European Central Bank & Banco de España

Mapping SDMX-XBRL/DPM

2/6/2019

1. Motivation

In 2016 the SDMX community launched the so called "SDMX Roadmap 2020"[1], intended to outline a series of strategic objectives covering the period 2016 to 2020. One of the activities included in this initiative is to "Encourage more compatibility of SDMX with other standards used for micro-data, such as DDI (Data Documentation Initiative) and XBRL (eXtensible Business Reporting Language)." In this document a preliminary study of a mapping between SDMX and DPM(XBRL) is described.

In this context, the main goal of this document is to propose an approach to map information between SDMX and DPM (XBRL). As this is a preliminary approach it is important to notice that the both standards are not fully covered in this document. This should be tackled in a wider document to provide a comprehensive view.

The document starts with a description of the information models of both standards in Chapter 2. After this description, their artefacts are mapped, highlighting their differences and similarities. As the mapping is intended to cover the two directions of mapping (i.e. SDMX to XBRL, and XBRL to SDMX), a comparison of the artefacts of the two data models is included in Chapter 3.

The final chapters are dedicated to case studies, one for each direction of the mapping. The case studies are not intended to cover all possible casuistic that could happen in a potential conversion from one standard to the other. However, they have been developed as granular as possible to make the reader understand every single mapping.

Validation Rules will not be discussed in this first version of the document. In case validation rules for mapping are to be considered, the document that should be taken as a reference is EBA's document "Representation in XBRL of the Data Point Model" public release v1 (as of Dec.2012) for XBRL and VTL reference manual for SDMX.

SDMX reference metadata is out of the scope of this document. Reference metadata includes concepts such as contact information, quality management, data revision policies, etc. These concepts cannot be properly mapped to XBRL artefacts, so it makes no sense to consider them for this study.

[1] https://sdmx.org/wp-content/uploads/SDMX_roadmap2020_FINAL.pdf

2. Introduction to the two information models

This chapter includes a brief description of the information models of DPM (XBRL) and SDMX 2.0 / 2.1.

2.1. XBRL-DPM information model

2.1.1. Introduction

XBRL (e**X**tensible **B**usiness **R**eporting **L**anguage) is the open international standard for digital business reporting, managed by a global not-for-profit consortium, XBRL International.

In a nutshell, XBRL provides a language in which reporting terms can be authoritatively defined. Those terms can then be used to uniquely represent the contents of financial statements or other kinds of compliance, performance and business reports. XBRL allows reporting information to move rapidly, accurately and digitally [1] across organizations.

2.1.2. DPM Information Model

DPM (**D**ata **P**oint **M**odeling) is a methodology for the development of financial data models that describe characteristics of the information exchanged in the context of supervisory reporting processes. These data models are often referred to as Data Point Models (DPM) or as meta-data (data that describe data). Data Point Models are formally represented by XBRL taxonomy files [2].

A Data Point represents an individual data requirement. Data points are expressed as a composition of features that univocally identify the financial concept to be measured:

- **A metric**: characteristic that defines the nature of the measure to be performed.
- **A set of dimensional characteristics** that qualify and complement the metric and provide the proper context to understand the financial phenomenon represented.
- **A time reference** that helps to determine the specific instant or interval of time in the context of a given reporting period.

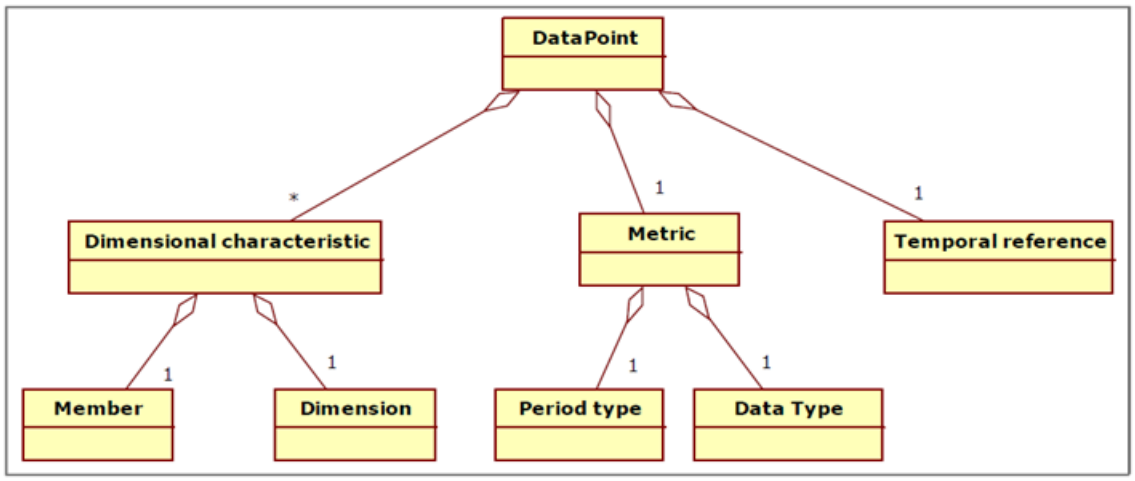


Figure 1: Data Point structure representation

Example:

- **Taxonomy**: FINancial REPorting 2016-A Individual (2.1.5)
  - **Author**: EBA (DPM 2.5)
  - **Table**: Balance Sheet Statement: Assets (F_01.01)
    - **Row**: Total assets
    - **Column**: Carrying amount
- **Data Point**:
  - **Metric**: eba_mi53 - Carrying amount
  - **Dimension 1**: BAS - Base
  - **Dimension 1 Value**: x6 - Assets
  - **Dimension 2**: MCY - Main Category
  - **Dimension 2 Value**: x25 - All assets

- **Data Point representation in an XBRL Instance:**

```
<xbrli:context id="c1">
  <xbrli: entity>
   <xbrli:identifier scheme="http://standards.iso.org/iso/17442">DUMMY_ENTITY</xbrli:identifier>
  </xbrli:entity>
  <xbrli:period>
   <xbrli:instant>yyyy-mm-dd</xbrli:instant>
  </xbrli:period>
  <xbrli:scenario>
   <xbrldi:explicitMember dimension="eba_dim:BAS">eba_BA:x6</xbrldi:explicitMember>
   <xbrldi:explicitMember dimension="eba_dim:MCY">eba_MC:x25</xbrldi:explicitMember>
  </xbrli:scenario>
 </xbrli:context>
 <eba_met:mi53 unitRef="uEUR" decimals="-3" contextRef="c1">FACT_VALUE</eba_met:mi53>
```

2.1.3. Dictionary

The basic elements required to develop data models are grouped into a single point called **Dictionary**, which is common to all taxonomies. A taxonomy developed with DPM methodology will include:
(a) The data model in which all the data required are defined exhaustively, (b) the information necessary to allow graphical representation and (c) validation rules that data must satisfy.

The dictionary contains the following elements:

2.1.4. Metrics

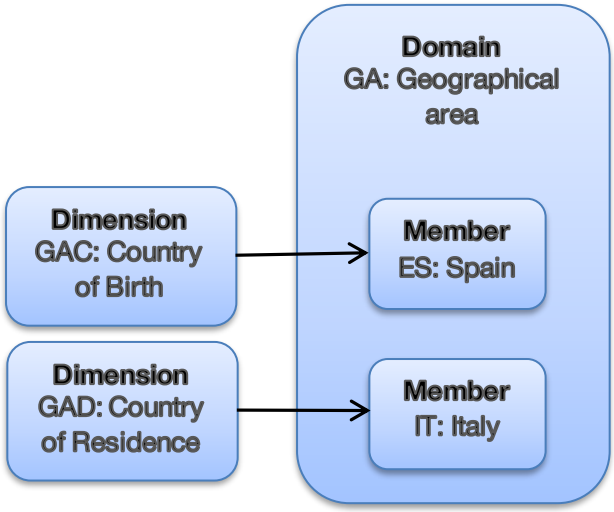
Metrics define the nature of the measure to be performed. Each metric determines a data type, a period type and additional semantics of their corresponding data points.

- The data type corresponds to the nature of the values of the facts to be reported (monetary information, percentages, dates, texts…)
- The period type establishes whether the property or measure is performed at a specific instant of time (stocks) or during an interval of time (flows).

2.1.5. Dimensions, Domains and Domain Members

A **Dimension** is a characteristic that qualifies and complements the metric and provides the proper context to understand the financial concept represented by a Data Point. Each dimensional characteristic is composed of a specific dimension and a domain member. The dimension represents an identifying property and the member is the value given to that property in the context of the data point.
Domains are sets of members that share a certain semantic identity.
Domain members are the different values of a domain that are given to dimensions.

Example:
Based on the EBA Dictionary, the image below shows a Domain called "Geographical area", and two Dimensions ("Country of Birth", and "Country of Residence"). Each dimension takes a different value from members of the Domain.



2.1.6. Hierarchies

Hierarchies are sets of members of an explicit domain arranged in a hierarchical disposition. A node of a hierarchy can define basic arithmetical relationships (=, <= or >=) in relation to its child nodes.

2.1.7. Taxonomies and Frameworks

A **taxonomy** represents a set of reporting requirements enforced by a certain legal document or set of documents. A taxonomy is defined in terms of modules, tables and table groups. In addition, taxonomies include attributes to identify the legal rules, their version date and an optional currency period.

Frameworks are groups of taxonomies following some functional requirements.

2.1.8. Modules

Modules are pre-defined sets of tables and table groups that are used in a certain process. For instance, in reporting processes, a module defines sets of information that must be reported together.

2.1.9. Tables and table groups

Data required by supervisors of credit institutions is described in legal rules by means of bi-dimensional forms usually referred to as templates or business templates. These business templates are represented in the model with the help of **tables** and **table groups**.

2.1.10. Validation Rules

Validation rules are tests to be applied to reported data in order to check their consistency. If the result of a validation rule in respect of a set of data is true, then the data reported are consistent according to that rule. If the result is false, the reported information presents an inconsistency that should be checked or corrected.

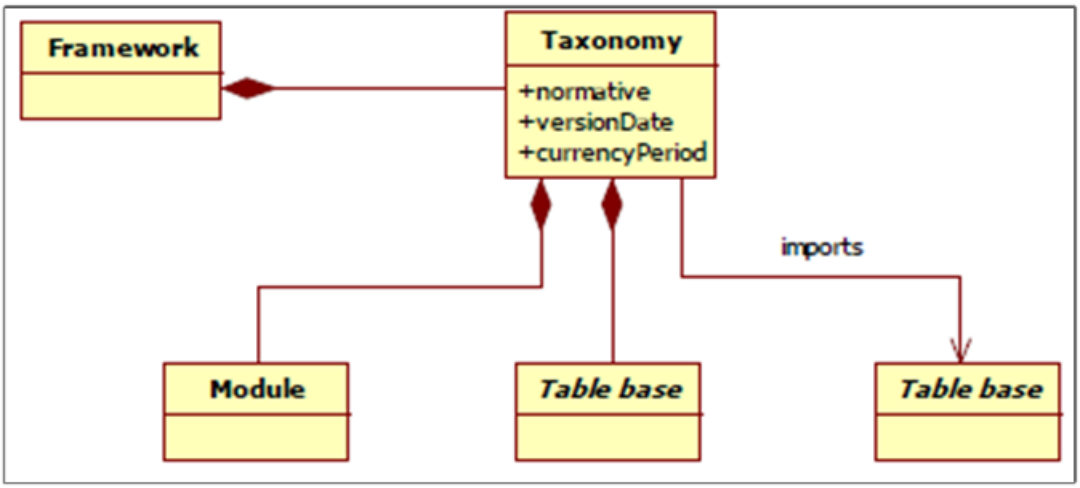


Figure 2: Taxonomy and Framework structure representation

2.2. SDMX information model

2.2.1. Introduction

SDMX (**S**tatistical **D**ata and **M**etadata e**X**change) is a set of standards and guidelines aimed at facilitating the production, exchange, dissemination, retrieval and processing of statistical data and metadata. SDMX is sponsored by a wide range of public institutions including the UN, the IMF, the Worldbank, BIS, ILO, FAO, the OECD, the ECB, Eurostat, and a number of national statistics offices and national banking authorities.

The ***SDMX Information Model*** provides a broad set of formal objects and their relationships to represent statistical data and metadata, actors, processes, and resources within statistical exchanges.

These objects or artefacts (in SDMX language) are defined as follows:

2.2.2. Concept and Concept Scheme

Concepts play an important role in the SDMX Information Model as they are used to describe the structure of a multidimensional statistical table or the structure of a metadata report. In the SDMX Information Model, Concepts can have a specific value representation (coded value, numeric format, date format, string, etc.) that can be defined in the **Concept Scheme**.

2.2.3. Code Lists

In the SDMX Information Model, a **Code List** is an object containing a list of codes and maintained by an agency. A Code List is simply a set of values to be used in the representation of a Concept (**Dimension** or **Attribute**) in Data Structure Definitions.

The model allows a code list to have **hierarchy** of codes. In that case, the hierarchy is made by defining any relationship parent-child among the codes of one code list.

2.2.4. Data Structure Definition (DSD)

The **Data Structure Definition** is a description of all the ***structural metadata*** needed to understand the structure of the Data set. In fact, the Data Structure Definition links the statistical data to its structural metadata by assigning descriptor Concepts to the elements of the statistical data.

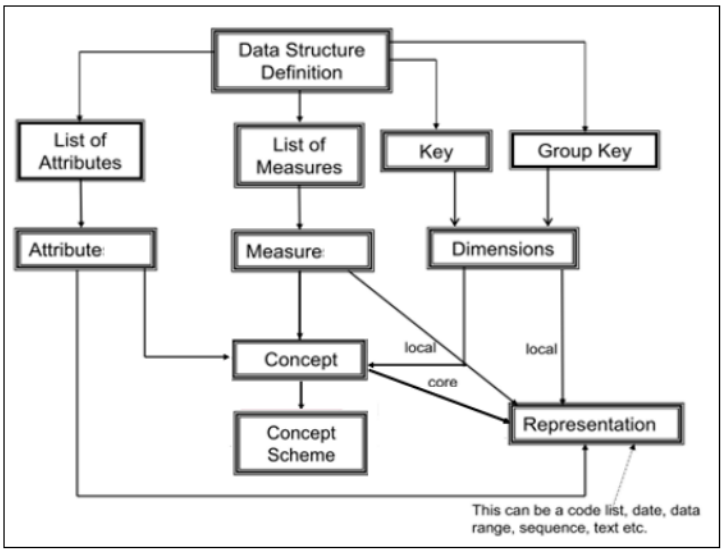


Figure 1: Data Structure Definition

As shown in Figure 1, the Data Structure Definition is formed by three sets of Concepts:

- Dimensions comprising Non-Key Dimensions and the Key lists:
  - Key descriptor;
  - Group Key descriptor(s) - there may be more than one Group Key descriptor;
- List of Measures;
- List of Attributes.

Example: DSD: ECB_IBSI: Individual Balance Sheet Items.

- **Dimensions:** FREQ, REF_AREA, ADJUSTMENT, BS_REP_SECTOR, MFI_LIST_IND, BS_ITEM, MATURITY_ORIG, DATA_TYPE, COUNT_AREA, BS_COUNT_SECTOR, CURRENCY_TRANS, BS_SUFFIX
- **Mandatory attributes:** TITLE, UNIT, UNIT_MULT, DECIMALS, COLLECTION, TITLE_COMPL
- **Time series key:** M.ES.N.A.ESXXXX.A60.X.1.Z5.0000.Z01.E.
  - **FREQ**: Monthly (M);
  - **REF_AREA**: Spain (ES);
  - **ADJUSTMENT**: Neither seasonally adjusted nor calendar adjusted data (N);
  - **BS_REP_SECTOR**: MFIs excluding ESCB (A);
  - **MFI_LIST_IND**: Spanish MFI XXXX (ESXXXX);
  - **BS_ITEM**: Non-financial assets (including fixed assets) (A60);
  - **MATURITY_ORIG**: Not applicable (X);
  - **DATA_TYPE**: Outstanding amounts at the end of the period (stocks) (1);
  - **COUNT_AREA**: Counterpart area: World not allocated (geographically) (Z5);
  - **BS_COUNT_SECTOR**: Unspecified counterpart sector (0000);
  - **CURRENCY_TRANS**: All currencies combined (Z01);
  - **BS_SUFFIX**: Euro (E).
- **Time series key attributes: UNIT**: Euro; **UNIT_MULT**: 6; **DECIMALS**: 2; **COLLECTION**: End of period.
- **Time series key list of measures**: OBS_VALUE (observation value); OBS_CONF (observation confidentiality); OBS_STATUS (observation status)
- **Time series observations: 145.02**

SDMX-ML of this series:

```
<Series FREQ="M" REF_AREA="ES" ADJUSTMENT="N" BS_REP_SECTOR="A" MFI_LIST_IND="ESXXXX" BS_ITEM="A60"
        MATURITY_ORIG="X" DATA_TYPE="1" COUNT_AREA="Z5" BS_COUNT_SECTOR="0000" CURRENCY_TRANS="Z01"
        BS_SUFFIX="E" COLLECTION="E" DECIMALS="2" TITLE="IBSI Example"
        TITLE_COMPL="IBSI Example. Complementary Title" UNIT="EUR" UNIT_MULT="6">

  <Obs TIME_PERIOD="2017-05" OBS_VALUE="145.02" OBS_STATUS="A" OBS_CONF="C"/>

</Series>
```

The Concepts used for Dimensions, Measures, and Attributes can be taken from any maintained Concept Scheme, and need not all be from the same agency or scheme.
Dimensions are those Concepts which describe the statistical data and form the identifier (Key) to the related data.

The **List of Measures** comprises for time series data one **Measure** - the **Primary Measure**. It measures a statistical phenomenon over a time period. There can be only one Primary Measure declared in the DSD.

On the other hand, for the cross-sectional data organization, a specific **Measure Dimension** can be declared containing the **multiple cross-sectional Measures**.

The **List of Attributes** comprises one or more Attributes. Attributes are Concepts used to provide more information about some part of the Data set.

The SDMX Information Model allows creating subsets of Keys, named **Group Key**. This subset of Key Dimensions forms a *Partial Key* whose combined values identify a subset of the 'cube' to which Attributes are linked giving metadata about the identified object. Thus, the purpose of a Group Key descriptor is to define a subset of the full Key descriptor to which data Attributes can be attached.

2.2.5. Data set

The Data Set contains data and related metadata whose content conforms to the specification of a Data Structure Definition.

2.2.5.1. Time series Data set

The time series Data Set comprises:

- Time series Keys, each of which defines the Key of a time series which, when combined with a Time Period uniquely identifies an Observation
- Optionally Group Keys, which (conceptually) comprise a set of Time series Keys for which Attribute values can be reported
- Attribute values, which are reported for a specific object as one of Data Set, Group Key, Time series Key or Observation

The main structure of the Data Set is a set of Keys and Group Keys. Each Key comprises a set of Key values, one value for each of the Dimensions defined in the Data Structure Definition. In case of time-series, for each Key there may be one or more Observation values at different times of a Time Period. Attribute values can be reported, and each of these values can be attached to the appropriate level: Data Set, Series Key, Group Key or directly to an Observation value.

2.2.5.2. Cross-sectional Data set

'Cross-sectional' data are types of statistical data which are not typically organized like time series. Data are organized around some other, non-time Dimension of the statistical data cube.

This functionality allows multiple Measures (so called cross-sectional Measures) to be declared in the Data Structure Definition, associated with the representational values of one Dimension. When data is structured to represent a set of multiple observations at a single point in time, the

'section' – one or more observations for each declared Measure – replaces the series in the Data Structure.

2.2.6. Dataflow definition

In SDMX, data are exchanged, reported or disseminated according to a **Dataflow** definition. The Dataflow definition is linked to the Data Structure Definition and may be associated with one or more subject matter domains, this facilitates the search for data according to organized Subject Matter Scheme (called Category Scheme in the model) as they provide a way of classifying data for collection, reporting, or publication.

A **Dataflow** can be seen as the on-going publication of a data linked to specific domain and its defined exchange flow, as new observations are added to the existing ones, or as subsequent data with the same subject and structure are published.

2.2.7. Constraints

The term 'Constraints' in the SDMX Information Model embeds a set of information: the specific topics about which data or metadata is reported within the theoretically possible set of data (as described by a Data Structure Definition or reference Metadata Structure Definition), and the time period covered by the statistical data and metadata.

2.2.8. Data provider

In SDMX a data provider is an organization which produces data and makes them available for other organizations.

2.2.9. Provision Agreement

Inherent in any statistical exchange – and in many dissemination activities - is a concept of 'service level agreement', even if this is not formalized or made explicit.
It is the set of information which describes the way in which Data sets are provided by a data provider.

2.2.10. Category Scheme

A **Category Scheme** provides a way of classifying data for collection, reporting, or publication. They are made up of a simple hierarchy of **Categories** (a Category may have one or more child Categories), which in SDMX may include any type of useful classification for the organization of data and metadata.

2.2.11. Summary

The Figure 2 below depicts the essential characteristics supported in the SDMX Information Model for data and metadata reporting.

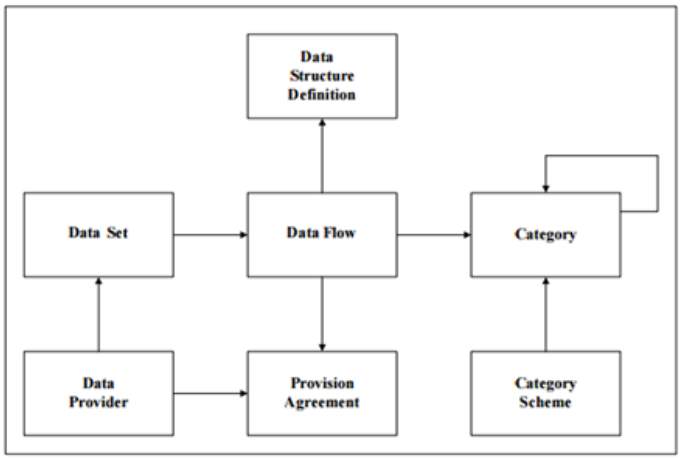


Figure 2: Main elements of the SDMX Information Model

3. SDMX/XBRL-DPM mapping

3.1. Mapping the two information models

The table below identifies the structures that could be fully or partially mapped between the two information models.

SDMX	DPM	Comments
Agency	Owner	In DPM the owner represents an institution that defines concepts of the model. In SDMX the Agency Name and Description are mandatory, so the SDMX Agency always has an Id and Name.
Composition of measure, attributes and dimensions	Metric	In general, these are the parameters that are measured in figures. In DPM metrics define the nature of the measure to be performed. Each metric determines a data type, a period type and additional semantics of their corresponding data points. The corresponding structure in SDMX is a concept corresponding to a dimension together with a unit concept (either an attribute or dimension).
Codelist	Domain	XBRL typed domains with no Members, e.g. integer, are not supported in SDMX.

SDMX	DPM	Comments
Concept/ Dimension/ Attribute	Dimension (explicit or typed)	In the context of a DPM, “dimensions” are used to group information in a meaningful way. Dimensions are used to define "by" conditions and provide structured information to describe a DataPoint in detail. In SDMX, “dimension” is a statistical concept used (most probably together with other statistical concepts) to identify a series, e.g. a statistical concept indicating a particular economic activity or a geographical reference area. Depending on the modelling of the DSD, a concept can be a dimension or an attribute. On the other hand, the XBRL specification does not include the definition of attributes.
Code	Member	In general, DPM Member is corresponding to a “code” in SDMX. Additionally, in the DPM a member may represent also an enumerated value of a Metric, data type or fact). The Code in SDMX contains the Id (the code), and a name and description either or both of which can be multi-lingual.
Default code, fixed code	Default member	DPM Domains contain default members applicable to all dimensions referring to a domain. In most of the cases they represent “Total/Not-applicable” or “Not-applicable” member but sometimes they may take a specific value. In SDMX for each dataflow constraints can be introduced to fix a specific code value for an attribute or dimension.
Relationship parent-child in a code list or Hierarchical codelist	Hierarchy	Hierarchies in XBRL represent a subset of domain members including the possibility of sorting and mathematical operations between members. SDMX relationships parent-child do not cover all functionalities in an XBRL Hierarchy
Category Scheme	Framework	In the DPM, “frameworks” are versioned as taxonomies that are sets of tables (defining graphical representation as well as valid combinations in hypercubes) gathered in modules. In SDMX a framework can be a Category Scheme with the individual Taxonomies being a Category.
Category	Taxonomy	
Time series / Group (siblings) key	Data Point + Entity	Data Point corresponds to a time series key when the entity is added as a dimension to the group key. When a time series is mapped into a data point, the Reference Area should be removed as a dimension and placed as the Entity.

SDMX	DPM	Comments
Data Flow	Module / Table group / Table	In SDMX a data flow is the structure which describes, categorises and constrains the allowable content of a data set that providers will supply for different reference periods. This can correspond to a module, a set of modules, a table or group of tables in DPM, depending on the approach used for modelling the mapping.
DSD	Module / Table group / Table	DSD can correspond to a module, a set of modules, a table or group of tables in DPM, depending on the approach used for modelling the mapping.

3.2. Comparison of SDMX and XBRL-DPM information models

As said before, both models have been created with the objective of the dissemination or exchange of statistical information and supervisory data. However, they have different features, which can make the difference in the decision of using one standard or the other in certain cases, to cover different data types.
The main aspects that are different in both standards are the following:

Entity identification

The reporting entity is usually modelled in SDMX as a dimension, and the value given to the dimension is the identification of the entity the data refer to. In the contrary, in XBRL the entity identifier is included in the instance as an identity identifier, so that it is not included in the definition of the data points.

Period or frequency

SDMX is very time-series oriented, and the reference date is usually modelled as a special dimension which is not part of the series key, but is included in the DSD. In the contrary, XBRL is more oriented to the dissemination of all data points related to a given reference date. In the XBRL taxonomy designed by the EBA for the DPM, the date is included, at the same way as the entity, as a scenario attribute, but it is not directly attached to the data point. The equivalent to an XBRL instance in SDMX is a cross sectional data message.
In the XBRL-DPM the frequency of the data is not defined anywhere, while in a SDMX DSD it can be defined as a dimension. So, there is no possible mapping in this case.

Use of dimensions

In SDMX a time series is univocally identified by a combination of values given to all dimensions defined in the data structure definition (DSD); however, in the DPM taxonomy one data point is identified by a combination of values given to some of the dimensions defined in the taxonomy.

This allows having a large number of dimensions –currently there are 127 dimensions defined in the XBRL taxonomy created based on the DPM-- defined in the taxonomy that are not used in all data points. Obviously, when mapping an XBRL taxonomy to a DSD, technically all dimensions could be included in the DSD, and default values could be applied to the dimensions that do not apply to a certain data point; however, this approach cannot be taken because the DSD would become illegible.

To avoid the problem mentioned in the previous paragraph, one XBRL taxonomy should be mapped to several DSDs, by selecting a subset of DPM dimensions for each one. The decision of which is the most optimal distribution of dimensions for each DSD has to be taken by the designer of the mapping. This decision can be adopted depending on the expected use of the data for analysis or other needs. The easiest way of designing it is to create one DSD per each table, or table group. In any case, a default value should be applied to the dimensions that do not apply to a certain data point.

Metrics vs measure dimensions/attributes

XBRL taxonomies contain many metrics –currently there are 413 metrics defined in the XBRL taxonomy created based on the DPM— that need to be reconverted into dimensions, measure dimensions/attributes or combinations of both in SDMX. Again, this adds one more level of complexity to the mapping, as it has to be leveraged how to design the model depending on the number of metrics that should be added to a certain DSD. The fact that SDMX does not support more than one primary measure does not help to the designer when creating the mapping. Nevertheless, this aspect is currently under discussion in the SDMX community.

Graphical representation

One of the characteristics of XBRL is the so called Table Linkbase. This is a way to create a graphical representation of the data defined in the taxonomy. It is not mandatory in XBRL, but if used, as in the case of the DPM, it cannot be mapped to SDMX, as the latter does not have this feature. This is also under discussion in the SDMX community.

Validation rules

This is one of the key advantages of using XBRL for certain data types: the possibility of defining validation rules –and also transformation rules, but they are not used in the DPM- embedded in the taxonomy. Thanks to this feature, anyone can check the validity of the data included in an XBRL instance by using any XBRL processor.
Regarding SDMX, currently there is no possibility to include validation rules into a DSD. However, there is a new standard promoted by SDMX, called Validation and Transformation Language (VTL), which can be used in the future for this aspect. Currently, there is a task force working in the implementation of VTL in SDMX. Once it is finished, it can be analysed if there is a possibility to map both systems.

Use of attributes

In a DSD, there is the possibility of adding attributes, which give information about the observation values. This characteristic is not present in XBRL and, in consequence, it is not straight forward to map them. In XBRL there are few pre-defined attributes (precision, currency, time period), and in few cases attributes are modelled as dimensions, nevertheless the latter is not common practise, as they are not part of the definition of the data points from a conceptual point of view. . However, technically any attribute that applies to observation values can be mapped by adding a new dimension of metric to the data points.
It is more problematic to define in XBRL attributes for other kind of objects, like instance, module, table, template, … Thus, whenever there are attributes defined at the level of time series, data set, etc. this information is lost when mapping to DPM, unless a new dimension or metric with the same value is added to all relevant data points.

4. SDMX-DPM Case study

The case study that will be done is in both directions, since the challenges are different when the mapping is done.

For the mapping from DPM to SDMX the example file from EBA in Corep containing the tables from C 01.00 to C05.02.

For the mapping from SDMX to the DPM, the DSD for Harmonised indices of consumer prices (HICP – ECB_ICP1) will be used.

4.1. Mapping from DPM to SDMX

When mapping from DPM to SDMX the major challenges is the number of tables and how to model these into one or several DSD(s) and also handling open dimensions.

4.1.1. Modelling consideration

Many considerations have to be taken into account when deciding how to map the XBRL file into the SDMX file. In this case we have only considered the specific mentioned tables as part of the official documentation, but the challenges arise when ever more XBRL tables are added to be contained in only one SDMX DSD file.

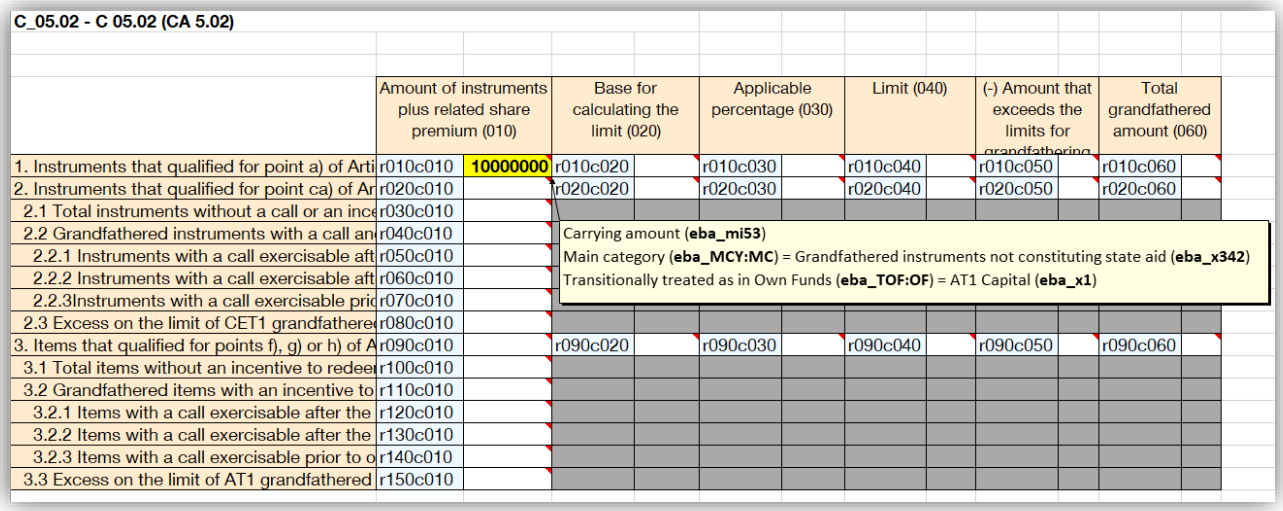
Tables/Table Groups

One way of modelling this would be to use tables belonging to the same table groups in the DPM model. But even there the different structure between the XBRL and SDMX model becomes visible. The example file from EBA only contains the C 05.02 table. This table belongs to a table group with the following templates: C -> 01.00, 02.00, 03.00, 04.00, 05.01, and 05.02. The templates 01.00 to 05.01 use many more dimensions, related to a SDMX modelling, than 05.02. They also don't use the same number of dimensions, in fact they can be very different, so modelling this has some issues that needs to be tackled if doing so.

In the case when using a table group, you would have to have a DSD with many dimensions that is not always used and then use a mechanism where you enable/disable dimensions. This is not covered directly

by the SDMX model, but can of course being achieved with a code from a code list that "disables" a dimension. This is an issue that already exist when only modelling the C 05.02 table, which is described later.

In the example the modelling is done from the single 05.02 table to one DSD, example from EBA, since this describes in a simple way, the transformation but also cover the issue with dimensions not being used.



C_05.02 - C 05.02 (CA 5.02)

		Amount of instruments plus related share premium (010)	Base for calculating the limit (020)	Applicable percentage (030)	Limit (040)	(-) Amount that exceeds the limits for grandfathering	Total grandfathered amount (060)
1. Instruments that qualified for point a) of Arti	r010c010	10000000	r010c020	r010c030	r010c040	r010c050	r010c060
2. Instruments that qualified for point ca) of Ar	r020c010		r020c020	r020c030	r020c040	r020c050	r020c060
2.1 Total instruments without a call or an ince	r030c010						
2.2 Grandfathered instruments with a call an	r040c010						
2.2.1 Instruments with a call exercisable aft	r050c010						
2.2.2 Instruments with a call exercisable aft	r060c010						
2.2.3Instruments with a call exercisable pric	r070c010						
2.3 Excess on the limit of CET1 grandfathere	r080c010						
3. Items that qualified for points f), g) or h) of A	r090c010		r090c020	r090c030	r090c040	r090c050	r090c060
3.1 Total items without an incentive to redeer	r100c010						
3.2 Grandfathered items with an incentive to	r110c010						
3.2.1 Items with a call exercisable after the	r120c010						
3.2.2 Items with a call exercisable after the	r130c010						
3.2.3 Items with a call exercisable prior to o	r140c010						
3.3 Excess on the limit of AT1 grandfathered	r150c010						

Carrying amount (**eba_mi53**)
Main category (**eba_MCY:MC**) = Grandfathered instruments not constituting state aid (**eba_x342**)
Transitionally treated as in Own Funds (**eba_TOF:OF**) = AT1 Capital (**eba_x1**)

4.1.2. Define DSD file

The file from EBA will be modelled into a SDMX DSD file and then create the data file with the same values from the XBRL example file. The DPM model from EBA is also represented with templates in Excel with the different tables, which makes it easier to visualize the transformation from a XBRL table into a DSD in SDMX, when using a taxonomy.

4.1.3. Concepts

The list of SDMX concepts is composed by the XBRL dimensions plus some ad-hoc concepts needed by the SDMX standard coming from other XBRL elements.

- Each XBRL dimension is an SDMX concept:
- Frequency is not an XBRL concept but is implicit in tables.
- Metric in XBRL is also necessary to be added to the ConceptScheme somehow. This element can be split into two SDMX concepts: observation value and metric itself, to represent the definition and the value of the XBRL metric.
- Other concepts like unit, unit multiplier and accuracy coming from implicit information in XBRL tables.

With this, the SDMX ConceptScheme will be:

Concept	Code
Main category	MCY
Callability of the instruments	COI
Transitionally treated as in Own Funds	TOF
Base	BAS
Frequency	FREQ
Metric	METRIC
Unit	UNIT
Unit multiplier	UNIT_MULT
Accuracy of the amount	ACCURACY

SDMX representation:

```
<message:Concepts>
    <structure:ConceptScheme agencyID="ECB" id="ECB_CONCEPTS" version="1.0">
      <structure:Name xml:lang="en">ECB concepts</structure:Name>
      <structure:Concept id="MCY">
        <structure:Name xml:lang="en">Main category</structure:Name>
      </structure:Concept>
      <structure:Concept id="COI">
        <structure:Name xml:lang="en">Callability of instruments</structure:Name>
      </structure:Concept>
      <structure:Concept id="TOF">
        <structure:Name xml:lang="en">Transitionally treated as in Own Funds</structure:Name>
      </structure:Concept>
      <structure:Concept id="BAS">
        <structure:Name xml:lang="en">Base</structure:Name>
      </structure:Concept>
      <structure:Concept id="FREQ">
        <structure:Name xml:lang="en">Frequency</structure:Name>
      </structure:Concept>
      <structure:Concept id="METRIC">
       <structure:Name xml:lang="en">Metric</structure:Name>
      </structure:Concept>
      <structure:Concept id="UNIT">
        <structure:Name xml:lang="en">Unit</structure:Name>
      </structure:Concept>
      <structure:Concept id="UNIT_MULT">
        <structure:Name xml:lang="en">Unit multiplier</structure:Name>
      </structure:Concept>
      <structure:Concept id="ACCURACY">
        <structure:Name xml:lang="en">Accuracy</structure:Name>
      </structure:Concept>
   </structure:ConceptScheme>
</message:Concepts>
```

4.1.4. Codelists

Domains

All the dimensions used in our example table have values associated with a domain in XBRL. These domains are represented in SDMX as codelists, where the values that each dimension can have are defined.

Each domain used in our example table must be defined in a Codelist. To simplify the example, we are going to define one of the cases.

In our example in XBRL, the COI dimension (Callability of the instruments) takes values from the CI domain (Callability of the instruments). In SDMX, we will define the codelist CL_COI with the possible values that the CI domain.

XBRL Values:

Value	Description
x0	Not applicable/ All instruments
x1	Instruments with a call exercisable after the reporting date, and which do not meet the conditions in Article 49 of CRR after the date of effective maturity
x2	Instruments with a call exercisable after the reporting date, and which meet the conditions in Article 49 of CRR after the date of effective maturity
x3	Instruments with a call exercisable prior to or on 20 July 2011, and which do not meet the conditions in Article 49 of CRR after the date of effective maturity
x4	Instruments with a call or an incentive to redeem
x5	Instruments without a call or an incentive to redeem

XBRL representation:

```
<xs:schema xmlns:eba_CI="http://www.eba.europa.eu/xbrl/crr/dict/dom/CI"
targetNamespace="http://www.eba.europa.eu/xbrl/crr/dict/dom/CI" elementFormDefault="qualified" attributeFormDefault="unqualified"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:link="http://www.xbrl.org/2003/linkbase"
xmlns:xbrli="http://www.xbrl.org/2003/instance" xmlns:model="http://www.eurofiling.info/xbrl/ext/model"
xmlns:nonnum="http://www.xbrl.org/dtr/type/non-numeric" xsi:schemaLocation="http://www.xbrl.org/2003/instance
http://www.xbrl.org/2003/xbrl-instance-2003-12-31.xsd http://www.eurofiling.info/xbrl/ext/model
http://www.eurofiling.info/eu/fr/xbrl/ext/model.xsd http://www.xbrl.org/dtr/type/non-numeric http://www.xbrl.org/dtr/type/nonNumeric-
2009-12-16.xsd">
    <xs:import namespace="http://www.xbrl.org/2003/instance" schemaLocation="http://www.xbrl.org/2003/xbrl-instance-2003-12-31.xsd" />
    <xs:import namespace="http://www.eurofiling.info/xbrl/ext/model"
schemaLocation="http://www.eurofiling.info/eu/fr/xbrl/ext/model.xsd" />
    <xs:import namespace="http://www.xbrl.org/dtr/type/non-numeric" schemaLocation="http://www.xbrl.org/dtr/type/nonNumeric-2009-12-
16.xsd" />
    <xs:annotation>
        <xs:appinfo>
            <link:linkbaseRef xlink:href="mem-lab-en.xml" xlink:type="simple"
xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase" xlink:role="http://www.xbrl.org/2003/role/labelLinkbaseRef" />
            <link:linkbaseRef xlink:href="mem-lab-codes.xml" xlink:type="simple"
xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase" xlink:role="http://www.xbrl.org/2003/role/labelLinkbaseRef" />
            <link:linkbaseRef xlink:href="mem-def.xml" xlink:type="simple"
xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase" xlink:role="http://www.xbrl.org/2003/role/definitionLinkbaseRef" />
        </xs:appinfo>
    </xs:annotation>
    <xs:element name="x1" substitutionGroup="xbrli:item" abstract="true" type="nonnum:domainItemType" xbrli:periodType="instant"
model:fromDate="2013-12-01" model:creationDate="2013-12-01" id="eba_x1" />
    <xs:element name="x2" substitutionGroup="xbrli:item" abstract="true" type="nonnum:domainItemType" xbrli:periodType="instant"
model:fromDate="2013-12-01" model:creationDate="2013-12-01" id="eba_x2" />
    <xs:element name="x3" substitutionGroup="xbrli:item" abstract="true" type="nonnum:domainItemType" xbrli:periodType="instant"
model:fromDate="2013-12-01" model:creationDate="2013-12-01" id="eba_x3" />
    <xs:element name="x4" substitutionGroup="xbrli:item" abstract="true" type="nonnum:domainItemType" xbrli:periodType="instant"
model:fromDate="2013-12-01" model:creationDate="2013-12-01" id="eba_x4" />
    <xs:element name="x5" substitutionGroup="xbrli:item" abstract="true" type="nonnum:domainItemType" xbrli:periodType="instant"
model:fromDate="2013-12-01" model:creationDate="2013-12-01" id="eba_x5" />
    <xs:element name="x0" substitutionGroup="xbrli:item" abstract="true" type="nonnum:domainItemType" xbrli:periodType="instant"
model:isDefaultMember="true" model:fromDate="2013-12-01" model:creationDate="2013-12-01" id="eba_x0" />
</xs:schema>
```

SDMX representation:

```
<structure:CodeList id="CL_COI" agencyID="ECB" version="1.0">
  <structure:Name xml:lang="en">Callability of the instruments</structure:Name>
  <structure:Code value="0">
    <structure:Description xml:lang="en">Not applicable / All instruments</structure:Description>
  </structure:Code>
  <structure:Code value="1">
    <structure:Description xml:lang="en">Instruments with a call exercisable after the reporting date, and which do not meet the
                                         conditions in Article 49 of CRR after the date of effective maturity</structure:Description>
  </structure:Code>
  <structure:Code value="2">
    <structure:Description xml:lang="en">Instruments with a call exercisable after the reporting date, and which meet the conditions
                                         in Article 49 of CRR after the date of effective maturity</structure:Description>
  </structure:Code>
  <structure:Code value="3">
    <structure:Description xml:lang="en">Instruments with a call exercisable prior to or on 20 July 2011, and which do not meet the
                                         conditions in Article 49 of CRR after the date of effective maturity</structure:Description>
  </structure:Code>
  <structure:Code value="4">
    <structure:Description xml:lang="en">Instruments with a call or an incentive to redeem</structure:Description>
  </structure:Code>
  <structure:Code value="5">
    <structure:Description xml:lang="en">Instruments without a call or an incentive to redeem</structure:Description>
  </structure:Code>
</structure:CodeList>
```

CL_METRIC

As a special codelist, CL_METRIC will be defined, where the possible values are the different metrics. In our sample XBRL table, as detailed below, 6 metrics are defined:

XBRL Metric	XBRL metric meaning	SDMX attribute	SDMX Dimension/Value
mi53	*m*:Monerary, *i*:Stock, *53*: Carrying amount	Monetary Stock	Carrying amount
mi57	*m*:Monetary, *i*:Stock, 57:	Monetary Stock	Base for calculating the limit for grandfathering of instruments
pi188	*p*:Percentage, *i*:Stock, 188:	Percentage Stock	Calculating transitional adjustments
mi160	*m:Monetary, i:Stock, 160*	Monetary Stock	Limit for grandfathering of instruments not constituting State aid
mi40	*m:Monetary, i:Stock, 40*	Monetary Stock	Amount that exceeds the limit for grandfathering of instruments not constituting State aid
mi243	*m:Monetary, i:Stock, 243*	Monetary Stock	Transitional computable amount

```
<structure:CodeList id="CL_METRIC" agencyID="ECB" version="1.0">
  <structure:Name xml:lang="en">Metric</structure:Name>
  <structure:Code value="mi53">
    <structure:Description xml:lang="en">Carrying amount</structure:Description>
  </structure:Code>
  <structure:Code value="mi57">
    <structure:Description xml:lang="en">Base for calculating the limit for grandfathering of instruments not
constituting State aid</structure:Description>
  </structure:Code>
  <structure:Code value="pi188">
    <structure:Description xml:lang="en">Percentage for calculating transitional
adjustments</structure:Description>
  </structure:Code>
  <structure:Code value="mi160">
    <structure:Description xml:lang="en">Limit for grandfathering of instruments not constituting State
aid</structure:Description>
  </structure:Code>
  <structure:Code value="mi40">
    <structure:Description xml:lang="en">Amount that exceeds the limit for grandfathering of instruments not
constituting State aid</structure:Description>
  </structure:Code>
  <structure:Code value="mi243">
    <structure:Description xml:lang="en">Transitional computable amount</structure:Description>
  </structure:Code>
</structure:CodeList>
```

CL_FREQ

```
<structure:CodeList id="CL_FREQ" agencyID="ECB" version="1.0">
  <structure:Name xml:lang="en">Frecuency</structure:Name>
  <structure:Code value="M">
    <structure:Description xml:lang="en">Monthly</structure:Description>
  </structure:Code>
</structure:CodeList>
```

CL_UNIT

```
<structure:CodeList id="CL_UNIT" agencyID="ECB" version="1.0">
  <structure:Name xml:lang="en">Unit</structure:Name>
  <structure:Code value="PURE">
    <structure:Description xml:lang="en">PURE</structure:Description>
  </structure:Code>
  <structure:Code value="EUR">
    <structure:Description xml:lang="en">EUR</structure:Description>
  </structure:Code>
</structure:CodeList>
```

CL_UNIT_MULT

```
<message:CodeLists>
    <structure:CodeList agencyID="ECB" id="CL_UNIT_MULT" version="1.0">
      <structure:Name xml:lang="en">Scale code list</structure:Name>
      <structure:Code value="0">
        <structure:Description xml:lang="en">Units</structure:Description>
      </structure:Code>
      <structure:Code value="2">
        <structure:Description xml:lang="en">Hundreds</structure:Description>
      </structure:Code>
      <structure:Code value="3">
        <structure:Description xml:lang="en">Thousands</structure:Description>
      </structure:Code>
      ...
    </structure:CodeList>
</message:CodeLists>
```

CL_ACCURACY

```
<message:CodeLists>
    <structure:CodeList agencyID="ECB" id="CL_ACCURACY" version="1.0">
      <structure:Name xml:lang="en">Accuracy code list</structure:Name>
      <structure:Code value="0">
        <structure:Description xml:lang="en">Accurate to units</structure:Description>
      </structure:Code>
      <structure:Code value="-3">
        <structure:Description xml:lang="en">Accurate to thousands</structure:Description>
      </structure:Code>
      <structure:Code value="INF">
        <structure:Description xml:lang="en">Absolutely exact monetary, percentage or other
amount</structure:Description>
      </structure:Code>
      <structure:Code value="-6">
        <structure:Description xml:lang="en">Accurate to millions</structure:Description>
      </structure:Code>
      <structure:Code value="-2">
        <structure:Description xml:lang="en">Accurate to hundreds</structure:Description>
      </structure:Code>
      <structure:Code value="2">
        <structure:Description xml:lang="en">Accurate to cents</structure:Description>
      </structure:Code>
      <structure:Code value="4">
        <structure:Description xml:lang="en">Accurate to a hundredth of a percentage
point</structure:Description>
      </structure:Code>
    </structure:CodeList>
</message:CodeLists>
```

4.1.5. DSD

For each table of the taxonomy (in our example only table C.05.02) a DSD will be defined. The way to define this DSD is by specifying the dimensions, attributes and measure.

Dimensions

Concept	Codelist	Type of dimension
FREQ	CL_FREQ	Frequency Dimension
MCY	CL_MCY	
COI	CL_COI	
TOF	CL_TOF	
BAS	CL_BAS	
METRIC	CL_METRIC	Measure Dimension

Alternatively, the Metric could also be modelled as an attribute. You could go even further and split the information from the Metric into a Dimension and Attribute, by keeping the information about the datatype/dataflow as an attribute and the rest of the information as a dimension, since this is more business related.
In the example we have chosen to keep Metric as a dimension to make it simpler, and also just named the dimension Metric, in an actual implementation a more useful name could of course be used.

In the DSD, an extra dimension, the frequency, has been added as the first dimension. Frequency is not part of the XBRL or DPM model but is fixed at module level. In SDMX, frequency is compulsory when managing time series. It has been a tradition to use this as the first dimension, and this will also be done in this use case.

Attributes

Attributes are part of the XBRL model, but used very limited when comparing it to SDMX. In SDMX it is used to add more information to time series and observations. In our example we have added the normally used attributes like, unit, accuracy, and unit multiplier, etc. Unit and accuracy from XBRL has a direct mapping to the attributes in SDMX, and this is therefore easily done in this example.

Attributes			
Concept	**Codelist**	**Assignment status**	**Attachment level**
UNIT	CL_UNIT	Mandatory	Observation
UNIT_MULT	CL_UNIT_MULT	Mandatory	Observation
ACCURACY	CL_ACCURACY	Mandatory	Observation

Measure

Measure
Concept
OBS_VALUE

```
<structure:KeyFamily id="COREP" agencyID="ECB" version="1.0">
  <structure:Name xml:lang="en">COREP key family</structure:Name>
  <structure:Components>
    <structure:Dimension conceptRef="FREQ" codelist="CL_FREQ" isFrequencyDimension="true"/>
    <structure:Dimension conceptRef="METRIC" codelist="CL_METRIC" isMeasureDimension="true"/>
    <structure:Dimension conceptRef="MCY" codelist="CL_MCY"/>
    <structure:Dimension conceptRef="COI" codelist="CL_COI"/>
    <structure:Dimension conceptRef="TOF" codelist="CL_TOF"/>
    <structure:Dimension conceptRef="BAS" codelist="CL_BAS"/>
    <structure:PrimaryMeasure conceptRef="OBS_VALUE">
      <structure:TextFormat textType="Double"/>
    </structure:PrimaryMeasure>
    <structure:Attribute conceptRef="UNIT" codelist="CL_UNIT" attachmentLevel="Observation"
assignmentStatus="Mandatory"/>
    <structure:Attribute conceptRef="UNIT_MULT" codelist="CL_UNIT_MULT" attachmentLevel="Observation"
assignmentStatus="Mandatory"/>
    <structure:Attribute conceptRef="ACCURACY" codelist="CL_ACCURACY" attachmentLevel="Observation"
assignmentStatus="Mandatory"/>
  </structure:Components>
</structure:KeyFamily>
```

4.1.6. Data file

In the XBRL data Corep instance file we find all the data values. In the example below we concentrate on the value marked with yellow. This value is attached to the contextRef=”2”.

```
<xbrli:context id="c2">
  <xbrli:entity>
    <xbrli:identifier scheme="http://www.eba.europa.eu/fr/dummy">DUMMY</xbrli:identifier>
  </xbrli:entity>
  <xbrli:period>
    <xbrli:instant>2014-03-31</xbrli:instant>
  </xbrli:period>
  <xbrli:scenario>
    <xbrldi:explicitMember dimension="eba_dim:MCY">eba_MC:x342</xbrldi:explicitMember>
    <xbrldi:explicitMember dimension="eba_dim:COI">eba_CI:x5</xbrldi:explicitMember>
    <xbrldi:explicitMember dimension="eba_dim:TOF">eba_OF:x2</xbrldi:explicitMember>
  </xbrli:scenario>
</xbrli:context>
<eba_met:mi53 unitRef="uEUR" decimals="INF" contextRef="c2">100000000.00</eba_met:mi53>
<eba_met:mi57 unitRef="uEUR" decimals="2" contextRef="c2">60000000.00</eba_met:mi57>
<eba_met:pi188 unitRef="uPURE" decimals="4" contextRef="c2">0.8000</eba_met:pi188>
<eba_met:mi160 unitRef="uEUR" decimals="INF" contextRef="c2">48000000000.00</eba_met:mi160>
<eba_met:mi40 unitRef="uEUR" decimals="2" contextRef="c2">-52000000.00</eba_met:mi40>
```

If we model this into the SDMX data file using the DSD as created above, we would get the following dimension keys:

Q:342:5:2:mi53:_Z, Q:342:5:2:mi57:_Z, Q:342:5:2:pi188:_Z, Q:342:5:2:mi160:_Z and Q:342:5:2:mi40:_Z

Which meaning is described in the following table (first dimension key):

Code	Description	Dimension	Code list
Q	Quarterly	FREQ	CL_FREQ
342	Grandfathered instruments not constituting state aid	MCY	CL_MCY
5	Instruments without a call or an incentive to redeem	COI	CL_COI
2	CET1 Capital	TOF	CL_TOF
mi53	Carrying amount (Monetary Stock)	Metric	CL_AT
_Z	Not applicable	BAS	CL_BAS

And the corresponding SDMX generic data file would be:

```
<DataSet>
  <generic:KeyFamilyRef>COREP</generic:KeyFamilyRef>
  <generic:Series>
    <generic:SeriesKey>
      <generic:Value concept="FREQ" value="Q"/>
      <generic:Value concept="METRIC" value="mi53"/>
      <generic:Value concept="MCY" value="342"/>
      <generic:Value concept="COI" value="5"/>
      <generic:Value concept="TOF" value="2"/>
      <generic:Value concept="BAS" value="_Z"/>
    </generic:SeriesKey>
    <generic:Obs>
      <generic:Time>2017-07-01</generic:Time>
      <generic:ObsValue value="100000000"/>
      <generic:Attributes>
        <generic:Value concept="UNIT" value="EUR"/>
        <generic:Value concept="UNIT_MULT" value="0"/>
        <generic:Value concept="ACCURACY" value="INF"/>
      </generic:Attributes>
    </generic:Obs>
  </generic:Series>
<generic:Series>
    <generic:SeriesKey>
      <generic:Value concept="FREQ" value="Q"/>
      <generic:Value concept="METRIC" value="mi57"/>
      <generic:Value concept="MCY" value="342"/>
      <generic:Value concept="COI" value="5"/>
      <generic:Value concept="TOF" value="2"/>
      <generic:Value concept="BAS" value="_Z"/>
    </generic:SeriesKey>
    <generic:Obs>
      <generic:Time>2017-07-01</generic:Time>
      <generic:ObsValue value="600000000"/>
      <generic:Attributes>
        <generic:Value concept="UNIT" value="EUR"/>
        <generic:Value concept="UNIT_MULT" value="0"/>
        <generic:Value concept="ACCURACY" value="2"/>
      </generic:Attributes>
    </generic:Obs>
  </generic:Series>
<generic:Series>
    <generic:SeriesKey>
      <generic:Value concept="FREQ" value="Q"/>
      <generic:Value concept="METRIC" value="pi188"/>
      <generic:Value concept="MCY" value="342"/>
      <generic:Value concept="COI" value="5"/>
      <generic:Value concept="TOF" value="2"/>
      <generic:Value concept="BAS" value="_Z"/>
    </generic:SeriesKey>
    <generic:Obs>
      <generic:Time>2017-07-01</generic:Time>
      <generic:ObsValue value=”0.8000"/>
      <generic:Attributes>
        <generic:Value concept="UNIT" value="PURE"/>
        <generic:Value concept="UNIT_MULT" value="0"/>
        <generic:Value concept="ACCURACY" value="4"/>
      </generic:Attributes>
    </generic:Obs>
  </generic:Series>
<generic:Series>
    <generic:SeriesKey>
      <generic:Value concept="FREQ" value="Q"/>
      <generic:Value concept="METRIC" value="mi160"/>
      <generic:Value concept="MCY" value="342"/>
      <generic:Value concept="COI" value="5"/>
      <generic:Value concept="TOF" value="2"/>
      <generic:Value concept="BAS" value="_Z"/>
    </generic:SeriesKey>
    <generic:Obs>
      <generic:Time>2017-07-01</generic:Time>
      <generic:ObsValue value="48000000000"/>
      <generic:Attributes>
        <generic:Value concept="UNIT" value="EUR"/>
        <generic:Value concept="UNIT_MULT" value="0"/>
        <generic:Value concept="ACCURACY" value="INF"/>
      </generic:Attributes>
    </generic:Obs>
  </generic:Series>
<generic:Series>
    <generic:SeriesKey>
      <generic:Value concept="FREQ" value="Q"/>
      <generic:Value concept="METRIC" value="mi40"/>
      <generic:Value concept="MCY" value="342"/>
      <generic:Value concept="COI" value="5"/>
      <generic:Value concept="TOF" value="2"/>
      <generic:Value concept="BAS" value="_Z"/>
    </generic:SeriesKey>
    <generic:Obs>
      <generic:Time>2017-07-01</generic:Time>
      <generic:ObsValue value="52000000"/>
      <generic:Attributes>
        <generic:Value concept="UNIT" value="EUR"/>
        <generic:Value concept="UNIT_MULT" value="0"/>
        <generic:Value concept="ACCURACY" value="2"/>
      </generic:Attributes>
    </generic:Obs>
  </generic:Series>
</DataSet>
```

4.2. Mapping from SDMX to DPM

Let's suppose we have a set of time series reported by a Data Structure Definition (DSD) with the following artefacts:

$$\{concept_i\}_{i\in I} \cup \{codelist_j\}_{j\in J} \cup DSD \cup CategoryScheme \cup Dataflow$$

Following the DSD, some concepts work as dimensions, some as attributes and one as the measure. This is,

$$\{concept_i\}_{i\in I} = \{attribute_n\}_{n\in N} \cup \{dimension_m\}_{m\in M} \cup measure$$

Example: Harmonised indices of consumer prices, HICP – ECB_ICP1 [3]

The structure of the DSD with dimension and attributes is described in table below:

The structure of the DSD with dimension and attributes is described in table below:

Dimensions			
Concept	**Codelist**	**Mandatory/Conditional**	
FREQ	CL_FREQ	Mandatory	
REF_AREA	CL_AREA_EE	Mandatory	
ADJUSTMENT	CL_ADJUSTMENT	Mandatory	
ICP_ITEM	CL_ICP_ITEM	Mandatory	
STS_INSTITUTION	CL_STS_INSTITUTION	Mandatory	
ICP_SUFFIX	CL_ICP_SUFFIX	Mandatory	
Attributes			
Concept	**Codelist**	**Assignment status**	**Atachment level**
TIME_FORMAT		Mandatory	Series
OBS_STATUS	CL_OBS_STATUS	Mandatory	Observation
OBS_CONF	CL_OBS_CONF	Conditional	Observation
OBS_PRE_BREAK		Conditional	Observation
OBS_COM		Conditional	Observation
BREAKS		Conditional	Series
COLLECTION	CL_COLLECTION	Mandatory	Series
COMPILING_ORG	CL_ORGANISATION	Conditional	Series
DATA_COMP		Conditional	Series
DISS_ORG	CL_ORGANISATION	Conditional	Series
DOM_SER_IDS		Conditional	Series
PUBL_ECB		Conditional	Series
PUBL_MU		Conditional	Series
PUBL_PUBLIC		Conditional	Series
UNIT_INDEX_BASE		Conditional	Series
COMPILATION		Conditional	Series
COVERAGE		Conditional	Series
DECIMALS	CL_DECIMALS	Conditional	Series
SOURCE_AGENCY	CL_ORGANISATION	Conditional	Series
TITLE		Conditional	Series
TITLE_COMPL		Conditional	Series
UNIT	CL_UNIT	Mandatory	Series

Dimensions			
Concept	**Codelist**	**Mandatory/Conditional**	
UNIT_MULT	CL_UNIT_MULT	Mandatory	Series
Measure			
Concept			
OBS_VALUE			

Likewise, let's take into consideration the following SDMX artefacts:

Artefact	ID	Description
Category Scheme	HICP_CS	Category Scheme for HICP data
Category	HICP_C	Category for HICP data
DataFlow	HICP_DF1	Dataflow with ECB_ICP series

4.2.1. Modelling consideration

When modelling a DSD in SDMX into a DPM instance the biggest challenges will be how to handle attributes in the DSD when mapping them to the DPM. A DSD contains Dimensions that will be equal to the dimensions in the DPM and some attributes that are directly mapped to the attributes in the DPM. Some of the attributes are not directly mapped because they, for instance, have different attachment level in SDMX and are not attributes at observation level.

4.2.2. Domains

Domains in DPM are similar to codelists in SDMX. Thus, every single codelist can be rewritten as a domain in DPM.

Example: CL_ICP_ITEM

Note where to locate the code (highlighted in green) and the description (highlighted in yellow) of the value in the DPM file.
Note also where to place the code of the codelist (highlighted in red) in the DPM file. As in DPM, domains are usually coded with two letters, our codelist code CL_ICP_ITEM turns to IC.
Notice also the relationship established in the tab <xs:appinfo> with the other two files.
In grey, the places for the domain of the organisation and the creation date.
Finally, highlighted (in light blue) the need of a default member.

In SDMX:

```
<CodeList id="CL_ICP_ITEM" agencyID="ECB" version="1.0" isFinal="true">
  <Name xml:lang="en">Indices of Consumer Prices classification code list</Name>
  <Code value="000000">
    <Description xml:lang="en">HICP - Overall index</Description>
  </Code>
...
</CodeList>
```

In DPM, we create the folder and the files:

· /dict/dom/**ic/mem_lab_en.xml**

```
<link:linkbase xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xlink="http://www.w3.org/1999/xlink"
               xmlns:link="http://www.xbrl.org/2003/linkbase" xsi:schemaLocation="http://www.xbrl.org/2003/linkbase
               http://www.xbrl.org/2003/xbrl-linkbase-2003-12-31.xsd">
  <link:labelLink xlink:type="extended" xlink:role="http://www.xbrl.org/2003/role/link">
    <link:loc xlink:type="locator" xlink:href="mem.xsd#ecb_x000000" xlink:label="loc_ecb_x000000" />
    <link:label xlink:type="resource" xlink:label="label_ecb_x000000" xml:lang="en"
                xlink:role="http://www.xbrl.org/2003/role/label">HICP - Overall index</link:label>
    <link:labelArc xlink:type="arc" xlink:arcrole="http://www.xbrl.org/2003/arcrole/concept-label"
                   xlink:from="loc_ecb_x000000" xlink:to="label_ecb_x000000" />
...
  </link:labelLink>
</link:linkbase>
```

· /dict/dom/**ic/mem_def.xml**

```
<link:linkbase xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xlink="http://www.w3.org/1999/xlink"
               xmlns:link="http://www.xbrl.org/2003/linkbase" xmlns:xbrldt="http://xbrl.org/2005/xbrldt"
               xsi:schemaLocation="http://www.xbrl.org/2003/linkbase http://www.xbrl.org/2003/xbrl-linkbase-2003-12-31.xsd
               http://xbrl.org/2005/xbrldt http://www.xbrl.org/2005/xbrldt-2005.xsd">
  <link:arcroleRef arcroleURI="http://xbrl.org/int/dim/arcrole/domain-member" xlink:type="simple"
                   xlink:href="http://www.xbrl.org/2005/xbrldt-2005.xsd#domain-member" />
  <link:definitionLink xlink:type="extended" xlink:role="http://www.xbrl.org/2003/role/link">
    <link:loc xlink:type="locator" xlink:href="../exp.xsd#ecb_IC" xlink:label="loc_ecb_IC" />
    <link:loc xlink:type="locator" xlink:href="mem.xsd#ecb_x000000" xlink:label="loc_ecb_x000000" />
    <link:definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/domain-member"
                        xlink:from="loc_ecb_IC" xlink:to="loc_ecb_x000000" order="1" />
...
  </link:definitionLink>
</link:linkbase>
```

· /dict/dom/**mem.xsd**

```
<xs:schema xmlns:ecb_IC="{domain}/xbrl/dict/dom/IC" ...
           targetNamespace="{domain}/xbrl/dict/dom/IC" ...>
... (imports)
  <xs:annotation>
    <xs:appinfo>
      <link:linkbaseRef xlink:href="mem-lab-en.xml" xlink:type="simple"
                        xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"
                        xlink:role="http://www.xbrl.org/2003/role/labelLinkbaseRef"/>
      <link:linkbaseRef xlink:href="mem-def.xml" xlink:type="simple"
                        xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"
                        xlink:role="http://www.xbrl.org/2003/role/definitionLinkbaseRef"/>
    </xs:appinfo>
  </xs:annotation>
  <xs:element name="x000000" type="nonnum:domainItemType" abstract="true" substitutionGroup="xbrli:item"
              id="ecb_x000000" xbrli:periodType="instant" model:isDefaultMember="true"
              model:creationDate="{aaaa-mm-dd}"/>
  ...
</xs:schema>
```

A suggestion for coding SDMX codelist into DPM domains can be seen in the following table:

Codelist	DPM/XBRL
CL_AREA_EE	RA
CL_ADJUSTMENT	AJ
CL_ICP_ITEM	IC
CL_STS_INSTITUTION	ST
CL_ICP_SUFFIX	SU

4.2.3. Dimension

The dimensions mentioned in the table can be mapped directly to dimensions in the DPM. All dimensions in the current version of SDMX are mandatory and should therefore be part of the mapping.

In XBRL the frequency for submitting reports is done on module level and is not part of the taxonomy or DPM. In SDMX the frequency is treated as a dimension. When mapping the frequency from SDMX to the DPM there are 3 different ways this could be tackled:

1. The frequency could be excluded from mapping and treated on module level as it is normally done in the taxonomies/DPM model from EBA

2. The frequency could be treated as other dimension by adding them to the Dimension table and referencing a Domain.

3. The 3rd option would be to map the frequency to the Metric and create a Metric with a combination of Datatype, FlowType and Frequency. This last option will be included in this study case. The dimension TIME_PERIOD will not be mapped since this does not provide any information important for the mapping.

Example: ICP_ITEM

This will give the following dimensions in the DPM model. The name convention used in the DPM is normally that the first 3 letters are the name of the dimension followed by a colon and then the domain name using 2 letters. A suggestion for this name convention will be made in the table, but this is not the main purpose of this exercise, since there are no restrictions on how you want to name the dimensions.

Dimension	DPM/XBRL
REF_AREA	REF:RA
ADJUSTMENT	ADJ:AJ
ICP_ITEM	ICP:IC
STS_INSTITUTION	STS:ST
ICP_SUFFIX	SUF:SU
FREQ	FRQ:FR

Note where to place the code and the description of the dimension in each file.
Also notice the relationship between all files set in the <xs:appinfo> tag in dim.xsd.

In SDMX, all dimensions are defined in the ConceptScheme artefact:

```
<Concepts>
  <ConceptScheme id="HICP" agencyID="ECB" version="1.0" isFinal="true">
    <Name xml:lang="en"> Indices of Consumer Prices classification concept scheme</Name>
    <Concept id="ICP_ITEM" agencyID="ECB" version="1.0" isFinal="true">
      <Name xml:lang="en">Indices of Consumer Prices item</Name>
    </Concept>
  ...
</CodeList>
```

In DPM, we add the following content to these files:

· /dict/dim/**dim-lab-en.xml**:

```
<link:loc xlink:type="locator" xlink:href="dim.xsd#ecb_ICP" xlink:label="loc_ecb_ICP" />
<link:label xlink:type="resource" xlink:label="label_ecb_ICP" xml:lang="en"
            xlink:role="http://www.xbrl.org/2003/role/label">Indices of Consumer Prices item</link:label>
<link:labelArc xlink:type="arc" xlink:arcrole="http://www.xbrl.org/2003/arcrole/concept-label"
               xlink:from="loc_ecb_ICP" xlink:to="label_ecb_ICP" />
```

· /dict/dim/**dim-def.xml**:

```
<link:loc xlink:type="locator" xlink:href="dim.xsd#ecb_ICP" xlink:label="loc_ecb_ICP" />
<link:label xlink:type="resource" xlink:label="label_ecb_ICP" xml:lang="en"
            xlink:role="http://www.xbrl.org/2003/role/label">Indices of Consumer Prices item</link:label>
<link:labelArc xlink:type="arc" xlink:arcrole="http://www.xbrl.org/2003/arcrole/concept-label"
               xlink:from="loc_ecb_ICP" xlink:to="label_ecb_ICP" />
```

· /dict/dim/**dim.xsd**:

```
<xs:schema ...>
...(imports)
  <xs:annotation>
    <xs:appinfo>
      <link:linkbaseRef xlink:href="dim-lab-en.xml" xlink:type="simple"
                        xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"
                        xlink:role="http://www.xbrl.org/2003/role/labelLinkbaseRef"/>
      <link:linkbaseRef xlink:href="dim-def.xml" xlink:type="simple"
                        xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"
                        xlink:role="http://www.xbrl.org/2003/role/definitionLinkbaseRef"/>
    </xs:appinfo>
  </xs:annotation>
  <xs:element name="ICP" type="xbrli:stringItemType" abstract="true" substitutionGroup="xbrldt:dimensionItem"
              nillable="false" id="ecb_ICP" xbrli:periodType="instant" model:creationDate="{aaaa-mm-dd}"/>
...
</xs:schema>
```

4.2.4. Metrics

The metric gives information about the data and flow type in the DPM. There is no direct mapping from SDMX to the DPM for the metric. To successfully map the metric, we have to be able to identify among SDMX dimensions and attributes the Data type and the Flow type.

The Flow type could in some DSDs be a dimension and in other cases this is automatically given by the kind of data that is collected and therefore not necessary to have a value to distinguish between the data. If a dimension or an attribute contains information about the flow type, then this can be mapped to the metric.

The Data type for data collected in SDMX is the primary measure and this is by default a double with the current SDMX standard 2.0. This does not mean that the value collected can't express a value in percentage, so the data type here is not so much the default value but more what type of data the value expresses. A value collected could be 0 or 1, and even the data type is double, this could actually express the data type as a Boolean.

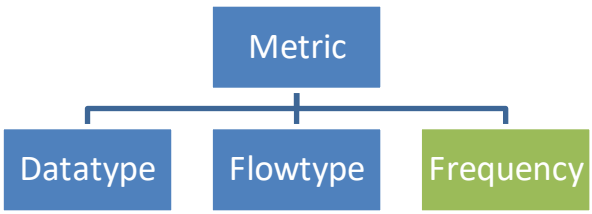
In the example of the ECB_ICP1 DSD, the data collected is a percentage. In terms of the metric that would be «**p**». The data collected can be either stock or flow which means the letter «**i**» or «**d**». So the prefix for the Metric would be «**pi**» or «**pd**».

4.2.4.1. Frequency

As mentioned in 4.2.3, the frequency can be mapped in 3 different ways. In the study case we have chosen to map the frequency to the Metric.

We want to map the frequency to the Metric to not only express the Datatype and Flowtype but also the Frequency. This requires that the Metric changes from not only showing Datatype and Flowtype as a 2 digit combination (xxx_met:**pi**, xxx_met:**pd**, etc.) but to include Frequency as a 3 digit combination (xxx_met:**piq**, xxx_met:**pdm**, etc.) where «**q**» would express quarterly and «**m**» monthly.

In the DPM the Metric references the Datatype and Flowtype tables to express the above. The above implementation then requires that the Metric also references a new table we will call Frequency.



In the table Frequency we add all the values from the codelist CL_FREQ from the SDMX standard. The code value has been changed from capital letter, normally used in SDMX, as to use the same format as in XBRL.

Code	Description
a	Annual
b	Business
d	Daily
e	Event (not supported)
h	Half-yearly
m	Monthly
n	Minutely
q	Quarterly
s	Half Yearly, semester (value H exists but change to S in 2009, move from H to this new value to be agreed in ESCB context)
w	Weekly

Besides having the Metric table referencing the Frequency table it is also necessary to add all the combinations of the 3 letter codes together as a Member code in the Member table referencing the Domain CO. This will be tackled in next point.

4.2.4.2. Attributes

Since the DPM does not specify attributes, they are part of the taxonomy, there is no direct mapping from SDMX to attributes in the DPM. But, however, some attributes can give extra information to the Metric and need to be mapped somehow.

As a way to proceed with the mapping of the attributes, we can start by attributes attached at Observation level. In the example, attributes OBS_STATUS and OBS_CONF, for example.
Assuming codelists CL_OBS_STATUS and CL_OBS_CONF have been mapped to domains, both attributes can go as attributes of the Metric created with the SDMX primary measure (primary metric in this document): obs_status & obs_conf.

Regarding attributes attached to Series level, some specific ones go as attributes of this primary metrics (UNIT, UNIT_MULT and DECIMALS) and the rest can be added as new metrics.

- The TIME_FORMAT defines the format that will be used depending on the frequency. This does not provide any necessary value when mapping to the DPM.

- As said in the previous point, the COLLECTION attribute is used to build the Primary Metric. The codelist this attribute follows is CL_COLLECTION:

Value	Description
A	Average of observations through period
B	Beginning of period
E	End of period
H	Highest in period
L	Lowest in period
M	Middle of period
S	Summed through period
U	Unknown
V	Other
Y	Annualised summed

- UNIT goes always with the Metric. As the Primary Metric is a percentage, the unit must be «xbrli:pure».

- UNIT_MULT can be added as an attribute of the Primary Metric.

- TITLE, TITLE_COMPL, … are new metrics

Summarizing, the code of the Metric is composed by:

1. A letter that represent the datatype

2. A letter that represents the period type (i:instant, d:duration)

3. A letter that represents the frequency

4. A letter that represents the collection

With all this, our possible metrics will be:

Metric	Convention code	Description
pdmA	pd1	Monthly percentage change of the CPI
pdqA	pd5	Quarterly percentage change of the CPI
	sd2	Title
	sd3	Title complement
	sd4	Domain series id
	…	

Accordingly, to the modelling considerations, the metrics in XBRL are defined as depicted below.

Metrics

Display name	Name (en)	Data type	Period type (XBRL)
ecb_pd1 - Monthly percentage change of the CPI	Monthly percentage change of the CPI	Percent	Flow
ecb_sd2 - Title of the time series	Title of the time series	Text	Flow
ecb_sd3 - Title complement	Title complement	Text	Flow
ecb_sd4 - Domain Series Id	Domain Series Id	Text	Flow
ecb_pd5 - Quarterly Percentage Change of the CPI	Quarterly Percentage Change of the CPI	Percent	Flow

And the files that have to be updated are:

In green, the code of the metrics. In yellow, the descriptions. And note how the period type is represented (in blue).

· /dict/met/**met-lab-en.xml**:

```
<link:loc xlink:type="locator" xlink:href="met.xsd#ecb_pd1" xlink:label="loc_ecb_pd1" />
<link:label xlink:type="resource" xlink:label="label_ecb_pd1" xml:lang="en"
            xlink:role="http://www.xbrl.org/2003/role/label">Monthly percentage change of the CPI</link:label>
<link:labelArc xlink:type="arc" xlink:arcrole="http://www.xbrl.org/2003/arcrole/concept-label" xlink:from="loc_ecb_pd1"
               xlink:to="label_ecb_pd1" />
<link:loc xlink:type="locator" xlink:href="met.xsd#ecb_sd2" xlink:label="loc_ecb_sd2" />
<link:label xlink:type="resource" xlink:label="label_ecb_sd2" xml:lang="en"
            xlink:role="http://www.xbrl.org/2003/role/label">Title of the time series</link:label>
<link:labelArc xlink:type="arc" xlink:arcrole="http://www.xbrl.org/2003/arcrole/concept-label" xlink:from="loc_ecb_sd2"
               xlink:to="label_ecb_sd2" />
...
```

· /dict/met/**met-def.xml**:

```
<link:loc xlink:type="locator" xlink:href="met.xsd#ecb_pd1" xlink:label="loc_ecb_pd1" />
<link:label xlink:type="resource" xlink:label="label_ecb_pd1" xml:lang="en"
            xlink:role="http://www.xbrl.org/2003/role/label">Monthly percentage change of the CPI</link:label>
<link:labelArc xlink:type="arc" xlink:arcrole="http://www.xbrl.org/2003/arcrole/concept-label"
               xlink:from="loc_ecb_pd1" xlink:to="label_ecb_pd1" />
<link:loc xlink:type="locator" xlink:href="met.xsd#ecb_sd2" xlink:label="loc_ecb_sd2" />
<link:label xlink:type="resource" xlink:label="label_ecb_sd2" xml:lang="en"
            xlink:role="http://www.xbrl.org/2003/role/label">title of the time series</link:label>
<link:labelArc xlink:type="arc" xlink:arcrole="http://www.xbrl.org/2003/arcrole/concept-label"
               xlink:from="loc_ecb_sd2" xlink:to="label_ecb_sd2" />
...
```

· /dict/dim/**met.xsd**:

```
<xs:schema ...>
...(imports)
  <xs:annotation>
    <xs:appinfo>
      <link:linkbaseRef xlink:href="met-lab-en.xml" xlink:type="simple"
                        xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"
                        xlink:role="http://www.xbrl.org/2003/role/labelLinkbaseRef"/>
      <link:linkbaseRef xlink:href="met-def.xml" xlink:type="simple"
                        xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"
                        xlink:role="http://www.xbrl.org/2003/role/definitionLinkbaseRef"/>
    </xs:appinfo>
  </xs:annotation>
  <xs:element name="pd1" type="xbrli:decimalItemType" substitutionGroup="xbrli:item" nillable="true" id="ecb_pd1"
              xbrli:periodType="duration"/>
  <xs:element name="sd2" type="xbrli:stringItemType" substitutionGroup="xbrli:item" nillable="true" id="ecb_sd2"
              xbrli:periodType="duration"/>

...
</xs:schema>
```

4.2.5. Framework

XBRL frameworks are similar to SDMX category schemes. As we have the following category scheme in SDMX:

```
<str:CategorySchemes>
  <str:CategoryScheme id="HICP_CS" version="1.0" isFinal="false" agencyID="ECB">
  <com:Name xml:lang="en">ECB-ICP categories</com:Name>
    <str:Category id="HICP_C">
      <com:Name xml:lang="en">ECB-ICP category</com:Name>
    </str:Category>
  </str:CategoryScheme>
</str:CategorySchemes>
```

We just need to update the files in XBRL:

· /fws/**fws-lab-en.xml**:

```
<link:loc xlink:type="locator" xlink:href="fws.xsd#ecb_hicp_cs" xlink:label="loc_ecb_hicp_cs" />
<link:label xlink:type="resource" xlink:label="label_ecb_hicp_cs" xml:lang="en"
            xlink:role="http://www.xbrl.org/2003/role/label">ECB-ICP categories</link:label>
<link:labelArc xlink:type="arc" xlink:arcrole="http://www.xbrl.org/2003/arcrole/concept-label"
               xlink:from="loc_ecb_hicp_cs" xlink:to="label_ecb_hicp_cs" />
```

· /fws/**fws.xsd**:

```
<xs:schema ...>
...(imports)
  <xs:annotation>
    <xs:appinfo>
      <link:linkbaseRef xlink:href="fws-lab-en.xml" xlink:type="simple"
                        xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"
                        xlink:role="http://www.xbrl.org/2003/role/labelLinkbaseRef"/>
    </xs:appinfo>
  </xs:annotation>
  <xs:element name="hicp_cs" type="model:frameworkType" abstract="true" substitutionGroup="xbrli:item" nillable="true"
              id="ecb_hipc_cs" xbrli:periodType="duration"/>
...
</xs:schema>
```

And create the folder: . /fws/**hicp_cs/**

4.2.6. Taxonomy

XBRL taxonomies are similar to SDMX categories. Following the category scheme in SDMX described in the previous point:

· /fws/hicp_cs/{normative_code}/{publication_date}/**tax-lab-en.xml**:

```
<link:linkbase xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xlink="http://www.w3.org/1999/xlink"
               xmlns:link="http://www.xbrl.org/2003/linkbase" xsi:schemaLocation="http://www.xbrl.org/2003/linkbase
               http://www.xbrl.org/2003/xbrl-linkbase-2003-12-31.xsd">
  <link:labelLink xlink:type="extended" xlink:role="http://www.xbrl.org/2003/role/link">
    <link:loc xlink:type="locator" xlink:href="tax.xsd#ecb_hicp_c" xlink:label="loc_ecb_hicp_c" />
    <link:label xlink:type="resource" xlink:label="label_ecb_hicp_c" xml:lang="en"
                xlink:role="http://www.xbrl.org/2003/role/label">ECB_ICP category</link:label>
    <link:labelArc xlink:type="arc" xlink:arcrole="http://www.xbrl.org/2003/arcrole/concept-label"
                   xlink:from="loc_ecb_hicp_c" xlink:to="label_ecb_hicp_c" />
  </link:labelLink>
</link:linkbase>
```

· /fws/hicp_cs/{normative_code}/{publication_date}/**tax.xsd**:

```
<xs:schema xmlns:ecb_tax="http://www.ecb.europa.eu/xbrl/fws/hicp_cs/{normative_code}/{publication_date}"
           xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
           xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:xlink="http://www.w3.org/1999/xlink"
           xmlns:link="http://www.xbrl.org/2003/linkbase" xmlns:xbrli="http://www.xbrl.org/2003/instance"
           xmlns:model="http://www.eurofiling.info/xbrl/ext/model"
           targetNamespace="http://www.ecb.europa.eu/xbrl/fws/hicp_cs/{normative_code}/{publication_date}"
           elementFormDefault="qualified" attributeFormDefault="unqualified"
           xsi:schemaLocation="http://www.xbrl.org/2003/instance http://www.xbrl.org/2003/xbrl-instance-2003-12-31.xsd
           http://www.eurofiling.info/xbrl/ext/model http://www.eurofiling.info/eu/fr/xbrl/ext/model.xsd">
  <xs:import namespace="http://www.xbrl.org/2003/instance"
             schemaLocation="http://www.xbrl.org/2003/xbrl-instance-2003-12-31.xsd"/>
    <xs:import namespace="http://www.eurofiling.info/xbrl/ext/model"
               schemaLocation="http://www.eurofiling.info/eu/fr/xbrl/ext/model.xsd"/>
    <xs:annotation>
      <xs:appinfo>
        <link:linkbaseRef xlink:href="tax-lab-en.xml" xlink:type="simple"
                          xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"
                          xlink:role="http://www.xbrl.org/2003/role/labelLinkbaseRef"/>
      </xs:appinfo>
    </xs:annotation>
    <xs:element name="hicp_c" type="model:taxonomyType" abstract="true" substitutionGroup="xbrli:item"
                nillable="true" id="ecb_hicp_c" xbrli:periodType="instant" model:fromDate="{aaaa-mm-dd}"/>
</xs:schema>
```

Note how the version of the taxonomy is represented by means of a normative code (1st level folder) and the publication date of the taxonomy is represented by means of a publication date (2nd level folder).

4.2.7. Modules

XBRL Modules are similar to SDMX Dataflows. We have one Dataflow in SDMX:

```
<str:Dataflows>
  <str:Dataflow id="HICP_DF1" version="1.0" isFinal="false" agencyID="ECB">
    <com:Name xml:lang="en">Dataflow with ECB_ICP series</com:Name>
    <str:Structure>
      <Ref id="ECB-ICP" version="1.0" agencyID="ECB" class="DataStructure" package="datastructure"/>
    </str:Structure>
  </str:Dataflow>
</str:Dataflows>
```

And the following constrainsts associated with it:

```
<str:Constraints>
  <str:ContentConstraint agencyID="ECB" id="HICP_CONSTRAINTS" isFinal="false" type="Allowed" version="1.0">
    <com:Name xml:lang="en">Constraints for the HICP_DF1 dataflow</com:Name>
    <str:ConstraintAttachment>
      <str:Dataflow>
        <Ref package="datastructure" agencyID="ECB" id="HICP_DF1" version="1.0" class="Dataflow"/>
      </str:Dataflow>
    </str:ConstraintAttachment>
    <str:CubeRegion include="true">
      <com:KeyValue id="FREQ">
        <com:Value>M</com:Value>
      </com:KeyValue>
      <com:KeyValue id="REF_AREA">
        <com:Value>DK</com:Value>
        <com:Value>ES</com:Value>
      </com:KeyValue>
      <com:KeyValue id="ADJUSTMENT">
                  <com:Value>N</com:Value>
      </com:KeyValue>
      <com:KeyValue id="ICP_ITEM">
                  <com:Value>000000</com:Value>
                  <com:Value>010000</com:Value>
                  <com:Value>020000</com:Value>
      </com:KeyValue>
      <com:KeyValue id="STS_INSTITUTION">
                  <com:Value>4</com:Value>
      </com:KeyValue>
      <com:KeyValue id="ICP_SUFFIX">
                  <com:Value>ANR</com:Value>
      </com:KeyValue>
    </str:CubeRegion>
  </str:ContentConstraint>
</str:Constraints>
```

In order to represent the SDMX dataflow, one XBRL module will be generated. Therefore, we need the following folder and files:

· /fws/hicp_cs/{normative_code}/{publication_date}/**mod**/

· /fws/hicp_cs/{normative_code}/{publication_date}/mod/**hicp_df1-lab-en.xml**:

```
<link:linkbase xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xlink="http://www.w3.org/1999/xlink"
               xmlns:link="http://www.xbrl.org/2003/linkbase" xsi:schemaLocation="http://www.xbrl.org/2003/linkbase
               http://www.xbrl.org/2003/xbrl-linkbase-2003-12-31.xsd">
  <link:labelLink xlink:type="extended" xlink:role="http://www.xbrl.org/2003/role/link">
    <link:loc xlink:type="locator" xlink:href="hicp_df.xsd#ecb_HICP_DF1"
              xlink:label="loc_eCB_HICP_DF1" />
    <link:label xlink:type="resource" xlink:label="label_ecb_HICP_DF1" xml:lang="en"
                xlink:role="http://www.xbrl.org/2003/role/label">Dataflow with ECB_ICP series</link:label>
    <link:labelArc xlink:type="arc" xlink:arcrole="http://www.xbrl.org/2003/arcrole/concept-label"
                   xlink:from="loc_ecb_HICP_DF1" xlink:to="label_ecb_HICP_DF1" />
  </link:labelLink>
</link:linkbase>
```

· /fws/hicp_cs/{normative_code}/{publication_date}/mod/**hicp_df1-pre.xml**:

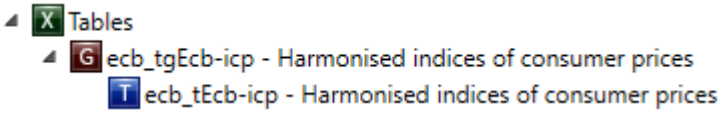
```
<link:linkbase xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:link="http://www.xbrl.org/2003/linkbase" xmlns:gen="http://xbrl.org/2008/generic"
xmlns:label="http://xbrl.org/2008/label" xsi:schemaLocation="http://www.xbrl.org/2003/linkbase
http://www.xbrl.org/2003/xbrl-linkbase-2003-12-31.xsd http://xbrl.org/2008/generic http://www.xbrl.org/2008/generic-
link.xsd http://xbrl.org/2008/label http://www.xbrl.org/2008/generic-label.xsd">
  <link:arcroleRef arcroleURI="http://www.eurofiling.info/xbrl/arcrole/group-table" xlink:type="simple"
xlink:href="http://www.eurofiling.info/eu/fr/xbrl/ext/model.xsd#group-table" />
  <gen:link xlink:type="extended" xlink:role="http://www.xbrl.org/2003/role/link">
    <link:loc xlink:type="locator" xlink:href="hicp_df1.xsd#es_HICP_DF1" xlink:label="loc_es_HICP_DF1" />
    <link:loc xlink:type="locator" xlink:href="../tab/tab.xsd#es_tgEcb-icp" xlink:label="loc_es_tgEcb-icp" />
    <gen:arc xlink:type="arc" xlink:arcrole="http://www.eurofiling.info/xbrl/arcrole/group-table"
xlink:from="loc_es_HICP_DF1" xlink:to="loc_es_tgEcb-icp" order="1" />
    <link:loc xlink:type="locator" xlink:href="../tab/ecb-icp/ecb-icp-rend.xml#es_tEcb-icp" xlink:label="loc_es_tEcb-
icp" />
    <gen:arc xlink:type="arc" xlink:arcrole="http://www.eurofiling.info/xbrl/arcrole/group-table"
xlink:from="loc_es_tgEcb-icp" xlink:to="loc_es_tEcb-icp" order="1" />
  </gen:link>
</link:linkbase>
```

· /fws/hicp_cs/{normative_code}/{publication_date}/mod/**hicp_df1.xsd**:

```
<xs:schema ...>
...(imports)
  <xs:annotation>
    <xs:appinfo>
     <link:linkbaseRef xlink:href="hicp_df1-lab-en.xml" xlink:type="simple"
                       xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"
                       xlink:role="http://www.xbrl.org/2003/role/labelLinkbaseRef"/>
    <link:linkbaseRef xlink:href="../../../../../dict/met/met-def.xml" xlink:type="simple"
                       xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"
                       xlink:role="http://www.xbrl.org/2003/role/definitionLinkbaseRef"/>
    <link:linkbaseRef xlink:href="hicp_df1-pre.xml" xlink:type="simple"
                       xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
    </xs:appinfo>
  </xs:annotation>
...
</xs:schema>
```

4.2.8. Tables/Table groups

As we have only one DSD, there will be only one table group containing a table in our XBRL Taxonomy.



Regarding the definition of the table group, the following structure needs to be created:

· /fws/hicp_cs/{normative_code}/{publication_date}/tab/**tab-lab-en.xml**:

```
<link:loc xlink:type="locator" xlink:href="tab.xsd#ecb_tgEcb-icp" xlink:label="loc_ecb_tgEcb-icp" />
<link:label xlink:type="resource" xlink:label="label_ecb_tbEcb-icp" xml:lang="en"
            xlink:role="http://www.xbrl.org/2003/role/label">Harmonised indices of consumer prices</link:label>
<link:labelArc xlink:type="arc" xlink:arcrole="http://www.xbrl.org/2003/arcrole/concept-label"
               xlink:from="loc_ecb_tgEcb-icp" xlink:to="label_ecb_tgEcb-icp" />
```

· /fws/hicp_cs/{normative_code}/{publication_date}/tab/**tab.xsd**:

```
<xs:schema ...>
...(imports)
  <xs:annotation>
    <xs:appinfo>
      <link:linkbaseRef xlink:href="tab-lab-en.xml" xlink:type="simple"
                        xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"
                        xlink:role="http://www.xbrl.org/2003/role/labelLinkbaseRef"/>
    </xs:appinfo>
  </xs:annotation>
  <xs:element name="tgEcb-icp" type="model:tableGroupType" abstract="true" substitutionGroup="xbrli:item"
              nillable="true" id="ecb_tgEcb-icp" xbrli:periodType="instant" model:creationDate="{aaaa-mm-dd}"/>
...
</xs:schema>
```

· /fws/hicp_cs/{normative_code}/{publication_date}/tab/**tab-pre.xsd**:

```
  <gen:link xlink:type="extended" xlink:role="http://www.xbrl.org/2003/role/link">
    <link:loc xlink:type="locator" xlink:href="../tax.xsd#ecb_hicp_c" xlink:label="loc_ecb_hicp_c" />

    <link:loc xlink:type="locator" xlink:href="tab.xsd#ecb_tgEcb-icp" xlink:label="loc_ecb_tgEcb-icp" />
   <gen:arc xlink:type="arc" xlink:arcrole="http://www.eurofiling.info/xbrl/arcrole/group-table"
xlink:from="loc_ecb_hicp_c" xlink:to="loc_ecb_tgEcb-icp" order="1" />
    <link:loc xlink:type="locator" xlink:href="ecb-icp/ecb-icp-rend.xml#ecb_tEcb-icp" xlink:label="loc_ecb_tEcb-icp" />
    <gen:arc xlink:type="arc" xlink:arcrole="http://www.eurofiling.info/xbrl/arcrole/group-table"
xlink:from="loc_ecb_tgEcb-icp" xlink:to="loc_ecb_tEcb-icp" order="1" />
  </gen:link>
```

Let's consider **ecb-icp** as the name of our table and our table group. Additionally, we consider the following XBRL table rendering:

Ecb-icp

	ObsValue	Title	Title_Compl	DOM_SER_IDS
	1	2	3	4
ADJ:N-FRQ:M-ICP:000000-REF:ES-STS:4-SUF:ANR	r1c1	r1c2	r1c3	r1c4
ADJ:N-FRQ:M-ICP:000000-REF:DK-STS:4-SUF:ANR	r2c1	r2c2	r2c3	r2c4
ADJ:N-FRQ:M-ICP:010000-REF:ES-STS:4-SUF:ANR	r3c1	r3c2	r3c3	r3c4
ADJ:N-FRQ:M-ICP:010000-REF:DK-STS:4-SUF:ANR	r4c1	r4c2	r4c3	r4c4
ADJ:N-FRQ:M-ICP:020000-REF:ES-STS:4-SUF:ANR	r5c1	r5c2	r5c3	r5c4
ADJ:N-FRQ:M-ICP:020000-REF:DK-STS:4-SUF:ANR	r6c1	r6c2	r6c3	r6c4

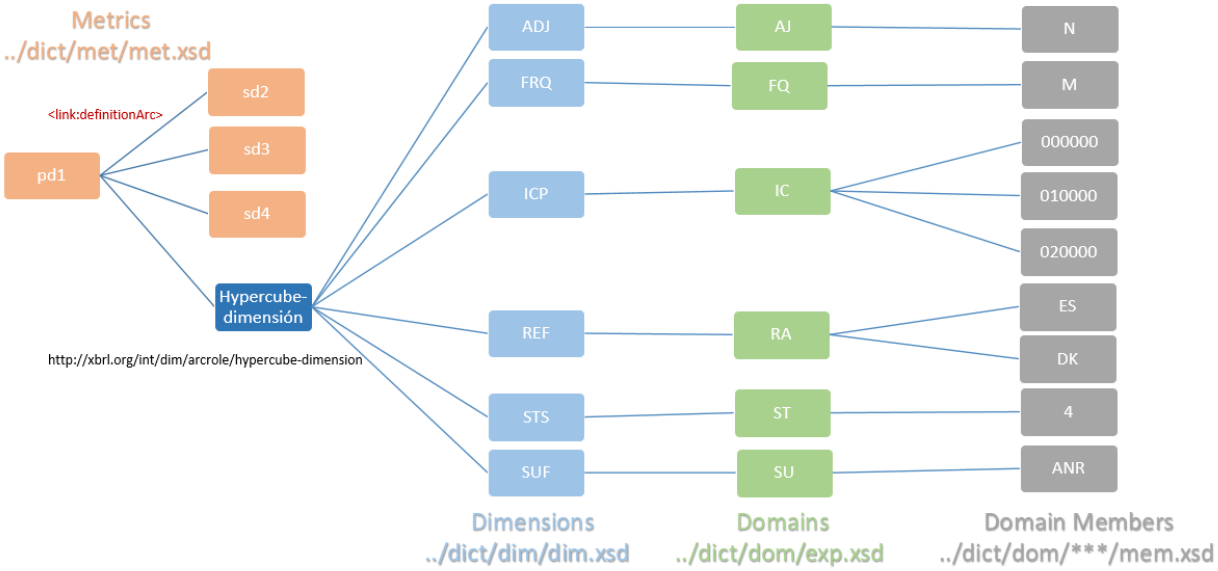
Regarding the table, the following folder has to be created:

· /fws/hicp_cs/{normative_code}/{publication_date}/tab/**ecb-icp**/

In that folder, the following files must be created:

· /fws/hicp_cs/{normative_code}/{publication_date}/tab/**ecb-icp/ecb-icp-def.xml**:

This definition XML file establishes the dimensional structure with the following logic:


Metrics
../dict/met/met.xsd
<link:definitionArc>
pd1
sd2
sd3
sd4
Hypercube-dimensión
http://xbrl.org/int/dim/arcrole/hypercube-dimension
ADJ
FRQ
ICP
REF
STS
SUF
AJ
FQ
IC
RA
ST
SU
N
M
000000
010000
020000
ES
DK
4
ANR
Dimensions
../dict/dim/dim.xsd
Domains
../dict/dom/exp.xsd
Domain Members
../dict/dom/***/mem.xsd

```
<link:linkbase ...>
  <link:arcroleRef arcroleURI="http://xbrl.org/int/dim/arcrole/all" xlink:type="simple"
xlink:href="http://www.xbrl.org/2005/xbrldt-2005.xsd#all" />
  <link:arcroleRef arcroleURI="http://xbrl.org/int/dim/arcrole/dimension-domain" xlink:type="simple"
xlink:href="http://www.xbrl.org/2005/xbrldt-2005.xsd#dimension-domain" />
  <link:arcroleRef arcroleURI="http://xbrl.org/int/dim/arcrole/domain-member" xlink:type="simple"
xlink:href="http://www.xbrl.org/2005/xbrldt-2005.xsd#domain-member" />
  <link:arcroleRef arcroleURI="http://xbrl.org/int/dim/arcrole/hypercube-dimension" xlink:type="simple"
xlink:href="http://www.xbrl.org/2005/xbrldt-2005.xsd#hypercube-dimension" />
  <link:roleRef roleURI="http://www.ecb.europa.eu/role/fws/HICP_CS/tax_normative_code/2019-01-09/tab/Ecb-
icp/1" xlink:type="simple" xlink:href="ecb-icp.xsd#role1" />
  <link:definitionLink xlink:type="extended"
xlink:role="http://www.ecb.europa.eu/role/fws/HICP_CS/tax_normative_code/2019-01-09/tab/Ecb-icp/1">
    <link:loc xlink:type="locator" xlink:href="../../../../../../dict/met/met.xsd#ecb_pd1"
xlink:label="loc_ecb_pd1" />
    <link:loc xlink:type="locator" xlink:href="../../../../../../dict/met/met.xsd#ecb_sd2"
xlink:label="loc_ecb_sd2" />
    <link:definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/domain-member"
xlink:from="loc_ecb_pd1" xlink:to="loc_ecb_sd2" order="1" />

    <rest of metrics...>

    <link:loc xlink:type="locator" xlink:href="http://www.eurofiling.info/eu/fr/xbrl/ext/model.xsd#hyp"
xlink:label="loc_hyp" />
    <link:definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/all"
xlink:from="loc_ecb_pd1" xlink:to="loc_hyp" xbrldt:closed="true" xbrldt:contextElement="scenario"
order="4" />
    <link:loc xlink:type="locator" xlink:href="../../../../../../dict/dim/dim.xsd#ecb_ADJ"
xlink:label="loc_ecb_ADJ" />
    <link:definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/hypercube-
dimension" xlink:from="loc_hyp" xlink:to="loc_ecb_ADJ" order="1" />
    <link:loc xlink:type="locator" xlink:href="../../../../../../dict/dom/exp.xsd#ecb_AJ"
xlink:label="loc_ecb_AJ" />
    <link:definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/dimension-domain"
xlink:from="loc_ecb_ADJ" xlink:to="loc_ecb_AJ" xbrldt:usable="false" order="1" />
    <link:loc xlink:type="locator" xlink:href="../../../../../../dict/dom/aj/mem.xsd#ecb_N"
xlink:label="loc_ecb_N" />
    <link:definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/domain-member"
xlink:from="loc_ecb_AJ" xlink:to="loc_ecb_N" order="1" />
    <link:loc xlink:type="locator" xlink:href="../../../../../../dict/dim/dim.xsd#ecb_FRQ"
xlink:label="loc_ecb_FRQ" />
    <link:definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/hypercube-
dimension" xlink:from="loc_hyp" xlink:to="loc_ecb_FRQ" order="2" />
    <link:loc xlink:type="locator" xlink:href="../../../../../../dict/dom/exp.xsd#ecb_FQ"
xlink:label="loc_ecb_FQ" />
    <link:definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/dimension-domain"
xlink:from="loc_ecb_FRQ" xlink:to="loc_ecb_FQ" xbrldt:usable="false" order="1" />
    <link:loc xlink:type="locator" xlink:href="../../../../../../dict/dom/fq/mem.xsd#ecb_M"
xlink:label="loc_ecb_M" />
    <link:definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/domain-member"
xlink:from="loc_ecb_FQ" xlink:to="loc_ecb_M" order="1" />
    <link:loc xlink:type="locator" xlink:href="../../../../../../dict/dim/dim.xsd#ecb_ICP"
xlink:label="loc_ecb_ICP" />
    <link:definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/hypercube-
dimension" xlink:from="loc_hyp" xlink:to="loc_ecb_ICP" order="3" />
    <link:loc xlink:type="locator" xlink:href="../../../../../../dict/dom/exp.xsd#ecb_IC"
xlink:label="loc_ecb_IC" />
    <link:definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/dimension-domain"
xlink:from="loc_ecb_ICP" xlink:to="loc_ecb_IC" xbrldt:usable="false" order="1" />
    <link:loc xlink:type="locator" xlink:href="../../../../../../dict/dom/ic/mem.xsd#ecb_x000000"
xlink:label="loc_ecb_x000000" />
    <link:definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/domain-member"
xlink:from="loc_ecb_IC" xlink:to="loc_ecb_x000000" order="1" />
    <link:loc xlink:type="locator" xlink:href="../../../../../../dict/dom/ic/mem.xsd#ecb_x010000"
xlink:label="loc_ecb_x010000" />
    <link:definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/domain-member"
xlink:from="loc_ecb_IC" xlink:to="loc_ecb_x010000" order="2" />
    <link:loc xlink:type="locator" xlink:href="../../../../../../dict/dom/ic/mem.xsd#ecb_x020000"
xlink:label="loc_ecb_x020000" />
    <link:definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/domain-member"
xlink:from="loc_ecb_IC" xlink:to="loc_ecb_x020000" order="3" />

    <...ecb_REF, ecb_STS, ...ecb_SIF>

  </link:definitionLink>
</link:linkbase>
```

· /fws/hicp_cs/{normative_code}/{publication_date}/tab/**ecb-icp/ecb-icp-lab-en.xml**:

```
<link:linkbase xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:link="http://www.xbrl.org/2003/linkbase" xmlns:gen="http://xbrl.org/2008/generic"
xmlns:label="http://xbrl.org/2008/label" xsi:schemaLocation="http://www.xbrl.org/2003/linkbase
http://www.xbrl.org/2003/xbrl-linkbase-2003-12-31.xsd http://xbrl.org/2008/generic http://www.xbrl.org/2008/generic-
link.xsd http://xbrl.org/2008/label http://www.xbrl.org/2008/generic-label.xsd">
  <link:arcroleRef arcroleURI="http://xbrl.org/arcrole/2008/element-label" xlink:type="simple"
xlink:href="http://www.xbrl.org/2008/generic-label.xsd#element-label" />
  <link:roleRef roleURI="http://www.xbrl.org/2008/role/label" xlink:type="simple"
xlink:href="http://www.xbrl.org/2008/generic-label.xsd#standard-label" />
  <gen:link xlink:type="extended" xlink:role="http://www.xbrl.org/2003/role/link">
    <link:loc xlink:type="locator" xlink:href="ecb-icp-rend.xml#ecb_a1" xlink:label="loc_ecb_a1" />
    <label:label xlink:type="resource" xlink:label="label_ecb_a1" xml:lang="en"
xlink:role="http://www.xbrl.org/2008/role/label">X</label:label>
    <gen:arc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/2008/element-label" xlink:from="loc_ecb_a1"
xlink:to="label_ecb_a1" />
    <link:loc xlink:type="locator" xlink:href="ecb-icp-rend.xml#ecb_a2" xlink:label="loc_ecb_a2" />
    <label:label xlink:type="resource" xlink:label="label_ecb_a2" xml:lang="en"
xlink:role="http://www.xbrl.org/2008/role/label">Y</label:label>
    <gen:arc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/2008/element-label" xlink:from="loc_ecb_a2"
xlink:to="label_ecb_a2" />
    <link:loc xlink:type="locator" xlink:href="ecb-icp-rend.xml#ecb_c10" xlink:label="loc_ecb_c10" />
    <label:label xlink:type="resource" xlink:label="label_ecb_c10" xml:lang="en"
xlink:role="http://www.xbrl.org/2008/role/label">ADJ:N-FRQ:M-ICP:010000-REF:ES-STS:4-SUF:ANR</label:label>
    <gen:arc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/2008/element-label" xlink:from="loc_ecb_c10"
xlink:to="label_ecb_c10" />
    <link:loc xlink:type="locator" xlink:href="ecb-icp-rend.xml#ecb_c11" xlink:label="loc_ecb_c11" />
    <label:label xlink:type="resource" xlink:label="label_ecb_c11" xml:lang="en"
xlink:role="http://www.xbrl.org/2008/role/label">ADJ:N-FRQ:M-ICP:010000-REF:DK-STS:4-SUF:ANR</label:label>
    <gen:arc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/2008/element-label" xlink:from="loc_ecb_c11"
xlink:to="label_ecb_c11" />
    <link:loc xlink:type="locator" xlink:href="ecb-icp-rend.xml#ecb_c12" xlink:label="loc_ecb_c12" />
    <label:label xlink:type="resource" xlink:label="label_ecb_c12" xml:lang="en"
xlink:role="http://www.xbrl.org/2008/role/label">ADJ:N-FRQ:M-ICP:020000-REF:ES-STS:4-SUF:ANR</label:label>
    <gen:arc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/2008/element-label" xlink:from="loc_ecb_c12"
xlink:to="label_ecb_c12" />
    <link:loc xlink:type="locator" xlink:href="ecb-icp-rend.xml#ecb_c13" xlink:label="loc_ecb_c13" />
    <label:label xlink:type="resource" xlink:label="label_ecb_c13" xml:lang="en"
xlink:role="http://www.xbrl.org/2008/role/label">ADJ:N-FRQ:M-ICP:020000-REF:DK-STS:4-SUF:ANR</label:label>
    <gen:arc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/2008/element-label" xlink:from="loc_ecb_c13"
xlink:to="label_ecb_c13" />
    <link:loc xlink:type="locator" xlink:href="ecb-icp-rend.xml#ecb_c3" xlink:label="loc_ecb_c3" />
    <label:label xlink:type="resource" xlink:label="label_ecb_c3" xml:lang="en"
xlink:role="http://www.xbrl.org/2008/role/label">ObsValue</label:label>
    <gen:arc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/2008/element-label" xlink:from="loc_ecb_c3"
xlink:to="label_ecb_c3" />
    <link:loc xlink:type="locator" xlink:href="ecb-icp-rend.xml#ecb_c5" xlink:label="loc_ecb_c5" />
    <label:label xlink:type="resource" xlink:label="label_ecb_c5" xml:lang="en"
xlink:role="http://www.xbrl.org/2008/role/label">Title</label:label>
    <gen:arc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/2008/element-label" xlink:from="loc_ecb_c5"
xlink:to="label_ecb_c5" />
    <link:loc xlink:type="locator" xlink:href="ecb-icp-rend.xml#ecb_c6" xlink:label="loc_ecb_c6" />
    <label:label xlink:type="resource" xlink:label="label_ecb_c6" xml:lang="en"
xlink:role="http://www.xbrl.org/2008/role/label">Title_Compl</label:label>
    <gen:arc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/2008/element-label" xlink:from="loc_ecb_c6"
xlink:to="label_ecb_c6" />
    <link:loc xlink:type="locator" xlink:href="ecb-icp-rend.xml#ecb_c7" xlink:label="loc_ecb_c7" />
    <label:label xlink:type="resource" xlink:label="label_ecb_c7" xml:lang="en"
xlink:role="http://www.xbrl.org/2008/role/label">DOM_SER_IDS</label:label>
    <gen:arc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/2008/element-label" xlink:from="loc_ecb_c7"
xlink:to="label_ecb_c7" />
    <link:loc xlink:type="locator" xlink:href="ecb-icp-rend.xml#ecb_c8" xlink:label="loc_ecb_c8" />
    <label:label xlink:type="resource" xlink:label="label_ecb_c8" xml:lang="en"
xlink:role="http://www.xbrl.org/2008/role/label">ADJ:N-FRQ:M-ICP:000000-REF:ES-STS:4-SUF:ANR</label:label>
    <gen:arc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/2008/element-label" xlink:from="loc_ecb_c8"
xlink:to="label_ecb_c8" />
    <link:loc xlink:type="locator" xlink:href="ecb-icp-rend.xml#ecb_c9" xlink:label="loc_ecb_c9" />
    <label:label xlink:type="resource" xlink:label="label_ecb_c9" xml:lang="en"
xlink:role="http://www.xbrl.org/2008/role/label">ADJ:N-FRQ:M-ICP:000000-REF:DK-STS:4-SUF:ANR</label:label>
    <gen:arc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/2008/element-label" xlink:from="loc_ecb_c9"
xlink:to="label_ecb_c9" />
    <link:loc xlink:type="locator" xlink:href="ecb-icp-rend.xml#ecb_tEcb-icp" xlink:label="loc_ecb_tEcb-icp" />
    <label:label xlink:type="resource" xlink:label="label_ecb_tEcb-icp" xml:lang="en"
xlink:role="http://www.xbrl.org/2008/role/label">Harmonised indices of consumer prices</label:label>
    <gen:arc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/2008/element-label" xlink:from="loc_ecb_tEcb-icp"
xlink:to="label_ecb_tEcb-icp" />
  </gen:link>
</link:linkbase>
```

· /fws/hicp_cs/{normative_code}/{publication_date}/tab/**ecb-icp/ecb-icp-rend.xml**:

```
<imports…>
<gen:link xlink:type="extended" xlink:role="http://www.ecb.europa.eu/role/fws/HICP_CS/tax_normative_code/2019-01-
09/tab/Ecb-icp">
    <table:table xlink:type="resource" xlink:label="ecb_tEcb-icp" aspectModel="dimensional" id="ecb_tEcb-icp" />
    <table:breakdown xlink:type="resource" xlink:label="ecb_a1" parentChildOrder="parent-first" id="ecb_a1" />
    <table:ruleNode xlink:type="resource" xlink:label="ecb_a1.root" abstract="true" id="ecb_a1.root" />
    <table:breakdownTreeArc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/PWD/2013-05-17/breakdown-tree"
xlink:from="ecb_a1" xlink:to="ecb_a1.root" order="0" />
    <table:ruleNode xlink:type="resource" xlink:label="ecb_c3" id="ecb_c3">
      <formula:concept>
        <formula:qname>ecb_met:pd1</formula:qname>
      </formula:concept>
    </table:ruleNode>
    <table:definitionNodeSubtreeArc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/PWD/2013-05-17/definition-
node-subtree" xlink:from="ecb_a1.root" xlink:to="ecb_c3" order="1" />
    <table:ruleNode xlink:type="resource" xlink:label="ecb_c5" id="ecb_c5">
      <formula:concept>
        <formula:qname>ecb_met:sd2</formula:qname>
      </formula:concept>
    </table:ruleNode>
    <table:definitionNodeSubtreeArc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/PWD/2013-05-17/definition-
node-subtree" xlink:from="ecb_a1.root" xlink:to="ecb_c5" order="2" />
    <table:ruleNode xlink:type="resource" xlink:label="ecb_c6" id="ecb_c6">
      <formula:concept>
        <formula:qname>ecb_met:sd3</formula:qname>
      </formula:concept>
    </table:ruleNode>
    <table:definitionNodeSubtreeArc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/PWD/2013-05-17/definition-
node-subtree" xlink:from="ecb_a1.root" xlink:to="ecb_c6" order="3" />
    <table:ruleNode xlink:type="resource" xlink:label="ecb_c7" id="ecb_c7">
      <formula:concept>
        <formula:qname>ecb_met:sd4</formula:qname>
      </formula:concept>
    </table:ruleNode>
    <table:definitionNodeSubtreeArc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/PWD/2013-05-17/definition-
node-subtree" xlink:from="ecb_a1.root" xlink:to="ecb_c7" order="4" />
    <table:tableBreakdownArc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/PWD/2013-05-17/table-breakdown"
xlink:from="ecb_tEcb-icp" xlink:to="ecb_a1" axis="x" order="1" />
    <table:breakdown xlink:type="resource" xlink:label="ecb_a2" parentChildOrder="parent-first" id="ecb_a2" />
    <table:ruleNode xlink:type="resource" xlink:label="ecb_a2.root" abstract="true" id="ecb_a2.root" />
    <table:breakdownTreeArc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/PWD/2013-05-17/breakdown-tree"
xlink:from="ecb_a2" xlink:to="ecb_a2.root" order="0" />
    <table:ruleNode xlink:type="resource" xlink:label="ecb_c8" id="ecb_c8">
      <formula:explicitDimension dimension="ecb_dim:ADJ">
        <formula:member>
          <formula:qname>ecb_AJ:N</formula:qname>
        </formula:member>
      </formula:explicitDimension>
      <formula:explicitDimension dimension="ecb_dim:FRQ">
        <formula:member>
          <formula:qname>ecb_FQ:M</formula:qname>
        </formula:member>
      </formula:explicitDimension>
      <formula:explicitDimension dimension="ecb_dim:REF">
        <formula:member>
          <formula:qname>ecb_RA:ES</formula:qname>
        </formula:member>
      </formula:explicitDimension>
      <formula:explicitDimension dimension="ecb_dim:ICP">
        <formula:member>
          <formula:qname>ecb_IC:x000000</formula:qname>
        </formula:member>
      </formula:explicitDimension>
      <formula:explicitDimension dimension="ecb_dim:STS">
        <formula:member>
          <formula:qname>ecb_ST:x4</formula:qname>
        </formula:member>
      </formula:explicitDimension>
      <formula:explicitDimension dimension="ecb_dim:SUF">
        <formula:member>
          <formula:qname>ecb_SU:ANR</formula:qname>
        </formula:member>
      </formula:explicitDimension>
    </table:ruleNode>
   <... rest of rows ...>
    <table:definitionNodeSubtreeArc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/PWD/2013-05-17/definition-
node-subtree" xlink:from="ecb_a2.root" xlink:to="ecb_c13" order="6" />
    <table:tableBreakdownArc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/PWD/2013-05-17/table-breakdown"
xlink:from="ecb_tEcb-icp" xlink:to="ecb_a2" axis="y" order="2" />
  </gen:link>
```

· /fws/hicp_cs/{normative_code}/{publication_date}/tab/**ecb-icp/ecb-icp.xsd**:

```
<xs:schema ...>
...(imports)
   <xs:annotation>
    <xs:appinfo>
      <link:linkbaseRef xlink:href="ecb-icp-lab-en.xml" xlink:type="simple"
xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase" />
      <link:linkbaseRef xlink:href="ecb-icp-rend.xml" xlink:type="simple"
xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase" />
      <link:linkbaseRef xlink:href="ecb-icp-def.xml" xlink:type="simple"
xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"
xlink:role="http://www.xbrl.org/2003/role/definitionLinkbaseRef" />
      <link:roleType roleURI="http://www.ecb.europa.eu/role/fws/HICP_CS/tax_normative_code/2019-01-09/tab/Ecb-icp"
id="role">
        <link:usedOn>gen:link</link:usedOn>
      </link:roleType>
      <link:roleType roleURI="http://www.ecb.europa.eu/role/fws/HICP_CS/tax_normative_code/2019-01-09/tab/Ecb-icp/1"
id="role1">
        <link:usedOn>link:definitionLink</link:usedOn>
      </link:roleType>
    </xs:appinfo>
  </xs:annotation>
...
</xs:schema>
```

4.2.9. Instance

An example of a data file from the dataflow ICP from the DSD ECB_ICP is visualized below:

```
<DataSet action="Replace" validFromDate="2018-04-15T14:46:39.963+02:00">
  <generic:KeyFamilyRef>ECB_ICP</generic:KeyFamilyRef>
  <generic:Series>
    <generic:SeriesKey>
      <generic:Value concept="FREQ" value="M"/>
      <generic:Value concept="REF_AREA" value="DK"/>
      <generic:Value concept="ADJUSTMENT" value="N"/>
      <generic:Value concept="ICP_ITEM" value="000000"/>
      <generic:Value concept="STS_INSTITUTION" value="4"/>
      <generic:Value concept="ICP_SUFFIX" value="ANR"/>
    </generic:SeriesKey>
    <generic:Attributes>
      <generic:Value concept="UNIT_MULT" value="0"/>
      <generic:Value concept="DECIMALS" value="1"/>
      <generic:Value concept="DOM_SER_IDS" value="ICPT.M.VAL.HICP.RCH_A.DK.00.M"/>
      <generic:Value concept="UNIT" value="PCCH"/>
      <generic:Value concept="COLLECTION" value="A"/>
      <generic:Value concept="TITLE_COMPL" value="Denmark - HICP - Overall index, Annual rate of change, Eurostat,
Neither seasonally nor working day adjusted"/>
      <generic:Value concept="TITLE" value="HICP - Overall index of Denmark"/>
    </generic:Attributes>
    <generic:Obs>
      <generic:Time>2017-07</generic:Time>
      <generic:ObsValue value="1.5"/>
      <generic:Attributes>
        <generic:Value concept="OBS_STATUS" value="A"/>
        <generic:Value concept="OBS_CONF" value="F"/>
      </generic:Attributes>
    </generic:Obs>
  </generic:Series>
<generic:Series>
    <generic:SeriesKey>
      <generic:Value concept="FREQ" value="M"/>
      <generic:Value concept="REF_AREA" value="ES"/>
      <generic:Value concept="ADJUSTMENT" value="N"/>
      <generic:Value concept="ICP_ITEM" value="000000"/>
      <generic:Value concept="STS_INSTITUTION" value="4"/>
      <generic:Value concept="ICP_SUFFIX" value="ANR"/>
    </generic:SeriesKey>
    <generic:Attributes>
      <generic:Value concept="UNIT_MULT" value="0"/>
      <generic:Value concept="DECIMALS" value="1"/>
      <generic:Value concept="DOM_SER_IDS" value="ICPT.M.VAL.HICP.RCH_A.ES.00.M"/>
      <generic:Value concept="UNIT" value="PCCH"/>
      <generic:Value concept="COLLECTION" value="A"/>
      <generic:Value concept="TITLE_COMPL" value="Spain - HICP - Overall index, Annual rate of change, Eurostat,
Neither seasonally nor working day adjusted"/>
      <generic:Value concept="TITLE" value="HICP - Overall index of Spain"/>
    </generic:Attributes>
    <generic:Obs>
      <generic:Time>2017-07</generic:Time>
      <generic:ObsValue value="2.5"/>
      <generic:Attributes>
        <generic:Value concept="OBS_STATUS" value="A"/>
        <generic:Value concept="OBS_CONF" value="F"/>
      </generic:Attributes>
    </generic:Obs>
  </generic:Series>
</DataSet>
```

The interesting part in the above example is not so much the dimensions, they would be mapped 1:1 so they do not need any further explanation.

When defining a name convention for dimensions, domains and members in XBRL and in the DPM, they are always abbreviated to very few letters, so to do the same in this example this abbreviation will be used:

Type	SDMX	DPM
Dimension	REF_AREA	ecb_dim:REF
Dimension	ADJUSTMENT	ecb_dim:ADJ
Dimension	ICP_ITEM	ecb_dim:ICP
Dimension	STS_INSTITUTION	ecb_dim:STS
Dimension	ICP_SUFFIX	ecb_dim:SUF

Codelist	CL_COLLECTION	ecb_CO
Codelist	CL_REF_AREA	ecb_RA
Codelist	CL_ADJUSTMENT	ecb_AJ
Codelist	CL_ICP_ITEM	ecb_IC
Codelist	CL_STS_INSTITUTION	ecb_ST
Codelist	CL_ICP_SUFFIX	ecb_SU

With the above abbreviations and described mapping an XBRL instance data file will look like this:

```
<xbrli:xbrl xmlns:iso4217="http://www.xbrl.org/2003/iso4217" xmlns:xbrldi="http://xbrl.org/2006/xbrldi"
xmlns:link="http://www.xbrl.org/2003/linkbase" xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:find="http://www.eurofiling.info/xbrl/ext/filing-indicators" xmlns:ecb_dim="http://www.ecb.europa.eu/dict/dim"
xmlns:ecb_met="http://www.ecb.europa.eu/dict/met" xmlns:ecb_AJ="http://www.ecb.europa.eu/dict/dom/AJ"
xmlns:ecb_FQ="http://www.ecb.europa.eu/dict/dom/FQ" xmlns:ecb_RA="http://www.ecb.europa.eu/dict/dom/RA"
xmlns:ecb_IC="http://www.ecb.europa.eu/dict/dom/IC" xmlns:ecb_ST="http://www.ecb.europa.eu/dict/dom/ST"
xmlns:ecb_SU="http://www.ecb.europa.eu/dict/dom/SU" xmlns:xbrli="http://www.xbrl.org/2003/instance">
  <link:schemaRef xlink:type="simple"
xlink:href="http://www.ecb.europa.eu/eu/fr/xbrl/fws/hicp_cs/tax_normative_code/2019-01-09/mod/hicp_df1v2.xsd" />
  <xbrli:unit id="upure">
    <xbrli:measure>xbrli:pure</xbrli:measure>
  </xbrli:unit>
  <xbrli:context id="c1">
    <xbrli:entity>
      <xbrli:identifier scheme="http://standards.iso.org/iso/17442">ECB</xbrli:identifier>
    </xbrli:entity>
    <xbrli:period>
      <xbrli:instant>2019-01-31</xbrli:instant>
    </xbrli:period>
  </xbrli:context>
  <xbrli:context id="c2">
    <xbrli:entity>
      <xbrli:identifier scheme="http://standards.iso.org/iso/17442">ECB</xbrli:identifier>
    </xbrli:entity>
    <xbrli:period>
      <xbrli:startDate>2019-01-01</xbrli:startDate>
      <xbrli:endDate>2019-01-31</xbrli:endDate>
    </xbrli:period>
    <xbrli:scenario>
      <xbrldi:explicitMember dimension="ecb_dim:ADJ">ecb_AJ:N</xbrldi:explicitMember>
      <xbrldi:explicitMember dimension="ecb_dim:FRQ">ecb_FQ:M</xbrldi:explicitMember>
      <xbrldi:explicitMember dimension="ecb_dim:REF">ecb_RA:ES</xbrldi:explicitMember>
      <xbrldi:explicitMember dimension="ecb_dim:ICP">ecb_IC:x000000</xbrldi:explicitMember>
      <xbrldi:explicitMember dimension="ecb_dim:STS">ecb_ST:x4</xbrldi:explicitMember>
      <xbrldi:explicitMember dimension="ecb_dim:SUF">ecb_SU:ANR</xbrldi:explicitMember>
    </xbrli:scenario>
  </xbrli:context>
  <xbrli:context id="c3">
    <xbrli:entity>
      <xbrli:identifier scheme="http://standards.iso.org/iso/17442">ECB</xbrli:identifier>
    </xbrli:entity>
    <xbrli:period>
      <xbrli:startDate>2019-01-01</xbrli:startDate>
      <xbrli:endDate>2019-01-31</xbrli:endDate>
    </xbrli:period>
    <xbrli:scenario>
      <xbrldi:explicitMember dimension="ecb_dim:REF">ecb_RA:DK</xbrldi:explicitMember>
      <xbrldi:explicitMember dimension="ecb_dim:ADJ">ecb_AJ:N</xbrldi:explicitMember>
      <xbrldi:explicitMember dimension="ecb_dim:FRQ">ecb_FQ:M</xbrldi:explicitMember>
      <xbrldi:explicitMember dimension="ecb_dim:ICP">ecb_IC:x000000</xbrldi:explicitMember>
      <xbrldi:explicitMember dimension="ecb_dim:STS">ecb_ST:x4</xbrldi:explicitMember>
      <xbrldi:explicitMember dimension="ecb_dim:SUF">ecb_SU:ANR</xbrldi:explicitMember>
    </xbrli:scenario>
  </xbrli:context>
  <ecb_met:sd3 contextRef="c2">Spain - HICP - Overall index, Annual rate of change, Eurostat, Neither seasonally nor
working day adjusted</ecb_met:sd3>
  <ecb_met:sd4 contextRef="c2"> ICPT.M.VAL.HICP.RCH_A.ES.00.M</ecb_met:sd4>
  <ecb_met:pd1 contextRef="c2" decimals="4" unitRef="upure">0.025</ecb_met:pd1>
  <ecb_met:sd2 contextRef="c2">HICP - Overall index of Spain</ecb_met:sd2>
  <ecb_met:pd1 contextRef="c3" decimals="4" unitRef="upure">0.015</ecb_met:pd1>
  <ecb_met:sd2 contextRef="c3">HICP - Overall index of Denmark</ecb_met:sd2>
  <ecb_met:sd3 contextRef="c3">Denmark - HICP - Overall index, Annual rate of change, Eurostat, Neither seasonally nor
working day adjusted </ecb_met:sd3>
  <ecb_met:sd4 contextRef="c3">ICPT.M.VAL.HICP.RCH_A.DK.00.M</ecb_met:sd4>
  <find:fIndicators>
    <find:filingIndicator contextRef="c1">Ecb-icp</find:filingIndicator>
  </find:fIndicators>
</xbrli:xbrl>
```

5. Bibliography

5.1. Reference bibliography and further information of XBRL-DPM

- Abstract description of the model represented in taxonomies following the DPM approach, EBA reporting framework 2.6. XBRL taxonomy files and supporting documentation

- Representation in XBRL of the Data Point Model, EBA document, public release v1 Date 20/12/2012

[1] https://www.xbrl.org/the-standard/what/an-introduction-to-xbrl/
[2] https://www.eba.europa.eu/documents/10180/632822/Description+of+DPM+formal+model.pdf

5.2. Reference bibliography and further information of SDMX

- The official site for the SDMX community. VTL: https://sdmx.org/?page_id=5096
- SDMX tutorials at Eurostat website. SDMX Information Model. Student book: http://ec.europa.eu/eurostat/web/sdmx-infospace/trainings-tutorials/tutorials

[3] ESCB Registry: https://sreg.escb.eu/data-structures.html