doi: 10.36689/uhk/hed/2022-01-052 HED Hradec Economic Days

Impact of Wage Increase and Estimation of Phillips' Curve in Czech Republic

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Abstract: The paper deals with the influence of wage growth on selected economic indicators in the condition of the Czech Republic. The estimate of the Phillips' curve in the conditions of the Czech Republic is constructed as a first step of the analysis, both for the original version, including the link between the change in wages and the unemployment rate, and in a modified form, examining the relationship between inflation and unemployment. The analyzed data show that the relationship between inflation and unemployment rate for the Czech Republic in the period 2005 to 2021 is not such significant ($R^2 = 0.245$), however, there is a stronger link between wage change and unemployment rate ($R^2 = 0.495$). Furthermore, the link between wage growth and consumption of households is examined, as it is referred to as a factor accelerating inflation rate. The data suggest that changes in consumption of households can be explained by 42.7% through wage changes. Thus, the results suggest that wage growth in the conditions of the Czech Republic was related to the low unemployment rate and is partly reflected in the growth of consumption of households, but the link to the accelerating inflation rate is missing.

Keywords: unemployment; inflation; wages; consumption; Phillips' curve

JEL Classification: E24; E31

1. Introduction

The last few years represent a significantly turbulent and unstable time. From the expectations and announcements of the upcoming economic crisis in 2019, through the unexpected and unpredictable effects of the pandemic in 2020, to the growing problems with the functioning of global trade routes and rising commodity prices in 2021. The economic situation in the Czech Republic and the world, is marked by uncertainty and concerns about future developments. Many economies of the Western world, including the Czech economy, are currently struggling with high levels of inflation (Czech National Bank, 2021).

The reasons for the rising price level can be seen in the rising prices of inputs to the production process, in the wake of a wide range of factors from insufficient capacity to meet growing demand, through problems with transport of raw materials in the wake of labor pandemic and unpredictability of the situation (Czech National Bank, 2021). This concept of inflation thus corresponds to cost-pushed inflation, and from the point of view of the Czech economy, due to the significant volume of imports of rising price raw materials, also to imported inflation. Another factor affecting inflation is growing aggregate consumption, stimulated on the one hand by the government's significantly expansionary fiscal policy, but also by growing household consumption. In the conditions of the Czech Republic, in 2020, and

subsequently also in 2021, we were able to observe a significant expansionary fiscal policy of the government to reduce the negative effects of the pandemic on economies (Ministry of Finance of the Czech Republic, 2022). In the area of household consumption, the information varies, from an assessment of a clear increase in household consumption due to long-term and persistent increases in average wages, stimulated by public sector wages (Bartušek, Bouchal, & Janský, 2022), to information on an increase in unused household funds in the form of a significant increase in household savings. because of restrictive anti-pandemic measures (Zábojníková, 2021).

In this context, the average wage therefore plays a significant role, with the potential to affect ongoing inflation at least indirectly. The average wage is linked not only to inflation but also to unemployment. The low unemployment rate that can be observed in the Czech Republic in recent years creates a suitable environment for the active negotiation of working conditions by employees, both existing and potential, including negotiations on wage increases. On the other hand, rising average wages also create the conditions for reducing unemployment by motivating people to enter the labor market, especially if wage growth is accompanied by growth in labor productivity and thus does not limit the ability of producers to increase the number of employees.

2. Methodology

The analysis is performed on economic indicators available through the Czech Statistical Office (2022a, 2022b, 2022c, 2022d)), for the longest possible period that was available for individual combinations of selected indicators. Most data are structured as quarterly data, except for data for the relationship between unemployment and inflation, where monthly data are used. Relationships including unemployment have been assessed for the period since 2005, the relationships between wage changes since 2001, and the relationship between consumption of households and GDP since 1996.

The results of analysis of the mutual relationship of chosen economic indicators presented below are based on the following indicators and data sources.

3. Results

The first relationship, which is presented in the result of the analysis, is an estimate of the derived Phillips' curve (Phelps, 1967). The left part of Figure 1 shows the development of unemployment and inflation by monthly data for the period 2005 to 2021. The data presented identifies the impact of the economically favorable period until 2008, which was reflected in declining unemployment and the growing indication of overheating of Czech economy in 2007 and 2008 and significantly rising inflation. Subsequently, in 2009 and 2010, the impact of the global economic crisis, which also affected the Czech Republic, manifests itself, namely by rising unemployment and a prolonged decline in inflation. The period from 2014 to 2017 is also clearly identifiable, manifested by almost zero inflation and a persistent decline in unemployment. The termination of the monetary commitment regime by the Czech National Bank in 2017 resulted in an increase in inflation to a level of around 2%, thus to a level

corresponding to the Czech National Bank's inflation target. Pandemic affected unemployment since 2020 and there is also the sharp rise in inflation in 2021.

The right part of the Figure 1 presents the relationship between unemployment and inflation. Based on the data, an estimate of the derived Phillips' curve is performed for the period 2005 to 2021 by means of a linear regression analysis using a linear trend to estimate the interconnection. However, the relationship between inflation and unemployment resulting from these data is inversely proportional ($y = -0.4852x + 4.8084$; where y: inflation and x: unemployment), however, this relationship cannot be considered significant ($R^2 = 0.2454$). Thus, it turns out that in the conditions of the Czech Republic, although the Phillips's curve in the period from 2005 to 2021 is valid, from the point of view of the government's economic policy, it does not represent a significant restriction on achieving the currently low inflation and unemployment values.

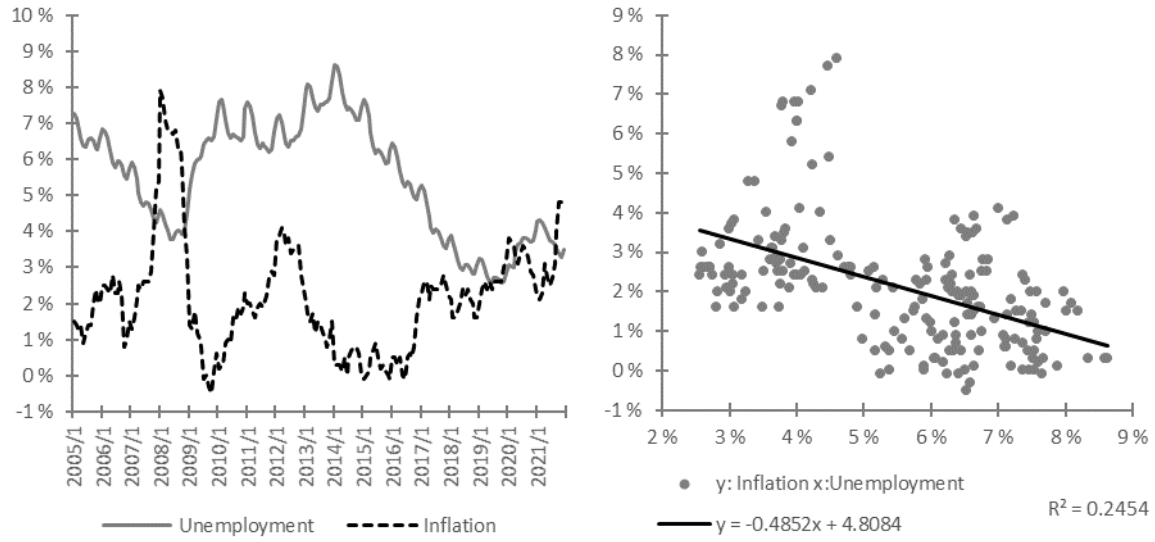

Figure 1. Development of unemployment and inflation in Czech Republic and mutual relationship with estimation of Phillips' Curve

In the next step of the analysis, Figure 2 presents data on unemployment and the rate of change in employees' average wages. Quarterly data for the same period as in the previous case were used, i.e., from 2005 to 2021. Moreover, compared to the already presented development of unemployment, the declining average wage change rate in the period since the outbreak of the economic crisis in 2008 can be identified and the continuing growth since 2014 can be seen in the left part of the Figure 2. The link between the average wage change rate and unemployment, thus the estimate of the original Phillips' curve (Phillips, 1958), is shown in the right part of the figure. Even in this case, the data point to a disproportionate relationship between unemployment and the average wage change rate ($y = -1.1738x + 0.1116$; where y: average wage change rate, x: unemployment) and this relationship is stronger than in the previous case ($R^2 = 0.4953$).

It turns out that the declining unemployment rate increases the average wage change rate and vice versa. This fact is logically justified also because if the volume of the available factor of production in the labor market decreases, its price increases. Thus, potential

employers are supposed to increase wages to acquire future employees, and this also leads to an overall increase in the wages of all employees and thus to an increase in the average wage in the national economy. At the same time, it can be assumed that the rising average wage represents a significant motivating factor that motivates even the inactive part of the population to enter the labor market and leads to a higher volume of employment.

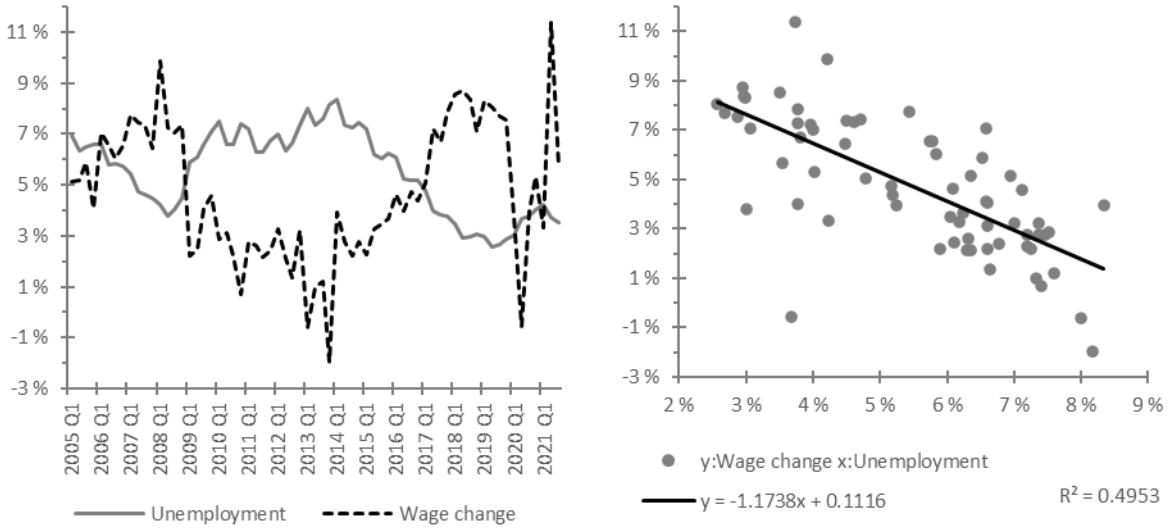

Figure 2. Development of unemployment and wage change in Czech Republic and mutual relationship with estimation of original Phillips' Curve

As pointed out, in the conditions of the Czech Republic, a relationship can be identified between the average wage change rate and unemployment. Therefore, in the next part of the paper, the analysis deals with the relationship between the average wage change rate and other selected economic indicators. From the point of view of employers, rising wages can also be reflected in rising compensation on employees. Figure 3 presents development and mutual relationship of average wage change rate and compensation on employees. It is already clear from the left part of the figure that the two mentioned economic indicators are significantly interconnected. Minor deviations in development, especially in the years 2009-2010 and in the period 2014 to 2019, are probably related to changes in unemployment, resp. total employment. A directly proportional relationship can be identified between the assessed economic indicators ($y = 1.1551x - 0.006$; where y: compensation on employment change rate, x: average wage change rate), within which compensation on employees can be explained from 68.92% by changes in average wage rate.

The average wage represents the income of employed individuals and thus the income of households. These funds can then be used by individual households to provide services to meet their needs. In this way, the average wage is linked to household consumption, and thus the existence of a relationship between the average wage change rate and the consumption of households change rate can be assumed. The analyzed data confirm this assumption, as direct relationship between the mentioned economic indicators is identified ($y = 0.8103x - 0.0023$; where y: consumption of households change rate, x: average wage change rate).

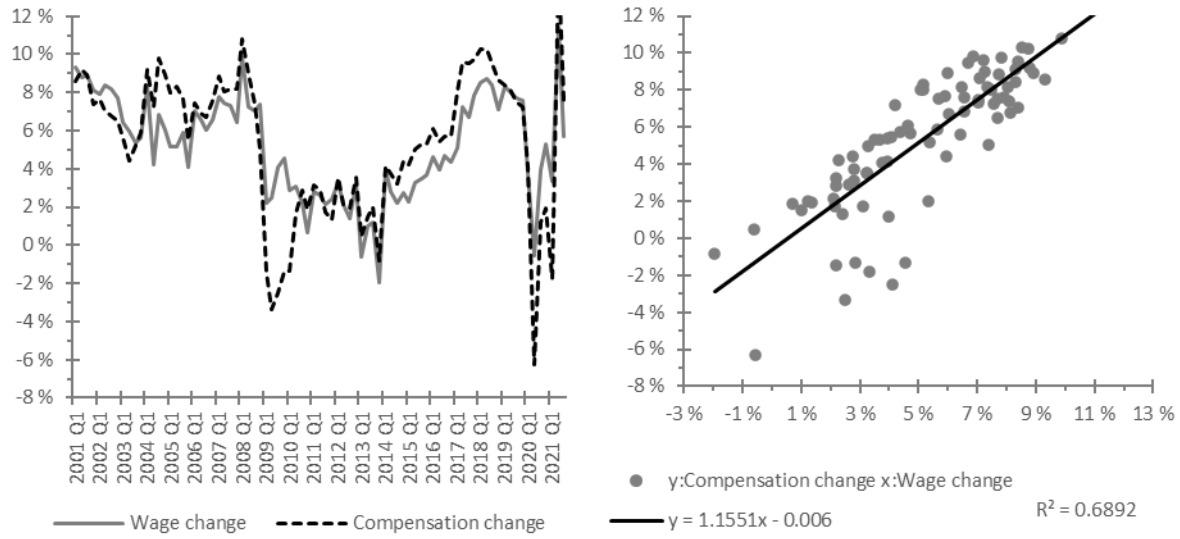

Figure 3. Development of wage change and change in compensation on employees in Czech Republic and mutual relationship with estimation of wage change influence

As the data suggest, consumption of households is not affected only by the average wage, because only 42.73% of consumption of households change rate can be explained by the average wage change rate within the identified relationship. This finding therefore points to the existence of other potential factors affecting consumption of households. Especially in the last 4 years, it can be seen from the left part of the graph that the consumption of households change rate is significantly lower than the average wage change rate. This is likely due to change the propensity to consume of individual households, and other factors influencing (limiting) consumption of households, especially in this period.

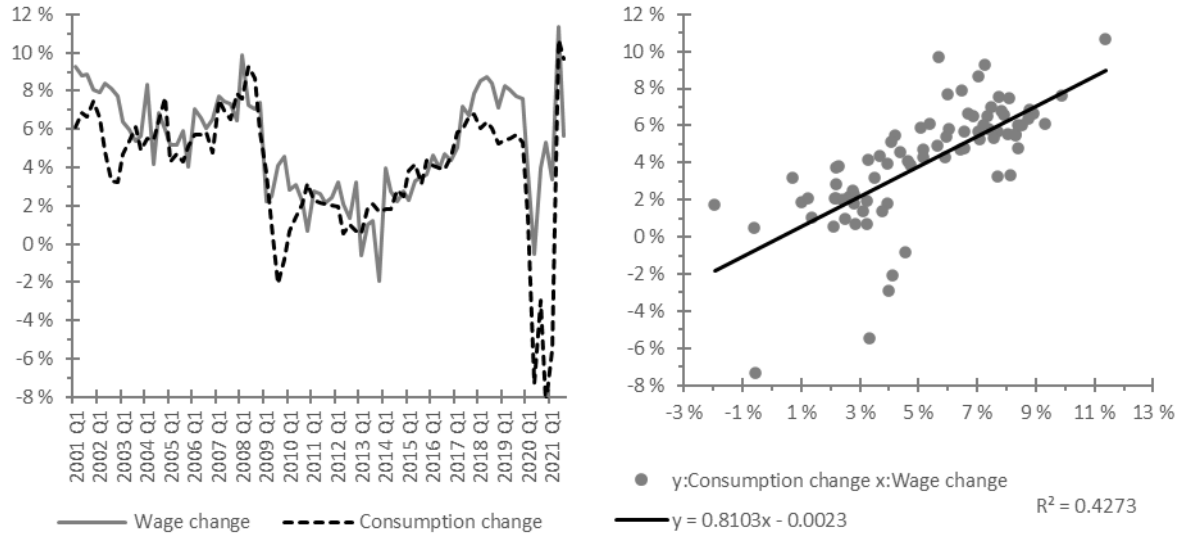

Figure 4. Development of wage change and change in consumption of households in Czech Republic and mutual relationship with estimation of wage change influence

In connection with consumption of households, the last part of the analysis examines its relationship to GDP. Consumption of households represents a significant part of GDP, and

its development is also influenced by the development of consumption of households. In this context, the analysis also shows a strong (R^2 = 0.7169) direct ratio of consumption of households change rate to GDP change rate (y = 0.8257x – 0.0124; where y: GDP change rate, x: consumption of households change rate).

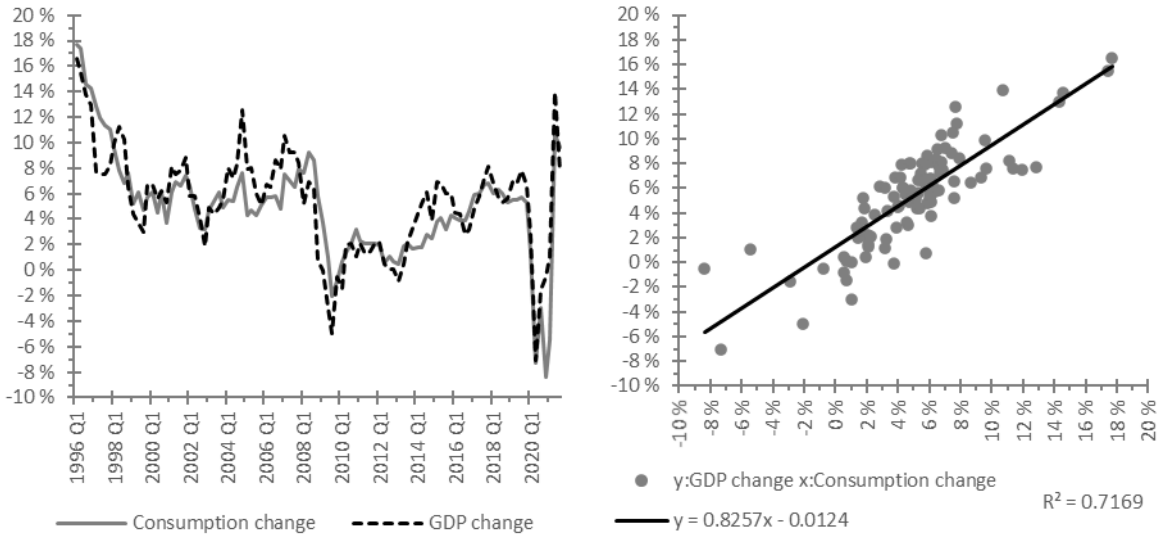

Figure 5. Development of change in consumption of households and change in GDP in Czech Republic and mutual relationship with estimation of consumption of households change influence

4. Discussion

The presented results of the Phillips' curve estimation point to some doubts about this relationship, especially in connection with its derived version. Although the link between inflation and unemployment in the conditions of the Czech Republic was identified based on the presented data, this link cannot be considered significant. The strength of the link would be increased by dividing the overall analyzed period 2005-2021 into at least two consecutive periods (for example, the division to periods 2005-2012 and 2013-2021 would increase the coefficient of determination for both periods to the value higher than 0.5). The results are therefore consistent with the findings reported in another study, where a standard Phillips' curve was identified not only in the conditions of the Czech Republic, but also in other V4 countries (Kadeřábková, Jašová, & Holman, 2020). However, the results contradict the study, which focused on estimating the Phillips' curve in the conditions of the Czech Republic in the same overall period (Krulický, Šanderová, & Dolejš, 2022). The verification of the Phillips' curve seems to be significantly influenced by the choice of period and by the methodological approach for its verification.

Furthermore, the results show that although average wages in the Czech Republic have been growing over the last two years, and although this means a logical increase in personnel costs for companies, their growth is not reflected in changes in domestic consumption. In the last two years, it has lagged average wages, so the data point to the existence of unused household disposable income, which is reflected in an increase in savings. The findings therefore correspond to the report of the Czech Statistical Office mapping the development of chosen economic indicators in 2020 (Zábojníková, 2021). On the other hand, in accordance

with Zábojníková and Kamenický (2021), the data point out that consumption of households has a significant effect on GDP in the Czech Republic.

According to the data, it seems that the average wage affects unemployment indirectly, and directly consumption of households, through which it also affects GDP. Unemployment, on the other hand, is disproportionate to inflation. From this, it can be assumed that there is a directly proportional relationship between the average wage and inflation. However, this relationship is not verified in the paper, because data sets do not match, while monthly data are used for inflation and quarterly data for the average wage. Thus, the existence of a wage-inflationary spiral cannot be assessed.

5. Conclusions

The paper presents an estimate of the original and derived Phillips' curve in the conditions of the Czech Republic for the period 2005 to 2021. The data indicate the existence of a derived Phillips' curve, i.e., disproportionate relationship between inflation and unemployment, although this relationship is not such strong ($R^2 = 0.2454$). In the case of the original Phillis curve, the data suggest a stronger link ($R^2 = 0.4953$) between the average wage change rate and unemployment. In this context, the relationship between the average wage change rate in relation to compensation of employees is further analyzed. The results indicate that other factors, such as the growth of total employment, also influence the development of compensation on employees. The average wage change rate also affects consumption of households, but data suggest that since 2017, consumption of households has been affected by factors other than the average wage change rate, especially after 2019, it can be assumed, that these factors are government restrictions in connection to pandemic.

Given the current development of inflation, i.e., its sharp rise in 2021 and the assumptions for maintaining a relatively high rate in the coming period, we can expect a persistently low unemployment rate in the Czech Republic according to the results of the analysis. In this context, continuing trend of average wage growth can also be expected.

However, these factors are not necessarily reflected in consumption of households, which, as the analyzed data suggest, is also influenced by other factors. If further measures would be taken to reduce consumption of households (such as increasing interest rates, which also affect the propensity to consume individual households), due to thesis that the current high rate of inflation is caused mainly due to excessive consumption of households, then impact on GDP could be seen. GDP growth could slow significantly, or GDP could decline. This assumption is further supported by the announced restrictive government policy, which would also negatively affect potential GDP growth.

Conflict of interest: none

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