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How Producer and Consumer Price Statistics React on the Fourth Industrial Revolution: A Case Study in Indonesia

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Inflation Targeting as the monetary policy framework in Indonesia challenges Bank Indonesia, the central bank of Indonesia, to always monitor inflation rate to meet its target. The inflation dynamics has been widely researched in order to explore how the behaviour of inflation rate under inflation targeting policy.

Globalization is not a new phenomenon. It covers the development of economic, social, and political dimension. The economic globalization development brings the world's market openness and allows the countries to do the international trade. Globalization may not just have an effect on inflation rates but also may even affect the process of inflation as a whole. (Pehnelt, 2007).

Technology is another important development in the global economy. As digitalization and technology continues to improve, the behaviour of goods and services in the market lead a new pattern on the dynamics of price changes.

Information, Communication, and Technology sector in Indonesia has the highest growth rate during 2010-2014 where in 2014 the growth rate of ICT sector is 10.02 percent higher than agriculture, mining, manufacturing industry, construction, financial services, and other sectors. (Statistics Indonesia 2015). This fact shows that in this current years, the economy of Indonesia has been shifting from industrial era to information and communication era.

The present study has the aim of linking the explicit quantification of globalization and technology and its effect on inflation.

Literature Review

Studies on the interaction between digitalization, globalization, and inflation are being developed. The challenging issues are on how to quantify the digitalization and globalization. Lv, Liu and Xu (2018) construct a model to quantify the contribution of technology and globalization variables to inflation in the United States. This study use producer price index as a proxy for technological effect and output gap of trading partner countries to measure

globalization. The analysis suggest that globalization on domestic inflation has been weakening in the past 20 years, while the impact of technology on inflation has been increasing.

There are various channels through which globalization influence inflation. Globalization may not just have an effect on inflation rates but also may even affect the process of inflation as a whole.

Meanwhile a literature and empirical study by Coffinet and Perillaud (2017) finds that the internet give mixed effects on inflation via three main channels, which are the use of electronic commerce, the consequences on productivity and labour, and the direct effect on the prices index.

International Monetary Fund – IMF (2018) measured the digital economy with one of the findings is that there is largely symmetric effect on price statistics, yielding a slight overestimate of inflation. Insufficient downward adjustment of price indexes in the presence of high quality increases

Data

This study uses quarterly data from BPS-Statistics Indonesia with period 2010-2019. Variables used to estimate the statistical model are 1) π_t core consumer price index (CPI) by excluding volatile and administered price to measure inflation. Using core inflation will be more effective in analysing the globalization effect on inflation fluctuation (Bhatnagar, Cornier and Hess, 2017); 2) $tech_t$ producer price index (PPI) of technical inputs -from computer, electronic products, and smart phone industry to measure technology-inputs, all technical inputs are weight-aggregated with the weights are the contribution of technology price to all price in the economy (Lv, Liu, and Xu, 2019); 3) $global_t$ trade openness index calculated from the ratio of export import value to GDP to measure the economic globalization from international trade.

Methodology

In order to analyse the impact of digitalization and globalization, a modified empirical model based on Lei, Liu, and Xu (2018) is build which is specified as:

$$\pi_t = c + \beta_1 tech_t + \beta_2 global_t + \beta_3 E\pi_t + \varepsilon_t$$

The model is estimated using Autoregressive Distributed Lag (ARDL) model.

Result

Before constructing the empirical model, the first step is tested the stability of each variable using unit root test. This study use Augmented Dickey Fuller Test (ADF) for the unit root methods.

(Table 1 – Result of unit root test)

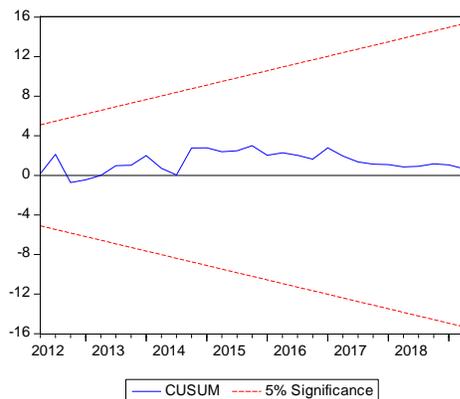
Based on table 1, the first difference stationary variables are the core inflation, technology, and globalization, while expected inflation is stationary at the level. Since the variables are stationary

in the level and first difference and no variable is stationary in the second difference, the ARDL model can be estimated.

Table 2. The Estimation Results of ARDL model

Variables	β (p-value)
c	-0.06 (0.112)
π_{t-1}	-0.54* (0.003)
$tech_t$	-0.29 (0.933)
$tech_{t-1}$	-12.94* (0.001)
$global_t$	-1.09 (0.395)
$global_{t-1}$	0.32 (0.776)
$E\pi_t$	-0.20 (0.685)
Joint Test (F-Statistics)	8.13** (0.000)
Durbin-Watson	2.22
R^2	0.63

In order to see test the stability of the estimation model, CUSUM test is conducted. The result of CUSUM test showed that the estimation model fulfil the stability requirement because all the line patterns do not exceed the red line at 5% significance level.



Graph 1. Stability CUSUM Test

Based on the result of ARDL estimation model showed in Table 2, the decreasing in inflation rate mostly affected by technological-input price on producer level. A one percentage point increase in technology innovation will significantly reduce inflation rate by 12.94 percent. According to Lv, Liu, and Xu (2019), the technology advancement has a direct impact on the

changes in the consumer price. Moreover, it has brought down the price of goods because the possible disinflationary effects of technical application, such as digitalization.

The inflation rate in the last period also affect the current inflation rate, with the increasing of one percent in previous period lead a decline in the current inflation rate by 0.54 percent. This could be happen because of the control of monetary policy on maintaining the inflation rate in its target. Therefore, once the inflation rate increases, monetary policy will respond in order to meet the inflation target.

Unfortunately, the estimation model could not prove the contribution of globalization as well as expectation inflation on the inflation rate.

Conclusion

Digitalization has a significant role on the low inflation rate in Indonesia. However, the contribution of globalization on inflation rate in Indonesia need to be more explored.

Reference

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