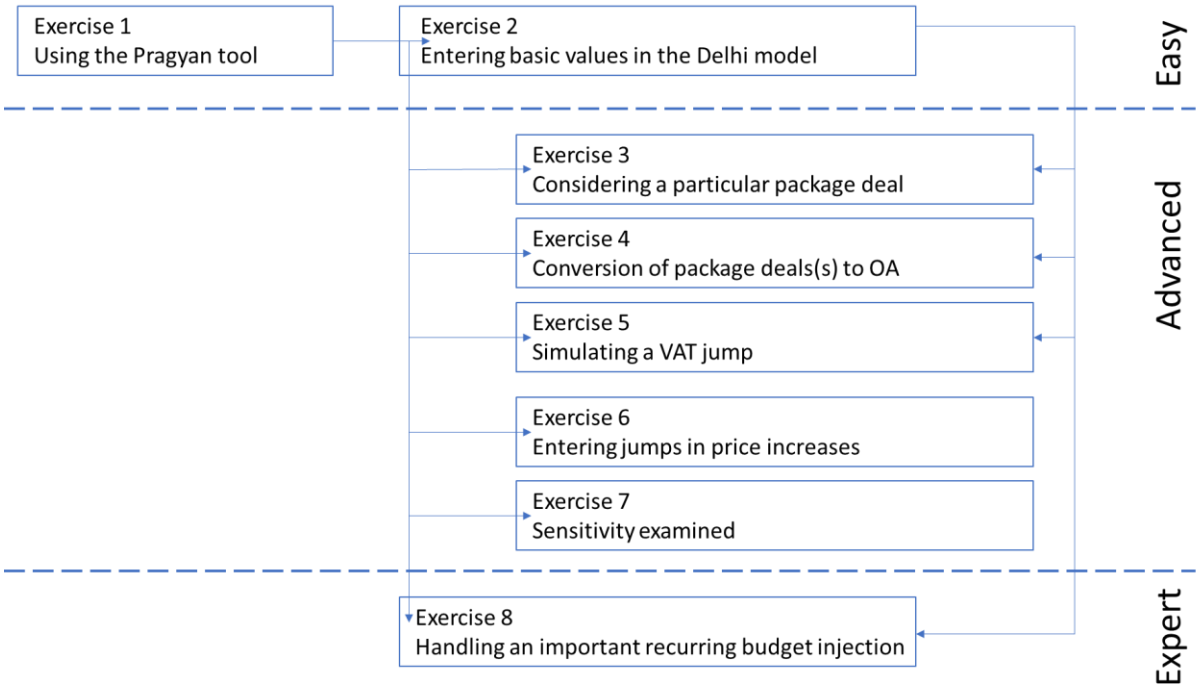
# Exercises Delhi model and Pragyan tool

## Preliminary remarks

*These eight exercises are to be used with the Delhi model (version 1.1) and the Pragyan tool version (1.1).*

Several exercises build on each other, especially the completed exercise 2 (entering basic values in the Delhi model), is used as input for other exercises. The following figure shows the relations between the exercises.




In the above figure we see that the currency data generated by the Pragyan tool is used in the seven other exercises, and exercise 2 serves as a base for exercises 3 through 8). The first two exercises are 'easy'. Exercises 3 through 7 are at and advanced level. Exercise 8 is at expert level, because for this exercise adaptations in the core of the Excel application of the Delhi model have to be made.

For these exercises there are the following files:

- this Word-file,
- Excel files of the Delhi-model, one for each exercise (except exercise 7 for which there are 5 files),
- SupportFile4Ex6.xlsx, an additional Excel-file for the eighth exercise.

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# Exercise 1 Using the Pragyan tool

## Introduction

In this exercise we take the first step necessary to calculate the evolution of a library budget. That is estimating the uncertainties regarding foreign currencies. Most academic libraries will purchase their information resources in both local and foreign currencies. The first task is therefore to make an inventory of which foreign currencies are involved.

When you open the Excel file for the Pragyan tool for the first time (or when you made a copy of the file and opened it for the first time), you will see two warnings. These warnings may be ignored and accepted: they involve retrieving the values of foreign currencies from external sources. This retrieval of external data happens automatically, without the user noticing anything, at least if the computer you are working on is connected to the internet.

Here we prepare the foreign currency information for an exercise in the Delhi model which will estimate the expenditures for five years from 2024 on, based on expenditures in 2023.

Notice the convention in the Excel file for the Pragyan tool that cells filled with a red color should not be altered, while cells with a green background expect input from the user. The orange color indicates that the value may be altered, but that there is a formula is this cell.

## 1.1 Making the list of foreign currencies

We assume a scientific library for which the local currency is the euro. The obvious ones, for a library in the eurozone, are expenditures in US dollars (USD) and British pounds (GBP). There are also, in our fictional example, expenses in Canadian dollars (CAD). And research contracts also involve expenditure in Indian rupees (INR) and Swiss francs (CHF).

In the table below, we placed the ISO4217 three-letter code next to the description of the foreign currencies used. This three-letter code can also be found in the worksheet ISO4217 of the Pragyan tool. If you enter an incorrect, non-existent three-letter code in the Pragyan tool, this will be indicated (in the Input worksheet, with the indication #N/A).

The foreign currencies used for this exercise is shown in the table below.

| *Foreign currency* | *ISO4217 code* |
|---|---|
| US dollar | USD |
| British pound | GBP |
| Canadian dollar | CAD |
| Indian rupee | INR |
| Swiss francs | CHF |

## 1.2 Entering the foreign currencies in Pragyan

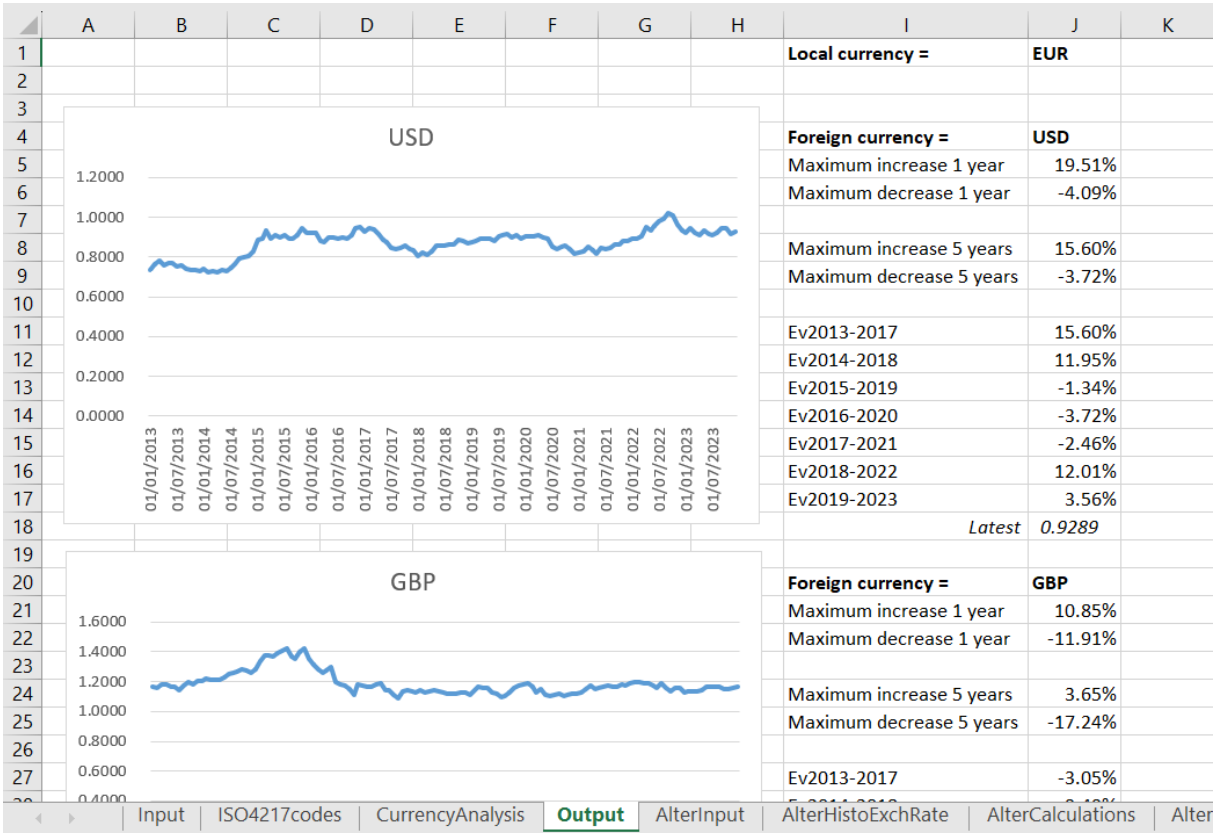
The overview of the local and foreign currencies used can be entered in the worksheet Input of the Pragyan tool. Because the calculation must use the expenditures in 2023, we place the year 2023 next to "End year:". The data we entered so far ended up in green colored cells. Pragyan calculates the starting year in the red box (cell H2): that is the ending year minus 10 years. The resulting Input worksheet is shown below.

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Local currency: | EUR | Foreign currency 1: | USD | ok | | End year: | 2023 | | |
| 2 | | | Foreign currency 2: | GBP | ok | | Start year: | 2013 | | |
| 3 | | | Foreign currency 3: | CAD | ok | | | | | |
| 4 | | | Foreign currency 4: | INR | ok | | | | | |
| 5 | | | Foreign currency 5: | CHF | ok | | | | | |

Input | ISO4217codes | CurrencyAnalysis | Output | AlterInput | AlterHistoExchRate | AlterCalculations

## 1.3 Checking the output of the basic module

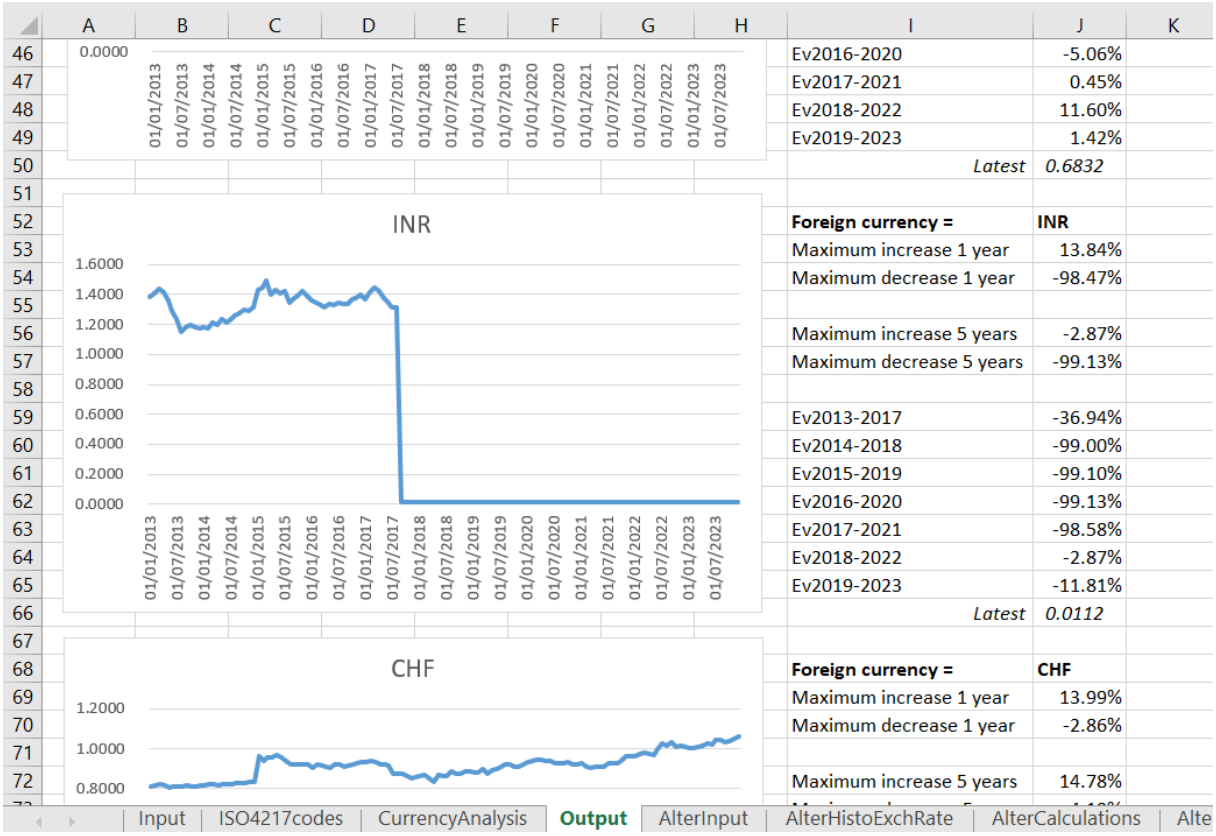
While the Input worksheet was being completed, the calculations in the CurrencyAnalysis worksheet were performed automatically. In principle, this worksheet does not have to be viewed. The Output worksheet contains all the results based on the values that were entered. We show the top of that worksheet below.




| | I | J |
|---|---|---|
| 1 | **Local currency =** | **EUR** |
| 4 | **Foreign currency =** | **USD** |
| 5 | Maximum increase 1 year | 19.51% |
| 6 | Maximum decrease 1 year | -4.09% |
| 8 | Maximum increase 5 years | 15.60% |
| 9 | Maximum decrease 5 years | -3.72% |
| 11 | Ev2013-2017 | 15.60% |
| 12 | Ev2014-2018 | 11.95% |
| 13 | Ev2015-2019 | -1.34% |
| 14 | Ev2016-2020 | -3.72% |
| 15 | Ev2017-2021 | -2.46% |
| 16 | Ev2018-2022 | 12.01% |
| 17 | Ev2019-2023 | 3.56% |
| 18 | *Latest* | *0.9289* |
| 20 | **Foreign currency =** | **GBP** |
| 21 | Maximum increase 1 year | 10.85% |
| 22 | Maximum decrease 1 year | -11.91% |
| 24 | Maximum increase 5 years | 3.65% |
| 25 | Maximum decrease 5 years | -17.24% |
| 27 | Ev2013-2017 | -3.05% |

Input | ISO4217codes | CurrencyAnalysis | Output | AlterInput | AlterHistoExchRate | AlterCalculations | Alter

This worksheet requires further consideration in its entirety. Very rarely, there are rate conversions that go wrong because Microsoft's Excel is obtaining the data from a source that contains errors. More information about this is given in the manual of the Pragyan tool. Further down in this worksheet we see that something goes wrong with the conversion from euro to Indian rupee. See the image below.




| | | |
|---|---|---|
| Ev2016-2020 | -5.06% | |
| Ev2017-2021 | 0.45% | |
| Ev2018-2022 | 11.60% | |
| Ev2019-2023 | 1.42% | |
| *Latest* | *0.6832* | |
| **Foreign currency =** | **INR** | |
| Maximum increase 1 year | 13.84% | |
| Maximum decrease 1 year | -98.47% | |
| Maximum increase 5 years | -2.87% | |
| Maximum decrease 5 years | -99.13% | |
| Ev2013-2017 | -36.94% | |
| Ev2014-2018 | -99.00% | |
| Ev2015-2019 | -99.10% | |
| Ev2016-2020 | -99.13% | |
| Ev2017-2021 | -98.58% | |
| Ev2018-2022 | -2.87% | |
| Ev2019-2023 | -11.81% | |
| *Latest* | *0.0112* | |
| **Foreign currency =** | **CHF** | |
| Maximum increase 1 year | 13.99% | |
| Maximum decrease 1 year | -2.86% | |
| Maximum increase 5 years | 14.78% | |

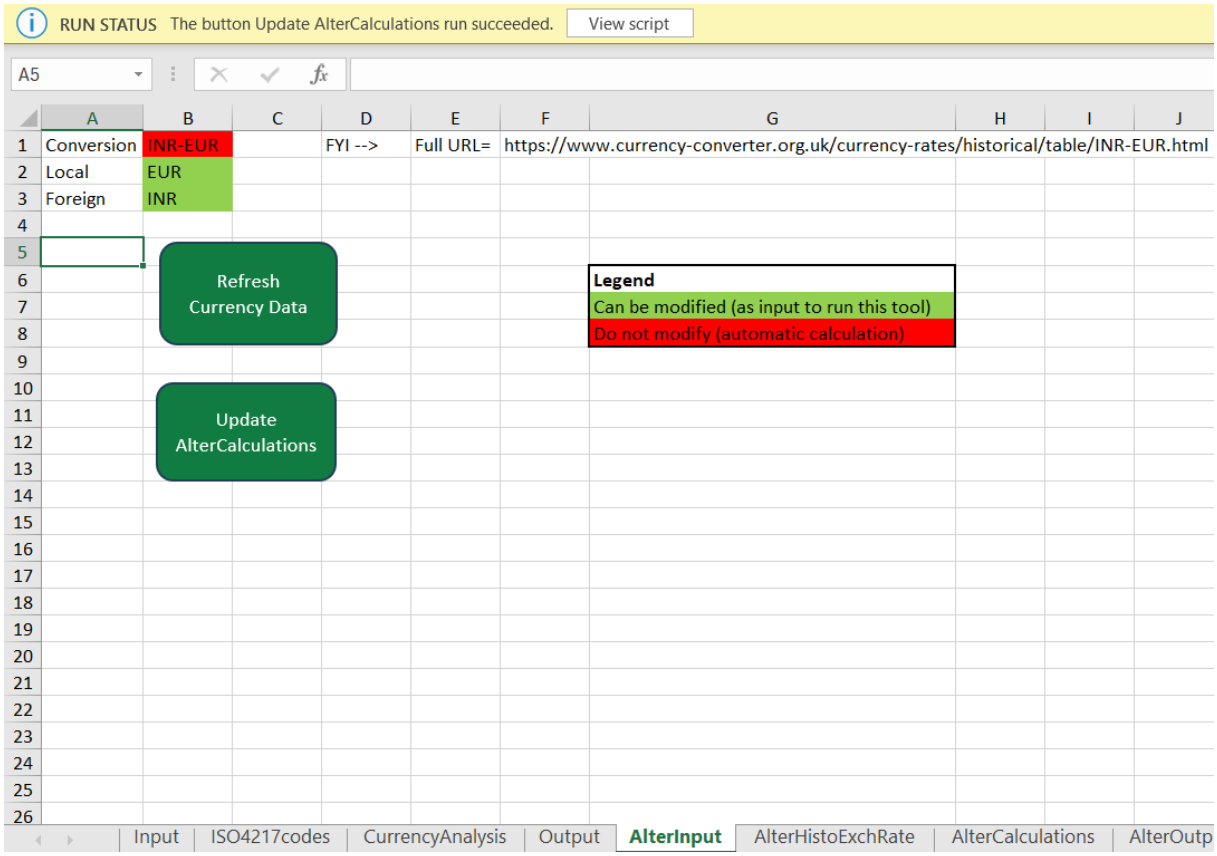
In such a case we have to use the alternative part of the Pragyan tool. This alternative part allows a single currency conversion to be made based on other source data. Note that if this alternative part of Pragyan suddenly no longer functions, this may be due to a (even minor) change in the interface of the source data. Contact the author of the Pragyan tool in such a case.

## 1.4 Using the alternative module of Pragyan

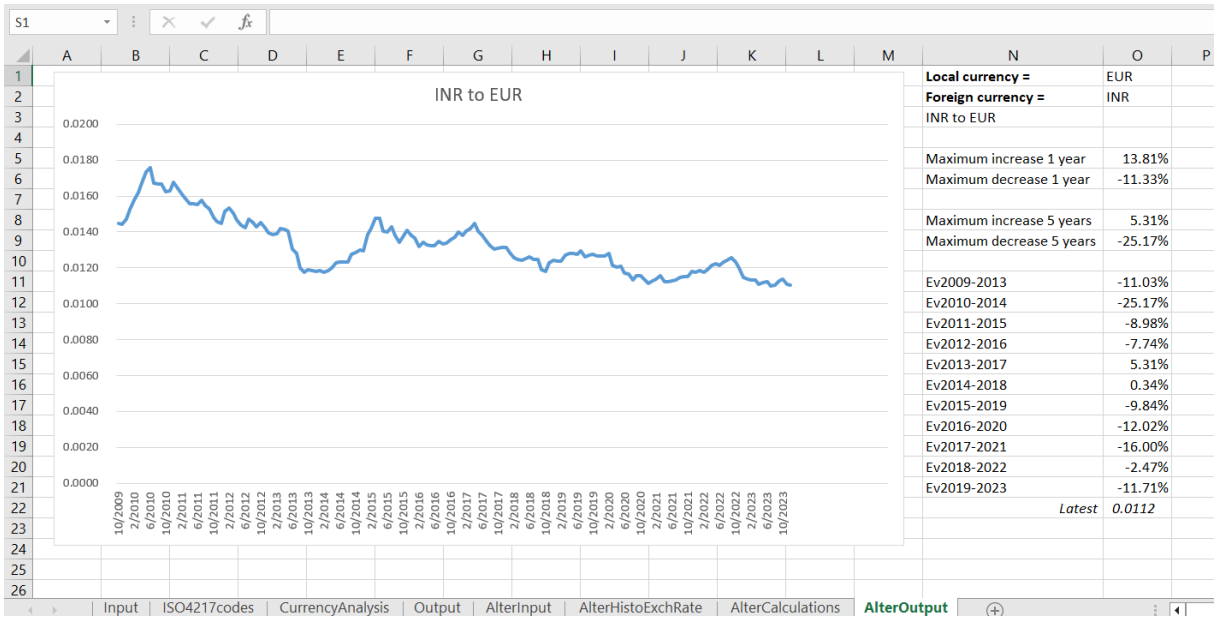
Only a single pair of foreign currencies can be entered in the AlterInput tab. The local currency is placed in the green cell B2, the foreign currency is placed in the green cell B3. It is not necessary to enter a year: Pragyan uses the maximum time period offered by the external data supplier.

Then click on the dark green button that says "Refresh Currency Data". Pragyan now retrieves the data from the external data source. This may take some time, depending on your computer and the speed of your connection to the internet. The text "The button Refresh Currency Data run succeeded" appears at the top in yellow.

Finally click on the dark green button "Update AlterCalculations". This actions is necessary due to a synchronization problem in the Excel macro. By clicking this button, a few seconds after termination of the previous macro, the first column in worksheet AlterCalculations is updated. See the figure below.




The AlterHistoExchRate and AlterCalculations worksheets are for internal use and must not be viewed. The AlterOutput worksheet contains the results of the alternative calculation. See the following figure.




## 1.5 Interpreting the results

We now have the following data regarding the evolution of foreign currencies against the local currency in recent years:

| *Type of evolution* | *USD* | *GBP* | *CAD* | *INR* | *CHF* |
|---|---|---|---|---|---|
| Maximum increase 1 year | 19.51% | 10.85% | 7.75% | 13.81% | 13.99% |
| Maximum decrease 1 year | -4.09% | -11.91% | -6.02% | -11.33% | -2.86% |
| | | | | | |
| Maximum increase 5 years | 15.60% | 3.65% | 11.60% | 5.31% | 14.78% |
| Maximum decrease 5 years | -3.72% | -17.24% | -7.33% | -25.17% | -4.19% |
| | | | | | |
| Ev2009-2013 | | | | -11.03% | |
| Ev2010-2014 | | | | -25.17% | |
| Ev2011-2015 | | | | -8.98% | |
| Ev2012-2016 | | | | -7.74% | |
| Ev2013-2017 | 15.60% | -3.05% | -7.33% | 5.31% | 9.46% |
| Ev2014-2018 | 11.95% | -9.49% | -4.52% | 0.34% | 5.38% |
| Ev2015-2019 | -1.34% | -17.24% | -3.94% | -9.84% | -4.19% |
| Ev2016-2020 | -3.72% | -7.46% | -5.06% | -12.02% | 1.86% |
| Ev2017-2021 | -2.46% | 2.02% | 0.45% | -16.00% | 4.07% |
| Ev2018-2022 | 12.01% | 3.65% | 11.60% | -2.47% | 14.78% |
| Ev2019-2023 | 3.46% | 0.81% | 1.39% | -11.47% | 14.23% |

A set of input values, regarding the foreign currency evolution, has to be prepared on the basis of this table. In the Delhi model, the uncertainties have to be entered yearly. The values in the table above show the evolution in the past, mostly over a period of five years. The evolution of uncertainties for the coming years should not overestimated, nor underestimated.

Consider the evolution of the euro versus the American dollar. A maximum increase of almost 20 percent is indicated. This is the highest increase over one year of all considered foreign currencies. In the Delhi model it would, on the other hand, not be relevant to enter a yearly increase of 20 percent, over five years. A lower value is more adequate. Indeed, the cumulative maximum increase (of 15,60 percent, occurring in the period 2013-2017) over five years means, in fact, that per year an increase of about 3 percent is more or less sufficient to include such a high increase over the calculations that are performed by the Delhi model. Moreover, already in the five-year period 2015-2019, there was a decrease of the currency value. As a worst case scenario we could select, at maximum, a value of 3 per cent per year, over a five year period. The best case scenario of the dollar becoming 12,01 percent cheaper (again, over five years) for euro based countries can be sufficiently simulated by selecting a -2,5 percent value, at maximum.

If we apply the same reasoning for all the foreign currencies, then this results in the following table with currency uncertainties as input for the Delhi model.

| *Type of evolution* | *USD* | *GBP* | *CAD* | *INR* | *CHF* |
|---|---|---|---|---|---|
| Uncertainty low | -2.50% | -1.00% | -1.20% | -2.00% | -0.50% |
| Uncertainty high | +3.00% | +0.70% | +2.00% | +2.50% | +3.00% |
| Current value | 0.9168 | 1.1491 | 0.6693 | 0.0110 | 1.0368 |

The values in this table are largely subjective. There is actually no harm in adjusting these values slightly, after an initial simulation with the Delhi tool, as long as the uncertainties stay in line with the historic values.

# Exercise 2 Entering basic values in the Delhi model

## Introduction

This exercise shows the basic use of the Delhi model with a forecast period of five years. The base year is the year, for which we know the expenditures. For example, when we have, during the summer of 2024, to submit a five-year forecast (2025-2029), then this is possible because in June 2024 we have already paid for most literature components, and we can securely estimate the expenditures for the remaining literature components in 2024.

After defining the literature components, you will collect the expenditures on these literature components and prepare these data so that they can be entered in the Delhi model. Then we examine the output of the model and copy the output in a report.

We are going to enter fictional data, somewhat inspired by the collection budget of a medium-sized Flemish university library. We assume a conservative collection policy, in which we will completely continue the collection in the coming years. The Delhi model takes into account global price increases per literature component and uses an average evolution of the foreign currencies (which we derived from the application of the Pragyan tool in the previous exercise). In the present exercise we use the euro (EUR) as local currency; the foreign currencies are US dollar (USD), British pound (GBP) and the Canadian dollar (CAD). The values of the uncertainties of the foreign currencies are, for this exercise as shown in the following table (taken from the Pragyan exercise).

| *Foreign currency* | *Rate* | *Uncertainty low* | *Uncertainty high* |
|---|---|---|---|
| USD | 0.9186 | -2.50% | +3.00% |
| GBP | 1.1491 | -1.00% | +0.70% |
| CAD | 0.6693 | -1.20% | +2.00% |

For this exercise, we make use of the blank version of the Delhi Excel file. Make sure to make a copy of this file, for example, copy DelhiModel_V1.1_blank.xlsx to **MyCopyOfDelhimodel.xlsx**.

## 2.1 Defining the literature components

The Delhi model allows to enter expenditure data for a maximum of 12 literature components. We will use 9 components as shown in the following table.

| *Literature component* | *Explanation* |
|---|---|
| Books (print) | Books, paper format, patron driven |
| Books (electronic) | E-books, both patron driven and EBA* |
| Subscriptions serials (print) | Subscriptions to printed journals |
| Subscriptions serials (electronic) | Subscriptions to electronic journals, not in PD** |
| Subscriptions newspapers (print) | Newspapers for the reading room |
| Subscriptions newspapers (electronic) | Newspapers in electronic format |
| Package deals institutional | Package deals not in consortium |
| Package deals consortium | Package deals acquired in consortium |
| Other | Book care: loose-leaf, binding, restoration |

*EBA = Evidence-Based Acquisition
**PD = package deal

Make sure that the selected literature components include all literature acquisitions that you want to cover. These components should include all the library's expenditures.

## 2.2 Collecting the expenditures on literature components

We collect the expenditures for each of the literature components in all the relevant foreign currencies. The following table summarizes all collected data. In this example we use fictional, but more or less realistic data.

| *Literature component* | *EUR* | *USD* | *GBP* | *CAD* |
|---|---|---|---|---|
| Books (print) | 25,000 | 25,000 | 3,000 | 5,000 |
| Books (electronic) | 110,000 | 75,000 | 20,000 | 8,000 |
| Subscriptions serials (print) | 50,000 | 60,000 | 20,000 | 42,000 |
| Subscriptions serials (electronic) | 850,000 | 520,000 | 220,000 | 18,000 |
| Subscriptions newspapers (print) | 8,000 | 0 | 0 | 0 |
| Subscriptions newspapers (electronic) | 25,000 | 0 | 0 | 0 |
| Package deals institutional | 1,200,000 | 0 | 0 | 0 |
| Package deals consortium | 480,000 | 250,000 | 70,000 | 0 |
| Other | 200,000 | 0 | 0 | 0 |
| Total | 2,948,000 | 930,000 | 333,000 | 73,000 |

To estimate the price increases makes use of several data sources:

- Information about the contracts (for books, serials and data bases),
- EBSCO's Serials Price Projection Report, for example https://www.ebsco.com/sites/default/files/acquiadam-assets/EBSCO-Serials-Price-Projections-Report-2024.pdf,
- Personal experience.

The next table contains the values used in this exercise.

| *Literature component* | *Price Increase Low* | *Price Increase Medium* | *Price Increase High* |
|---|---|---|---|
| Books (print) | 1.00% | 2.00% | 3.00% |
| Books (electronic) | 1.00% | 2.00% | 3.00% |
| Subscriptions serials (print) | 3.00% | 5.00% | 7.00% |
| Subscriptions serials (electronic) | 3.00% | 5.00% | 7.00% |
| Subscriptions newspapers (print) | 2.00% | 4.00% | 6.00% |
| Subscriptions newspapers (electronic) | 1.00% | 2.00% | 3.00% |
| Package deals institutional | 2.00% | 3.00% | 4.00% |
| Package deals consortium | 1.00% | 2.00% | 3.00% |
| Other | 2.00% | 3.00% | 4.00% |

## 2.3 Entering the values in the Delhi model

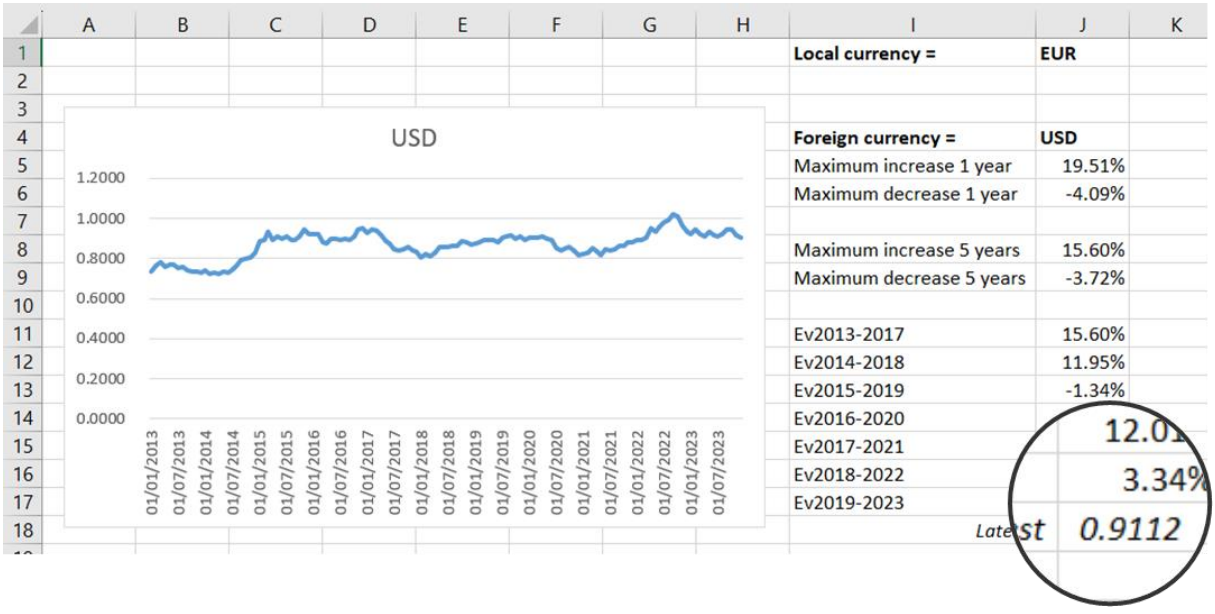
Select the worksheet Input. Enter the present year, as 2024 in the green cell B4. This means that 2024 is the 'base year', the year for which we know the expenditures for the literature components. In the red cells B5..B9 the following years are automatically filled in. We see that the Delhi model will calculate the expenditures for the five years 2025..2029. Hint: these cells B5..B9 are in red, which means that these cells are calculated with a formula. It is advised to not alter the contents of these five cells. See the following figure.

| | A | B | C |
|---|---|---|---|
| 1 | **Input of base data** | | |
| 2 | | | |
| 3 | ***Year range*** | | |
| 4 | Base year | 2024 | |
| 5 | Base year + 1 | 2025 | |
| 6 | Base year + 2 | 2026 | |
| 7 | Base year + 3 | 2027 | |
| 8 | Base year + 4 | 2028 | |
| 9 | Base year + 5 | 2029 | |
| 10 | | | |

Next, enter the local (base) and foreign currency codes in cells B13..B18 as three-letter codes (corresponding to the ISO 4217 codes). Notice that in the adjacent cells C13..C18 a validity check is shown: if the currency code you entered is found in the list of ISO 4217 codes (stored in the worksheet ISO4217codes), an 'ok' appears in the cells C13..C18. The fields containing foreign currency codes (cells B13..B18) do not have to be filled in all: you can explicitly mention 'XXX' as three-letter code to clearly indicate that these foreign codes are not used. See the following figure.

| | A | B | C |
|---|---|---|---|
| 12 | ***Currency information*** | | CheckISO |
| 13 | Local (base) currency: | EUR | ok |
| 14 | Foreign currency 1: | USD | ok |
| 15 | Foreign currency 2: | GBP | ok |
| 16 | Foreign currency 3: | CAD | ok |
| 17 | Foreign currency 4: | XXX | #N/A |
| 18 | Foreign currency 5: | XXX | #N/A |
| 19 | | | |

Enter the rate-to-base values in cells D13..D18. For the local currency a rate of 1.0000 can be entered. In cells D13..D18 you must enter the foreign currency rates you want to use. These rates can be the present day rate, or a mean value over the past few months. Use the Pragyan tool to see the present day rates (they are shown next to the graphs in Pragyan's worksheet Output).




| | I | J |
|---|---|---|
| 1 | **Local currency =** | **EUR** |
| 2 | | |
| 3 | | |
| 4 | **Foreign currency =** | **USD** |
| 5 | Maximum increase 1 year | 19.51% |
| 6 | Maximum decrease 1 year | -4.09% |
| 7 | | |
| 8 | Maximum increase 5 years | 15.60% |
| 9 | Maximum decrease 5 years | -3.72% |
| 10 | | |
| 11 | Ev2013-2017 | 15.60% |
| 12 | Ev2014-2018 | 11.95% |
| 13 | Ev2015-2019 | -1.34% |
| 14 | Ev2016-2020 | 12.01 |
| 15 | Ev2017-2021 | 3.34% |
| 16 | Ev2018-2022 | |
| 17 | Ev2019-2023 | |
| 18 | Latest | 0.9112 |

The foreign currency uncertainties should be entered in the green cells E14..G18. Notice that in column F the medium values of 0% are entered: this makes that the medium calculation of the

model will give the results as if we do not take into account the influence of the variations (uncertainties) of the foreign currencies. This is a good practice, because it will allow to show the influence of uncertainties in the foreign currencies.
The values you enter in the green cells E14..G18 result in values of the uncertainties for all the following years: The cells H14..S18 are in orange, meaning that there is a formula in these cells, but that entering other values into these cells is allowed. For this exercise, we will not change the contents of cells H14..S18. See the figure below.

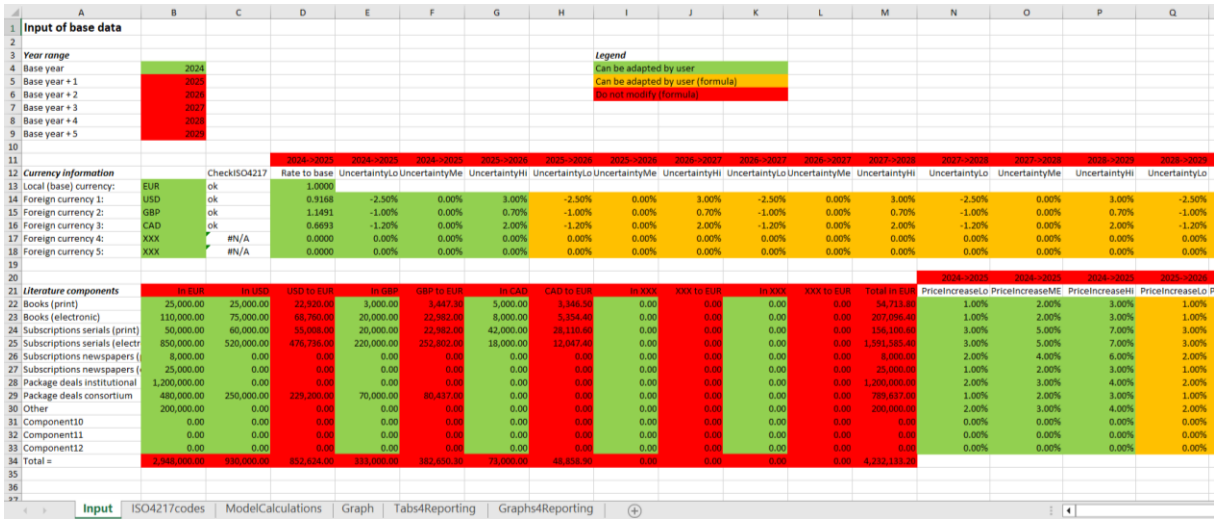
| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | | | | 2024->2025 | 2024->2025 | 2024->2025 | 2025->2026 | 2025->2026 | 2025->2026 | 2026->2027 | 2026-> |
| 12 | ***Currency information*** | | CheckISO4217 | Rate to base | UncertaintyLo | UncertaintyMe | UncertaintyHi | UncertaintyLo | UncertaintyMe | UncertaintyHi | Uncertair |
| 13 | Local (base) currency: | EUR | ok | 1.0000 | | | | | | | |
| 14 | Foreign currency 1: | USD | ok | 0.9168 | -2.50% | 0.00% | 3.00% | -2.50% | 0.00% | 3.00% | -2 |
| 15 | Foreign currency 2: | GBP | ok | 1.1491 | -1.00% | 0.00% | 0.70% | -1.00% | 0.00% | 0.70% | -1 |
| 16 | Foreign currency 3: | CAD | ok | 0.6693 | -1.20% | 0.00% | 2.00% | -1.20% | 0.00% | 2.00% | -1 |
| 17 | Foreign currency 4: | XXX | #N/A | 0.0000 | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 18 | Foreign currency 5: | XXX | #N/A | 0.0000 | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |

Enter the expenditures in local (cells B22..B33) and foreign currencies (columns C, E, G, I and K). Check the totals in row 34: these totals should correspond to the totals you calculated in advance. By checking these totals you can correct typing errors. See the following figure illustrating the status of the literature components.

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 21 | ***Literature components*** | In EUR | In USD | USD to EUR | In GBP | GBP to EUR | In CAD | CAD to EUR | I |
| 22 | Books (print) | 25,000.00 | 25,000.00 | 22,920.00 | 3,000.00 | 3,447.30 | 5,000.00 | 3,346.50 | |
| 23 | Books (electronic) | 110,000.00 | 75,000.00 | 68,760.00 | 20,000.00 | 22,982.00 | 8,000.00 | 5,354.40 | |
| 24 | Subscriptions serials (print) | 50,000.00 | 60,000.00 | 55,008.00 | 20,000.00 | 22,982.00 | 42,000.00 | 28,110.60 | |
| 25 | Subscriptions serials (electr | 850,000.00 | 520,000.00 | 476,736.00 | 220,000.00 | 252,802.00 | 18,000.00 | 12,047.40 | |
| 26 | Subscriptions newspapers ( | 8,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 27 | Subscriptions newspapers ( | 25,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 28 | Package deals institutional | 1,200,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 29 | Package deals consortium | 480,000.00 | 250,000.00 | 229,200.00 | 70,000.00 | 80,437.00 | 0.00 | 0.00 | |
| 30 | Other | 200,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 31 | Component10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 32 | Component11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 33 | Component12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 34 | Total = | 2,948,000.00 | 930,000.00 | 852,624.00 | 333,000.00 | 382,650.30 | 73,000.00 | 48,858.90 | |

Finally, enter the price increase percentages in cells N22..P33. Also for these percentual data, the data are automatically copied into the cells Q22..Y33 that contain the price increase percentages for the following years. Notice that these cells are indicated in orange. This means that this copy function is performed by a formula in these cells. You can alter the values in these cells. In the present exercise do not alter these values (we do that in the exercise about a tax jump).

The worksheet should now look as follows.



Input of base data

Year range

| | |
|---|---|
| Base year | 2024 |
| Base year + 1 | 2025 |
| Base year + 2 | 2026 |
| Base year + 3 | 2027 |
| Base year + 4 | 2028 |
| Base year + 5 | 2029 |

Legend: Can be adapted by user; Can be adapted by user (formula); Do not modify (formula)

| Currency information | | CheckISO4217 | 2024->2025 Rate to base | 2024->2025 UncertaintyLo | 2024->2025 UncertaintyMe | 2024->2025 UncertaintyHi | 2025->2026 UncertaintyLo | 2025->2026 UncertaintyMe | 2025->2026 UncertaintyHi | 2026->2027 UncertaintyLo | 2026->2027 UncertaintyMe | 2026->2027 UncertaintyHi | 2027->2028 UncertaintyLo | 2027->2028 UncertaintyMe | 2027->2028 UncertaintyHi | 2028->2029 UncertaintyLo | 2028->2029 UncertaintyMe | 2028->2029 UncertaintyHi | 2028->2029 UncertaintyLo |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Local (base) currency: | EUR | ok | 1.0000 | | | | | | | | | | | | | | | | |
| Foreign currency 1: | USD | ok | 0.9168 | -2.50% | 0.00% | 3.00% | -2.50% | 0.00% | 3.00% | -2.50% | 0.00% | 3.00% | -2.50% | 0.00% | 3.00% | -2.50% | | | |
| Foreign currency 2: | GBP | ok | 1.1491 | -1.00% | 0.00% | 0.70% | -1.00% | 0.00% | 0.70% | -1.00% | 0.00% | 0.70% | -1.00% | 0.00% | 0.70% | -1.00% | | | |
| Foreign currency 3: | CAD | ok | 0.6693 | -1.20% | 0.00% | 2.00% | -1.20% | 0.00% | 2.00% | -1.20% | 0.00% | 2.00% | -1.20% | 0.00% | 2.00% | -1.20% | | | |
| Foreign currency 4: | XXX | #N/A | 0.0000 | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | | | |
| Foreign currency 5: | XXX | #N/A | 0.0000 | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | | | |

| Literature components | In EUR | In USD | USD to EUR | In GBP | GBP to EUR | In CAD | CAD to EUR | In XXX | XXX to EUR | In XXX | XXX to EUR | Total in EUR | 2024->2025 PriceIncreaseLo | 2024->2025 PriceIncreaseME | 2024->2025 PriceIncreaseHi | 2025->2026 PriceIncreaseLo |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Books (print) | 25,000.00 | 25,000.00 | 22,920.00 | 3,000.00 | 3,447.30 | 5,000.00 | 3,346.50 | 0.00 | 0.00 | 0.00 | 0.00 | 54,713.80 | 1.00% | 2.00% | 3.00% | 1.00% |
| Books (electronic) | 110,000.00 | 75,000.00 | 68,760.00 | 20,000.00 | 22,982.00 | 8,000.00 | 5,354.40 | 0.00 | 0.00 | 0.00 | 0.00 | 207,096.40 | 1.00% | 2.00% | 3.00% | 1.00% |
| Subscriptions serials (print) | 50,000.00 | 60,000.00 | 55,008.00 | 20,000.00 | 22,982.00 | 42,000.00 | 28,110.60 | 0.00 | 0.00 | 0.00 | 0.00 | 156,100.60 | 3.00% | 5.00% | 7.00% | 3.00% |
| Subscriptions serials (electr | 850,000.00 | 520,000.00 | 476,736.00 | 220,000.00 | 252,802.00 | 18,000.00 | 12,047.40 | 0.00 | 0.00 | 0.00 | 0.00 | 1,591,585.40 | 3.00% | 5.00% | 7.00% | 3.00% |
| Subscriptions newspapers ( | 8,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8,000.00 | 2.00% | 4.00% | 6.00% | 2.00% |
| Subscriptions newspapers ( | 25,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 25,000.00 | 1.00% | 2.00% | 3.00% | 1.00% |
| Package deals institutional | 1,200,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1,200,000.00 | 2.00% | 3.00% | 4.00% | 2.00% |
| Package deals consortium | 480,000.00 | 250,000.00 | 229,200.00 | 70,000.00 | 80,437.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 789,637.00 | 1.00% | 2.00% | 3.00% | 1.00% |
| Other | 200,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 200,000.00 | 2.00% | 3.00% | 4.00% | 2.00% |
| Component10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00% | 0.00% | 0.00% | 0.00% |
| Component11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00% | 0.00% | 0.00% | 0.00% |
| Component12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00% | 0.00% | 0.00% | 0.00% |
| Total = | 2,948,000.00 | 930,000.00 | 852,624.00 | 333,000.00 | 382,650.30 | 73,000.00 | 48,858.90 | 0.00 | 0.00 | 0.00 | 0.00 | 4,232,133.20 | | | | |

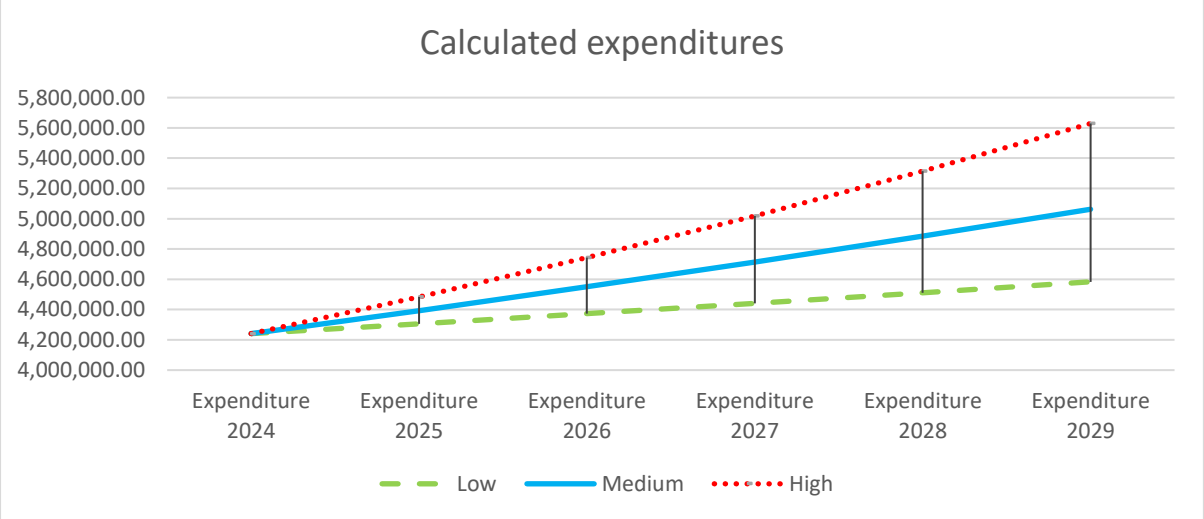
Input | ISO4217codes | ModelCalculations | Graph | Tabs4Reporting | Graphs4Reporting

## 2.4 Interpreting the output of the Delhi model

Before pasting the output of the Delhi model into a report, we should carefully inspect all worksheets that allow interpreting the output. These worksheets are Graph, Tabs4Reporting and Graphs4Reporting. The worksheet Graph gives a quick and general overview of the results. On top of this worksheet the expenditures are given in numerical form over the simulated years and in the low, medium, and high scenarios. See the following figure.

| Calculated expenditures | Expenditure 2024 | Expenditure 2025 | Expenditure 2026 | Expenditure 2027 | Expenditure 2028 | Expenditure 2029 |
|---|---|---|---|---|---|---|
| Low | 4,240,978.60 | 4,306,110.49 | 4,372,885.49 | 4,441,341.08 | 4,511,515.75 | 4,583,449.04 |
| Medium | 4,240,978.60 | 4,392,577.09 | 4,550,264.90 | 4,714,308.21 | 4,884,985.51 | 5,062,588.15 |
| High | 4,240,978.60 | 4,483,587.50 | 4,742,395.90 | 5,018,629.23 | 5,313,614.30 | 5,628,788.20 |

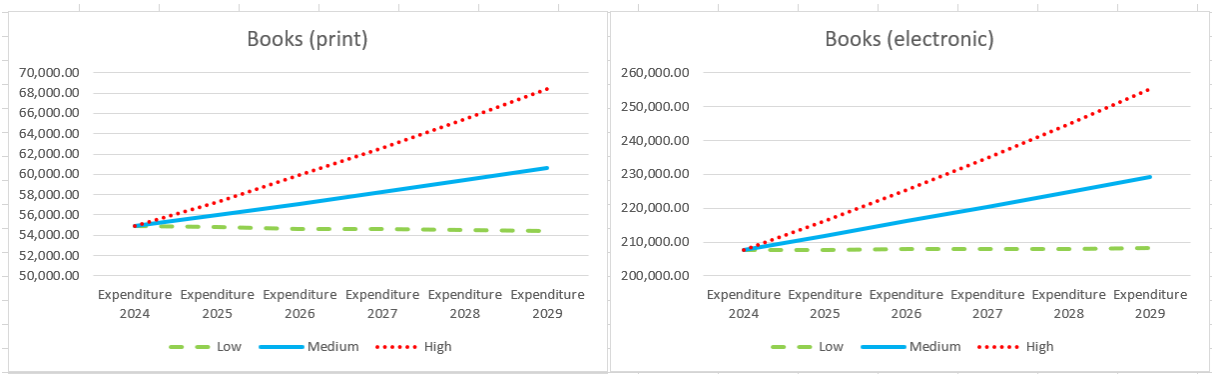
Under this table a graphical representation is given. See following picture (in which the vertical axis, with expenditures, has been rescaled).




The blue line gives, with the values used in this exercise, the evolution of the required budget, with price increases for the literature components, but without the influence of the variation of the foreign currencies. The dotted red line gives the pessimistic calculation of the expenditures (with the foreign currencies becoming more expensive than in de present, base year). The green dashed line gives the optimistic calculation (with the foreign currencies becoming cheaper than in de present, base year).

Warning: with some combinations of input data (which is not so in this exercise), the green dotted line shows a downward trend. If that is the case, we should adjust some values of the uncertainties of foreign currencies, so that that optimistic forecast no longer shows a downward trend. Indeed, a smaller budget may give the finance department the idea that such a smaller budget may also be sufficient in the coming years, and that is not what we want. Usually it is sufficient to slightly adjust the uncertainties regarding foreign currencies: in such a case, select a smaller (possible) decrease in the values of the foreign currencies for the input.

We show below that a smaller budget is calculated for some literature components. Using the data for this exercise, the Delhi model calculates that expenditure on printed and electronic books may decline if foreign currencies develop favorably. In the figure below, taken from the worksheet Graphs4Reporting, we see that the green dashed line is slightly downwards for both printed and electronic books.




If this happens for multiple literature components, it is possible that the total budget will show a decreasing green dashed line, which we obviously want to avoid (but that is not necessary in the current exercise). If the detailed graphs are shown to the financing government, this will of course require some explanation, or this can be remedied by adjusting some values in the Input worksheet: it is then the values for PriceIncreaseLo that must be increased. This is well justified: in fact, based on the known price evolutions for books, the chosen small price increase of 1% is particularly low.

## 2.5 Pasting the output of the Delhi model in a report

Once we are satisfied with the results, we can simply copy and paste tables from the Excel-file into a report, such as a Word-file. While all data from the Tabs4Reporting worksheet can be easily copied, we will only look at the Graphs4Reporting worksheet here. The Tabs4Reporting worksheet shows a lot of detail, but will be used more for detailed analyses.

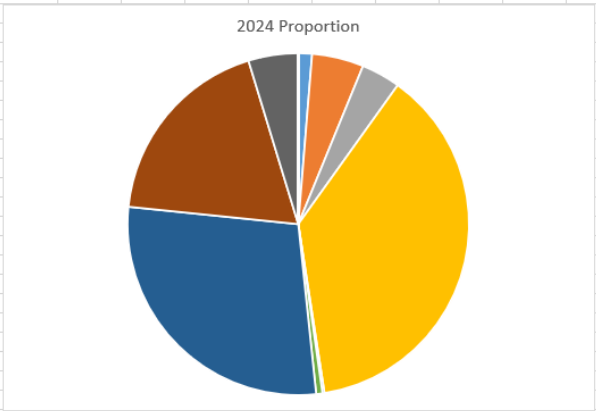
The pie charts, which show the proportions of the different literature components, only show the most relevant information, for the start and the end year. The tables below the pie charts give the numerical values in the first simulated and the last simulated year. This is interesting for two reasons:

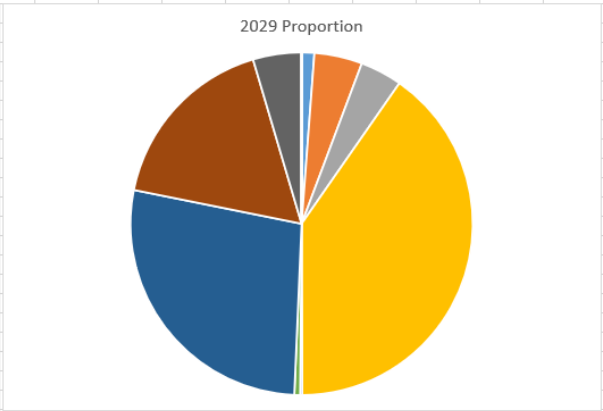
- we gain insight into the mutual shares (or proportions) of the literature components,
- we see how these proportions evolve over a period of five years.

Note that the two pie charts, or the two tables below them, may give an indication that due to developments in the market (both in terms of price increases and in terms of the evolution of the foreign currencies), the share of one of the literature components becomes much larger or much

smaller over the years. That is not the case in this exercise, but it is worth paying attention to such an evolution while inspecting the pie charts and the two tables below them.

**Evolution of literature component proportion**



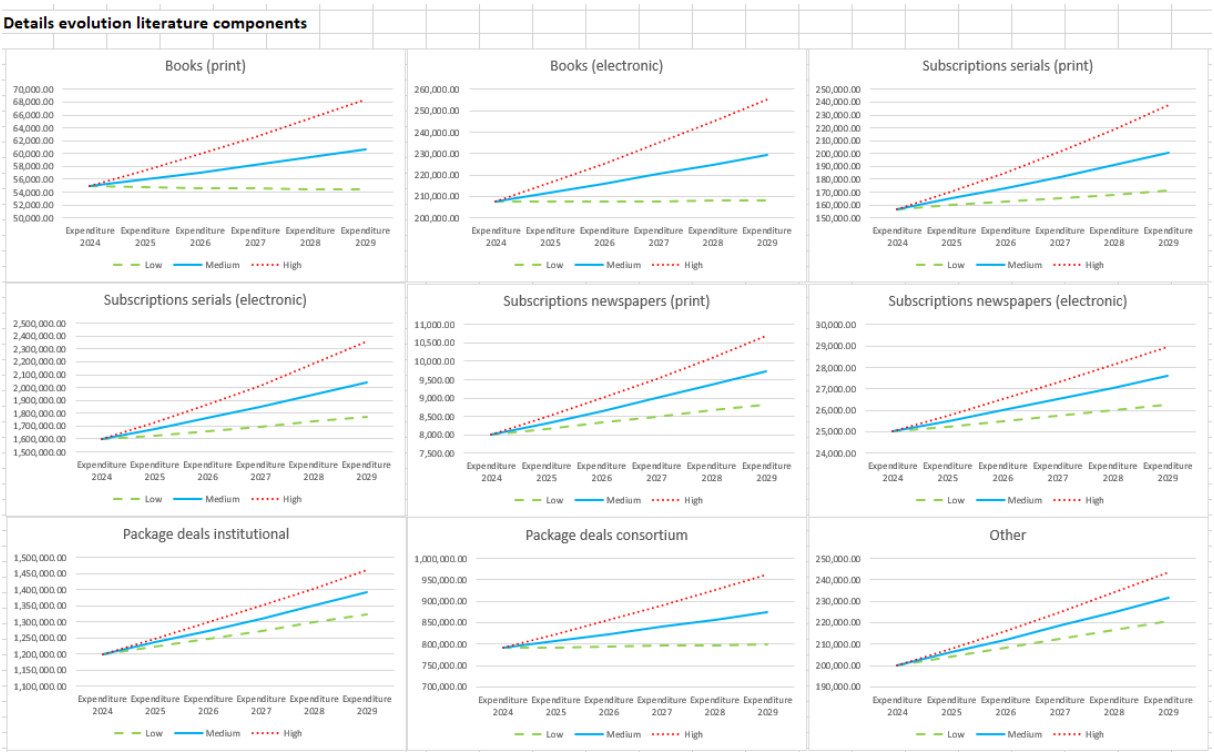




| Literature component | 2024 Proportion (medium) |
|---|---|
| Books (print) | 1.29% |
| Books (electronic) | 4.90% |
| Subscriptions serials (print) | 3.70% |
| Subscriptions serials (electror | 37.65% |
| Subscriptions newspapers (pr | 0.19% |
| Subscriptions newspapers (ele | 0.59% |
| Package deals institutional | 28.30% |
| Package deals consortium | 18.66% |
| Other | 4.72% |
| Component10 | 0.00% |
| Component11 | 0.00% |
| Component12 | 0.00% |
| Total = | 100.00% |

| Literature component | 2029 Proportion (medium) |
|---|---|
| Books (print) | 1.20% |
| Books (electronic) | 4.53% |
| Subscriptions serials (print) | 3.96% |
| Subscriptions serials (electror | 40.26% |
| Subscriptions newspapers (pr | 0.19% |
| Subscriptions newspapers (ele | 0.55% |
| Package deals institutional | 27.48% |
| Package deals consortium | 17.26% |
| Other | 4.58% |
| Component10 | 0.00% |
| Component11 | 0.00% |
| Component12 | 0.00% |
| Total = | 100.00% |

It might be important to consider the evolution of these proportions over more than five years. If the Delhi model is applied year after year, then we can check whether one or more literature components are becoming exuberantly larger or smaller. Take the example of printed or electronic books. It may be that due to large price increases in other literature components, electronic books will account for an undesirably decreasing share of the total literature budget. In this case it might be desirable to assign a larger budget to electronic books.

In the image below we clearly see that the two literature components related to books are experiencing growth, except in the scenario where the evolution of foreign currencies was chosen too optimistic (in the Input worksheet). We also see that the other literature components all show an increase, regardless of whether the developments in the prices of literature components and foreign currencies were chosen to be optimistic or pessimistic.




Further adjustment of the price increases of the literature components or of the uncertainties of the foreign currencies is not recommended. The Delhi model is not a panacea: it only tries to calculate an evolution of the literature budget using a few assumptions. Further adjustment of the input data is probably "pushing too hard".

# Exercise 3 Considering a particular package deal

## Introduction

One of the larger contracts involving an institutional package deal, worth 400,000.00 in local currency, ends next year. The financial conditions are changing: instead of an annual price increase of three percent, the price increase drops to two percent.

In the exercise on entering basic data into the Delhi model, we brought together all institutional package deals under a single literature component, the "Package deals institutional". For this literature component we used the range 2%-3%-4% for price increases. Now we are sure that for this package deal, starting from the next year, the price increase will be 2%, not less and not more. It is therefore worthwhile to separate this package deal and consider it as a separate literature component.

## 3.1 Splitting the involved literature component

We therefore split the literature component "Package deals institutional" in two. For the rest, we do not adjust the data on the literature components. The new overview of expenditure on literature components is shown in the following table.

| *Literature component* | *EUR* | *USD* | *GBP* | *CAD* |
|---|---|---|---|---|
| Books (print) | 25,000 | 25,000 | 3,000 | 5,000 |
| Books (electronic) | 110,000 | 75,000 | 20,000 | 8,000 |
| Subscriptions serials (print) | 50,000 | 60,000 | 20,000 | 42,000 |
| Subscriptions serials (electronic) | 850,000 | 520,000 | 220,000 | 18,000 |
| Subscriptions newspapers (print) | 8,000 | 0 | 0 | 0 |
| Subscriptions newspapers (electronic) | 25,000 | 0 | 0 | 0 |
| Package deals institutional | 800,000 | 0 | 0 | 0 |
| Package deal institutional new | 400,000 | 0 | 0 | 0 |
| Package deals consortium | 480,000 | 250,000 | 70,000 | 0 |
| Other | 200,000 | 0 | 0 | 0 |

The price increases for the literature components used are summarized in the following table.

| *Literature component* | *Price Increase Low* | *Price Increase Medium* | *Price Increase High* |
|---|---|---|---|
| Books (print) | 1.00% | 2.00% | 3.00% |
| Books (electronic) | 1.00% | 2.00% | 3.00% |
| Subscriptions serials (print) | 3.00% | 5.00% | 7.00% |
| Subscriptions serials (electronic) | 3.00% | 5.00% | 7.00% |
| Subscriptions newspapers (print) | 2.00% | 4.00% | 6.00% |
| Subscriptions newspapers (electronic) | 1.00% | 2.00% | 3.00% |
| Package deals institutional | 2.00% | 3.00% | 4.00% |
| Package deal institutional new | 2.00% | 2.00% | 2.00% |
| Package deals consortium | 1.00% | 2.00% | 3.00% |
| Other | 2.00% | 3.00% | 4.00% |

Until the new deal comes into effect next year, the price increase will be 3%. Since our simulation starts from next year, the price increase percentages can be set to 2% for all years. Suppose the price

increase only takes effect a year later, then we can still enter the price increase as 3% for the next year, and only set it to 2% for the later years.

## 3.2 Entering the values in the Delhi model

To enter the data for this exercise, we start from the values we entered in the exercise regarding entering basic data in the Delhi model. After entering the data adjusted for this exercise, the Input worksheet will look as follows for the literature components.

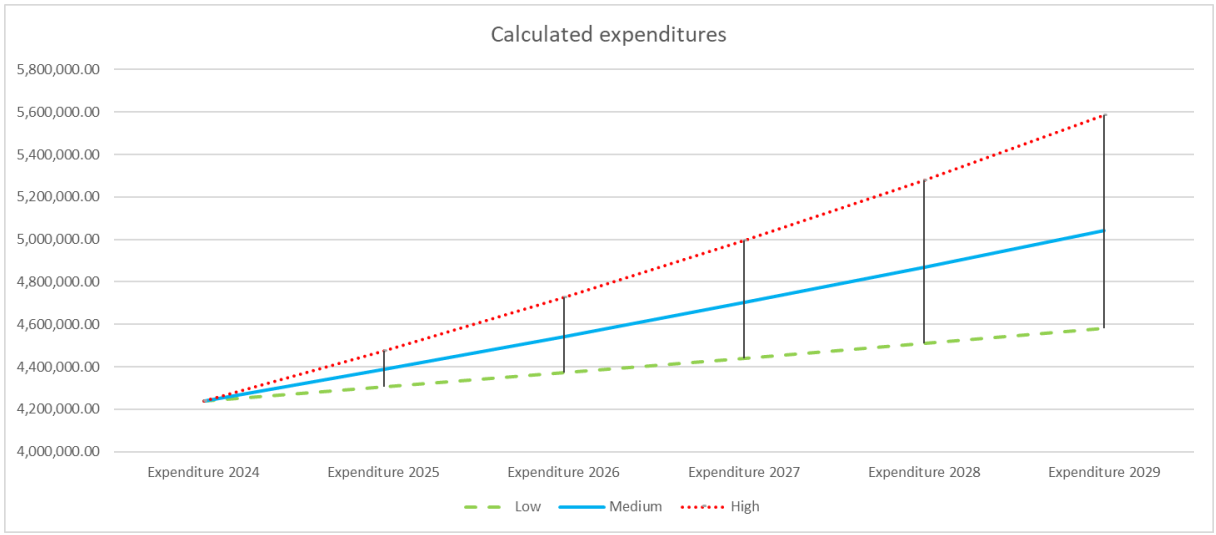
| Literature components | In EUR | In USD | USD to EUR | In GBP | GBP to EUR | In CAD | CAD to EUR | In XXX | XXX to EUR | In XXX | XXX to EUR | Total in EUR | 2024->2025 PriceIncreaseLo | 2024->2025 PriceIncreaseME | 2024->2025 PriceIncreaseHi | 2025->2026 PriceIncreaseLo P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Books (print) | 25,000.00 | 25,000.00 | 22,970.00 | 3,000.00 | 3,382.80 | 5,000.00 | 3,403.00 | 0.00 | 0.00 | 0.00 | 0.00 | 54,875.80 | 1.00% | 2.00% | 3.00% | 1.00% |
| Books (electronic) | 110,000.00 | 75,000.00 | 68,910.00 | 20,000.00 | 23,552.00 | 8,000.00 | 5,444.80 | 0.00 | 0.00 | 0.00 | 0.00 | 297,906.80 | 1.00% | 2.00% | 3.00% | 1.00% |
| Subscriptions serials (print) | 50,000.00 | 60,000.00 | 55,128.00 | 20,000.00 | 23,552.00 | 42,000.00 | 28,585.20 | 0.00 | 0.00 | 0.00 | 0.00 | 157,265.20 | 3.00% | 5.00% | 7.00% | 3.00% |
| Subscriptions serials (electronic) | 850,000.00 | 520,000.00 | 477,776.00 | 220,000.00 | 259,072.00 | 18,000.00 | 12,256.20 | 0.00 | 0.00 | 0.00 | 0.00 | 1,396,898.80 | 3.00% | 5.00% | 7.00% | 3.00% |
| Subscriptions newspapers (print) | 8,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8,000.00 | 2.00% | 4.00% | 6.00% | 2.00% |
| Subscriptions newspapers (electronic) | 25,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 25,000.00 | 1.00% | 2.00% | 3.00% | 1.00% |
| Package deals institutional | 800,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 800,000.00 | 2.00% | 3.00% | 4.00% | 2.00% |
| Package deals institutional (new) | 400,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 400,000.00 | 2.00% | 2.00% | 2.00% | 2.00% |
| Package deals consortium | 480,000.00 | 250,000.00 | 229,700.00 | 70,000.00 | 82,432.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 791,432.00 | 1.00% | 2.00% | 3.00% | 1.00% |
| Other | 200,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 200,000.00 | 2.00% | 3.00% | 4.00% | 2.00% |
| Component11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00% | 0.00% | 0.00% | 0.00% |
| Component12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00% | 0.00% | 0.00% | 0.00% |
| Total = | 2,948,000.00 | 930,000.00 | 854,484.00 | 313,000.00 | 392,035.80 | 73,000.00 | 49,683.80 | 0.00 | 0.00 | 0.00 | 0.00 | 4,240,978.60 | | | | |

Below is an enlargement of the left part of the previous figure.

| *Literature components* | In EUR | In USD | USD to EUR |
|---|---|---|---|
| Books (print) | 25,000.00 | 25,000.00 | 22,970.00 |
| Books (electronic) | 110,000.00 | 75,000.00 | 68,910.00 |
| Subscriptions serials (print) | 50,000.00 | 60,000.00 | 55,128.00 |
| Subscriptions serials (electronic) | 850,000.00 | 520,000.00 | 477,776.00 |
| Subscriptions newspapers (print) | 8,000.00 | 0.00 | 0.00 |
| Subscriptions newspapers (electronic) | 25,000.00 | 0.00 | 0.00 |
| Package deals institutional | 800,000.00 | 0.00 | 0.00 |
| Package deals institutional (new) | 400,000.00 | 0.00 | 0.00 |
| Package deals consortium | 480,000.00 | 250,000.00 | 229,700.00 |
| Other | 200,000.00 | 0.00 | 0.00 |
| Component11 | 0.00 | 0.00 | 0.00 |
| Component12 | 0.00 | 0.00 | 0.00 |
| Total = | 2,948,000.00 | 930,000.00 | 854,484.00 |

## 3.3 Interpreting the output of the Delhi model

When we look at the "Graph" worksheet, we hardly notice a difference with the results obtained in the previous exercise.

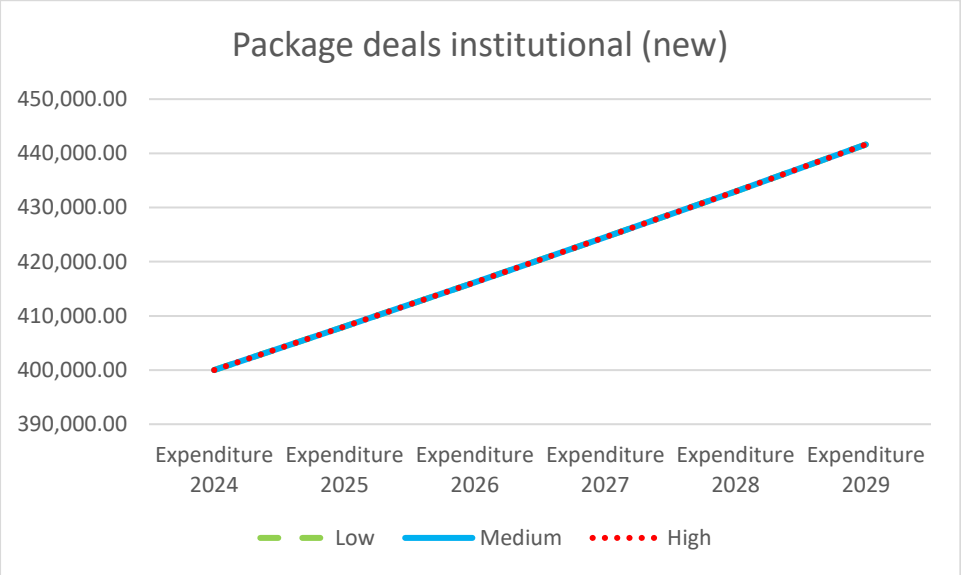



That result may be disappointing, but all things considered, it was to be expected. After all, it concerns a partial budget for this literature component of 400,000 out of a total budget of 3,400,000. And the saving is only 1%. No wonder we hardly see any difference in the global graph. To see any

difference we have to look at the table that is on the same Graph worksheet. Below is a comparison between the results of both exercises.

| *Calculated expenditures* | *Expenditure 2024* | *Expenditure 2025* | *Expenditure 2026* | *Expenditure 2027* | *Expenditure 2028* | *Expenditure 2029* |
|---|---|---|---|---|---|---|
| Medium (basic exercise) | 4,240,978.60 | 4,392,577.09 | 4,550,264.90 | 4,714,308.21 | 4,884,985.51 | 5,062,588.15 |
| Medium (this exercise) | 4,240,978.60 | 4,388,577.09 | 4,542,064.90 | 4,701,700.61 | 4,867,754.85 | 5,040,510.84 |

The differences are noticeable in the Tabs4Reporting worksheet. In the Graphs4Reporting worksheet the differences are almost invisible, but there we now see a graph appear for the additional literature component (which contains the new institutional package deal with a smaller price increase). In this graph it is striking that the three lines, which represent the different scenarios, coincide: after all, we know the price evolution of this package deal.




Wasn't hard negotiation worth it for this package deal? In the table above we see that after a few years already 20,000 was saved, which is a nice sum to spend on other sources of information. As always, we must respond very carefully to opportunities that present themselves on the market: all savings and reduced expenditures ultimately lead to a healthy budget. The Delhi tool provides a means to understand better than before how the literature budget is evolving and how the literature components interact with each other. In a next exercise, about a sudden VAT jump, we consider an evolution that is very clearly visible in the tables and graphs generated by the Delhi tool.

# Exercise 4 Conversion of package deals(s) to OA

## Introduction

A few package deals will switch towards open access (OA), involving Article Processing Charges (APC's). Maybe only parts of a package deal will be converted to OA. Notice that in some countries, including Belgium, VAT may become higher: from 6% VAT on the package deal to 21% on the APC's. All this can be simulated by the Delhi tool.

Normally we shouldn't worry about this VAT difference. But the publisher says that the cost of the package (for the publisher this is without VAT) can be completely converted to pay for APC's. To fully enjoy the publisher's offer, the expenditure will increase because of the higher VAT on APC's. It is suggested that the librarian goes for this maximum in the calculations: i.e. going for the maximum use of the APC's, even if this costs more in the local currency, since paying for the APC's will be over the complete year, not only in the first months of 2025 (and paying for APC's can always be stopped if the available budget exhausts). The price increases for all OA-packages payable in EUR are fixed at 2%, while the price increases for the OA-package payable in USD is fixed at 1,5%.

Let's make this exercise a little more complex by assuming that it concerns multiple packages, from different publishers, where the currency used sometimes differs.

## 4.1 Calculating the virtual expenditures

The table below shows how the literature components are divided and which expenditures replace the old ones.

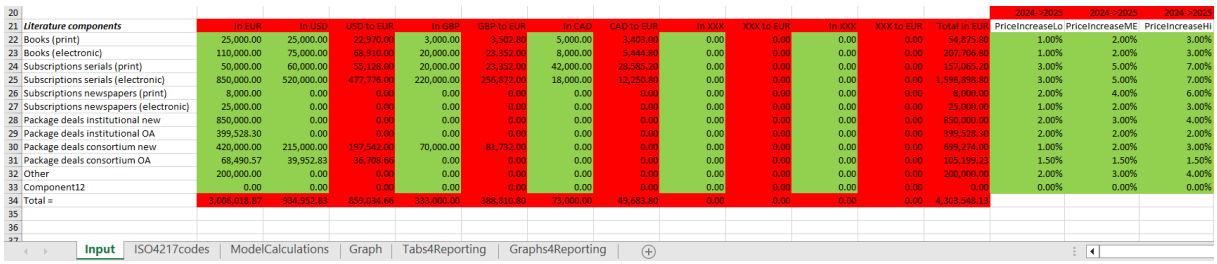
| EUR | EUR no OA incl VAT 6% | EUR no OA excl VAT 6% | EUR new OA incl 6% & 21% |
|---|---|---|---|
| Package deals institutional new | 850,000.00 | 801,886.79 | 850,000.00 |
| Package deals institutional OA | 350,000.00 | 330,188.68 | 399,528.30 |
| Package deals consortium new | 420,000.00 | 396,226.42 | 420,000.00 |
| Package deals consortium OA | 60,000.00 | 56,603.77 | 68,490.57 |
| TOTAL | 1,680,000.00 | | 1,738,018.87 |

| USD | USD no OA incl VAT 6% | USD no OA excl VAT 6% | USD new OA incl 6% & 21% |
|---|---|---|---|
| Package deals institutional new | 0.00 | 0.00 | 0.00 |
| Package deals institutional OA | 0.00 | 0.00 | 0.00 |
| Package deals consortium new | 215,000.00 | 202,830.19 | 215,000.00 |
| Package deals consortium OA | 35,000.00 | 33,018.87 | 39,952.83 |
| TOTAL | 250,000.00 | | 254,952.83 |

It is clear that what is in the table above is not the expenditure we will incur in 2024. It is the virtual expenses that the Delhi model can use to calculate expenses in the coming years. Now, with the help of exercise two, which worked with basic expenditures, we can enter the expenditures for the split literature components. We already see, should the new deals take place in 2024, that there is a significant additional expenditure because the VAT rate on the OA part is not 6% but 21%. This concerns an additional expenditure of more than EUR 60,000. This jump will not be apparent from the graphs produced by the Delhi model (because this jump has already been included in the current year). To make the leap clear to the financial department, a separate table or graph must be created.

## 4.2 Entering the values in the Delhi-model

The relevant part of the worksheet Input is shown in the following figure.

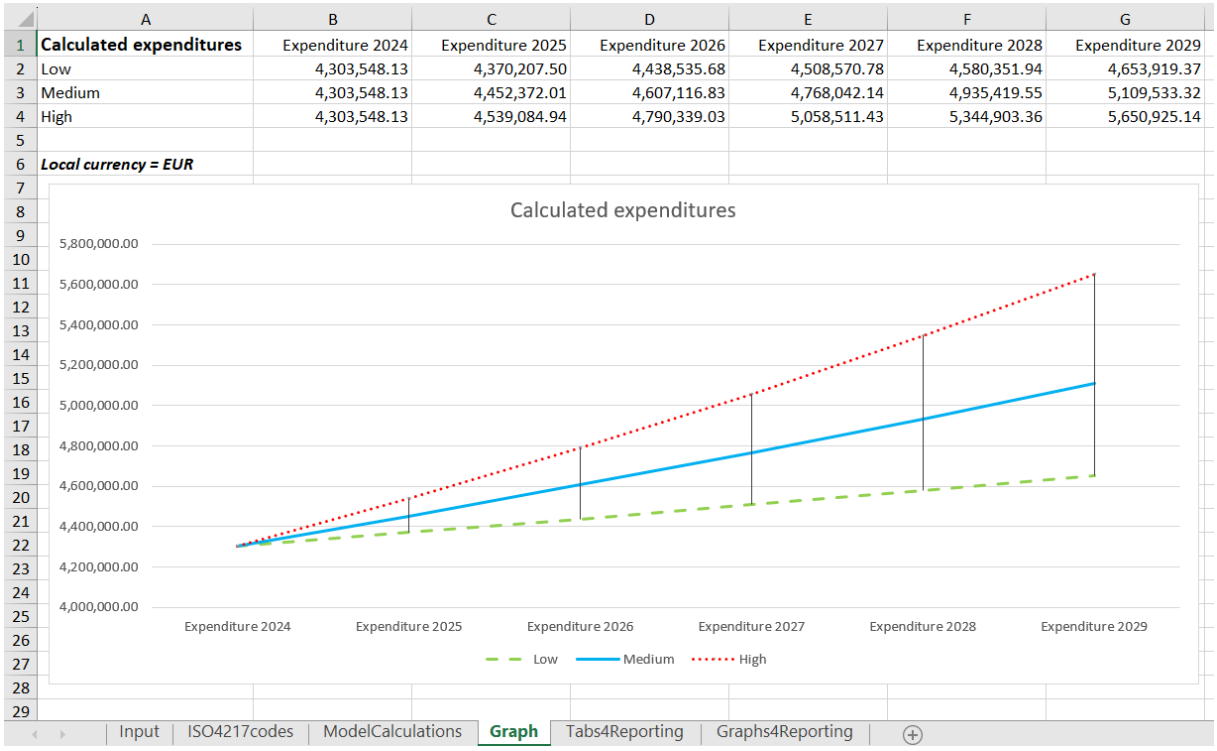


| | | | | | | | | | | | | | 2024->2025 | 2024->2025 | 2024->2025 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | *Literature components* | In EUR | In USD | USD to EUR | In GBP | GBP to EUR | In CAD | CAD to EUR | In XXX | XXX to EUR | In XXX | XXX to EUR | Total in EUR | PriceIncreaseLo | PriceIncreaseME | PriceIncreaseHi |
| 22 | Books (print) | 25,000.00 | 25,000.00 | 22,970.00 | 3,000.00 | 3,502.80 | 5,000.00 | 3,403.00 | 0.00 | 0.00 | 0.00 | 0.00 | 54,875.80 | 1.00% | 2.00% | 3.00% |
| 23 | Books (electronic) | 110,000.00 | 75,000.00 | 68,910.00 | 20,000.00 | 23,352.00 | 8,000.00 | 5,444.80 | 0.00 | 0.00 | 0.00 | 0.00 | 207,706.80 | 1.00% | 2.00% | 3.00% |
| 24 | Subscriptions serials (print) | 50,000.00 | 60,000.00 | 55,128.00 | 20,000.00 | 23,352.00 | 42,000.00 | 28,585.20 | 0.00 | 0.00 | 0.00 | 0.00 | 157,065.20 | 3.00% | 5.00% | 7.00% |
| 25 | Subscriptions serials (electronic) | 850,000.00 | 520,000.00 | 477,776.00 | 220,000.00 | 256,872.00 | 18,000.00 | 12,250.80 | 0.00 | 0.00 | 0.00 | 0.00 | 1,596,898.80 | 3.00% | 5.00% | 7.00% |
| 26 | Subscriptions newspapers (print) | 8,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8,000.00 | 2.00% | 4.00% | 6.00% |
| 27 | Subscriptions newspapers (electronic) | 25,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 25,000.00 | 1.00% | 2.00% | 3.00% |
| 28 | Package deals institutional new | 850,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 850,000.00 | 2.00% | 3.00% | 4.00% |
| 29 | Package deals institutional OA | 399,528.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 399,528.30 | 2.00% | 2.00% | 2.00% |
| 30 | Package deals consortium new | 420,000.00 | 215,000.00 | 197,542.00 | 70,000.00 | 81,732.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 699,274.00 | 1.00% | 2.00% | 3.00% |
| 31 | Package deals consortium OA | 68,490.57 | 39,952.83 | 36,708.66 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 105,199.23 | 1.50% | 1.50% | 1.50% |
| 32 | Other | 200,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 200,000.00 | 2.00% | 3.00% | 4.00% |
| 33 | Component12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00% | 0.00% | 0.00% |
| 34 | Total = | 3,006,018.87 | 934,952.83 | 859,034.66 | 333,000.00 | 388,810.80 | 73,000.00 | 49,683.80 | 0.00 | 0.00 | 0.00 | 0.00 | 4,303,548.13 | | | |

Input | ISO4217codes | ModelCalculations | Graph | Tabs4Reporting | Graphs4Reporting

## 4.3 Interpretating the output of the Delhi-model

On the worksheet Graph we do not see a sudden jump, because the changes in expenditures where already entered in the basic year 2024. See the following figure.



| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | **Calculated expenditures** | Expenditure 2024 | Expenditure 2025 | Expenditure 2026 | Expenditure 2027 | Expenditure 2028 | Expenditure 2029 |
| 2 | Low | 4,303,548.13 | 4,370,207.50 | 4,438,535.68 | 4,508,570.78 | 4,580,351.94 | 4,653,919.37 |
| 3 | Medium | 4,303,548.13 | 4,452,372.01 | 4,607,116.83 | 4,768,042.14 | 4,935,419.55 | 5,109,533.32 |
| 4 | High | 4,303,548.13 | 4,539,084.94 | 4,790,339.03 | 5,058,511.43 | 5,344,903.36 | 5,650,925.14 |
| 5 | | | | | | | |
| 6 | ***Local currency = EUR*** | | | | | | |



Input | ISO4217codes | ModelCalculations | **Graph** | Tabs4Reporting | Graphs4Reporting

## 4.4 Comparison of the expenditures with and without the OA-deal

It is by comparing the calculated expenditures from exercise 2 with the present expenditure that the difference becomes clear. See the following table, in which only the results for the 'medium' calculation are represented.

| Calculated expenditures | Expenditure 2024 | Expenditure 2025 | Expenditure 2026 | Expenditure 2027 | Expenditure 2028 | Expenditure 2029 |
|---|---|---|---|---|---|---|
| Medium without OA | 4,240,978.60 | 4,392,577.09 | 4,550,264.90 | 4,714,308.21 | 4,884,985.51 | 5,062,588.15 |
| Medium with OA | 4,303,548.13 | 4,452,372.01 | 4,607,116.83 | 4,768,042.14 | 4,935,419.55 | 5,109,533.32 |

# Exercise 5 Simulating a VAT jump

## Introduction

In this exercise we will simulate a jump of the value added taxes (VAT) on all printed and electronic literature components, from a reduced VAT rate of 6% to 9%. This is something that may happen in Belgium in 2024 or 2025. In order to see the effects of such a tax jump on the global library expenditures, the base year for the expenditures is taken in 2023, and we start simulating from 2024, and assume the tax jump will appear in 2025.

To calculate the impact of a VAT jump from 6% to 9% one cannot simply add 3% to the already assumed price increase of a literature component. Consider a price of 100, expressed in any currency. VAT has already been included in this amount. The parts are as follows:

- cost price without VAT (of 6%) = tax included price / 1.06 = 94.34,
- the VAT amount is therefore 100 - 94.34 = 5.66.

If 9% VAT is charged on the basic price, then:

- 94.34 * 0.09 = 8.49 in VAT is to be paid,
- the total cost is then 94.34 + 8.49 = 102.83.

This means that we should not add 3 percent to the price increase of the literature component, but **2.83%**. Also note that this additional price increase may only be applied once (in 2025).

Newspapers are a special case: the present VAT rate of 0% applied to them, will also be increased to 9%. We don't know yet if this VAT increase becomes effective immediately, so to make the exercise slightly more complicated, we assume for this exercise that this VAT increase comes into effect in 2026. The VAT jump has the effect in 2026 that there is a price increase of the plain **9%** (no other calculation needed since we start from 0% VAT at present).

## 5.1 Determining which literature components will be affected by the VAT jump

VAT is always paid in the country of destination. Therefore, a VAT jump in your own country does not only apply to information sources purchased from a supplier in your country, but to all supplies of magazines, books and even online information sources ordered from any foreign supplier.

It must now be determined which literature components the VAT jump will affect. Often, the VAT jump will affect entire literature components. If this is not the case, the literature component must be split into the part(s) to which the VAT jump applies in different ways.

We work with the same literature components as in the exercise where we entered basic values into the Delhi model. For each of these literature components, we must ask ourselves what impact the VAT jump will have. Perhaps strong lobbying led to the VAT jump not being applied to printed books in 2025, but only coming into effect after one more year (in 2026). In this special case, the literature component "Books (print)" must not be divided over two literature components: the 'price' jump only has to be entered one year later. The literature component "Other" may consist of three parts:

- a part on which the standard rate of 21% VAT is already paid (no price increase),
- a part on which the reduced rate of 6% VAT is paid and where the VAT jump to 9% applies immediately in 2025 (the price increase is 2.83%),
- a part to which the reduced rate of 0% applied and to which the VAT jump will apply immediately in 2025 (the price increase is 9%).

In order not to complicate matters unnecessarily, we work with the same uncertainties in foreign currencies as in the Pragyan exercise.

## 5.2 Price increase values for the affected literature components

Let us start from the set of input data from the exercise about entering basic values in Delhi.

In the previous paragraph we indicated that printed books are only subject to the VAT jump in 2026. There is no need to split the literature component “Books (print)”, we only need to apply the price increase of 2.83% due to the VAT jump one year later. The two components containing newspapers make a price increase of 9% in 2025. The other components containing subscriptions and package make their price increase of 2.83% in 2025. The literature component “Other” has to be split in three parts, each part representing the particular price increase. An overview is given in the following table.

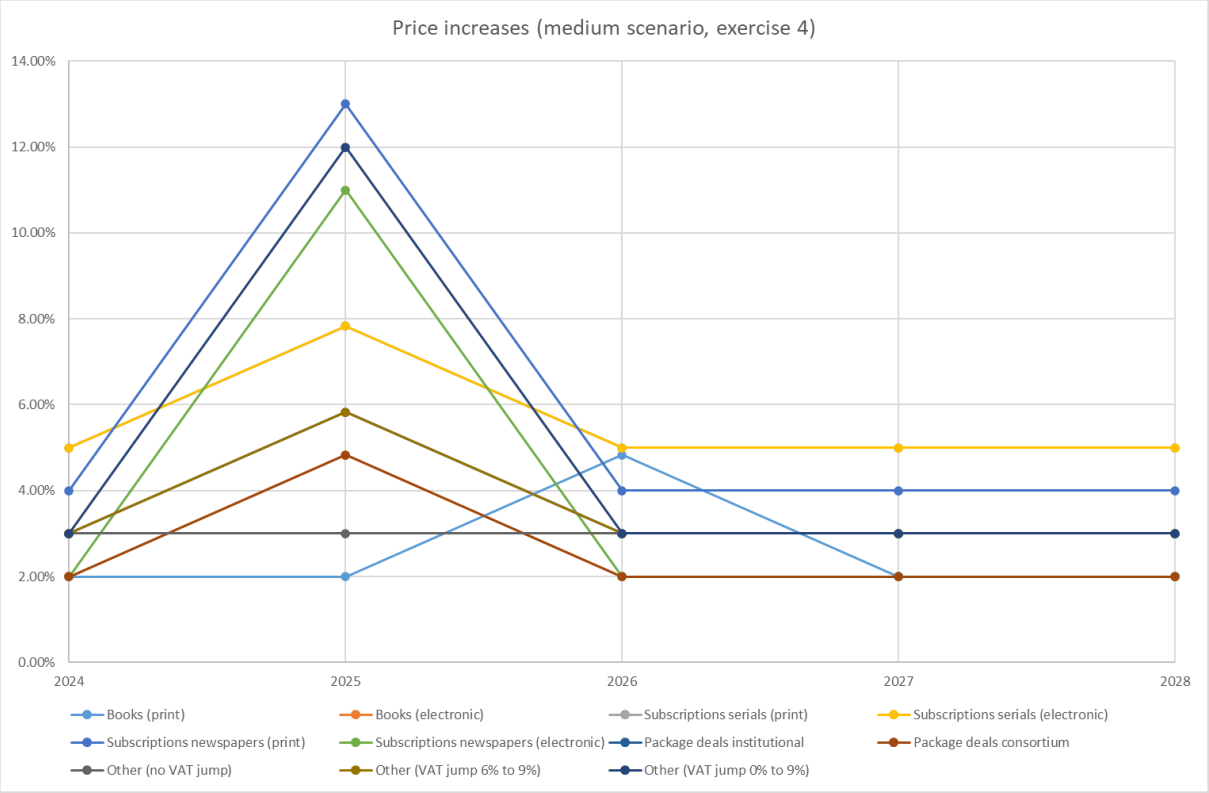
| *Literature components* | *Extra price increase* |
|---|---|
| Books (print) | VAT jump in 2026 (2.83%) |
| Books (electronic) | VAT jump in 2025 (2.83%) |
| Subscriptions serials (print) | VAT jump in 2025 (2.83%) |
| Subscriptions serials (electronic) | VAT jump in 2025 (2.83%) |
| Subscriptions newspapers (print) | VAT jump in 2025 (9%) |
| Subscriptions newspapers (electronic) | VAT jump in 2025 (9%) |
| Package deals institutional | VAT jump in 2025 (2.83%) |
| Package deals consortium | VAT jump in 2025(2.83%) |
| Other (no VAT jump) | No VAT jump |
| Other (VAT jump 6% to 9%) | VAT jump in 2025 (2.83%) |
| Other (VAT jump 0% to 9%) | VAT jump in 2025 (9%) |

The last step is to define how the literature component “Other” has to split. We split the component as shown in the following table.

| *New components type “Other”* | *Expenditure (2023)* |
|---|---|
| Other (no VAT jump) | 60,000.00 |
| Other (VAT jump 6% to 9%) | 40,000.00 |
| Other (VAT jump 0% to 9%) | 100,000.00 |
| Total | 200,00.00 |

Initially, we use the same percentages for price increases for the three parts of the literature component "Other", in 2023 (for the increase towards 2024): 2% for the optimistic (Lo), 3% for the moderate (Me) and 4 % for the pessimistic (Hi) scenario.

An overview of all price increases of all literature components is given in the following figure. Notice that the following figure is made outside the Delhi model, by extracting the data and plotting them in another Excel spreadsheet.




In this figure we clearly see the VAT jump for most literature components in 2025 and for printed books a year later. The sudden, one-off price increases will be less clearly visible in total expenditure. This has to do with the relative share of each literary component in the total expenditure.

## 5.3 Entering the values in the Delhi model

Now we are ready to enter the values in the Delhi model. Remind that we start from the data used in the exercise about entering basic values in Delhi. Do not forget to set the start (base) year to 2023. Notice that the price increase due to the VAT jump has to be entered only once (i.e. in one year) in an orange cell. However, for the year after the normal values have to be entered again manually.

After splitting the literature component “Other” into three parts and introducing the price increases due to the VAT jumps in 2025 and 2026 the worksheet Input looks as in the following figure.

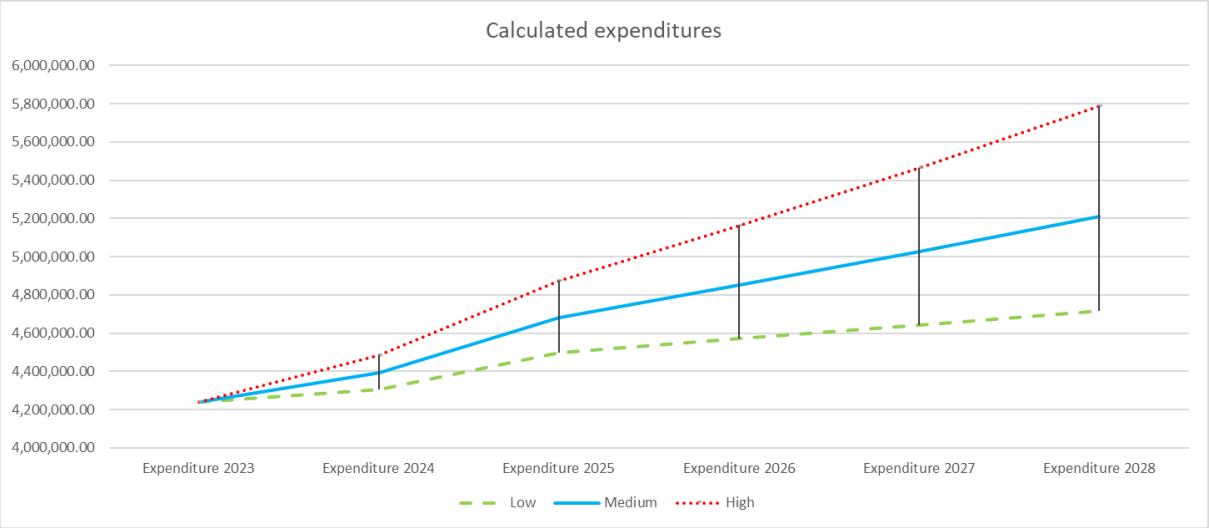
| | 2023->2024 | 2023->2024 | 2023->2024 | 2024->2025 | 2024->2025 | 2024->2025 | 2025->2026 | 2025->2026 | 2025->2026 | 2026->2027 | 2026->2027 | 2026->2027 | 2027->2028 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Literature components*** | PriceIncreaseLo | PriceIncreaseME | PriceIncreaseHi | PriceIncreaseLo | PriceIncreaseME | PriceIncreaseHi | PriceIncreaseLo | PriceIncreaseME | PriceIncreaseHi | PriceIncreaseLo | PriceIncreaseME | PriceIncreaseHi | PriceIncreaseLo | Pric |
| Books (print) | 1.00% | 2.00% | 3.00% | 1.00% | 2.00% | 3.00% | 3.83% | 4.83% | 5.83% | 1.00% | 2.00% | 3.00% | 1.00% | |
| Books (electronic) | 1.00% | 2.00% | 3.00% | 3.83% | 4.83% | 5.83% | 1.00% | 2.00% | 3.00% | 1.00% | 2.00% | 3.00% | 1.00% | |
| Subscriptions serials (print) | 3.00% | 5.00% | 7.00% | 5.83% | 7.83% | 9.83% | 3.00% | 5.00% | 7.00% | 3.00% | 5.00% | 7.00% | 3.00% | |
| Subscriptions serials (electronic) | 3.00% | 5.00% | 7.00% | 5.83% | 7.83% | 9.83% | 3.00% | 5.00% | 7.00% | 3.00% | 5.00% | 7.00% | 3.00% | |
| Subscriptions newspapers (print) | 2.00% | 4.00% | 6.00% | 11.00% | 13.00% | 15.00% | 2.00% | 4.00% | 6.00% | 2.00% | 4.00% | 6.00% | 2.00% | |
| Subscriptions newspapers (electronic) | 1.00% | 2.00% | 3.00% | 10.00% | 11.00% | 12.00% | 1.00% | 2.00% | 3.00% | 1.00% | 2.00% | 3.00% | 1.00% | |
| Package deals institutional | 2.00% | 3.00% | 4.00% | 4.83% | 5.83% | 6.83% | 2.00% | 3.00% | 4.00% | 2.00% | 3.00% | 4.00% | 2.00% | |
| Package deals consortium | 1.00% | 2.00% | 3.00% | 3.83% | 4.83% | 5.83% | 1.00% | 2.00% | 3.00% | 1.00% | 2.00% | 3.00% | 1.00% | |
| Other (no VAT jump) | 2.00% | 3.00% | 4.00% | 2.00% | 3.00% | 4.00% | 2.00% | 3.00% | 4.00% | 2.00% | 3.00% | 4.00% | 2.00% | |
| Other (VAT jump 6% to 9%) | 2.00% | 3.00% | 4.00% | 4.83% | 5.83% | 6.83% | 2.00% | 3.00% | 4.00% | 2.00% | 3.00% | 4.00% | 2.00% | |
| Other (VAT jump 0% to 9%) | 2.00% | 3.00% | 4.00% | 11.00% | 12.00% | 13.00% | 2.00% | 3.00% | 4.00% | 2.00% | 3.00% | 4.00% | 2.00% | |
| Component12 | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | |

In the figure below the view with formulas made visible is shown. Notice that the price increase due to the VAT jump is added in one year, and subtracted again in the following year. You may, of course, also opt to enter fixed values, but applying the one-year price increases once (and subtracting them again the year after) is slightly clearer to what happened in these particular years.

| =CONCAT(B4;"->";B5) | =CONCAT(B4;"->";B5) | =CONCAT(B4;"->";B5) | =CONCAT(B5;"->";B6) | =CONCAT(B5;"->";B6) | =CONCAT(B5;"->";B6) | =CONCAT(B6;"->";B7) | =CONCAT(B6;" |
|---|---|---|---|---|---|---|---|
| PriceIncreaseLo | PriceIncreaseME | PriceIncreaseHi | PriceIncreaseLo | PriceIncreaseME | PriceIncreaseHi | PriceIncreaseLo | |
| 0.01 | 0.02 | 0.03 | =N22 | =O22 | =P22 | =Q22+2.83% | =R22+2.83% |
| 0.01 | 0.02 | 0.03 | =N23+2.83% | =O23+2.83% | =P23+2.83% | =Q23-2.83% | =R23-2.83% |
| 0.03 | 0.05 | 0.07 | =N24+2.83% | =O24+2.83% | =P24+2.83% | =Q24-2.83% | =R24-2.83% |
| 0.03 | 0.05 | 0.07 | =N25+2.83% | =O25+2.83% | =P25+2.83% | =Q25-2.83% | =R25-2.83% |
| 0.02 | 0.04 | 0.06 | =N26+9% | =O26+9% | =P26+9% | =Q26-9% | =R26-9% |
| 0.01 | 0.02 | 0.03 | =N27+9% | =O27+9% | =P27+9% | =Q27-9% | =R27-9% |
| 0.02 | 0.03 | 0.04 | =N28+2.83% | =O28+2.83% | =P28+2.83% | =Q28-2.83% | =R28-2.83% |
| 0.01 | 0.02 | 0.03 | =N29+2.83% | =O29+2.83% | =P29+2.83% | =Q29-2.83% | =R29-2.83% |
| 0.02 | 0.03 | 0.04 | =N30 | =O30 | =P30 | =Q30 | =R30 |
| 0.02 | 0.03 | 0.04 | =N31+2.83% | =O31+2.83% | =P31+2.83% | =Q31-2.83% | =R31-2.83% |
| 0.02 | 0.03 | 0.04 | =N32+9% | =O32+9% | =P32+9% | =Q32-9% | =R32-9% |
| 0 | 0 | 0 | =N33 | =O33 | =P33 | =Q33 | =R33 |

## 5.4 Interpreting the output of the Delhi model

To check what results the Delhi model produces, we immediately go to the Graph worksheet. The effect of the rather complicated VAT jump is visible in the graph, albeit much less than we might have expected. It is clear: this graph alone will not convince the finance department to prepare for a budget increase. Moreover, the finance department can come up with the rather logical argument that a windfall with regard to foreign currencies will cancel out the effect of the VAT jump.




In fact, it is the table with figures on the Graph worksheet that is much more convincing, especially when these expenditures are compared with those of the simulation without VAT jump. Below are the results of both simulations in table form.

Calculated expenditure without VAT jump (exercise 2).

| | *2023* | *2024* | *2025* | *2026* | *2027* | *2028* |
|---|---|---|---|---|---|---|
| Low | 4,240,978.60 | 4,306,110.49 | 4,372,885.49 | 4,441,341.08 | 4,511,515.75 | 4,583,449.04 |
| Medium | 4,240,978.60 | 4,392,577.09 | 4,550,264.90 | 4,714,308.21 | 4,884,985.51 | 5,062,588.15 |
| High | 4,240,978.60 | 4,483,587.50 | 4,742,395.90 | 5,018,629.23 | 5,313,614.30 | 5,628,788.20 |

Calculated expenditure with VAT jump (this exercise).

| | *2023* | *2024* | *2025* | *2026* | *2027* | *2028* |
|---|---|---|---|---|---|---|
| Low | 4,240,978.60 | 4,306,110.49 | 4,499,108.09 | 4,571,102.05 | 4,643,332.95 | 4,717,373.25 |
| Medium | 4,240,978.60 | 4,392,577.09 | 4,679,683.64 | 4,849,963.75 | 5,025,479.25 | 5,208,113.61 |
| High | 4,240,978.60 | 4,483,587.50 | 4,875,299.39 | 5,160,844.47 | 5,464,006.26 | 5,787,906.30 |

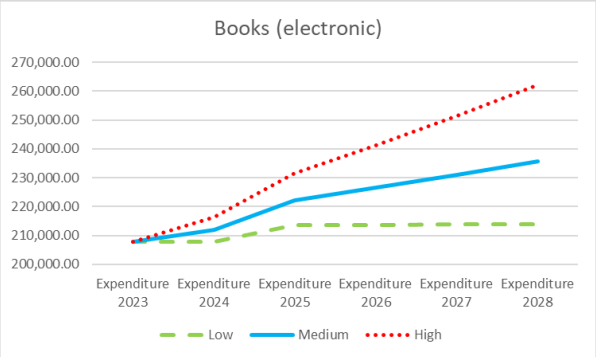
Actually, these figures show a bit too much detail. What we are looking for is a table that clearly shows the increase due to the VAT jump. To this end, we can present only the expenses calculated by

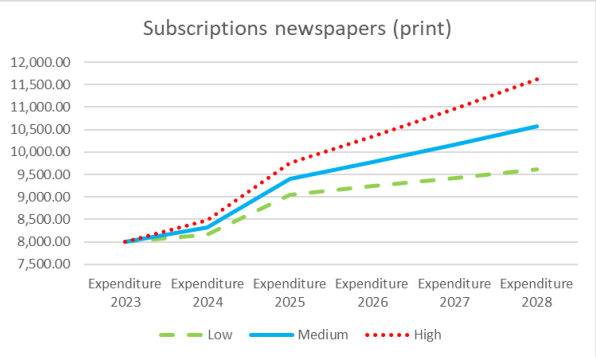
the Delhi model without the influence of foreign currency fluctuations, and only for the medium scenario. To make our statement more powerful and clear, we present the expenses without decimal places and add a line with the differences (we calculated the latter in a separate Excel file, outside the Delhi model).

| | *2023* | *2024* | *2025* | *2026* | *2027* | *2028* |
|---|---|---|---|---|---|---|
| Without VAT jump | 4,240,978 | 4,392,577 | 4,550,264 | 4,714,308 | 4,884,985 | 5,062,588 |
| With VAT jump | 4,240,978 | 4,392,577 | 4,679,683 | 4,849,963 | 5,025,479 | 5,208,113 |
| Difference | 0 | 0 | 129,419 | 135,655 | 140,494 | 145,525 |

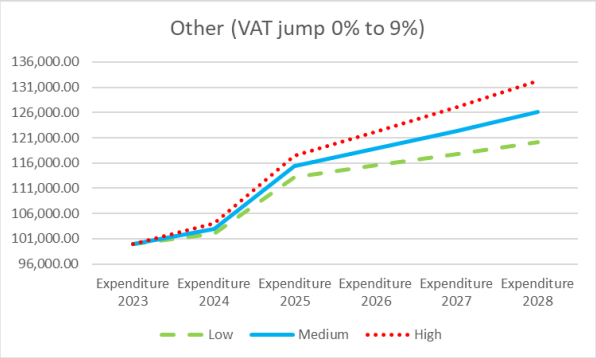
In the table above we now clearly see the influence of the VAT jump. This jump will of course become visible from 2025, the year that the new VAT rates come into effect. The necessary budget to continue the collection of information sources is 105,000 larger in 2025. The difference will become even greater in subsequent years.

With the current simulation it may also be interesting to show some of the detailed graphs (per literature component) from the Graphs4reporting worksheet. For example for “Books (electronic)” and “Subscriptions newspaper (paper)” are rather convincing.




The graph for the component “Other (VAT jump 0% to 9%)” is perhaps a bit too striking.




Of course, all this depends on the sensitivities and interests of the finance department (based on experience over several years).

# Exercise 6 Entering jumps in price increases Calculating and tinkering with a contract proposal

## Introduction

In another exercise, we already isolated a package deal because we knew in advance that the contract with the supplier would be adjusted within a year. In this exercise we look at the more complex case where a supplier switches from payment in foreign currencies to payment in local currency. In 2024 we paid USD 123,000 for this package deal.

It sometimes happens that a supplier decides to open an office in the country or region of delivery. From then on, payment can be made in local currency. The supplier also realizes that payment now involves fewer uncertainties for the customer and the supplier therefore takes the risk of fluctuations in foreign currencies on his side. In this particular case, this does not happen completely free of charge: if we choose to pay in local currencies, the supplier requires a one-time price increase of 0.5% (for the price from 2024 to 2025).

The supplier tells us that we have the option to continue the existing contract, with continued payment in foreign currencies. With the Delhi model we have a tool to investigate this, and maybe come to the right and most financially interesting choice. This exercise is in fact about jumps in price increases and decreases, of which the consequences are difficult to understand due to their complexity, except with the help of the Delhi model.

## 6.1 Determining which literature components will be used

For this exercise we will only use two literature components: both components contain only the package from the supplier in question, where one literature component is related to the existing contract, and the other literature component is about the new contract. The graphical representations offered by the Delhi tool allow the two package proposals to be quickly compared.

Note that the Delhi model will also calculate totals, which are meaningless because they contain the sum of both contract proposals.

When interpreting the model results, you should immediately look at the details in the Tabs4Reporting and Graphs4Reporting worksheets. Probably this exercise is for internal use only.

Thus, on the one hand we will work with the literature component "Package foreign currency (existing)" (in accordance with the current, ongoing contract) and on the other hand we will work with the literature component "Package local currency (new)" (in accordance with the new contract proposal).

## 6.2 Collecting input values for the literature components

Since it concerns a contract, we can also assume that the price increases are fixed. For this exercise, let's assume that the existing three-year contract runs for one more year after 2024, with an agreed price increase of 3% per year. The price for this package is therefore fixed for the years 2024 and 2025 (and uncertainties regarding price increases must not be considered).

In the event that we opt for the new contract, payable in local currencies, the three-year contract would start in 2025 (and run until 2027). In any case, for the years 2028 and 2029 we must again build in uncertainties regarding price increases.

See the following table for a summary of all price increases.

| | Percentage price increase | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Literature component | 2024->2025 | 2025->2026 | 2026->2027 | | 2027->2028 | | 2028->2029 | |
| Package foreign currency (existing) | 3% | 3% | 2%<br>3%<br>4% | (Lo)<br>(Me)<br>(Hi) | 2%<br>3%<br>4% | (Lo)<br>(Me)<br>(Hi) | 2%<br>3%<br>4% | (Lo)<br>(Me)<br>(Hi) |
| Package local currency (new) | 3%+0.5% | 3% | 3% | | 2%<br>3%<br>4% | (Lo)<br>(Me)<br>(Hi) | 2%<br>3%<br>4% | (Lo)<br>(Me)<br>(Hi) |

For the “Package foreign currency (existing)” we still have to specify the uncertainties regarding the foreign currency in which we pay for this package during the last three years of the simulation. For the “Package local currency (new)” there is an uncertainty for one year (going from 2024 to 2025), but also for the last two years.

One question remains about which currency rate do we have to apply to calculate the price for the “Package local currency (new)”. Much depends on the time of the year that we perform the run of the Delhi model. In mid-2024, until 2025, we cannot know how the foreign currency will evolve during 2025. Much depends also on the moment that we have to pay for the “Package local currency (new)”: if that moment of payment is already in January 2025, then the uncertainties regarding the foreign currency is small. On the other hand, the supplier of the package deal may also decide to communicate the new price, in the local currency, themselves (note that this may be a point that can be negotiated with the supplier).

Let us assume that we are mid-2024, or later in the year 2024, and that we have to choose ourselves an acceptable exchange rate. Then it is best to take “today's date”. We can put the USD rate for, for example, July 2024 at 0.9321. The payment of USD 123,000 would then be EUR 114,648.30.

## 6.3 Entering the values in the Delhi model

To perform this exercise we can either start from the blank version or start from a previously completed exercise (the exercise about entering basic values is a good candidate).The advantage of starting with a completed version is that the data on foreign currencies is already in the file. Ideally, in that case we empty the information fields regarding the unused literature components.

After entering the data as described above, the left part of the Input worksheet of the Delhi tool looks as follows.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **Input of base data** | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | |
| 3 | ***Year range*** | | | | | | | | | | | | |
| 4 | Base year | 2024 | | | | | | | | | | | |
| 5 | Base year + 1 | 2025 | | | | | | | | | | | |
| 6 | Base year + 2 | 2026 | | | | | | | | | | | |
| 7 | Base year + 3 | 2027 | | | | | | | | | | | |
| 8 | Base year + 4 | 2028 | | | | | | | | | | | |
| 9 | Base year + 5 | 2029 | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | |
| 11 | | | | 2024->2025 | 2024->2025 | 2024->2025 | 2025->2026 | 2025->2026 | 2025->2026 | 2026->2027 | 2026->2027 | 2026->2027 | 2027->2028 |
| 12 | ***Currency information*** | | CheckISO4217 | Rate to base | UncertaintyLo | UncertaintyMe | UncertaintyHi | UncertaintyLo | UncertaintyMe | UncertaintyHi | UncertaintyLo | UncertaintyMe | UncertaintyHi |
| 13 | Local (base) currency: | EUR | ok | 1.0000 | | | | | | | | | |
| 14 | Foreign currency 1: | USD | ok | 0.9321 | -2.50% | 0.00% | 3.00% | -2.50% | 0.00% | 3.00% | -2.50% | 0.00% | 3.00% |
| 15 | Foreign currency 2: | XXX | #N/A | 0.0000 | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 16 | Foreign currency 3: | XXX | #N/A | 0.0000 | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 17 | Foreign currency 4: | XXX | #N/A | 0.0000 | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 18 | Foreign currency 5: | XXX | #N/A | 0.0000 | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 19 | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | |
| 21 | ***Literature components*** | In EUR | In USD | USD to EUR | In XXX | XXX to EUR | In XXX | XXX to EUR | In XXX | XXX to EUR | In XXX | XXX to EUR | Total in EUR |
| 22 | Package foreign currency (existing) | 0.00 | 123,000.00 | 114,648.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 114,648.30 |
| 23 | Package local currency (new) | 114,648.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 114,648.30 |
| 24 | Component3 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 25 | Component4 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 26 | Component5 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 27 | Component6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 28 | Component7 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 29 | Component8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 30 | Component9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 31 | Component10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 32 | Component11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 33 | Component12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 34 | Total = | 114,648.30 | 123,000.00 | 114,648.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 229,296.60 |

**Legend**

| |
|---|
| Can be adapted by user |
| Can be adapted by user (formula) |
| Do not modify (formula) |

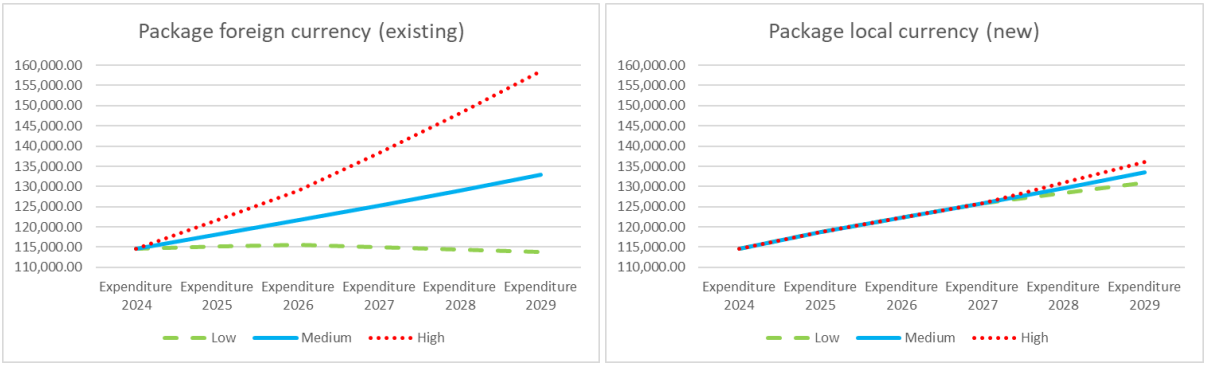
The right part of the Input worksheet of the Delhi tool looks like this.

| 2027->2028 | 2027->2028 | 2028->2029 | 2028->2029 | 2028->2029 | |
|---|---|---|---|---|---|
| UncertaintyLo | UncertaintyMe | UncertaintyHi | UncertaintyLo | UncertaintyMe | UncertaintyHi |
| -2.50% | 0.00% | 3.00% | -2.50% | 0.00% | 3.00% |
| 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |

| 2024->2025 | 2024->2025 | 2024->2025 | 2025->2026 | 2025->2026 | 2025->2026 | 2026->2027 | 2026->2027 | 2026->2027 | 2027->2028 | 2027->2028 | 2027->2028 | 2028->2029 | 2028->2029 | 2028->2029 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PriceIncreaseLo | PriceIncreaseME | PriceIncreaseHi | PriceIncreaseLo | PriceIncreaseME | PriceIncreaseHi | PriceIncreaseLo | PriceIncreaseME | PriceIncreaseHi | PriceIncreaseLo | PriceIncreaseME | PriceIncreaseHi | PriceIncreaseLo | PriceIncreaseME | PriceIncreaseHi |
| 3.00% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% | 2.00% | 3.00% | 4.00% | 2.00% | 3.00% | 4.00% | 2.00% | 3.00% | 4.00% |
| 3.50% | 3.50% | 3.50% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% | 2.00% | 3.00% | 4.00% | 2.00% | 3.00% | 4.00% |
| 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |

## 6.4 Interpreting the output of the Delhi model

Let's jump right into the detailed graphs in the Graphs4Reporting worksheet. Note that it is necessary to make an adjustment to the scale of the vertical axis that is the same for both proposals considered for this package deal.

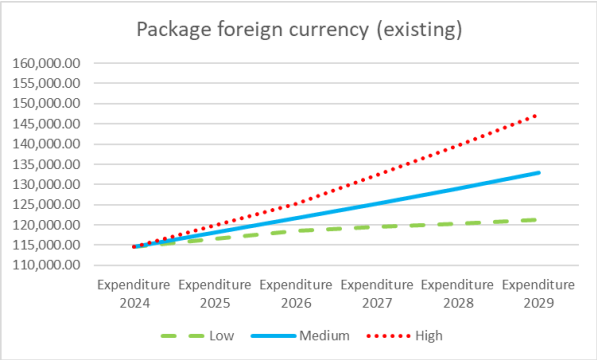


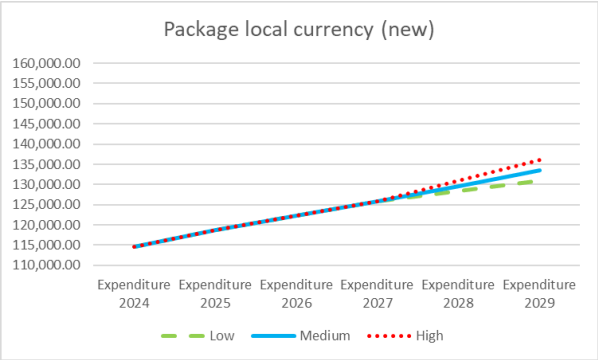

The first thing you notice is the big difference between the two graphs. This difference is mainly due to the uncertainty regarding the evolution of foreign currencies. When inspecting the blue line, where only price increases play a role and the possible evolution of the USD is ignored, we see that in 2029 the expenditure for this literature component is very similar. Indeed, on the Tabs4Reporting worksheet we see that for the option "Package foreign currency (existing)" the price we will pay in

2029 is 132,908.80 EUR, while for the option "Package local currency (new)" it is 133,553.99 EUR. This small difference may not make it worth switching to the new option (with payment in local currency).

Now look at the progression of the red dotted line (pessimistic evolution of the USD against the EUR) and the green dashed line (optimistic evolution of the USD against the EUR). The relatively steeply rising red dotted line, based on the existing contract, indicates that it is much better to switch to the new contract, with payment in the local currency. The even slightly declining green dashed line indicates that it is better to stick with the old contract. That is a difficult choice, where everything depends on the estimated evolution of the rate of the USD against the EUR, knowing that any estimate of such a currency evolution is dangerous. We must therefore, for what it is worth in these matters, build on our experience about the stability of local currencies against foreign currencies. Maybe we dare to assume that after a few bad years there will usually be some good years, but maybe not. Especially if the local currency is rather weak, opting for the new contract seems to be the best choice.

As a test, we can halve the uncertainty of the evolution of the USD against the EUR. We thereby simulate a 'calmer' evolution of the financial markets. That gives the following two figures.




At first glance, this representation does not seem to help much in making the choice between the two proposals. However, this does indicate that, even if the uncertainties regarding the exchange rate of the USD against the EUR are halved, the new contract proposal may still be the best.

The new contract in EUR seems more predictable and potentially less risky. However, it's essential to consult with the financial department and consider the university's risk tolerance before making a decision.

You might also, together with the financial department, investigate hedging strategies to reduce the impact of foreign currency variations. The university might hold an amount of USD in its portfolio (acquired at a moment that the USD rate was favorable). By using these 'cheap' dollars at a moment that the USD is 'expensive', the university reduces the its foreign currency exposure. At this point, an important advice is to consult financial experts, especially in the case that the Delhi model predicts a high, and important foreign currency risk.

## 6.5 Notice regarding price increases for package deals

You might have wondered why in most exercises price increases of literature components regarding package deals were entered with an uncertainty: package deals have fixed prices. This is due to a global approach: some contracts end, start over again with maybe a higher or lower yearly price increase, etc. The price increases that we used reflect this. It is in the current exercise that we learned more about the different types of uncertainties that the Delhi model can work with.

## 6.6 Tip regarding the usefulness of this exercise

Keep this Delhi Excel file at hand during negotiations with the supplier. You will be able to respond quickly to any additional conditions or changes in the proposal.

# Exercise 7 Sensitivity to price increases and currency variations examined

## Introduction

In the previous exercises we always used the combined influence of the price increases of the literature components, together with the uncertainties regarding the foreign currencies. A worst case scenario was therefore the very worst (most expensive) case, where price increases were maximum, together with the largest increase in the value of foreign currencies. However, it is worthwhile to examine the individual influence of these uncertainties.

## 7.1 Setting up scenarios for the sensitivity analysis

Four plus one Excel files are added for this exercise: we start from the Excel file for the second exercise in which we entered the values of a limited number of literature components (scenario 0). Four scenarios are developed for this exercise. Each scenario corresponds to an Excel file. Each scenario is shown in a separate Excel file (with Sc0..Sc4 at the end of the file name). See the table below.

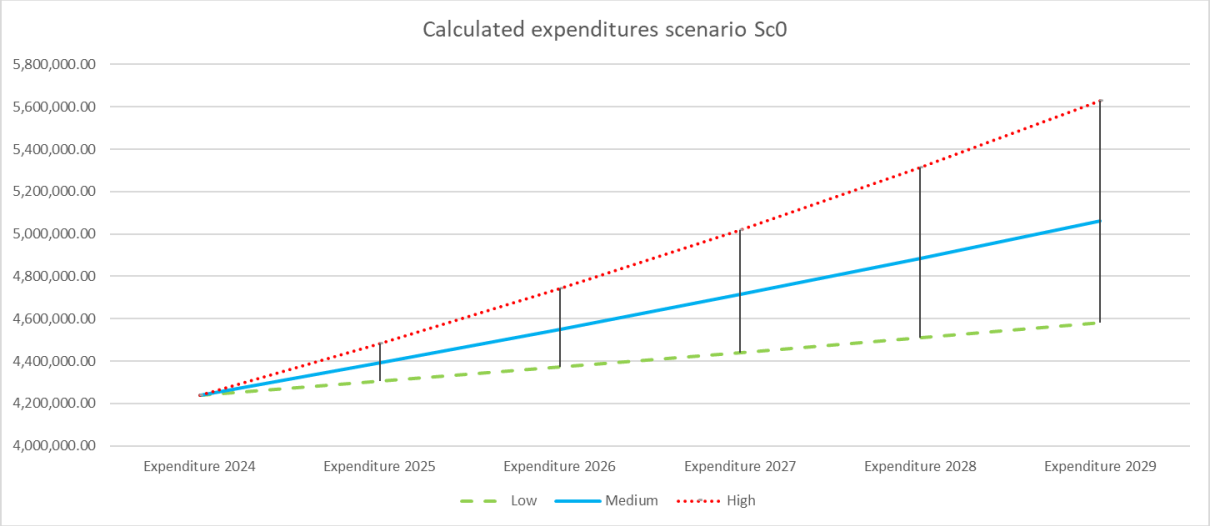
| Scenario | Price increase low | Price increase high | Foreign currencies low | Foreign currencies high |
|---|---|---|---|---|
| Sc0 | enabled | enabled | enabled | enabled |
| Sc1 | disabled | disabled | enabled | enabled |
| Sc2 | enabled | enabled | disabled | disabled |
| Sc3 | enabled | enabled | enabled | disabled |
| Sc4 | disabled | disabled | disabled | disabled |

There is also an Excel file with ScAll at the end of the filename. This file, which will be discussed at the end of this exercise, is not a scenario file, but a representation of the simulation results of all the scenarios.

Scenario Sc0 is what we calculated in exercise 2. In the first scenario Sc1 we only eliminate the influence of the uncertainties surrounding price increases; this is a rather imaginary scenario (but it allows to investigate the influence of uncertainties regarding foreign currencies). In the second scenario Sc2, just the opposite happens: the influence of foreign currencies is eliminated, while the influence of the uncertainties surrounding price increases is retained (this is also a rather theoretical scenario). With the third scenario Sc3 we look at what happens when only the influence of the risk for foreign currencies is eliminated (which is a fairly realistic scenario when the university has a large amount of cheaply purchased foreign currencies). We conclude with a fourth scenario Sc4 in which all uncertainties surrounding price increases and foreign currencies are eliminated.

## 7.2 First look at the results

For scenario Sc0 the resulting graph is identical to the graph in exercise 2, and looks as follows.




For scenarios Sc1..Sc4 the results are interesting: see the following figure with four graphs.

The theme of scenario Sc1 was “no price increases” (but still uncertainty about the foreign currencies). That makes that the blue line (representing the expenditure to literature components, without influence from foreign currency variations) is horizontal. The dashed green line, which is continuously decreasing, indicates that expenditures become lower and lower due to the cheaper and cheaper foreign currencies. The dotted red line, which is continuously increasing, indicates that the expenditures become higher, due to the foreign currencies that become more expensive every year.

The theme of scenario Sc2 was “no currency variations” (and only price increases for the literature components). The blue line shows what happens to the expenditure if the prices increase as foreseen. In this graph the green dashed line increases over the years: there is nothing that makes the expenditures lower, so the expenditures increase slightly. The expenditures rise more steeply, as represented by the red dashed line.

The results of scenario Sc3 should be compared with those of scenario Sc0. What happens in scenario Sc3 is that the financial department pays for the price increases due to more expensive foreign currencies (using, for example, hedging funds). Notice that in 2009, but also in the previous years, the distance between the dashed green line and the full blue line is the same in both scenarios

Sc0 and Sc3. Notice also that that in 2009, but also in the previous years, the distance between the dotted red line and the full blue line is smaller in scenario Sc3 than in scenario Sc0: that is due to the intervention of the financial department.

There are no surprises in scenario Sc4: no price increases and no uncertainties (nor evolutions) of the foreign currencies lead to three flat horizontal lines.

We do not go into detail regarding the tables, nor do we discuss here the graphs of the individual literature components: de global graphs were already sufficiently clear.

## 7.3 Towards a good-looking and handy presentation of the scenarios

A good-looking and handy graphical presentation of the results of the scenarios can be made by using dynamic charts with drop-down lists in Excel. Descriptions of the technique used here can easily be found on the web. Search for “Excel drop-down graphs”.

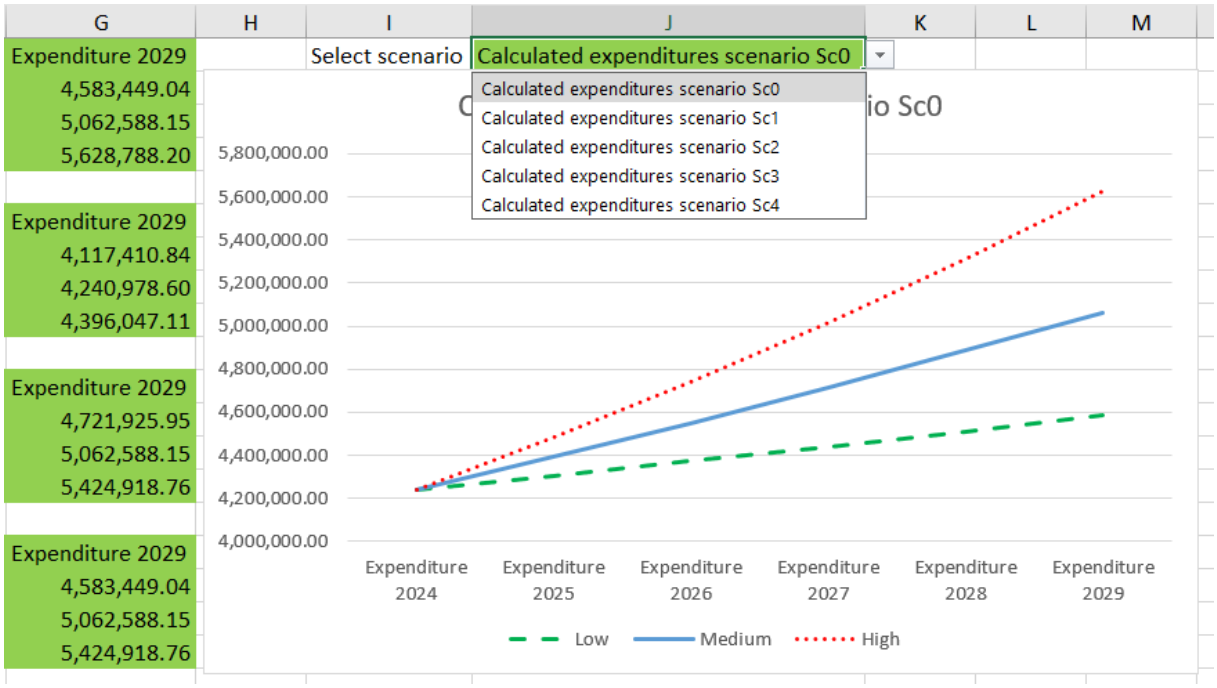
Realize that such dynamic charts can be handy for all comparisons of different simulations with the Delhi-tool. Think about the exercise in which two contract proposals for a package deal were compared. With more than two comparison elements, as in the current exercise, this representation becomes even more interesting.

The Excel file DelhiModel_V1.1_Exercise7_ScAll.xlsx can be used to present and compare up to five scenarios. The data can be taken from any resulting Dehli Excel file: copy and paste the table which can be found on top of the worksheet(s) Graph. Paste each of these tables in a separate area of the worksheet, as show in the following table (which is the present exercise, with five scenarios).

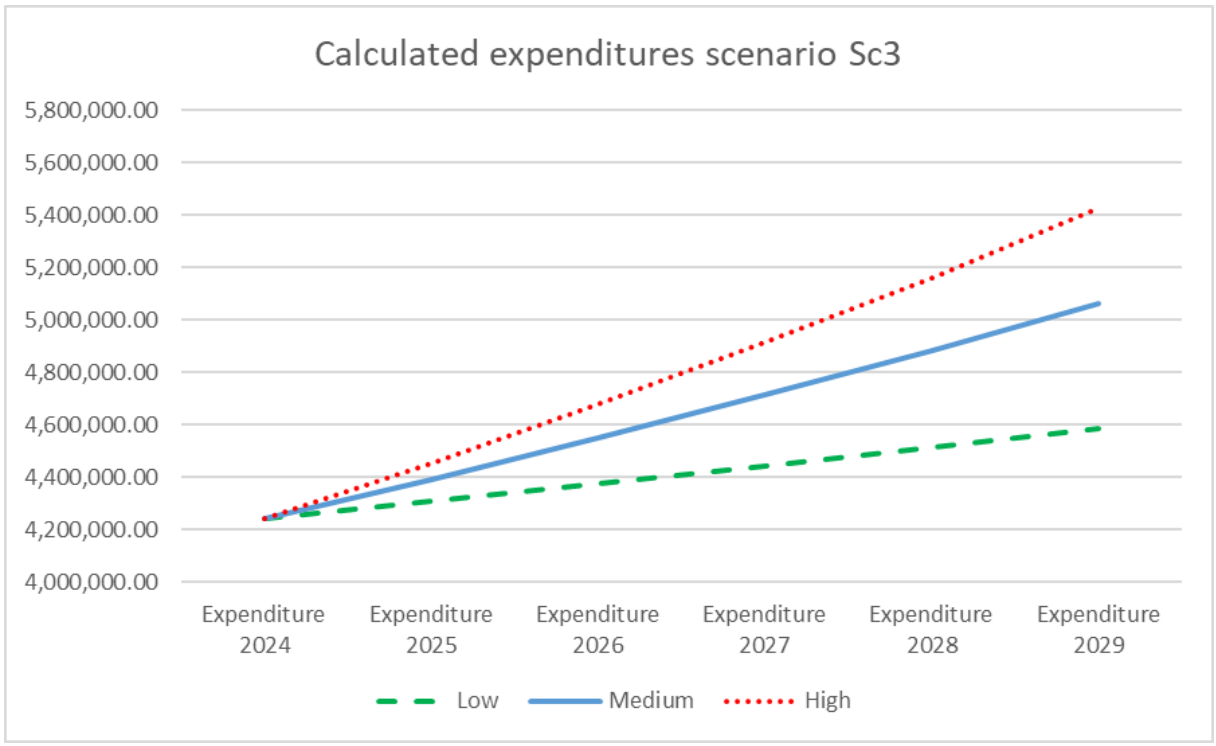
| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | **Calculated expenditures scenario Sc0** | Expenditure 2024 | Expenditure 2025 | Expenditure 2026 | Expenditure 2027 | Expenditure 2028 | Expenditure 2029 |
| 2 | Low | 4,240,978.60 | 4,306,110.49 | 4,372,885.49 | 4,441,341.08 | 4,511,515.75 | 4,583,449.04 |
| 3 | Medium | 4,240,978.60 | 4,392,577.09 | 4,550,264.90 | 4,714,308.21 | 4,884,985.51 | 5,062,588.15 |
| 4 | High | 4,240,978.60 | 4,483,587.50 | 4,742,395.90 | 5,018,629.23 | 5,313,614.30 | 5,628,788.20 |
| 5 | | | | | | | |
| 6 | **Calculated expenditures scenario Sc1** | Expenditure 2024 | Expenditure 2025 | Expenditure 2026 | Expenditure 2027 | Expenditure 2028 | Expenditure 2029 |
| 7 | Low | 4,240,978.60 | 4,215,132.19 | 4,189,865.86 | 4,165,165.80 | 4,141,018.51 | 4,117,410.84 |
| 8 | Medium | 4,240,978.60 | 4,240,978.60 | 4,240,978.60 | 4,240,978.60 | 4,240,978.60 | 4,240,978.60 |
| 9 | High | 4,240,978.60 | 4,270,328.47 | 4,300,486.30 | 4,331,475.70 | 4,363,320.96 | 4,396,047.11 |
| 10 | | | | | | | |
| 11 | **Calculated expenditures scenario Sc2** | Expenditure 2024 | Expenditure 2025 | Expenditure 2026 | Expenditure 2027 | Expenditure 2028 | Expenditure 2029 |
| 12 | Low | 4,240,978.60 | 4,332,547.67 | 4,426,366.40 | 4,522,494.51 | 4,620,993.34 | 4,721,925.95 |
| 13 | Medium | 4,240,978.60 | 4,392,577.09 | 4,550,264.90 | 4,714,308.21 | 4,884,985.51 | 5,062,588.15 |
| 14 | High | 4,240,978.60 | 4,452,606.52 | 4,676,068.77 | 4,912,087.44 | 5,161,431.25 | 5,424,918.76 |
| 15 | | | | | | | |
| 16 | **Calculated expenditures scenario Sc3** | Expenditure 2024 | Expenditure 2025 | Expenditure 2026 | Expenditure 2027 | Expenditure 2028 | Expenditure 2029 |
| 17 | Low | 4,240,978.60 | 4,306,110.49 | 4,372,885.49 | 4,441,341.08 | 4,511,515.75 | 4,583,449.04 |
| 18 | Medium | 4,240,978.60 | 4,392,577.09 | 4,550,264.90 | 4,714,308.21 | 4,884,985.51 | 5,062,588.15 |
| 19 | High | 4,240,978.60 | 4,452,606.52 | 4,676,068.77 | 4,912,087.44 | 5,161,431.25 | 5,424,918.76 |
| 20 | | | | | | | |
| 21 | **Calculated expenditures scenario Sc4** | Expenditure 2024 | Expenditure 2025 | Expenditure 2026 | Expenditure 2027 | Expenditure 2028 | Expenditure 2029 |
| 22 | Low | 4,240,978.60 | 4,240,978.60 | 4,240,978.60 | 4,240,978.60 | 4,240,978.60 | 4,240,978.60 |
| 23 | Medium | 4,240,978.60 | 4,240,978.60 | 4,240,978.60 | 4,240,978.60 | 4,240,978.60 | 4,240,978.60 |
| 24 | High | 4,240,978.60 | 4,240,978.60 | 4,240,978.60 | 4,240,978.60 | 4,240,978.60 | 4,240,978.60 |

Notice that many cells are in green. We use the same color coding, where green means “can be altered by the user”, red means “should not be altered”. In this version there are no cells in orange (which would mean that there are cells that can be altered, but that there are formulae behind this cell).

Just right from this table there is a graph. Cell J1 is a scroll-down menu. See the next figure.




After selecting the desired scenario, it graphical representation is shown in the graph. See, for example the next figure, where the third scenario is visualized.



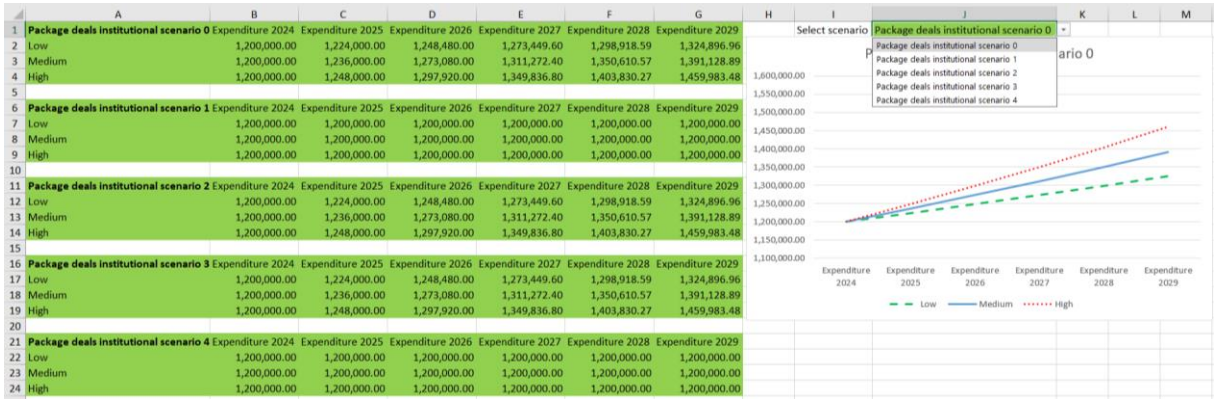

Note that the Excel file Excel file DelhiModel_V1.1_Exercise7_ScAll.xlsx contains an extra worksheet with the name Background. All the cells are presented in red, meaning that these should not be touched. Indeed, this is an internal calculation worksheet. It is not made hidden, just in case you want to take a closer look at the internal functioning.

If you want to work with, for example, only three scenarios it might be interesting to delete the contents of the remaining two scenarios. Just delete the contents, not the rows, so that this Excel file does not lose it functionalities. This worksheet will then be like shown on the following figure.

| Calculated expenditures scenario Sc0 | Expenditure 2024 | Expenditure 2025 | Expenditure 2026 | Expenditure 2027 | Expenditure 2028 | Expenditure 2029 |
|---|---|---|---|---|---|---|
| Low | 4,240,978.60 | 4,306,110.49 | 4,372,885.49 | 4,441,341.08 | 4,511,515.75 | 4,583,449.04 |
| Medium | 4,240,978.60 | 4,392,577.09 | 4,550,264.90 | 4,714,308.21 | 4,884,985.51 | 5,062,588.15 |
| High | 4,240,978.60 | 4,483,587.50 | 4,742,395.90 | 5,018,629.23 | 5,313,614.30 | 5,628,788.20 |
| **Calculated expenditures scenario Sc1** | **Expenditure 2024** | **Expenditure 2025** | **Expenditure 2026** | **Expenditure 2027** | **Expenditure 2028** | **Expenditure 2029** |
| Low | 4,240,978.60 | 4,215,132.19 | 4,189,865.86 | 4,165,165.80 | 4,141,018.51 | 4,117,410.84 |
| Medium | 4,240,978.60 | 4,240,978.60 | 4,240,978.60 | 4,240,978.60 | 4,240,978.60 | 4,240,978.60 |
| High | 4,240,978.60 | 4,270,328.47 | 4,300,486.30 | 4,331,475.70 | 4,363,320.96 | 4,396,047.11 |
| **Calculated expenditures scenario Sc2** | **Expenditure 2024** | **Expenditure 2025** | **Expenditure 2026** | **Expenditure 2027** | **Expenditure 2028** | **Expenditure 2029** |
| Low | 4,240,978.60 | 4,332,547.67 | 4,426,366.40 | 4,522,494.51 | 4,620,993.34 | 4,721,925.95 |
| Medium | 4,240,978.60 | 4,392,577.09 | 4,550,264.90 | 4,714,308.21 | 4,884,985.51 | 5,062,588.15 |
| High | 4,240,978.60 | 4,452,606.52 | 4,676,068.77 | 4,912,087.44 | 5,161,431.25 | 5,424,918.76 |



It is also possible to present the scenarios of an individual literature component. The Tabs4Reporting worksheet contains the results of the simulation in the same format, but per literature component. After copying and pasting the results for the five simulations, the result looks like in the following figure.



| Package deals institutional scenario 0 | Expenditure 2024 | Expenditure 2025 | Expenditure 2026 | Expenditure 2027 | Expenditure 2028 | Expenditure 2029 |
|---|---|---|---|---|---|---|
| Low | 1,200,000.00 | 1,224,000.00 | 1,248,480.00 | 1,273,449.60 | 1,298,918.59 | 1,324,896.96 |
| Medium | 1,200,000.00 | 1,236,000.00 | 1,273,080.00 | 1,311,272.40 | 1,350,610.57 | 1,391,128.89 |
| High | 1,200,000.00 | 1,248,000.00 | 1,297,920.00 | 1,349,836.80 | 1,403,830.27 | 1,459,983.48 |
| **Package deals institutional scenario 1** | **Expenditure 2024** | **Expenditure 2025** | **Expenditure 2026** | **Expenditure 2027** | **Expenditure 2028** | **Expenditure 2029** |
| Low | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 |
| Medium | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 |
| High | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 |
| **Package deals institutional scenario 2** | **Expenditure 2024** | **Expenditure 2025** | **Expenditure 2026** | **Expenditure 2027** | **Expenditure 2028** | **Expenditure 2029** |
| Low | 1,200,000.00 | 1,224,000.00 | 1,248,480.00 | 1,273,449.60 | 1,298,918.59 | 1,324,896.96 |
| Medium | 1,200,000.00 | 1,236,000.00 | 1,273,080.00 | 1,311,272.40 | 1,350,610.57 | 1,391,128.89 |
| High | 1,200,000.00 | 1,248,000.00 | 1,297,920.00 | 1,349,836.80 | 1,403,830.27 | 1,459,983.48 |
| **Package deals institutional scenario 3** | **Expenditure 2024** | **Expenditure 2025** | **Expenditure 2026** | **Expenditure 2027** | **Expenditure 2028** | **Expenditure 2029** |
| Low | 1,200,000.00 | 1,224,000.00 | 1,248,480.00 | 1,273,449.60 | 1,298,918.59 | 1,324,896.96 |
| Medium | 1,200,000.00 | 1,236,000.00 | 1,273,080.00 | 1,311,272.40 | 1,350,610.57 | 1,391,128.89 |
| High | 1,200,000.00 | 1,248,000.00 | 1,297,920.00 | 1,349,836.80 | 1,403,830.27 | 1,459,983.48 |
| **Package deals institutional scenario 4** | **Expenditure 2024** | **Expenditure 2025** | **Expenditure 2026** | **Expenditure 2027** | **Expenditure 2028** | **Expenditure 2029** |
| Low | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 |
| Medium | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 |
| High | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 | 1,200,000.00 |

# Exercise 8 Handling an important recurring budget injection

## Introduction

Good news! Next year your library will receive an important recurring budget increase. The conditions are that you submit your budget request, with a five-year forecast, like in previous years and immediately spend the injected budget next year. You have complete freedom to spend on any information sources, as long as there is a good distribution across the various faculties, and an agreement with the faculties. The budget increase concerns a total of 500,000 euros. Fortunately, the financial department realizes that there will be additional expenditure in subsequent years due to the increase in the prices of information sources.

The budget increase is indeed good news. The demand for the additional budget request and the forecast are acceptable. Immediate spending is not a problem since the faculties are still asking for several new subscriptions to individual information sources and many extensions of existing package deals.

The question, however, is whether such a budget increase can be introduced in the Delhi model. In the present version of the Delhi tool this is difficult: you enter the basic expenditure for the current year and Delhi calculates what the expenditure will be for the five coming years. Adding an extra budget is possible, but for this we have to delve deeper into the Excel file, and even develop an additional worksheet.

## 8.1 Analysis of the impact of the budget injection

We base our calculations on the budget distribution that we also used in the exercise in which we entered basic values in the Delhi model. The task we have to perform from the library point-of-view is, in fact, quite complicated: after all, for some components the expenses are in foreign currencies. When it comes to package deals, the prices and price increases are fixed (based on quotes we received). For other components, such as (electronic) books, we can play a little more with the planned expenditure. In other words, even if the requests from the faculties are reasonably fixed, we can still play with the number of (electronic) books to be purchased, or with the literature components 'Books' or 'Other', in order not to give the financial authorities the impression that the available budget cannot be spent.

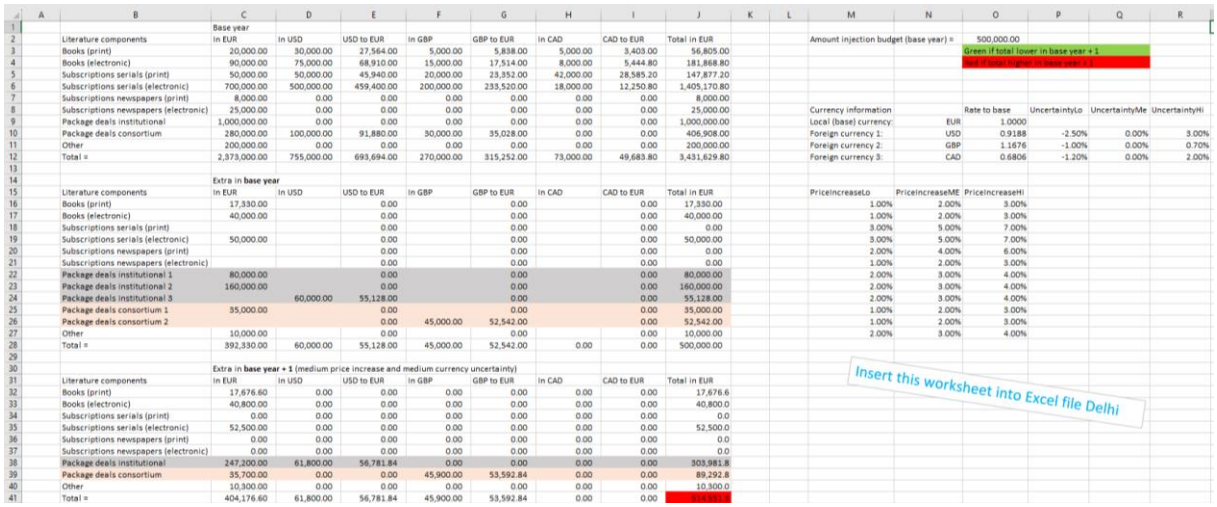
As part of this exercise, in an initial phase, we will assume the additional purchase of the information sources as shown in the following table.

| *Literature components* | *In EUR* | *In USD* | *In GBP* |
|---|---|---|---|
| Books (electronic) | 40,000.00 | | |
| Subscriptions serials (electronic) | 50,000.00 | | |
| Package deals institutional 1 | 80,000.00 | | |
| Package deals institutional 2 | 160,000.00 | | |
| Package deals institutional 3 | | 60,000.00 | |
| Package deals consortium 1 | 35,000.00 | | |
| Package deals consortium 2 | | | 45,000.00 |

The electronic books concern access to individual books, on a yearly subscription base. Likewise, the electronic journals are a subscription on a yearly basis. There are three new institutional package deals, of which there is one to be paid in a non-local currency (USD in this case). Also access to a collection within a consortium are on the wish list, with one package deal in a non-local currency (GBP in this case).

## 8.2 Towards the approach using the Delhi model

This exercise requires setting up a small, additional Excel application (which is made available as a supplement to the files that contain these exercises, in Excel-format). In this Excel application, we enter the expenditures in the base year (the current year) in the original currencies, the exchange rate conversions, and any price increase for the various literature components (because we can only start the purchase in the year following the base year). If we take care of the layout of the additional Excel application, then it will be easy to import the calculation results into the Delhi model. A general view of the Excel application is shown below.



| | | Base year | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Literature components | in EUR | in USD | USD to EUR | in GBP | GBP to EUR | in CAD | CAD to EUR | Total in EUR |
| | Books (print) | 20,000.00 | 30,000.00 | 27,564.00 | 5,000.00 | 5,838.00 | 5,000.00 | 3,403.00 | 56,805.00 |
| | Books (electronic) | 90,000.00 | 75,000.00 | 68,910.00 | 15,000.00 | 17,514.00 | 8,000.00 | 5,444.80 | 181,868.80 |
| | Subscriptions serials (print) | 50,000.00 | 50,000.00 | 45,940.00 | 20,000.00 | 23,352.00 | 42,000.00 | 28,585.20 | 147,877.20 |
| | Subscriptions serials (electronic) | 700,000.00 | 500,000.00 | 459,400.00 | 200,000.00 | 233,520.00 | 18,000.00 | 12,250.80 | 1,405,170.80 |
| | Subscriptions newspapers (print) | 8,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8,000.00 |
| | Subscriptions newspapers (electronic) | 25,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 25,000.00 |
| | Package deals institutional | 1,000,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1,000,000.00 |
| | Package deals consortium | 280,000.00 | 100,000.00 | 91,880.00 | 30,000.00 | 35,028.00 | 0.00 | 0.00 | 406,908.00 |
| | Other | 200,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 200,000.00 |
| | Total = | 2,373,000.00 | 755,000.00 | 693,694.00 | 270,000.00 | 315,252.00 | 73,000.00 | 49,683.80 | 3,431,629.80 |

| | | Extra in base year | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Literature components | in EUR | in USD | USD to EUR | in GBP | GBP to EUR | in CAD | CAD to EUR | Total in EUR |
| | Books (print) | 17,330.00 | | 0.00 | | 0.00 | | 0.00 | 17,330.00 |
| | Books (electronic) | 40,000.00 | | 0.00 | | 0.00 | | 0.00 | 40,000.00 |
| | Subscriptions serials (print) | | | 0.00 | | 0.00 | | 0.00 | 0.00 |
| | Subscriptions serials (electronic) | 50,000.00 | | 0.00 | | 0.00 | | 0.00 | 50,000.00 |
| | Subscriptions newspapers (print) | | | 0.00 | | 0.00 | | 0.00 | 0.00 |
| | Subscriptions newspapers (electronic) | | | 0.00 | | 0.00 | | 0.00 | 0.00 |
| | Package deals institutional 1 | 80,000.00 | | 0.00 | | 0.00 | | 0.00 | 80,000.00 |
| | Package deals institutional 2 | 160,000.00 | | 0.00 | | 0.00 | | 0.00 | 160,000.00 |
| | Package deals institutional 3 | | 60,000.00 | 55,128.00 | | 0.00 | | 0.00 | 55,128.00 |
| | Package deals consortium 1 | 35,000.00 | | 0.00 | | 0.00 | | 0.00 | 35,000.00 |
| | Package deals consortium 2 | | | 0.00 | 45,000.00 | 52,542.00 | | 0.00 | 52,542.00 |
| | Other | 10,000.00 | | 0.00 | | 0.00 | | 0.00 | 10,000.00 |
| | Total = | 392,330.00 | 60,000.00 | 55,128.00 | 45,000.00 | 52,542.00 | 0.00 | 0.00 | 500,000.00 |

| | | Extra in base year + 1 (medium price increase and medium currency uncertainty) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Literature components | in EUR | in USD | USD to EUR | in GBP | GBP to EUR | in CAD | CAD to EUR | Total in EUR |
| | Books (print) | 17,676.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 17,676.6 |
| | Books (electronic) | 40,800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 40,800.0 |
| | Subscriptions serials (print) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 |
| | Subscriptions serials (electronic) | 52,500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 52,500.0 |
| | Subscriptions newspapers (print) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 |
| | Subscriptions newspapers (electronic) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 |
| | Package deals institutional | 247,200.00 | 61,800.00 | 56,781.84 | 0.00 | 0.00 | 0.00 | 0.00 | 303,981.8 |
| | Package deals consortium | 35,700.00 | 0.00 | 0.00 | 45,900.00 | 53,592.84 | 0.00 | 0.00 | 89,292.8 |
| | Other | 10,300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 10,300.0 |
| | Total = | 404,176.60 | 61,800.00 | 56,781.84 | 45,900.00 | 53,592.84 | 0.00 | 0.00 | 514,551.2 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Amount injection budget (base year) = | | 500,000.00 | | | |
| | | | Green if total lower in base year + 1 | | | |
| | | | Red if total higher in base year + 1 | | | |
| | Currency information | | Rate to base | UncertaintyLo | UncertaintyMe | UncertaintyHi |
| | Local (base) currency: | EUR | 1.0000 | | | |
| | Foreign currency 1: | USD | 0.9188 | -2.50% | 0.00% | 3.00% |
| | Foreign currency 2: | GBP | 1.1676 | -1.00% | 0.00% | 0.70% |
| | Foreign currency 3: | CAD | 0.6806 | -1.20% | 0.00% | 2.00% |

| | | | |
|---|---|---|---|
| | PriceIncreaseLo | PriceIncreaseME | PriceIncreaseHi |
| | 1.00% | 2.00% | 3.00% |
| | 1.00% | 2.00% | 3.00% |
| | 3.00% | 5.00% | 7.00% |
| | 3.00% | 5.00% | 7.00% |
| | 2.00% | 4.00% | 6.00% |
| | 1.00% | 2.00% | 3.00% |
| | 2.00% | 3.00% | 4.00% |
| | 2.00% | 3.00% | 4.00% |
| | 2.00% | 3.00% | 4.00% |
| | 1.00% | 2.00% | 3.00% |
| | 1.00% | 2.00% | 3.00% |
| | 2.00% | 3.00% | 4.00% |

Insert this worksheet into Excel file Delhi

On the left side there are three blocks:

- the upper block is for the entry of the price information in the base year, without the extras,
- the middle block is contains the extras with the prices in the base year,
- the bottom block is the calculation of the expenditures in the base year plus one.

On the right side, the upper block contains one important single cell that contains the amount of the extra budget (which may not be exceeded): the legend explains the meaning of the green and red color. The Excel application automatically shows in the last cell of the left bottom block whether the sum is exceeded (red) or not (green). The middle block on the right side contains currency uncertainties. The bottom block contains the price increases of the literature components for the optimistic, medium and pessimistic scenarios.

## 8.3 Preparing and setting up the literature components

The upper left block shows the price information in the base year, without the extras. This information is necessary to be able to calculate the total new expenditures on the different literature components in the base year plus one.

Notice that, on the left side, in the middle and bottom bocks, a few rows are filled with light grey and with light orange. This is just an indication that a split has occurred here. The gray cells concern three separate institutional package deals and the orange cells are two separate package deals in a consortium context. These package deals are combined again in the block below. The breakdown allows you to investigate the influence of changes, if desired, for example by reducing the cost price by purchasing a subset, or by applying a different price increase (per package). See the next figure of the middle left block.

| | Extra in **base year** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Literature components | In EUR | In USD | USD to EUR | In GBP | GBP to EUR | In CAD | CAD to EUR | Total in EUR |
| Books (print) | 17,330.00 | | 0.00 | | 0.00 | | 0.00 | 17,330.00 |
| Books (electronic) | 40,000.00 | | 0.00 | | 0.00 | | 0.00 | 40,000.00 |
| Subscriptions serials (print) | | | 0.00 | | 0.00 | | 0.00 | 0.00 |
| Subscriptions serials (electronic) | 50,000.00 | | 0.00 | | 0.00 | | 0.00 | 50,000.00 |
| Subscriptions newspapers (print) | | | 0.00 | | 0.00 | | 0.00 | 0.00 |
| Subscriptions newspapers (electronic) | | | 0.00 | | 0.00 | | 0.00 | 0.00 |
| Package deals institutional 1 | 80,000.00 | | 0.00 | | 0.00 | | 0.00 | 80,000.00 |
| Package deals institutional 2 | 160,000.00 | | 0.00 | | 0.00 | | 0.00 | 160,000.00 |
| Package deals institutional 3 | | 60,000.00 | 55,128.00 | | 0.00 | | 0.00 | 55,128.00 |
| Package deals consortium 1 | 35,000.00 | | 0.00 | | 0.00 | | 0.00 | 35,000.00 |
| Package deals consortium 2 | | | 0.00 | 45,000.00 | 52,542.00 | | 0.00 | 52,542.00 |
| Other | 10,000.00 | | 0.00 | | 0.00 | | 0.00 | 10,000.00 |
| Total = | 392,330.00 | 60,000.00 | 55,128.00 | 45,000.00 | 52,542.00 | 0.00 | 0.00 | 500,000.00 |

In the above figure we see that the total extra expenditure is exactly 500.000 EUR in the base year. This was obtained by adjusting the expenditure of the printed books. It will be clear that some adjustments have to be made since prices increase towards the base year + 1. When we now look at the bottom block on the left, we see that the cell with the total for the additional information sources is indicated in red. See the following figure.

| | Extra in **base year + 1** (medium price increase and medium currency uncertainty) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Literature components | In EUR | In USD | USD to EUR | In GBP | GBP to EUR | In CAD | CAD to EUR | Total in EUR |
| Books (print) | 17,676.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 17,676.6 |
| Books (electronic) | 40,800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 40,800.0 |
| Subscriptions serials (print) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 |
| Subscriptions serials (electronic) | 52,500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 52,500.0 |
| Subscriptions newspapers (print) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 |
| Subscriptions newspapers (electronic) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 |
| Package deals institutional | 247,200.00 | 61,800.00 | 56,781.84 | 0.00 | 0.00 | 0.00 | 0.00 | 303,981.8 |
| Package deals consortium | 35,700.00 | 0.00 | 0.00 | 45,900.00 | 53,592.84 | 0.00 | 0.00 | 89,292.8 |
| Other | 10,300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 10,300.0 |
| Total = | 404,176.60 | 61,800.00 | 56,781.84 | 45,900.00 | 53,592.84 | 0.00 | 0.00 | 514,551.3 |

This means that the total extra expenditure in base year + 1 was exceeded. Since base year + 1 is the year in which the total extra expenditure has to be 500,000, or slightly less, we have to lower the extras in some literature components. We do not want to delete any packages, as they were selected on the basis of perhaps difficult negotiations with the faculties. The items that can be cut back on are the extra printed books (which might be replaced by their electronic versions) and the extra 'other' (which could be used from the restoration of old prints). The following figure shows a possible solution (with the red light turned to green, and the adapted cells in yellow).

| | Extra in **base year** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Literature components | In EUR | In USD | USD to EUR | In GBP | GBP to EUR | In CAD | CAD to EUR | Total in EUR |
| Books (print) | 8,000.00 | | 0.00 | | 0.00 | | 0.00 | 8,000.00 |
| Books (electronic) | 40,000.00 | | 0.00 | | 0.00 | | 0.00 | 40,000.00 |
| Subscriptions serials (print) | | | 0.00 | | 0.00 | | 0.00 | 0.00 |
| Subscriptions serials (electronic) | 50,000.00 | | 0.00 | | 0.00 | | 0.00 | 50,000.00 |
| Subscriptions newspapers (print) | | | 0.00 | | 0.00 | | 0.00 | 0.00 |
| Subscriptions newspapers (electronic) | | | 0.00 | | 0.00 | | 0.00 | 0.00 |
| Package deals institutional 1 | 80,000.00 | | 0.00 | | 0.00 | | 0.00 | 80,000.00 |
| Package deals institutional 2 | 160,000.00 | | 0.00 | | 0.00 | | 0.00 | 160,000.00 |
| Package deals institutional 3 | | 60,000.00 | 55,128.00 | | 0.00 | | 0.00 | 55,128.00 |
| Package deals consortium 1 | 35,000.00 | | 0.00 | | 0.00 | | 0.00 | 35,000.00 |
| Package deals consortium 2 | | | 0.00 | 45,000.00 | 52,542.00 | | 0.00 | 52,542.00 |
| Other | 5,000.00 | | 0.00 | | 0.00 | | 0.00 | 5,000.00 |
| Total = | 378,000.00 | 60,000.00 | 55,128.00 | 45,000.00 | 52,542.00 | 0.00 | 0.00 | 485,670.00 |
| | | | | | | | | |
| | Extra in **base year + 1** (medium price increase and medium currency uncertainty) | | | | | | | |
| Literature components | In EUR | In USD | USD to EUR | In GBP | GBP to EUR | In CAD | CAD to EUR | Total in EUR |
| Books (print) | 8,160.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8,160.0 |
| Books (electronic) | 40,800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 40,800.0 |
| Subscriptions serials (print) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 |
| Subscriptions serials (electronic) | 52,500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 52,500.0 |
| Subscriptions newspapers (print) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 |
| Subscriptions newspapers (electronic) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 |
| Package deals institutional | 247,200.00 | 61,800.00 | 56,781.84 | 0.00 | 0.00 | 0.00 | 0.00 | 303,981.8 |
| Package deals consortium | 35,700.00 | 0.00 | 0.00 | 45,900.00 | 53,592.84 | 0.00 | 0.00 | 89,292.8 |
| Other | 5,150.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5,150.0 |
| Total = | 389,510.00 | 61,800.00 | 56,781.84 | 45,900.00 | 53,592.84 | 0.00 | 0.00 | 499,884.7 |

## 8.4 Adjustments in the ModelCalculations worksheet

Now we are ready to add an extension to the Excel-file containing the Delhi model. We now have all the information to have the Delhi model perform the calculation with the addition of the extras for

the injection budget, starting from base year + 1. To do this, add the supplementary Excel worksheet as a new worksheet in the Excel file containing the Delhi model with the values from the exercise on entering basic values.

Input | ISO4217codes | ModelCalculations | **DelhiEx8** | Graph | Tabs4Reporting | Graphs4Reporting

Now it is easy to add the extra expenses in the Model Calculations worksheet. In the Model Calculations worksheet you only have to make the addition in the cells that are in the original currency.

B18 =(B2*(1+Input!$N22))+DelhiEx8!C32

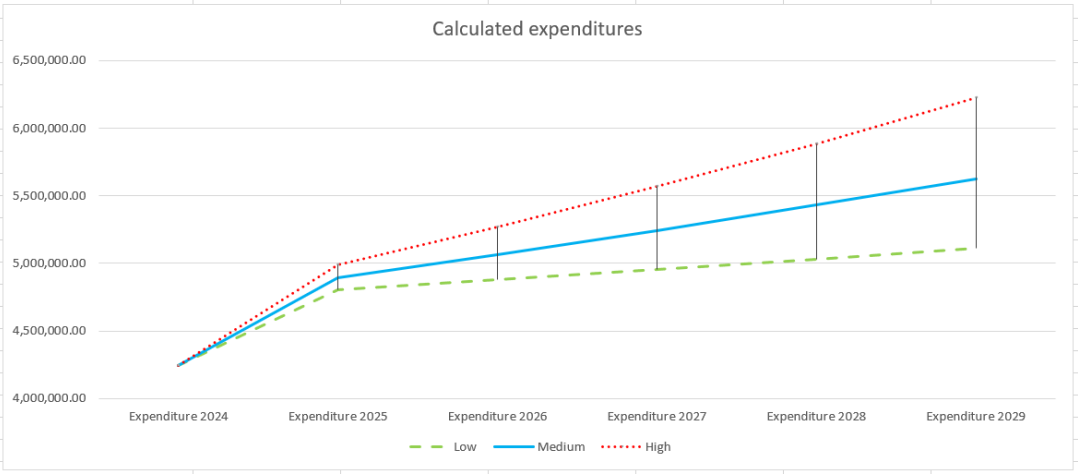
| | A | B | C | D | E |
|---|---|---|---|---|---|
| 16 | ***Scenario low 2025*** | price increase ----------> | | | |
| 17 | Calculated year (2025) Lo | EURLoprice | USDLoprice | GBPLoprice | CADLoprice |
| 18 | Books (print) | 33,410.00 | 25,250.00 | 3,030.00 | 5,050.00 |
| 19 | Books (electronic) | 151,900.00 | 75,750.00 | 20,200.00 | 8,080.00 |
| 20 | Subscriptions serials (print) | 51,500.00 | 61,800.00 | 20,600.00 | 43,260.00 |
| 21 | Subscriptions serials (electron | 928,000.00 | 535,600.00 | 226,600.00 | 18,540.00 |
| 22 | Subscriptions newspapers (pri | 8,160.00 | 0.00 | 0.00 | 0.00 |
| 23 | Subscriptions newspapers (ele | 25,250.00 | 0.00 | 0.00 | 0.00 |
| 24 | Package deals institutional | 1,471,200.00 | 61,800.00 | 0.00 | 0.00 |
| 25 | Package deals consortium | 520,500.00 | 252,500.00 | 116,600.00 | 0.00 |
| 26 | Other | 209,150.00 | 0.00 | 0.00 | 0.00 |
| 27 | Component10 | 0.00 | 0.00 | 0.00 | 0.00 |
| 28 | Component11 | 0.00 | 0.00 | 0.00 | 0.00 |
| 29 | Component12 | 0.00 | 0.00 | 0.00 | 0.00 |

Do not forget to performing this operation of adding input from the additional worksheet to all three scenarios: low, medium and high.

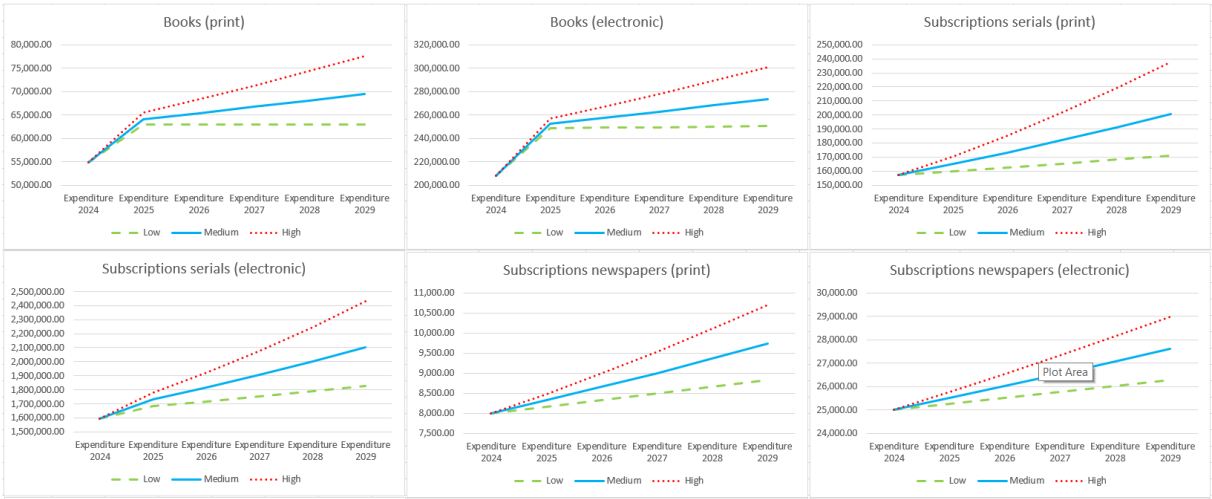
## 8.5 Interpreting the output of the Delhi model

In the worksheet Graph, the addition of the extra budget may not be immediately visible in the numbers. But the graph speaks for itself.

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | **Calculated expenditures** | Expenditure 2024 | Expenditure 2025 | Expenditure 2026 | Expenditure 2027 | Expenditure 2028 | Expenditure 2029 |
| 2 | Low | 4,240,978.60 | 4,804,039.70 | 4,877,973.50 | 4,953,746.22 | 5,031,399.86 | 5,110,977.57 |
| 3 | Medium | 4,240,978.60 | 4,892,461.77 | 5,064,813.59 | 5,243,985.69 | 5,430,272.55 | 5,623,982.16 |
| 4 | High | 4,240,978.60 | 4,985,550.79 | 5,266,840.28 | 5,566,663.13 | 5,886,406.47 | 6,227,571.30 |
| 5 | | | | | | | |
| 6 | ***Local currency = EUR*** | | | | | | |




The impact of the addition of the extra budget is clearly visible in the Graphs4Reporting worksheet. You can clearly see to which literature components an extra has been added.




## 8.6 Similarity to a budget cut

It goes without saying that the method of this exercise can also be applied to budget cuts. The Delhi model will then ensure well-founded choices regarding budget cuts on the various literature components. Such an exercise can make it clear what the increase in expenditure will be in the years after the budget cut, due to the continued increase in prices for information sources.