	-	6.9
Poland	4.0	4.5	4.5	4.5	4.8	3.8	3.8	4.9	4.4	4.9
Portugal	3.7	4.4	3.4	4.1	3.4	3.5	2.8	4.8	3.7	5.6
Singapore	5.2	5.1	4.1	4.3	4.2	3.8	3.9	4.4	4.4	4.6
Slovak	4.1	4.5	4.0	4.2	4.0	3.5	3.6	5.1	4.2	-
Slovenia	4.6	4.5	4.2	4.5	4.4	3.9	3.9	4.6	4.9	4.9
South Africa	2.9	3.7	3.1	4.2	5.4	2.8	2.8	6.9	8.6	6.0
Spain	4.3	4.4	4.0	4.4	3.9	3.6	3.3	5.2	6.3	5.5
Sweden	4.3	4.6	4.0	4.5	4.2	3.6	3.6	5.6	4.3	6.4
Switzerland	4.2	4.4	3.9	4.3	4.1	3.6	3.5	6.4	4.5	5.7
Turkey	3.8	3.7	4.0	4.4	4.2	3.6	3.7	-	5.0	-
UK	5.3	5.1	4.4	5.0	4.7	3.8	3.9	6.5	4.4	4.8
USA	4.0	3.8	2.8	3.5	3.4	2.4	1.8	5.6	3.2	7.0

Table 9: Net Present Value of Capital Allowances, Lower Inflation/Interest Scenario, 2015

	Manufacturing plants	Office buildings	Manufacturing	Transportation	Communications	Power Generation	Solar Power Generation	Computers	Scientific R&D	Software
Austria	71.7	60.2	87.2	94.4	92.9	81.0	81.0	95.7	92.3	94.6
Australia	65.0	54.1	79.4	91.2	92.3	81.8	76.2	94.7	86.4	94.7
Belgium	52.6	38.0	76.5	76.5	76.5	76.5	76.5	69.9	87.3	81.8
Canada	77.4	67.7	93.5	90.4	86.8	73.5	93.5	94.0	88.9	96.0
Chile	40.3	54.1	81.1	89.9	91.1	86.4	86.4	91.1	91.1	-
Costa Rica	54.1	54.1	86.4	92.3	86.4	81.8	81.8	92.3	60.2	92.3
Czech	75.6	65.0	93.3	93.3	95.0	89.2	76.2	95.0	94.8	94.8
Denmark	71.7	0.0	93.5	93.5	93.5	91.2	91.2	93.5	97.3	97.3
Estonia	-	-	-	-	-	-	-	-	-	-
Finland	71.8	59.3	90.1	90.1	90.1	90.1	90.1	90.1	86.4	94.8
France	64.6	64.6	92.9	92.9	92.9	92.9	92.9	-	92.3	-
Germany	65.0	65.0	79.4	91.2	92.3	81.8	76.2	94.7	92.3	94.7
Greece	71.7	71.7	86.4	88.3	86.4	86.4	86.4	92.3	94.7	92.3
Hungary	54.1	54.1	94.7	92.3	94.7	90.0	90.0	90.0	96.0	-
Iceland	79.4	65.0	91.6	92.7	92.7	92.7	92.7	92.7	92.3	92.3
Ireland	71.7	0.0	88.7	88.7	88.7	88.7	88.7	88.7	81.8	88.7
Israel	54.1	54.1	86.4	92.3	90.2	81.8	93.5	94.7	88.7	94.7
Italy	62.9	56.4	83.6	88.4	90.1	76.0	69.1	83.6	96.7	92.7
Japan	62.3	54.1	89.2	95.1	93.0	83.0	83.0	95.1	-	92.3
Luxembourg	71.7	71.7	83.6	87.9	78.5	71.8	76.2	92.3	94.8	94.7
Mexico	76.2	76.2	83.7	93.5	93.5	76.2	97.3	94.3	94.9	76.2
Netherlands	92.3	92.3	92.3	92.3	92.3	92.3	92.3	92.3	97.3	92.3
New Zealand	84.5	0.0	87.0	89.4	87.0	81.8	87.0	95.4	84.2	95.4
Norway	59.3	42.2	87.9	87.9	91.6	35.3	78.5	91.6	-	91.6
Poland	86.4	60.2	86.4	92.3	86.4	91.6	91.6	94.3	92.3	96.0
Portugal	76.2	54.1	92.3	92.3	94.7	76.2	93.5	94.7	93.5	94.7
Singapore	0.0	0.0	94.8	94.8	94.8	94.8	94.8	97.3	92.3	97.3
Slovak	76.2	60.2	91.1	93.5	93.5	91.1	91.1	93.5	92.3	-
Slovenia	65.0	65.0	92.3	92.3	92.3	92.3	92.3	96.0	86.4	96.0
South Africa	94.3	76.2	94.3	92.3	81.1	94.3	95.5	94.8	76.2	94.7
Spain	65.0	54.1	88.3	90.7	92.3	76.2	86.4	93.5	76.2	94.7
Sweden	71.7	54.1	91.6	91.6	91.6	91.6	91.6	91.6	91.6	91.6
Switzerland	74.5	59.3	91.6	93.6	93.6	93.6	96.0	93.6	93.6	93.6
Turkey	89.7	89.7	92.6	92.6	92.6	92.6	92.6	-	85.1	-
UK	0.0	0.0	86.8	86.8	86.8	86.8	86.8	86.8	91.1	96.3
USA	61.0	61.0	91.2	93.2	91.2	82.3	93.2	93.2	97.5	93.7

Table 10: Effective Average Tax Rates, Lower Inflation/Interest Scenario, 2015 (Equity Finance)

	Manufacturing plants	Office buildings	Manufacturing	Transportation	Communications	Power Generation	Solar Power Generation	Computers	Scientific R&D	Software
Australia	24.8	25.1	25.7	24.8	24.1	23.4	24.0	25.3	25.7	26.3
Austria	29.2	29.7	29.4	28.8	28.8	28.2	28.4	29.7	29.1	31.6
Belgium	28.1	28.7	28.6	30.4	29.6	27.0	27.1	35.8	28.2	33.8
Canada	25.6	26.0	25.1	26.8	27.0	25.5	24.5	27.4	26.8	27.1
Chile	23.7	22.6	22.9	22.7	22.0	20.9	21.0	24.5	22.1	-
Costa Rica	30.5	30.1	29.5	29.5	30.5	28.1	28.4	31.9	38.1	33.6
Czech	18.3	18.6	17.9	18.5	17.9	17.5	18.2	19.1	18.0	19.9
Denmark	22.9	26.4	22.1	22.8	22.4	21.6	21.7	24.4	21.7	22.9
Estonia	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Finland	19.4	19.8	19.2	20.1	19.7	18.4	18.5	22.2	20.5	21.0
France	37.7	37.2	35.9	37.1	36.5	34.8	34.9	-	36.9	-
Germany	29.9	29.5	31.0	30.0	29.1	28.3	29.0	30.5	29.3	31.7
Greece	25.3	25.0	25.6	26.6	26.4	24.1	24.3	27.6	24.7	29.1
Hungary	19.3	19.1	17.7	18.7	18.0	17.5	17.6	21.1	17.8	-
Iceland	19.1	19.6	19.0	19.5	19.2	18.3	18.4	21.1	19.4	22.4
Ireland	12.2	14.0	12.1	12.8	12.5	11.5	11.6	14.2	13.4	15.3
Israel	27.0	26.6	26.1	26.0	26.1	24.8	24.3	26.8	26.6	27.9
Italy	26.2	26.4	27.0	26.9	26.7	25.0	25.8	30.1	26.6	30.7
Japan	32.0	32.2	31.1	30.6	30.8	30.0	30.3	32.2	-	36.0
Luxembourg	28.4	28.1	29.3	30.0	31.6	28.0	28.0	31.0	27.7	30.7
Mexico	28.8	28.6	30.0	29.1	28.7	28.5	27.2	30.6	28.4	47.4
Netherlands	23.0	22.9	23.7	24.6	24.1	22.9	23.0	26.6	23.1	28.0
New Zealand	26.3	31.5	27.5	28.4	28.3	26.2	26.1	27.9	29.3	28.9
Norway	27.1	27.8	26.3	27.8	26.2	27.9	25.8	29.1	-	30.7
Poland	17.8	18.8	18.7	18.7	19.3	17.4	17.5	19.4	18.5	19.3
Portugal	28.4	29.6	28.0	29.0	27.9	28.0	27.0	29.8	28.3	31.0
Singapore	19.7	19.1	15.9	16.2	16.1	15.5	15.5	16.3	16.5	16.6
Slovak	21.1	21.8	21.0	21.3	21.0	20.2	20.3	22.8	21.4	-
Slovenia	16.8	16.6	16.1	16.7	16.4	15.6	15.6	16.7	17.5	17.2
South Africa	25.6	26.7	26.0	27.5	29.7	25.5	25.5	30.7	34.2	29.4
Spain	27.7	28.1	27.2	28.0	27.0	26.6	26.2	29.0	31.4	29.4
Sweden	21.4	22.1	20.9	21.8	21.4	20.2	20.3	23.7	21.5	25.1
Switzerland	20.4	21.0	19.9	20.5	20.2	19.3	19.2	24.1	20.9	22.9
Turkey	15.9	15.8	16.3	16.9	16.6	15.7	15.7	-	18.1	-
UK	23.1	22.5	19.6	20.8	20.2	18.5	18.7	23.6	19.7	20.1
USA	38.9	38.4	37.2	37.9	37.9	36.4	35.7	40.6	35.9	42.0

Table 11: Effective Marginal Tax Rates, Lower Inflation/Interest Scenario, 2015 (Equity Finance)

	Manufacturing plants	Office buildings	Manufacturing	Transportation	Communications	Power Generation	Solar Power Generation	Computers	Scientific R&D	Software
Australia	23.1	25.5	29.9	23.8	18.0	11.1	16.6	27.1	29.7	33.4
Austria	23.8	27.6	25.5	20.2	20.5	14.3	17.0	28.1	23.5	39.6
Belgium	-59.8	-41.1	-42.8	-3.4	-19.2	-123.2	-110.1	44.2	-58.6	32.5
Canada	17.5	20.8	12.8	27.1	29.1	16.6	5.6	31.6	27.4	29.2
Chile	30.8	23.0	25.5	23.8	18.1	7.5	9.0	35.3	19.5	-
Costa Rica	33.6	30.6	26.6	26.0	33.1	13.8	16.4	41.1	61.4	48.6
Czech	12.8	15.5	9.0	14.4	9.0	5.0	12.3	19.7	10.3	26.0
Denmark	18.3	40.7	11.0	17.5	14.5	5.3	6.4	29.6	7.1	19.0
Estonia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Finland	15.3	18.5	13.3	20.8	17.4	4.8	5.9	34.2	24.1	27.2
France	35.8	32.7	21.3	31.7	27.0	8.2	9.9	-	30.7	-
Germany	28.0	25.3	35.6	28.8	22.1	13.9	20.6	32.5	23.8	39.4
Greece	20.4	18.2	22.9	30.4	28.8	8.9	10.7	36.4	14.7	43.6
Hungary	21.7	19.4	7.2	16.2	9.5	4.6	5.6	33.1	8.0	-
Iceland	11.7	16.4	11.5	16.2	13.4	3.6	4.4	27.7	15.3	35.5
Ireland	9.4	24.2	9.1	14.6	12.1	3.2	3.9	25.4	19.5	31.5
Israel	29.9	27.0	23.3	22.9	23.1	11.9	5.6	28.7	27.6	35.3
Italy	-42.9	-38.2	-24.2	-23.5	-28.8	-83.2	-55.4	21.7	-29.8	25.2
Japan	31.4	32.7	24.1	19.8	21.9	14.1	16.8	32.8	-	51.0
Luxembourg	23.1	20.7	29.6	34.6	43.0	19.3	19.8	40.0	16.8	38.3
Mexico	20.8	18.6	30.3	22.8	19.2	17.3	2.8	33.8	16.9	74.4
Netherlands	6.2	5.4	13.8	21.5	18.0	5.0	6.1	35.2	7.7	42.4
New Zealand	13.4	46.5	24.0	30.5	30.1	12.7	11.3	27.4	36.4	33.8
Norway	27.9	32.3	21.7	32.1	20.8	33.0	16.7	39.5	-	46.9
Poland	7.6	17.2	16.5	16.2	21.3	3.9	4.7	21.9	14.5	21.0
Portugal	20.4	30.1	16.7	25.6	15.8	17.0	6.4	31.6	20.3	38.5
Singapore	34.5	31.4	6.3	10.3	8.4	2.2	2.6	10.3	12.9	13.5
Slovak	14.7	20.0	13.5	16.3	13.5	4.9	6.0	27.8	16.9	-
Slovenia	15.6	13.8	9.0	14.4	11.9	3.2	3.8	14.6	20.6	18.8
South Africa	5.4	17.2	9.9	24.2	38.5	4.4	4.2	43.3	55.6	37.0
Spain	25.9	28.5	22.1	27.7	20.4	16.0	11.7	34.7	46.4	37.0
Sweden	17.0	22.5	12.8	20.1	16.7	4.6	5.6	33.2	18.1	40.3
Switzerland	15.0	19.6	10.0	15.5	12.8	3.4	2.6	39.2	18.9	32.9
Turkey	-36.5	-38.2	-27.6	-15.5	-21.0	-41.4	-39.7	-	1.1	-
UK	39.1	35.8	17.1	26.0	21.9	6.4	7.7	41.0	17.3	21.0
USA	38.9	35.7	25.9	31.6	32.3	18.8	9.9	47.8	12.9	53.5

Table 12: Cost of Capital, Lower Inflation/Interest Scenario, 2015 (Equity Finance)

	Manufacturing plants	Office buildings	Manufacturing	Transportation	Communications	Power Generation	Solar Power Generation	Computers	Scientific R&D	Software
Austria	2.6	2.8	2.7	2.5	2.5	2.3	2.4	2.8	2.6	3.3
Australia	2.6	2.7	2.9	2.6	2.4	2.2	2.4	2.7	2.8	3.0
Belgium	1.3	1.4	1.4	2.0	1.7	0.9	1.0	3.6	1.3	3.0
Canada	2.4	2.5	2.3	2.7	2.8	2.4	2.1	2.9	2.8	2.8
Chile	2.9	2.6	2.7	2.6	2.4	2.2	2.2	3.1	2.5	-
Costa Rica	3.0	2.9	2.7	2.7	3.0	2.3	2.4	3.4	5.2	3.9
Czech	2.3	2.4	2.2	2.3	2.2	2.1	2.3	2.5	2.2	2.7
Denmark	2.4	3.4	2.2	2.4	2.3	2.1	2.1	2.8	2.2	2.5
Estonia	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Finland	2.4	2.5	2.3	2.5	2.4	2.1	2.1	3.0	2.6	2.7
France	3.1	3.0	2.5	2.9	2.7	2.2	2.2	-	2.9	-
Germany	2.8	2.7	3.1	2.8	2.6	2.3	2.5	3.0	2.6	3.3
Greece	2.5	2.4	2.6	2.9	2.8	2.2	2.2	3.1	2.3	3.5
Hungary	2.6	2.5	2.2	2.4	2.2	2.1	2.1	3.0	2.2	-
Iceland	2.3	2.4	2.3	2.4	2.3	2.1	2.1	2.8	2.4	3.1
Ireland	2.2	2.6	2.2	2.3	2.3	2.1	2.1	2.7	2.5	2.9
Israel	2.9	2.7	2.6	2.6	2.6	2.3	2.1	2.8	2.8	3.1
Italy	1.4	1.5	1.7	1.6	1.6	1.1	1.3	2.6	1.5	2.7
Japan	2.9	3.0	2.6	2.5	2.6	2.3	2.4	3.0	-	4.1
Luxembourg	2.6	2.5	2.8	3.1	3.5	2.5	2.5	3.3	2.4	3.2
Mexico	2.5	2.5	2.9	2.6	2.5	2.4	2.1	3.0	2.4	7.8
Netherlands	2.1	2.1	2.3	2.5	2.4	2.1	2.1	3.1	2.2	3.5
New Zealand	2.3	3.7	2.6	2.9	2.9	2.3	2.3	2.8	3.1	3.0
Norway	2.8	3.0	2.6	2.9	2.5	3.0	2.4	3.3	-	3.8
Poland	2.2	2.4	2.4	2.4	2.5	2.1	2.1	2.6	2.3	2.5
Portugal	2.5	2.9	2.4	2.7	2.4	2.4	2.1	2.9	2.5	3.3
Singapore	3.1	2.9	2.1	2.2	2.2	2.0	2.1	2.2	2.3	2.3
Slovak	2.3	2.5	2.3	2.4	2.3	2.1	2.1	2.8	2.4	-
Slovenia	2.4	2.3	2.2	2.3	2.3	2.1	2.1	2.3	2.5	2.5
South Africa	2.1	2.4	2.2	2.6	3.3	2.1	2.1	3.5	4.5	3.2
Spain	2.7	2.8	2.6	2.8	2.5	2.4	2.3	3.1	3.7	3.2
Sweden	2.4	2.6	2.3	2.5	2.4	2.1	2.1	3.0	2.4	3.3
Switzerland	2.4	2.5	2.2	2.4	2.3	2.1	2.1	3.3	2.5	3.0
Turkey	1.5	1.4	1.6	1.7	1.7	1.4	1.4	-	2.0	-
UK	3.3	3.1	2.4	2.7	2.6	2.1	2.2	3.4	2.4	2.5
USA	3.3	3.1	2.7	2.9	3.0	2.5	2.2	3.8	2.3	4.3

Table 13: Effective Average Tax Rates, Lower Inflation/Interest Scenario, 2015 (Debt Finance)

	Manufacturing plants	Office buildings	Manufacturing	Transportation	Communications	Power Generation	Solar Power Generation	Computers	Scientific R&D	Software
Australia	21.4	21.7	22.3	21.6	20.9	20.1	20.6	22.2	22.4	23.1
Austria	25.1	25.6	25.4	24.9	24.9	24.1	24.4	26.0	25.2	27.7
Belgium	28.1	28.7	28.6	30.4	29.6	27.0	27.1	35.8	28.2	33.8
Canada	22.0	22.4	22.0	23.4	23.6	21.9	21.3	24.3	23.4	24.4
Chile	20.6	19.5	19.9	19.7	19.0	17.9	18.0	21.5	19.2	-
Costa Rica	26.5	26.0	25.6	25.6	26.5	24.1	24.4	28.0	34.1	29.8
Czech	15.7	16.0	15.3	15.9	15.3	14.9	15.7	16.5	15.6	17.5
Denmark	19.7	23.2	19.1	19.8	19.4	18.5	18.6	21.4	19.3	20.5
Estonia	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Finland	16.8	17.1	16.6	17.5	17.1	15.8	15.9	19.6	17.9	18.4
France	32.6	32.1	31.0	32.2	31.6	29.9	30.0	-	32.2	-
Germany	25.8	25.4	27.0	26.1	25.3	24.3	24.9	26.8	25.5	28.0
Greece	21.8	21.5	22.1	23.2	23.0	20.7	20.8	24.3	21.4	25.8
Hungary	16.8	16.5	15.3	16.2	15.5	15.0	15.1	18.6	15.5	-
Iceland	16.4	16.9	16.5	17.0	16.7	15.8	15.8	18.5	16.8	19.8
Ireland	10.5	12.3	10.5	11.1	10.8	9.9	9.9	12.5	11.7	13.6
Israel	23.4	23.0	22.6	22.6	22.6	21.3	20.9	23.5	23.2	24.6
Italy	26.2	26.4	27.0	26.9	26.7	25.0	25.8	30.1	26.6	30.7
Japan	27.7	27.9	26.8	26.6	26.7	25.7	26.0	28.2	-	31.9
Luxembourg	24.5	24.2	25.5	26.3	27.8	24.1	24.1	27.4	24.1	27.1
Mexico	24.8	24.6	26.1	25.3	24.9	24.4	24.3	26.9	24.8	43.3
Netherlands	19.8	19.7	20.5	21.3	20.9	19.7	19.8	23.3	20.6	24.8
New Zealand	22.6	27.6	23.8	24.7	24.6	22.5	22.4	24.5	25.6	25.5
Norway	23.5	24.1	22.8	24.3	22.8	24.2	22.2	25.7	-	27.4
Poland	15.2	16.2	16.2	16.2	16.8	14.9	15.0	16.9	16.0	16.9
Portugal	24.4	25.6	24.2	25.2	24.2	24.0	23.3	26.2	24.6	27.3
Singapore	17.4	16.8	13.7	14.1	13.9	13.3	13.3	14.3	14.3	14.7
Slovak	18.2	18.8	18.1	18.5	18.2	17.3	17.4	20.0	18.5	-
Slovenia	14.5	14.3	13.9	14.5	14.2	13.3	13.4	14.6	15.2	15.1
South Africa	21.8	22.9	22.4	23.9	26.0	21.9	21.9	27.9	31.5	26.7
Spain	23.9	24.3	23.6	24.3	23.4	22.8	22.4	25.5	27.7	26.0
Sweden	18.4	19.1	18.1	19.0	18.6	17.4	17.5	20.9	18.7	22.3
Switzerland	17.6	18.1	17.2	17.8	17.6	16.7	16.7	21.5	18.2	20.3
Turkey	15.9	15.8	16.3	16.9	16.6	15.7	15.7	-	18.1	-
UK	20.4	19.7	17.0	18.2	17.6	15.9	16.0	20.9	17.0	17.7
USA	33.7	33.2	32.2	33.0	32.9	31.3	30.8	35.7	32.7	37.4

Table 14: Effective Marginal Tax Rates, Lower Inflation/Interest Scenario, 2015 (Debt Finance)

	Manufacturing plants	Office buildings	Manufacturing	Transportation	Communications	Power Generation	Solar Power Generation	Computers	Scientific R&D	Software
Australia	-17.7	-12.3	-2.1	-14.0	-26.9	-47.4	-33.1	-4.8	-2.0	7.9
Austria	-36.0	-24.8	-29.5	-42.2	-43.0	-68.8	-58.7	-17.6	-33.9	9.6
Belgium	-59.8	-41.1	-42.8	-3.4	-19.2	-123.2	-110.1	44.2	-58.6	32.5
Canada	-37.3	-29.1	-39.6	-9.3	-6.4	-40.3	-58.9	3.7	-9.3	4.6
Chile	4.8	-10.6	-5.1	-7.6	-19.0	-44.0	-40.4	14.2	-16.0	-
Costa Rica	-8.0	-16.3	-25.7	-24.5	-7.7	-69.9	-60.1	12.9	50.3	28.4
Czech	-20.8	-15.8	-28.4	-17.8	-28.3	-36.5	-21.4	-8.0	-22.6	4.9
Denmark	-23.6	21.1	-36.9	-22.2	-28.9	-52.9	-50.1	2.6	-32.2	-9.4
Estonia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Finland	-18.3	-12.4	-20.5	-6.5	-12.8	-37.5	-35.4	16.5	-1.7	5.3
France	-35.4	-50.2	-105.3	-47.2	-70.5	-227.1	-207.0	-	-48.9	-
Germany	-24.1	-32.5	-2.5	-18.3	-36.8	-70.9	-47.3	-5.2	-31.7	10.8
Greece	-27.9	-33.6	-20.5	-2.7	-6.5	-58.3	-53.0	10.6	-36.0	24.3
Hungary	-4.3	-8.4	-28.6	-13.0	-24.1	-35.6	-33.6	15.5	-25.3	-
Iceland	-25.6	-16.7	-23.4	-14.1	-19.4	-38.8	-37.2	6.2	-17.1	18.3
Ireland	-9.8	11.1	-10.0	-2.0	-5.7	-18.8	-17.8	12.9	4.8	21.2
Israel	-6.7	-13.4	-21.1	-20.3	-20.8	-53.2	-66.6	-4.8	-10.4	8.8
Italy	-42.9	-38.2	-24.2	-23.5	-28.8	-83.2	-55.4	21.7	-29.8	25.2
Japan	-22.0	-18.3	-44.0	-52.9	-49.2	-87.7	-75.6	-11.6	-	30.5
Luxembourg	-34.3	-41.7	-13.5	0.0	17.3	-45.3	-44.3	13.7	-43.9	10.2
Mexico	-45.5	-53.1	-15.7	-32.3	-43.5	-57.5	-61.3	-2.0	-47.0	70.0
Netherlands	-57.5	-59.7	-37.2	-18.7	-26.9	-60.9	-57.9	10.0	-34.7	23.3
New Zealand	-56.8	25.3	-24.8	-7.7	-9.1	-59.8	-63.0	-10.2	5.3	3.9
Norway	-12.6	-2.4	-24.9	-0.3	-25.0	-1.1	-40.9	15.9	-	29.6
Poland	-30.2	-12.3	-13.1	-13.0	-4.5	-36.6	-35.0	-2.2	-16.0	-2.4
Portugal	-44.0	-15.9	-50.4	-23.9	-48.6	-55.5	-85.0	-5.4	-37.7	10.2
Singapore	19.8	15.2	-24.4	-17.5	-20.8	-31.8	-30.9	-13.2	-13.8	-8.2
Slovak	-26.2	-15.1	-27.2	-20.2	-26.1	-46.7	-44.3	2.2	-19.5	-
Slovenia	-10.3	-13.3	-20.6	-11.3	-15.6	-31.1	-29.8	-9.2	-1.5	-2.4
South Africa	-89.6	-46.1	-64.0	-22.0	9.5	-83.2	-83.9	27.6	46.5	17.1
Spain	-21.3	-14.6	-29.7	-14.0	-32.4	-49.7	-61.9	3.8	25.6	9.6
Sweden	-21.3	-10.2	-26.9	-12.1	-18.8	-45.0	-42.7	12.2	-16.0	23.9
Switzerland	-22.4	-13.4	-30.1	-17.9	-23.2	-42.7	-42.9	23.6	-11.4	13.5
Turkey	-36.5	-38.2	-27.6	-15.5	-21.0	-41.4	-39.7	-	1.1	-
UK	23.2	17.9	-14.0	2.3	-5.0	-35.2	-32.5	26.9	-13.7	-3.8
USA	-28.5	-43.8	-88.9	-51.0	-52.1	-158.9	-223.6	10.4	-62.0	28.2

Table 15: Cost of Capital, Lower Inflation/Interest Scenario, 2015 (Debt Finance)

	Manufacturing plants	Office buildings	Manufacturing	Transportation	Communications	Power Generation	Solar Power Generation	Computers	Scientific R&D	Software
Austria	1.5	1.6	1.5	1.4	1.4	1.2	1.3	1.7	1.5	2.2
Australia	1.7	1.8	2.0	1.8	1.6	1.4	1.5	1.9	2.0	2.2
Belgium	1.3	1.4	1.4	2.0	1.7	0.9	1.0	3.6	1.3	3.0
Canada	1.5	1.5	1.4	1.8	1.9	1.4	1.3	2.1	1.8	2.1
Chile	2.1	1.8	1.9	1.9	1.7	1.4	1.4	2.3	1.7	-
Costa Rica	1.9	1.7	1.6	1.6	1.9	1.2	1.2	2.3	4.0	2.8
Czech	1.7	1.7	1.6	1.7	1.6	1.5	1.6	1.9	1.6	2.1
Denmark	1.6	2.5	1.5	1.6	1.6	1.3	1.3	2.1	1.5	1.8
Estonia	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Finland	1.7	1.8	1.7	1.9	1.8	1.5	1.5	2.4	2.0	2.1
France	1.5	1.3	1.0	1.4	1.2	0.6	0.7	-	1.3	-
Germany	1.6	1.5	2.0	1.7	1.5	1.2	1.4	1.9	1.5	2.2
Greece	1.6	1.5	1.7	1.9	1.9	1.3	1.3	2.2	1.5	2.6
Hungary	1.9	1.8	1.6	1.8	1.6	1.5	1.5	2.4	1.6	-
Iceland	1.6	1.7	1.6	1.8	1.7	1.4	1.5	2.1	1.7	2.4
Ireland	1.8	2.2	1.8	2.0	1.9	1.7	1.7	2.3	2.1	2.5
Israel	1.9	1.8	1.7	1.7	1.7	1.3	1.2	1.9	1.8	2.2
Italy	1.4	1.5	1.7	1.6	1.6	1.1	1.3	2.6	1.5	2.7
Japan	1.6	1.7	1.4	1.3	1.3	1.1	1.1	1.8	-	2.9
Luxembourg	1.5	1.4	1.8	2.0	2.4	1.4	1.4	2.3	1.4	2.2
Mexico	1.4	1.3	1.7	1.5	1.4	1.3	1.2	2.0	1.4	6.7
Netherlands	1.3	1.3	1.5	1.7	1.6	1.2	1.3	2.2	1.5	2.6
New Zealand	1.3	2.7	1.6	1.9	1.8	1.3	1.2	1.8	2.1	2.1
Norway	1.8	2.0	1.6	2.0	1.6	2.0	1.4	2.4	-	2.8
Poland	1.5	1.8	1.8	1.8	1.9	1.5	1.5	2.0	1.7	2.0
Portugal	1.4	1.7	1.3	1.6	1.3	1.3	1.1	1.9	1.5	2.2
Singapore	2.5	2.4	1.6	1.7	1.7	1.5	1.5	1.8	1.8	1.8
Slovak	1.6	1.7	1.6	1.7	1.6	1.4	1.4	2.0	1.7	-
Slovenia	1.8	1.8	1.7	1.8	1.7	1.5	1.5	1.8	2.0	2.0
South Africa	1.1	1.4	1.2	1.6	2.2	1.1	1.1	2.8	3.7	2.4
Spain	1.6	1.7	1.5	1.8	1.5	1.3	1.2	2.1	2.7	2.2
Sweden	1.6	1.8	1.6	1.8	1.7	1.4	1.4	2.3	1.7	2.6
Switzerland	1.6	1.8	1.5	1.7	1.6	1.4	1.4	2.6	1.8	2.3
Turkey	1.5	1.4	1.6	1.7	1.7	1.4	1.4	-	2.0	-
UK	2.6	2.4	1.8	2.0	1.9	1.5	1.5	2.7	1.8	1.9
USA	1.6	1.4	1.1	1.3	1.3	0.8	0.6	2.2	1.2	2.8

APPENDIX

A. Using the Model Files

Two model files have been developed to calculate ETR measures as defined in Section 3. However, since the models may be used to analyse many different policy questions it is useful to distinguish between two general areas of application (see Section 2). First, they may be used to calculate EATRs, EMTRs and the CoC under each source of finance for a set of assets. Second, they may also be used to calculate ETR measures for a given asset before and after a specific policy change. The model file ETAX.xlsm is used for the first type of application, while the file ETAX_DEPRECIATION.xlsm is used for the second type.

- The first model file, **ETAX.xlsm**, contains calculations for the complete theoretical model as discussed in Section 3. It allows for the calculation of both ETRs as well as the other two outcome measures (CC and *A*) with and without personal income and real estate taxation, accounting for inventories, half-year conventions, ACE as well as all three sources of finance.

    - The model file can be used to derive a wide set of comparable results at the asset-level, allowing for an in-depth analysis of the distortive effects of corporate and personal income taxation across assets and sources of finance.
    - Such an analysis will typically be carried out on the asset-level for one specific country, with potential aggregation to business-, industry- or country-level; it can also be instructive to compare the results, independent of the level of aggregation, across countries.
    - A potential drawback of this approach is that the theoretical framework does not cover some of the country-specific provisions related to the definition of the tax base; e.g. certain depreciation methods, enhanced depreciation or time-varying tax incentives.
    - Being based on the same methodology, results produced by this file are directly comparable to those of the CBT and the ZEW.

- The second model file, **ETAX_DEPRECIATION.xlsm**, contains period-by-period calculations of the cash flows associated with a given investment project. While it also allows for the calculation of all three ETR measures, it does not cover personal income and real estate taxation, inventories, ACE or different sources of finance.

    - It focuses on the evaluation of the effects of policy changes on the ETR measures associated with an equity-financed investment in a given asset. This type of analysis is used to study the effects of specific tax provisions, such as various depreciation methods, time-varying credits and allowances, enhanced depreciation as well as the tax treatment of losses, on ETR measures.
    - Analyses using this model file will typically be carried out for a limited set of assets, conditional on the corporate and personal tax system of a given country.
    - The drawback of this approach is that it does not allow the comparison of different financing sources and the evaluation of the effects of personal income taxation.
    - As a robustness check, results for equity-financed investment including only corporate taxation can still be compared, given the same set of assumptions, to those produced by the first model file as well as those from publications of the CBT and the ZEW.

Both model files use the same notation so that each variable can be directly traced back to the relevant equations of the theoretical model. Descriptions, notation as well as the relationship to the corresponding equations are summarised in Table A1 for the input parameters and Table A2 for the output parameters.

Table A1: Input Parameters

Description	Excel	Paper	Equation
Pre-tax real rate of return	p	p	
Real interest rate	rr	r	
Economic rent in the absence of taxation	RSTAR	R^*	
Inflation rate	pi	π	
Nominal interest rate	i	i	
Tax credit at shareholder-level (as % of dividend)	cc	c	
Corporate tax rate	tau	τ	
Marginal SH PIT rate on interest income	mi	m^i	
Marginal SH PIT rate on dividend income	md	m^d	
Accrual-equivalent capital gains tax rate	z	z	(20)
Withholding tax on dividends	wd	w^d	
Net SH income per unit-increase in dividends	gamma	γ	(5)
Financing Source	F	*(dummy)*	
Nominal SH discount rate	rho	ρ	
First-year allowance	phi_init	φ^{FY}	
Remaining proportion qualifying for depreciation (net of first-year allowance)	phi_rest	φ^{REST}	
Capital allowance rate	phi_rate	φ	
Depreciation method	SL	*(dummy)*	
Net present value of depreciation allowances	A	A	(19)
Economic depreciation rate (DB)	delta	δ	
Proportion of accumulated accrued capital gains realized per period	lambda	λ	
Statutory capital gains tax rate	zstar	z^*	

Table A2: Outcome Variables

Description	Excel	Paper	Equation
Post-tax economic rent on investments financed by retained earnings	RRE	R^{RE}	(9), (21), (23)
Additional financial cost of external finance	FC	F	(11b)
Post-tax economic rent	RGEN	R	(11a)
Average Effective Tax Rate	EATR	*EATR*	(1), (12)
Cost of capital	pbar	$\tilde{p}$	(13), (22), (24)
Post-tax real rate of return to SH	s	s	(15)
Marginal investment tax wedge	tw	-	
Marginal Effective Tax Rate	EMTR	*EMTR*	(13), (14), (15)

ETAX.XLSM

The file contains just two sheets. All calculations are done in the first sheet denoted "Calculations". The second sheet, denoted "Definitions", contains a table summarising the definition of each of the variables; it can also be used to trace each of the calculations back to the corresponding equation in Section 3.

The first and the second row of the "Calculations" sheet are used to define the input parameters as summarised in Table A1. Cells with blue background colour contain variables which can be changed, while those with white background are intermediate variables which are calculated on the basis of the input parameters (e.g. R^* or i). Output variables are found in rows 4 and 5, where intermediate variables (e.g. R^{RE}, F or s) again have a white background and results (EATR, EMTR and the cost of capital $\tilde{p}$) are highlighted in green. Any changes in the input parameters will immediately be reflected in intermediate and output parameters, reflecting the easiest way to study the effects of a change in parameter.

Rows 34 to 39 can be used to define a set of 10 assets based on different input parameters including the capital allowance rate, depreciation method, economic depreciation rate, DBSL factor as well as treatment of inventories and real estate taxation. Having defined a set of assets in this section of the sheet, clicking the button on the top-right corner of the sheet will start the calculation procedures, producing the full set of output variables for each of the assets in rows 29 to 31 (green background). The source of finance is kept constant for each of the assets and is indicated in cell D8. To keep track of the input parameters used for each of the assets, the relevant parameters are summarised in rows 9 to 27.

Example #1

To get a better understanding of the model as well as the results, consider the following example. The economic parameters used for the first example are summarised in Table A3. For the sake of simplicity personal income taxation is excluded, implying that only τ, φ and the depreciation method are required as inputs (Table A4). In addition, it is assumed that the investment is financed by retained earnings.

Table A3: Economic Parameters in Example #1

Economic Parameters	Excel	Units	Value
Pre-tax real rate of return	p	%	20
Real interest rate	rr	%	5
Inflation rate	pi	%	2
Economic depreciation rate	delta	%	17.5

Table A4: Tax Parameters in Example #1 (excluding PIT)

Tax Parameters	Excel	Units	Value
Corporate tax rate	tau	%	30
Marginal SH PIT rate on interest income	mi	%	0
Marginal SH PIT rate on dividend income	md	%	0
Tax credit at shareholder-level (as % of dividend)	cc	%	0
Withholding tax on dividends	wd	%	0
Capital allowance rate	phi_rate	%	25
Depreciation method	SL	*(0,1)*	0
Proportion of accumulated accrued capital gains realized per period	lambda	%	0
Statutory capital gains tax rate	zstar	%	0

Table A5: Intermediate Variables (excluding PIT)

Intermediate Variables	Excel	Units	Value
Economic rent in the absence of taxation	RSTAR	*monetary*	0.1429
Nominal interest rate	i	*%*	7.10
Accrual-equivalent capital gains tax rate	z	*%*	0.00
Net SH income per unit-increase in dividends	gamma	*monetary*	1.00
Nominal SH discount rate	rho	*%*	7.10
Net present value of depreciation allowances	A	*monetary*	0.2336

Intermediate results for this set of parameters are shown in Table A5; they have been determined based on the following equations.

$$i = (1 + r)(1 + \pi) - 1 = 1.05 * 1.02 - 1 = 0.071$$

$$R^* = (p - r)/(1 + r) = \frac{0.2 - 0.05}{1.05} = 0.1429$$

$$A^{DB} = \frac{\tau\varphi}{\varphi + \rho} = \frac{0.3 * 0.25}{0.25 + 0.071} = 0.2336$$

Output variables are shown in Table A6, including the post-tax economic rent which is determined through equation (9).

Table A6: Outcome Variables (excluding PIT)

Outcome Variables: Retained Earnings	Excel	Units	Value
Post-tax economic rent on investments financed by retained earnings	RRE	*monetary*	0.0858
Additional financial cost of external finance	FC	*monetary*	0
Post-tax economic rent	RGEN	*monetary*	0.0858
Average Effective Tax Rate	EATR	*%*	29.96
Cost of capital	pbar	*%*	7.13
Post-tax real rate of return to SH	s	*%*	5.00
Marginal investment tax wedge	tw	*pp*	2.13
Marginal Effective Tax Rate	EMTR	*%*	29.90

$$R^{RE} = -\gamma(1 - A) + \frac{\gamma}{1 + \rho}[(p + \delta)(1 + \pi)(1 - \tau) + (1 - \delta)(1 + \pi)(1 - A)]$$
$$= -0.7664 + \left(\frac{1}{1.071}\right)[(0.2 + 0.175) * (1.02) * 0.7 + 0.825 * 1.02 * 0.7664] = 0.0858$$

Since the investment is assumed to be financed by retained earnings no external costs have to be accounted for. The EATR can thus be derived based on equation (1); the CoC from equation (13) and the EMTR from equation (14), making use of the fact that s is equal to the real interest rate in the absence of personal taxation.

$$EATR = \frac{R^* - R}{p/(1 + r)} = \frac{(0.1429 - 0.0858)}{\left(\frac{0.2}{1.05}\right)} = 0.2996$$

$$\tilde{p} = \frac{(1-A)(\rho + \delta(1+\pi) - \pi)}{(1+\pi)(1-\tau)} - \delta = \frac{0.7664 * (0.2 + 0.175 * 1.02 - 0.02)}{1.02 * 0.7} - 0.175 = 0.0713$$

$$EMTR = \frac{\tilde{p} - r}{\tilde{p}} = \frac{0.0713 - 0.05}{0.0713} = 0.2990$$

Table A7 shows the full set of input parameters, now including personal income taxation; Table A8 shows the intermediate variables which are constant across different financing sources. Finally, Tables A9 to A11 show the results for each of the three sources of finance.

Table A7: Tax Parameters in Example #1 (including PIT)

Tax Parameters	Excel	Units	Value
Corporate tax rate	tau	%	30
Marginal SH PIT rate on interest income	mi	%	40
Marginal SH PIT rate on dividend income	md	%	32.5
Tax credit at shareholder-level (as % of dividend)	cc	%	10
Withholding tax on dividends	wd	%	0
Capital allowance rate	phi_rate	%	25
Depreciation method	SL	*(0,1)*	0
Proportion of accumulated accrued capital gains realized per period	lambda	%	10
Statutory capital gains tax rate	zstar	%	14

Table A8: Intermediate Variables (including PIT)

Intermediate Variables	Excel	Units	Value
Economic rent in the absence of taxation	RSTAR	*monetary*	0.1429
Nominal interest rate	i	%	7.10
Accrual-equivalent capital gains tax rate	z	%	9.82
Net SH income per unit-increase in dividends	gamma	*monetary*	0.8316
Nominal SH discount rate	rho	%	4.72
Net present value of depreciation allowances	A	*monetary*	0.2523

Table A9: Outcome Variables under Retained Earnings Finance (including PIT)

Outcome Variables: Retained Earnings	Excel	Units	Value
Post-tax economic rent on investments financed by retained earnings	RRE	*monetary*	0.0905
Additional financial cost of external finance	FC	*monetary*	0
Post-tax economic rent	RGEN	*monetary*	0.0905
Average Effective Tax Rate	EATR	*%*	32.17
Cost of capital	pbar	*%*	4.04
Post-tax real rate of return to SH	s	*%*	2.22
Marginal investment tax wedge	tw	*pp*	1.83
Marginal Effective Tax Rate	EMTR	*%*	45.21

Table A10: Outcome Variables under New Equity Finance (including PIT)

Outcome Variables: New Equity	Excel	Units	Value
Post-tax economic rent on investments financed by retained earnings	RRE	*monetary*	0.0905
Additional financial cost of external finance	FC	*monetary*	0.0070
Post-tax economic rent	RGEN	*monetary*	0.0834
Average Effective Tax Rate	EATR	*%*	35.49
Cost of capital	pbar	*%*	4.74
Post-tax real rate of return to SH	s	*%*	2.22
Marginal investment tax wedge	tw	*pp*	2.52
Marginal Effective Tax Rate	EMTR	*%*	53.24

Table A11: Outcome Variables under Debt Finance (including PIT)

Outcome Variables: Debt	Excel	Units	Value
Post-tax economic rent on investments financed by retained earnings	RRE	*monetary*	0.0905
Additional financial cost of external finance	FC	*monetary*	0.0018
Post-tax economic rent	RGEN	*monetary*	0.0887
Average Effective Tax Rate	EATR	*%*	33.02
Cost of capital	pbar	*%*	4.22
Post-tax real rate of return to SH	s	*%*	2.22
Marginal investment tax wedge	tw	*pp*	2.01
Marginal Effective Tax Rate	EMTR	*%*	47.53

Comparing the results calculated in example 1 (with and without PIT as well as for different sources of finance) to those published in the final report to the European Commission confirms that they are the same (see B-1 to B-7, ZEW, 2015), which is to be expected as they are both based on the same methodology (as is also the CBT approach).

ETAX_DEPRECIATION.XLSM

1. The second model file includes three sheets: "Calculation", "Cash Flows Baseline" and "Cash Flows Reform" (see screenshots in Appendix C). As before, input and output parameters are all depicted in the first of these three sheets; inputs are again marked in light blue and outputs in green. The main economic parameters are defined as before and can be changed in the upper-left section of the sheet.

In order to compare the results from this model file to those of the ETAX.xlsm it is important to keep in mind the differences in assumptions. To this end, the necessary assumptions are all listed in the upper-right section of the "Calculation" sheet. In fact, the calculations in this sheet reflect a subset of the cases covered by the full theoretical model developed in the model file ETAX.xlsm. In particular, only corporate taxes are included, taxation at the shareholder level is not accounted for (i.e. the corresponding rates from the theoretical model are all set to zero). There is no distinction between investments financed by retained earnings and new equity; neither is debt finance considered. The parameter capturing the discrimination between new equity and retained earnings, γ, is thus equal to one and the discount rate, ρ, is equal to the nominal interest rate, i. Inventory valuation and real estate taxes are also excluded from the analysis.

There are two scenarios to consider in this model file, a baseline and a reform scenario. The tax depreciation parameters for the baseline can be altered in rows 15 to 18. As before, the corporate tax rate, τ, and the capital allowance rate, φ, can be changed. However, cell D16 allows a choice between 5 different recovery methods. Apart from straight line (SL) and declining balance (DB) depreciation, it also includes three additional methods for accelerating depreciation which are currently used in OECD countries.

- **Straight line (SL):** To use this method it is sufficient to set a capital allowance rate. Per-period deductions are then equal to this rate times the initial investment; they are thus constant over time. If only the tax life of an asset is known, the corresponding (SL) capital allowance rate can be determined by dividing the initial investment by the tax life of the asset.

- **Declining balance (DB):** Declining balance depreciation implies that per-period deductions are simply equal to the capital allowance rate times the remaining tax value of the asset. In contrast to straight line depreciation, this implies that the absolute amount deductible decreases over time but never reaches zero[10]. To avoid this, a threshold can be defined in cell D18 at which the remaining tax value is completely written down.

- **Declining balance with switch to straight line (DBSL)**: This method is based on one additional parameter, the DBSL factor in cell H15, which is typically set to 1.5 or 2. Using this method, per period deductions as a proportion of the remaining value of the investment for tax purposes are determined as the product of the DBSL factor and the capital allowance rate. For example, if the DBSL factor is 2 and $\varphi = 0.05$ a deduction of 10 units on an investment with a remaining tax value of 100. However, as with DB depreciation, deductions decrease each period in line with reductions of the remaining tax value of the investment. The switch to straight line depreciation occurs in the period when the capital allowance falls below the allowance which would be granted on the basis of SL depreciation; based on the above example this will be the case when it falls below 5 units.

- **Coefficient-based depreciation (COEF):** This method is based on the two coefficients which can be changed in cells H17 and H18. The first coefficient is typically set to 3, 5, 10, 20, 30 or 50; the deduction in the first period is then equal to the value of the investment divided by the first coefficient (e.g. 20 if the coefficient is equal to 5 and investment is 100). In all following periods

[10] The algebraic approach discussed in Section 3 avoids this by taking limits.

the deductions are determined on the basis of the second coefficient. In each period the deduction is equal to two times the remaining tax value over the difference between the second coefficient and the tax life of the asset. Choosing a second coefficient which is just one unit larger than the first coefficient ensures that the asset is completely depreciated after a number of years equal to the first coefficient.

- **Sum of the years' digits (SYD):** Using this method per period deductions are calculated as fractional parts of the sum over all the years of an asset's tax life. That is to say, if the asset has a tax life of 5, defined in cell H16, the sum of the years is $1 + 2 + 3 + 4 + 5 = 15$. The five fractional parts, taken in reverse order, then define the proportion of the asset which can be depreciated in each period: $5/15$, $4/15$, $3/15$, $2/15$ and $1/15$. As their sum adds up to one there is no need to define an ultimate write-off threshold.

However, since loss carryover provisions are not included in this model file, capital allowances may expire unused in situations where the deduction exceeds taxable income. This may be the case, for instance, when a large capital allowance rate is chosen (e.g. higher than the rate of return), implying that some of the tax value of the asset is lost and effective tax rates are higher. While these may be an interesting case to study, it is also possible to indicate in cell L15 that capital allowances are non-wasteable in the sense that businesses are able to offset excess allowances against profits from other investments (which are not modelled). This may not always be a suitable assumption, but it can be instructive to analyse such cases as well.

In rows 21 to 24 the same set of tax parameters, now corresponding to the reform scenario, can be defined. However, to evaluate the effects of specific tax provisions on ETR measures additional inputs can be provided for the reform scenario. In particular, rows 27 to 29 enable the researcher to specify the time-pattern of (accelerated) depreciation which is to be evaluated. Row 27 captures tax allowances, row 28 tax credits and row 29 enhancements of the remaining tax value to be depreciated in subsequent periods; in cells C27 to C29 each of these types of provisions can be switched on or off[11]. Each of those three types of provisions can be given specific values for each of the first 10 periods of the investment project, corresponding to cells F27 to O29.

- **Allowances:** Further acceleration of tax depreciation can be accounted for by directly specifying tax allowances in each of the first 10 periods of the investment. Consider, for instance, an asset with a straight line tax depreciation based on a 10% rate; this implies that each period the firm can deduct 10% from taxable income and the asset depletes after 10 periods. Specifying a tax allowance of 20% in period one (in cell F27) then implies that tax depreciation is accelerated and the tax life of the asset is reduced to 9. Similarly, cells G27 to O27 can be used to specify allowances for periods 2 to 10. If tax allowances in these cells are set to zero, tax depreciation simply follows the method defined by the main parameters defined in rows 21 to 24. As in the baseline scenario, allowances can be assumed to be wasteable or not as defined in cell L21.

- **Enhancements:** The allowances specified in cells F27 to O27 can never exceed the total value of the asset. To account for enhanced depreciation, that is depreciation deductions adding up to more than the total value of the investment, it is necessary to use cells F29 to O29. As before, enhancements can be specified for each of the first ten periods separately, implying that the

[11] Please note that since the EATR is calculated instantaneously it will still capture the effects of the (non-zero) tax incentives; switching them off only makes a difference for the calculation of the EMTR and the cost of capital.

corresponding amount is simply added to the remaining tax value of the asset in the corresponding period.

- **Credits:** Tax credits are modelled in a similar way, by using cells F28 to O28 to define additional tax credit for each of the first ten periods. Any non-zero credit is simply subtracted from tax liability in the respective period. As with allowances, cell L22 can be used to specify whether credits are wasteable or not; if they are, no refunds are given and the effective value of the credit will depend on the tax liability in the respective period.

Having made these specification choices for the baseline and reform scenarios, the corresponding EATR is instantaneously calculated in cells F38 and G38. Although underlying calculations are made on the basis of period-by-period cash flows depicted in the two additional sheets, "Cash Flows Baseline" and "Cash Flows Reform", the results correspond to the definition of the EATR in equation (1) in Section 3. As before, it is calculated as the difference between the NPV of the investment in the absence of taxation and the NPV of the investment with taxation over the NPV of the net income generated by the investment. These intermediate outputs are depicted in cells F32 to F36 for the baseline scenario and G32 to G36 for the reform scenario, including the NPV of tax allowances (A), net income, tax, as well as the pre- and post-tax cash flows (corresponding to the pre- and post-tax economic rents[12] R^* and R). To derive the corresponding CoC and EMTR it is sufficient to click on the button on the right hand side of the sheet; this will trigger a program to find the value of the rate of return, $p = \tilde{p}$, at which the post-tax cash flow, or economic rent R, is equal to zero.

As will become apparent in the following example, the ETR measures based on the cash flow calculations are equivalent to those from the theoretical model as long as inflation is zero. This is due to the fact that the theoretical model assumes a one-period investment whereas the cash flow calculations trace the investment until full depletion. When prices do not change over time this difference in assumptions becomes irrelevant, if they do, one-period investments will generally be subject to higher ETRs.

However, the NPV of tax allowances, A, is always directly comparable between the two types of investment as it is, per definition, calculated over the entire lifetime of the investment. It is therefore possible to first calculate different values of A based on the full set of parameter choices covered in the second model file, and then insert these values into the corresponding cell R2 in the first model file (make sure to copy the original content of the cell). This approach allows the researcher to incorporate a wide range of depreciation schedules and provisions within the standard theoretical framework developed in ETAX.xlsm, thus greatly increasing flexibility.

Example #2

The second example illustrates how the results from the theoretical model can be reproduced by the model specifying period-by-period cash flows. To keep it simple it uses similar input parameters as in the first example, the only change being that inflation is now assumed to be zero[13] (Tables A12 and A13).

[12] They should not be expected, for a given investment, to have the same magnitude because the theoretical model assumes a one-period investment whereas the cash flow calculations trace the investment until full depletion

[13] Setting inflation equal to 2% in the second model file shows that the NPV of tax allowances is equal to 0.2336, exactly the same amount as calculated in the first example under the same assumptions.

Table A12: Economic Parameters in Example #2

Economic Parameters	Excel	Units	Value
Pre-tax real rate of return	p	%	20
Real interest rate	rr	%	5
Inflation rate	pi	%	0
Economic depreciation rate	delta	%	17.5

Table A13: Tax Parameters in Example #2 (excluding PIT)

Tax Parameters	Excel	Units	Value
Corporate tax rate	tau	%	30
Marginal SH PIT rate on interest income	mi	%	0
Marginal SH PIT rate on dividend income	md	%	0
Tax credit at shareholder-level (as % of dividend)	cc	%	0
Withholding tax on dividends	wd	%	0
Capital allowance rate	phi_rate	%	25
Depreciation method	SL	*(0,1)*	0
Proportion of accumulated accrued capital gains realized per period	lambda	%	0
Statutory capital gains tax rate	zstar	%	0

Table A14 illustrates the period-by-period cash flows associated with this set of parameters. It traces all main variables needed for the calculation of the ETR measures over the first 20 periods of the investment; although it takes longer until the initial investment of one unit is entirely depleted. Column 3 and 4 show the capital stock and economic depreciation (which always follows a declining balance schedule); columns 5 and 6 depict revenue (capital times the rate of return plus economic depreciation) and net income (capital times the rate of return). In the following two columns each period's allowance as well as the remaining value of the investment for tax purposes is calculated based on the declining balance method. Taxable income, in column 9, is calculated by subtracting the allowance from revenues. Taxes, column 11, are obtained by multiplying taxable income with the tax rate, thus also determining pre- and post-tax cash flows in the last two columns. The value of capital allowances, in column 10, is obtained by multiplying the allowances in each period by the tax rate. The last row in the table shows the NPVs for the relevant variables, calculated on the basis of the discount rate $\rho = i = r$. Subtracting the NPVs of post- from pre-tax cash flows and dividing by the NPV of net income then yields the EATR; it is shown, together with other output variables, in Table A16.

Table A15: Comparison of Intermediate Variables

ETAX.xlsm (File #1) and ETAX_DEPRECIATION.xlsm (File #2)

Intermediate Variables	Excel	Units	File #1	File #2
Economic rent in the absence of taxation	RSTAR	*monetary*	0.1429	0.6667
Nominal interest rate	i	%	5.00	5.00
Accrual-equivalent capital gains tax rate	z	%	0.00	0.00
Net SH income per unit-increase in dividends	gamma	*monetary*	1.00	1.00
Nominal SH discount rate	rho	%	5.00	5.00
Net present value of depreciation allowances	A	*monetary*	0.25	0.25

Table A16: Comparison of Outcome Variables

ETAX.xlsm (File #1) and ETAX_DEPRECIATION.xlsm (File #2)

Outcome Variables: Retained Earnings	**Excel**	**Units**	**File #1**	**File #2**
Post-tax economic rent on investments financed by retained earnings	RRE	*monetary*	0.0893	0.4167
Additional financial cost of external finance	FC	*monetary*	0	0
Post-tax economic rent	RGEN	*monetary*	0.0893	0.4167
Effective Average Tax Rate	EATR	*%*	28.1250	28.1250
Cost of capital	pbar	*%*	6.6071	6.6071
Post-tax real rate of return to SH	s	*%*	5.00	-
Marginal investment tax wedge	tw	*pp*	1.61	-
Effective Marginal Tax Rate	EMTR	*%*	24.3243	24.3243

Table A14: Period-by-period Cash Flows in Example #2

Year	Investment	Capital	Real Depreciatio	Revenue	Pre-Tax Net Income	Remaining Tax Value	Allowance	Taxable Income	Value: Cap. Allowances	Taxes	Pre-Tax Cash Flow	Post-Tax Cash Flow
0	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.00	-1.00
1	0	1.00	0.18	0.38	0.20	1.00	0.25	0.13	0.08	0.04	0.38	0.34
2	0	0.83	0.14	0.31	0.17	0.75	0.19	0.12	0.06	0.04	0.31	0.27
3	0	0.68	0.12	0.26	0.14	0.56	0.14	0.11	0.04	0.03	0.26	0.22
4	0	0.56	0.10	0.21	0.11	0.42	0.11	0.11	0.03	0.03	0.21	0.18
5	0	0.46	0.08	0.17	0.09	0.32	0.08	0.09	0.02	0.03	0.17	0.15
6	0	0.38	0.07	0.14	0.08	0.24	0.06	0.08	0.02	0.03	0.14	0.12
7	0	0.32	0.06	0.12	0.06	0.18	0.04	0.07	0.01	0.02	0.12	0.10
8	0	0.26	0.05	0.10	0.05	0.13	0.03	0.06	0.01	0.02	0.10	0.08
9	0	0.21	0.04	0.08	0.04	0.10	0.03	0.06	0.01	0.02	0.08	0.06
10	0	0.18	0.03	0.07	0.04	0.08	0.02	0.05	0.01	0.01	0.07	0.05
11	0	0.15	0.03	0.05	0.03	0.06	0.01	0.04	0.00	0.01	0.05	0.04
12	0	0.12	0.02	0.05	0.02	0.04	0.01	0.03	0.00	0.01	0.05	0.03
13	0	0.10	0.02	0.04	0.02	0.03	0.01	0.03	0.00	0.01	0.04	0.03
14	0	0.08	0.01	0.03	0.02	0.02	0.01	0.02	0.00	0.01	0.03	0.02
15	0	0.07	0.01	0.03	0.01	0.02	0.00	0.02	0.00	0.01	0.03	0.02
16	0	0.06	0.01	0.02	0.01	0.01	0.00	0.02	0.00	0.01	0.02	0.02
17	0	0.05	0.01	0.02	0.01	0.01	0.00	0.01	0.00	0.00	0.02	0.01
18	0	0.04	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.01	0.01
19	0	0.03	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.01	0.01
20	0	0.03	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.01
NPV					**0.89**				**0.25**	**0.25**	**0.67**	**0.42**

Table A16 contains results from both model files based on the same set of assumptions. As expected, comparison shows that, while pre- and post-tax cash flows (or economic rents) differ, all three ETR measures, EATR, EMTR and the CoC, coincide. Replicating this example in the model files and setting tax depreciation equal to economic depreciation also confirms that, in this case, the EATR and EMTR are both equal to the statutory rate.

Example #3

The third example shows how the second model file can be used to analyse other tax provisions which are commonly used to accelerate depreciation and provide incentives for investment. Consider the case where, as before, inflation is zero but fiscal depreciation follows economic depreciation (Tables A17 and A18) except for a first-year accelerated allowance of 30%. To analyse this case the capital allowance rate is set to 17.5% (matching economic depreciation) in the baseline and reform scenarios, and the first-year allowance is entered in cell F27; in addition, the entry in cell E27 is switched to "YES" (to indicate that there are accelerated allowances).

Table A17: Economic Parameters in Example #3

Economic Parameters	Excel	Units	Value
Pre-tax real rate of return	p	%	20
Real interest rate	rr	%	5
Inflation rate	pi	%	0
Economic depreciation rate	delta	%	17.5

Table A18: Tax Parameters in Example #3

Tax Parameters	Excel	Units	Value
Corporate tax rate	tau	%	30
Marginal SH PIT rate on interest income	mi	%	0
Marginal SH PIT rate on dividend income	md	%	0
Tax credit at shareholder-level (as % of dividend)	cc	%	0
Withholding tax on dividends	wd	%	0
Capital allowance rate	phi_rate	%	17.5
Depreciation method	SL	*(0,1)*	0
Proportion of accumulated accrued capital gains realized per period	lambda	%	0
Statutory capital gains tax rate	zstar	%	0

Clicking on the button to solve for the CoC and the EMTR yields the full set of results in cells F32 to G40. They are summarized in Tables A19 and A20, showing how the additional tax incentive increased the NPV of capital allowances and the post-tax economic rent while having a decreasing effect on the EATR, EMTR and the CoC. To gain a better understanding of the impact of the first-year allowance on cash flows and NPVs Tables A21 and A22 depict period-by-period values as in the previous example. Tax credits and enhanced depreciation can be analysed using the same procedure.

Table A19: Intermediate Variables in Baseline and Reform Scenarios

Intermediate Variables	Excel	Units	Baseline	Reform
Economic rent in the absence of taxation	RSTAR	*monetary*	0.6667	0.6667
Nominal interest rate	i	%	5.00	5.00
Accrual-equivalent capital gains tax rate	z	%	0.00	0.00
Net SH income per unit-increase in dividends	gamma	*monetary*	1.00	1.00
Nominal SH discount rate	rho	%	5.00	5.00
Net present value of depreciation allowances	A	*monetary*	0.2333	0.2413

Table A20: Outcome Variables in Baseline and Reform Scenarios

Outcome Variables: Retained Earnings	Excel	Units	Baseline	Reform
Post-tax economic rent on investments financed by retained earnings	RRE	*monetary*	0.4000	0.4079
Additional financial cost of external finance	FC	*monetary*	0	0
Post-tax economic rent	RGEN	*monetary*	0.4000	0.4079
Average Effective Tax Rate	EATR	%	30.00	29.11
Cost of capital	pbar	%	7.14	6.89
Post-tax real rate of return to SH	s	%	-	-
Marginal investment tax wedge	tw	*pp*	-	-
Marginal Effective Tax Rate	EMTR	%	30.00	27.41

Table A21: Period-by-period Cash Flows in the Baseline Scenario

Year	Investment	Capital	Real Depreciatio	Revenue	Pre-Tax Net Income	Remaining Tax Value	Allowance	Taxable Income	Value: Cap. Allowances	Taxes	Pre-Tax Cash Flow	Post-Tax Cash Flow
0	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.00	-1.00
1	0	1.00	0.18	0.38	0.20	1.00	0.18	0.20	0.05	0.06	0.38	0.32
2	0	0.83	0.14	0.31	0.17	0.83	0.14	0.17	0.04	0.05	0.31	0.26
3	0	0.68	0.12	0.26	0.14	0.68	0.12	0.14	0.04	0.04	0.26	0.21
4	0	0.56	0.10	0.21	0.11	0.56	0.10	0.11	0.03	0.03	0.21	0.18
5	0	0.46	0.08	0.17	0.09	0.46	0.08	0.09	0.02	0.03	0.17	0.15
6	0	0.38	0.07	0.14	0.08	0.38	0.07	0.08	0.02	0.02	0.14	0.12
7	0	0.32	0.06	0.12	0.06	0.32	0.06	0.06	0.02	0.02	0.12	0.10
8	0	0.26	0.05	0.10	0.05	0.26	0.05	0.05	0.01	0.02	0.10	0.08
9	0	0.21	0.04	0.08	0.04	0.21	0.04	0.04	0.01	0.01	0.08	0.07
10	0	0.18	0.03	0.07	0.04	0.18	0.03	0.04	0.01	0.01	0.07	0.06
11	0	0.15	0.03	0.05	0.03	0.15	0.03	0.03	0.01	0.01	0.05	0.05
12	0	0.12	0.02	0.05	0.02	0.12	0.02	0.02	0.01	0.01	0.05	0.04
13	0	0.10	0.02	0.04	0.02	0.10	0.02	0.02	0.01	0.01	0.04	0.03
14	0	0.08	0.01	0.03	0.02	0.08	0.01	0.02	0.00	0.00	0.03	0.03
15	0	0.07	0.01	0.03	0.01	0.07	0.01	0.01	0.00	0.00	0.03	0.02
16	0	0.06	0.01	0.02	0.01	0.06	0.01	0.01	0.00	0.00	0.02	0.02
17	0	0.05	0.01	0.02	0.01	0.05	0.01	0.01	0.00	0.00	0.02	0.01
18	0	0.04	0.01	0.01	0.01	0.04	0.01	0.01	0.00	0.00	0.01	0.01
19	0	0.03	0.01	0.01	0.01	0.03	0.01	0.01	0.00	0.00	0.01	0.01
20	0	0.03	0.00	0.01	0.01	0.03	0.00	0.01	0.00	0.00	0.01	0.01
NPV					**0.89**				**0.23**	**0.27**	**0.67**	**0.40**

Table A22: Period-by-period Cash Flows in the Reform Scenario (with a 30% first-year allowance)

Year	Investment	Capital	Real Depreciatio	Revenue	Pre-Tax Net Income	Remaining Tax Value	Allowance	Taxable Income	Value: Cap. Allowances	Taxes	Pre-Tax Cash Flow	Post-Tax Cash Flow
0	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.00	-1.00
1	0	1.00	0.18	0.38	0.20	1.00	0.30	0.08	0.09	0.02	0.38	0.35
2	0	0.83	0.14	0.31	0.17	0.70	0.12	0.19	0.04	0.06	0.31	0.25
3	0	0.68	0.12	0.26	0.14	0.58	0.10	0.15	0.03	0.05	0.26	0.21
4	0	0.56	0.10	0.21	0.11	0.48	0.08	0.13	0.03	0.04	0.21	0.17
5	0	0.46	0.08	0.17	0.09	0.39	0.07	0.10	0.02	0.03	0.17	0.14
6	0	0.38	0.07	0.14	0.08	0.32	0.06	0.09	0.02	0.03	0.14	0.12
7	0	0.32	0.06	0.12	0.06	0.27	0.05	0.07	0.01	0.02	0.12	0.10
8	0	0.26	0.05	0.10	0.05	0.22	0.04	0.06	0.01	0.02	0.10	0.08
9	0	0.21	0.04	0.08	0.04	0.18	0.03	0.05	0.01	0.01	0.08	0.07
10	0	0.18	0.03	0.07	0.04	0.15	0.03	0.04	0.01	0.01	0.07	0.05
11	0	0.15	0.03	0.05	0.03	0.12	0.02	0.03	0.01	0.01	0.05	0.04
12	0	0.12	0.02	0.05	0.02	0.10	0.02	0.03	0.01	0.01	0.05	0.04
13	0	0.10	0.02	0.04	0.02	0.08	0.01	0.02	0.00	0.01	0.04	0.03
14	0	0.08	0.01	0.03	0.02	0.07	0.01	0.02	0.00	0.01	0.03	0.03
15	0	0.07	0.01	0.03	0.01	0.06	0.01	0.02	0.00	0.00	0.03	0.02
16	0	0.06	0.01	0.02	0.01	0.05	0.01	0.01	0.00	0.00	0.02	0.02
17	0	0.05	0.01	0.02	0.01	0.04	0.01	0.01	0.00	0.00	0.02	0.01
18	0	0.04	0.01	0.01	0.01	0.03	0.01	0.01	0.00	0.00	0.01	0.01
19	0	0.03	0.01	0.01	0.01	0.03	0.00	0.01	0.00	0.00	0.01	0.01
20	0	0.03	0.00	0.01	0.01	0.02	0.00	0.01	0.00	0.00	0.01	0.01
NPV					**0.89**				**0.24**	**0.26**	**0.67**	**0.41**

B. Country-level Input Parameters

Australia: AUS 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Capital Allowance Rate	4.00	2.50	7.84	19.25	15.00	5.00	5.00	4.00	13.75	20.00
Recovery Method	SL	SL	DBSL	DBSL	DBSL	DBSL	DBSL	DBSL	DBSL	DBSL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA
Austria: AUT 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Capital Allowance Rate	3.00	2.00	6.00	17.00	20.00	7.00	5.00	33.00	10.00	33.00
Recovery Method	SL	SL	SL	SL	SL	SL	SL	SL	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO
Belgium: 2015 - Lower Bound	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	33.99	33.99	33.99	33.99	33.99	33.99	33.99	33.99	33.99	33.99
Capital Allowance Rate	5.00	3.00	10.00	10.00	10.00	10.00	10.00	10.00	33.33	20.00
Recovery Method	SL	SL	SL	SL	SL	SL	SL	SL	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO
Belgium: 2015 - Upper Bound	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	33.99	33.99	33.99	33.99	33.99	33.99	33.99	33.99	33.99	33.99
Capital Allowance Rate	5.00	3.00	10.00	10.00	10.00	10.00	10.00	10.00	33.33	20.00
Recovery Method	SL	SL	DBSL	DBSL	DBSL	DBSL	DBSL	SL	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO

Canada: CAN 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	26.70	26.70	26.70	26.70	26.70	26.70	26.70	26.70	26.70	26.70
Capital Allowance Rate	10.00	6.00	50.00	30.00	20.00	8.00	50.00	55.00	25.00	100.00
Recovery Method	DB	DB	DB	DB	DB	DB	DB	DB	DB	DB
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Inventory Valuation	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA
Switzerland: CHE 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	21.15	21.15	21.15	21.15	21.15	21.15	21.15	21.15	21.15	21.15
Capital Allowance Rate	8.00	4.00	30.00	40.00	40.00	40.00	-	40.00	40.00	40.00
Recovery Method	DB	DB	DB	DB	DB	DB	SL	DB	DB	DB
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	0.50	-	-	-
Second Year: Allowance	-	-	-	-	-	-	0.50	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO
Chile: CHL 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50
Capital Allowance Rate	1.25	2.00	6.67	14.29	16.67	10.00	10.00	16.67	16.67	-
Recovery Method	SL	SL	SL	SL	SL	SL	SL	SL	SL	-
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA
Costa Rica: CRI 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Capital Allowance Rate	2.00	2.00	10.00	20.00	10.00	7.00	7.00	20.00	2.50	20.00
Recovery Method	SL	SL	SL	SL	SL	SL	SL	SL	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA

Czech Rep.: CZE 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00
Capital Allowance Rate	-	-	-	-	-	-	5.00	-	33.33	33.33
Recovery Method	COEF	COEF	COEF	COEF	COEF	COEF	SL	COEF	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	30.00	50.00	5.00	5.00	3.00	10.00	-	3.00	-	-
COEF: Second Year Coefficient	31.00	51.00	6.00	6.00	4.00	11.00	-	4.00	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA
Denmark: DEN 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50
Capital Allowance Rate	4.00	0.00	25.00	25.00	25.00	17.00	17.00	25.00	100.00	100.00
Recovery Method	SL	0.00	SL	SL	SL	SL	SL	SL	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO
Estonia: EST 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Capital Allowance Rate	-	-	-	-	-	-	-	-	-	-
Recovery Method	-	-	-	-	-	-	-	-	-	-
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	-	-	-	-	-	-	-	-	-	-
Spain: ESP 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00
Capital Allowance Rate	3.00	2.00	12.00	16.00	20.00	5.00	10.00	25.00	5.00	33.00
Recovery Method	SL	SL	SL	SL	SL	SL	SL	SL	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA

Finland: FIN 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Capital Allowance Rate	7.00	4.00	25.00	25.00	25.00	25.00	25.00	25.00	10.00	33.33
Recovery Method	DB	DB	DB	DB	DB	DB	DB	DB	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO
France: FRA 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00
Capital Allowance Rate	5.00	5.00	16.07	16.07	16.07	16.07	16.07	-	20.00	-
Recovery Method	DB	DB	DBSL	DBSL	DBSL	DBSL	DBSL	-	SL	-
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	2.00	2.00	2.00	2.00	2.00	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA
Utd. Kingdom: GBR 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Capital Allowance Rate	0.00	0.00	18.00	18.00	18.00	18.00	18.00	18.00	16.69	55.00
Recovery Method	-	-	DB	DB	DB	DB	DB	DB	DB	DB
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO
Germany: GER 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	30.18	30.18	30.18	30.18	30.18	30.18	30.18	30.18	30.18	30.18
Capital Allowance Rate	3.00	3.00	6.00	17.00	20.00	7.00	5.00	33.00	20.00	33.00
Recovery Method	SL	SL	SL	SL	SL	SL	SL	SL	0.00	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO

Greece: GRE 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00
Capital Allowance Rate	4.00	4.00	10.00	12.00	10.00	10.00	10.00	20.00	33.33	20.00
Recovery Method	SL	SL	SL	SL	SL	SL	SL	SL	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO
Hungary: HUN 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00
Capital Allowance Rate	2.00	2.00	33.00	20.00	33.00	14.50	14.50	14.50	50.00	-
Recovery Method	SL	SL	SL	SL	SL	SL	SL	SL	SL	-
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA
Ireland: IRL 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50
Capital Allowance Rate	4.00	0.00	12.50	12.50	12.50	12.50	12.50	12.50	7.00	12.50
Recovery Method	SL	-	SL	SL	SL	SL	SL	SL	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA
Iceland: ISL 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Capital Allowance Rate	6.00	3.00	30.00	35.00	35.00	35.00	35.00	35.00	20.00	20.00
Recovery Method	SL	SL	DB	DB	DB	DB	DB	DB	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO

Israel: ISR 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	26.50	26.50	26.50	26.50	26.50	26.50	26.50	26.50	26.50	26.50
Capital Allowance Rate	2.00	2.00	10.00	20.00	15.00	7.00	25.00	33.00	12.50	33.00
Recovery Method	SL	SL	SL	SL	SL	SL	SL	SL	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA
Italy: 2015 - Lower Bound	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	31.29	31.29	31.29	31.29	31.29	31.29	31.29	31.29	31.29	31.29
Capital Allowance Rate	3.00	2.00	6.00	20.00	12.50	7.00	4.00	20.00	20.00	20.00
Recovery Method	SL	SL	SL	SL	SL	SL	SL	SL	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Half-Year Convention	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Inventory Valuation	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO
Italy: 2015 - Upper Bound	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	31.29	31.29	31.29	31.29	31.29	31.29	31.29	31.29	31.29	31.29
Capital Allowance Rate	7.00	5.50	20.00	30.00	36.00	12.50	9.00	20.00	100.00	50.00
Recovery Method	SL	SL	SL	SL	SL	SL	SL	SL	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Half-Year Convention	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Inventory Valuation	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO
Japan: JPN 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	32.11	32.11	32.11	32.11	32.11	32.11	32.11	32.11	32.11	32.11
Capital Allowance Rate	2.70	2.00	10.00	25.00	16.67	5.90	5.90	25.00	-	0.00
Recovery Method	SL	SL	DBSL	DBSL	DBSL	DBSL	DBSL	DBSL	-	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	2.00	2.00	2.00	2.00	2.00	2.00	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA

Luxembourg: LUX 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	29.22	29.22	29.22	29.22	29.22	29.22	29.22	29.22	29.22	29.22
Capital Allowance Rate	4.00	4.00	14.00	20.00	10.00	7.00	5.00	33.00	33.33	33.00
Recovery Method	SL	SL	DB	DB	DB	DB	SL	DB	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO
Mexico: MEX 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Capital Allowance Rate	5.00	5.00	8.00	25.00	25.00	5.00	100.00	30.00	35.00	5.00
Recovery Method	SL	SL	SL	SL	SL	SL	SL	SL	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA
Netherlands: NLD 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Capital Allowance Rate	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	100.00	20.00
Recovery Method	SL	SL	SL	SL	SL	SL	SL	SL	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO
Norway: NOR 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00
Capital Allowance Rate	4.00	2.00	20.00	20.00	30.00	1.50	10.00	30.00	-	30.00
Recovery Method	DB	DB	DB	DB	DB	DB	DB	DB	-	DB
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO

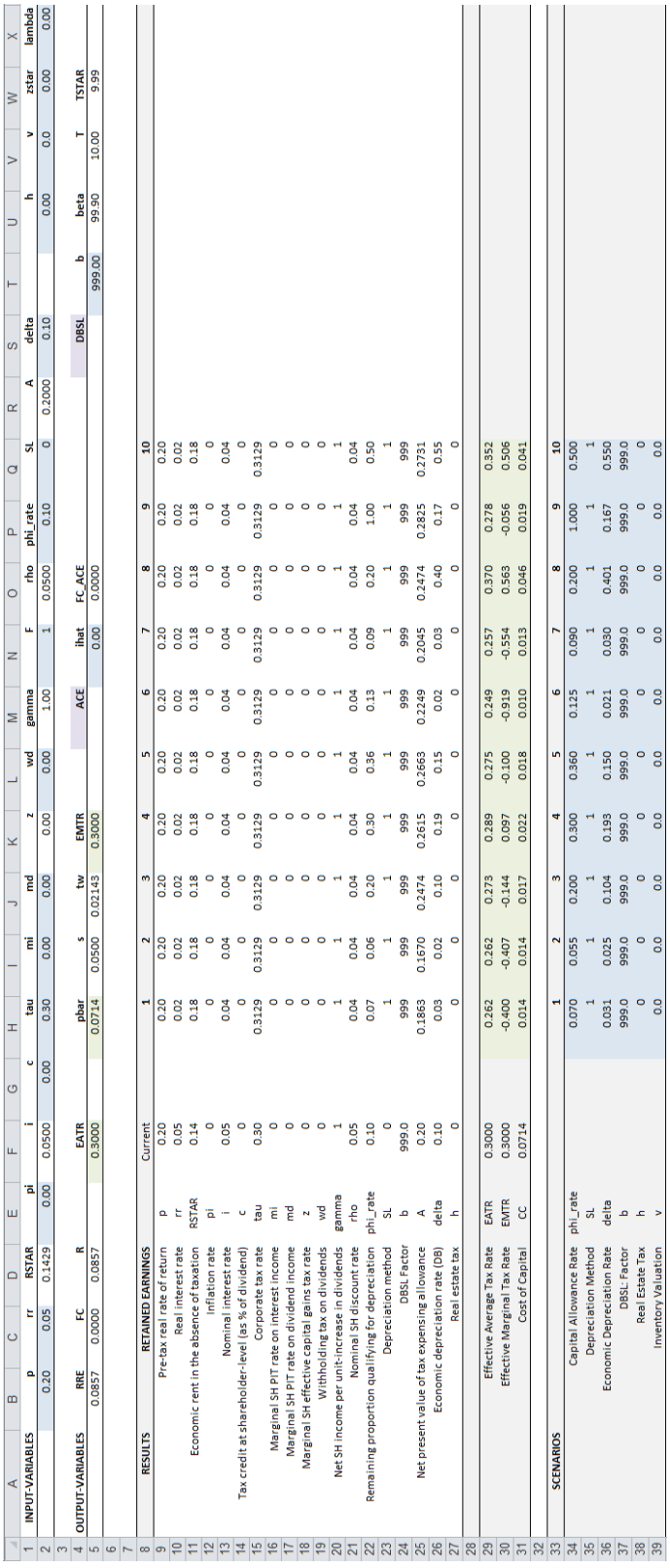
New Zealand: NZL 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00
Capital Allowance Rate	0.09	0.00	0.11	0.14	0.11	0.07	0.11	0.40	0.08	0.40
Recovery Method	SL	SL	SL	SL	SL	SL	SL	SL	SL	SL
Economic Depreciation Rate	0.03	0.02	0.10	0.19	0.15	0.02	0.03	0.40	0.17	0.55
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA
Poland: POL 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00
Capital Allowance Rate	10.00	2.50	10.00	20.00	10.00	18.00	18.00	30.00	20.00	50.00
Recovery Method	SL	SL	SL	SL	SL	SL	SL	SL	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO
Portugal: PRT 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50
Capital Allowance Rate	5.00	2.00	20.00	20.00	33.33	5.00	25.00	33.33	25.00	33.33
Recovery Method	SL	SL	SL	SL	SL	SL	SL	SL	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA
Singapore: SGP 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00
Capital Allowance Rate	0.00	0.00	33.33	33.33	33.33	33.33	33.33	100.00	20.00	100.00
Recovery Method	-	-	SL	SL	SL	SL	SL	SL	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO

Slovak Rep.: SVK 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00
Capital Allowance Rate	5.00	2.50	16.70	25.00	25.00	16.70	16.70	25.00	25.00	-
Recovery Method	SL	SL	SL	SL	SL	SL	SL	SL	SL	-
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA
Slovenia: SVN 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00
Capital Allowance Rate	3.00	3.00	20.00	20.00	20.00	20.00	20.00	50.00	10.00	50.00
Recovery Method	SL	SL	SL	SL	SL	SL	SL	SL	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA
Sweden: SWE 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00
Capital Allowance Rate	3.14	2.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Recovery Method	DB	DB	DB	DB	DB	DB	DB	DB	DB	DB
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO
Turkey: TUR 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Capital Allowance Rate	10.00	10.00	14.29	14.29	14.29	14.29	14.29	-	6.66	-
Recovery Method	DBSL	DBSL	DBSL	DBSL	DBSL	DBSL	DBSL	-	DBSL	-
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	2.00	2.00	2.00	2.00	2.00	2.00	2.00	-	2.00	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	WA	WA	WA	WA	WA	WA	WA	WA	WA	WA

United States: USA 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00
Capital Allowance Rate	2.56	2.56	14.29	20.00	14.29	6.67	20.00	20.00	100.00	33.33
Recovery Method	SL	SL	DBSL	DBSL	DBSL	DBSL	DBSL	DBSL	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	2.00	2.00	2.00	1.50	2.00	2.00	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	-	-	-	-	-	-	-	-	-	-
Second Year: Allowance	-	-	-	-	-	-	-	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	NO	NO	YES	YES	YES	YES	YES	YES	NO	YES
Inventory Valuation	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO	LIFO
South Africa: ZAF 2015	MAP	OFB	MAE	TRA	COM	POW	SOL	PC	RD	SW
Corporate Tax Rate	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00
Capital Allowance Rate	20.00	5.00	20.00	20.00	6.67	20.00	20.00	33.33	5.00	33.33
Recovery Method	SL	SL	SL	SL	SL	SL	SL	SL	SL	SL
Economic Depreciation Rate	3.14	2.47	10.43	19.25	15.00	2.11	3.03	40.09	16.69	55.00
DBSL: Factor	-	-	-	-	-	-	-	-	-	-
SYD: Tax Life	-	-	-	-	-	-	-	-	-	-
COEF: First Year Coefficient	-	-	-	-	-	-	-	-	-	-
COEF: Second Year Coefficient	-	-	-	-	-	-	-	-	-	-
First Year: Allowance	40.00	-	40.00	-	-	40.00	50.00	-	-	-
Second Year: Allowance	-	-	-	-	-	-	30.00	-	-	-
ACE: Notional Interest Rate	-	-	-	-	-	-	-	-	-	-
Half-Year Convention	-	-	-	-	-	-	-	-	-	-
Inventory Valuation	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO	FIFO

C. Screenshots of the Model Files

Screenshot: Calculation Sheet of ETAX.xlsm



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	**INPUT-VARIABLES**		**p**	**rr**	**RSTAR**	**pi**	**i**	**c**	**tau**	**mi**	**md**	**z**	**wd**	**gamma**		**F**	**rho**	**phi_rate**	**SL**	**A**	**delta**		**h**	**v**	**zstar**	**lambda**
2			0.20	0.05	0.1429	0.00	0.0500	0.00	0.30	0.00	0.00	0.00	0.00	1.00		1	0.0500	0.10	0	0.2000	0.10		0.00	0.0	0.00	0.00
3																										
4	**OUTPUT-VARIABLES**		**RRE**	**FC**	**R**		**EATR**		**pbar**	**s**	**tw**	**EMTR**		**ACE**		**ihat**	**FC_ACE**					**DBSL**	**b**	**beta**	**T**	**TSTAR**
5			0.0857	0.0000	0.0857		0.3000		0.0714	0.0500	0.02143	0.3000				0.00	0.0000						999.00	99.90	10.00	9.99
6																										
7																										
8		**RESULTS**			**RETAINED EARNINGS**		Current		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**								
9			Pre-tax real rate of return		p		0.20		0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20								
10			Real interest rate		rr		0.05		0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02								
11			Economic rent in the absence of taxation		RSTAR		0.14		0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18								
12			Inflation rate		pi		0		0	0	0	0	0	0	0	0	0	0								
13			Nominal interest rate		i		0.05		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04								
14			Tax credit at shareholder-level (as % of dividend)		c		0		0	0	0	0	0	0	0	0	0	0								
15			Corporate tax rate		tau		0.30		0.3129	0.3129	0.3129	0.3129	0.3129	0.3129	0.3129	0.3129	0.3129	0.3129								
16			Marginal SH PIT rate on interest income		mi		0		0	0	0	0	0	0	0	0	0	0								
17			Marginal SH PIT rate on dividend income		md		0		0	0	0	0	0	0	0	0	0	0								
18			Marginal SH effective capital gains tax rate		z		0		0	0	0	0	0	0	0	0	0	0								
19			Withholding tax on dividends		wd		0		0	0	0	0	0	0	0	0	0	0								
20			Net SH income per unit-increase in dividends		gamma		1		1	1	1	1	1	1	1	1	1	1								
21			Nominal SH discount rate		rho		0.05		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04								
22			Remaining proportion qualifying for depreciation		phi_rate		0.10		0.07	0.06	0.20	0.30	0.36	0.13	0.09	0.20	1.00	0.50								
23			Depreciation method		SL		0		1	1	1	1	1	1	1	1	1	1								
24			DBSL Factor		b		999.0		999	999	999	999	999	999	999	999	999	999								
25			Net present value of tax expensing allowance		A		0.20		0.1863	0.1670	0.2474	0.2615	0.2663	0.2249	0.2045	0.2474	0.2825	0.2731								
26			Economic depreciation rate (DB)		delta		0.10		0.03	0.02	0.10	0.19	0.15	0.02	0.03	0.40	0.17	0.55								
27			Real estate tax		h		0		0	0	0	0	0	0	0	0	0	0								
28																										
29			Effective Average Tax Rate		EATR		0.3000		0.262	0.262	0.273	0.289	0.275	0.249	0.257	0.370	0.278	0.352								
30			Effective Marginal Tax Rate		EMTR		0.3000		-0.400	-0.407	-0.144	0.097	-0.100	-0.919	-0.554	0.563	-0.056	0.506								
31			Cost of Capital		CC		0.0714		0.014	0.014	0.017	0.022	0.018	0.010	0.013	0.046	0.019	0.041								
32																										
33		**SCENARIOS**							**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**								
34			Capital Allowance Rate		phi_rate				0.070	0.055	0.200	0.300	0.360	0.125	0.090	0.200	1.000	0.500								
35			Depreciation Method		SL				1	1	1	1	1	1	1	1	1	1								
36			Economic Depreciation Rate		delta				0.031	0.025	0.104	0.193	0.150	0.021	0.030	0.401	0.167	0.550								
37			DBSL Factor		b				999.0	999.0	999.0	999.0	999.0	999.0	999.0	999.0	999.0	999.0								
38			Real Estate Tax		h				0	0	0	0	0	0	0	0	0	0								
39			Inventory Valuation		v				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0								

Screenshot: Calculation Sheet of ETAX_DEPRECIATION.xlsm

	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	**GENERAL ECONOMIC PARAMETERS**										**ASSUMPTIONS**			
2		Rate of Return	p	0.20							Source of Finance	F=(1,2)	Equity (Retained Earnings or New Equity)	
3		Real Interest Rate	r	0.05							Shareholder Level Taxation: Interest	mi=0	(not accounted for)	
4		Nominal Interest Rate	i	0.07							Shareholder Level Taxation: Dividends	md=0	(not accounted for)	
5		Shareholder level discount factor	rho	0.07							Dividend Withholding Tax	wd=0	(not accounted for)	
6		Economic rent in the absence of taxation	RSTAR	0.14							Capital Gains Tax	z=0	(not accounted for)	
7		Economic Depreciation	delta	0.55							Net shareholder income per unit-increase in dividends	gamma=1	(fixed)	
8		Investment	-	1							Wealth Tax	w=0	(not accounted for)	
9		Inflation	pi	0.02							Inventories	v=0	(not accounted for)	
10														
11														
12														
13														
14	**TAX DEPRECIATION: BASELINE**													
15	Corporate Tax Rate	0.28			DBSL: Factor	2.00			Allowances: Wasteable	NO				
16	Recovery Method	SL			SYD: Tax Life	999								
17	Capital Allowance Rate	0.20			COEF: First Year Coefficient	999								
18	DB: Write-off Threshold	0.00			COEF: Second Year Coefficient	999								
19														
20	**TAX DEPRECIATION: REFORM**													
21	Corporate Tax Rate	0.39			DBSL: Factor	2.00			Allowances: Wasteable	NO			Tax Life under SL	3
22	Recovery Method	SL			SYD: Tax Life	999			Credits: Wasteable	NO			Optimal Switching Period	2
23	Capital Allowance Rate	0.33			COEF: First Year Coefficient	999							Half-year Convention	NO
24	DB: Write-off Threshold	0.00			COEF: Second Year Coefficient	999								
25														
26		**TAX INCENTIVES IN REFROM SCENARIO**		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	
27		Allowance	YES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
28		Credit	YES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
29		Enhanced Depreciation	YES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
30														
31		**RESULTS**		BASE	REFORM									
32		NPV Tax Allowances	A	0.2290	0.3405									
33		NPV Net Income	YSTAR	0.3285	0.3285									
34		NPV Tax	-	0.1110	0.1330									
35		NPV Pre-tax Cash Flow	RSTAR	0.2142	0.2142									
36		NPV Post-tax Cash Flow	R	0.1032	0.0812									
37														

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