Short economic and financial analyses

Post-pandemic nominal wage growth in Slovenia through the lens of the wage Phillips curve

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Abstract

This paper investigates the drivers of wage growth in the Slovenian private sector, particularly focusing on the post-pandemic period. Understanding the factors that influence recent wage dynamics is vital for policymakers, given the important role of wage growth in shaping inflation outcomes. Employing a wage Phillips curve model and decomposition analysis, I analyse quarterly macroeconomic data spanning from Q2 2009 to Q4 2023 to identify the key determinants of wage growth. My central finding reveals that labour market tightness and past inflation emerge as the predominant drivers of wage growth in Slovenia in 2023. Additionally, the paper highlights that wage growth in Slovenia, surpassing that of the euro area, can be attributed to greater labour market tightness and more backward-looking wage dynamics. These findings underscore the necessity for policies that promote sustainable wage growth without exacerbating inflationary pressures.

1   Introduction

The recent trajectory of wage growth within the Slovenian private sector reflects a complex interaction of factors, ranging from the significant economic disruptions triggered by the COVID-19 pandemic in 2020 to the subsequent robust recovery of economic activity. Of particular interest is the labour market's resilience, which resulted in unprecedented labour market tightness.

At the onset of the pandemic, nominal wage growth in the private sector initially declined, as illustrated in Figure 1. The growth rate in the second quarter of 2020 fell to -1.3% in year-on-year terms, primarily as a consequence of the methodological effects associated with the introduction of job retention schemes. These schemes had a pronounced impact on nominal wage growth measures during the turbulent times of COVID-19.[1] Throughout the remainder of 2020, wage growth remained subdued, recording rates lower than the preceding year. However, in the second quarter of 2021, there was a substantial increase in wage growth, driven by the effects of the low base in the second quarter of 2020. This momentum persisted throughout 2021 and 2022, consistently maintaining levels above the historical average and hovering around 7.0%. A notable surge occurred in 2023, with wage growth reaching 13.5% in the second quarter.

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[1] In Q2 2020, 124,800 people were put into a job retention scheme. The negative effects of such schemes on wage growth, as measured by compensation per employee, arise from the fact that the number of employed persons does not change significantly. Individuals in job retention schemes are still classified as employed, but they receive lower compensation, leading to a decrease in compensation per employee.

Figure 1: **Nominal wage growth in the private sector**
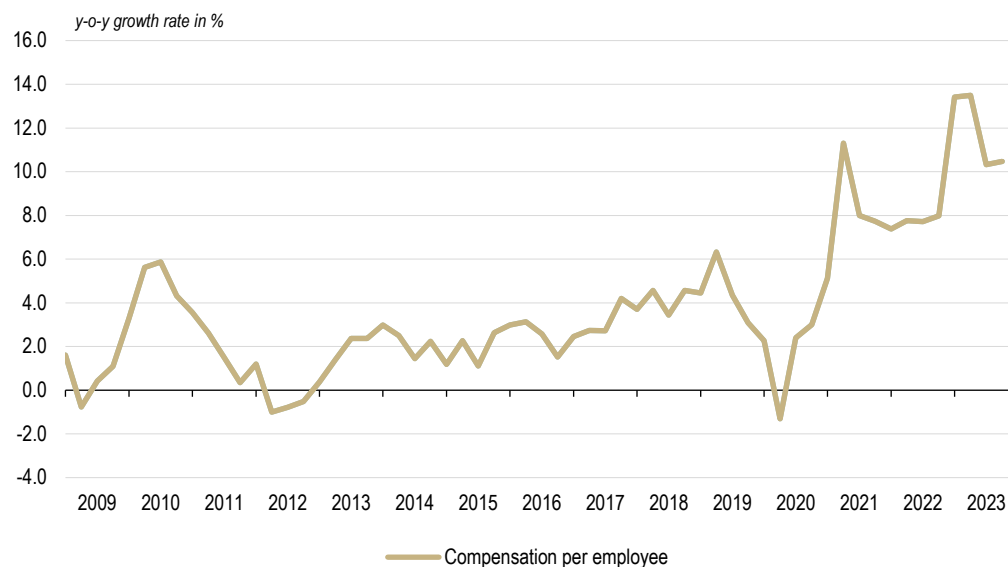
y-o-y growth rate in %

Compensation per employee

r
Source: SORS, own calculations.
Note: Nominal wage growth is measured as growth in compensation of employees per employee.

In tandem with robust nominal wage growth, the Slovenian economy saw a swift recovery in the labour market, marked by higher employment growth compared to what Okun's law dynamics would imply (Bank of Slovenia, 2023). The rapid decrease in unemployment and robust employment growth led to an exceptionally tight labour market. Indicators such as labour market tightness, measured as the ratio between the job vacancy rate and the unemployment rate[2], reached record highs in the post-pandemic period (see Figure 2). These developments are further documented by the elevated labour shortage statistics, indicating a demand for workers that surpasses the availability within the domestic labour pool.

Figure 2: **Labour market tightness**

ratio

Tightness indicator
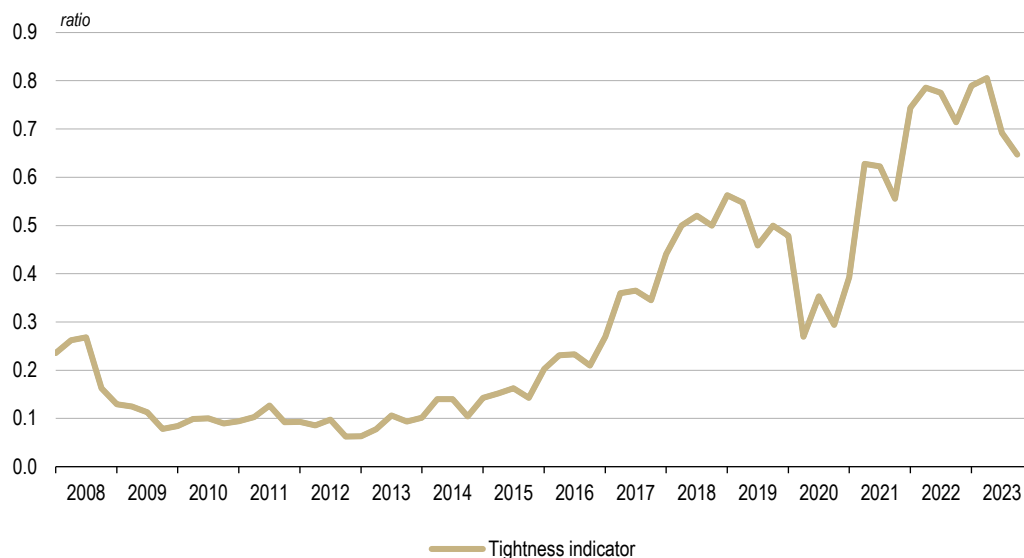
'
Source: SORS, own calculations.
Note: Labour market tightness is measured as the ratio of the vacancy rate to the unemployment rate.

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[2] Typically, labour market tightness is calculated as the ratio between the number of job openings and the number of registered unemployed individuals. However, in this analysis, I use the ratio of the vacancy rate to the unemployment rate. This adjustment is necessary because the number of job openings is not available for the euro area.

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While descriptive statistics and economic theory point to the importance of labour market tightness as the key driver of the current high nominal wage growth, the quantitative contribution of this factor and others to wage growth over the past years necessitates an empirical model-based approach.[3] This paper aims to bridge this gap by offering a comprehensive assessment of wage growth in Slovenia in recent years. Employing the wage Phillips curve framework, the study seeks to dissect the various drivers influencing wage growth, including the impact of past prices, labour market tightness, productivity and long-term equilibrium forces. Furthermore, a comparative analysis of wage growth dynamics in Slovenia and the broader euro area aims to uncover any divergences in the factors contributing to wage growth.

2 Empirical strategy

To gain a comprehensive understanding of wage dynamics and their primary drivers, I build on the simple model specification proposed by Christiane et al. (2019). However, I augment it by incorporating an error-correction term to account for wage gaps stemming from deviations from the long-term labour market equilibrium. Moreover, instead of using the unemployment rate as a measure of slack, I use the vacancy rate to the unemployment rate ratio.

In the long-run equation, I assume that the level of nominal wages is determined by labour productivity, price level and labour market tightness. While the inclusion of labour market tightness in the long-term equation is unconventional, I incorporate it to ensure the stationarity of the residual term. The long-term equation is represented as:

$$\log(w_t) = \gamma_1 + \gamma_2 \log(g_t) + \gamma_3 \log(\pi_t) + \gamma_4 v/u_t + \epsilon_t \tag{1}$$

where w_t is the level of compensation of employees per employee in the private sector[4], g_t is the level of labour productivity measured as value added per employee, π_t is the price level measured as the Harmonized Index of Prices, v/u_t is labour market tightness measured as the ratio of job vacancy rate to unemployment rate, and ϵ_t is the residual representing the deviation of wages from the long-term equilibrium.

I model the short-term equation as:

$$\Delta w_t = \beta_1 + \beta_2 \Delta w_{t-1} + \beta_3 \Delta \pi_{t-1} + \beta_3 v/u_t + \beta_4 \Delta g_t + \beta_5 \epsilon_{t-4} + \varepsilon_t \tag{2}$$

where Δ represents the year-on-year growth rate of a given variable and ε_t is the residual. A discerning reader may observe that the error-correction term enters the equation with a fourth lag, which is somewhat atypical for this type of equation. This decision arises from the use of year-over-year growth rate data.

The estimation of the system of equations follows the two-step procedure proposed by Engle and Granger (1987). The first step involves estimating the long-run equation, while the second step utilizes the residuals from cointegrating regression to es-

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[3] See Blanchard and Lawrence (1999) for theoretical support of this proposition.
[4] The private sector encompasses all NACE categories except OPQ.

timate the short-run wage equation. Both equations are estimated using data from Q2 2009 to Q4 2023.[5]

Based on the estimated model, I perform a historical decomposition of wage growth by following the approach of Yellen (2015). First, I compute the residuals of the estimated model. Next, I conduct a series of counter-factual simulations of the model from Q2 2009 to Q4 2023. In each simulation, one explanatory variable of the model is set to zero, and the model is then simulated. The difference between actual wage growth and its simulated value reflects the contribution of that particular variable or factor to wage growth. Notably, these simulations are dynamic, with the lagged wages set equal to its simulated value in the preceding period rather than their actual value. Consequently, decompositions incorporate the effects of changes in lagged wages attributable to previous movements in the explanatory variables. The contributions of each variable are expressed as:

$$C_t^x = \beta_t^x X_t + \beta_2 C_{t-1}^x \tag{3}$$

where β_t^x is the corresponding coefficient on explanatory variable X obtained from equation (2) and β_2 is the coefficient on lagged wage growth.

3   Decomposition of wage growth in Slovenia

The estimation results reveal that all coefficients exhibit plausible signs and are statistically significant (see Table 1). The findings indicate a positive correlation between the growth in nominal wages and the growth in labour productivity, the degree of labour market tightness and past inflation rates. As theory predicts, I observe negative wage catch-up, which means nominal wages adjust to their long-term equilibrium.

Table 1: **Regression results for Slovenia**

Variable	Coefficient	Std. Error
Constant	-0.07	0.27
Wage (-1)	0.32***	0.10
Price (-1)	0.29***	0.09
Tightness	5.41***	1.13
Productivity	0.40***	0.07
Error-correction (-4)	-0.16**	0.07

Source: SORS, own estimates.
Note: The table reports the estimated coefficients of the wage Phillips curve specified in equation 3. The dependent variable is nominal wage growth. (-1) denotes a lag of one quarter and (-4) a lag of four quarters. The estimation sample is Q2 2009–Q4 2023. Significance: ** (p<0.05), *** (p<0.01).

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[5] The relatively brief time span results from the limited availability of vacancy rate data, which is only accessible from Q1 2008 onwards.

A decomposition of wage growth into various factors highlights that the initial decline in wage growth in 2020 was mainly driven by low labour productivity associated with COVID-19-related economic measures. However, it is crucial to interpret this observation with caution, because the decline in wage growth is actually largely attributed to the effects of job retention schemes, which in the model are captured by productivity. These schemes kept employment levels relatively stable but led to significantly reduced compensation for employees. They were most widespread in the first half of 2020 and completely phased out by the middle of 2021, indicating that job retention schemes influence my results until Q2 2022 (see Figure 6 in the Appendix). Throughout 2020, low labour productivity consistently constrained wage growth. However, with the reopening of the economy and a subsequent robust economic recovery, wage growth experienced a significant upturn in the early months of 2021. Notably, in the second quarter, the growth was particularly strong, largely attributed to low base effects, as Q2 2020 was the quarter most affected by pandemic-induced lockdowns.

The robust economic recovery in 2021, evidenced by a substantial contribution of productivity, remained the primary driver of wage growth throughout that year. The recovery also led to an increasingly tight labour market. While the labour market was somewhat less tight during the pandemic, due to lower economic activity, it quickly rebounded and even surpassed pre-pandemic levels as economic activity increased (Figure 2). Consequently, labour market tightness became an important contributor to wage growth in 2021. Conversely, the error-correction term and low past inflation exerted adverse effects on wage growth in 2021.

At the beginning of 2022, the economic recovery began to decelerate, primarily due to the fallout from the war in Ukraine. On the other hand, the labour market remained robust, with a decreasing unemployment rate and a high vacancy rate, indicating continued demand for workers. This was especially true in labour-intensive sectors such as construction and hospitality. As a result, productivity was no longer the primary driver; instead, labour market tightness emerged as the predominant factor. Furthermore, inflation spiked significantly towards the end of 2021, adding to the factors contributing to wage growth. Consequently, in 2022, wage growth was primarily driven by a very tight labour market and high inflation, while labour productivity somewhat muted the growth.

Figure 3: **Decomposition of nominal wage growth in the private sector in Slovenia**
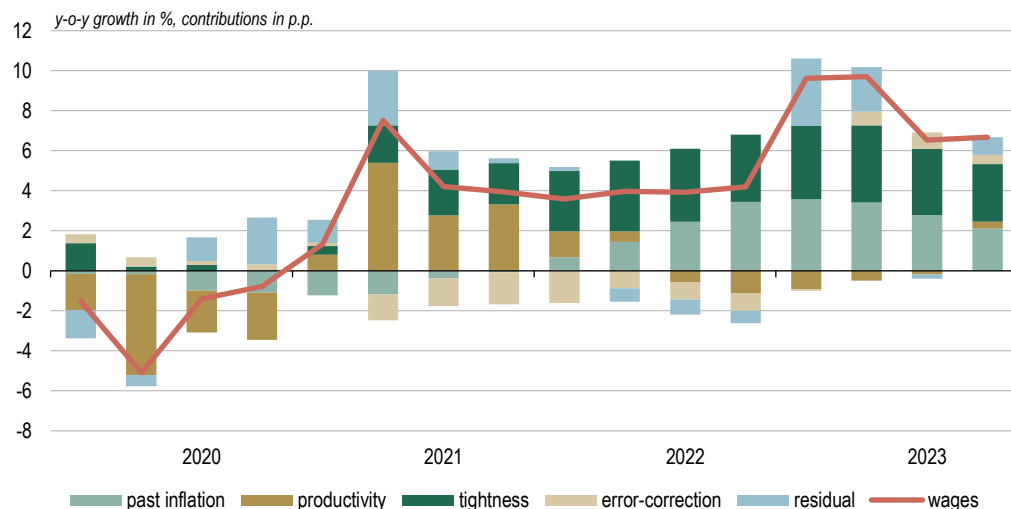
Source: SORS, own calculations.
Note: All values are in terms of deviations from their averages since 2010. The initial condition and constant are excluded from the graph because their demeaned contribution is zero.

In 2023, similar trends persisted, with labour market tightness remaining at record levels and continuing to contribute significantly to wage growth. Inflation also remained a significant factor contributing to high wage growth. In the first half of 2023, there was an increase in residual contribution, possibly influenced by a historically large 12.0% increase in the minimum wage at the beginning of the year or nonlinearities in the dynamics of wage growth. Another plausible explanation could be that firms partially compensated for the loss of workers' purchasing power by offering higher holiday allowances, typically paid in the first half of the year. This is supported by the observation that wage growth measured as average gross earnings did not increase as sharply as compensation per employee in the first half of the year.[6]

4   Comparision with the euro area

In this section, I compare the results obtained for Slovenia with the results for the euro area. To ensure comparability of results and eliminate the influence of model specification on my findings, I employ the same model specification and sample period for both the euro area and Slovenia. This approach eliminates potential biases arising from differences in functional forms and sample sizes.

The comparative analysis of wage growth decomposition in Slovenia and the euro area reveals broadly similar trends. Wage growth was negative at the onset of the pandemic and then increased rapidly at the start of 2021 as a result of reopening of the economy. In 2022, wage growth in Slovenia was approximately 2.5 percentage points higher than in the euro area, and the most notable divergence appeared in 2023, when wage growth in Slovenia increased significantly and was on average 6.3 percentage points higher than in the euro area (Figure 4). While pandemic-related factors such as variations in job retention schemes likely influenced differences in wage growth in 2020 and 2021, the difference observed in 2022 and 2023 warrants a more in-depth econometric exploration.

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[6] Holiday allowances ("*regres za letni dopust*" in Slovenian) are not accounted for in the statistics for average gross earnings.

Figure 4: **Comparision of wage growth in the private sector between Slovenia and the euro area.**


y-o-y growth rate in %
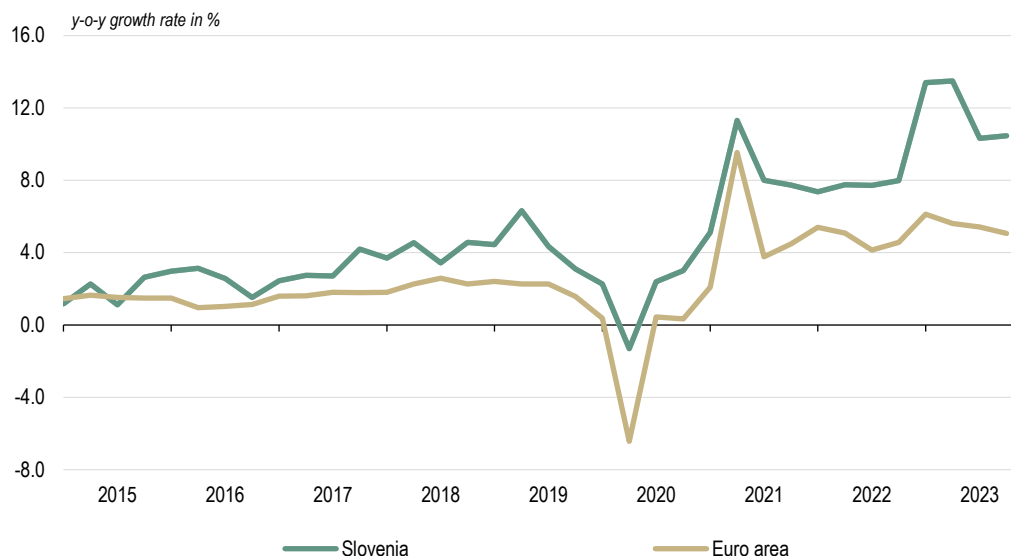
Sources: Eurostat and SORS, own calculations.
Note: Nominal wage growth is measured as growth in compensation of employees per employee.

Slovenia's wage growth has consistently outpaced the euro area since 2014, likely reflecting economic convergence. This pre-existing trend potentially explains some of the post-pandemic wage growth differential. In 2023, a notable contrast emerged, as Slovenia witnessed a substantial rise in wages, contrasting sharply with the euro area's comparatively modest growth. Figures 3 and 5 suggest that a tighter labour market in Slovenia is a key factor driving the wage growth differential. Additionally, past inflation appears to exert a stronger influence on Slovenian wage dynamics compared to the euro area, as evidenced by the higher regression coefficient for past inflation in Slovenia (see Tables 1 and 2). This aligns with the IMF's November 2023 Regional Economic Outlook for Europe, which highlights a tendency for more backward-looking wage formation in Central, Eastern, and Southeastern European economies.

Figure 5: **Decomposition of nominal wage growth in the private sector in the euro area**
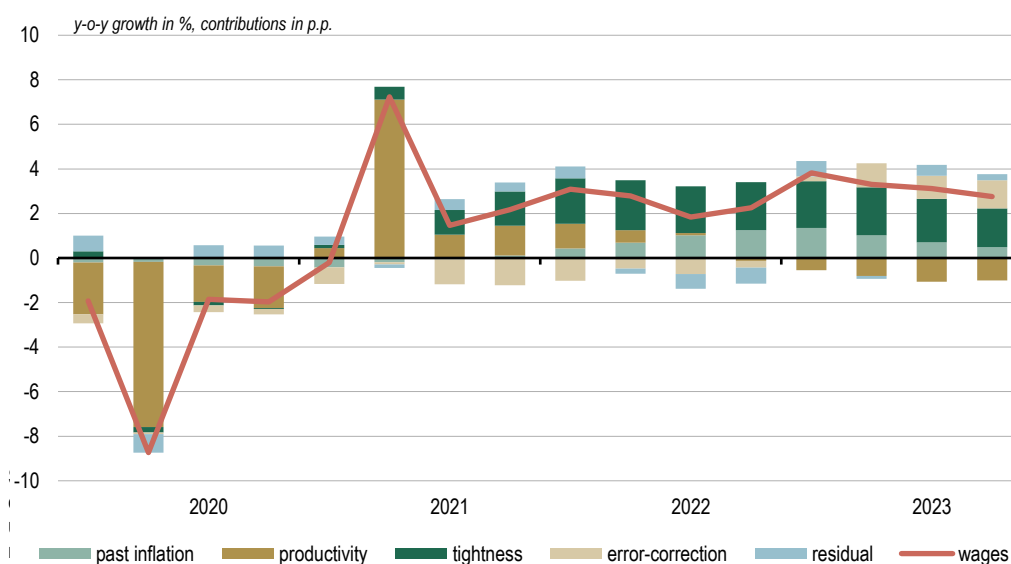
y-o-y growth in %, contributions in p.p.

Source: SORS, own calculations.
Note: All values are in terms of deviations from their averages since 2010. The initial condition and constant are excluded from the graph because their demeaned contribution is zero.

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5   Conclusions

This paper provides a comprehensive analysis of wage growth dynamics in the Slovenian private sector, particularly focusing on the post-pandemic period. By employing an empirical framework and conducting decomposition analysis, I have identified the key drivers of wage growth in Slovenia. Labour market tightness emerged as a predominant factor driving wage growth, particularly in the aftermath of the pandemic. Additionally, past inflation exerted a notable influence on wage dynamics, highlighting the backward-looking nature of wage dynamics in Slovenia.

Furthermore, comparative analysis with the euro area reveals distinct wage growth patterns, highlighting Slovenia's surpassing of euro area wage growth. While pre-existing trends of economic convergence likely contribute to this divergence, the significant disparity observed in 2023 underscores the unique drivers shaping Slovenian wage dynamics, notably the tighter labour market conditions and more backward-looking wage dynamics.

The insights collected from this research have important implications for policymakers. Recognizing the pivotal role of labour market dynamics and inflation in shaping wage outcomes can inform policy responses aimed at promoting sustainable wage growth. This significance is amplified during the current period of elevated inflation rates, as wage growth is an important driver of inflation. Notably, heightened rates of wage growth can hinder the convergence of inflation rates towards the targeted goal of 2%.

6 References

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7 Appendix

Table 2: **Regression results for the euro area.**

Variable	Coefficient	Std. Error
Constant	-0.46***	0.15
Wage (-1)	0.01	0.04
Price (-1)	0.17***	0.04
Tightness	8.99***	0.90
Productivity	0.60***	0.02
Error-correction (-4)	-0.34**	0.05

Source: Eurostat, own estimates.
Note: The table reports the estimated coefficients of the wage Phillips curve specified in equation 3. The dependent variable is nominal wage growth. (-1) denotes a lag of one quarter and (-4) a lag of four quarters. The estimation sample is Q2 2009–Q4 2023. Significance: ** ($p<0.05$), *** ($p<0.01$).

Figure 6: **Number of persons in job retention schemes**

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