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Labor Costs and Inflation

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Abstract

In this note we estimate the dynamic relationship between CPI inflation and labor costs.

Introduction

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Data

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The method

I will implement the first basic evaluation methods for the relation between labour costs inflation and price inflation following the first section dispalyed in the ECB's workign paper no.2235. The evaluation will include *cross-correlations and granger causality* tests.

I will use ULC (calculated as the total compensation per sector devided by the real GDP per sector) and use the sector inflation.

The data starts from Q1 2006 because of previously missing data or a change of measurment method for the compensation and sector GDP (from sna93 to cls11).

Next, we tidy the data (each variable is a column, each observation is a row):

Seasonally adjust the data

Next, we plot the data

Figure 1. Year over year percent change

Preapare (nest) the data for the `ccf` and `grangertet` functions

Cross correlations

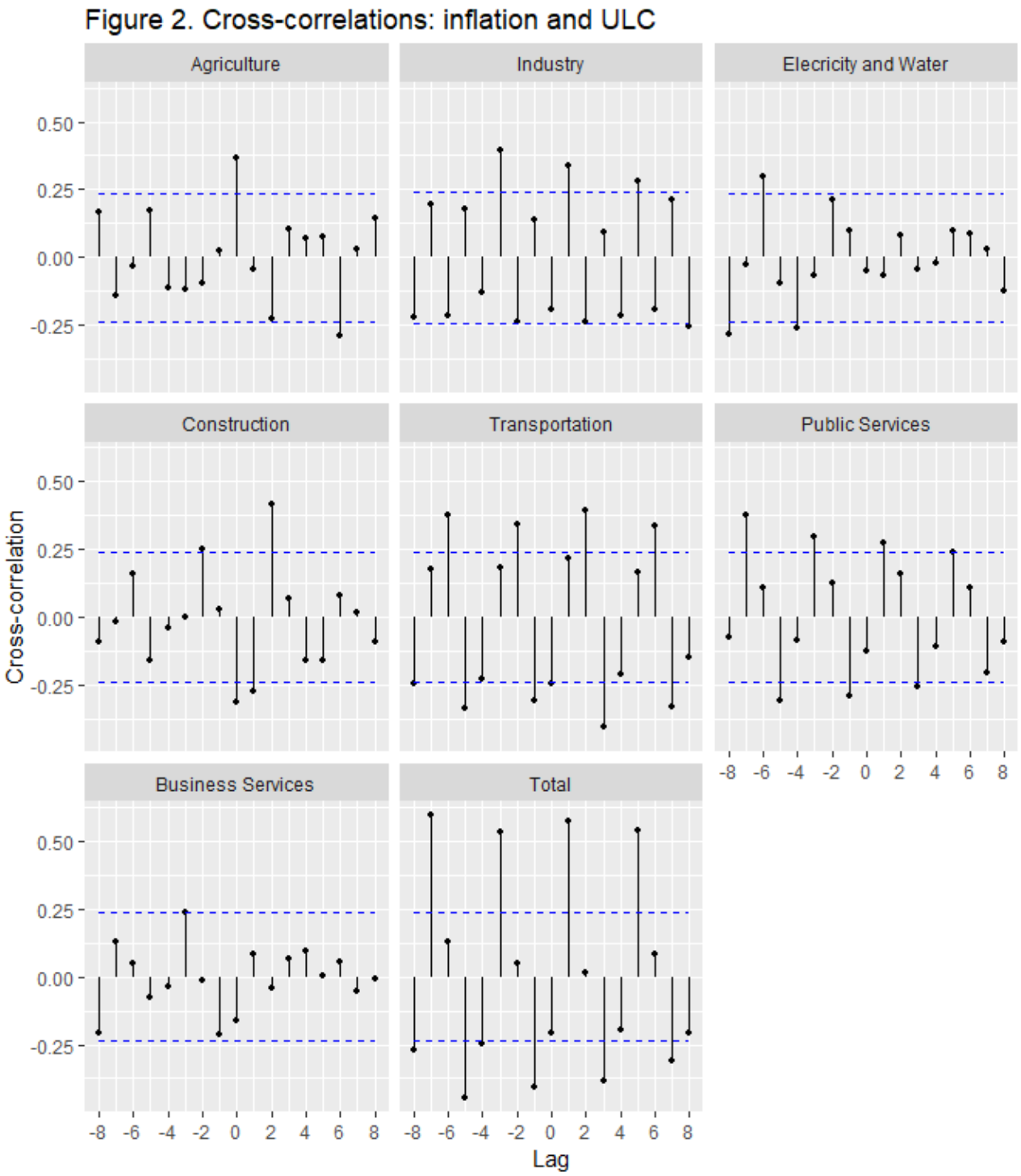
When working with a time series, one important thing we wish to determine is whether one series preceed changes in another. In other words, is there a strong correlation between a time series and another given a number of lags? The way we can detect this is through measuring cross-correlation.

For instance, one time series could serve as a lagging indicator. This is where the effect of a change in one time series transfers to the other time series several periods later. This is quite common in economic data; e.g. an economic shock having an effect on GDP two quarters later.

But how do we measure the lag where this is significant? One very h

Run the `ccf` test on the data by sectors

Plot results



Granger Causality Tests

Let y and x be stationary time series. To test the null hypothesis that x does not Granger-cause y, we run the following linear regression model

$$y_t = a_0 + a_1 y_{t-1} + \cdots + a_p y_{t-p} + \beta_1 x_{t-1} + \cdots + \beta_q x_{t-q} + \varepsilon_t$$

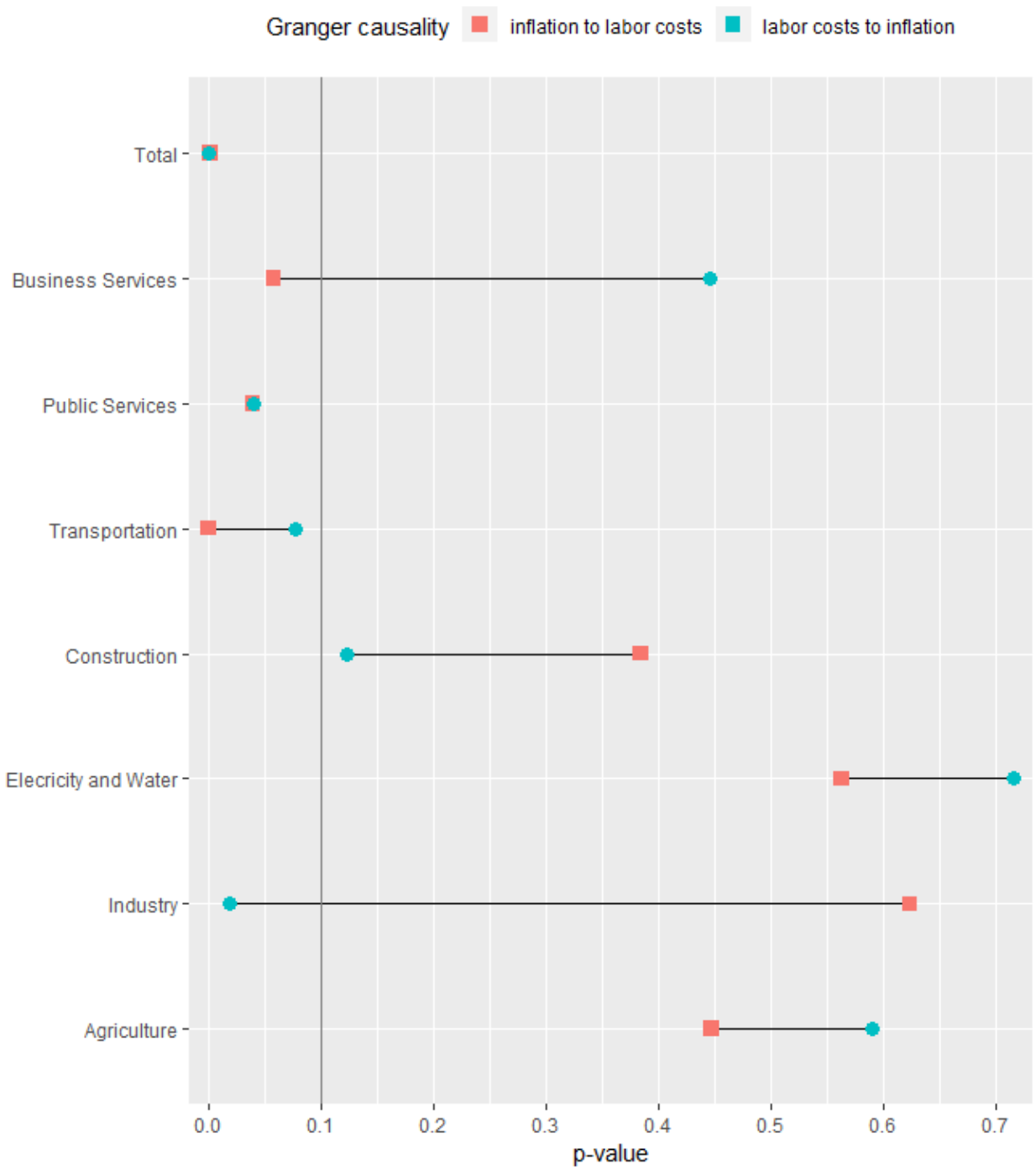
Under the null hypothesis, the coefficients of lagged x are different from zero, i.e.

$$H_0 : \beta_1 = \beta_2 = \cdots = \beta_q = 0 \qquad (x \nrightarrow y),$$

where $(\nrightarrow)$ reads x does not Granger cause y.

The results of the Granger causality tests are given in Figure 3. Three results stand out: unit labor cost Granger causes inflation $(p\text{-value} < 10\%)$, and not vice versa. Similar finding holds for the transportation sector. By contrast, in the agriculture sector, we find that inflation Granger causes unit labor costs. For the rest of the sectors…

Figure 3. Granger causality tests



Refferences