Plutus – A new tool to handle metadata of seasonal adjustment

Keywords: seasonal adjustment, metadata

1. INTRODUCTION

Seasonal adjustment [1, 2, 3] is an everyday step of the statistical business process in the official statistics, therefore a proper system that guarantees the high quality results is important for every National Statistical Institute (NSI). In general we can say that seasonal adjustment needs two types of knowledge: first the mathematical-statistical knowledge which is highly important for time series analysis, and second is the sound knowledge of the specific time series. In an ideal world one person owns all these knowledge but typically this is not the case.

Because of this, NSIs should adapt or create a system which solves this problem. In Europe there are two main scenarios: one is when one person really owns the required knowledge (mathematical-statistical and domain-specific) and can manage the whole statistical business process by himself/herself which does not guarantee standard, common solutions within the whole institute. The other one is the scenario of having experts of the subject-matter domain fields who know really well their time series and experts who know everything about time series analysis (usually methodologists). The aim of this paper to present a system called Plutus[1] that could support seasonal adjustment in an NSI working in an environment as described by the latter scenario with a standard metainformation system in place.

2. DETAILS

The Hungarian Central Statistical Office (hereinafter referred to as: HCSO) operates a centralized internal system for seasonal adjustment. Experts of the Methodology Department work closely together with the colleagues from the subject-matter domain departments. Methodological experts own the knowledge about the time series analysis, the subject-matter experts know everything about their time series.

The annual division of labour has two big runs. At the beginning of every year, before the first publication of seasonally adjusted data in the given year, we make a whole annual revision of the models in case of every time series with software JDemetra+. [4] The Methodology Department is responsible for this task but key information is needed from the subject-matter domains about the specific time series. During the year the subject-matter domains refresh the data and models, however, this part is of the work is also controlled (checked, and if needed, modified) by the Methodology Department.

Figure 1 is a simple flow chart representing our system during a year in case of one time period where blue means tasks for the subject-matter domain departments, green means

[1] The tool is designed to support seasonal adjustment processes with software JDemetra+. Origin of the name: Demeter is the goddess of cultivation and fertility in the ancient Greek mythology. She was the reason for the seasons, seasonality. Plutus was one of her sons, who was the god of wealth. We would like to express the wealth of information with this name.

tasks for the Methodology Department and yellow means tasks for the Dissemination and Publishing Department:

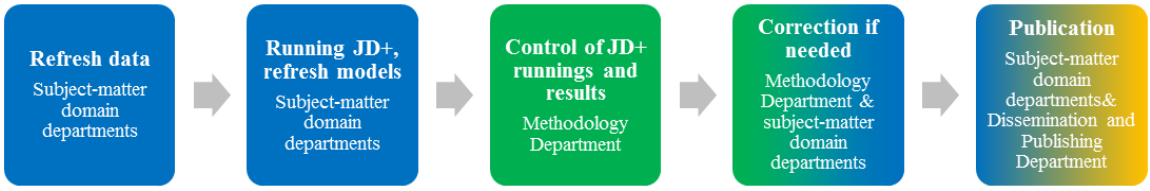

Figure 1. Simple flow chart about the centralized system during a year in case of one time period

How can we ensure quality in this system in case of seasonal adjustment? Until now, at the beginning of every year the Methodology Department sent a questionnaire to the subject-matter domains to collect as much information as possible on their time series to prepare for the annual model revisions. Year after year the HCSO have produced more and more time series and at the same time more and more information on them. This old system cannot be managed anymore. The aim of Plutus is to help the collaboration of colleagues from different departments and solve the problem of increased data set. Especially during the annual model revisions.

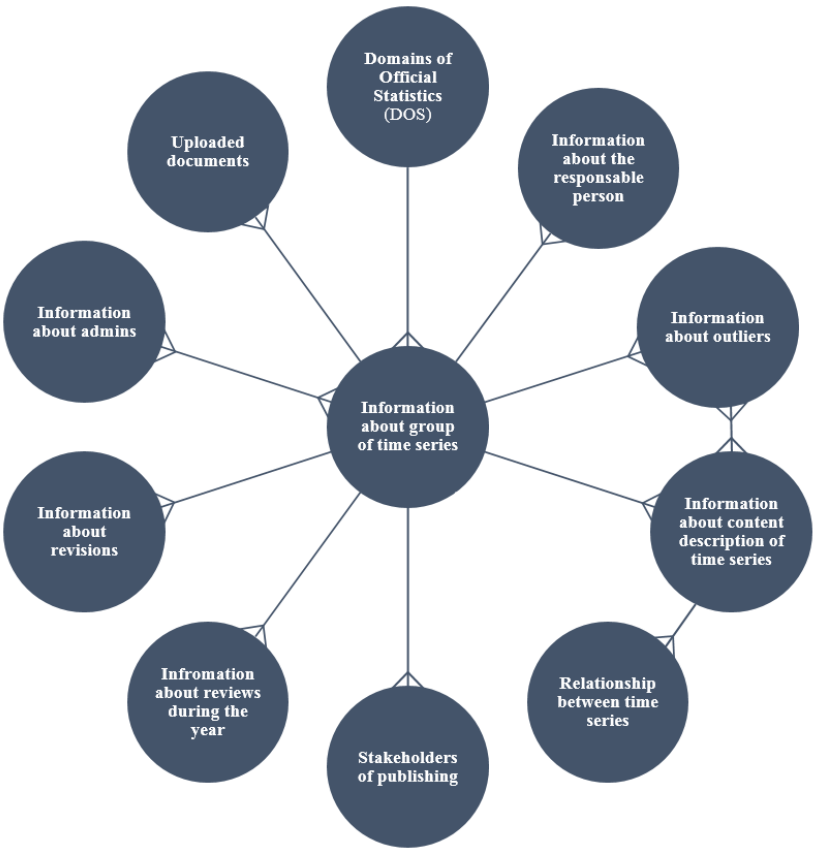

Figure 2 Schematic chart about databases

Plutus is a system of databases with a user friendly interface, fully metadata driven. This new tool is helpful for all cooperating departments because they can see each other's information on their time series. What kind of information does the system have? The base of the databases was the annual questionnaire. On this questionnaire the Methodology Department collected the most important information from the subject-matter domains' experts such as outlier events and information on seasonality, working or trading day

effects, leap year effect and so on. They also collect the revisions' and publications' dates to organize the work during a year. On *figure 2* we can see a schematic chart about the databases and how we organize these collected information.

The biggest advantage of this whole system is that the whole system is more transparent than before and the collected metainformation can be linked to any other metadata object (for example: descriptive information on subject-matter domains). Our colleagues have a reading right to all information which makes their work easier. This is especially true in case of aggregated time series such as the GDP. It also makes the work easier when a new colleague arrives in the HCSO and he/she needs to collect all the information on his/her time series.

One of the most important part of Plutus is that it collects and records information on outliers. During the year, the subject-matter domain experts collect all the events that might cause an outlier in their time series. When they refresh the data in JDemetra+ and an outlier is automatically appears in their model they can check the validity of the outlier. This could help us in detecting data errors as well. The Plutus will have another feature which makes the work easier with the outliers. Based on the plans the tool will be able to read the output type *csv matrix* by JDemetra+ and check the outliers. The system can compare which outlier is in the system, which is in the model and list the differences. The other most important part of Plutus is that it will be connected to the Single Integrated Metadata Structure (SIMS) [5] which connection is really important in case of linking metainformation and thus quality management.

This tool is now under construction and the planned implementation is the next annual revision period in 2019.

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