UDC: 336.748.12:331.56(497.7)"2010/2016"
336.748.12:338.31(497.7)"2010/2016"
Original scientific paper

THE DETERMINANTS OF CORE INFLATION IN THE REPUBLIC OF MACEDONIA

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Abstract

We investigate the determinants of core inflation in Macedonia and show that the most important drivers of the cumulative core inflation in the post crisis period i.e. between 2010-16 relative to 2008-09 are underutilization of labor in the form of involuntary part-time employment and headline unemployment rate. Both indicators have contributed positively to cumulative core inflation since 2015 but headline unemployment rate much less so. The contribution of trend productivity growth has remained negligible. Sluggishness in core inflation faced against the background of relatively buoyant activity in the post-crisis period—has corresponded with slow pass through from declining unemployment rates to faster wage growth. We suggest that core inflation rates in Macedonia will likely remain low unless wage growth speeds-up beyond productivity growth more sustainably.

Keywords: *Core inflation, unemployment, productivity, underemployment*

JEL classifications*: E2, E24, C22*

1. Introduction

Low and stable inflation is essential for macroeconomic stability and sound financial system. High inflation erodes the purchasing power and distorts the income distribution in favor of high-income households. The role of the central bank is to achieve price stability which in turn will lead to predictable economic environment, hence improve income distribution and reduce poverty. The central bank can choose different tools and various monetary policy channels to achieve price stability.

Inflation has slowed-down markedly in many economies over the last 7-8 years. According to the IMF – WEO 2016 Report, the subdued inflation coincided with a

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sharp drop in oil and other commodity prices, thus core inflations, (i.e. price change of goods and services minus food and energy) remain below central bank targets for several consecutive years in most of the major advanced economies. Sluggishness in core inflation in Macedonia —a somewhat surprising factuality in view of relatively buoyant activity in the post-crisis period—has coincided with slow transmission of declining unemployment rates into faster wage growth. The analysis also reveals continued spare capacity in labor market as a key impediment: wage growth has been moderate because the proportion of workers involuntarily working part-time remains at a relatively high level. Namely, once firms and workers become more confident about the economic prospects, and once labor markets start reflecting consecutive positive net employment scores, wages should accelerate. As a consequence, the core inflation will eventually pick-up as well. However, the still weak productivity gains in the post-crisis period may have been a key drag behind the subdued wage growth.

To this end, the impact of year over year trend productivity growth on wage growth between 2013-15 has reached values beyond 1, but with rapidly propagating downward pattern. Moreover, in 2016 we observe less than one-for-one association between these two variables, which indicates that some of the productivity gains are translated into higher profits. Core inflation rates will likely remain low unless wage growth accelerates beyond productivity growth in a sustained way.

In this paper we employ regression analysis to determine the influence of a group of structural indicators on the core inflation in Macedonia. With this regard, we show that the most important factors behind the cumulative core inflation in the post-crisis period i.e. between 2010-16 relative to 2008-09 are underutilization of labor in the form of involuntary part-time employment and headline unemployment rate. Both indicators have contributed positively to cumulative core inflation since 2015 but headline unemployment rate much less so. The contribution of trend productivity growth has remained negligible.
The rest of the paper is structured as follows: Section 2 briefly reviews the field literature; Section 3 discusses the econometric method, along with the data we used, in parallel presenting the estimates we obtain; Section 4 concludes.

2. Literature review

A large array of studies empirically examines the nexus among budget deficit, output gap, money supply and inflation (Catao (2003), Gerald P. (2001) and Gerslach S (2006) among others). However, a recent strand in the literature put greater emphasis on the structural determinants like for instance, productivity, unemployment rate, underemployment, wages and labor costs. Some of these factors are analyzed in the context of core inflation in this work as well. To this end, Howel C. (1992) was arguing that productivity growth was the main reason behind the low inflation in the period 1990-1992. Hufner F. (2007) had the same conclusion arguing that wage growth has lagged productivity growth thus keeping unit labor costs down, and in turn contributing to low core inflation. This corroborates with Kim S. (2013) who argue that increase in labor productivity and Total Factor Productivity reduces Consumer price inflation.

Moreover, Caisha Bank Research (2018) presents evidence that the relationship between these two variables is actually ambiguous. They argue that on the one hand, the larger number of goods and services resulting from higher productivity should push down prices, given a certain rise in wages, but on the other hand higher productivity growth could also result in larger wage demands by workers and this could also affect prices, especially if such demands are greater than what would be justified by the productivity gains.

Underemployment represents a measure of employment and labor utilization in the economy that looks at how well the labor force is being utilized in terms of skills, experience and availability to work. Labor that falls under the underemployment classification are mainly part-time workers who would prefer to be full time but it also includes those workers who are highly skilled but working in low paying jobs[3]. Underemployment as a determinant of the inflation rate has being a part of a large number of empirical works. For instance, Mitchel W. (2013) was arguing that short-term unemployment rate constrains the annual inflation rate more than the overall unemployment rate and that the level of underemployment exerts a separate negative impact on the inflation process. Furthermore, underemployment is considered to be a reason behind the low wage growth which is also a determinant of the low inflation in the recent years (Blanchflower D. 2018).

Blanchflower D (2014) in the case of UK provides evidence that the rise in underemployment represents an additional amount of spare capacity that pushes down on wages, just as the inactivity rate does in the case of US. The IMF's World Economic Outlook 2017 is focusing on wage developments, and they find that the bulk of the wage slowdown can be explained by labor market slack (both headline unemployment and underutilization of labor in the form of involuntary part-time employment), inflation expectations, and trend productivity growth. Consequently, while involuntary part-time employment may have helped support labor force participation and facilitated stronger engagement with the workplace than the alternative of unemployment, it also appears to have weakened wage growth.

Our work follows the approach employed by Caisha Bank Research (2018). Their results show that, jointly, labor market slack (measured by headline unemployment rate and underemployment) and trend productivity growth account for two thirds of the core inflation dynamics between 2014 and 2016. They find, somewhat surprisingly, that the unemployment rate has limited predictive capacity. On the contrary, the remaining variables are good predictors of the core inflation trend, particularly the underemployment rate (23% of the trend observed). Perhaps the most interesting finding is that one third of the observed variation in inflation remains unexplained.

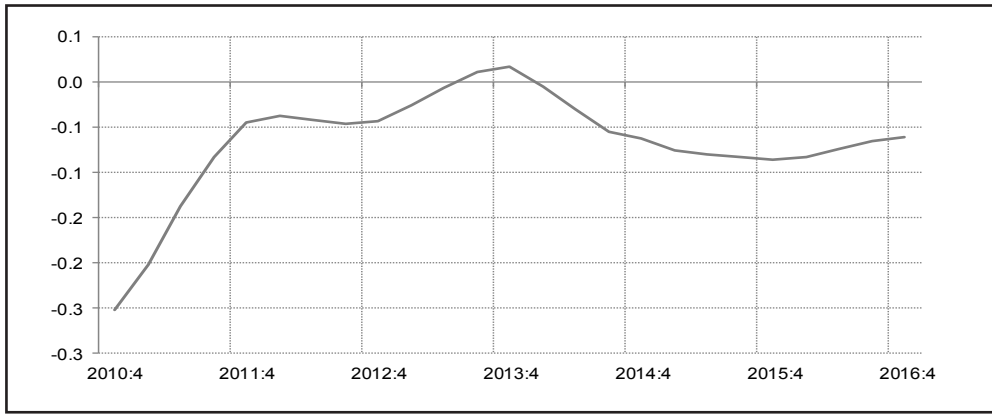
3 According to Eurostat, an underemployed part-time worker is a person aged 15-74 working part-time who would like to work additional hours and is available to do so. Part-time work is recorded as self-reported by individuals. This statistical indicator covers persons who, in spite of being employed, do not work full-time and lack a sufficient volume of work, which is somewhat similar to being unemployed. The part-time requirement in the definition is important because the people who work full-time and still want to work more hours have a different profile: in spite of working many hours they have insufficient income; underemployed part-time, on the other hand, highlights situations of insufficient volume of work and underutilised labour among persons already employed.

3. Data and methodology in a nutshell

Core inflation in Macedonia averaged 1.8% between 2010-13, and it has oscillated around 0.6% since 2014 (i.e. between 2014-16). This paper finds that the bulk of the core inflation slowdown since 2014 can be explained by labor market variables (both unemployment rate as a headline or benchmark indicator and underutilization of labor in the form of involuntary part-time employment as a supplemental indicator aiming to provide somewhat richer picture about the labor market developments) , and trend productivity growth.

While involuntary part-time employment may help to sustain labor force participation, it also appears to have slowed-down wage growth. Figure 1 documents this status.

Figure 1. Wage elasticity of involuntary part-time employment shares, recursive coefficient estimates

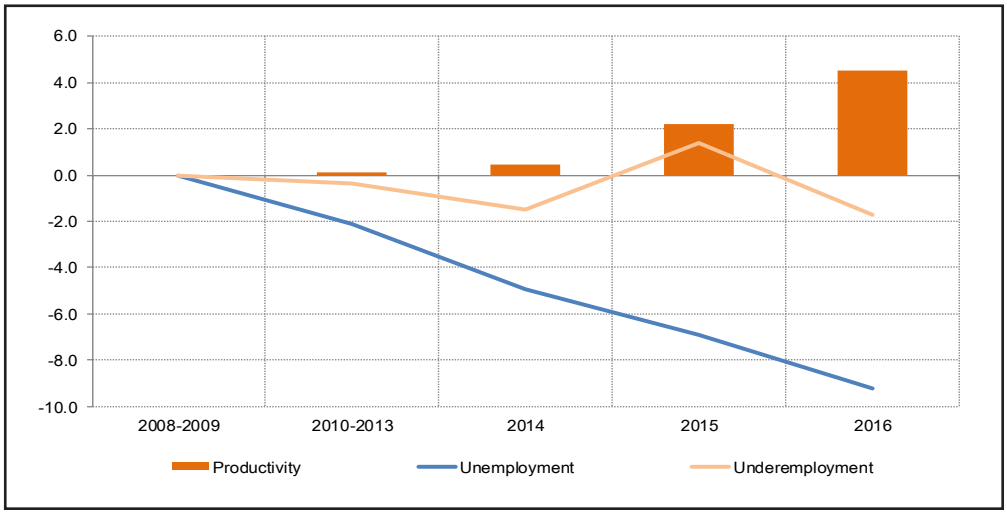


The coefficients at the beginning of the reporting period are, however, less precisely estimated than the later coefficients due to smaller samples
Source: Authors' calculations based on data from State Statistical Office and EUROSTAT

This factuality is observed despite the environment of continuously declining unemployment rate in the post-crisis period. Therefore, a more comprehensive outlook of the labor market emerges by taking into account supplementary indicators that in fact highlight some slack in the labor market that is not captured by headline unemployment rates.

Figure 2 documents that involuntary part-time employment between 2010-16, on average remains just slightly below the level registered during the crisis period (2008-2009). Moreover, in 2015 the involuntary part-time share of employment is even higher than it was during the crisis. This happens against the background of relatively rapid decrease of the underlying unemployment rate (unemployment rate in 2016 is 9.2 p.p. below the level registered in 2008-2009 on average).

Figure 2. Unemployment, productivity and labour underutilization, Difference relative to 2008-09 average (in p.p.)



Source: Authors' calculations based on data from State Statistical Office and EUROSTAT

This subsection provides a quantification of each factor's impact on inflation. One useful benchmark is the IMF wage growth analysis for all developed economies. A similar methodology is used in this article but focusing on core inflation rather than wages. To this end, our work closely reflects Caixa bank research (2018).

Thus, analogous to Caixa bank research (2018) the following equation is estimated: $\pi_{i,t} = \alpha + \rho_{\pi,t-1} + \beta u_t + \gamma prod_t + \delta sube_t + \varepsilon_t$, in which π denotes core inflation, u the unemployment rate, prod the three-year moving average of labour productivity growth, sube the underemployment rate, and ε the residual of the regression, t denotes the period of time. The sample consists of quarterly data between 2008 and 2016.

Table 1. Estimation output

Equation	β_1	β_2	β_3	β_4
$\pi_t = \beta_0 + \beta_1 \pi_{t-1} + \beta_2 u_t + \beta_3 prod_t + \beta_4 sube_t + e_t$	-0.243 (0.14)	-0.112 (0.41)	-0.015 (0.92)	-0.145*** (0.01)

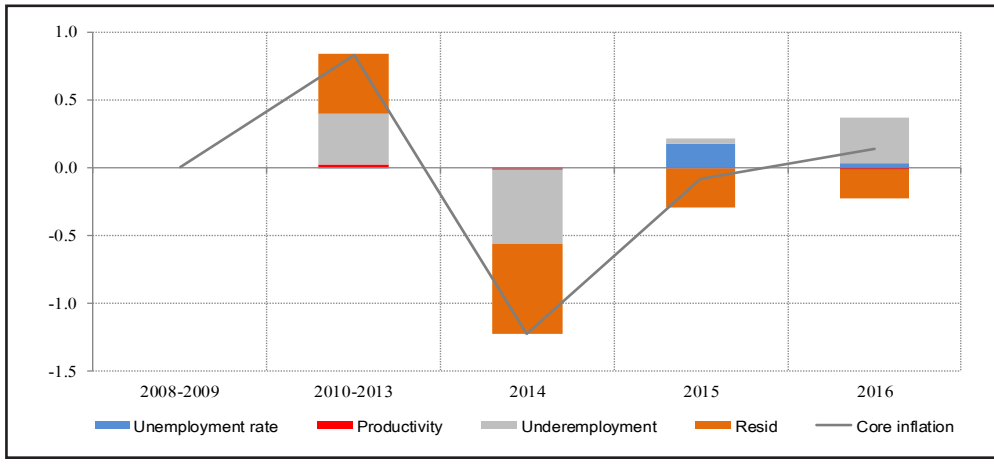
The values in (.) arep-values. *** denotes the 1% significant level

The regression analysis indicates that only the involuntary part-time employment share as a broader measure of labor market slack is statistically significantly associated with the core inflation, with expected sign (negative coefficient). Namely, measured unemployment rates may not accurately capture the slack in the labor market in Macedonia. Furthermore, "to the extent that declining unemployment rates partly reflect workers forced into part-time jobs, increases in such types of employment may overstate the tightening of the labor market. Specifically, these workers may be willing to accept slower increases in wages and, at the same time, may continue to seek full-time employment and open-ended contracts. By doing so, they compete with workers

employed under more traditional arrangements and, so, weigh on their wage growth as well. True labor market slack may therefore be larger than suggested by headline unemployment rates" Caixa bank research (2018).

To this end, a higher share of involuntary part-time employment is associated with lower core inflation. On average, a 1 percentage point increase in the involuntary part-time employment share is associated with a 0.1 percentage point decline in core inflation. The coefficient is statistically significant.

Figure 3. Contribution to the core inflation, Difference relative to 2008-09 average (in p.p.)



Source: Authors' calculations based on data from State Statistical Office and EUROSTAT

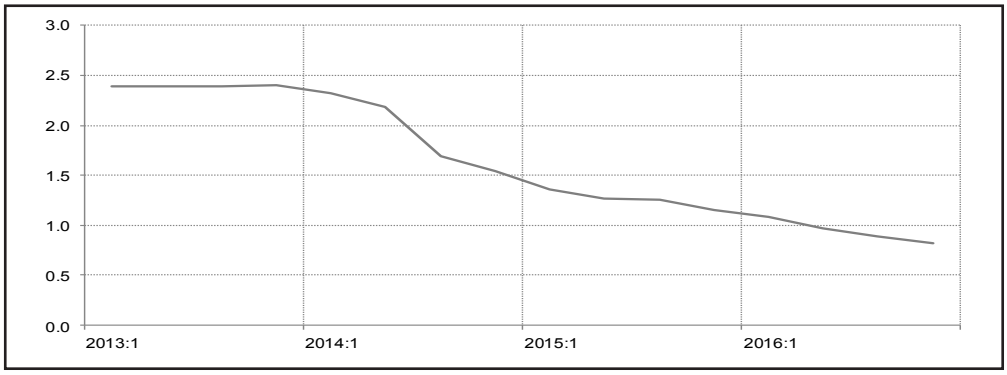
In addition, a 1 percentage point increase in the unemployment rate is associated with a 0.1 percentage point decline in core inflation. Although with the expected sigh, the coefficient is statistically insignificant.

A 1 percentage point increase in trend productivity growth is associated with a 0.01 percentage point decline in core inflation, but in this case as well, the coefficient is not statistically significant. This finding corroborates with Caixa bank research (2018), and it implies that larger number of goods and services resulting from higher productivity weigh down on prices, in an environment of subdued raise in wages.

The empirical evidence suggests that in the most recent period, the association between y-o-y nominal wage growth and the trend productivity growth turns smaller than one-for-one. To this end, in 2016 a 1 percentage point increase in trend productivity growth is associated with a 0.9 on average percentage point annual increase in nominal wages.

In 2016, the impact of trend productivity growth on wage growth (year over year growth rates) fell below 1.

Figure 4. Wage elasticity of trend productivity growth, Recursive coefficient estimates



The coefficients at the beginning of the reporting period are, however, less precisely estimated than the later coefficients due to smaller samples
Source: Authors' calculations based on data from State Statistical Office

A coefficient smaller than 1 implies a less than one-for-one association between productivity growth and wage growth, and indicates that some of the gains from higher productivity growth translate into higher profits. Core inflation rates will likely remain low unless wage growth accelerates beyond productivity growth in a sustained manner.

The results also show that, together, these three factors (labor market slack (both headline unemployment and underutilization of labor in the form of involuntary part-time employment), and trend productivity growth) account for about one third of the cumulative core inflation between 2010 and 2016 (see the Figure 5). We find, somewhat surprisingly, that the unemployment rate and the trend productivity growth have very limited predictive capacity (accounting for around 7% and 2% of the trend observed). On the contrary, much better predictor of the inflation trend is the underemployment rate (around 62% of the trend observed).

Perhaps the most interesting finding is that 30% of the observed cumulative core inflation between 2010-16 remains unexplained.

Figure 5. Contribution to the core inflation trend, Cumulative difference relative to 2008-09 average (in p.p.)

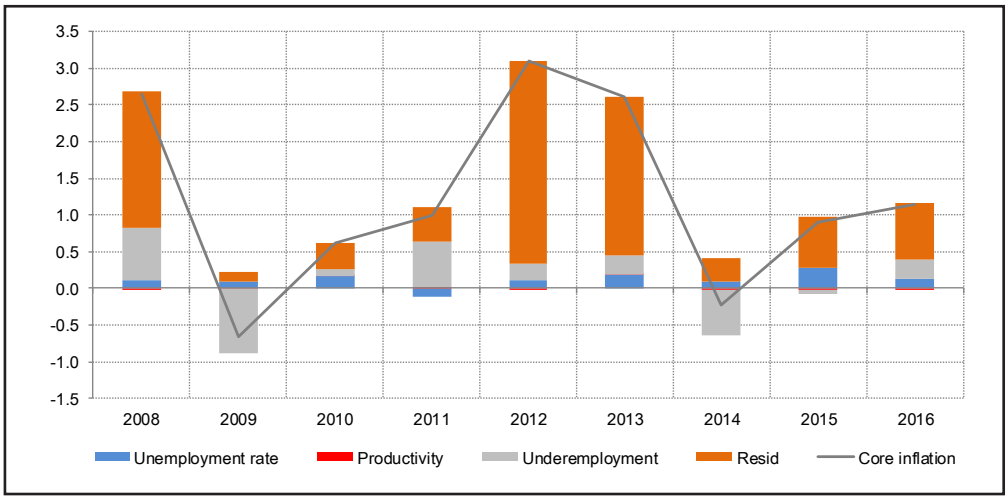
Source: Authors' calculations based on data from State Statistical Office and EUROSTAT

4. Conclusion

This paper aims at highlighting the empirical determinants of core inflation in Macedonia. To this end, we explore their relative contributions to the actual core inflation since 2008 to explain why core inflation is relatively sluggish in the post-crisis period. The findings show that the most important factors behind the cumulative core inflation in the post crisis period i.e. between 2010-16 relative to 2008-09 are underutilization of labor in the form of involuntary part-time employment and headline unemployment rate. Both indicators have contributed positively to cumulative core inflation since 2015 but headline unemployment rate much less so. The contribution of trend productivity growth has remained negligible. Relatively low inflation despite economic recovery has given rise to the question of "missing inflation" While GDP is on the rise, some slack may still be present [adaptation from ECON Committee Report from February 2018]. To this end, our work suggests that wage growth may continue to remain subdued until involuntary part-time employment diminishes or trend productivity growth picks up. Consequently, core inflation rates will also likely remain low unless wage growth accelerates beyond productivity growth more sustainably.

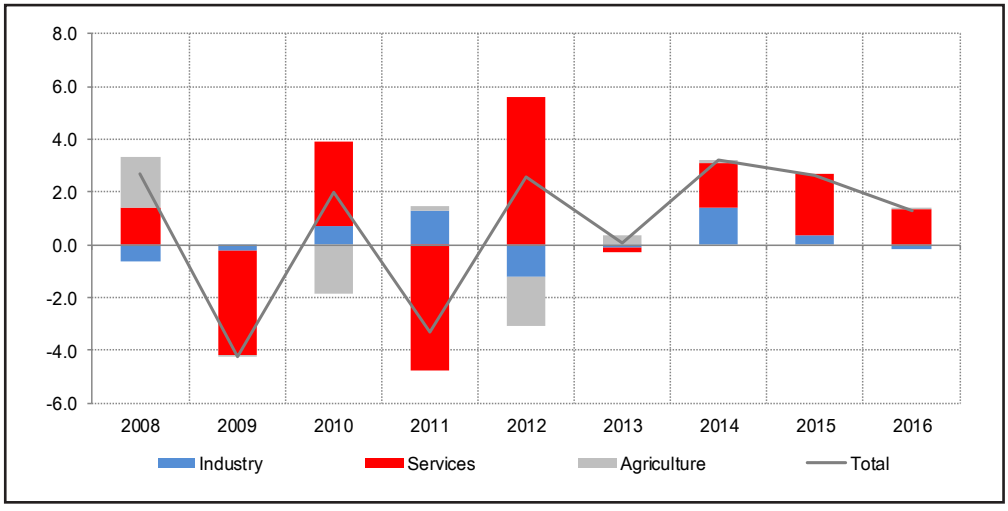
Appendix

Figure 1. Contribution to the core inflation



Source: Authors' calculations based on data from State Statistical Office and EUROSTAT

Figure 2. Sectoral contributions to annual growth rates of labour productivity (in p.p.)



Source: Authors' calculations based on data from State Statistical Office

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