Commodity-Specific Conversion Factors Database for the Republic of South Africa

national treasury

Department:
National Treasury
REPUBLIC OF SOUTH AFRICA

USER MANUAL

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Introduction

South Africa Commodity-Specific Conversion Factors Database (South Africa CSCF) has been developed by Cambridge Resources International Inc. (CRI) for the National Treasury of the Republic of South Africa. The database contains Commodity-Specific Conversion Factors (CSCFs) for estimating economic values for more than 8,000 tradable commodities and 28 non-tradable items from 7 different categories (i.e., Construction, Transportation, Trade, Utilities, Social Services, Financial Services, and Other Services). The database also estimates Economic Opportunity Cost of Labour (EOCL) for seven categories of labour with different range of skills and labour market types applicable to South Africa.

The database is created to search for, present, and update, whenever necessary, the CSCFs for South Africa's Labour and tradable and non-tradable goods and services. It is designed for professionals involved in the economic and social appraisal of investment projects in the South Africa.

The program provides multiple ways to search and browse the database with an easy to learn interface. CRI has estimated the CSCFs in this database based on the prevailing distortions (taxes, custom duties, subsidies, etc.) in the South African economy.

This user manual provides a helpful guide on how to use the system and all its components. The rest of the manual is organised as follows. The first section describes the user interface of the program. The second section provides a brief discussion of the use of CSCFs and EOCL in project evaluation, their different types and the choice of the relevant ones when carrying out an economic appraisal of an investment project.

South Africa CSCF Interface

Home Page

User will be met with a homepage every time they visit the website and from here, they can use the top navigation pane to access all parts of the website.

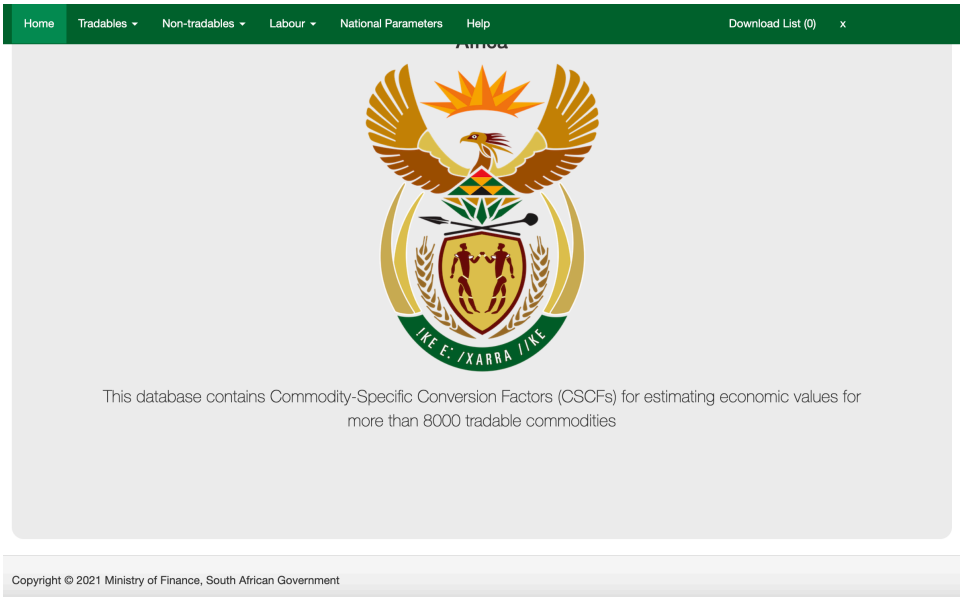

Figure 1: Landing Page

Search Tradables

The search tradables page is a comprehensive search engine that facilitates the search for more than 8,000 tradable commodities in the database.

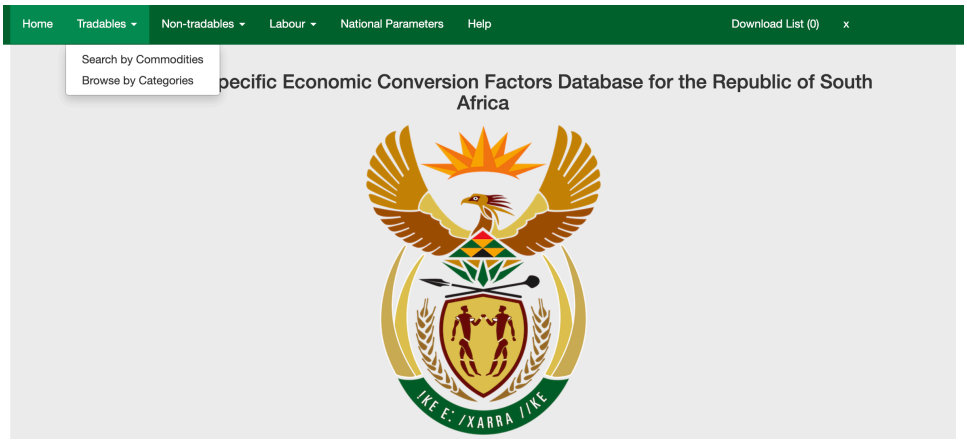

Figure 2: Search Tradables Page

In the search bar, a user can search according to **keyword**, **HS Code**[1] or **(Sub)Chapter Number**.

After typing the desired **keyword**, **HS Code** or **(Sub)Chapter Number**, user can press enter or click the search button to reveal the search results. The X symbol can be pressed at any time to reset the search.

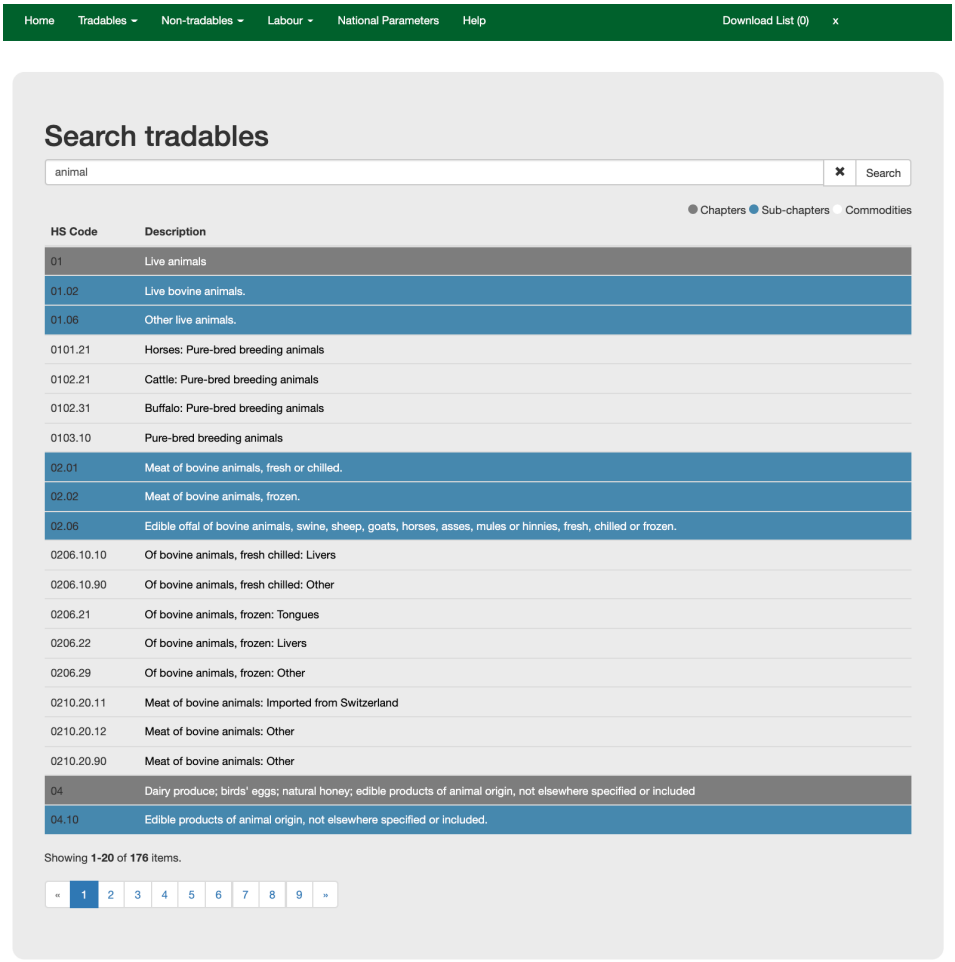

Figure 3: Sample Search Results for "Animal"

Search colour coordinates Chapters (Gray), Sub-chapters (Blue) and Commodities (White). The (sub)chapters and commodities are displayed in the database as they are categorised in the HS code system.

If a chapter or a sub-chapter is selected, the user is directed to the chapter with all subchapters displayed in the browse tradable page.

[1] The Harmonized Commodity Description and Coding System, generally known as the Harmonized System (HS) is used by the World Customs Organization (WCO) as an internationally standardized system of names and numbers to classify traded products.

If a commodity is selected, the user is directed to the calculation page where they can view or perform simulations on the CSCF of the selected commodity.

Browse Tradables

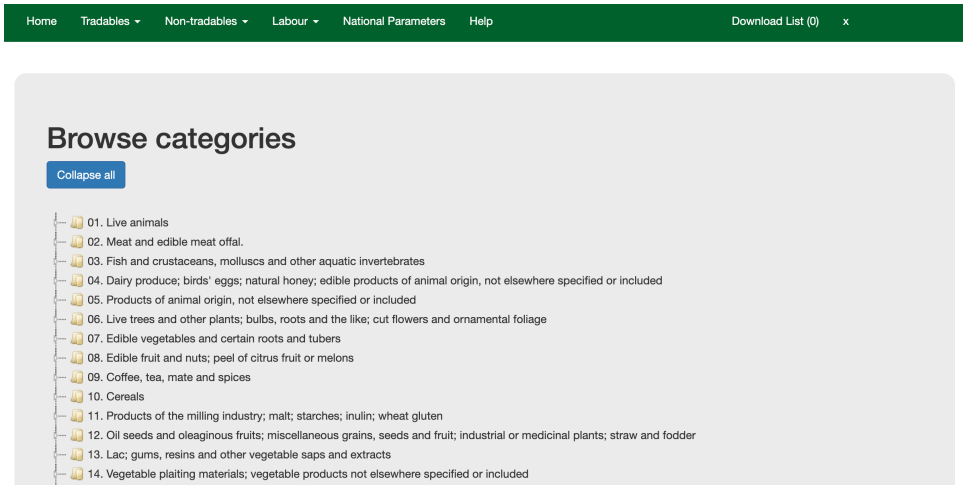

Figure 4: Browse Categories Page

Browse categories page provides an alternative way to search through tradable commodities, categorised into 99 HS chapters. When a user selects a chapter, the chapter will expand and reveal all sub-chapters associated with the chapter. Once the sub-chapter is also selected, it will expand to show all commodities within the sub-chapter.

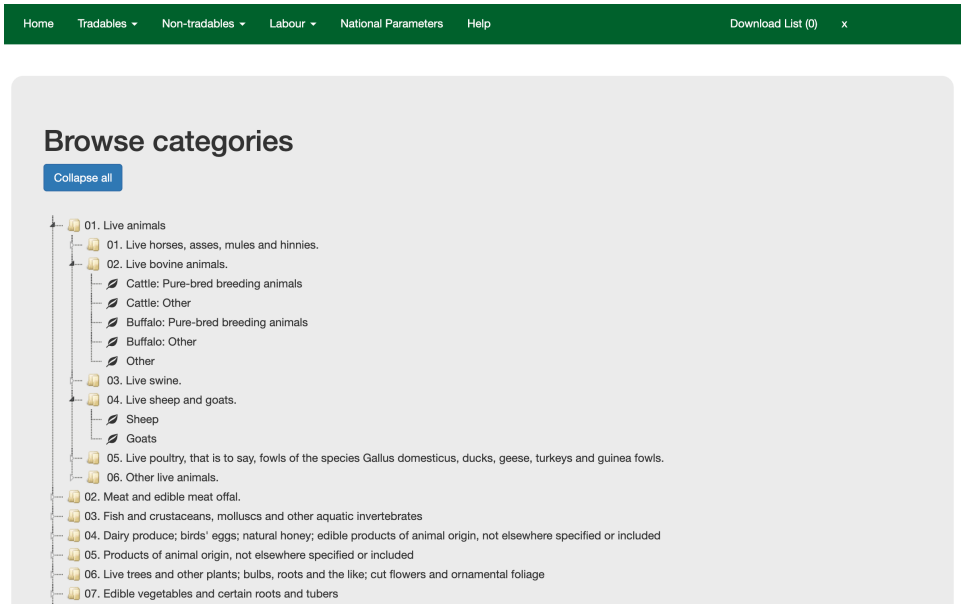

Figure 5: Sample Chapter, Sub-chapter Expansion

Once a commodity is selected, the user is directed to the calculation page to view, download and/or perform simulations on the CSCF of the particular commodity.

Collapse All button will collapse the tree into its original state.

Conversion Factors for Tradables

A user can access this page by either searching for a commodity and clicking it on the search tradable page, or alternatively, browsing by category and selecting a commodity via the browse categories page.

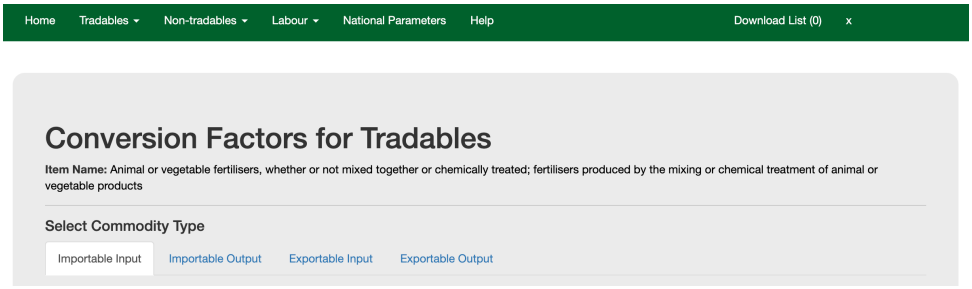

Figure 6: Conversion Factors for Tradables

Item Name refers to the commodity description, in the above example "Animal or vegetable fertilisers" commodity is selected.

Clicking on the item name will reveal detailed information about the commodity such as its HS Code, Chapter Name as well as its Sub-Chapter Name.

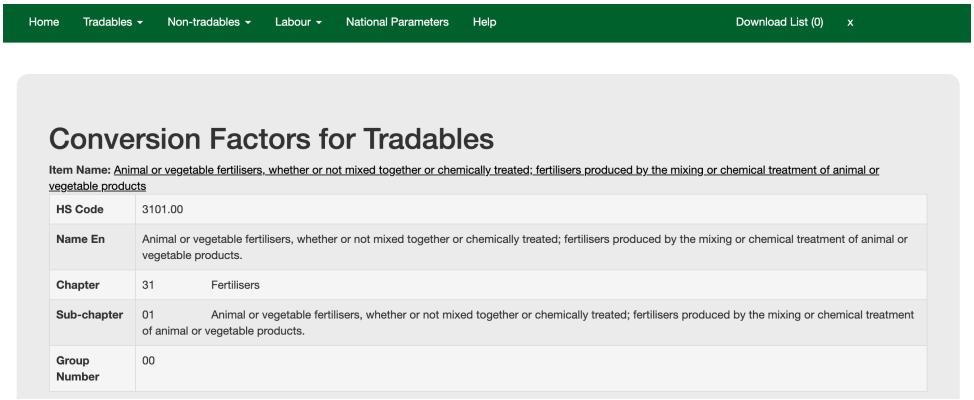

Figure 7: Expanded Item Details

Four different commodity types can be selected to reveal different estimations, which are "**Importable Input**", "**Importable Output**", "**Exportable Input**" and "**Exportable Output**".[2]

Once a commodity type is selected, a tab will appear and present the user estimation results as well as options for the user to practice estimations by inputting values into the table.

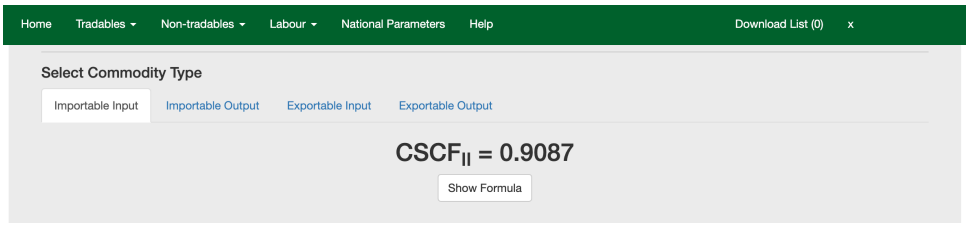

Figure 8: Importable Input Commodity Type Selected

Show Formula will reveal the estimation formula for the commodity type.

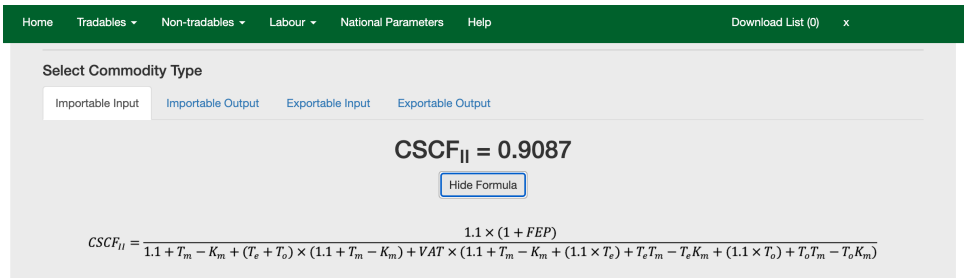

Figure 9: Show Formula Button Expanded (Tradable Section)

Hide Formula hides the currently expanded formula.

The table allows a user to input different values and recalculate to display a new estimation result.

Base Input Values are calculated using the base input values as of the designated year.

Recalculate commits the Updated Input Values to the formulation and displays the estimation with the updated values.

Reset allows resetting of the inputted values for the estimation results.

[2] See the second section of the manual for details of the commodity types.

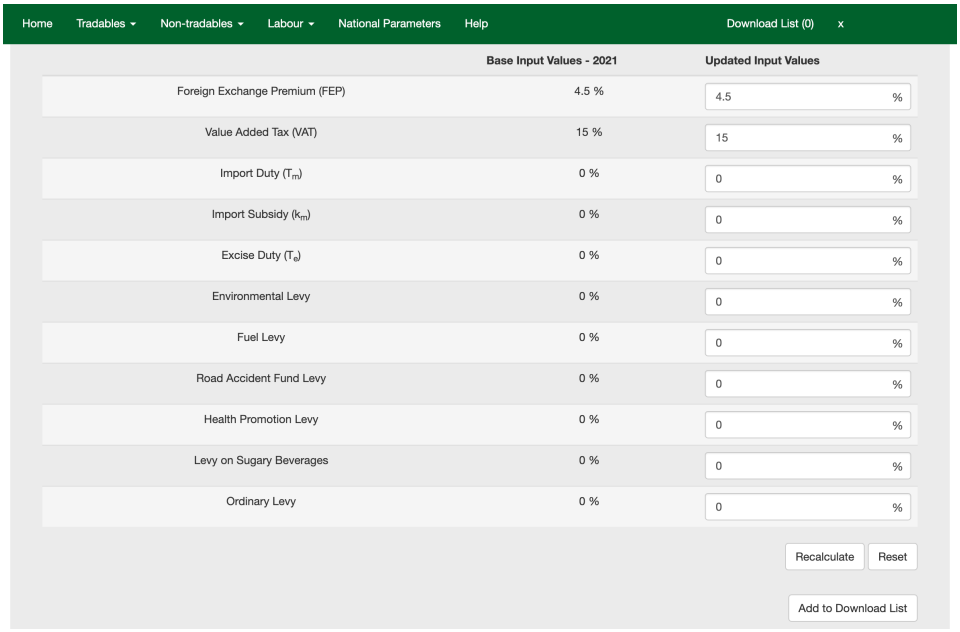

Figure 10: Simulation Table for Updating Input Values

Add to Download List allows users to save their estimation results to an excel file which can be downloaded by pressing the "Download List" from the top menu.

User can add various commodities (tradable and/or non-tradable) or different types of a particular tradable commodity to the download list by clicking "Add to Download List" each time CSCF is displayed for the commodity. Once the desired numbers of items are added to the list, the list can be downloaded by clicking the "Download List" on the top right of the navigation pane.

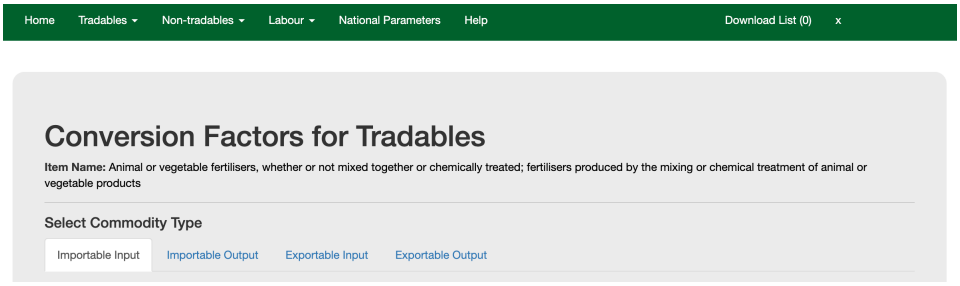

Figure 11: Download List on Top Right

By pressing the X button next to the "Download List", the accumulated list of commodities will be reset back to zero.

Non-tradables

Twenty-eight non-tradable items from seven different categories (i.e., Construction, Transportation, Trade, Utilities, Social Services, Financial Services, and Other Services), are calculated in this section.

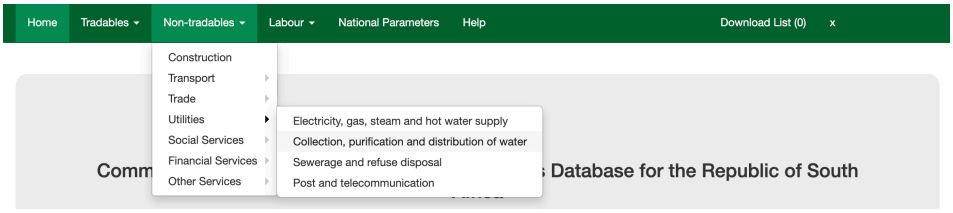

Figure 12: Non-tradables Landing Page

Once a user selects a service, they will be redirected to the conversion factors page where they can see the estimation results as well as options for the user to practice estimations by inputting values into the table.

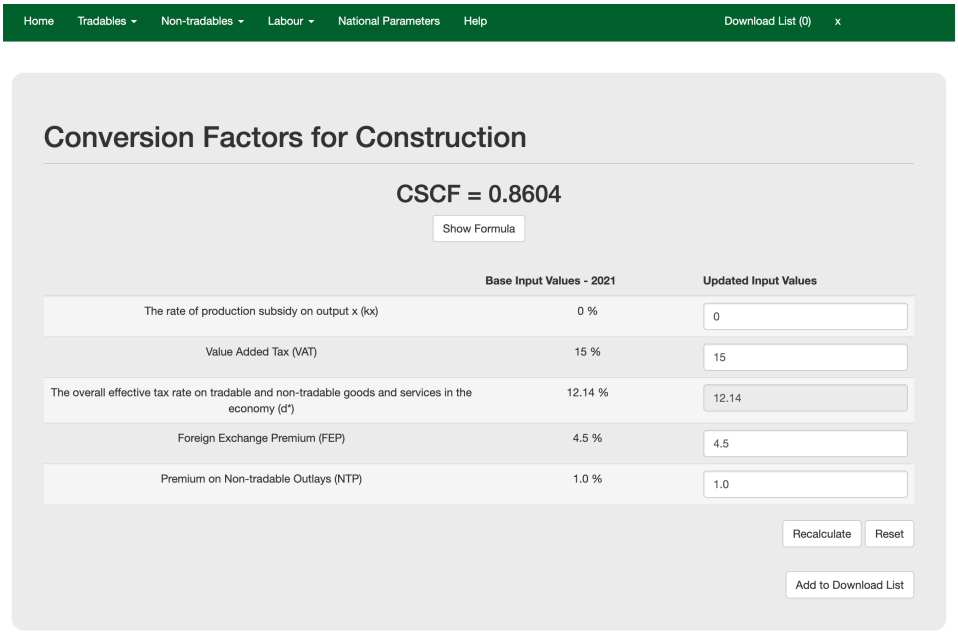

Figure 13: Non-tradables Estimation Page

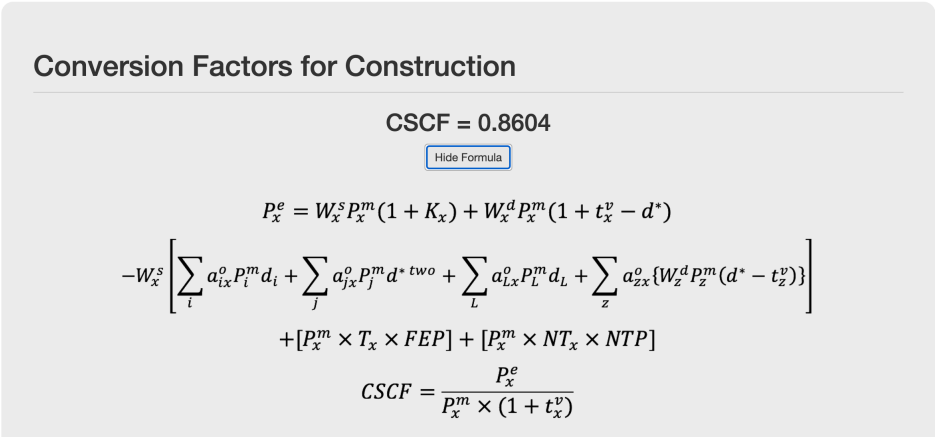

Figure 14: Show Formula Button Expanded (Non-Tradable Section)

Show Formula will reveal the estimation formula for the commodity type.

Hide Formula hides the currently expanded formula.

The table allows a user to input different variables and recalculate to display a new estimation result.

Base Input Values are calculated using the base input values as of the designated year.

Recalculate commits the Updated Input Values to the formulation and displays the estimation with the updated values.

Reset allows resetting of the inputted values for the estimation results.

Add to Download List allows users to save their estimation results to an excel file which can be downloaded by pressing the “Download List” from the top menu.

Labour

Economic Opportunity Cost of Labour (EOCL) for seven categories of labour with different range of skills and labour market types has been estimated for the South Africa.

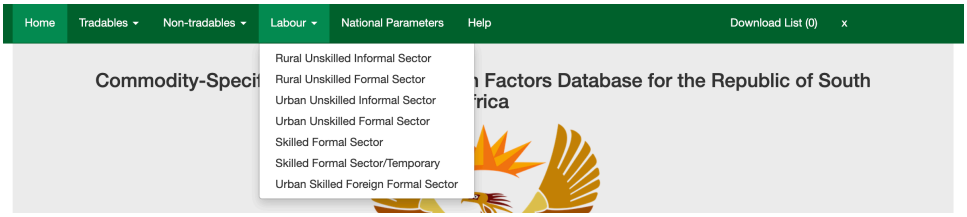

Figure 15: EOCL Landing Page

Once a user selects a labour category, they will be redirected to the page where they can see the estimation results (i.e., EOCL, CF, Ratio of Labour Externality, Labour Benefits, and Fiscal Benefits) as well as options for the user to practice estimations by inputting values into the table.

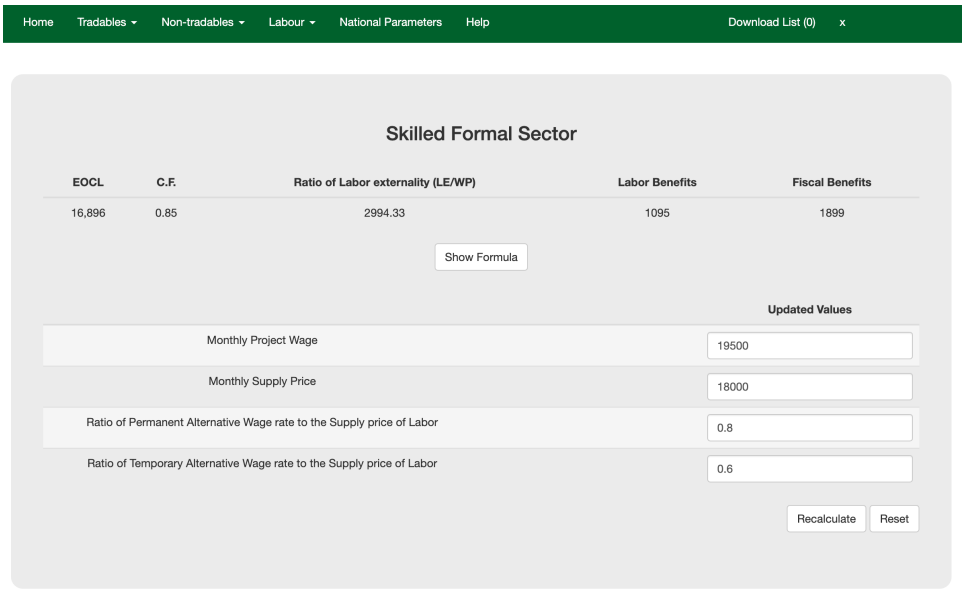

Figure 16: EOCL Estimation Page

Show Formula will reveal the estimation formula for the Economic Opportunity Cost of Labour.

Hide Formula hides the currently expanded formula.

The table allows a user to input different variables and recalculate to display a new estimation result.

Base Input Values are used to calculate estimation results.

Recalculate commits the Updated Input Values to the formulation and displays the estimations with the updated values.

Reset allows resetting of the inputted values for the estimation results.

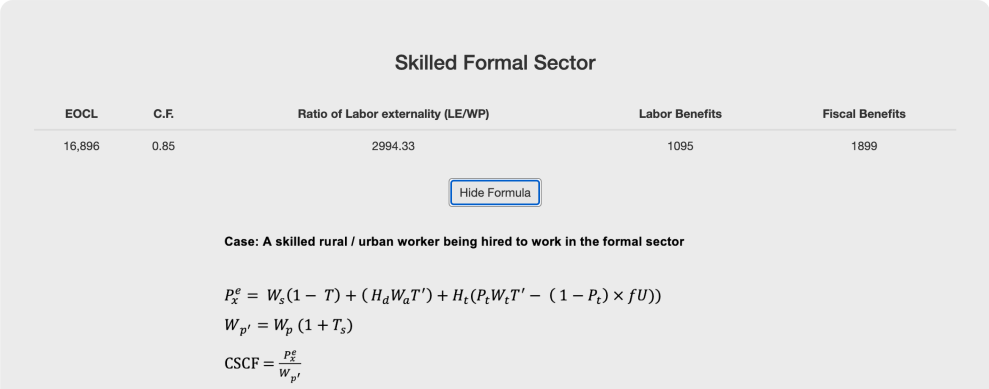

Figure 17: Show Formula Button Expanded (EOCL Section)

National Parameters

National Parameters are displayed in this page. Only the Administrator of the database can permanently update the National Parameters. As described earlier, users can temporarily update the parameters in calculation pages for simulation purposes.

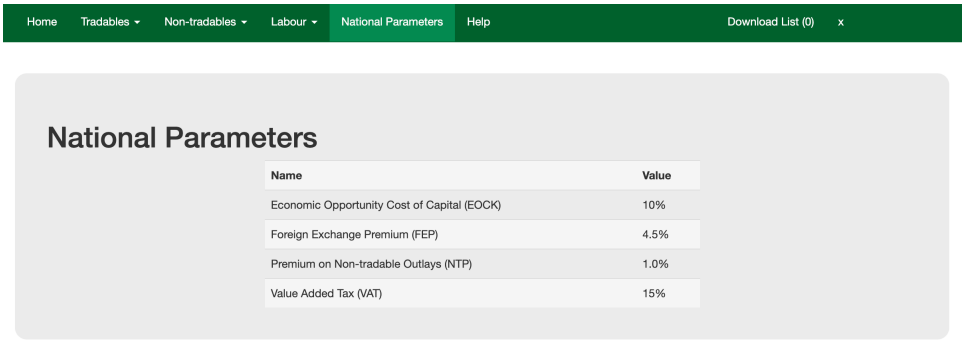

Figure 18: National Parameters Page

Use of Conversion Factors in Project Appraisal

Why Use Conversion Factors

Economic prices account for the real resources consumed or produced by a project and hence do not include tariffs, taxes or subsidies as these are merely transfers between consumers, producers and the government all within the same economy. Financial prices are market prices, which naturally incorporate all the tariffs, taxes and subsidies.

In project appraisal, the difference between the financial and economic values of inputs and outputs should be emphasized particularly when distortions exist on either the demand or supply side of markets for these goods and services. These distortions, which are caused by trade taxes and subsidies as well as other indirect taxes (such as the value added tax-VAT), drive a wedge between financial and economic prices of goods and services. The concept of a conversion factor, defined as the ratio of the economic price to the financial price, can play an important role in determining the economic costs or benefits of a project and in measuring the divergence between the prices.

Since a CSCF is the ratio of the economic price of a commodity to its financial price, the economic price of any commodity can be determined by multiplying the CSCF of that commodity times its financial price. South Africa CSCF helps the user identify the CSCF that is then used to estimate the economic price of the commodity as part of the economic appraisal of the investment under analysis.

$$\text{CSCF} = \frac{\text{Economic Price}}{\text{Financial Price}}$$

$$\Downarrow$$

$$\text{Economic Price} = \text{Financial Price } x \text{ CSCF}$$

Different Types of Conversion Factors

Buying or Producing the Commodity

The CSCF is the ratio of a commodity's economic price to its financial price. While the economic price of a commodity will be the same whether the project is producing this commodity as an output or using it as an input, the financial prices could differ from one case to another.[3]

For example, an excise tax (duty) levied on a certain good or the more general VAT will increase the financial price paid by consumers (demand price) but will not affect the cost to producers (supply price). If the project is using (buying) the commodity, the relevant financial price to the project will be the demand price and the CSCF will be given the notation $CSCF_{II}$ or $CSCF_{EI}$ depending on whether the demanded good is an importable (importable input, II) or exportable (exportable input, EI) commodity. Alternatively, if the project is producing (selling) the commodity, the relevant financial price would be the supply price and the commodity-specific conversion factor will be given the notation $CSCF_{IO}$ or $CSCF_{EO}$, i.e., importable output (IO), exportable output (EO). For non-tradables, however, as there is no difference between the CSCF for inputs and outputs, only the notation CSCF is used.[4]

Tradable vs. Non-Tradable

While the methodology used for the estimation of internationally tradable goods is the same as that of internationally non-tradable goods and services, the resulting formulas for the estimation of the conversion factors are different. We provide below definitions for tradable and non-tradable goods and services.

A good or service is considered **tradable** when an increase in demand (supply) by a project does not affect the amount demanded (supplied) by

[3] There is likely to be a difference between the economic value of a commodity demanded by a project (an input) and the economic value of the same commodity when produced by a project (an output) due to possible differences in transport and handling content of the input and the output. If the economic value is estimated at the port (before any domestic freight and handling are considered), both economic values will be the same.

[4] See Jenkins (2011a) for technical details.

domestic consumers (producers). The increase in demand (supply) by a project is eventually reflected as an increase (decrease) in imports or a decrease (increase) in exports depending on whether the project is demanding or supplying the importable or exportable commodity.

South Africa **importable** goods include (a) all goods imported into South Africa and (b) all goods produced and sold domestically that are close substitutes for either the imported goods or potentially imported goods. An increase in demand for an importable commodity by a project, results in an increase in demand for imports. Alternatively, when a project produces an importable commodity, there will be a reduction in imports.

South Africa **exportable** goods include (a) all goods exported by South Africa and (b) domestic consumption of similar or close substitutes for the exported goods. An increase in demand for an exportable commodity by a project, results in a reduction in exports, while the production of an exportable by a project will result in an increase in exports.

A commodity or service is "**non-tradable**" from South Africa's point of view if its domestic price lies above its free on board (FOB) export price or below its cost, insurance, and freight (CIF) import price. The international transportation cost may be very high compared to the value of the product so that no profitable trade is feasible. Alternatively, an importable good will become non-tradable if it receives such a high level of protection in the form of trade quotas or prohibitive tariffs that no import transactions will take place.

Labour

The measurement of the economic benefits from the jobs created by a project is an important component of the economic appraisal of the investment. When a project hires a person, the economic benefits are estimated based on the difference between the total cost to the project of employing this person and the economic opportunity cost of the labor (EOCL) of this individual. The concept of EOCL emerged from the fact that using a person (a resource) for one project implies that the individual is giving up other opportunities that would utilize their time. These

workers express this economic cost in the minimum wage rate they require to accept employment in the specific project. In addition, there are other cost and benefit externalities from employment, such as taxes and subsidies, that must be accounted for when estimating the economic opportunity cost of employing a person in a specific project.

Equations for Estimating Conversion Factors

Tradables

Importable Commodities

For importable commodities, and assuming the only direct distortions are due to import tariffs and other taxes such as excise and value added taxes, the CSCF measured at the port (i.e., before considering transportation and handling costs) for a project importing a commodity to use as an input (importable input, II) can be calculated as follows:

$$CSCF_{II} = \frac{1.1 \times (1 + FEP)}{1.1 + T_m - K_m + (T_e + T_o) \times (1.1 + T_m - K_m) + VAT \times (1.1 + T_m - K_m + (1.1 \times T_e) + T_e T_m - T_e K_m + (1.1 \times T_o) + T_o T_m - T_o K_m)}$$

where,

- FEP is the foreign exchange premium.
- T_m stands for the rate of import duty levied on the FOB price of the imported input
- K_m is the rate of import subsidy expressed as the percentage of the FOB price
- T_e is the rate of excise duty levied on the CIF price plus the import duty on the imported input (retail price excluding VAT)
- T_o is the rate of all other levies (i.e., Environmental Levy, Fuel Levy, Road Accident Fund Levy, Health Promotion Levy, Levy on Sugary Beverages, and Ordinary Levy) applies on the CIF price plus the import duty/subsidy on the imported input (retail price excluding VAT)
- VAT is the value added tax rate levied on the basis of the sum of FOB price (marked up by 10%) plus import duty, excise duty, and all other duties and levies on the commodity.

The CSCF measured at the port (i.e., before considering transportation and handling costs) for a project producing an import substitute (importable output, IO) measured at the port can be calculated as follows:

$$CSCF_{IO} = \frac{1.1 \times (1 + FEP)}{1.1 + T_m - K_m + (T_e + T_o) \times (1.1 + T_m - K_m) + VAT \times (1.1 + T_m - K_m + (1.1 \times T_e) + T_e T_m - T_e K_m + (1.1 \times T_o) + T_o T_m - T_o K_m)}$$

Exportable Commodities

For exportable goods, and assuming the only direct distortions levied on the commodity are due to an export subsidy or export tax and a value added tax, the CSCF measured at the port (i.e., before considering transportation and handling costs) for a project producing an exportable commodity (exportable output, EO) will be estimated as follows:

$$CSCF_{EO} = \frac{1 + FEP}{(1 + K_x - T_x)}$$

where, k_x stands for the rate of export subsidy, and T_x is the rate of export tax, both expressed as the percentage of the FOB price.

The CSCF measured at the port (i.e., before considering transportation and handling costs) for a project using an exportable good as an input (exportable input, EI, i.e., a good that would have otherwise been exported) can be calculated as follows:

$$CSCF_{EI} = \frac{1 + FEP}{1 + K_x - T_x + VAT(1 + K_x - T_x)}$$

The only difference between the conversion factors for exportable inputs and exportable outputs is the value added tax. If a project is using an exportable input, the financial price to the project will include the value added tax. If, on the other hand, a project is producing a good for export, the supply price to this project will not include the VAT.

Non-tradables

The number of non-tradable commodities in any economy is typically much smaller than that of tradable commodities. Here in this case, CSCFs were estimated for 28 non-tradable items from 7 different categories (i.e., Construction, Transportation, Trade, Utilities, Social Services, Financial Services, and Other Services).

The general formula for the estimation of the economic prices of non-tradable goods and services has the following form:

$$P_x^e = W_x^s P_x^m (1 + K_x) + W_x^d P_x^m (1 + t_x^v - d^*)$$

$$-W_x^s \left[\sum_i a_{ix}^o P_i^m d_i + \sum_j a_{jx}^o P_j^m d^{*\,two} + \sum_L a_{Lx}^o P_L^m d_L + \sum_z a_{zx}^o \{W_z^d P_z^m (d^* - t_z^v)\} \right]$$

$$+[P_x^m \times T_x \times FEP] + [P_x^m \times NT_x \times NTP]$$

$$CSCF = \frac{P_x^e}{P_x^m \times (1 + t_x^v)}$$

where,

- x: Non-tradable output produced or purchased by the project
- P_x^e: Economic price of output x
- W_x^s: Supply weight for output x
- W_x^d: Demand weight for output x $(W_x^d + W_x^s = 1)$
- P_x^m: Market price per unit of output x (net of value added tax, i.e., VAT)
- k_x: The rate of production subsidy on output x
- t_x^v: VAT on output x
- d^*: The overall effective tax rate on tradable and non-tradable goods and services in the economy
- a_{ix}^o: Input-output coefficient for tradable input i used in the production of a unit of output x
- P_i^m: Market price per unit of input i (net of VAT)
- d_i: The rate of non-creditable tax or subsidy on the tradable inputs used in the production of output x
- a_{jx}^o: Input-output coefficient for tradable input j used in the production of non-tradable inputs (direct tradable inputs to the NT inputs and the indirect tradable inputs of their subsequent inputs) used for a production of a unit of output x
- P_j^m: Market price per unit of j
- $d^{*\,two}$: The overall average effective tax rate of the tradable inputs (in the whole economy) used indirectly in the non-tradable inputs for a production of output x excluding VAT.
- a_{Lx}^o: Input-output coefficient for direct and indirect labor input L used in the production of a unit of output x
- P_L^m: Market price per unit of labor L
- d_L: The rate of distortions on the labor inputs used in the production of output x
- a_{zx}^o: Input-output coefficient for non-tradable input z (direct input) used in the production of a unit of output x
- W_z^d: Demand weight for input z
- P_z^m: Market price per unit of input z (net of VAT and distortions on tradable components of input z)
- t_z^v: VAT on input z paid by the new consumers of z
- T_x: Share of tradable components for output x
- NT_x: Share of non-tradable (i.e., Labor) components of output x $(T_x + NT_x = 1)$
- FEP: Foreign exchange premium
- NTP: Premium on non-tradable outlays

In line with the case of tradables, CSCF for non-tradables can be calculated as follows:

$$CSCF = \frac{\text{Financial Price}}{\text{Economic Price}} = \frac{P_x^e}{P_x^m \times (1 + t_x)}$$

$$\Downarrow$$

$$\text{Economic Price} = \text{Financial Price} \; x \; \text{CSCF}$$

Labour

The estimation of EOCL depends on different determinants. It varies by the type of labour being employed (skilled vs. unskilled), the regional pattern (rural vs. urban), the source of labour (coming from domestic or foreign countries), and the type of job offered (in the formal sector or the informal sector). Here in this toolkit, seven cases are covered. In all cases, we assume that the offered job is permanent, and the project wage is greater than the minimum wage that needs to be paid to attract sufficient workers with particular skills (supply price of labour).

Rural Unskilled Informal Sector

This is the simplest case in which the assumed wage rate typically does not meet the minimum taxable income for being subject to the income tax. Since the new job is in the unprotected (informal) sector, no social security payments would be applied. However, in this case, the impact of receiving social grants must be accounted for.

Case: A rural unskilled worker currently unemployed being hired to work in the informal sector

$P_x^e = W_{s_1}$-CSG [If annual income > Threshold to be qualified for CSG (52,800 ZAR)]

$P_x^e = W_{s_0}$ [If annual income < Threshold to be qualified for CSG (52,800 ZAR)]

$W_{s_1} = W_{s_0} + \text{CSG}$

$\text{CSCF} = \frac{P_x^e}{W_p}$

Notations:

x:	Labor category employed by the project
P_x^e:	Economic price of the labor category
W_{s_0}:	Gross of income tax supply price of labor (when income is less than the threshold and CSG is being applied)
W_{s_1}:	Gross of income tax supply price of labor (when income is above the threshold and CSG is not applicable)
$W_{p'}$:	Total labor compensation
W_p:	Gross of tax project wage for labor
CSG:	Child Support Grant

Rural Unskilled Formal Sector

This case is similar to the previous case. Here we also need to account for the impact of CSG payment, and the designated project wage is not great enough to be subject to income taxes. However, as the new job is in the formal sector, both labour and fiscal benefits will need to be adjusted by the amount of social security paid by both employee (Tse) and employer (Ts).

Case: A rural unskilled worker currently unemployed being hired to work in the formal sector

$P_x^e = W_{s_1}$-CSG [If annual income > Threshold to be qualified for CSG (52,800 ZAR)]

$P_x^e = W_{s_0}$ [If annual income < Threshold to be qualified for CSG (52,800 ZAR)]

$$W_{s_1} = W_{s_0} + \text{CSG}$$

$$W_{p'} = W_p\,(1 + T_s)$$

$$\text{CSCF} = \frac{P_x^e}{W_{p'}}$$

Notations:

x:	Labor category employed by the project
P_x^e:	Economic price of the labor category
W_{s_0}:	Gross of income tax supply price of labor (when income is less than the threshold and CSG is being applied)
W_{s_1}:	Gross of income tax supply price of labor (when income is above the threshold and CSG is not applicable)
W_p:	Gross of tax project wage for labor
$W_{p'}$:	Total labor compensation
T_s:	Social security tax rate paid by employer
CSG:	Child Support Grant

Urban Unskilled Informal Sector

Here again, the impact of CSG must be accounted for. The typical project wage is not enough to meet the income tax threshold level. The project is based in the informal sector; no social security payments are considered (Wp=Wp'). However, there are usually negative externalities or fiscal costs associated with the resulting rural-urban migration that the unskilled informal sector workers do not pay for. These negative externalities may include additional security costs and government subsidies associated with increased access to health services.

Case: An urban unskilled worker currently unemployed being hired to work in the informal sector

$$P_x^e = W_{s_1}\text{-CSG} + W_{s_1} \times K$$ [If annual income > Threshold to be qualified for CSG (52,800 ZAR)]

$$P_x^e = W_{s_0} + W_{s_0} \times K$$ [If annual income < Threshold to be qualified for CSG (52,800 ZAR)]

$$W_{s_1} = W_{s_0} + \text{CSG}$$

$$\text{CSCF} = \frac{P_x^e}{W_p}$$

Notations:

x:	Labor category employed by the project
P_x^e:	Economic price of the labor category
W_{s_0}:	Gross of income tax supply price of labor (when income is less than the threshold and CSG is being applied)
W_{s_1}:	Gross of income tax supply price of labor (when income is above the threshold and CSG is not applicable)
K:	Negative externality
W_p:	Gross of tax project wage for labor
CSG:	Child Support Grant

Urban Unskilled Formal Sector

Here again, we need to take into account the impact of CSG payment. The project is based in the formal sector; thus, social security payments need to be considered (Wp'=Wp(1+Ts)). We assume that the project wage is not enough to meet the income tax threshold level, and the negative fiscal externality exists. Owing to the presence of CSG payments, two scenarios are considered. If the annual project wage is greater than the CSG threshold level and when the annual project wage is less than the CSG threshold level.

Case: An urban unskilled worker currently unemployed being hired to work in the formal sector

$$P_x^e = W_{s_1}\text{-CSG} + W_{s_1} \times K \quad \text{[If annual income > Threshold to be qualified for CSG (52,800 ZAR)]}$$

$$P_x^e = W_{s_0} + W_{s_0} \times K \quad \text{[If annual income < Threshold to be qualified for CSG (52,800 ZAR)]}$$

$$W_{s_1} = W_{s_0} + \text{CSG}$$

$$W_{p'} = W_p\,(1 + T_s)$$

$$\text{CSCF} = \frac{P_x^e}{W_{p'}}$$

Notations:

x:	Labor category employed by the project
P_x^e:	Economic price of the labor category
W_{s_0}:	Gross of income tax supply price of labor (when income is less than the threshold and CSG is being applied)
W_{s_1}:	Gross of income tax supply price of labor (when income is above the threshold and CSG is not applicable)
K:	Negative externality
W_p:	Gross of tax project wage for labor
$W_{p'}$:	Total labor compensation

Skilled Formal Sector

Until now, in all previous cases, the unskilled worker was considered. We now consider the case of a project in a rural area employing skilled labour. The net of tax wage rate paid by the rural project must be at least as great as the net of tax supply price of this labour. In some circumstances, the project wage may be greater than the prevailing market wage for a particular skill in the project's location to retain enough skilled workers. The wage rate offered by the new job is typically subject to income taxes. As the new job is in the formal sector, then the social security payments must be considered. The annual income of skilled workers is usually more than the CSG threshold level then the impact of CSG payment does not account.

Case: A skilled rural / urban worker being hired to work in the formal sector

$$P_x^e = W_s(1 - T) + (H_d W_a T') + H_t(P_t W_t T' - (1 - P_t) \times fU))$$

$$W_{p'} = W_p\ (1 + T_s)$$

$$\text{CSCF} = \frac{P_x^e}{W_{p'}}$$

Notations:

x:	Labor category employed by the project
P_x^e:	Economic price of the labor category
W_p:	Gross of tax project wage for foreign labor
$W_{p'}$:	Total labor compensation
T:	Combined effective income tax rate plus social security contributions paid by employees on the supply price of labor and the project wage
f:	The proportion of time an unemployed worker expects to collect unemployment benefits
U:	Unemployment insurance benefits
H_t:	Share of the project's labor sourced from alternative jobs in the temporary sector
T':	Total effective tax rate, including both the income tax rate and the social security taxes (Ts+ Tse) on the alternative wage rates
W_t:	Temporary Alternative Wage rate
P_t:	The proportion of time a member of the temporary sector worker expects to be employed during a calendar year
W_a:	Permanent Alternative Wage rate
H_d:	Share of the project's labor sourced from alternative jobs in the permanent sector
W_s:	Gross of income tax supply price of labor
T_s:	Social security tax rate paid by employer

Skilled Formal Sector/Temporary

In this case the project will hire several person months of skilled labour. For example, skilled construction workers for building a project, or the project hires workers on a seasonal bases for operations. The nature of the jobs is that they do not provide 12 months of employment a year for each person they employ. When a project hires people to full these temporary jobs, the required workers will be sourced from individuals already are working in alternative permanent sector jobs, other temporary sector jobs and some may have been previously out of the labor force.

Case: Skilled workers are hired to work in the temporary formal sector

$$P_x^e = W_s(1 - T) + \left(\frac{H_d}{P_t}\right) \times (W_a T' + (1 - P_t) \times fU) + H_t W_t(T') + H_s \left(\frac{1 - P_t}{P_t}\right) fU$$

$$W_{p'} = W_p\ (1 + T_s)$$

$$\text{CSCF} = \frac{P_x^e}{W_{p'}}$$

Notations:

x:	Labor category employed by the project
P_x^e:	Economic price of the labor category
W_p:	Gross of tax monthly project wage for labor
$W_{p'}$:	Total labor compensation
T:	Combined effective income tax rate plus social security contributions paid by employees on the supply price of labor and the project wage
f:	The proportion of time an unemployed worker expects to collect unemployment benefits
U:	Unemployment insurance benefits
H_s:	Share of the project's labor sourced from out of labor force
H_t:	Share of the project's labor sourced from alternative jobs in the temporary sector
T':	Total effective tax rate, including both the income tax rate and the social security taxes (Ts+ Tse) on the alternative wage rates
W_t:	Temporary Alternative Wage rate
P_t:	The proportion of time a member of the temporary sector worker expects to be employed during a calendar year
W_a:	Permanent Alternative Wage rate
H_d:	Share of the project's labor sourced from alternative jobs in the permanent sector
W_s:	Gross of income tax supply price of labor
T_s:	Social security tax rate paid by employer

Urban Skilled Foreign Formal Sector

In the presence of international migration, an additional complication in estimating the EOCL would be faced beyond the retention of prospective emigrant workers. Often, large projects requiring skilled labor experience significant shortages of specific types of labor skills. When international migration is possible (a reasonable assumption in most situations), we would expect this excess demand to be met, at least in part, by workers migrating internationally to work on the project. Foreign workers pay income taxes, and they also may send remittances back to their home country, just as in the other cases we have analyzed. However, the

economic opportunity cost of foreign labor (EOCFL) needs to be adjusted downward because of the value-added tax levied on the consumption of foreign workers in the host country. Similarly, foreign labor may impose additional fiscal costs, including additional security costs and government subsidies associated with increased access to health services which must be taken into consideration when the EOCL is estimated.

Case: A foreign worker is hired to work in the formal sector

$$P_x^e = W_p(1 - T_h) - W_p(1 - T_h)(1 - R)\, tVAT + W_p(1 - T_h)R\left(\frac{E_e}{E_m} - 1\right) + KW_p$$

$$W_{p'} = W_p\,(1 + T_s)$$

$$\text{CSCF} = \frac{P_x^e}{W_{p'}}$$

Notations:

x:	Labor category employed by the project
P_x^e:	Economic price of the labor category
W_p:	Gross of tax project wage for foreign labor
$W_{p'}$:	Total labor compensation
T_h:	Personal income tax: including the socials security paid by employees levied by the host country on foreign labor
R:	Proportion of the net of tax income repatriated by foreign labor
$tVAT$:	VAT rate levied on consumption
$\left(\frac{E_e}{E_m} - 1\right)$:	Proportion of repatriated income lost via the foreign exchange premium
T_s:	Social security tax rate paid by employer
K:	Negative externality

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References

Jenkins, G. P., Kuo C. Y. and Harberger A. C. (2011a). Economic Prices for Non-Tradable Goods and Services, DDP 2011-11, John Deutsch International, Queen's University, Canada.
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Jenkins, G. P., Kuo C. Y. and Harberger A. C. (2011b). Economic Prices for Tradable Goods and Services, DDP 2011-10, John Deutsch International, Queen's University, Canada.
Available at http://jdintl.econ.queensu.ca/discussion-papers/

Jenkins, G. P., Kuo C. Y. and Harberger A. C. (2011b). The Economic Opportunity Cost of Labour, DDP 2011-12, John Deutsch International, Queen's University, Canada.
Available at http://jdintl.econ.queensu.ca/discussion-papers/