

NUMERICAL EXERCISE

PRODUCTION IN CONSTRUCTION INDEX (PCI) CALCULATION Deflated by INDEX of PRICES FOR CONSTRUCTION (IPC)

STAGE 1: SAMPLE CALCULATION

STAGE 2: COEFFICIENT CALCULATION

STAGE 3: ELEVATED DATA EMPLOYEES AND TURNOVER

STAGE 4: PRODUCTION CONSTRUCTION INDEX (TURNOVER)

STAGE 5: CALCULATION OF INDEX FOR PRICES OF CONSTRUCTION

STAGE 6: PRODUCTION IN CONSTRUCTION INDEX DEFLACTED

STAGE 1: SAMPLE CALCULATION

SAMPLE calculation

We can sample a total number of **4.000** companies, (*because is what our organization can afford*)

The whole number of companies sampled (in SBS Construction) las year was **7,500 companies**. Out of that amount we know **500** must be sampled exhaustively.

So:

File F: 7500 (number of companies with answer from SBS Construction)

File F₁: 500 (number of companies to be exhaustively contacted)

First calculation:

Number of companies to be sample in layer 433-3, knowing that the total number of companies in that layer are 10.

STAGE 2: COEFFICIENT CALCULATION

COEFFICIENT CALCULATION

Information of **the 5 companies** in the sample 433-3 already **sampled**.

This layer is from 50 up to 99 employees.

| Company | Employees output | Employees arrival | Turnover |
|---------|------------------|--------------------|-----------|
| A | 50 | 48 (out) | 1.500.000 |
| B | 65 | 62 | 1.100.000 |
| C | 80 | 82 | 1.750.000 |
| D | 90 | 93 | 1.950.000 |
| E | 98 | 102 (out) | 2.050.000 |
| | | | |
| F (in) | 49 | 52 (from 433-2) | 1.200.000 |

$$N_{433-2}^R = 40 \quad a_{433-2} = 1$$

Determin:

$$N_{433-3}^R ? \quad n_{433-3}^I ? \quad n_{433-3}^F ? \quad n_{433-2}^I ?$$

E_{1ij}^l ? E_{2ij}^l ? Coefficient₄₃₃₋₃

Number of employees in layer 433-3?

CALCULATIONS: COEFFICIENT CALCULATION

**STAGE 3: ELEVATED DATA EMPLOYEES AND
TURNOVER**

DATA SAMPLE ELEVATION: EMPLOYEES

Layer 433-3 Coefficient: 2,138888

| Companie | Employees | Coefficient | Elevated employees |
|----------|-----------|-------------|--------------------|
| B | 62 | 2,138888 | |
| C | 82 | 2,138888 | |
| D | 93 | 2,138888 | |
| F | 52 | 2,138888 | |
| TOTAL | | | |
| TOTAL | | | |

DATA SAMPLE ELEVATION: TURNOVER

Layer 433-3 Coefficient: 2,138888

| Companie | Turnover | Coefficient | Elevated turnover (thousand €) |
|----------|-----------|-------------|-----------------------------------|
| B | 1.100.000 | 2,138888 | |
| C | 1.750.000 | 2,138888 | |
| D | 1.950.000 | 2,138888 | |
| F | 1.200.000 | 2,138888 | |
| TOTAL | | | |

STAGE 4: INDEX PRODUCTION CONSTRUCTION **(TURNOVER)**

It takes into account the base year for calculating the index. We usually use years ending in 0 or 5.

Turnover thousand € (companies B,C,D,F) 2010: 11.550.325,5

Turnover thousand €(companies B,C,D,F) 2016:

Calculate index production.

STAGE 5: CALCULATION OF COSTS INDEX OF CONSTRUCTION **INDUSTRY**

Calculation index of materials

It is analyzed in a sample of material budgets execution of real projects, how the cost of an average construction project between the different sections NACE involved in building and civil engineering is distributed.

As the concept of "medium project" is not stable over time (varies according to the relative market importance of the different sub-sectors: residential, nonresidential, etc.) it has been weighted by the turnover of each subsector in the sector of the building. (This data was obtained from the SBS of Construction). More weights and / or work type classifications could be done.

The sample of projects should be balanced as possible in terms of its size and selection, taking into account typological and geographic aspects.

To simplify the calculation only seven types of materials in addition to the machinery have been considered in this example.

For each of the products prices are considered in the base period (in this case is 2010). Each month the indices are calculated from these leading to an indicator used to measure the evolution of the products manufactured by the industry in the first stage of

commercialization prices. This index is called the Industrial Price Index, PPI, which is calculated monthly by the National Statistics Institute of Spain.

Calculation Index Labor

For the index of labor data obtained from the Survey of Labor Costs for companies of Section F of NACE 93 Rev. 2 are used.

The labor cost is defined as the cost incurred by the employer for the use work factor. This cost must be measured in net terms for the employer, deducting the various subsidies received.

All companies or establishments with 500 or more employees are analyzed and the rest companies are sampled, adding in total 28,500 establishments or companies from sections B to S of NACE 93 Rev. 2.

CALCULATION INDEX COST AS OF JULY 2016

Materials to be used:

Aggregates, Asphalt, Precast, Concrete, Ceramics, Steel, Wood and machinery.

Type of works:

Non-residential building, residential building and civil engineering.

Distribution in% of costs of materials, machinery and labor according to the chosen sample:

| | Total Building | | Engineering Civil |
|------------|----------------|-----------------|-------------------|
| | Residential | Non-residential | |
| Labor | 38,00 | 35,00 | 18,00 |
| Aggregates | 10,00 | 11,00 | 8,00 |
| Asphalt | 1,00 | 2,00 | 5,00 |
| Precast | 13,00 | 8,00 | 4,00 |
| Concrete | 13,00 | 7,00 | 12,00 |
| Machinery | 6,00 | 5,00 | 32,00 |
| Ceramics | 5,00 | 3,00 | 0,00 |
| Steel | 11,00 | 26,00 | 19,00 |
| Wood | 3,00 | 3,00 | 2,00 |

Turnover distribution obtained from the SBS of Industry Construction according to the types of selected works:

Turnover: SBS Industry Construction

(Thousand €)

| | |
|--------------------|---------|
| TOTAL CONSTRUCCIÓN | 108.000 |
| BUILDING | 73.000 |
| Residential | 53.000 |
| Non-residential | 20.000 |
| ENGINEERING CIVIL | 35.000 |

Price Index of materials, machinery and labor:

INDEX INDUSTRIAL PRODUCTS (base year 2010)

| | AUGUST 2010 (BASE) | JULY 2016 |
|------------|-----------------------|-----------|
| Labor | 100,00 | 102,11 |
| Aggregates | 100,00 | 100,55 |
| Asphalt | 100,00 | 104,34 |
| Precast | 100,00 | 100,61 |
| Concrete | 100,00 | 101,20 |
| Machinery | 100,00 | 101,00 |
| Cerámics | 100,00 | 99,65 |
| Steel | 100,00 | 99,63 |
| Wood | 100,00 | 107,01 |

Calculate the cost index weighted with labor for:

Total Building

Civil Engineering

Total Construction

SOLUTION

DISTRIBUTION COSTS BY TYPE OF PROJECT

Weighted Turnover according SBS of Construction

| | Total Building | Civil Engineering | Total Construction |
|------------|----------------|-------------------|--------------------|
| Labor | 37,18 | 18,00 | 30,96 |
| Aggregates | 10,27 | 8,00 | 9,54 |
| Asphalt | 1,27 | 5,00 | 2,48 |
| Precast | 11,63 | 4,00 | 9,16 |
| Concrete | 11,36 | 12,00 | 11,56 |
| Machinery | 5,73 | 32,00 | 14,24 |
| Ceramics | 4,45 | 0,00 | 3,01 |
| Steel | 15,11 | 19,00 | 16,37 |
| Wood | 3,00 | 2,00 | 2,68 |

INDEX COST CONSTRUCTION JULY 2016

| | Total Building | Engineering Civil | Total Construction |
|------------|----------------|-------------------|--------------------|
| Labor | 37,96 | 18,38 | 31,62 |
| Aggregates | 10,33 | 8,04 | 9,59 |
| Asphalt | 1,33 | 5,22 | 2,59 |
| Precast | 11,70 | 4,02 | 9,21 |
| Concrete | 11,49 | 12,14 | 11,70 |
| Machinery | 5,78 | 32,32 | 14,38 |
| Ceramics | 4,44 | 0,00 | 3,00 |
| Steel | 15,05 | 18,93 | 16,31 |
| Wood | 3,21 | 2,14 | 2,86 |
| | 101,30 | 101,20 | 101,27 |

STAGE 6: INDEX PRODUCTION CONSTRUCTION DEFLACTED

| | |
|-------------------------------------------------|---------------|
| Index Production Construction july 2016: | 111,11 |
| Index Cost Construction july 2016: | 101,27 |
| Index Production Construction Deflacted | 109,72 |