



Shared Prosperity **Dignified Life**



The Investment Price Index

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Amman, Jordan
December 6-7, 2023

The first step towards a broader goal...

- The Price Statistics team at ESCWA is planning to develop and produce an **Investment Price Index**, to be used by *investors, policymakers, governmental entities, economists,* and *researchers* to track and monitor the cost evolution of **Gross Fixed Capital Formation**.
- The Investment Price Index will be a composite of two main price indices: the **Construction Index**, and the **Machinery and Equipment Index**, and will be produced every year.
- As a **first step**, ESCWA will develop and produce the **Construction Price Index**.



The Investment Price Index

What does the investment Index bring about?

- The **Investment Price Index** helps investors and policymakers gauge the overall *cost trends* in the Gross Fixed Capital Formation component of GDP (temporal comparison tool).
- It aids in assessing *inflationary pressures*, allowing for **more informed** monetary and fiscal policy decisions.
- The price indices for both '**Construction**' and '**Machinery & Equipment**' will enable stakeholders *to pinpoint specific cost fluctuations* within these crucial investment domains, aiding in *strategic decision-making* and *risk management*.

The Harmonized Investment Price Index

The harmonized investment price index doubles as a **spatial** and **temporal** comparison tool!

- A **harmonized Investment Price Index** offers the advantage of **standardization** and **consistency** in measuring cost trends across countries (spatial comparison tool).
- This **uniformity** facilitates accurate **cross-country or cross-industry comparisons**, enabling investors, policymakers, and analysts to make informed decisions based on reliable data.
- It promotes **transparency** and **reduces confusion** by providing a **standardized framework** for assessing investment costs, making it easier to identify **trends, disparities, and potential areas of concern**.
- Overall, a **harmonized index** enhances the **reliability** and **comparability** of data, contributing to more **effective analysis and decision-making**.

The Harmonized Investment Price Index

Capitalizing on the *experiences gained* and the *collected historical datasets* to generate insightful tools!

- The Price Statistics Team at ESCWA decided to **capitalize** on the *experiences gained* and the *historical databases* already collected to create the Index.
- The **list of inputs** (materials, equipment hire, and labor) was extracted from the *Construction and Civil Engineering Survey*; it is thus the same for all countries.
- Historical **comparable data** for the Index is thus readily available, simplifying the process of producing a **Harmonized Index**.
- The **Investment Index** is comprised of two main price indices: the *Construction Index* and the *Machinery and Equipment Index*.
- As a first step, we will be discussing the *methodology* behind the production of the Construction Index.



The Harmonized Construction Price Index

The Harmonized Construction Price Index

In fact, we will be calculating *two types* of Construction Price Indices: The **input-based index** and the **output-based index**.

- **Construction price indices** are primarily used to *analyze price fluctuations* in the construction sector, *calibrate price escalation clauses* in construction contracts, and for the *deflation of national accounts components*.
- The **input index** is particularly used by contractors to *calibrate contracts between contractors and clients*, as it monitors changes in costs incurred in the construction process.
- The **output index** is primarily used to *deflate the value of output figures*. It is also used as a short-term indicator to *outline the evolution of prices* when published regularly.

The Construction Price Index

The construction price index is computed for **three construction types** (or Basic Headings):

- ***Residential buildings:*** buildings that are exclusively or predominantly destined for dwelling purposes such as apartment buildings, townhouses, villas, etc.;
- ***Non-residential buildings:*** buildings that are exclusively or predominantly destined for purposes other than dwelling such as office buildings, industrial buildings, retail centers, malls, etc.;
- ***Civil engineering works:*** infrastructure works such as highways, railways, dams, bridges, canals, recreational installations, etc.

Data requirements

A- Price data:

- The estimation of construction PPPs requires the collection of specific construction inputs which are divided into *3 sub-basic headings*:
 - Materials;
 - Labor;
 - Equipment hire.
- This same list is priced for all three types of construction but are each assigned a specific matrix of importance.



Pricing the three types of Construction inputs

The list of inputs (materials, equipment hire, and labor) was extracted from the **Construction and Civil Engineering Survey** and is thus the same for all countries.

The **input-based index** covers the following cost categories:

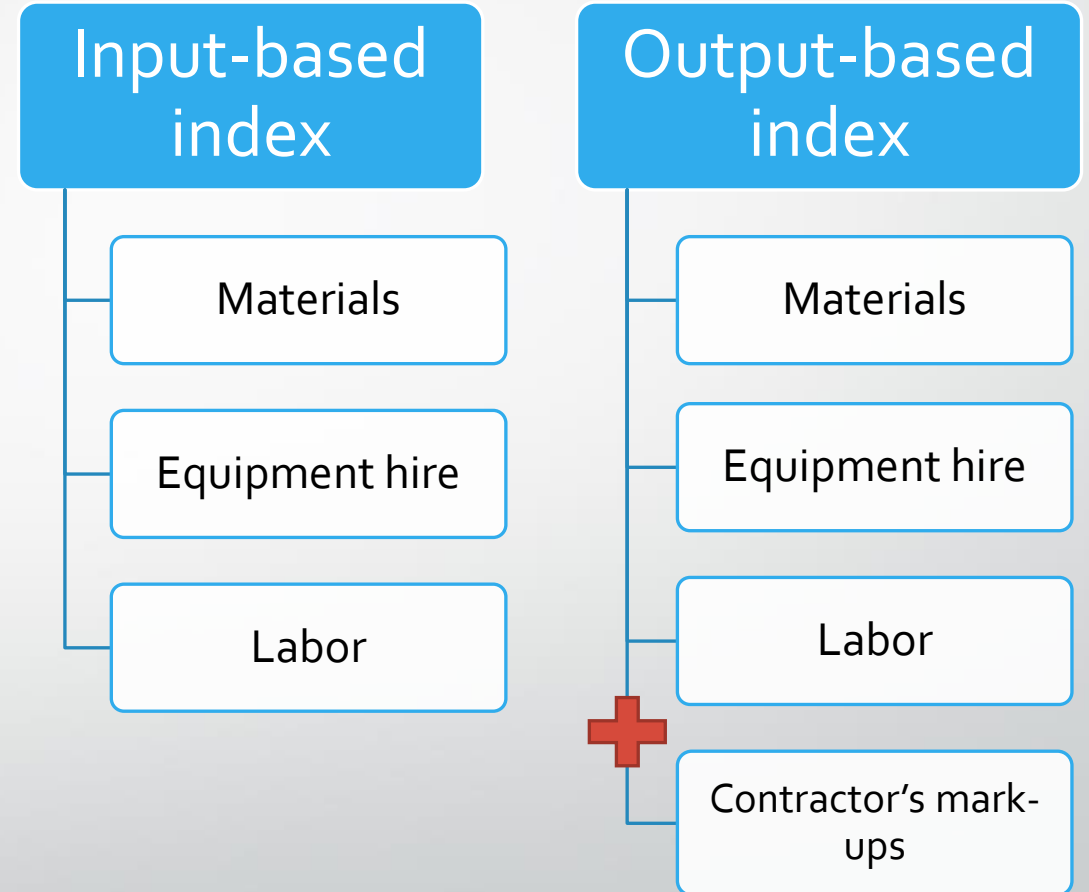
- **Construction materials** - costs of materials used by construction companies during the construction process; including the cost of energy such as fuel and electricity.
- **Labor** - expenses for remuneration of workers employed in the construction process (does not include the remuneration of project managers, architects, engineers, and other similar positions).
- **Equipment hire** - expenses incurred on the rental of machinery and equipment (crane, concrete pump, excavator, and other construction equipment) during the construction process.

In the case of an **output-based index**, one more set of inputs is required:

- **Contractor's mark-ups** – such as profits, head office overhead, general site cost, temporary works, etc.

As outlined above, we will be calculating **two types** of Construction Price Indices: The **input-based index** and the **output-based index**:

- The *input-based index* requires the collection of three types of construction inputs: **Materials**, **Equipment hire**, and **labor**;
- The *output-based index* requires the collection of the same three types of construction inputs as the input-based approach but also takes into account **the contractor's mark-ups**.



Data requirements (cont'd)

B- Weight data:

Three layers of weights are required to complete the construction PPP estimation:

1. A *percentage weight* is assigned to each item and should reflect the relative importance of the item within **the three sub-basic headings**.
2. A *percentage weight* is assigned to each sub-basic heading and should reflect the relative importance of the sub-basic heading within **the three construction types (or BHs)**.
3. A *percentage weight* is assigned to each construction type and should reflect the relative size of the BH within **the Construction group**.



Producing the required weights

The *relative importance* of each item, basic heading, and construction type is translated by *percentage weights*.

The *first 2 layers of weights* used for the computation of the index are compiled via *construction experts* while the third is extracted from *National Accounts expenditure data*.

- The percentage weights allocated to **items under the three sub-basic headings** and the weights allocated to **each construction input type** (basic heading) should be determined by **experts in the construction field** (construction companies, civil engineers, consultants, etc.).
- The percentage weights allocated to **each construction type** are extracted from the **National Accounts expenditure data** (MORES). The calculation is simple and automated in the excel, for example:

$$\text{Percentage weight (Civil engineering)} = \frac{\text{Expenditure on Civil Engineering}}{\text{Total expenditure on Construction}} \times 100$$

The national computation template (Excel)

- The Price Statistics team at ESCWA developed a simple and easy-to-use *Excel-based template* to automate the computation process of the Harmonized Construction Price Index.
- Each country will be able to produce the Construction Price Index *autonomously* and *as frequently* as it chooses.
- The Price Statistics team at ESCWA will in turn produce a **Regional Construction Price Index** based on the inputs of contributing countries.

Completing the national computation template (Prices)

Completing the **price data** requirements:

- The list of Materials, Labor, and Equipment Hire is priced *every year*.
- Prices are added to the computation template as *price relatives and* calculated according to a *specific and unified base year* (in this example, the base year is 2017).
- The prices are the same for all three construction types

Code	Product	2017	2018	2019	2020	2021	2022
	Materials						
150120001101	Aggregate, for concrete	100	83.3333	115.385	103.987	99.359	132.179
150120001102	Sand, for concrete and mortar	100	94.4969	94.4969	81.7121	81.7121	91.7176
150120001103	Softwood, for carpentry	100	102.439	97.3171	0	1.05073	3.21951
150120001105	Exterior plywood	100	98	103	113.4	126	148.5
150120001106	Interior plywood	100	0	100	103.467	93.3333	93.3333
150120001107	Chipboard sheet	100	100	100	100	100	100
150120001108	Petrol (gasoline)	100	112	112	112	112	112
150120001109	Diesel fuel	100	114.286	128.571	128.571	128.571	128.571
150120001110	Oil paint	100	100	100	90	110	110
150120001111	Emulsion paint	100	100	113.924	113.924	113.924	113.924
150120001112	Ordinary Portland cement	100	100	94.1176	72.0588	88.2353	88.2353
150120001113	Ready mix concrete	100	100	100	82.3529	79.4118	79.4118
150120001114	Precast concrete slabs	100	100	100	100	100	100
150120001115	Common bricks	100	100	100	100	100	100
150120001116	Facing bricks	100	100	100	100	100	100
150120001117	Concrete blocks, hollow	100	108.777	100	71.2678	71.8905	85.9565
150120001118	Concrete blocks, solid	100	97.0626	100	93.2312	93.6526	103.234
150120001119	Clay roof tiles	100	100	100	100	100	100
150120001120	Concrete roof tiles	100	100	100	100	100	100
150120001121	Float (sheet) glass	100	100	114.286	120	151.429	151.429
150120001122	Double glazing units	100	100	100	100	100	100
150120001123	Ceramic wall tiles	100	179.894	100	149.418	0	169.312
150120001124	Plasterboard	100	100	100	100	100	100
150120001125	Hand wash basin	100	100	100	109.375	125	150
150120001126	High yield steel reinforcement	100	98.7234	96.5106	95.1702	129.574	116.17
150120001127	Mild steel reinforcement	100	100	100	100	100	100
150120001128	Structural steel sections	100	100	100	100	100	100
150120001129	Sheet metal roofing	100	100	100	100	100	100
150120001131	Cast iron drain pipe	100	100	100	100	100	100
150120001132	Copper pipe	100	100	90.4762	90.4762	100	100
150120001138	Electricity	100	113.636	100	100	100	100
	Index	100	100.35	102.315	98.8002	98.0358	105.919
	Labor						
150120001301	General labourers, unskilled	100	100	100	100	120	120
150120001302	Bricklayer, skilled	100	100	100	100	128.333	128.333
150120001303	Plumber, skilled	100	100	100	100	216.667	216.667
150120001304	Carpenter, skilled	100	100	100	100	128.333	128.333
150120001305	Structural steel worker, skilled	100	100	100	100	173.333	173.333
150120001306	Electrician, skilled	100	100	100	100	183.333	183.333
150120001307	Machine (equipment) operator, skilled	100	100	100	100	150	150
	Index	100	100	100	100	152.983	152.983
	Equipment Hire						
150120001201	Wheeled loader and excavator, with operator	100	114.286	114.286	0	120	125.714
150120001202	Tracked tractor, with operator	100	68.1818	68.2182	163.636	152.727	200
150120001203	Skid steer loader, with operator	100	38.8889	38.9333	55.5556	52.5	48.8889
150120001204	Tandem vibrating roller, with operator	100	91.6667	91.7333	91.6667	87.5	110
150120001205	Compact track loader, with operator	100	100	90	110	100	100
150120001211	Wheeled loader and excavator, without operator	0	0	0	0	0	0
150120001212	Tracked tractor, without operator	0	0	0	0	0	0
150120001213	Skid steer loader, without operator	0	0	0	0	0	0
150120001214	Tandem vibrating roller, without operator	0	0	0	0	0	0
150120001215	Compact track loader, without operator	0	0	0	0	0	0
	Index	100	83.9593	82.284	77.593	102.431	116.206

Completing the national computation template (Mark-ups)

Adding the **contractors' markups**:

- For the calculation of the **output-based index**, an additional set of inputs is required under the **contractor's markups**.
- These markups are added as **percentages**, and the Excel template automatically does the calculations.

Input Price Index	100	98.96826	100.1222	96.74055	109.1276	115.901
Contractors' markup in %	22	20	28	26	30	32
Contractors' markup	22	19.79365	28.03421	25.15254	32.73827	37.08833
After adding contractors' markup	122	118.7619	128.1564	121.8931	141.8658	152.9894
Ouput Price Index	100	97.34583	105.0462	99.91238	116.2835	125.4011

Completing the national computation template (Weights)

1- Weighing **the items** under each sub-basic heading:

- As previously mentioned, the three types of construction *share the same list of construction inputs* (material, labor, and equipment hire).
- However, the list is assigned *three different matrices of importance* that are specific to each construction type.
- The importance of each item is reflected by a *percentage weight* and the percentage weights *should add up to 100* under every sub-basic heading.

Weight	Code	Product
80		Materials
2	150120001101	Aggregate, for concrete
4	150120001102	Sand, for concrete and mortar
3	150120001103	Softwood, for carpentry
4	150120001105	Exterior plywood
3	150120001106	Interior plywood
4	150120001107	Chipboard sheet
3	150120001108	Petrol (gasoline)
4	150120001109	Diesel fuel
2	150120001110	Oil paint
6	150120001111	Emulsion paint
1	150120001112	Ordinary Portland cement
6	150120001113	Ready mix concrete
5	150120001114	Precast concrete slabs
4	150120001115	Common bricks
2	150120001116	Facing bricks
2	150120001117	Concrete blocks, hollow
3	150120001118	Concrete blocks, solid
4	150120001119	Clay roof tiles
2	150120001120	Concrete roof tiles
3	150120001121	Float (sheet) glass
1	150120001122	Double glazing units
3	150120001123	Ceramic wall tiles
2	150120001124	Plasterboard
3	150120001125	Hand wash basin
4	150120001126	High yield steel reinforcement
2	150120001127	Mild steel reinforcement
4	150120001128	Structural steel sections
3	150120001129	Sheet metal roofing
3	150120001131	Cast iron drain pipe
4	150120001132	Copper pipe
4	150120001138	Electricity
		Materials
		Index
15		Labor
22	150120001301	General labourers, unskilled
15	150120001302	Bricklayer, skilled
8	150120001303	Plumber, skilled
10	150120001304	Carpenter, skilled
20	150120001305	Structural steel worker, skilled
15	150120001306	Electrician, skilled
10	150120001307	Machine (equipment) operator, skilled
		Labor
		Index
5		Equipment Hire
25	150120001201	Wheeled loader and excavator, with operator
18	150120001202	Tracked tractor, with operator
20	150120001203	Skid steer loader, with operator
20	150120001204	Tandem vibrating roller, with operator
17	150120001205	Compact track loader, with operator
0	150120001211	Wheeled loader and excavator, without operator
0	150120001212	Tracked tractor, without operator
0	150120001213	Skid steer loader, without operator
0	150120001214	Tandem vibrating roller, without operator
0	150120001215	Compact track loader, without operator
		Equipment Hire
		Index

Completing the national computation template (Weights)

2- Weighing **the three sub-basic headings** under each construction type (or BH):

- The importance of each sub-basic heading within each Construction type is reflected by a *percentage weight*.
- The percentage weights of all three sub-basic headings *should add up to 100* under every construction type.

Residential			Weight	52.90579913
Weight	Code	Product		
80		Materials		
2	150120001101	Aggregate, for concrete		
4	150120001102	Sand, for concrete and mortar		
3	150120001103	Softwood, for carpentry		
4	150120001105	Exterior plywood		
3	150120001106	Interior plywood		
4	150120001107	Chipboard sheet		
3	150120001108	Petrol (gasoline)		
4	150120001109	Diesel fuel		
2	150120001110	Oil paint		
6	150120001111	Emulsion paint		
1	150120001112	Ordinary Portland cement		
6	150120001113	Ready mix concrete		
5	150120001114	Precast concrete slabs		
4	150120001115	Common bricks		
2	150120001116	Facing bricks		
2	150120001117	Concrete blocks, hollow		
3	150120001118	Concrete blocks, solid		
4	150120001119	Clay roof tiles		
2	150120001120	Concrete roof tiles		
3	150120001121	Float (sheet) glass		
1	150120001122	Double glazing units		
3	150120001123	Ceramic wall tiles		
2	150120001124	Plasterboard		
3	150120001125	Hand wash basin		
4	150120001126	High yield steel reinforcement		
2	150120001127	Mild steel reinforcement		
4	150120001128	Structural steel sections		
3	150120001129	Sheet metal roofing		
3	150120001131	Cast iron drain pipe		
4	150120001132	Copper pipe		
4	150120001138	Electricity		
		Materials		
15		Labor		
22	150120001301	General labourers, unskilled		
15	150120001302	Bricklayer, skilled		
8	150120001303	Plumber, skilled		
10	150120001304	Carpenter, skilled		
20	150120001305	Structural steel worker, skilled		
15	150120001306	Electrician, skilled		
10	150120001307	Machine (equipment) operator, skilled		
		Labor		
5		Equipment Hire		
20	150120001201	Wheeled loader and excavator, with operator		
18	150120001202	Tracked tractor, with operator		
20	150120001203	Skid steer loader, with operator		
20	150120001204	Tandem vibrating roller, with operator		
17	150120001205	Compact track loader, with operator		
0	150120001211	Wheeled loader and excavator, without operator		
0	150120001212	Tracked tractor, without operator		
0	150120001213	Skid steer loader, without operator		
0	150120001214	Tandem vibrating roller, without operator		
0	150120001215	Compact track loader, without operator		
		Equipment Hire		

Completing the national computation template (Weights)

3- Weighing **the three construction types (or BH)** under the construction group:

- The share of each heading within the Construction group is reflected by a *percentage weight*.
- The percentage weights of all three basic headings *should add up to 100* under the construction.
- These percentage weights are *not directly inserted* into the template. As previously mentioned, they are calculated by the template using *National Accounts Data* under "Construction".

Residential		Weight	52.90579913
Weight	Code	Product	
80		Materials	
2	150120001101	Aggregate, for concrete	
4	150120001102	Sand, for concrete and mortar	
3	150120001103	Softwood, for carpentry	
4	150120001105	Exterior plywood	
3	150120001106	Interior plywood	
4	150120001107	Chipboard sheet	
3	150120001108	Petrol (gasoline)	
4	150120001109	Diesel fuel	

Civil Engineering		Weight	=100	17.91026527
Weight	Code	Product		
60		Materials		
8	150120001101	Aggregate, for concrete		
5	150120001102	Sand, for concrete and mortar		
6	150120001103	Softwood, for carpentry		
5	150120001105	Exterior plywood		
0	150120001106	Interior plywood		
0	150120001107	Chipboard sheet		
7	150120001108	Petrol (gasoline)		
6	150120001109	Diesel fuel		

Non-Residential		Weight	29.1839356
Weight	Code	Product	
72		Materials	
2	150120001101	Aggregate, for concrete	
4	150120001102	Sand, for concrete and mortar	
3	150120001103	Softwood, for carpentry	
4	150120001105	Exterior plywood	
3	150120001106	Interior plywood	
4	150120001107	Chipboard sheet	
3	150120001108	Petrol (gasoline)	
4	150120001109	Diesel fuel	

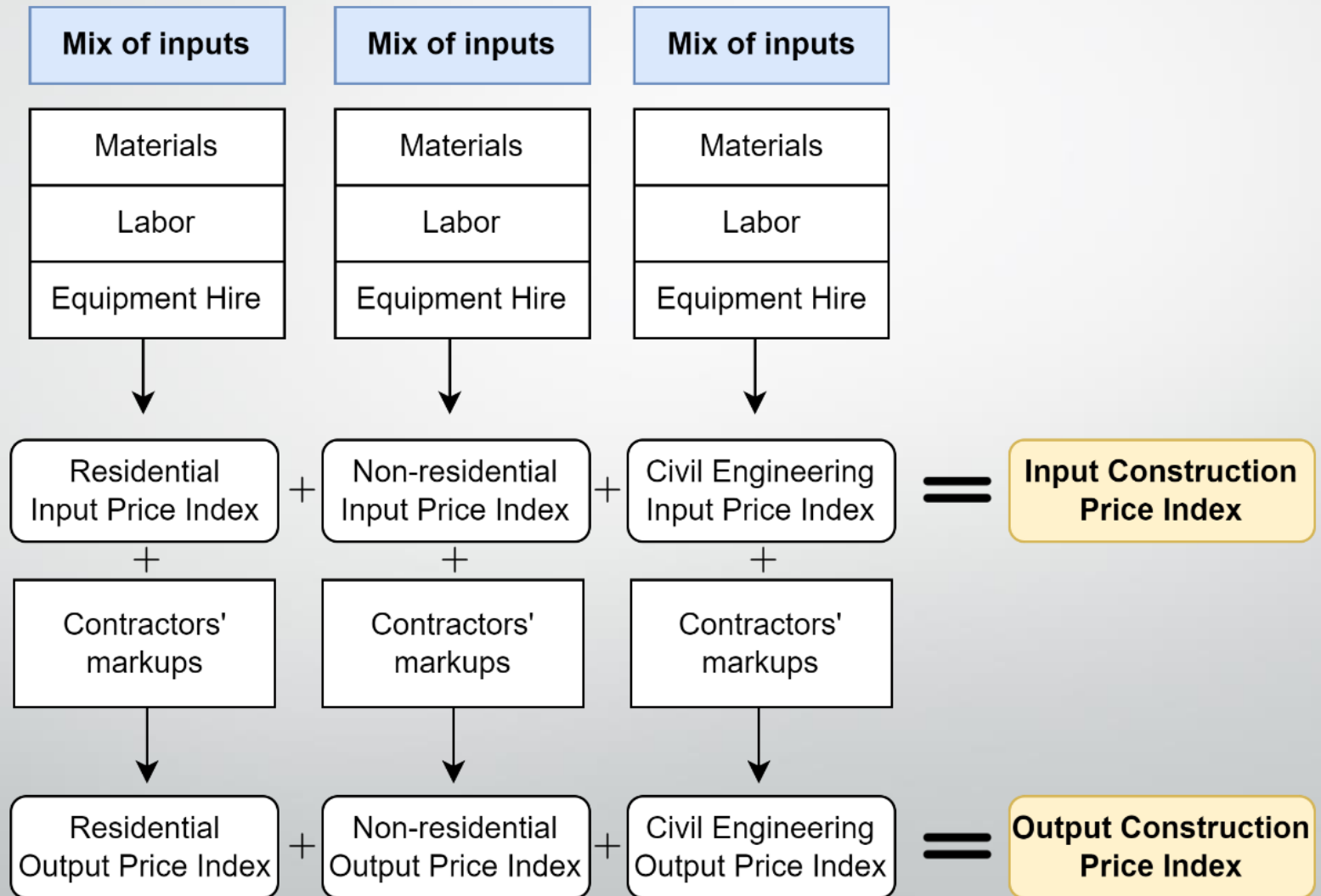
Completing the national computation template (**Weights**)

3- Weighing **the three construction types (or BH)** under the construction group:

- Thus, National Accounts *expenditure data* for “Construction” is inserted into the template, and the template automatically calculates the *percentage shares*.
- This data is available in the MORES files of every country.

Code	Name	Level	Weights	Please Insert The Expenditures Here
1701112	CONSTRUCTION	Group	100	2723423152
1701112	Residential buildings	Basic Heading	52.90579913	1440848782
1701112	Non-residential buildings	Basic Heading	29.1839356	794802058.8
1701112	Civil engineering works	Basic Heading	17.91026527	487772310.9

Final structure of the Index



Final index results

- Once all the prices and weights are added, the template *automatically* generates the results.
- The results are displayed as follows:

	2017	2018	2019	2020	2021	2022
Construction Price Index - Input price Index	100	98.714	99.908	95.887	106.655	113.558
Construction Price Index - Output price Index	100	96.347	100.579	97.947	111.546	120.971

Thank you!!

