

TaxBEN: The OECD tax-benefit simulation model

Methodology, user guide and policy applications

This version: December 2022



ACKNOWLEDGEMENTS

This document was produced with the financial assistance of the European Union Programme for Employment and Social Innovation “EaSI” (2014-2020).



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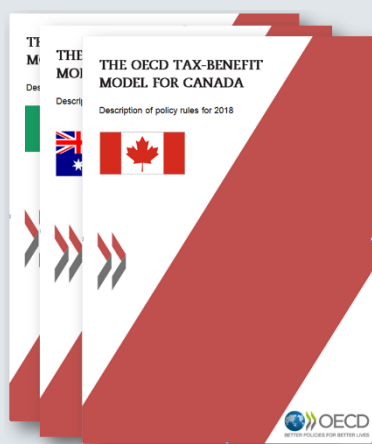
1 Introduction

1. The tax-benefit model TaxBEN ([TaxBEN](#)) is the cross-country tax and benefit simulation model developed and maintained by the OECD. It is a unique tool for exploring the detailed mechanics of tax-benefit policies and reforms on working age individuals and their families across countries. The scope of TaxBEN includes taxes and social benefits that, together, account for a large share of government budgets. This paper provides a comprehensive guide to the TaxBEN model, including key concepts, assumptions, updates and validation. It also describes the channels through which the OECD makes results and the model itself available to the policy community, researchers and the general public.¹

2. TaxBEN produces policy indicators on household incomes, labour costs and work incentives in different family situations and policy settings. It covers a broad set of income-support and tax policies going back to early 2000s for more than 40 OECD member and non-member countries (see [online Annex A](#) – Table A1). The model draws on a comprehensive library of tax and benefit policy rules that are relevant for working-age individuals and their families (see Box 1).

Box 1. OECD tax-benefit policy descriptions

Detailed descriptions of the main tax and benefit rules are available from the [project website](#) for each country (section ‘Policy descriptions’). These country reports include also extensive output from the OECD TaxBEN model and provide the reader with additional details on country-specific modelling assumptions made by the OECD when translating policy rules into computer programmes.



The OECD currently releases the tax-benefit policy descriptions on an annual basis. While the main focus is on the policies that are implemented in the OECD TaxBEN model, the Annex provides information on other cash transfers and taxes on employment incomes that are relevant for some groups of the working age population, but that are outside the scope of the model.

For complex policy rules and mechanisms, the reports provide also detailed step by step calculations of selected tax and benefit amounts. The aim of these calculations is twofold. First, they provide a better understanding of how complex tax and benefit rules work and interact in practice. In addition, they facilitate the validation of model results with the OECD [network](#)

[of national tax-benefit experts.](#)

¹ This manual is updated as the model evolves, and in response to user comments. If you wish to submit comments or questions on this manual, please, contact Tax-Benefit.Models@oecd.org.

All of the reports follow a consistent format to facilitate comparisons across countries and monitoring of policy reforms over time. The series of OECD tax-benefit country reports for all the available policy years is available from this [web link](#).

A comparative summary of policies across countries is provided in [policy summary tables](#).

3. Model updates have been undertaken annually with full results for the current year typically available internally before the end of the calendar year and disseminated to the users soon after. Updates benefit from the direct involvement of [country officials from ministries and other government institutions](#), who provide up-to-date policy information and ensuring the accuracy of results.² To maintain a consistent time series for policy monitoring and analysis, any changes or corrections to the tax and benefit calculations are systematically back-dated to earlier policy years as relevant.

4. The model covers insurance benefits, assistance and universal benefits, including **unemployment, minimum-income, housing and in-work benefits**, as well as **cash family support**. On the tax side, TaxBEN incorporates **personal income taxes** as well as **mandatory social contributions, non-tax compulsory payments and payroll taxes**. **Childcare fees and benefits** for parents using centre-based childcare and **disability benefits** are included for selected countries and years (see [online Annex A](#) Table A2). The most important policy areas that currently remain outside the scope of the model are direct taxes on wealth (e.g. taxes on immovable and movable property, including council tax at a local level), indirect taxes (e.g. VAT), early-retirement and retirement benefits, and in-kind transfers (e.g. subsidised housing, transport and health care). Sickness benefits and short-time working benefits (partial unemployment benefits and similar job-retention measures) were included in the policy library in 2020 and may be added to the model in the future.

5. TaxBEN follows a “hypothetical family” approach, that is to say, it calculates tax liabilities and benefit entitlements for a broad set of stylised families (sometimes referred to as “vignettes”) whose characteristics are relevant from a policy perspective. Different sets of characteristics can be of interest depending on the specific use of the model and model users can define many of them exogenously, e.g., the economic activity status of the adult members, the age and number of children, the earnings level and hours of work for those who are in paid employment, or the unemployment duration and previous earnings for those who are out of work.³

6. The hypothetical family approach does not require the use of survey or administrative microdata, which are typically available only with significant time lags or are difficult to access. The focus on stylised but policy-relevant households enables broad country coverage, timely results and model use by a broad range of users without a need to apply for access to household micro-data. Box 2 situates hypothetical household models and their strengths and limitations relative to population-based tax-benefit microsimulation models. In practice, hypothetical family and microdata-based simulation models are useful complements (Hufkens et al., 2019_[1]). The former facilitate the understanding of key policy mechanisms and interactions for selected policy-relevant households comparable across countries. The latter produce results that are representative for the whole population, but are more difficult to construct and compare in a cross-country setting. Results from population-based models, and their changes over time, can be difficult to validate and

² The tax and social-contribution parts of TaxBEN are validated against tax formulas maintained by the OECD Centre for Tax Policy and Administration in co-operation with country delegates from ministries of finance. The OECD publication [Taxing Wages](#) provides more information on the tax-burden models and the related indicators.

³ Section 4 provides the list of characteristics that can be varied by model users.

interpret because of the interactions between policy mechanisms and the composition of the underlying population.

Box 2. Hypothetical family models and population-based microsimulation models

Because of their focus on policy mechanics, outputs of hypothetical family models are well suited for estimating policy indicators, i.e. indicators of the *design* of policies rather than their *outcomes*. They facilitate cross-country comparisons of policies, as differences can be shown for similar household situations across different countries. Abstracting from differences in population characteristics is also useful for analysing “pure” policy effects of reforms over time, by holding characteristics of selected family types constant.

Hypothetical household models can also provide insights for population groups that are typically underrepresented in survey data, and they are well-suited for measuring and comparing incentives over time and across countries (e.g., for uncovering those parts of families’ choice sets that are particularly unattractive from an economic point of view and may, therefore, not be observable from representative micro-data). Relatedly, model outputs serve as valuable inputs for statistical analyses that explore associations or causal links between different socio-economic outcomes (e.g. labour-force participation) on one side and policy configurations (e.g. the generosity of out-of-work support) on the other.

By contrast, microdata-based tax-benefit simulation models allow calculating tax liabilities and benefit entitlements for all individuals and households included in representative household data. These models allow estimating reform impacts for the whole population and results are therefore particularly useful for estimating the budget implications of policy reforms and their detailed incidence for different population groups and across the entire income distribution. Policy impacts depend on both the policy design and on the population to which the policies are applied – for example, a progressive tax schedule will achieve more redistribution in a country where pre-tax income inequality is higher. Identifying “pure” policy effects with population-based microsimulation models therefore requires decomposition techniques to isolate the different drivers (Bargain and Callan, 2010^[21]).

The data requirements for population-based microsimulation models are considerable and available microdata may not be sufficient for analysing some key policy instruments, .e.g. insurance benefit, which depend on employment histories over a longer period.

7. Widely used indicators derived from the OECD tax-benefit model include [net replacement rates](#), [participation tax rates](#), [marginal effective tax rates](#) and [net childcare costs](#). These and other indicators (see the list of headline indicators in Section 5.3) are part of the policy-monitoring scoreboards used at the OECD to analyse reform options and compare policy features across countries and over time. Indicators and underlying policy information are systematically disseminated through the project webpage “[Benefits and Wages](#)”, the [OECD Data portal](#), the Social Protection and Well-being data cube on the [OECD.Stat](#) platform (section “Benefits, Taxes and Wages”), and in the form of a user-friendly [web calculator](#) (Section 4.1) that enables analysts, journalists and the general public to undertake customised calculations of tax liabilities and benefit entitlements for a broad set of family types and labour market characteristics.

8. The remainder of this paper proceeds as follows. Section 2 provides an overview of selected TaxBEN uses, both within the OECD and in the broader policy and research communities. Section 3 describes the methodology and model assumptions. Section 4 explains how to use the model whereas Section 5 describes model outputs and the headline tax-benefit indicators.

2 Uses of TaxBEN for policy analysis

9. TaxBEN and its associated policy library are long-standing activities that provide input into analysis of numerous policy areas, including crisis response, inequality, employment policy, skills, gender/family policy and migration. The model is used intensively within the OECD. The results, and the model itself, are also available to the broader policy and research communities. In the recent past, TaxBEN has been increasingly used for assessing the effects of specific policy reforms at the country level, including both past and prospective policy changes.

2.1. Model uses in the OECD

10. TaxBEN has supported work undertaken across the OECD on employment, social and fiscal policies. In part, this reflects the breadth of the policy areas covered in TaxBEN, and the fact that tax-benefit policies serve a broad range of objectives. There are also interlinkages between tax-benefit policies and measures taken in other policy areas that require co-ordination and joint analysis.

Input into the OECD Jobs Strategy

11. First versions of the tax-benefit model were developed in the early 1990s in context of the *OECD Jobs Study*, whose recommendations constituted the first OECD Jobs Strategy (OECD, 1994_[3]). The 1994 Jobs Study was undertaken in response to high and persistent unemployment in many OECD countries, and included a specific focus on the generosity of unemployment benefit systems and their effect on out-of-work durations and re-employment incentives.⁴ In line with the Jobs Study's call for attention to work incentives and careful integration of tax and benefit systems, the early version of TaxBEN was maintained and expanded as an input into this policy agenda and for analysing the role of in-work benefits (Scarpetta, 1996_[4]; Pearson and Whitehouse, 1997_[5]).

The *Reassessed Jobs Strategy* (OECD, 2006_[6]) further emphasised the importance of coherent policy packages and the need for attention to interactions between different policies and institutions, including taxes and out-of-work benefits (Bassanini and Duval, 2006_[7]).⁵ The 2006 Strategy also placed greater emphasis on the social implications of strategies to boost employment, and on the contribution of out-of-work benefits to reducing inequality and poverty.

12. The OECD's latest Jobs Strategy (OECD, 2018_[8]) embraces inclusiveness as one of the principal pillars of labour-market performance and highlights the role of redistribution and other policies that seek to reduce inequality directly.⁶ The new Jobs

⁴ For instance, the 1994 Jobs Study argued that “the greater the generosity of unemployment benefits, the slower the labour-market adjustment following shocks”, and that “relatively high unemployment benefit entitlements tend eventually to increase unemployment”.

⁵ The 2006 Jobs Strategy states that “a policy mix with low unemployment benefits and low investment in active labour market programmes appears to perform no better than a policy mix with high unemployment benefits and high investment in active labour market programmes, combined with tight monitoring of job-search behaviour” (p. 193).

⁶ The 2018 Jobs Strategy states: “Unemployment insurance can also contribute significantly to redistribution [...]. Increasing the coverage of unemployment insurance is a promising avenue for

Strategy employs TaxBEN to analyse and compare how interactions between policy areas, such as minimum wages and tax burdens, or in-work and out-of-work benefits, shape income security and work incentives. TaxBEN also feeds into the job quality (labour-market security) index that is part of the Job Strategy scoreboard on labour-market performance (OECD, 2017_[9]).

Input into OECD work on inequality and redistribution

13. All recent OECD flagship reports on inequality have included in-depth analysis of redistribution through taxes and benefits (OECD, 2008_[10]; 2011_[11]; 2015_[12]; 2018_[13]; 2019_[14]).⁷ (OECD, 2011_[11]) and (Immervoll and Richardson, 2011_[15]) undertook a detailed assessment of longer-term trends in government redistribution through taxes and benefits and identified out-of-work benefits as the key driver of declining redistributive power between the mid-1990s and the mid-2000s.⁸

14. More recent work updated and extended the analysis of redistribution trends ([DELSA/ELSA\(2018\)4](#), (Causa, Browne and Vindics, 2019_[16])). Results relying on TaxBEN confirm earlier finding that policy changes in most OECD countries have lowered benefits for jobless individuals relative to median income, thus reducing redistribution between *working and workless households*. But policy changes since the early 2000s had strengthened redistribution between *working families at different earnings levels*. A further notable result was that, despite numerous policy changes since the start of the 2008-9 global financial crisis, the net effect of these successive reforms on redistribution among working-age families since 2007 appears to have been only very limited overall (that is, income inequality among working-age families would not have been significantly higher or lower in most countries had tax and benefit policies remained as they were in 2007).

15. Other more recent TaxBEN inputs into the OECD work programme include the following:

Income support policies

- Unemployment benefits, minimum-income benefits and related out-of-work support (OECD, 2018_[17]; OECD, 2019_[18]; Hye, Fernández and Immervoll, 2020_[19]; Immervoll, Jenkins and Königs, 2015_[20]; Immervoll, 2010_[21]; Hijzen and Salvatori, 2020_[22]).
- In-work benefits (Immervoll and Pearson, 2009_[23]; OECD, 2005_[24]).
- Disability benefits (OECD, 2010_[25]; Immervoll, MacDonald and Prinz, 2020_[26]).
- Basic Income (OECD, 2017_[27]; Browne and Immervoll, 2017_[28]).

Employment, activation policies and work incentives

- Thematic and comparative reports (Immervoll and Scarpetta, 2012_[29]).

promoting labour market security and inclusiveness, provided it is carried out together with the rigorous enforcement of a ‘mutual-obligations’ framework to preserve work incentives.” (p. 82).

⁷ Further studies with a distributional focus have sometimes used TaxBEN results in parts of their analysis, e.g. the Employment Outlook chapters on the declining labour share (OECD, 2012_[166]) and on in-work poverty (OECD, 2009_[167]).

⁸ This was in part due to declining coverage (such as the share of jobseekers receiving unemployment benefits). But benefit recipients have also experienced falling support levels, with net replacement rates declining in 7 out of 10 countries. However, policy changes appeared less “regressive” for families with children than for single and childless people.

- Country reviews: *Faces of Joblessness* series⁹, *Connecting People with Jobs* series¹⁰, *Activation Policy Reviews* series¹¹.

Crisis response

- *Employment Outlook* (OECD, 2009_[30]; 2011_[31]).
- Ministerial Council Meeting (C(2013)48/REV1/EN/PDF) and Social Policy Ministerial (OECD, 2011_[32]).
- Inventory of social policy measures and assessment of reform priorities (OECD, 2014_[33]; Immervoll and Richardson, 2013_[34]; Immervoll, 2012_[35]; Immervoll and Llena-Nozal, 2011_[36]).

Other themes

- Minimum Wages (OECD, 2015_[37]; 2015_[38]; 2020_[39]).
- Informality (OECD, 2008_[40]).
- Gender equality, female labour force participation and cost of childcare (OECD, 2018_[41]; 2017_[42]; 2012_[43]; 2007_[44]; 2020_[45]; Thévenon, 2013_[46]).
- Family policy and child poverty (Adema, Ali and Thévenon, 2014_[47]).
- *Investing in Youth* (OECD, 2019_[48]; 2019_[49]; 2016_[50]).
- Displaced workers, older workers (OECD, 2019_[51]; OECD, 2018_[17]).
- Housing policies (Salvi del Pero et al., 2016_[52]).
- Migration, fiscal dimensions (OECD, 2013_[53]; forthcoming_[54]).
- Skills, labour market outcomes and returns to education (OECD, 2018_[55]; 2015_[37]).

Country studies and comparative policy benchmarking / monitoring

- *OECD Reviews of Labour Market and Social Policies* (OECD, 2018_[56]; 2016_[57]; 2011_[58]; 2010_[59]; 2010_[60]; 2009_[61]), including TaxBEN indicators on net minimum wage, net replacement rates, income support for families with children, value and targeting of childcare support, value of minimum-income benefits relative to poverty line, participation tax rates, tax wedge.¹²
- *Society at a Glance* (OECD, 2019_[62]; 2011_[63]), with comparative results on net replacement rates by unemployment duration and the value of minimum-income benefits relative to poverty line, earnings needed to escape income poverty.

TaxBEN input into other OECD databases and analytical tools

- **OECD Pension model**: Various TaxBEN inputs into the estimation of pension replacement rates (OECD, 2019_[64]).

⁹ (Browne et al., 2018_[151]; Pacifico et al., 2018_[152]; Pacifico et al., 2018_[153]; Düll et al., 2018_[154]; Fernandez et al., 2018_[155]; Browne et al., 2018_[156]).

¹⁰ (OECD, 2016_[157]; OECD, 2017_[158]; OECD, 2018_[159]).

¹¹ (Duell et al., 2010_[160]; Duell, Grubb and Singh, 2009_[161]; Grubb, Singh and Tergeist, 2009_[162]; Duell, Singh and Tergeist, 2009_[163]; Duell et al., 2010_[164]; OECD, 2012_[165]).

¹² *Accession reports* prepared by other committees have also relied on selected TaxBEN indicators, e.g. (Demmou, 2016_[168]).

- **[OECD Family support calculator](#)**: TaxBEN feeds the calculation of tax burdens and benefit entitlements of families with children from before birth and during the first years following a child's birth.
- **[OECD Family Database](#)**: TaxBEN feeds indicators on the availability of family benefits, benefit amount (by family type, earnings, number of children and their age), gender neutrality of tax-benefit systems for couples, parental-leave benefits replacement rates, and childcare costs.
- **[OECD Affordable Housing Database](#)**: TaxBEN feeds indicators on rent allowances, and the impact of rent allowance withdrawal on work incentives.
- **[OECD Better Life Initiative: Measuring Well-Being and Progress](#)**: TaxBEN feeds the Work and Job Quality indicators: Labour market insecurity (OECD, 2020_[65]).
- **[Going for Growth Database](#)**: TaxBEN feeds indicators on net replacement rates in unemployment (by duration, previous earnings and family type), and net childcare costs and their impact on work incentives (by earnings and family type).
- **OECD macro-economic models**: TaxBEN feeds indicators into macro-models maintained by the Economics Department, see, e.g., Bulman et al. (2019_[66]).

2.2. A trusted source of evidence in the wider policy and research communities

16. Outside the OECD and individual member countries, numerous institutions and researchers with an active work programme on tax and transfer policies rely on TaxBEN as an established and trusted source of evidence.

17. Annex B provides a partial listing of academic research that was published in reputable research journals or books. The summary focuses on recent work. It does not aim to be exhaustive but it nonetheless spans a number of fields, including social and family policy, inequality research, labour economics, education, economic modelling and political science.

18. International bodies also regularly make use of the model and its results:

- **European Commission (EC)**: The EC has been a key partner in this activity, and has supported TaxBEN since 2002. Results provide inputs into EC flagship publications (European Commission, 2019_[67]), the European Semester [country reports](#) and [recommendations](#), as well as a number of EC publications and databases that provide monitoring capabilities in the context of key convergence objectives, such as the Council Recommendations on [Access to Social Protection](#), and the [European Pillar of Social Rights](#). TaxBEN also features regularly in analytical reports and studies undertaken, commissioned or supported by the EC.
- TaxBEN has also informed analytical and policy reports by numerous other International Organisations, including ILO, IMF, United Nations and World Bank.¹³

¹³ Selected uses include the following. ILO: (International Labour Organization, 2016_[169]; International Labour Organization; World Trade Organization, 2011_[170]); IMF: (Duval et al., 2018_[171]; Duval and Loungani, 2019_[172]; Vtyurina, 2020_[173]; Gbohoui, 2019_[174]; IMF, 2020_[175]); UN: (United Nations - Economic Commission for Europe, 2019_[176]); World Bank: (Packard, Koettl and Montenegro, 2012_[177]; Bargu and Morgandi, 2018_[178]).

2.3. Exploring policy reform options with TaxBEN

19. TaxBEN increasingly supports specific reform assessments and the exploration of reform options. As illustrated above, the model has long played a prominent role in monitoring the impact of *past reforms* on household incomes, work incentives and redistribution. As a simulation model, it also supports *forward-looking* reform assessments. These can reflect reform initiatives that are already planned or foreseen. They can also relate to less definitive reform options, including hypothetical ones that feature in national or international policy debates (such as e.g. a comprehensive Basic Income).¹⁴

20. The model is set up in a way that facilitates exploring and experimenting with reform scenarios by providing analysts with discrete “buttons to push” and “levers to pull” (tax rates, tax band limits, ceiling, entitlement conditions and benefit withdrawal rates). It also supports exploring structural policy changes (e.g., a move from joint to individual taxation), the introduction of an entirely new policy measure (an in-work benefit, short-term working scheme, or unemployment assistance programme) or broader policy packages (a higher minimum wage in combination with more generous out-of-work support, or replacing tax-deductibility of childcare costs with a targeted childcare support programme).

21. The extensive TaxBEN policy library facilitates the formulation of reform scenarios through a comprehensive and accessible repository of past reforms and specific policy designs that exist in other parts of the OECD area. An established set of indicators allows assessing reform impacts from multiple angles, including (i) total income changes and “gainers/losers” analysis along the earnings spectrum, (ii) decompositions of those changes by tax/benefit component; (iii) summary indicators on redistribution and progressivity; (iv) generosity of out-of-work benefits, such as net replacement rates; (v) work incentive measures, such as participation tax rates and marginal effective tax rate; and (vi) effective overall tax burden on labour.

22. Recent uses of TaxBEN in the context of assessments of reform or policy options have included the following:

- out-of-work support in **Finland** (Pareliussen, Hwang and Viitamäki, 2018_[68]), **Iceland** and **Lithuania** (Koutsogeorgopoulou and Guzzardi, 2018_[69]; OECD, 2018_[70]),
- social security contributions and in-work benefits in **France** (Carcillo et al., 2019_[71]),
- comprehensive policy package in **Greece**, including minimum-income benefits, housing allowance, family benefits and income tax (OECD, 2018_[72]). A subset of these reforms are also the subject of an assessment of the ESM (European Stability Mechanism) Financial Assistance Programme for Greece (OECD, 2020_[73]),
- family benefits and in-work benefits in **Israel** (OECD, 2020_[74]),
- minimum-income benefits in **Italy** (Bulman et al., 2019_[66]; OECD, 2019_[75]),
- more progressive taxation in **Latvia** (OECD, 2019_[76]),
- Universal Credit in the **United Kingdom** (Pareliussen, 2013_[77]).

23. In a number of countries, government departments have also relied on TaxBEN for reform assessments or monitoring. An example is the work of the Expert Group for Evaluation of the Adequacy of Basic Social Security in **Finland**, though not all such country-specific uses are published (The Second Expert Group for Evaluation of the Adequacy of Basic Social Security, 2015_[78]).

¹⁴ See for example (OECD, 2017_[27]; Browne and Immervoll, 2017_[28]).

3 Methodology

24. Calculating tax liabilities and benefit entitlements requires information on policy rules and on a wide range of household and individual characteristics. While TaxBEN allows users to calculate net family incomes for a variety of individual and family circumstances, it leaves some characteristics fixed in order to keep the number of outputs manageable. In addition, the model makes a number of assumptions that seek to facilitate cross-country comparison.

25. This section provides details on the definitions and assumptions used in the TaxBEN model. It describes key concepts (Section 3.1), the treatment of regional differences (Section 3.2), the family types and circumstances that are currently supported by the model (Section **Error! Reference source not found.**), the policy scope (Section REF_Ref35595670 \r \h 3.4), and the assumptions underlying the calculation of different benefits, taxes and income components (Section 3.5).

3.1. Key concepts

26. The key output of TaxBEN is a measure of **net family income after direct taxes, employee social security contributions and cash benefits**. Housing costs or any other forms of “committed expenditure” are *not* deducted from the net income measure. The only exception are childcare fees, which are subtracted from net incomes when the model is used for exploring the income consequences of using centre-based childcare (see Section 3.5.9). Similarly, social security contributions paid by employers or benefit agencies are not added to net incomes but shown as a separate component in the TaxBEN output.¹⁵

27. Tax and benefit amounts are calculated using the regulations that are in force on a particular **reference date**. For 2018 and later years, the reference date is 1 January (or the beginning of the fiscal year for individual taxpayers, where this differs from the calendar year); for earlier years, it is 1 July.¹⁶

28. All monetary amounts are expressed in **national currency**. In countries where the currency has changed, outputs are expressed in the currency of the year in question (e.g. for Latvia the outputs are in LVL up to 2013, and in EUR from 2014 onwards).¹⁷

29. TaxBEN calculates tax liabilities and benefit entitlements **for a particular month** of the selected year. Income amounts enter the calculations in an *annualized* format, in

¹⁵ As a result, cross-country comparisons of net incomes do not capture differences in employer social contributions, except to the extent that they influence the underlying calculations of gross in-work earnings (e.g. if they are subject to income tax).

¹⁶ In a few countries, the fiscal year for individual taxpayers differs from the calendar year. For instance, since 2018, calculations for New Zealand and for the United Kingdom refer to April. Details are documented in the [country policy descriptions](#) available online.

¹⁷ Table A1 in [online Annex A](#) shows the full list of currencies used across countries and years.

order to include the effect of the tax-benefit policies that depend on annual incomes (e.g. final taxes after filling in the tax return). For instance, when national legislation defines benefit amounts in monthly terms, values enter the calculations multiplied by 12 in order to obtain annualized amounts. When national legislations specify amounts in terms of working days or weeks, the annualization process in TaxBEN assumes five working days per week and 52 weeks per year.

30. In countries where regular benefit payments are made to support occasional or seasonal expenses (e.g. heating supplements during winter months, Christmas bonuses, start-of-school allowances), the total sum of these payments over the year is subsequently added to the annualized amounts.

31. **Annualization of incomes** has two implications. First, income taxes, which depend on annual incomes, are determined in relation to annualised amounts (e.g. the values for the particular month of interest multiplied by 12). Second, the annualized amount of certain benefits may exceed the maximum amount that can actually be received over a 12-month period (e.g. unemployment benefits or in-work benefits that are available for less than 12 months). This modelling approach enables examining how benefit entitlements and net incomes change *month by month* over a period of time (e.g., the effect of an unemployment spell on net income of a family for each month of the spell, see Section 3.5.2 and 4.2.2). Annualizing incomes avoids the need for additional assumptions about the *temporal pattern* of employment and incomes during an entire fiscal year (e.g., when the duration of benefits is shorter than 12 months). Taxing annualised values is consistent with the aim of determining taxes and benefits for a particular month. For instance, it is a reasonably good approximation of the deduction of income tax pre-payments (pay-as-you-earn, PAYE) during months when benefits are received.

32. For working family members, the default model assumption is **employment in the private sector with a standard employment contract and full-year employment throughout the year** without interruptions and with constant earnings and working hours. Section 3.5.1 details the measurement of wages earned while in work and options for setting working hours.

33. As the aim of TaxBEN is to assess the impact of tax-benefit rules in force at a particular point in time (e.g. on 1 January), **time lags** delaying the assessment of claimants' entitlement (e.g. for administrative reasons) are disregarded. This enables better understanding of interactions between different policy elements. Waiting periods are also typically disregarded with some exceptions (see Section 3.5.2). Any lags between benefit entitlements or tax liabilities, and their subsequent payment (e.g. whether they are paid in arrears or in advance) are ignored as well. For instance, if entitlement to social assistance benefits in the current month depends on income in a previous period, entitlements are instead computed based on the family's current income situation. Put differently, changes in income affect benefit entitlements *instantaneously*, rather than with a time lag. Relatedly, unemployment benefits often depend on gross earnings in a previous year. For consistency, when model users specify such earnings levels as percentages of average or minimum wages, the model computes earnings-related benefits in relation to average or minimum wages in the *current* (rather than a previous) year. Similarly, where previous *net* (rather than gross) earnings are the basis for benefit entitlements, relevant taxes are computed using the *current* year's tax rules.

3.2. Treatment of regional differences

34. Few OECD countries operate only national-level taxes and benefits: regions, municipalities or other sub-national jurisdictions often determine or implement taxes and benefits at a local level. TaxBEN applies the following broad principles when policy rules differ between regions or other sub-national jurisdictions:

- Default national-level rules are applied when they exist. Where regional variations consist of deviations from national default rules that would otherwise apply, variations are not taken into account.
- When there is no national default, rules for a particular selected jurisdiction are applied (an alternative would be to use some weighted average of rules that apply across jurisdictions).

35. The [online country policy descriptions](#) provide details on the treatment of regional differences for each country and tax-benefit policy where regional provisions are relevant. [Online Annex A](#) Table A3 summarises regional policy components modelled in TaxBEN.

3.3. Family types

36. TaxBEN calculates tax liabilities and benefit amounts for a broad set of hypothetical (or “stylised”) families. Users can create suitable stylised families by specifying a number of demographic and labour market characteristics. There are four main types of nuclear family:

- Single adults with or without dependent children; and
- Couples with or without dependent children.

37. In couple households, the two adult members are referred to in the model syntax as ‘first adult’ (or ‘principal’) and ‘second adult’ (or ‘spouse’), respectively. A single person is always referred to as ‘first adult’. Some options, such as eligibility for unemployment insurance benefits, can be specified only for the first adult. Members of a couple are assumed to be legally married (or to be in a registered cohabiting partnership, in cases where this is legally equivalent as far as tax-benefit provisions are concerned).

38. A single adult with children is assumed to be divorced, and receiving neither child nor spousal support from the former partner or absent parent. The model calculations assume that children live in the household at all times, that is, there is no shared custody between parents who have separated.

39. The model allows for up to four children per household. They can be of any age between 1 and 17 years old (including) and model users can specify ages separately for each child.¹⁸ The age of adults can currently range from a minimum of 18 to a statutory pension age.¹⁹ All adults in a household have the same age (i.e. it is not possible to specify different ages for the two members of the couple). When exact birthdays are relevant, as is the case for some child-related tax-benefit provisions, TaxBEN assumes that children and

¹⁸ The core TaxBEN model imposes a minimum age of one and prevents users from setting ages to zero. Birth-related leave benefits (usually granted at “age zero”) are available for selected years and countries via a special TaxBEN module (see Section 3.5.5).

¹⁹ Older workers are assumed to be part of labour force (working or looking for a job) and not in early or partial retirement.

adults were born on the policy reference date (i.e. 1 January in most countries for policy years 2018 onwards, see Section 3.1).

40. The default TaxBEN assumption is that all family members are in good health and that all adult members have full working capacity. An exception are model uses that require the calculation of disability-related benefits.

3.4. Policy scope

41. The model covers the main components of net family income for working-age families. Net family income is normally calculated as the sum of household members' market incomes (e.g. gross employment earnings, see Section 3.4.1) plus government cash transfers received (see Section 3.4.2) minus taxes and social security contributions paid by employees or benefit recipients (see Section 3.4.3). When the model is used for exploring the income consequences of using centre-based childcare, childcare fees are also subtracted from net incomes (see Section 3.5.9).

3.4.1. Market income

42. Gross employee earnings are the only 'market' incomes included in the model. Self-employment income and other market incomes, e.g. income from capital, are also excluded. Note that this implicitly adds other assumptions to the family circumstances considered in the TaxBEN framework. For instance, in cases where a former spouse is expected to provide financial support to the selected family, it is assumed that such support is not forthcoming. Section 3.5.1 describes the measurement of gross employee earnings.

3.4.2. Cash benefits

43. TaxBEN covers the following sources of cash benefits:

- Unemployment insurance and unemployment assistance benefits;
- Means-tested social assistance, including guaranteed minimum income benefits;
- Housing benefits for privately rented accommodations;
- Employment-conditional (or "in-work") benefits;
- Transitional "into-work" benefits - temporary payments designed to support jobseekers when transitioning into a new job;
- Family and child benefits, including lone-parent benefits;
- Childcare benefits whose eligibility is conditional on parents using centre-based childcare for their pre-school children.

44. Childcare benefits have been part of the core model output since the policy year 2018. As such, these policies are now updated on a yearly basis. Along with childcare benefits, the childcare policy module simulates also childcare fees (see more details in Section 3.5.9). Before 2018, childcare benefits are available for policy years 2004, 2008, 2012 and 2015.

45. Disability benefits are currently implemented in TaxBEN for selected countries in the policy year 2016.²⁰ The main results related to this ad-hoc module are available in the OECD report "[Benefit generosity and work incentives for disability benefit recipients](#)". A

²⁰ These countries are: Belgium, Czech Republic, Denmark, Estonia, Finland, Hungary, Ireland, Lithuania, the Netherlands, Poland, Sweden and the United Kingdom.

companion note available within the report describes the disability benefit policies as simulated in the TaxBEN model. Annex B of the report gives direct access to the full set of indicators that were produced with this ad-hoc module ([here](#)).²¹

46. Another special TaxBEN module, currently available only for the policy year 2014, allows calculating birth-related leave payments, such as birth grants, maternity, paternity and parental benefits for each month of early childhood, starting with the prenatal period (nine months prior to birth) and ending with the 36th month after birth. Users can calculate these entitlements through an ad-hoc excel-based calculator (available from [this link](#)). The underlying policies considered in this module are described [in this note](#).

47. [Online Annex A](#) Table A2 provides the list of special TaxBEN modules and the counties and years for which these modules are available.

48. In some countries, large-scale near-cash transfers are also covered because of their importance and interactions with other tax-benefit instruments, e.g. the Supplemental Nutrition Assistance Program (SNAP, formerly “Food Stamps”) in the United States.

49. The model covers also bonus payments to support occasional or seasonal expenses (e.g. heating, Christmas bonuses, etc.), see Section 3.1 for details on how these payments enters model calculations.

50. The [country policy descriptions](#) (Box 1) describe the individual tax and benefit programmes covered in each country and year of the TaxBEN model. Sections 3.5.2 to 3.5.9 describe in detail the assumptions underlying the calculation of each benefit income.

3.4.3. Taxes, social contributions and other compulsory payments

51. TaxBEN covers the following tax components:

- Personal incomes taxes, including central, state and local government income taxes (see Section 3.2 on the treatment of regional differences);
- Mandatory employee and employer social security contributions payable on wage earnings;
- Mandatory social contributions paid by benefit recipients;
- Non-tax compulsory payments made by employers or employees in connection with the employees’ labour activity;
- Payroll taxes;
- Standard tax reliefs, including tax credits and tax allowances, automatically available to all taxpayers who satisfy the eligibility rules.

52. The [country policy descriptions](#) (Box 1) and Section 3.5.10 provide detailed definitions and assumptions for calculation of each tax components.

3.4.4. Policies outside the scope of the model

53. The most important policy areas that are currently outside the scope of the model follow from the income concept employed by TaxBEN, and from characteristics of individual and family situations that it covers:

- Because the model considers families' cash disposable income, it excludes indirect taxes (e.g., VAT, excise and environmental taxes), as well as in-kind transfers (such as social housing or subsidised transport or healthcare) but may include certain near-cash transfers (see Section 3.4.2).
- Retirement benefits (including also early retirement benefits), sick-leave and long-term care benefits are not included as the model's focus is on able-bodied working-age individuals and their family members.
- The model does not consider any household wealth or capital incomes and, hence, does not model asset tests (relevant for some means-tested benefits), or taxes on wealth and property (e.g. taxes on immovable and movable properties, including inheritance taxes). It also excludes local residence taxes.

54. Sickness benefits and short-time working benefits (partial unemployment benefits and similar job-retention measures) were recently included in the TaxBEN policy library and may be added to the model in the future.

3.5. Calculation details for individual income components

3.5.1. Gross earnings from

55. TaxBEN users can select the gross full-time earnings from employment for each working adult family member. Possible inputs are: the OECD full-time Average Wage (AW), the statutory full-time Minimum Wage (MW), and the nine earnings deciles of the full-time earnings distribution (total or separate distribution for men and women). Users can also enter percentages of these earnings measures, e.g. 50% of the Average Wage or 150% of the Minimum Wage. The next three sub-sections describe the characteristics of each gross earnings measure, the last sub-section 'Working hours' describes how to allow for part-time employment in the TaxBEN model.

Full-time Average Wage (AW)

56. This measure is the annual average wage among full-time employees in sectors B to N (inclusive) of the International Standard Industrial Classification of economic activities (ISIC, Revision 4).²² Broadly speaking, this average excludes public sector and agricultural workers who are often covered by different social security regimes. Part-time workers are also excluded in the majority of countries. In countries where part-time workers are included in the average, they enter as Full-time Equivalent units.

57. The AW measure includes regular cash supplements (e.g. Christmas bonuses, thirteenth month payments and vacation month payments) as well as any regular annual bonuses that do not take the form of dividend payments. Fringe benefits and taxes and social contributions not paid directly by the wage earner are not included in the AW measure. More details on the calculation of the AW measure for OECD countries are available in the methodological section of the OECD [Taxing Wages](#) publication. AW measures for non-OECD countries are produced following the same methodology as close as possible. The [country policy descriptions](#) available online (Box 1) describe any deviations from the standard methodology.

²² This classification corresponds to sectors C to K (inclusive) of ISIC Revision 3.1, which is still used in some countries.

58. When official wage estimates for year t indicators are not available before the first annual release (typically in February of year $t+1$), TaxBEN temporary uses wage projections obtained by applying forecasted wage growth to the latest available AW estimate. Wage growth projections are based on the [OECD Economic Outlook](#) for OECD countries, and the [EU economic forecasts](#) for non-OECD EU Member States.²³

Full-time statutory minimum wage

59. Another option is to set earnings equal to full-time statutory minimum wages that are applicable in the country or countries of interest. TaxBEN expresses minimum wages in annual terms assuming a full-time full-year worker. When national legislation provides for minimum wages in hourly, daily or weekly amounts, the model calculates annual minimum wages following country-specific annualization rules that apply to a standard full-time full-year employee (see Table A4 in [online Annex A](#)). Generally, this means assuming 40 working hours per week, 5 working days per week, and 52 remunerated weeks per year, plus any applicable bonuses (such as mandatory Christmas or vacation allowances).

60. The reference date for minimum-wage provisions is the same as for tax-benefit rules, i.e., minimum wage changes during the calendar (or fiscal) year are ignored. If minimum wages vary geographically, TaxBEN uses either a weighted average of the minimum wage levels across regions (e.g. in Japan and Canada) or the federal minimum wage (e.g. in the United States and Germany). If minimum wages vary along other dimensions, country-specific assumptions are used, e.g. a worker with secondary education. Section 1 of the [country policy descriptions](#) (Box 1) describes the methodology followed for the calculation of the statutory minimum wage that applies in the TaxBEN model. See also (OECD, 2015_[38]).

Earnings deciles of the full-time earnings distribution

61. Model users can also set earnings to any decile points of the full-time full-year earnings distribution (total or separate distribution for men and women). These points are calculated using the methodological framework developed in D’Addio and Immervoll (2010_[79]), where information from auxiliary data sources is used to derive synthetic distribution around the AW measure. In practice, the nine decile points for the full-time earnings distribution are computed based on the OECD [Earnings Distribution Database](#) (which compiles data from the European Union Structure of Earnings Survey, Labour Force Survey, country-specific household surveys or enterprise surveys). Decile points are then expressed as ratios of the mean in the same survey. Finally, these ratios are applied to the AW measure. In this way, the shape of the earnings distribution is maintained, but the distribution is anchored on the AW measure, making all TaxBEN wages internally consistent. When earnings distribution microdata is not available for a particular year, inter- or extrapolation is used to fill gaps in decile-point data.

²³ If wage rate projections are not available, wage growth is approximated with the growth of closest proxy variable, such as the compensation per employee, unit labour costs or (in rare cases) consumer prices.

Working hours

62. In addition to full-time earnings levels, users can choose the hours of work per week, up to 100% of full-time work.²⁴ In this case, an important caveat to bear in mind is that the AW measure described above refers to *full-time* workers. This means that TaxBEN uses *constant* hourly wages at all working hours, and therefore does not impose any ‘part-time penalties’ to those who work part time. The model currently does not account for any specific provisions that apply to employees working more than 100% of full-time hours (overtime, see also Section 3.5.10).

63. Section 4.2.2 describes how to use various TaxBEN options for setting wages and working hours.

3.5.2. Unemployment insurance benefits

64. Unemployment insurance benefits are designed to support the income and facilitate effective job search by smoothing consumption of people who lost a previous job. Insurance benefits are typically linked to previous earnings and require previous employment record and social contribution payments. This distinguishes them from unemployment assistance benefits (Section 3.5.3), which are usually means-tested benefits and either provide a second-tier safety net for those who have exhausted their rights to unemployment insurance, or serve as a principal form of income support for jobseekers who were not entitled in the first place (e.g., because they just entered the labour force or otherwise lack the employment history that would be needed for claiming insurance benefits).

65. In the standard TaxBEN configuration, only the first adult (Section 3.3) can receive unemployment insurance benefits. For any second unemployed adults in the same household, it is assumed that insurance benefits are not available, though assistance benefits may be available subject to applicable rules.

66. Rules for calculating unemployment insurance entitlements can be divided into three parts: conditions for receiving the benefit, benefit amount and duration of benefit entitlements.

Conditions for receiving the benefit

67. Among the conditions for receiving the benefit, a key distinction is between entitlement criteria and eligibility conditions:

- *Entitlement criteria* define the characteristics that an individual or family has to meet in order to establish the right to benefit receipt. In general, these criteria act as a filter at the point of application for the benefit. For instance, to be entitled to unemployment insurance benefits, claimants might require a minimum employment or contribution record (e.g. a worker must have paid contributions into the insurance fund for at least 12 months in the 24 months before becoming unemployed). TaxBEN users are free to set many individual and family characteristics that may be

²⁴ The model does not explicitly define the number of full-time working hours for each country. However, the underlying wage data for full-time employees (average or minimum wages) is based on country-specific definitions of full-time working hours and thus implicitly assumes these working hours in the calculations.

relevant for benefit entitlement. For example, users can set the jobseeker's age, their previous employment record as well as previous earnings levels (Section 4).

- *Eligibility conditions* refer to a range of behavioural requirements, which have to be met by those who have established a right to receive unemployment benefits, i.e., once it has been determined that they satisfy all relevant entitlement criteria). Eligibility criteria for unemployment benefits often include: (i) active job search, (ii) availability for work, (iii) acceptance of certain job offers, (iv) initial waiting periods during which jobseekers should not receive other benefits. By default, TaxBEN calculations assume that jobseekers meet all relevant behavioural eligibility requirements when claiming unemployment benefits. The OECD data portal '[how demanding are activation requirements for jobseekers?](#)' provides policy rules and data that allows assessing the strictness of countries' eligibility conditions for unemployment and related benefits.²⁵

68. For jobseekers with a previous employment record, TaxBEN assumes that the individual paid social security contributions on a regular basis, unless previous earnings are below the threshold for compulsory contributions. In countries where unemployment insurance is voluntary but covers the majority of employees, enrolment in voluntary unemployment insurance schemes is assumed (e.g. Denmark). If different unemployment insurance programmes exist, e.g., for private and public-sector workers, or for workers standard and non-standard employment contracts, model calculations relate to private sector dependent employees with a "standard" employment contract.

69. Countries usually assess entitlement criteria to unemployment insurance benefits (e.g. previous contribution record) over a particular time period preceding unemployment ("reference period"). To simplify calculations, TaxBEN assumes that the previous employment spell was continuous and finished right at the end of the reference period. Therefore, the employment record specified by TaxBEN users by definition falls within the reference period. If the specified employment record exceeds the duration of the reference period, it means that a person was employed during the whole reference period, and also for some time before that.

70. Entitlement to unemployment insurance benefits can also vary depending on whether an individual is unemployed as a result of dismissal, redundancy or resignation. TaxBEN assumes that unemployment spells begin as a result of redundancy, which typically gives the most generous entitlement conditions. Special rules for temporary layoffs, severance pay and special benefits paid in case of business closure are not included.

Benefit amount

71. Benefit amounts can depend on numerous jobseeker characteristics that model users can specify. The most important ones are past earnings, employment and contribution histories, age and family circumstance. For example, TaxBEN simulates supplements that are paid reflecting the family situation of the unemployed person (e.g. for dependent spouse

²⁵ Data on the strictness of activation requirements cover policy settings in OECD and EU countries and gauges policy trends over recent years, including the type of job offers that claimants need to accept, requirements for reporting on job-search efforts, obligations to participate in active labour market programmes, and sanctions for failing to meet these requirements. To facilitate cross-country comparisons, the individual indicators are summarised into an index of overall "strictness".

or children). Benefit amounts may also depend on previous working hours. In such case, the TaxBEN assumption is full-time work prior to unemployment.

72. Benefits are sometimes reduced after a certain period of receipt. TaxBEN allows entitlements to be calculated at different months of an unemployment spell (Section 4).

73. In some cases it is possible to receive an increased benefit amount if an unemployed person participates in training or other active labour market programmes. Such additional entitlements are not accounted for. Likewise, and in line with the assumption that claimants fulfil all relevant behavioural requirements, TaxBEN typically does not model any sanctions that may reduce entitlements.²⁶

Benefit duration

74. Benefit calculations at different points in an unemployment spell account for all applicable rules regarding benefit durations, e.g., depending on past employment record and age. Some countries operate “pre-retirement” unemployment benefits that provide for extended benefit durations for jobseekers just prior to retirement. These rules are not modelled if they depend on characteristics not covered by the model (e.g. gender).

75. In some countries there is a possibility to extend benefit entitlements beyond the formal maximum duration by entering an active labour market programme (training, subsidised employment, etc.). TaxBEN normally assumes that such participation does not take place and unemployment insurance benefits therefore expire at this point. However, an exception are large-scale programmes that cover most unemployed and in practice serve as a de-facto benefit extension (e.g. in Sweden).

76. Some countries allow unemployment benefit recipients to continue receiving reduced unemployment benefits on re-entering work in certain circumstances, e.g. if a person takes up part-time employment. It is possible to examine this situation using TaxBEN (Section 4.2.3). However, currently TaxBEN does not allow for circumstances where a reduction in working hours makes an employed person eligible to part-time unemployment benefits.

77. Waiting periods which are sometimes imposed on recipients of unemployment insurance benefits are not simulated in the model. The benefit is assumed to be paid right away following the claim, if the claimant is eligible. The only exceptions are for the mandatory waiting periods when a person switches from receiving one type of benefit to the other (e.g. from receiving unemployment insurance benefit to unemployment assistance benefit).

3.5.3. Unemployment assistance and social assistance / minimum-income benefits

78. Jobseekers who do not qualify for unemployment insurance benefits, or whose entitlement to these benefits are low or have expired, can claim unemployment assistance

²⁶ There are some exceptions. For example, TaxBEN simulates reduction of unemployment benefits in Finland in 2018-2019 if the activity requirement is not met (see [country policy descriptions](#) for more details). The activity test requires certain amount of work or participation in active labour market measures. The model assumes no participation in such measures and does not simulate additional entitlements related to them. The OECD portal ‘[how demanding are activation requirements for jobseekers?](#)’ provides detailed policy rules of sanction provisions across countries and over time.

(UA) and/or social assistance or minimum-income (SA) benefits. These benefits are usually means-tested, that is, receipt is conditional on individual and/or family income and assets. In addition, entitlement to some UA benefits may depend on past employment or contribution records, or they may be available only as a follow-up to insurance benefits, but not as a replacement for jobseekers who were not previously entitled to insurance support. When entitlement to means-tested UA depends on age or previous work history, the assumptions are the same as for unemployment insurance (Section 3.5.2).

79. The [TaxBEN benefit classification table](#) describes which benefit programmes are classified as unemployment assistance or social assistance in each country. Some elements differentiate SA and UA benefits. The main purpose of UA programmes is to encourage the labour market reintegration of jobseekers who have exhausted or are not eligible to the standard UI benefit. The purpose and potential target group is broader for SA programmes, which primarily aim at reducing risks of income poverty and social exclusion. Conditions for UA typically include requirements to register with the public employment service and participate in active job search in a similar way as for unemployment insurance. This is not always the case for SA benefits, for which low income is the key entitlement criterion.

80. Many of countries' specific means-test rules are fully represented in TaxBEN, including interactions between policy areas (such as the effect of other benefits or taxes when calculating individual or household "means"). Some provisions are nevertheless beyond the scope of the model:

- In some countries, benefit administration officers or caseworkers have some discretion when deciding upon social assistance benefit entitlements. Where benefit amounts are set in national regulations, these are used in the model. If there is local discretion, TaxBEN applies national guidelines where available or applies the rules of a selected region (see Section 3.2 for details). If social assistance payouts are not an individual right but depend on available budgetary resources, TaxBEN assumes that such resources are available.
- Social assistance may only be paid where all other sources of support have been exhausted. In cases where other individuals, such as absent parents or extended family members, have a legal obligation to support those without resources, it is assumed that such support is *not* forthcoming.
- Savings and other types of assets must often be below some level for there to be entitlement to benefit. TaxBEN assumes that the family's level of assets is sufficiently low and does not affect benefit entitlements.
- In some countries rather than assessing income directly, the decision to grant support is based on a "proxy means test", i.e. an algorithm that assesses household income or needs based on household or individual characteristics and living conditions (e.g. Chile). In such cases, the model applies "proxy income thresholds" to define eligibility to benefits. Such thresholds may be linked to the extreme poverty line in the country, obtained empirically from survey or administrative data or calculated based on other assumptions chosen together with national experts to resemble the proxy means testing.
- Social assistance programmes may impose conditions on the behaviour of the claimant, as well as other family members. For example, both spouses may be required to be actively looking for work. In other countries, SA benefits are individual entitlements (even if one partner's entitlement also depends on their partner's income), so both members of a couple can claim benefits in their own

right. In these cases, it is assumed that both spouses claim these benefits if they would be eligible, and that they both fulfil applicable requirements. If there are any behaviour requirements for children (e.g. attending school or regular medical check-ups), such condition are assumed to be met.

- In some countries the means test is relaxed or removed altogether for payments made to beneficiaries participating in specific active labour market programmes. It is assumed that benefit claimants do not participate in these programmes. Consequently, additional benefits paid conditional on participation in active labour market programs are not taken into account.

81. Social assistance can be the primary out-of-work benefit or can act as a “top up” to supplement other income sources, including earnings and unemployment insurance benefits, where these are below certain levels. By default, TaxBEN assumes that family applies to social assistance and that relevant eligibility conditions outside the scope of the model are met.²⁷ However, it is also possible for users to ‘switch off’ social assistance entitlements (see Section 4.2.3 for details). This model configuration corresponds to the case where families do not meet the behavioural conditions to receive these benefits, or do not claim the benefits to which they are entitled for other reasons.

82. TaxBEN does not impose assumptions about benefit take-up based on external evidence from the countries. Rather, it offers users possibility to explore different scenarios according to the purpose of each particular study. Standard OECD outputs and indicators (Section 5 are available both with and without take-up of major means-tested benefit schemes (e.g. social assistance). In countries, where non-take-up of social assistance benefits is high or access is limited to the most deprived, results with non-take-up provides a relevant lower bound scenario.

3.5.4. Housing benefits

83. TaxBEN incorporates housing benefit (HB) rules for people living in privately rented accommodation. Benefit entitlements for other housing tenures are not simulated. For example, subsidies for the construction of housing, purchases of owner-occupied housing, favourable interest payments, or in-kind support for those in social housing, etc. are not included. Specific cash support for housing-related expenditures other than rent, e.g. heating and water bills, are outside the scope of the model. However, if part of housing benefits aim to cover utility costs, and cannot be identified separately, calculated housing benefits include these components as well. If housing benefits are means tested, the assumptions concerning means-testing are the same as those used when modelling social and unemployment assistance benefits (Section 3.5.3).

84. Cash housing support in the form of rent assistance can be provided either through standalone programmes, which are paid alongside other benefits, or via housing-related supplements to other benefits, such as social assistance. TaxBEN incorporates both. Where possible, specific housing supplements to SA or UA programmes are separated from these programmes and classified as HB in TaxBEN output.

85. In most countries, housing benefit entitlements cannot exceed the rent paid, or a specific absolute ceiling that typically depends on family size, composition and location. Model users can set the level of rent using a fraction of the Average Wage as a reference

²⁷ For instance, if eligibility depends on the number of years of residence in the country, i.e. a variable that is outside the scope of the model, it is assumed that these conditions are met.

value (see Section 4.2.3 for relevant TaxBEN options). The selected rent level serves as a measure of the relevant housing costs used for the calculation of the housing benefit. TaxBEN applies relevant benefit ceilings as per housing benefit regulations and in line with relevant assumptions about region, etc. (see Section 3.2 and [online Annex A – Table A3](#) for the list of simulated regional policies).

86. In countries where eligibility for the housing benefit depends on the level of the housing costs, TaxBEN does not take into account the fraction of the housing costs that are above the benefit eligibility threshold. The rationale is to allow cross-country comparisons of maximum benefit amounts, even when the selected level of housing costs exceeds the benefit eligibility threshold.²⁸

87. Model users can select the amount of rent and earnings of the family independently. In other words, the model does not automatically adjust housing consumption according to the income level of the family. This allows comparing model outputs by earnings levels and labour markets situations keeping other factors, such as housing costs, constant. Fixed housing costs is, for instance, a valid assumption for short-term unemployed or for employees facing temporary wage cuts, but may be less suitable for those who have been without work for extended periods. This should be born in mind when producing and analysing model results. The selected level of rent is also independent of household size. This implies that, unless users specify otherwise, single persons will pay the same rent as a couple with two children. This assumption is practical for comparing results across varied family compositions and for understanding the factors driving differences in benefit entitlements. But if users wish, they can specify different housing costs for different family types in the relevant model options (see Section 4.2.3).

88. In some countries, housing benefits cover only “standard” housing costs based on official housing consumption norms per household member, which vary by family and housing type (e.g. Latvia, Estonia). In these cases, the standard housing expenditure is assumed to be roughly equal to the average housing costs as available from administrative or survey data.

89. In countries where eligibility for the housing benefit depends on the reported level of the housing costs, TaxBEN sets internally a level of rent equal to the maximum possible value for HB eligibility. The rationale behind this rule is to allow users to calculate and compare housing benefit entitlements and benefit maximum amounts as a function of earnings and housing costs, even when the selected level of rent exceeds the legal eligibility threshold.

90. Where the size of the dwelling is relevant for HB entitlements, it is assumed to be 70 square metres. This value is fixed and currently cannot be changed by model users.

91. As in case with social assistance benefits, model users can ‘switch off’ housing benefits (see Section 4.2.3). This option corresponds to the situation where the household does not face any rental costs, or where tenants do not take up support to which they are entitled. In countries where housing costs are covered through social assistance benefits, the behaviour of the SA and HB ‘switches’ are interrelated. Model users can in these cases calculate SA entitlements without the housing supplement by ‘switching on’ SA and ‘switching off’ HB. This might, e.g., represent a family that applies for SA but pays no

²⁸ This rule applies for instance in the Netherlands, where housing benefit claimants who declare a value of housing costs above a certain threshold are not eligible for the benefit. See also Section 5.2 (Main assumptions behind headline tax-benefit indicators).

rent. However, simulation of the opposite situation is not feasible. So, if model users ‘switch off’ SA, the housing component of SA will also be zero regardless the HB ‘switch’ and irrespective of the chosen housing costs.

3.5.5. Family benefits

92. Family benefits (FB) are income support programmes that are conditional on having children or adult dependants.²⁹

93. Benefits that are conditional on using formal centre-based childcare for parents of pre-school children are instead classified as ‘childcare benefits’ and described in Section 3.5.9. By contrast, ‘homecare’ allowances that are designed to support parents who look after their children and are conditional on *not* using centre-based childcare *are* included in the FB category. Section 3.5.9 provides details on childcare and homecare benefits.

94. In the standard TaxBEN model, FB do not include maternity and other birth-related benefits. Those benefits are part of a separate TaxBEN module (see Section 3.4.2). To avoid confusion in the interpretation of standard model results, TaxBEN imposes a minimum age of one year for children and prevents users from setting ages to zero. In some cases, parental leave benefits may be available beyond age one. In these cases, the standard TaxBEN model includes parental-leave benefits³⁰ if they are non-contributory and do not depend on the employment status prior to childbirth. While users can select two or more children of the same age, special provisions for multiple births are not modelled.

95. Where FB are means-tested, the assumptions given in Section 3.5.3 apply. Where receipt of family benefits is conditional on certain behavioural requirements, such as ensuring school attendance, immunisation or compliance with particular medical examinations, these requirements are assumed to be met.

96. Some countries operate specific benefit provisions for lone parents, or they provide state guarantees for certain minimum amounts of alimony child support payments in cases where the absent parent does not or cannot provide such support. As a general rule, such benefits are included in TaxBEN if they are paid on regular basis for a long period (e.g. until a child is 18 years old). Benefits paid only for a short period (e.g. one-off support upon becoming a lone parent) are outside the scope of the model. Special benefits for widows/widowers are also not included. Calculations of lone-parent benefits are based on family circumstances as described in Section 3.3 (i.e., divorced, permanent custody of children, no child support payments from absent parent). Where benefits are conditional on the lone parent’s co-operation with authorities’ attempts to enforce any financial obligations of an absent parent, it is assumed that such co-operation is forthcoming.

97. As with social assistance and housing benefits, model users can ‘switch off’ family benefits (see Section 4.2.3). This option corresponds to a situation where the household does not take up support to which they are entitled.³¹

²⁹ Benefits for dependent spouses are also classified as Family benefits (e.g. in Italy).

³⁰ Note that unlike ‘homecare’ allowances, parental-leave benefits are not necessarily conditional on *not* using centre-based childcare.

³¹ Non-take up of family benefits may be less common than for other benefits with strict means tests and conditionality. Nevertheless, running TaxBEN scenarios without family benefits can be informative for studying interactions between different elements of tax-benefit systems.

3.5.6. *Employment-conditional (“in-work”) benefits*

98. TaxBEN covers employment-conditional (“in-work”) benefits (IW) that are conditional on the following key requirements:

- Being employed on a regular basis with a standard employment contract;
- Working a certain number of hours and/or earning more than a certain minimum.

99. This notably excludes ‘workfare’ programmes and related ‘work-first’ policies that make out-of-work benefits conditional on participation in work activities. Benefits that are available to low-income individuals *regardless* of their work status are also not included in IW calculations (though they may be accounted for in other parts of TaxBEN calculations).

100. IW payments may be made by different parts of government, including tax administrations (e.g. through tax credits), social insurance authorities (e.g., regular cash refunds of social security contributions) and benefit administrations (e.g. through standalone benefit programmes and/or top ups to other cash benefits). All these forms of IW are within the scope of TaxBEN. However, tax advantages or reductions in social security contributions that are granted to employees without minimum thresholds for work activity or earnings are not classified as IW but are, instead, included in the calculation of income tax liabilities or social security contributions. Likewise, TaxBEN typically does not categorise as IW any preferential treatment of in-work earnings in means-tested out-of-work, housing or family benefits (such as earnings ‘disregards’). Such provisions are accounted for in the calculation of these other benefits.

101. Where IW depend on household incomes, the modelling of relevant means-testing provisions for IW follow the principles given in Section 3.5.3. As with other benefits, there is an option in TaxBEN to ‘switch off’ IW to examine situations where families do not take up benefits to which they are entitled.

3.5.7. *Transitional “into-work” benefits*

102. Some countries operate one-off or temporary benefits that are available following a recent transition into work, e.g., during a predefined period after taking up new employment. These benefits are referred to as transitional “into-work” benefits in TaxBEN. Model users can switch these entitlements on or off. If they choose to include them, the model assumes that the first adult of the family (see 3.3) has recently moved into work. Users can calculate into-work benefit entitlements at different points in time after a move into new employment (see Section 4.2.3 for details).

103. If entitlements or eligibility for the transitional into-work benefit depend on another out-of-work programme that is within the scope of the TaxBEN model, the benefit is classified as the out-of-work programme to which they are linked. For example, a temporary payment to SA recipients who take up employment is classified as SA. Stand-alone into-work benefits that are not linked to other programmes are classified as In-Work benefits.

104. If temporary into-work benefit are paid for a certain period of time after taking up a job, they are calculated for a specific month and then multiplied by 12 (in line with the ‘annualization’ procedure described in Section 3.1). If temporary into-work benefit are linked to another out-of-work benefit and are paid as a one-off lump sum upon transition into a new job, then the overall amount is spread over the remaining duration of the benefit from which the entitlements are derived (e.g. if an unemployment benefit recipient receives

a lump-sum payment upon transition into a new job this payment is spread over the remaining duration of the unemployment benefit had the transition not occurred). If the remaining duration of relevant out-of-work benefit cannot be estimated (e.g. if social assistance benefit is paid indefinitely), then the lump sum is spread over the first year of the new employment (i.e. if a social assistance recipient gets a lump sum upon transition into work, this payment is added to the annualized income in the first year of employment).

105. If into-work benefits are conditional on maintaining employment for a certain number of months, they are included in the model assuming that employment in the new job will last for at least that minimum duration.

3.5.8. Disability benefits

106. TaxBEN currently includes disability benefits modules for 12 countries referring to the 2016 policy year (Section 3.4.2). The scope is limited to long-term disability schemes. Other types of health-related benefits are not covered (including short-term sickness benefits, benefits designed to support those providing care to incapacitated persons, allowances designed to cover disability-related costs or needs, and special benefits for those who have been disabled since childhood).

107. This section provides an overview of the methodology underlying disability benefit calculations, further details are provided in Annex A of the OECD report "[Benefit generosity and work incentives for disability benefit recipients](#)". The disability is assumed to affect only the first adult in the household. Users can specify the degree of disability as a percentage of lost work capacity (see Section 4.2.3). In most countries the disability measure used in the model corresponds to the measurement in the national legislation. However, in countries where disability is measured in levels rather than as percentages of work capacity, these levels are mapped to percentages in an ad-hoc way. Note that the measure of disability used in the model is not necessarily comparable across countries (i.e. 50% of lost work capacity may correspond to different health conditions in different countries). Thus, any cross-country comparison should be done with caution.

108. If disability benefit entitlements are conditional on first claiming temporary sickness benefits over an initial period of time then this condition is assumed to be met (although the sickness period itself is omitted from the model), as are any other behavioural requirements related to eligibility, such as participation in rehabilitation programmes or engaging in work-related activity. However, any top-ups paid for participation in such programmes are not modelled.

109. In some cases, persons with a disability are eligible to more generous supplements that are available as part of other tax-benefit programmes covered in TaxBEN (e.g. higher amounts of social assistance or special tax allowances). Such supplements are included in the model. More complex combinations of different economic states are outside the scope of TaxBEN (e.g., partial disability affecting somebody who is registered as unemployed and entitling her to a supplementary unemployment benefit).

110. In some countries, eligibility as well as amounts of disability benefits depend on long-term employment history and on the number of years of residence in the country (i.e. these "pension-type" disability benefits are linked to the pension system of the country). In such cases, it is assumed to that a person has resided in the country in question since birth. Two main employment scenarios can be modelled: (i) a continuous working history (of varied duration) prior to the start of the disability benefit claim, and (ii) a situation where a person has never worked and has no contribution record. Additional scenarios

allow for a working history with one career break of a chosen duration for unemployment or inactivity.

111. In countries with “pension-type” disability benefits, entitlements depend on previous earnings accumulated during the claimant’s entire working career (or a long-term period). For these schemes, TaxBEN assumes that claimants have earned a fixed proportion of the Average Wage prevailing in each year of their working life.³² If benefit entitlement depends on earnings just before the claim of the benefit, the model computes earnings-related benefits in relation to wages in the current year, similar to the approach taken for calculation of unemployment insurance benefits (see Section 3.1).

112. Some disability benefits require periodic reassessments of the claimant’s medical condition. This may lead to revisions of the degree of disability and the amount of disability benefits. The model assumes that such reassessments confirm the initial medical condition.

3.5.9. *Childcare fees and childcare benefits*

113. The childcare module calculates the net cost of centre-based Early Childhood Education and Care (ECEC) for families with pre-school children, assuming that all adults are in employment (i.e. working lone parents and two-earner couples). Since 2018, the OECD updates the childcare module as part of the regular model update.³³

114. Any costs associated with children attending mandatory schools, *including mandatory pre-schools*, and of any associated care after school hours are outside the scope of the model. For instance, in countries where kindergarten is compulsory for pre-school children above a certain age, TaxBEN assumes that the associated costs are zero. For this reason, the standard TaxBEN calculations with childcare refer to two children aged two and three, respectively.

115. The standard model configuration of the childcare module assumes full-time childcare use. However, starting with policy year 2019, it is also possible to model part-time childcare use.

116. When users select the ‘childcare’ option (Section 3.5.9), TaxBEN assume that the family uses centre based childcare and calculates the related childcare costs and childcare benefits. The difference between childcare costs and benefits is then added to the net household income. In general, childcare costs are the *gross* childcare fees that providers charge to parents whereas childcare benefits can take the form of fee rebates, allowances or tax concessions related to the use of centre-based childcare. The next sub-sections provides details on these measures.

Childcare benefits

117. Childcare benefits are income support measures whose eligibility is conditional on the use of centre-based childcare. They can take the form of (i) fee rebates applied directly by the childcare centre, (ii) universal or means-tested cash allowances, (iii) increased entitlements in other benefit programmes, and (iv) tax reductions. Fee rebates include cases

³² Information on historical Average Wage values is taken from the OECD tax-benefit database, the OECD pension database or national statistics databases. When the relevant time series is not long enough, historical AWs are imputed by applying the wage growth observed in the national data to the earliest available AW.

³³ The childcare module is available also for the years 2004, 2008, 2012 and 2015.

where some families can access childcare free of charge for some or all of their children, or where fees differentiate based on family income and circumstances, or the characteristics of the child (e.g. age).

118. Fee rebates applied directly by the childcare centre and universal or means-tested cash allowances are part of the same output variable in TaxBEN (see Section 5.1). Tax concessions and changes in other benefit amounts that are conditional on the use of centre-based childcare enter the calculations of the appropriate tax or benefit policy element (i.e., they change calculated amounts of income taxes, family benefits, social assistance, etc.).

119. Benefits explicitly designed to support families who do *not* use centre-based childcare and look after children at home are also part of the TaxBEN model. These entitlements are lost when parents start using formal childcare services, and can be thought of as increasing the effective costs of centre-based childcare. These benefits are classified in the category of Family Benefits (Section 3.5.5), and they are taken into account when calculating the OECD net childcare costs indicator (see Section 5.3.5).

Childcare costs

120. Childcare costs in TaxBEN are a measure of the *gross* childcare fee charged to parents by childcare providers. Childcare costs include the cost of meals but exclude other optional services, such as those related to health care, transportation, special classes or activities. The model assumes the use of *public* providers where these are commonly available.³⁴ The gross fee is the amount that facilities charge parents *before any reductions or rebates applied to special family circumstances* (e.g., a reduction for the second child or low-income families). In countries where differentiated fee structures are in place, the gross fee corresponds to the *maximum* fee charged by the childcare provider (e.g., for the first child, if care for additional children reduces the fee; or for high-income parents, in cases where low-income parents pay less). It is worth noting that this is not necessarily the full economic cost of childcare provision for the facility, as the amount charged to parents is calculated *after* any public subsidies received by the provider.

121. The degree to which national or local authorities regulate childcare fees differ by country. In some, a national law determines fees directly or sets clear and detailed guidelines, which apply to providers across the country. In others, pricing decisions are taken by local authorities or by individual childcare providers.

122. Before 2019, TaxBEN calculations of childcare fees depended, in part, on country settings and data availability. The choice of appropriate rules, guidelines or empirical pricing data was largely delegated to country experts. Since 2019, TaxBEN adopts a more structured methodology. The new methodology is described in the [guidelines](#) that the OECD prepared for the [network of national tax-benefit country experts](#).³⁵ The main steps can be summarized as follows:

³⁴ Public childcare facilities are defined as facilities owned and operated by public authorities at central, regional or local level. Private facilities are owned by for-profit or non-profit organizations; they can be either self-financed or publicly subsidized. Focusing on public provision implicitly ignores any supply-side restrictions on the availability of places in public childcare centres (though such constraint are related to the cost of childcare).

³⁵ This means that in some countries the approach used since 2019 is not fully comparable to previous years. This is the case for Cyprus, the Czech Republic, Estonia, Germany, Greece,

- a. If childcare fees are determined by a national law and this law is precise enough to calculate *exact* fee amounts for the families that are within the scope of the model, then TaxBEN calculates gross childcare fees and any related fee rebates according to this national law.
- b. Equivalently, if childcare fees are determined autonomously at lower administrative levels (i.e. municipalities, regions, counties or states, depending on the institutional level responsible for the regulation of childcare fees), and these regulations are precise enough to calculate exact fee amounts for the families that are within the scope of the model, then TaxBEN calculations rely on regulations in a selected region (Section 3.2).
- c. In countries where childcare fees are entirely set by individual providers, and there are no regulations at all, TaxBEN uses an estimate of the *average* childcare fee in the country from a national survey. Where the average childcare fee is not available, TaxBEN calculates the gross childcare cost as the average operating cost per child.
- d. In countries where childcare fees are largely set by individual providers, but there are some national or local regulations, notably specific fee rebates to families that are within the scope of the model (e.g. low-income or large families), TaxBEN calculates gross childcare fees as the average operating cost per child, minus any public subsidies designed at the national or local level to reduce the cost of childcare. The *net* childcare fee is then calculated by subtracting the fee rebate from the gross childcare fee for the family circumstances identified by the law.³⁶

123. Focusing on a particular institutional setting, in some cases narrows the scope of the model but, in line with the broader setup of TaxBEN, it ensures a family and people-centred perspective: It applies to a specific jurisdiction, instead of averaging across different policy settings and family circumstances. Focussing on a specific jurisdiction allows accounting more precisely for support that is provided at sub-national levels. Such support is often particularly relevant for economically more vulnerable groups, such as lone parents, low-income families, and large families.

124. Based on this methodological guidance, the country policy descriptions (Box 1) available [online](#) describe in greater detail how childcare fees are calculated for each country.

3.5.10. Taxes

125. TaxBEN implements tax rules as they apply on the reference date (Section 3.1). It calculates taxes and social security contributions on employment incomes and cash benefits, e.g. accounting for any special tax treatments of unemployment and family benefits. It accounts also for specific tax regulations that apply to the family and labour market characteristics of taxpayers within the scope of the TaxBEN model. These characteristics include the age of the taxpayer, hours of work, ages and number of children, months of work in the current job for those who recently moved into a new job, and the

Hungary, Latvia, Lithuania, Poland, the Slovak Republic, and Spain. This structural break should be kept in mind when interpreting changes in childcare fees over time.

³⁶ Using an estimate of the average fee from national consumption surveys would underestimate the final costs borne to parents, as the average amount incorporates already the fee rebate applied by the childcare providers.

months of benefit receipt for those who are out of work. The following summarises the main assumptions that apply when calculating tax liabilities.³⁷

Income taxes

126. Only personal income taxes payable in respect of employment earnings and benefits are included. In line with the scope of income sources considered in TaxBEN (Section 3.4.1 and 3.4.2), the calculations do not account for the taxation of other types of income, e.g. income from capital or self-employment income. Both central and local government income taxes are included. If local taxes differ across the country, then calculations either apply an average, or they use tax rules of a selected region (see Section 3.2).

127. TaxBEN distinguishes between standard tax reliefs and non-standard tax reliefs:

- Standard tax reliefs are automatically available to taxpayers who satisfy eligibility rules specified in legislation. They are unrelated to actual expenditures incurred by the taxpayer on specific items. Typical standard reliefs include the basic reliefs available to all taxpayers, wage earners, or benefit recipients, irrespective of family status, as well as reliefs available to taxpayers depending on their marital status or to families with children.
- Non-standard reliefs are linked to expenditures on particular items. Typical examples include reliefs related to costs of owner-occupied housing, reliefs for interest on qualifying loans, voluntary insurance premiums, contributions to savings or pension plans, purchase of medical insurance, and charitable donations.

128. TaxBEN includes standard tax reliefs when calculating tax payments. Non-standard reliefs are normally outside the scope of the model, because expenditure patterns are not part of the family or individual circumstances that are considered in TaxBEN. There are two exceptions to this latter rule. First, when non-standard reliefs contain a “minimum benefit” clause, i.e. when the relief is equal to the larger of some fixed amount or actual expenses, the fixed amount is used (and can be seen as a kind of “standard” tax relief in this case). Second, when a specific model run features the calculation of childcare costs or housing benefits, tax deductions, allowances and credits that relate to childcare costs and rent are accounted for in the calculations.

129. Tax rules are applied at the individual or couple/family level, according to country legislation regarding individual or joint taxation. If the married couples can choose between individual and joint taxation, they are assumed to choose the scheme that is more advantageous to their situation. Similarly, where taxpayers can choose between a special tax treatment and the receipt of a particular benefit, or when partners can choose how to split available tax reliefs between them, TaxBEN selects the option that maximizes net income for the household as a whole.

³⁷ The methodological annex of the OECD [Taxing Wages](#) publication provides an extended description of the assumptions used for calculating tax liabilities in the context of the OECD tax-burden models, which are broadly comparable with TaxBEN. However, because the methodology of the two models is not precisely the same, calculations of tax liabilities may be slightly different (see Box 5 for details).

Social security contributions

130. TaxBEN calculates social security contributions paid by employees and employers.

131. In countries where social security schemes differ by occupation, economic sector, firm size, degree of health risk associated with the job, etc., the model applies a typical scheme or the weighted average of the rates across all schemes. The country policy descriptions (Box 1) available [online](#) describe in greater detail the approach followed for each country.

132. By default, TaxBEN deducts employee's social security contributions from gross income to arrive at net household income. Employer contributions are not added to gross incomes but shown as a separate component in TaxBEN output. Employer and employee contributions can be seen as essentially the same tax – both create a wedge between the cost to an employer of employing someone and the net earnings they receive. Any shifting of the incidence of contributions (i.e. employee contributions being shifted to employers and employer contributions being shifted to employees) occurs through adjustments to the gross wage. Such wage changes are reflected in the Average Wage measure used in the model, and therefore taken into account in the final net income measure.

Non-tax compulsory payments

133. In addition to taxes, TaxBEN also incorporates any Non-Tax Compulsory Payments (NTCPs) made by employers or employees in connection with the employees' labour activity. Examples are mandatory payments to private health or pension providers. The OECD Centre for Tax Policy and Administration defines NTCPs as required and unrequited compulsory payments to privately-managed funds, welfare agencies or social insurance schemes outside general governments and to public enterprises. NTCPs can include also 1) payments to general governments earmarked for bodies outside general government where the government is simply acting in an agency capacity; 2) contributions to schemes that are not institutions of general government, even in cases where the schemes have actually been imposed by government.

134. By default, the model calculates NTCPs together with other social security contribution payments and, symmetrically to the treatment of social security contributions, subtracts employee NTCPs from gross incomes to arrive at the net (or disposable) income. However, users have the option to 'switch off' the calculation of these payments, e.g. to produce net income results that account for tax payments only (see Section 4.2.4). Further information on NTCPs in OECD countries and their treatment in model calculation is provided in [this OECD report](#).

Payroll taxes

135. The model includes payroll taxes paid by employers and levied either as a proportion of the entire payroll, or as an amount per employee. These taxes widen the gap between gross labour costs and gross earnings in the same way as employer social security contributions do, but they do not confer an entitlement to social security benefits. In the TaxBEN model, payroll taxes are included in the same variable as employer social contributions. Payroll taxes are simulated following the same methodology as described in the OECD [Taxing Wages](#) publication.

4 Using TaxBEN

136. TaxBEN calculates net household incomes for a wide range of hypothetical households. Users can select a large number of family and labour market characteristics to illustrate the functioning of policy mechanisms or the consequences of policy reforms on family incomes. Users can access the TaxBEN model through:

- A tax-benefit web calculator available from the [project webpage](#).
- An [online platform](#), after the review of the application process.³⁸

137. Both the web calculator and the online platform calculate net household income and underlying income components for selected family and labour market circumstances. The main difference between the two is that the web calculator produces simplified output for one type of model run at a time (e.g., for a single-parent household in the past ten years in a given country, or in a given year across a group of countries), whereas the online platform can produce a large number of model runs using a single command (e.g. for multiple family situations across most OECD countries and over the past 10 years).

138. Sections 4.1 and 4.2 describe how to use these two tools and explain the core options that are available for customizing the results. The online presentation “[Calculating OECD tax-benefit indicators: a step by step guide](#)” provides additional information on how to use the web calculator for calculating the headline policy indicators (see also Section 5 for more information on the policy indicators).

139. All TaxBEN users are required to acknowledge the use of the OECD tax-benefit model in any dissemination of results using the standard reference “*Own calculations based on the OECD tax-benefit model, TaxBEN version [INSERT VERSION NUMBER], <http://oe.cd/taxben>.*” and the standard disclaimer “*Results and their interpretation are the sole responsibility of the author(s). In particular, the OECD and its member countries are not responsible for any errors, omissions, or inaccuracies.*”

140. Users of the web calculator can find the version number either in the *log* file or in “*Readme*” sheet of the Excel output file. Both files are available for download in the result page under the chart. Users of the online platform can find the version number in the browse window when executing the TaxBEN command.

141. The version number has three digits, e.g. 2.2.0. The first digit identifies major revisions in the TaxBEN core executable (i.e. revisions that change fundamentally the design of the model). A change in the second digit signals inclusion of models for a new policy year. The last digit identifies smaller revisions related to adding information on new countries for the latest available year if such information was missing, revisions in country models for previous years, and updates of the input wages (Section 3.5.1).

³⁸ Contact Tax-Benefit.Models@oecd.org for the application form.

4.1. The tax-benefit web calculator

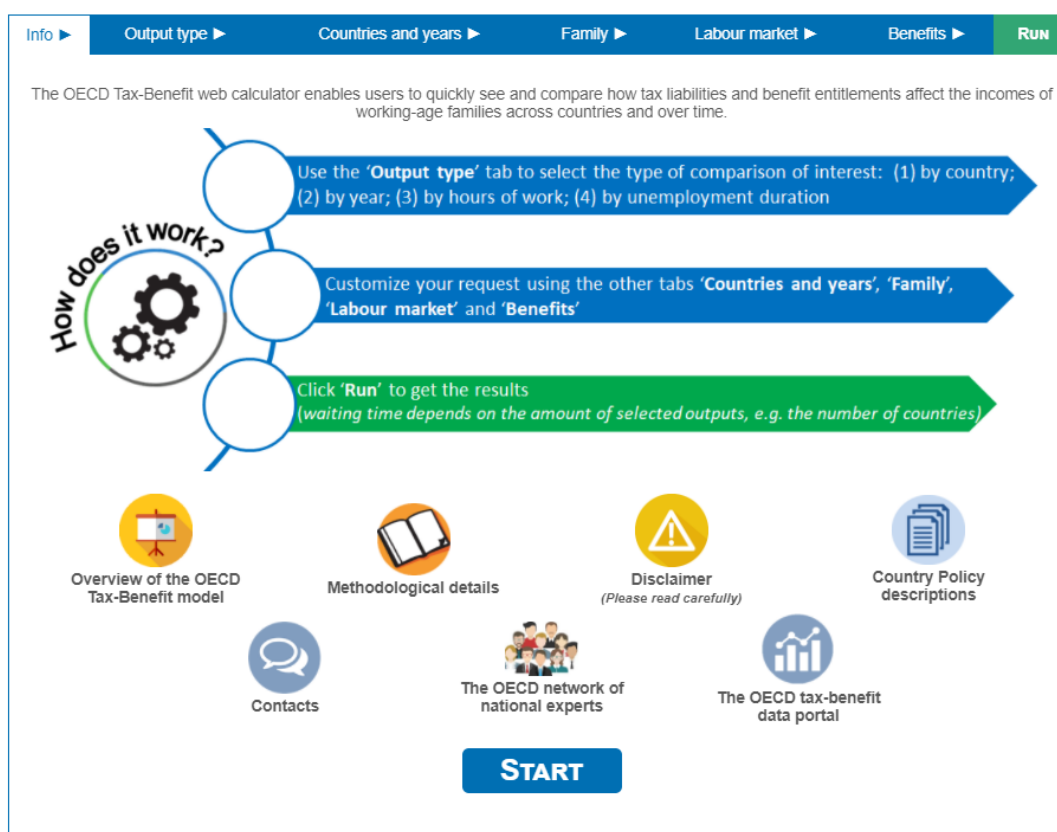
142. The web calculator is designed to facilitate model operations for non-expert users who want to compare the impact of tax-benefit systems on net household income levels. Users do not need any programming knowledge to work with the web calculator as a user-friendly interface allows customising the output through an intuitive guided procedure. The web calculator works in three simple steps (see Figure 1):

Step 1: Users select output type.

Step 2: Users choose countries and years of interest and customise family characteristics.

Step 3: Users run the model and get the results.

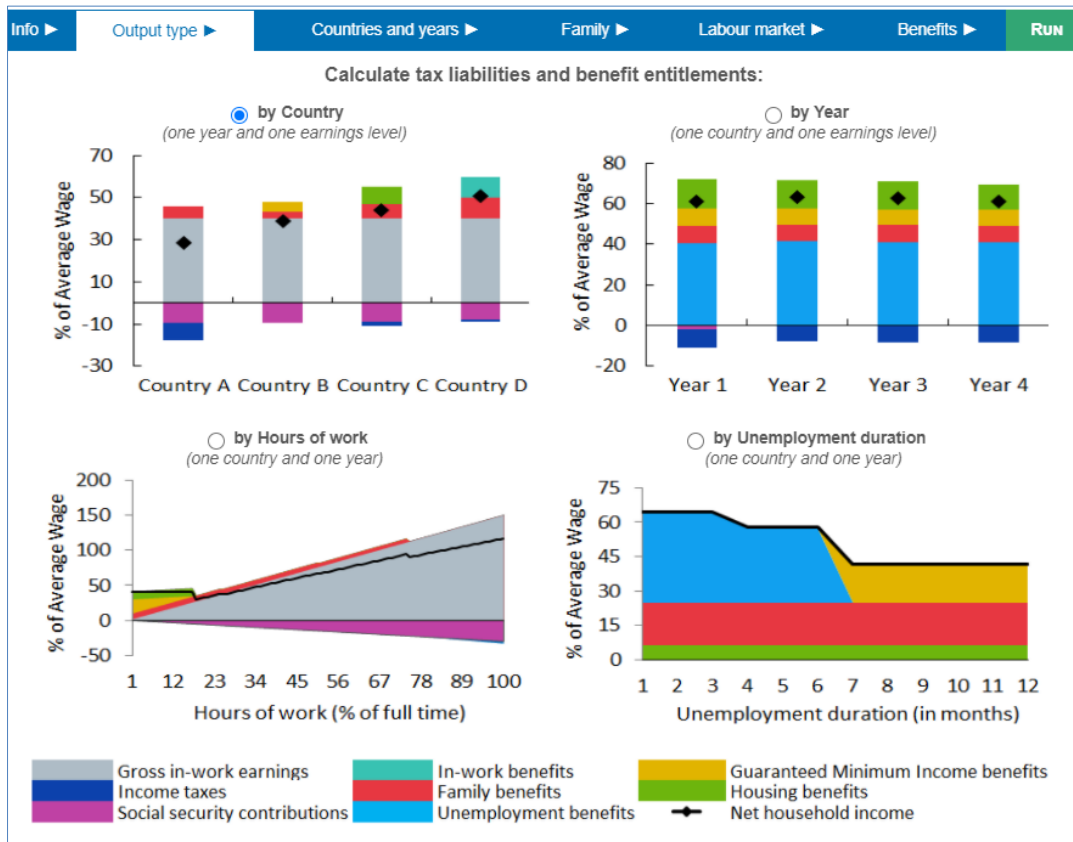
Figure 1. Producing output with the OECD tax-benefit web calculator in three simple steps



143. In **Step 1** users can select one of the four different output types (see Figure 2) showing net income by:

1. Country;
2. Policy year;
3. Working hours;
4. Unemployment duration.

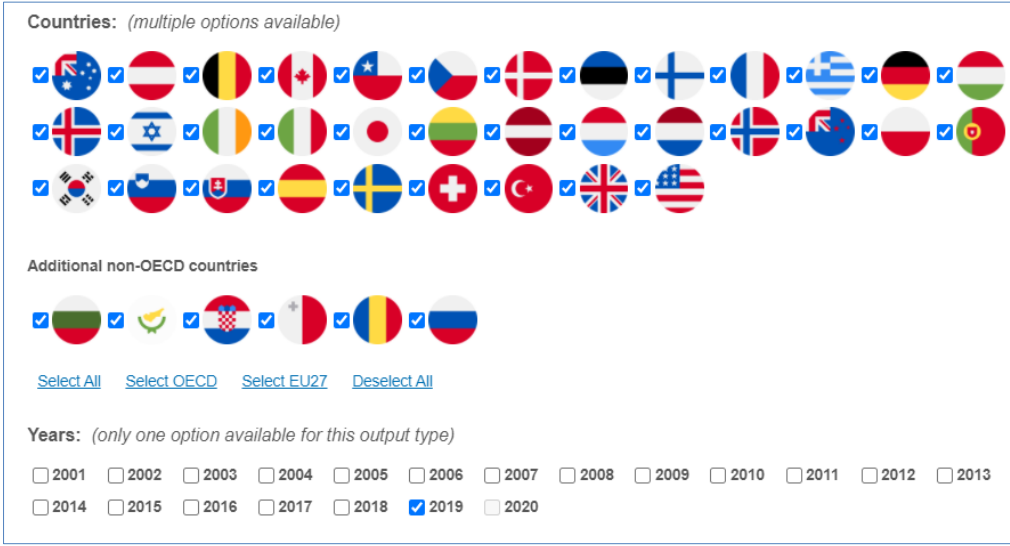
Figure 2. Available output types in the TaxBEN web calculator



144. In **Step 2** users can choose the countries and the policy years that they are interested in, and customize characteristics of the selected family. The interface covers basic family characteristics (e.g. number and age of children), labour market characteristics (e.g. employment status, wage, working hours) as well as options regarding cash benefit entitlements (e.g. previous earnings for the calculation of unemployment benefits, level of housing cost for the calculation of housing benefit, etc.). Figure 3 and Figure 4 show examples of interface options provided in the web calculator.

Figure 3. Selecting countries and years in the TaxBEN web calculator

Countries: *(multiple options available)*



Additional non-OECD countries

[Select All](#) [Select OECD](#) [Select EU27](#) [Deselect All](#)

Years: *(only one option available for this output type)*

2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013
 2014 2015 2016 2017 2018 2019 2020

Note: This screenshot shows the output by country (Output type 1) which allows users to choose multiple countries and one policy year. Other output types have different settings, e.g. output by year (Output type 2) allows choosing multiple years and one country.

Figure 4. Selecting family characteristics in the TaxBEN web calculator

Family type:

Single
 Couple

Age of adults (in years):

Number of children:

Age of children (in years):

Note: This screenshot shows the basic family characteristics related to demographics. Other options (not shown in this figure) cover labour market characteristics and benefit entitlements (e.g. employment status, wage, working hours, previous earnings, housing cost, number of months in unemployment, etc.).

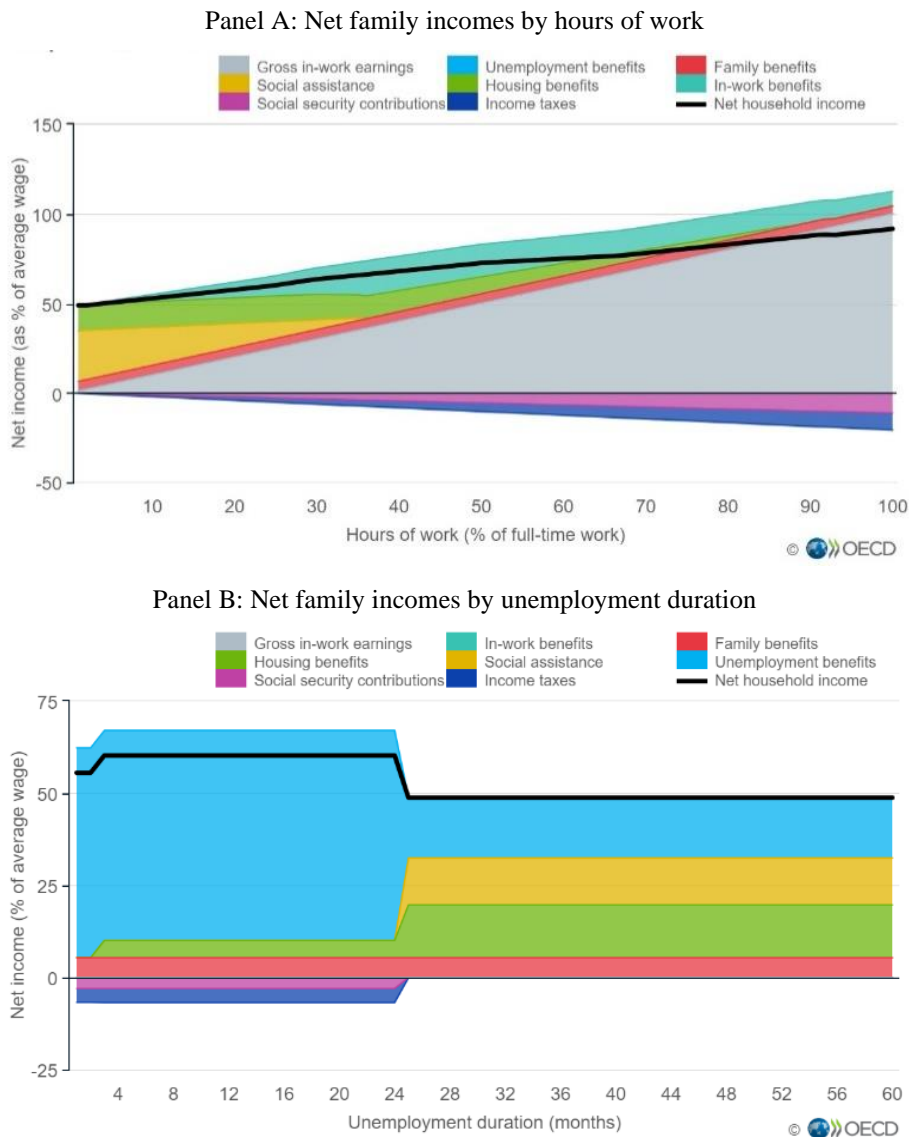
145. Once the request is customized, users can proceed to **Step 3** and run the model by simply pressing the “RUN” button. The output is displayed in a form of an interactive graph that shows the net family incomes for the selected output type, decomposed by income components (see Figure 5). Users can save the graph and download the underlying

data in Excel format. Section 5.1 provides more information on the variables included in model outputs.

146. Figure 5 shows two examples of standard model outputs produced with the web calculator. The black line shows the net household income whereas the coloured stacked areas show the individual income components. The panels of Figure 5 show incomes:

- by hours of work from 1% to 100% of full-time work (Panel A);
- by unemployment duration from 1 to 60 months for a jobseeker claiming unemployment benefits (Panel B).

Figure 5. Example of outputs from the TaxBEN web calculator



Notes: The results refer to a 40-year old couple with two children aged 4 and 6. The second adult is out of work and is not eligible for unemployment benefits, but meets any other relevant behavioural requirement needed to make the family eligible to other social benefits (e.g. social assistance, housing benefits, family and in-work benefits). In Panel A, the wage rate of the first adult is fixed at the full-time average wage whereas the hours of work vary between 1% and 100% of full-time work. In Panel B, the first adult is out of work claiming unemployment benefits. This person is assumed to have a previous employment record of 264 months.

Source: Calculations based on the OECD tax-benefit model.

147. The web calculator produces output in real time by executing the TaxBEN model installed in the OECD server. This means that results are always up to date and synchronized with those available in the [OECD tax-benefit data portal](#) and the [OECD.stat](#) database.

4.2. The online platform

148. The online platform provides direct access to the underlying TaxBEN calculation models and various options for specifying model runs and assumptions. It is intended for users requiring detailed, recurring or larger-volume output for an academic project or for other non-commercial uses.

149. The online platform provides access to a broad range of model functions and capabilities through an intuitive single-line syntax command. The command follows the general rules of the STATA[®] syntax. For instance, the following command line:

```
taxben, country(CAN DEU) year(2017/2019) hhtype(single couple) nchildren (0 2)
```

calculates outputs for two countries (Canada and Germany), three policy years (2017, 2018 and 2019) and four family types (single adult without children, lone parent with two children, couple without children, and couple with two children).

150. In general, the number of outputs is given by the product of the terms included in each syntax option. For instance, the example above includes a list of two countries, three policy years, two family configurations and two options for the number of children, i.e. a total of $2 \times 3 \times 2 \times 2 = 24$ family incomes. Each family income is shown by one observation in the output data.

151. The example above shows the TaxBEN command line with selected basic options. Users can customize further their query by adding other options. Each option has a default value that applies if the option is not specified in the syntax command. Table C.1 in Annex C provides the list of available options with a short description and the default values.

152. Besides the basic options included in the web interface (Section 4.1), the online platform offers additional choices, e.g. users can calculate childcare costs and disability benefits (Section 4.2.3), exclude employee or employer non-tax compulsory payments from the calculations (Section 4.2.4), allow for partial unemployment benefits where these benefits are compatible with work activity 4.2.3). Moreover, users have access not only to the final aggregate income components (e.g. family benefits, final income tax, etc.), but also to intermediate variables referring to income subcomponents (e.g. basic family allowances, benefits for large families and lone parents, gross state tax, gross local tax and income tax credits)³⁹. Final results can be downloaded in a local drive in several formats, including Excel, Stata, or text files. The remainder of this section describes how to use the TaxBEN syntax command.

4.2.1. Specifying family characteristics

153. TaxBEN provides an option to specify whether there are one or two adults in the family (option `hhtype`, see Table C.1 in the Annex C for all options described in this and following Sections). Option `hhtype(single)` calculates results for a household with one single adult, whereas `hhtype(couple)` provides results for a couple. There is also an option to specify the number of children up to four (option `nchildren`) and the age for

³⁹ Country policy descriptions (Box 1) provide variable names for income subcomponents in the beginning of each section along with the full name of a benefit or a tax in English and in the national language.

each of them (options `chage1`, `chage2`, `chage3` and `chage4`). Users can also specify the age of the adults, but for a couple the age of the two adults is the same (option `agead`).

4.2.2. *Setting labour market characteristics*

Activity status: in work

154. For each adult, users can specify the economic activity status and, in the case of employment, the related earnings levels and working hours. For the first adult there are separate options for the economic activity status (option `activity`) and the earnings levels (option `wage`). Activity can be defined as `activity(empl)` for in-work situation or `activity(unempl)` for out-of-work situation. For the second adult, the activity status is derived from their earnings (option `wageSP`), i.e. the second adult is in work if the user specifies positive earnings, and out of work otherwise.

155. The `wage` and `wageSP` options allow for the following earnings levels (see also Section 3.5.1 on gross earnings measurement):

- Fractions of the Average Wage measure. For instance, the notation `wage(AW, 50AW, 162AW)` means that TaxBEN calculates results for three earnings levels of the first adult: the Average Wage, 50% of the Average Wage, 162% of the Average Wage. The notations `wage(AW)` and `wage(100AW)` produce identical results.
- Fractions of the percentiles of the full-time gender-specific earnings. For instance, the notation `wage(P10, FP30, MP60, 60P50)` means that TaxBEN will calculate results for the following earnings levels of the first adult: the 10th percentile of the full-time earnings distribution for all employees; the 30th percentile of the female-specific full-time earnings distribution; the 60th percentile of the male-specific full-time earnings distribution; 60% of the 50th percentile (median) of the full-time earnings distribution.
- Fractions of the national statutory minimum wage, where applicable. For instance, the notation `wage(MW 150MW)` means that TaxBEN will calculate results for the following earnings levels of the first adult: the minimum wage and 150% of the minimum wage.⁴⁰

156. Users can combine the different earnings specifications outlined above in one command line. For instance, one can type `wageSP(AW 50AW MW P10 80P50)`.

157. For the second adult, the option `wageSP` also allows for the notation `wageSP(NW)`, which means “no work”. Thus, the notation `wageSP(NW AW)` calculates two sets of results: one where the second adult is out of work, and the other where the second adult is employed with earnings equal to the Average Wage.

158. When adults are employed, users can specify also the hours of work using fractions of full-time work. Working hours can range from zero to 100% of full-time work. Values above 100% of full time are possible but users should keep in mind that TaxBEN does not cover regulations on overtime pay (see Section **Error! Reference source not found.**). The options for setting the hours of work are `workdayp` and `workdays` for the first and the

⁴⁰ Model results calculated for values of the minimum wage above 100%, e.g. with the notation `wage(150MW)`, do not take into account possible interactions between the statutory minimum wage and other components of the tax and benefit systems, e.g. the increase of guaranteed minimum income benefits in countries where GMI amounts are defined as a fraction of the statutory minimum wage.

second adult, respectively. When using these options, users should keep in mind that full-time work is normalized to 5. For instance, `workdayp(2.5)` means half of full-time work, e.g. 20 hours a week in countries where the national legislation defines full time as 40 hours a week.

159. While TaxBEN does not assume any particular distributions of working hours across the working week, the model assumes full-year employment, so `workdayp(2.5)` means that the first adult works 20 hours a week for 52 weeks. Differently from the `wage` and `wageSP` options, the `workdayp` and `workdays` options do not allow users to use multiple items. For instance, `workdayp(5 2.5 3.8)` is not supported.

Activity status: out of work

160. When the first adult is out of work, users can specify the following options: the number of months of previous social security contributions over the entire career (option `crecord`); the previous employment earnings before the job loss (option `prWage_pr`); the number of months since the first claim of the main out-of-work benefit (option `time`). Where relevant, TaxBEN uses these options to calculate entitlement to unemployment insurance benefits (see Section 3.5.2 for details).

161. By default, TaxBEN assumes a continuous career from the age of 18, therefore the default value for `crecord` is the selected age of the adult minus 18. Users can specify a lower contribution record but the underlying assumption in this case is that any breaks in the employment record happened at the beginning of the carrier (see Section 3.5.2).

162. The earnings levels available for the `prWage_pr` option are the same as those for the `wage` option described above. When users do not specify the previous employment earnings, they are set by default at the same level as the selected current employment earnings (option `wage`). If option `wage` is not specified, the default value for the previous employment earnings is the Average Wage.⁴¹

163. The option `time` refers to the number of months since the claim of the main out-of-work benefit. Note that waiting period is not taken into account in the model, so the benefit is assumed to be paid right away following the claim, if the claimant is eligible. See Section 3.5.2 and 3.5.3 for other assumptions related to calculation of out-of-work benefits.

4.2.3. Setting benefit eligibility

Unemployment benefits

164. Users can specify the main out of work benefit using the `primeUB` option. The main out of work benefit can be unemployment benefit, `primeUB(1)`, or not, `primeUB(0)`. If users select `primeUB(1)`, unemployment benefits are calculated for the first adult only, assuming take up of both unemployment insurance *and* unemployment assistance benefits where relevant (Sections 3.5.2 and 3.5.3). Individual and family characteristics selected by the user (such as record of social security contributions, previous earnings, duration of unemployment, family income, etc.) determine whether the first adult will receive unemployment insurance, unemployment assistance or neither of the two.

165. Some countries allow unemployment benefit recipients to continue receiving reduced unemployment benefits on re-entering work in certain circumstances. It is possible

⁴¹ When this happens, TaxBEN issues an alert showing the previous employment earnings that enter the calculations.

to examine this situation using TaxBEN by specifying both a current earnings level (e.g. `wage (AW)`), a previous earnings level, e.g. `prWage_pr (AW)`, and setting the main out-of-work benefit to be unemployment benefits, i.e. `primeUB (1)`.

Housing and social assistance

166. Options `sa` and `hb` allow for take up of social assistance and housing benefits. For instance, the syntax `sa (1) hb (1)` allows for take up of both. When users specify unemployment benefit as the primary out of work benefit, i.e. `primeUB (1)`, the options `sa (1)` and `hb (1)` allow for social assistance and housing benefit top ups in countries where these benefits can be cumulated with unemployment benefits. Note that the option `time` in this case will refer to the number of months since the first claim of unemployment benefit. However, if `primeUB` is equal to 0 and `sa` is equal to 1, then the option `time` will refer to the number of months since the first claim of social assistance.

167. When the users allow for the calculation of housing benefits, the option `hc` sets the rent costs relevant for the calculation of the housing benefit entitlements. Rent costs enter as a percentage of the Average Wage measure (see Section 3.5.1). For instance, `hc (0.2)` means that the rent cost used to calculate the amount of housing benefit is 20% of the Average Wage.⁴²

Employment-conditional (in-work) benefits

168. Option `iw (0)` allows for non-take-up of employment conditional (or in-work) benefits. By default, the options is set to 1, which means that standard outputs will include in-work benefits.

Into-work benefits

169. Transitional “into-work” benefit are available to jobseekers who recently made a transition from out of work into work (Section 3.5.7). The option `intoWB` allows the first adult to take up such transitional benefits. In countries where such benefits exist, option `time_iw` allows for selecting the number of months since the beginning of the new employment. The default for this variable is the value specified in the option `time` or, if the option `time` is not specified, two months in the new job.

170. For instance, the syntax `intoWB (1)` and `time_iw (5)` means that the first adult took employment recently and has been in the new job for five months. In countries where the person who has moved into work can keep part or all the benefits received when he or she was out of work, the options `primeUB` and `time` are important. They define whether the person’s primary out of work benefit was unemployment benefit and set the duration of out-of-work status before moving into the new job.

Family benefits

171. Family benefits include general family related allowances, ‘lone parent’ benefits and benefits that are conditional on *not* using centre-based childcare such as ‘homecare’ and ‘child-rising’ allowances (See Section 3.5.5).⁴³ TaxBEN offers three options `fb (0)`,

⁴² Note that rent costs are independent of the selected family size or family income (see also Section 3.5.4).

⁴³ Birth-related payments as well as maternity/paternity benefits and parental leave benefits are calculated in a separate TaxBEN module that is not available through the online platform (see Section 3.4.2).

`lp(0)`, and `ha(0)` to ‘switch off’ each of these three components respectively. Note that option `lp(0)` refers only to maintenance support provided to a single parent by the state in situations when support from the second parent is not forthcoming. Other benefits for lone parents are included in general family benefits and can be switched off using option `fb(0)`. The default value for all three options is 1, which means that all family benefits are available in the calculations by default.

Childcare benefits and childcare fees

172. The option `childcare(1)` allows for the use of centre-based childcare for families with pre-school children. When users select this option, TaxBEN calculates the childcare fees charged to parents for the use of centre-based childcare and any childcare-related benefits designed to reduce these fees for the parents. Childcare fees minus childcare benefits are then deducted from the final net household income measure. Under this scenario, the family will *not* be given entitlement to ‘homecare’ or ‘child-rising’ benefits. Childcare fees and childcare benefits are calculated only for families where all adults work. If any of the adults is out of work, they assumed to take care of children at home and the childcare costs are set to zero (see also Section 3.5.9).

Disability benefits

173. Users can select degree of disability of the first adult using the option `disdeg`.⁴⁴ For example, `disreg(30)` defines a person who lost 30% of their work capacity, and `disdeg(100)` – a person who lost all work capacity. If degree of disability is specified, the model assumes full take up of disability benefits provided that a person meets the eligibility criteria. By default the model sets option `disdeg` to zero, which means that the adult is fully able to work and does not claim disability benefits. See Section 3.5.8 for more details on the measurement of disability and other assumptions used in the calculations.

174. In some countries the level of disability benefits changes with duration. In this case, the option `time` sets the number of months since the first claim of disability benefits. Note that TaxBEN does not support simulation of both unemployment and disability benefits at the same time.

175. In some countries disability benefits depend on previous earnings just before the benefit claim, in others, they depend on earnings over entire working career or a long-term period (“pension-type” disability benefits). In both cases, individual working histories are constructed using the percentage of current and/or historical AWs selected in the TaxBEN command line using the `prWage_pr` option.⁴⁵

176. For countries with “pension-type” disability benefits, additional TaxBEN options are available to account for carrier breaks and delayed labour market entry:⁴⁶

- `age_entry` specifies the age at which the main adult entered labour market and allows modelling the effect of delayed labour market entry on accumulated disability entitlements;

⁴⁴ See Section 3.4.2 or Table A2 in [online Annex A](#) for the list of countries and years for which the disability module in TaxBEN is available.

⁴⁵ Note that setting previous wages to wage percentiles or minimum wages is not supported for calculation of disability benefits.

⁴⁶ These options have been implemented for Finland and Poland.

- `break` defines the age interval at which the person experienced a career break, e.g. `break(30 35)` means that the person was out of work from age 30 to age 35 (including);
- `break_type` specifies the economic status of the person during the break: `break_type(0)` stands for inactivity and `break_type(1)` for unemployment.

4.2.4. Other TaxBEN options

Non-tax compulsory payments

177. TaxBEN allows calculating non-tax compulsory payments (Section 3.5.10) made by the employer (`ntcp_er`) and the employee (`ntcp_ee`). The default is to calculate both these payments and to subtract the employee payments from the final net household income measure.

Version control

178. Every new release of the TaxBEN model comes with a version number. Users of the online platform can find the version number in the browse window when they execute the TaxBEN command. Users can use the TaxBEN option ‘`version`’ to produce results based on a particular model version, e.g. `version(2.2.0)`. If the option is not specified, the model by default uses the latest available version.

Options to speed up calculations

179. TaxBEN is designed to produce model output *in sequence*. For instance, the following command line:

```
taxben, country(CAN DEU) year(2017/2019) hhtype(single couple)
```

Calculates in *separate* model runs results for two countries, three policy years, and two family types. In the final step, model combines separate outputs together in one dataset (see the option ‘`accumulate`’ in Table C.1 in the Annex C). While these calculations are typically fast, i.e. less than a second for each output, there are options designed to speed up some calculations even further. Let us consider the following syntax:

```
taxben, country(CAN) year(2020) hhtype(single) wage(50AW 60AW 70AW 80AW 90AW 100AW 110AW)
```

180. This command line will calculate results for Canada 2020 for a single person and seven earnings levels: 50%, 60%, 70%, 80%, 90%, 100% and 110% of Average Wage. The model will calculate results for each wage level separately and then combine all outputs in one dataset.

181. Alternatively, users can produce the same results in a more efficient way by using options `by` and `byperc`:

```
taxben, country(CAN) year(2019) hhtype(single) wage(AW) by(earnings) byperc(0.5(0.1)1.1)
```

182. The syntax `(x(z)y)` means that TaxBEN considers a list of numbers ranging from `x` to `y` with a step of `z`. The example above calculates results for earnings ranging between 50% and 110% of the Average Wage, with steps of 10 percentage points. The main difference between the two programming choices is that the former will run TaxBEN as many times as the number of selected wage levels, whereas the latter will run the model only once, thus optimizing the time spent for producing results.

183. More generally, option `by` allows users to calculate results for percentages of the variable specified in this option. Option `byperc` defines the percentages. Other TaxBEN options set the ‘baseline’ value of the variable used in calculations, e.g. option `wage (AW)` sets the baseline wage in the example above to the Average Wage. Similarly, the syntax: `wage (MIN) by (earnings) byperc (0.5 (0.1) 1.1)`, will calculate family incomes using percentages of the Minimum Wage instead of the Average Wage measure.

184. Users can select other variables in option `by`. For instance, the syntax:

```
taxben, country(CAN) year(2019) hhtype(single) nchildren (0) workdayp(5)
by(workdayp) byperc(0.1(0.01)1)
```

Calculates results for working hours ranging between 10% and 100% of full-time work (i.e. `workdayp(5)`), with steps of 1 percentage point (see Section 4.2.2 for details on the option `workdayp`).

185. When the interest is not in percentages of the variable selected in the `by` option, but in specific *values* of the selected variable, e.g. months of out-of-work benefit receipt, users can replace the option `byperc` with the option `bylevel`. For instance, the syntax:

```
taxben, country(CAN) year(2019) hhtype(single) time(2) nchildren(0)
by(time) bylevel(1/60)
```

Will calculate results by months of benefit receipt ranging between 1 and 60 months. Note that the use of the option `bylevel` overwrites the baseline level of the variable selected in the option `by` (i.e. the option `time(2)` in the example above has no effect on the outcome and can be omitted).

186. While the option `by` can work in principle with any TaxBEN variable, it has been tested only for the following variables:

- a. Earnings level of the first adult: `by(earnings)`
- b. Previous earnings level of the first adult: `by(pr_earnings)`
- c. Working hours of the first adult: `by(workdayp)`
- d. Months of out-of-work benefit receipt of the first adult: `by(time)`
- e. Months spent in the new job: `by(time_iw)`
- f. Length of social security contributions record of the first adult: `by(crecord)`

187. An important remark to keep in mind when using the option `by` is that the model will run keeping all the other variables fixed at the selected values (or their default values if the users did not specify values in the command line). It is therefore users’ responsibility to check if the outputs produced are coherent. Let us consider for instance the option `by(time) bylevel(1/60)`. In this case, the age of the first adult is kept fixed at the value specified in the option `agead` while the months of benefit receipt will vary between 1 and 60 months. Similarly, when users requires calculations by earnings levels or working hours it is important to keep in mind that all the other input variables are kept constant, including those that are typically related with the household income, e.g. the rent specified in the option `hc`.

5 Model output and policy indicators

5.1. Net household income and subcomponents

188. Standard TaxBEN output is the **net family income** and its subcomponents, expressed in annual terms and in the national currency (see Section 3.1). All the monetary variables available in the standard model output refer to family amounts. The list below shows the **variables** of the standard TaxBEN output (see Section 3.5 for a description of each income component):

- **NET:** Net family income
- **GROSS:** Gross employee earnings
- **FB:** Family benefits
- **SA:** Social assistance, including Guaranteed Minimum Income (GMI) benefits
- **UB:** Unemployment benefits, including both unemployment insurance and unemployment assistance
- **HB:** Housing Benefits
- **IW:** Employment-conditional (or in-work) benefits
- **DB:** Disability benefits
- **cc_cost:** gross childcare fees paid by parents for centre-based childcare
- **cc_benefits:** childcare benefits conditional on the use of centre-based childcare, including childcare fee reductions
- **IT:** Income tax
- **SC:** Employee's social security contributions and non-tax compulsory payments
- **SSCR:** Employer's social security contributions, non-tax compulsory payments and payroll taxes

189. The sum of income subcomponents is equal to net family income:

$$\text{NET} = \text{GROSS} + \text{FB} + \text{SA} + \text{UB} + \text{HB} + \text{IW} + \text{DB} - \text{IT} - \text{SC} - (\text{cc_costs} - \text{cc_benefits})$$

190. Each variable above may include amounts related to more than one benefit programme or tax. The 'benefit classification table' (available from [this link](#)) provides the names of the individual benefit programmes included in each variable. The country policy descriptions (see Box 1) available [online](#) provide details on each individual programme.

191. Some of the variables listed above are available only to users of the online platform as they refer to situations not modelled in the web calculator (see Section 4):

- **SSCR:** available in the online platform as a separate variable but is not part of net family income;
- **DB:** available in the online platform if users specify degree of disability;
- **cc_benefits** and **cc_cost:** available in the online platform if users select the childcare option in the TaxBEN command line.

5.2. Main assumptions behind headline tax-benefit indicators

192. The OECD tax-benefit indicators are an integral part of the policy-monitoring process at the OECD and wider policy and research communities (see Section 2). The OECD publishes regularly tax-benefit indicators in the [OECD.stat](#) database, the [OECD data portal](#), and the [project webpage](#). Users can combine standard TaxBEN outputs to calculate policy indicators, e.g. indicators of benefit generosity and work incentives for particular policy configurations. For instance, dividing the net income of a family where the first adult is unemployed with the net household income of an otherwise identical family where the first adult is in work gives a measure of the “Net Replacement Rate in unemployment”.

193. The headline OECD tax-benefit indicators are calculated for specific TaxBEN family, individual and labour market characteristics. These characteristics are selected with the view of ensuring a good representation of relevant policy mechanisms and cross-country comparability.⁴⁷ The following list describes the main family and individual characteristics that are used to calculate the headline indicators:

- Adults are aged 40.
- Families either have no children or two children aged 4 and 6. For families with children, the standard assumption is that there are no costs associated with school attendance, including pre-school attendance, unless the indicator allows explicitly for use of centre-based childcare and children are under the age of 4.
- If the family uses centre-based childcare, the family is assumed to have two children aged 2 and 3. Net childcare costs are deducted from the net income measure only when the family uses centre-based childcare.
- Family benefits and in-work benefits are always included in the calculations subject to relevant income and eligibility conditions.
- Families receive social assistance benefits subject to relevant income and eligibility conditions. If benefit receipt is subject to activity tests, such as active job-search or being available for work, it is assumed that these requirements are met.
- The first adult has an employment record of 264 months (22 years).
- Unemployed second adults have been unemployed for a ‘long’ time and do not qualify for unemployment insurance and unemployment assistance, e.g. because it has expired. However, they are assumed to meet any other relevant behavioural requirements needed for eligibility to other social benefits.
- For indicators that allow for transitional ‘into-work’ benefits, the first adult has been employed in the new job for two months and had received out-of-work benefits for two months before the transition occurred.
- If not specified otherwise, indicators calculated when the first adult is unemployed assume the second month of unemployment benefit receipt.
- Relevant housing costs are equal to 20% of the Average Wage regardless of income level, family type and labour market status. This value can be considered an upper bound and may not reflect the typical housing costs in many OECD countries. Two

⁴⁷ They also allow keeping the number of indicators manageable. Producing indicators for all possible combinations of model parameters becomes quickly intractable. It is of course possible to calculate tax-benefit indicators for other family and labour market characteristics using the web interface or the online platform (see Section 4).

reasons justify the use of a relatively high value of housing costs. First, in countries where benefit entitlements depend on the housing costs a high level of rent allows capturing the highest benefit amount possible. This is important when comparing benefit generosity across countries. Second, changing the housing costs depending on the labour market status would make the interpretation of any policy indicators difficult as measure will capture both policy settings and ad-hoc behavioural assumptions.⁴⁸

- Employee non-tax compulsory payments are subtracted from the net income measure.

194. The assumptions chosen for the headline tax-benefit indicators correspond to the ‘default’ settings of individual and family characteristics in the web calculator and the online platform. For instance, the default settings refer to a family with *two* children where adults are *40 years old*. Table C.1 in Annex C provides the ‘default’ settings that are used when calculating the headline indicators. Additional assumptions depend on the type of indicator and are described in the relevant subsections of Section 5.3.

195. The remainder of this section describes the standard OECD tax-benefit indicators. Users can reproduce these indicators using the web calculator and the online platform. The presentation “[Calculating OECD tax-benefit indicators: a step by step guide](#)” describes how to use the web calculator to calculate the main headline indicators.

5.3. Headline indicators

5.3.1. Net Replacement Rate in unemployment

196. The Net Replacement Rate in unemployment (NRR) indicator shows the proportion of the net household income before the job loss that is maintained at a particular month of the unemployment benefit receipt. In practice, the indicator compares the net income of a family where the first adult is employed with the net income of an otherwise identical family where the first adult is unemployed claiming unemployment benefits.⁴⁹

197. NRRs are defined as follows:

$$NRR_t = \frac{y_{out\ of\ work,t}}{y_{in\ work}}$$

198. Where $y_{in\ work}$ is the net household income before the job loss and $y_{out\ of\ work,t}$ is the net household income at month t of unemployment benefit receipt.

5.3.2. Adequacy of Guaranteed Minimum Income Benefits

199. This is an indicator of income adequacy (IA) for claimants of Guaranteed Minimum Income (GMI) benefits:

$$IA = \frac{y_{GMI}}{y_{median}}$$

⁴⁸ In countries where eligibility to the housing benefit depends on the declared level of housing cost, TaxBEN does not take into account the fraction of housing cost that is above the eligibility threshold. See Section 3.5.4 for details.

⁴⁹ NRRs compare total family resources across two different economic activities of the first adult. As a result, NRRs for two-earner couples are less relevant from a policy perspective as, to a large extent, they are driven by the employment income of the second adult, whose employment status and hours of work are assumed to remain unchanged following the job loss of the partner.

200. The numerator is the net income of a jobless family claiming social assistance benefits, including GMI benefits, and not eligible for unemployment benefits (e.g. because they have expired).

201. The denominator is the median household disposable income in the country calculated before housing costs or other types of “committed” expenditure. Values are from the [OECD Income Distribution Database](#) and the [European Union Statistics on Income and Living Conditions](#) (EU-SILC) for non-OECD countries.⁵⁰

202. Both the numerator and denominator are adjusted for family size (“equivalized”) using the square root of the family size.

203. The normalization of net income of GMI recipients in terms of the median disposable income allows measuring the gap between GMI benefit entitlements and a relative poverty line defined as a fixed percentage of the median income. For instance, if the poverty line is calculated as 50% of the median disposable income (i.e. the OECD definition of relative poverty line), a value of the IA indicator of 30% means that GMI benefit entitlements are 20 percentage points below the poverty line.

5.3.3. Financial work incentives

204. TaxBEN allows calculating indicators of financial work incentives such as the Participation Tax Rate (PTR) and the Marginal Effective Tax Rate (METR). These indicators measure the proportion of earnings that is lost to higher taxes or lower benefits when a jobseeker takes up employment (PTR) or an employee increases their working hours (METR). Thus, higher values indicate *weaker* financial work incentives. PTR and METR are calculated as follows:

$$PTR \text{ or } METR = 1 - \frac{\Delta y_{net}}{\Delta y_{gross}}$$

205. Indicator values are typically multiplied by 100%. The symbols Δy_{net} and Δy_{gross} denote the change of net and gross family incomes after the labour market transition. Box 3 provides details on the PTR/METR indicators and their algebraic properties, including the property of additive decomposition into policy levers.

Box 3. The OECD work incentive indicators

Participation Tax Rate (PTR) and the Marginal Effective Tax Rate (METR) measure the fraction of gross earnings that a family loses to higher taxes and/or lower benefits when a family member makes a transition from one employment status to another (e.g. from out-of-work to in-work, or from part-time to full-time work). Formally, the indicators are calculated as 1 minus the change in the net family income (N) relative to the change in the gross family employment income (G) before (b) and after (a) the employment transition:

$$PTR \text{ or } METR = 1 - \frac{N_a - N_b}{G_a - G_b}$$

The equation above is equal to zero when $(N_a - N_b) = (G_a - G_b)$, i.e. when the family keeps 100% of the additional gross earnings that occur after the employment transition. On the other hand, when the family loses 100% of the additional earnings to either higher taxes and/or lower benefits,

⁵⁰ Users should bear in mind that income population statistics are updated with a significant delay. Every new release of the headline indicator uses the latest available estimates of median disposable incomes and reliable income projections.

the indicator is equal to 1. Hence, lower values are associated with stronger financial work incentives.

A useful property of the indicator is the additive decomposition into policy levers. Let us rewrite the net family income as $N = G + B - T$, where B denotes the overall benefit entitlements and T the overall tax liabilities. In this case, the indicator becomes:

$$PTR \text{ or } METR = 1 - \frac{N_a - N_b}{G_a - G_b} = 1 - \frac{(G_a + B_a - T_a) - (G_b + B_b - T_b)}{G_a - G_b} = \frac{T_a - T_b}{G_a - G_b} - \frac{B_a - B_b}{G_a - G_b}$$

Each additive component measures the contribution of a selected policy lever to the overall indicator. For instance, higher tax liabilities (i.e. $T_a > T_b$) and lower benefit entitlements (i.e. $B_a < B_b$) after the employment transition increase the indicator, and therefore decrease financial work incentives.

206. When interpreting PTR results, users should bear in mind that TaxBEN calculates benefit entitlements and tax liabilities *for a selected month of employment / unemployment*, using *annualized* income values as inputs for the calculations (see Section 3.1 for details). For instance, a PTR calculated for a jobseekers who takes up employment after, e.g., 2 months of unemployment does not imply that the incomes in employment entering the PTR calculations will relate to the remaining part of the fiscal year (e.g. 10 months), but will refer to a particular month of employment (also selected by the user, see section 4.2.2).

207. The OECD publishes PTRs and METRs for a broad range of labour and family circumstances. For instance, PTRs are calculated for many different family types and different configurations of benefit eligibility, e.g. with and without eligibility for unemployment benefits, or with and without eligibility for transitional into-work benefits (in order to capture the ‘short-term’ employment incentives provided by these benefit schemes). Similarly, METRs are calculated for different marginal increases of working hours, e.g. from 33% to 67% and from 67% to 100% of full-time work.

208. Headline PTRs are published also for parents using centre-based childcare (Section 3.5.9). Published PTR accounting for net childcare costs assume that parents work full-time and use full-time childcare in situations in work, whereas in situations out of work parents take care of their children at home and do not incur childcare costs.⁵¹ This means that the PTR indicator with net childcare costs takes into account not only direct childcare costs but also other financial implications of parents’ decision to use childcare, e.g. loss of ‘homecare’ or ‘child-rising’ allowances. Parents receive these allowances in the out of work scenario as these benefits are given to families who do *not* use formal childcare. These benefits *increase* PTRs as they are withdrawn when the family uses childcare in the in-work scenario.

209. Headline METRs assume the same hourly wage rate after the increase in working hours (i.e. there is no ‘part-time penalty’ in these calculations). Similarly, headline PTRs assume that the earnings in the previous job are the same as those in the new job. This assumption is relevant when the main out-of-work benefit is unemployment benefit, which often depends on the level of previous earnings.

210. In line with the calculation of income taxes, TaxBEN calculates social security contributions using the rules of the current policy reference date. However, in practice, social security contributions may give employees entitlement to benefits later on (e.g. pension entitlements, qualification for unemployment insurance benefits), so these payments may affect individuals’ work incentives differently to the extent that they are aware of these future income implications and take them into account when making decisions. Although this is beyond the scope of TaxBEN’s static modelling framework, for

⁵¹ As of 2019, the model allows also for part-time work and part-time use of centre-based childcare.

low-income groups who may face liquidity constraints the current income may be the most relevant and pressing concern.⁵²

5.3.4. Hours of work needed to escape poverty

211. This indicator relates both the income adequacy indicator and the effective tax rates on entering employment and increasing working hours. It measures the number of working hours that the first adult in the family has to work to move above a relative poverty line defined as 50% of the median disposable household income in the country. The settings used to calculate this indicator are the same as the settings of the headline PTR, METR and IA indicators. The headline indicator does not consider use of centre-based childcare.

5.3.5. Net childcare costs

212. The Net Childcare Cost (NCC) indicator is defined as the net reduction in family budgets resulting from the use of centre-based care. It is calculated by comparing net income of a family that purchases childcare and an otherwise similar family where no childcare services are bought (for example, if the family is able to use unpaid informal care). Formally, the indicator is calculated as follows:

$$NCC(w, t, b, c) = y_{nc}(w - t + b) - y_{wc}(w - t + b, c - bc)$$

213. Where y_{wc} is the net income of a family that uses centre-based childcare, and y_{nc} is the net income of an otherwise identical working family that does not use childcare.

214. Net incomes in the equation above are a function of the following elements:

- w is the sum of full-time earnings at the family level;
- t is the total amount of tax liabilities;
- b is the total amount of benefit entitlements except childcare benefits (Section 3.5.9);
- c is the childcare fee charged by childcare centre *before* any fee reductions applied by the centre (e.g. before discounts for low-income families);
- bc is the sum of fee reductions and childcare benefits (Section 3.5.9).

215. Changes in benefit entitlements other than childcare benefits (such as social assistance and family benefits) as well as special tax concessions designed to alleviate the costs of centre-based childcare are included in the policy instrument to which they relate (e.g. social assistance benefits, family benefits and income taxes). This implies that tax concessions related to family expenditures on centre-based childcare can be calculated by running the model with and without childcare and taking the difference of the income tax variable in the two scenarios. A similar reasoning applies for ‘homecare’ and ‘child-rising’ allowances, which are classified as family benefits in the OECD tax-benefit model (Section 3.5.5) and are withdrawn when the family uses centre based childcare.

⁵² Standard work incentive indicators do not include employer social security contributions as they are not part of the net income measure (Section 3.5.10). For example, consider two countries with identical levels of social security contributions overall, but different incidence on the employee or the employer. The country with higher employee contributions (and lower employer contributions) will appear to have higher PTRs/METRs, whereas the country with higher employer contributions (and lower employee contributions) will appear to have lower PTRs/METRs and a lower Average Wage. Hence, it should be borne in mind that work incentive indicators show the effective tax rate that is applied to earnings, not to the overall labour cost of the employer, which includes employer social security contributions as well as wages. Other OECD indicators, such as OECD tax wedge and the OECD Effective Tax Rate on Labour (Section 5.3.6), examine the total tax wedge applied to the labour cost, and so are not affected by the split between employee and employer contributions.

216. The headline NCC indicator is expressed as a percentage of the net household income *before* net childcare costs, or as a percentage of the average wage. Children are 2 and 3 years old.

5.3.6. Other tax-benefit indicators

217. The OECD develops tax-benefit indicators as part of ongoing policy analysis. As these indicators are not updated on a regular basis they are not included in [OECD.Stat](#) or the [OECD tax-benefit data portal](#). Some of these indicators are included in the OECD tax-benefit [policy evaluation scoreboard](#), which the OECD uses internally to analyse hypothetical or recent policy reforms. Among the others, the policy evaluation scoreboard includes indicators of:

- Redistributive design (so-called “RED” index);
- Effective tax rate on labour.

218. Other policy indicators that use output from the OECD tax-benefit model are described in the publications or databases for which they have been produced. Examples include the indicator of the [Benefits in investing in education](#), or the [Labour Market Insecurity index](#). All indicators calculated based on outputs from the OECD tax-benefit model TaxBEN should acknowledge TaxBEN as the source (see Section 4).

Indicator of redistributive design

219. The OECD tax-benefit model is a hypothetical family simulation model and, as such, is not designed to calculate the impact of policies on country-wide estimates of income inequality and poverty.⁵³ Calculating these measures requires the use of population-based microsimulation models (see Box 2).

220. Nevertheless, it is possible to compute summary measures of tax progressivity (Kakwani, 1977_[80]), income inequality (Gini, 1912_[81]) and redistribution (Reynolds and Smolensky, 1977_[82]) using only a limited number of data points calculated with the TaxBEN model. These results should not be used to make an inference on a population broader than those from which they originate (e.g. for a selected family type).⁵⁴

221. With this key caveat in mind, the OECD tax-benefit model can be used to estimate a summary index of Redistributive Design (“RED” index), adapted from Reynolds and Smolensky (1977_[82]). The index is computed for a group of ten hypothetical households, who have different earnings levels but otherwise identical characteristics. The earnings levels used are zero earnings and the nine decile points of the full-time earnings distribution (see Section 3.5.1). Box 4 describes the main features of the RED index.

222. The RED index provides a useful summary measure of the redistributive design of tax-benefit policies for specific household types (e.g. one-earner couples with children *only*) across the earnings distribution. Positive changes after a policy reform imply a greater

⁵³ To estimate the distributional impact of a reform for the whole household population using the OECD tax-benefit calculator one would have to take into account the differential impact of the reform *between* household types and the distribution of the household types across the income range, as well as the distributional impact within households of the same type at different income levels.

⁵⁴ Consider the increase in the tax-free threshold in an individual-based income tax system that reduces income tax liabilities for each taxpayer by a fixed cash amount. *Within* any given household type, this fixed cash amount will represent a larger percentage of income for lower-income households. But two-earner couples, who tend to be found at higher levels of the household income distribution, will benefit twice as much as single-earner couples who are typically found lower down. The impact on overall income inequality in the population is therefore ambiguous.

degree of redistribution through the tax-benefit system for a selected household type, while negative changes mean that the reform is regressive. The *RED* index can be decomposed into policy levers and, for each of them, one can compute the two components driving the overall redistributive design: “the size” (or “incidence”) and the “progressivity”:

- The size is a function of the average tax (or benefit) rate. This rate is computed as total tax liabilities (or benefit expenditures) divided by total amount of gross income. Higher values indicate higher benefit spending or lower tax revenues.
- Progressivity is measured by the *Kakwani* index. Positive values denote a higher concentration of the policy instrument (tax or benefit) at high income levels (this is typically the case for progressive taxes), whereas negative values indicate a higher concentration at low income levels (this is typically the case for social benefits).

Box 4. Indicator of redistributive design (RED index)

The RED index draws on the redistribution measure developed by Reynolds and Smolensky (1977_[82]), it is computed as follows:

$$RED = \underbrace{\frac{t}{1-t}}_{\text{Incidence}} \cdot \underbrace{K}_{\text{Progressivity}}$$

Where t is the average tax (or benefit) rate, and K is the Kakwani index. The Kakwani index is a well-known measure of progressivity (or “targeting”) and is calculated as the difference between the concentration index of tax liabilities and the Gini index on the gross income distribution. The average tax rate t is calculated as the total tax liabilities divided by the total gross income of the selected households. Benefit entitlements enter the index as negative taxes ($-t$).

The key difference between the RED index and the original index described in Reynolds and Smolensky (1977_[82]) is that the RED index does not consider the (residual) change in redistribution driven by the re-ranking of some households as a consequence of the tax-benefit rules. This residual component has little scope in an evaluation framework based on few households located at different earnings decile points.

The decomposition of the RED index above shows that a tax has some redistributive power as long as it is progressive. A tax schedule that is exactly proportional to gross income will have K equal to zero, as the concentration of tax liabilities would be exactly the same as the distribution of gross income. Instead, a tax schedule that generates larger tax liabilities as a percentage of gross income for higher-income groups will have a positive effect on redistribution.

The decomposition shows also that the overall redistributive effect of a tax (or a benefit) depends on its size or incidence: a “small” benefit amount will not change the difference between the Gini coefficients before and after the benefit, even if that benefit is highly progressive.

The RED index can be conveniently decomposed into the sum of the progressivity and incidence components of each individual element of the tax-benefit system. Assuming a tax-benefit system with only one benefit (b) and one tax (t), the RED index can be written as:

$$RED = \frac{1}{1 - (I_t - I_b)} \cdot (I_t K_t - I_b K_b)$$

Where I_t is the incidence of the tax, i.e. $I_t = \frac{t}{1-t}$, I_b is the incidence of the benefit, i.e. $I_b = \frac{-b}{1+b}$, K_b and K_t are the *Kakwani* indices computed for benefit b and tax t , respectively.

Recent contributions using the RED index to analyse the effect of tax-benefit reforms on redistribution policies are Immervoll et al. (2015_[83]) and Causa et al. (2019_[16]).

Effective tax rate on labour

223. Effective tax rate on labour (ETRL) is defined as net taxes paid on labour (i.e. total taxes and social security contributions paid for an employee, minus any cash benefits received) divided by the total labour costs for the employer:

$$ETRL = \frac{(IT + SC + SSCR) - (BEN)}{GROSS + SSCR}$$

224. Where *GROSS* are the gross employment earnings, *SSCR* the employer social security contributions, *SC* the employee social security contributions, *IT* the income tax and *BEN* the sum of benefit entitlements. All amounts are calculated at the family level, so the spouse's earnings enter the computation where applicable.

225. This indicator is similar but not identical to the OECD Tax Wedge indicator illustrated in the OECD publication [Taxing Wages](#). Box 5 describes the main methodological differences in the calculations of the two indicators. For EU non-OECD countries a special model run of the OECD Tax-Benefit model allows calculating the OECD Tax Wedge indicator following the same methodology.

Box 5. Differences between the OECD Tax Wedge and the Effective Tax Rate on Labour

While the calculation of income tax and social security payments used to calculate the Effective Tax Rate on Labour are based on the same information used to calculate the Tax Wedge indicator, there are some methodological differences that may result in small discrepancies between the indicators.

Scope – The calculations of the Effective Tax Rate on Labour consider a wider range of benefits, including maintenance payments for lone parents, unemployment benefits, in-work benefits, family benefits, housing benefits and social assistance benefits. These benefits are not systematically included in the calculation of the Tax Wedge indicator. Hence, when these benefits interact with the tax system, there may be discrepancies in the income tax liabilities calculated in the two cases.

Calculations – There is also a difference in how the two indicators treat non-tax compulsory payments (NTCP), i.e. compulsory payments to social security schemes outside of government. The OECD Tax Wedge indicator does not consider NTCP, i.e. these payments do not increase the tax wedge as other mandatory payments, e.g. mandatory social security contributions. Nevertheless, when NTCP affect the amount of income tax paid, for example, if they are deductible from taxable income, the income tax amounts are reduced. The Effective Tax Rate on Labour includes NTCP both as a compulsory tax/contribution as well as a deductible expenditure.

Timing – The Effective Tax Rate on Labour is calculated using the policy rules as they apply on a particular reference day - 1st January (or 1st July before 2018). The system in place on this date is then annualised to give an annual figure (see Section 3.1). The Tax Wedge indicator looks instead across the fiscal year, and accounts for within-year changes. For example if in 2019 a social security rate changes mid-year, then Tax Wedge indicator will use a weighted average rate, whereas the Effective Tax Rate on Labour will use the rate in place on 1 January.

Family Types – For families with children, the Tax Wedge indicator considers the most generous family benefit that a family with two children aged between 6 and 11 is eligible for (excluding the case of twins). By contrast, the effective Tax Rate on Labour assumes fixed ages of 6 and 4. As a result, family benefit entitlements may differ, which could in turn affect the level of income tax paid in cases where family benefits and income tax interact.

The methodology annex of the [Taxing Wages](#) report provides a detailed overview of the OECD Tax Wedge indicator.

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Annex A. TaxBEN policy information

Please, follow the link to the [online Annex A](#) containing information on:

- countries and years available in TaxBEN (Tables A1),
- special TaxBEN policy modules (Table A2),
- simulated regional policy components (Table A3), and
- annualization rules for minimum wages (Table A4).

Annex B. Selected uses of TaxBEN in academic and other published research

Table B.1. Journal articles using TaxBEN

Authors	Journal	Main use	
		Comparative and descriptive analysis (benchmarking / policy monitoring / reform assessments)	Statistical / econometric analysis
(Abrassart, 2015 ^[84])	Journal of European Social Policy		x
(Allan and Scruggs, 2004 ^[85])	American Journal of Political Science		x
(Anic and Krstic, 2017 ^[86])	Economic Annals	x	
(Avdagic, 2014 ^[87])	British Journal of Industrial Relations		x
(Bassanini, 2012 ^[88])	Review of Economics and Institutions		x
(Bassanini and Cingano, 2018 ^[89])	Industrial and Labor Relations Review		x
(Bassanini and Duval, 2009 ^[90])	Oxford Review of Economic Policy		x
(Bassanini and Garnero, 2013 ^[91])	Labour Economics		x
(Benczúr, Kátay and Kiss, 2018 ^[92])	Economic Modelling	x	
(Berloff and Modena, 2013 ^[93])	Review of Income and Wealth		x
(Boarini and Strauss, 2010 ^[94])	OECD Economic Studies		x
(Boeri, Conde-Ruiz and Galasso, 2012 ^[95])	Journal of the European Economic Association		x
(Bottasso, Conti and Sulis, 2017 ^[96])	Labour Economics		x
(Bradley and Stephens, 2007 ^[97])	Comparative Political Studies		x
(Buti et al., 2010 ^[98])	Economic Policy		x
(Checchi and García-Peñalosa, 2008 ^[99])	Economic Policy		x
(Clark and Postel-Vinay, 2008 ^[100])	Oxford Economic Papers		x
(Conti and Sulis, 2016 ^[101])	Journal of Comparative Economics		x
(D'Addio and Mira d'Ercole, 2006 ^[102])	OECD Economic Studies	x	
(De Giorgi and Pellizzari, 2009 ^[103])	Labour Economics		x
(Dhont and Heylen, 2008 ^[104])	Economic Inquiry		x
(Di Tella and MacCulloch, 2005 ^[105])	European Economic Review		x
(Égert, 2018 ^[106])	Open Economies Review		x
(Fiori et al., 2012 ^[107])	Economic Journal		x
(Flambard, 2018 ^[108])	Housing Studies	x	
(Freundt, Straubinger and Kvist, 2013 ^[109])	European Journal of Social Security	x	
(Gauthier, 2008 ^[110])	Vienna Yearbook of Population Research	x	
(Howell et al., 2007 ^[111])	Capitalism and Society		x
(Howell and Rehm, 2009 ^[112])	Oxford Review of Economic Policy		x
(Immervoll and Scarpetta, 2012 ^[29])	IZA Journal of Labor Policy	x	
(Kawaguchi and Murao, 2014 ^[113])	Journal of Money, Credit and Banking		x
(Krebs and Scheffel, 2013 ^[114])	IMF Economic Review		x
(Kuitto, 2016 ^[115])	Social Indicators Research		x

(Kvist, Straubinger and Freundt, 2013 _[116])	European Journal of Social Security	x	
(Laurin, 2019 _[117])	SSRN Electronic Journal	x	
(Lehmann et al., 2015 _[118])	International Tax and Public Finance		x
(Lohmann, 2008 _[119])	European Sociological Review	x	
(Lubbers et al., 2018 _[120])	Social Policy & Administration		x
(Marchal and Van Lancker, 2018 _[121])	Social Indicators Research	x	
(Martin, 2015 _[122])	IZA Journal of Labor Policy	x	
(Matysiak and Węziak-Białowolska, 2016 _[123])	European Journal of Population	x	
(Milberg and Winkler, 2010 _[124])	International Review of Applied Economics		x
(Nelson, 2011 _[125])	European Sociological Review	x	
(Nickell, Nunziata and Ochel, 2004 _[126])	Economic Journal		x
(Noel, 2018 _[127])	Journal of Social Policy		x
(Nymoen and Sparman, 2014 _[128])	Oxford Bulletin of Economics and Statistics		x
(Oesch, 2010 _[129])	European Journal of Industrial Relations		x
(Olivetti and Petrongolo, 2017 _[130])	Journal of Economic Perspectives		x
(Seeleib-Kaiser, 2013 _[131])	International Journal of Social Quality	x	
(Szelewa, 2013 _[132])	European Journal of Social Security	x	
(Tridico, 2017 _[133])	Cambridge Journal of Economics		x
(Turrini et al., 2015 _[134])	IZA Journal of Labor Policy		x
(van Vliet and Wang, 2017 _[135])	Comparative European Politics	x	
(Wüst, 2008 _[136])	International Journal of Social Welfare	x	

Source: OECD Secretariat.

Table B.2. Book chapters using TaxBEN

Authors	Book title	Main uses	
		Comparative analysis (country benchmarking / policy monitoring / reform assessment)	Statistical / econometric analysis
(Allègre and Jaehrling, 2011 ^[137])	Working Poverty in Europe	x	
(Boeri, 2011 ^[138])	Handbook of Labor Economics		x
(Bradshaw, 2008 ^[139])	Family benefit systems	x	
(Ferrarini, Nelson and Höög, 2013 ^[140])	Minimum Income Protection in Flux	x	
(Freundt, Straubinger and Kvist, 2013 ^[141])	Social Policy Review 25	x	
(Frölich et al., 2014 ^[142])	Social Insurance, Informality, and Labor Markets	x	
(Immervoll, 2007 ^[143])	Modelling our Future - Population Ageing, Health and Aged Care	x	
(Immervoll, 2012 ^[144])	Counting the Poor	x	
(Kaeding, 2013 ^[145])	Towards an Effective European Single Market	x	
(Koettl and Weber, 2012 ^[146])	Research in Labor Economics, Informal Employment in Emerging and Transition Economies		x
(Maquet and Stanton, 2012 ^[147])	Counting the Poor	x	
(Nickell and Layard, 1999 ^[148])	Handbook of Labor Economics		x
(Saraceno, 2009 ^[149])	United in Diversity?	x	

Source: OECD Secretariat.

Annex C. TaxBEN syntax for the online platform

Table C.1. List of TaxBEN options available in the online platform

Options	Description	Example	Default value	Allow for Multiple items
country(list)	List of countries, based on ISO3 codes. Users can specify also a group of countries, e.g. 'OECD', 'EU28' or 'EU27', 'all' (for all TaxBEN countries)	country(ITA DEU GBR)	This option is required, users have to specify at least one country	Yes
year (list)	List of policy years, from 2001 for most countries. See Table A2 in online Annex A for the countries available for each policy year.	year(2007/2018)	This option is required, users have to specify at least one year	Yes
out(name)	Specify the folder where TaxBEN saves the output.	out(/home/ /OUTFILES/)	This option is required.	N/A
hhtype(list)	List of family types (two choices: 'single' or 'couple')	hhtype(single couple)	(couple)	Yes
nchildren(list)	Number of dependent children (five choices: 0, 1, 2, 3, 4)	nch(0 1 2 4)	(0 2)	Yes
agead(value)	Age of the adult family members (any integer number from 18 to 64)	agead(30)	(40)	No
agech1(value)	Age of the first child (any integer number from 1 to 17)	agech1(3)	(4)	No
agech2(value)	Age of the second child (any integer number from 1 to 17)	agech2(4)	(6)	No
agech3(value)	Age of the third child (any integer number from 1 to 17)	agech3(15)	(8)	No
agech4(value)	Age of the fourth child (any integer number from 1 to 17)	agech4(17)	(10)	No
activity(name)	Economic activity status of the first adult member: Two choices: employed (code: 'empl') or out of work (code: 'unempl')	activity(empl)	(empl)	No
wage(list)	List of wage levels of the first adult. Available choices: AW (the average wage); xAW, i.e. a percentage of the AW, e.g. wage(30AW) means 30% of the AW; MIN (the statutory minimum wage); P10, P20, ..., P90 (decile points of the full-time earnings distribution); FP10, FP20, ..., FP90 (the decile points of the full-time earnings distribution of women); MP10, MP20, ..., MP90 (the decile points of the full-time earnings distribution of men).	wage(AW, MIN, 50AW, P50)	(AW)	Yes
wageSP(list)	List of wage levels of the second adult. The choices are the same as for <i>wage()</i> plus 'NW', which means 'No Work'. In this case, the second adult is assumed to be out of work without eligibility to unemployment benefits.	wageSP(NW, 50AW)	(NW)	Yes
prWage_pr(list)	List of wage levels in the previous job of the first adult. The choices are the same as for <i>wage()</i> . This option is relevant only if the first adult is out of work, i.e. <i>activity(unempl)</i> .	PrWage_PR(AW, MIN, 50AW, P50)	value specified in option <i>wage()</i>	Yes
workdayp(value)	Number of working hours per week of the first adult. Note: full-time hours are normalized to 5. Thus, in countries with a standard full-time 40 hours working week, <i>workdayp(5)</i> means 40	workdayp(2.5)	(5)	Yes

Options	Description	Example	Default value	Allow for Multiple items
	hours/week whereas <i>workdayp(2.5)</i> means 20 hours/week.			
workdays(value)	Number of working hours per week of the second adult. The values are the same as for the option <i>workdayp()</i> .	workdays(2)	(5)	Yes
primeUB(value)	Whether the primary out of work benefit of the first adult is unemployment benefit (1) or not (0). Note: unemployment benefit includes both unemployment insurance and unemployment assistance benefits.	primeUB(1)	(0)	No
sa(list)	Whether the household claims (1) or not (0) social assistance, including GMI benefits.	sa(0 1)	(1)	Yes
hb(list)	Whether the household claims (1) or not (0) housing benefits.	hb(1 0)	(1)	Yes
fb(value)	Whether the household claims (1) or not (0) family benefits. Note that family benefit here do not include maintenance payments to lone parents and homecare allowances conditional on <i>not</i> using centre-based childcare. These benefits are controlled by options <i>lp()</i> and <i>ha()</i> .	fb(0)	(1)	No
lp(value)	Whether the household claims (1) or not (0) maintenance payments to lone parents. Note that other family benefits to lone parents are controlled by option <i>fb()</i> .	lp(0)	(1)	No
ha(value)	Whether the household claims (1) or not (0) homecare allowances conditional on <i>not</i> using centre-based childcare.	ha(0)	(1)	No
iw(value)	Whether the household claims (1) or not (0) employment-conditional in-work benefits.	iw(0)	(1)	No
intoWB(list)	Whether the first adult claims (1) or not (0) temporary “into-work” benefits when moving into work.	intoWB(1)	(0)	Yes
childcare(value)	Whether the household uses (1) or not (0) centre-based childcare	childcare(1)	(0)	No
hc(value)	Housing costs considered for the calculation of housing benefits measured as a percentage of the average wage. Value 0.2 corresponds to 20% of the average wage. Note: this value does not change with the specified earnings levels or family type.	hc(0.11)	(0.2)	No
time(value)	Months of receipt of the primary out of work benefit when the first adult is out of work.	time(3)	(2)	No
time_iw(value)	Months in the new job for the first adult who has recently moved into the new job and applies to temporary “into-work” benefits. Used in combination with option <i>intoWB(1)</i> .	time_iw(5)	value specified in option <i>time()</i> , otherwise (2)	No
crecord(list)	Employment record of the first adult (in months)	crecord(0(12)120) ²	Equal to $12*(agead() - 18)$, e.g. $12*(40-18)=264$	Yes
ntcp_er(value)	Whether to add (1) or not (0) the employer non-tax contributory payments to the employer social security contributions.	ntcp_er(0)	ntcp_er(1)	No
ntcp_ee(value)	Whether to add (1) or not (0) the employee non-tax contributory payments to the employee social security contributions.	ntcp_ee(1)	ntcp_ee(1)	No
disdeg(value)	Degree of disability of the first adult measured as a percentage of lost work capacity: from (0) – fully able to work, to (100) - full loss of work capacity.	disdeg(50)	disdeg(0)	No
age_entry(value)	The age at which the first adult entered labour market before the loss of disability. This option	age_entry(25)	age_entry(19)	No

Options	Description	Example	Default value	Allow for Multiple items
	allows modelling the effect of delayed labour market entry on accumulated disability entitlements.			
break(list)	The age interval at which the first adult experienced a career break before the loss of disability. Only two values are allowed: the age when the break started and the age when it finished.	break(30 35)	break(0 0), i.e. no break in the career	Yes (two values only)
break_type(value)	The economic status of the first adult during the career break is inactivity (0) or unemployment (1).	break_type(1)	break_type(0)	No
by(variable name)	Fast calculation of a large number of outputs based on different values of the variable specified in brackets. The values of the variable specified in brackets are set with the options 'bylevels' / 'byperc' – see below). ¹ Available choices for the <i>by</i> options are: 'earnings' (outputs by wage levels of the first adults); 'pr_earnings' (output by previous wage levels of the first adult); 'time' (outputs by months of receipt of the primary out-of-work benefit); 'time_iw' (outputs by months in the new job); 'workdayp' (output by working hours of the first adult, 'crecord' (output by employment record of the first adult).	by(earnings)	by(workdayp)	No
bylevels(list)	Specifies the <i>levels</i> of the variable selected in the option <i>by()</i> , e.g. the syntax <i>by(time) bylevel(1/60)</i> will calculate results for values of time from 1 to 60. ¹	bylevels(15/20)	bylevels(1/60)	Yes
byperc(list)	Specifies the <i>percentages</i> of the variable selected in the option <i>by()</i> , e.g. the syntax <i>by(earnings) byperc(0(0.01)2)</i> generates outputs for different earnings levels of the first adult given by the multiplication of the numbers in the option <i>byperc()</i> with the wage value specified in the option <i>wage()</i> . ¹	byperc(0.1(0.1)0.3)	byperc(1)	Yes
version(value)	Specifies the version of the TaxBEN model. This option is useful to replicate results based on previous model's inputs.	Version(2.2.0)	Latest version	No
keepvar	When specified, keeps all intermediate variables in the final dataset. Note: using this option can slow down the data production process.			N/A
keepv(list)	Keeps the intermediate variable specified in the option.			Yes
name(name)	Name of the final dataset, see also the option <i>save</i> below.		name(data)	N/A
accumulate	This options tells the platform to provide in the final dataset the results for all the countries, years, family and labour market circumstances specified in the command line.		accumulate	N/A
save	This option tells the platform to save the final dataset in the selected output folder, see option <i>out()</i> . When users specify the 'save' option, the platform automatically use the 'accumulate' option.		Note: by default TaxBEN does not save results.	N/A

1. Users can specify either *byperc(list)* or *bylevel(list)*. See Section 4.2.4 for details on the 'by' options.

2. The syntax for a list of numbers is flexible. For instance, the following notations for the *crecord* option produce the same results: *crecord(1 2 3 4)*, *crecod(1/4)*, and *crecord(1(1)4)*, where the value (1) in the middle defines the steps used in the numbers' progression. If the step is not specified, as in *crecod(1/4)*, the default step is 1.

Examples of TaxBEN syntax

Example Syntax 1 (output by earnings levels). Net family incomes in 2018 and 2017 for all countries for a 30-years-old lone parent with 2 and 4 children, at different earnings levels (from 0 to 200% of the average wage, with steps of 1ppts):

```
taxben, country(all) year(2017/2018) hhtype(single) nchildren(2 4) agead(30) activity(empl)
by(earnings) byperc(0(0.01)2)
```

Example Syntax 2 (output by working hours). Net family income in Japan in 2018 for a 1-earner and a 2-earner couple, with and without children, at different working hours of the first adult (from 1 to 100% of full time, with steps of 10ppts), three wage rates of the first adult (average wage, median wage and minimum wage), with and without housing benefit top-ups and with social assistance top ups:

```
taxben, country(JPN) year(2018) hhtype(couple) wageSP(NW P50) nch(0 2) activity(empl) wage(AW P50
MIN) by(workdayp) byperc(0(0.1)1) hb(0 1) sa(1)
```

Example Syntax 3 (output by time spent in the new job). Net family income for a one-earner couple with 1 child where the first adult is working part time (50% of full-time work) at the minimum wage, from the first month until the 12th month of employment in the new job:

```
taxben, country(all) year(2018) hhtype(couple) nchildren(1) agead(30) activity(empl) workdayp(2.5)
wage(MIN) wageSP(NW) intoWB(1) by(time_iw) bylevel(1/12)
```

Example Syntax 4 (output by unemployment duration). Net family incomes for a single-adult and a couple, with 1 to 4 children, at different unemployment durations of the first adult (from 1st to 60th month), two previous earnings levels of the first adult (median and average wage), and three (current) earnings levels of the second adult (first decile of the full-time earnings distribution, 67% of the average wage, and the AW):

```
taxben, country(all) year(2001/2018) hhtype(single couple) nchildren(1 2 3 4) activity(unempl)
prWage_pr(AW 50AW) wageSP(P10 67AW AW) by(time) bylevel(1/60)
```

Example Syntax 5 (output by previous earnings levels). Net family income in Italy in 2018 for a 45-years-old jobseeker with one child of 10 years old, at the 3rd month of unemployment, claiming unemployment benefits, for three previous earnings levels (33%, 67% and 100% of the AW):

```
taxben, country(ITA) year(2018) hhtype(single) nch(1) agead(45) agechl(10) activity(unempl)
primeUB(1) prWage_pr(AW) time(3) by(pr_earnings) byperc(0.33 0.67 1)
```

Note that the same output can be calculated less efficiently by typing:

```
taxben, country(ITA) year(2018) hhtype(single) nch(1) agead(45) agechl(10) activity(unempl)
primeUB(1) prWage_pr(33AW 67AW AW) time(3)
```

The syntax above calls the model three times, i.e. for each earnings level of the first adult. Instead, outputs generated using the 'by' option do not require multiple model executions and are therefore produced more quickly.

Additional output variables generated by the TaxBEN command

- `country_name`: the full country name
- `iso3`: country ISO3 code
- `year`: reference policy year for the calculations of taxes and benefits
- `time`: months of out-of-work benefit receipt
- `time_iw`: months in the new job
- `hhtype`: Family type. Values for families *without* children: `single`, `1earnerC`, `2earnerC`. Values for families *with* children: `single#C`, `1earner#C` and `2earner#C`, where '#' is the number of children for families with children (from 1 to 4).
- `run`: model-run identifier (part 1): selected values of options 'activity' and 'by'. For instance if the syntax includes the options 'activity(empl) by(workdayp)' then `run = empl_workdayp`.
- `middle`: model run identifier (part 2): selected values of the following options `primeUB`, `intoWB`, `hb`, `sa` and `crecord`. For instance, if the syntax includes the following options: `primeUB(0) intoWB(0) hb(0) sa(1)`, then 'middle' is 'primeSA_NointoW_noHBtp_SAtp_cr264' where 'tp' means 'top up' (so `noHBtp` means 'no housing benefit top ups') and the last part of the code (`_cr264`) refers to the social security contribution record of the first adult (264 month). Note that when `primeUB=0` then the primary out-of-work benefit is Social Assistance.
- `index`: model run identifier (part 3): row identifier based on the selected value of option `byperc / bylevel` (for a given combination 'run' and 'middle').
- `earnings`: annual earnings of the first adult in national currency.
- `workdayp`: working hours of the first adult (from 1 to 5, where 5=full-time, e.g. 40 hours a week).
- `wagetype_pr`: wage rate(s) of the first adult, i.e. the value(s) specified in the option `wage(list)`.
- `wagetype_s`: wage rate(s) of the second adult, i.e. the value(s) specified in the option `wageSP(list)`.
- `median`: equivalised median disposable household income for the population.

