



EUROPEAN CENTRAL BANK
EUROSYSTEM

Occasional Paper Series

Cristina Checherita-Westphal (editor)
Based on an analysis by the Eurosystem
members of the Working Group on Public Finance

Public wage and pension indexation in the euro area: an overview

No 299 / August 2022

Disclaimer: This paper should not be reported as representing the views of the European Central Bank (ECB). The views expressed are those of the authors and do not necessarily reflect those of the ECB.

Contents

Abstract	3
1 Introduction	4
2 Overview of public wage and pension indexation (setting) schemes	6
2.1 Indexation and setting schemes for public wages	6
Box The relationship between public and private wages in the euro area	7
2.2 Indexation and setting schemes for public pensions	12
3 Public wage and pension expenditure	14
3.1 Country overview of wage and pension expenditure	14
3.2 Euro area public wage and pension projections	17
4 Conclusions	20
Appendix	22
A.1 Belgium	23
A.2 Germany	24
A.3 Estonia	25
A.4 Ireland	26
A.5 Greece	27
A.6 Spain	28
A.7 France	29
A.8 Italy	30
A.9 Cyprus	31
A.10 Lithuania	32
A.11 Luxembourg	33
A.12 Latvia	34
A.13 Malta	35
A.14 Netherlands	36

A.15	Austria	37
A.16	Portugal	38
A.17	Slovenia	39
A.18	Slovakia	40
A.19	Finland	41
	References	42

Abstract

If the responses of wages – both private and public – and of pensions to an increase in inflation lead to second-round effects, this can make an inflationary shock more persistent, especially in the presence of automatic wage and pension indexation. This occasional paper presents an overview of the indexation schemes and other mechanisms for setting public wages and pensions across the euro area countries. It concludes that price indexation of public wages is relatively limited in the euro area, while public pensions are overwhelmingly automatically indexed, either fully or partially, to prices and wages.

Keywords: Fiscal policy; Wages, Compensation, and Labor Costs; Social Security and Public Pensions; Inflation

JEL codes: E62, J3, H55, E31

1 Introduction

If the responses of wages – both private and public – and pensions to an increase in inflation lead to second-round effects, this can make an inflationary shock more persistent. This transmission is more likely in the presence of automatic wage and pension indexation. It can, however, also play an important role in wage negotiations, especially when inflation is high. Transmission through wages, particularly in the private sector, is likely to be stronger and to affect prices from both the demand and the production side. Pensions are likely to affect demand through disposable income, which is also an important channel.¹ On private wages, various ECB and Eurosystem analyses² have concluded that the likelihood of wage-setting schemes triggering second-round effects via inflation indexation is relatively limited in the euro area, particularly when it comes to energy inflation.

This occasional paper sheds light on the prevailing indexation schemes for public wages and pensions and other setting mechanisms across the euro area countries on the basis of a questionnaire completed by the members of the Working Group on Public Finance (WGPF). Sections 2 and 3 present an overview of these schemes and mechanisms. Country-specific information for each of the 19 euro area members is presented in the Appendix. The paper also provides an overview of the December 2021 Eurosystem staff macroeconomic projections for public wages and pensions. This projection vintage database constitutes the source for all data presented in this paper, including for past periods.

Euro area public wage and pension expenditure accounts for significant budget resources and has grown more rapidly recently. In 2021 the public wage bill (compensation of public employees excluding employers' social contributions) is estimated to have amounted to €922 billion (7.6% of GDP or 14.3% of total public expenditure), while public pensions are estimated at €1,484 billion (12.1% of GDP or 23.1% of total public expenditure).

Euro area average public wages and pensions have grown at rates well above contemporaneous or lagged HICP³ inflation since 2015, recovering after the subdued growth seen during the sovereign debt crisis (Chart 1). On average over the almost two decades running up to the coronavirus (COVID-19) crisis (2001-19), the annual growth rates of public and private wages per employee, as well as of average pensions, were remarkably similar. They stood at around 2.2-2.3%, i.e. above the average HICP inflation rate of 1.7%. This masks differences across periods, with

¹ If higher pensions are accompanied immediately by higher social security contribution rates, this may imply only a redistribution of total demand rather than a net increase.

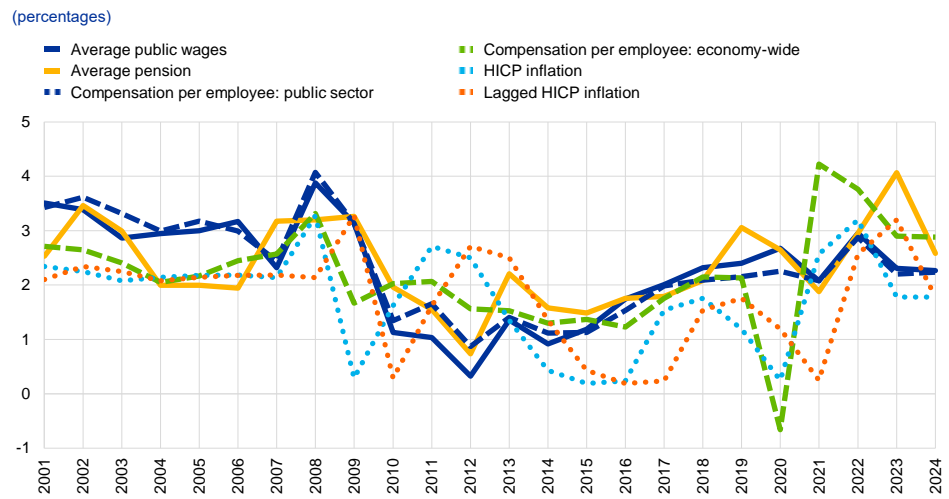
² See, for instance, Koester and Grapow (2021) and the [December 2021 Eurosystem staff macroeconomic projections](#).

³ HICP stands for the Harmonised Index of Consumer Prices, as compiled by Eurostat and the national statistical institutes. It is “harmonised” because all the countries in the European Union follow the same methodology. As will be shown in this paper, where indexation is relevant, it is largely done on the basis of national price indices, which can differ from the harmonised indices. National CPIs are lower than HICPs, with a few exceptions. The indices relevant for indexation purposes can also exclude selected components, most frequently health-related items, such as tobacco. Energy is excluded from the price index (HICP, used for public wage indexation) only in Italy.

public wages growing faster than inflation and private wages before and during the great financial crisis and more slowly during the sovereign debt crisis. The dynamics of compensation per public employee have been very similar to those of public wages, while economy-wide compensation more closely follows private sector compensation. From 2015 until 2019, public wage and pension growth outpaced inflation on average, though fell somewhat short of private wage growth. In 2020, when the COVID-19 pandemic hit the euro area, wage trends were affected by one-off factors. The increase in public wages reflected bonuses in the health sector, among other things, while the decline in the growth of private wages was related to the partial coverage by public funds under job retention schemes. Public pensions have followed lagged inflation more closely, especially after the sovereign debt crisis.

Chart 1

Average public wage, compensation and pension growth rate: euro area aggregate



Sources: ECB, Eurosystem staff macroeconomic projections for the euro area, December 2021 and authors' calculations.
 Notes: Average public wages are computed by dividing expenditure recorded under "Wages and salaries" in the government finance statistics (GFS) by the number of government employees. The average pension refers to old age pensions and survivors' pensions (D.62U in COFOG 10.2.0 + COFOG 10.3.0), computed as total expenditure divided by the number of pensioners. Compensation of employees is the sum of "wages and salaries" and "employers' social contributions". For average pensions, consistent data are available for France as of 2010, for Greece as of 2014 and for Luxembourg as of 2007. The euro area aggregate excludes these countries when data are not available. Growth rates are shown on an annual basis. Lagged inflation is annual end-of-period inflation lagged by one year.

2 Overview of public wage and pension indexation (setting) schemes

2.1 Indexation and setting schemes for public wages

Results from the WGPf questionnaire indicate that price indexation of public wages is relatively limited (to about one fifth) in the euro area (Chart 2).

Full and partial price indexation is reported in five countries, representing 19% of the euro area public wage bill in 2021 (or 18% of euro area government employees).⁴ In two countries (Belgium and Luxembourg, 5% of euro area public wage bill), public wages are fully automatically indexed to prices (with a backward-looking index, linked to the cost of living), while in Cyprus and Malta a similar, but restricted indexation is in place. In Italy, expected inflation excluding energy is taken into account during negotiations for contract renewals: if inflation turns out to be higher than the increase in public wages over the three-year contract period, the difference is made up in the following three-year period.

In most euro area countries, public wages are not automatically indexed to inflation, nor does inflation play a *formal* role in wage setting. However, inflation is or can be taken into account in public wage negotiations in many countries.⁵

The majority of public wages in the euro area are set under collective public wage agreements, covering the whole or specific sub-sectors of the government. Where collective agreements exist, their statutory or customary length varies across countries, but it is usually between one to three years, more specifically one year in Lithuania, Austria, Slovakia; mainly one to two years in Slovenia, Germany and the Netherlands⁶; two years in Belgium, Estonia⁷, Luxembourg and Finland⁸; two to three years in Cyprus; three years in Italy; and two to four years in Ireland. In Malta, the collective wage contracts within the central government have a longer length than in other countries (on average at 5.3 years and with the current civil service agreement covering about 7.5 years, 2017-24), while other entities within the general

⁴ In general, the two indicators (share in total public wage bill and number of employees) are close.

⁵ For example, inflation is used in a backward-looking way as a reference in wage negotiations (in Lithuania and Austria), or in a forward-looking way (in Portugal). In Slovenia, only a minor part of public wages (e.g. meal allowances, business trips, tenure allowances) are indexed to past inflation; the minimum wage is also adjusted (at least) in line with inflation. In Slovakia, about 12% of public employees are subject to an automatic wage indexation system linked to economy-wide wages (backward-looking). On the other hand, at the cut-off date of the December 2021 Eurosystem staff projections, public wages were frozen in Greece and France (in the latter, until end-2022, with the freeze not applying to education, health and low wages). More recently, the freeze has been reversed in France.

⁶ In Slovenia, the agreements can have an impact also in the next year. In Germany, the current agreement covers the period from September 2020 until December 2022 for the federal and municipal level and from October 2021 until September 2023 for the state level. In the Netherlands, the duration varies across specific collective agreements.

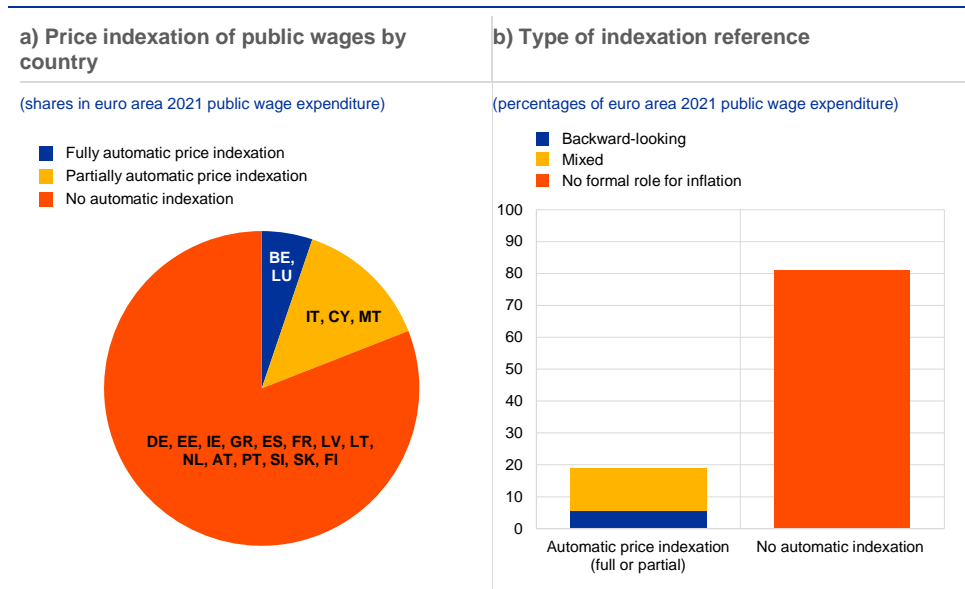
⁷ In Estonia, the collective wage agreement covers only about 15% of public sector employees as it only applies to health sector employees (both public and private ones).

⁸ In Finland there is no "statutory" length, i.e. the legislation leaves the length of collective agreements open. In practice, agreements often last two years, though there are exceptions.

government sector have separate collective agreements, which typically cover about three years. The remaining countries (Greece, Spain, France, Latvia, Portugal) do not have collective wage agreements to settle public wages, which are typically updated in the context of budget discussions.

Chart 2

Public wage indexation across euro area countries



Sources: WGF questionnaire, Eurosystem staff macroeconomic projections for the euro area, December 2021 and authors' calculations.

Notes: See description in the text for the various categories. In panel a), "Partially automatic price indexation" refers to restrictions on full indexation to prices, either in the amount (an adjustment lower than 100% of a given price index) or depending on other trigger variables and/or administrative decisions. In panel b), the left-hand bar includes Belgium, Luxembourg, Cyprus and Malta (with a backward-looking indexation, blue part of the bar) and Italy (with a mix of forward and backward-looking indexation, yellow part of the bar). The right-hand (red) bar shows the percentage of euro area countries where inflation does not play a "formal" (automatic or mandatory) role in public wage setting, though inflation can be taken into account informally in wage negotiations.

Box

The relationship between public and private wages in the euro area

Prepared by Cristina Checherita-Westphal, João Domingues Semeano and Elena Ahonen

This box provides a short overview of the literature and an empirical analysis on the role of public wages in explaining private wages across euro area countries.

The empirical literature analysing the relationship between public and private wages is relatively rich, with several studies focusing on the euro area and, in general, finding a positive relationship, including bi-directional causation. The evidence at individual country level, especially with respect to causality (leading sector), is less clear-cut across various studies.

In a review of older country level studies, Holm-Hadulla et al. (2010) conclude that empirical evidence generally supports the so-called "Scandinavian model" of wage determination, according to which the private sector (tradable) has a lead role over the public sector (non-tradable). Most of these studies referred to Sweden and other countries outside the euro area or before the EMU period. In their review for the euro area, the authors conclude that there is evidence of a strong positive correlation and co-movement between public and private wages in the short to medium term, both directly and indirectly via the price level, in most euro area countries.

As regards individual studies for euro area countries, in one such study, Lamo et al. (2007) investigate the co-movement and causality between public and private wages in 11 euro area countries from 1960 to 2007. Their results suggest that there is a contemporaneous correlation of around 0.87, on average for the sample, between nominal private and public sector wages per employee. The correlation coefficients for the four largest euro area economies are high, ranging from 0.71 to 0.91 for Spain and Italy, respectively. Further, using causality tests (and controlling for the price level), the authors find a bi-directional relationship between public and private wages for Ireland, France, Italy, the Netherlands and Finland. Private wages are found to lead in Germany, Greece, Portugal and the euro area aggregate, while no causality is found for the other euro area countries. Similarly, Pérez and Sánchez (2010) investigate the signalling effect of public wages on private wages in the four largest euro area economies. By controlling for prices, productivity and institutional variables, the authors find that public wages have a signalling effect (lead) on private wages in France and Italy, whereas there is a bi-directional effect between public and private wages in Germany and Spain.

Afonso et al. (2010) investigate the relationship between public and private sector wage growth in OECD countries using a dynamic labour market equilibrium model. They find that a 1% increase in public wages increases private wages by between 0.3% and 0.5%, depending on the size of the public sector.

Attinasi et al. (2019) explore the relationship between public and private wages employing a panel and country-specific Bayesian vector autoregression (BVAR) framework for the five largest economies of the euro area over the period 1997 to 2016. Their analysis suggests that private wages react positively, on average, to a shock on public wages. In response to a 1% shock to public wages, private sector wages are found to increase on average by around 0.1% after one year. In cumulative terms, the peak effect is reached after five years and amounts to 0.2%. At country level, using interpolated quarterly data, the response of private wages to a public wage shock is found to be positive and statistically significant for Italy, Spain and France, but not for Germany and the Netherlands.

Empirical results for the euro area countries over 2001-20

(a) Granger causality

To test if changes in public wages are predictive for changes in private wages (and vice-versa), we first perform panel Granger-causality tests. The results are summarised in Table A. Model 1 corresponds to a linear univariate equation where the number of lags for both the dependent and independent variable included as controls is chosen on the basis of the Akaike information criterion. Model 2 is a multivariate model where, additionally, the effect of prices is controlled for in the assessment of Granger causality. In this case, the choice for the number of lags relies on the Bayesian information criterion. Two periods⁹ are considered on the basis of annual data – 2001 to 2019 and 2001 to 2020 – for EA-5 (largest five economies of the euro area), EA-12 (first 12 members of the euro area) and EA-19 (all current euro area members). The first period is meant to isolate the effects of the pandemic that struck in 2020.

⁹ The period 2013-19 used in the subsequent empirical analysis for the robustness check is too short for the test properties with annual data.

Table A

Panel Granger causality of public wages on private wages and vice-versa

	Period	Model 1			Model 2					
		Without prices			Without prices			With prices		
		EA-5	EA-12	EA-19	EA-5	EA-12	EA-19	EA-5	EA-12	EA-19
Public causes private	2001-19	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
	2001-20	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Private causes public	2001-19	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	2001-20	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The tests are run on series of compensation per employee in natural logs. Model 1 is run with the `xtgcause` function in STATA, using the Akaike information criterion to choose the number of lags providing the best fit. Model 2 is run with the `xtgranger` function, using the Bayesian information criterion and allowing for multiple variable testing. Causality tests run with a 90% confidence level.

Overall, there is strong evidence for a causal relationship between public and private wages in both directions. Notably, the inclusion of the outlier year 2020 does not necessarily break the causality relation, especially in Model 2 with prices. Furthermore, causality is also found between prices and both private and public wages. These more updated findings are in line with Lamo et. al (2008), who also unveiled evidence of bi-directional causality when including prices. When prices are not considered, many instances of bi-directional causality still arise, with cases where public wages affect private wages also being reported.

(b) Panel regressions

In this section, we investigate the impact of public wages on private wages, while controlling for other variables used in the literature, such as inflation, labour market and other cyclical economic conditions.¹⁰ We use a series of panel regression models in annual growth rates, checking the robustness of the results to different country samples (EA-5, EA-12, EA-19), periods (2001-20, 2001-19, 2013-19) and estimator choices. Three estimators are considered, namely Driscoll-Kraay (DK), Arellano-Bond (AB), and Prais-Winsten (PW). Driscoll-Kraay is robust to cross-sectional correlation and temporal dependence and uses fixed effects to control for country-specific characteristics that do not change in time. Arellano-Bond is a generalized method of moments (GMM) estimator with robust standard errors that controls better for endogeneity and dynamic effects. Lastly, Prais-Winsten employs the generalized least-squares (GLS) method and allows for serially correlated errors, which are assumed to follow a first order autoregressive (AR) process.

Table B summarises the results for a restricted number of models. We focus on the first two estimators as the third one yields similar results, as well as on the longer period 2001-20 with results for the shorter periods shown for the EA-19 sample.

In every regression, average public wage growth is statistically significant in explaining the growth rate of average private wages. For a 1 percentage point increase in public wage growth the estimated reaction of private wages ranges from 0.3 percentage points to 0.6 percentage points,

¹⁰ The literature on the determinants of private wages, including standard wage Phillips curves, largely relies on measures of slack and labour market conditions, including productivity, in addition to inflation. For an overview, see Nickel et al. (eds.) (2019). Conversely, literature on the determinants of public sector wages is scarce. Lamo et al. (2007) find that the public wage bill for the euro area aggregate follows a procyclical pattern in response to real GDP, real GDP per capita and unemployment variables. In theoretical models, technological shocks can have a positive effect on both private and public wages. Fernández de Córdoba et al. (2009) investigate the interactions between public and private wages and the labour market with a dynamic equilibrium model. Their findings suggest that a 1% total factor productivity shock results in a 0.5% increase in both private and public wages.

with most values up to 0.5 percentage points (the PW estimator yields somewhat larger responses ranging up to 0.7 percentage points). The lowest values are found for EA-12, which is notably close to the 0.3 percentage points reported by Afonso and Gomes (2008) when using a general equilibrium framework.

In terms of other determinants of private wage growth, productivity growth is found to be statistically significant and positive in every case except for the 2013-19 period in the EA-19 sample. Increases in productivity growth lead to increases in private wages. The unemployment rate, as a proxy for slack in the labour market, is, as expected, negatively associated with private wage growth, but its statistical significance drops in several models. It seems to be highly statistically significant for the most recent sample with EA-19 and for the EA-12 sample. Beyond the trends captured by the unemployment rate, cyclical effects as proxied by the output gap do not seem to be statistically significant in explaining private wage growth. Meanwhile, the contemporaneous inflation rate is generally found to be statistically significant and positively associated with private wage growth. A 1 percentage point increase in the inflation rate is associated with an increase of 0.2-0.3 percentage points in the private wage growth rate. The outlier year of 2020 does not seem to have an influence on the overall robustness of the results, especially with respect to the impact of public wages.

Table B

Panel regressions for the period 2001-20

Dependant variable: average private wage growth

	EA-5		EA-12		EA-19		EA-19 (2001-19)		EA-19 (2013-19)	
	DK	AB	DK	AB	DK	AB	DK	AB	DK	AB
Average public wage growth	0.432*** (0.092)	0.398*** (0.080)	0.373*** (0.027)	0.302*** (0.063)	0.502*** (0.074)	0.481*** (0.090)	0.505*** (0.071)	0.482*** (0.087)	0.590*** (0.104)	0.564*** (0.112)
Productivity growth	0.403* (0.148)	0.358*** (0.116)	0.140* (0.074)	0.128** (0.063)	0.365*** (0.121)	0.356*** (0.118)	0.395*** (0.132)	0.388*** (0.128)	0.108 (0.090)	0.124 (0.093)
Unemployment rate	-0.119 (0.058)	-0.000 (0.069)	-0.155*** (0.049)	-0.107* (0.064)	-0.118 (0.092)	-0.164 (0.113)	-0.124 (0.092)	-0.192* (0.111)	-0.395*** (0.132)	-0.473*** (0.164)
Output gap	-0.033 (0.077)	0.031 (0.047)	0.066 (0.046)	0.118** (0.048)	0.113 (0.097)	0.114 (0.101)	0.110 (0.103)	0.092 (0.109)	-0.171 (0.121)	-0.205 (0.133)
Inflation	0.266 (0.178)	0.213* (0.123)	0.204* (0.102)	0.195** (0.099)	0.327*** (0.110)	0.318*** (0.112)	0.325*** (0.104)	0.292*** (0.110)	0.177 (0.176)	0.318** (0.149)
Lagged average private wage growth		0.383*** (0.069)		0.133 (0.115)		0.018 (0.055)		0.034 (0.050)		-0.150* (0.086)
Constant	1.437 (0.980)	-0.244 (1.141)	2.323*** (0.616)	1.811* (1.023)	1.743* (0.880)	2.208** (0.960)	1.737* (0.944)	2.396** (0.957)	4.395*** (1.214)	5.383*** (1.793)
No of observations	100	100	240	240	380	378	361	359	133	133
R-squared	0.614		0.636		0.708		0.715		0.712	

Notes: The dependent variable is the annual growth rate of average (per employee) private wages (as a percentage). Similarly, the explanatory variable average public wage growth is expressed as the annual growth rate of average (per employee) public wages (as a percentage). Robust standard errors in parenthesis. Confidence levels: *** p<0.01, ** p<0.05, * p<0.1. DK stands for the Driscoll-Kraay estimator and AB stands for the Arellano-Bond estimator.

(c) Panel vector autoregression (BVAR) model

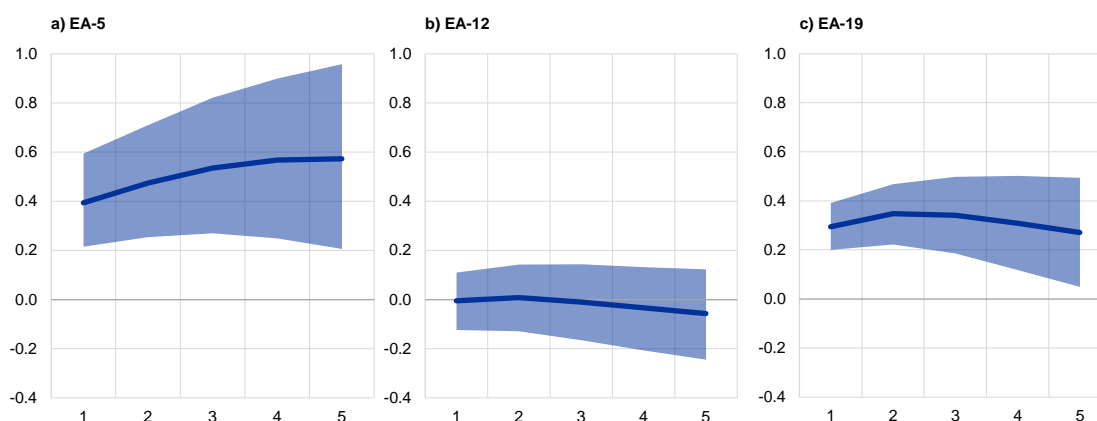
Lastly, a panel BVAR setting allows us to further investigate the reaction of private wages to a shock to public wages. Following the variable choice above and similarly to Attinasi et al. (2019), we set a panel BVAR model using public and private wages (here proxied by compensation per employee),

productivity, HICP and public sector size (all in logs at annual frequency).¹¹ For the EA-19 sample, we find that a permanent impulse of 1% to public wages delivers a 0.3% increase in private wages, which is broadly maintained at a five-year horizon. A restriction of the country set to the 12 initial euro area members does not, surprisingly, yield significant results, while the average response for the big-five euro area economies is larger, albeit also surrounded by much larger uncertainty.

Chart A

Impulse response function of private wages to a 1% shock to public wages

(percentage deviation from baseline)



Notes: Estimation period 2001-20 (yearly). The X-axis indicate the time periods (1 = year of the shock). The dark line indicates the median response; the shaded areas represent the 34% and 68% percentiles. The variables used in the BVAR are natural logarithms of nominal public and private compensation per employee, productivity (defined as real GDP divided by total economy employment), HICP and size of public sector (defined as the share of public employment in total employment). The identification strategy is a Cholesky factorisation with the following order: productivity, public wages, private wages, HICP, size of public sector.

Conclusions

This box has empirically tested the relationship between public and private wage growth, on average, in different euro area samples. Clear evidence of bi-directional causation is found through Granger-causality testing. Overall, the results point to statistically significant spillover effects of public wages to private wages, on average, in the euro area. These effects seem to be more sizeable when the smaller euro area countries are added to the sample.

¹¹ The estimation is done using the BEAR toolbox update (see Dieppe et al., 2016 for the original paper). Similarly, with Attinasi et al. (2019), the model is estimated using a Bayesian pooled estimator and the traditional Normal-Wishart prior distribution. While Attinasi et al. (2019) use quarterly data for the EA-5 sample over the period 1997-2017 (for public wages, quarterly data being obtained from interpolated annual data), this analysis uses original annual (GFS) data. This choice reflects the need to employ more reliable fiscal data, as well as the need for consistency with the regression analysis in part (b) of this box. The identification strategy is a Cholesky factorisation with the following order: productivity, public wages, private wages, HICP, size of public sector. Given the use of annual data, ordering public wages before private wages (differently from Attinasi et al., who ordered private wages first, while using quarterly data) implies that public wages: (i) are allowed to have an effect on impact of the shock (in year 1); and (ii) are unaffected within the same year by shocks to other variables. Notwithstanding the differences with Attinasi et al., the BVAR results for the EA-5 are broadly in line (albeit suggesting larger coefficients) with this previous study, which finds that in response to a 1% increase in public wages, private sector wages increase on average by around 0.1% after one year, with a peak (cumulative) effect of 0.2% after five years.

2.2 Indexation and setting schemes for public pensions

In almost all euro area countries, public pensions are indexed automatically – fully or partially – to prices and wages, mostly in a backward-looking way (Chart 2). Four categories can be identified on the basis of the questionnaire:

- (i) **Full price indexation of public pensions:** applies in six countries (Belgium, Greece, Spain, Italy, Luxembourg and Slovakia), representing 37% of the euro area pension expenditure in 2021. In Spain, this will happen under a new law to take effect as of 2022, following a regime of no automatic indexation in place since 2014. In Greece – in this category as a border-line case – a nominal freeze is currently in effect, with the automatic pension indexation formula to apply as of 2023.¹²
- (ii) **Partial automatic price indexation:** applies in ten euro area countries, representing one-third of the pension bill. In four countries in this group (France, Cyprus, Austria and Portugal) deviations from full price indexation reflect specificities of automatic formulae or government decisions.¹³ In the remaining six countries (Estonia, Latvia, Lithuania, Malta, Slovenia and Finland) pensions are automatically indexed to prices and wages, mostly in a backward-looking way.¹⁴
- (iii) **Indexation to economy-wide wages** applies in Germany and (to the minimum wage) in the Netherlands, the countries representing together 30% of euro area pension expenditure. In Germany, the indexation is done on the basis of backward-looking data in general. However, due to several factors, such as safeguard clauses, different indexing lags and revisions, the link of German pensions to wages is rather weak from year to year and materialises in the medium term. In the Netherlands, the anchor used for indexation – the minimum wage – is linked, in turn, to the average trend of collectively negotiated wage agreements. The type of indexation can be considered mixed (mainly forward-looking, but corrected with adjustments in the forecast).

¹² In Greece, the indexation formula can result in average pension growth rates below lagged CPI inflation in periods in which GDP growth is below CPI inflation. In the context of the December 2021 BMPE, the application of the indexation formula delivered full indexation to one year-lagged CPI inflation as of 2023.

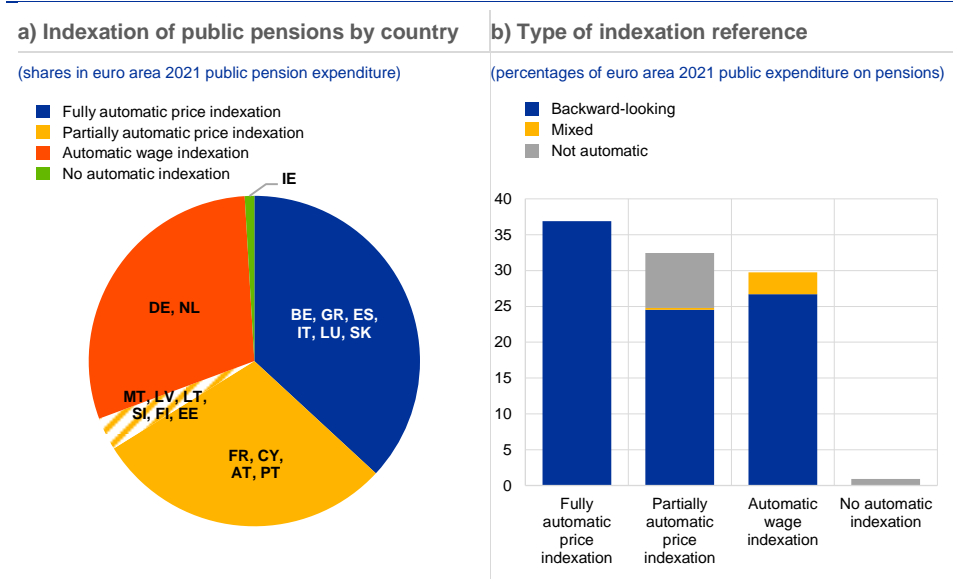
¹³ For instance, in France automatic price indexation applies to basic pensions (backward-looking indexation, about 67% of the total pension bill), while complementary pension revaluation depends on specific regimes (no automaticity). In Estonia, France, Cyprus and Austria, pension increases can be made by government decision, and can deviate from the indexation formula. In Portugal, the pension indexation is determined by a backward-looking formula, in which the main benchmark for inflation is adjusted up or down depending on past real GDP growth, while extraordinary increases for the lowest pensions have been granted by the government in recent years.

¹⁴ Wages have a higher share in the index in all countries apart from Finland and (currently, but not in the future) Malta. In Finland, “earnings-related” pensions (92% of total pensions) are indexed in a backward-looking way to prices (CPI; 80%) and wages (20%), while national pensions (8% of total) are indexed fully to CPI. In Malta, pensions are updated on the basis of the cost of living adjustment (CoLA), as well as any increases in sectoral wages. Following the 2006 pension reform, persons born after 1 January 1962 will have their pension updated annually by 70% of the percentage increase in the national average wage for the previous calendar year, plus 30% of the inflation rate for that same year. In Slovenia, pensions are indexed to the gross monthly wage (60%) and CPI (40%) of the previous year. In Lithuania, most pensions (old-age, survivors, disability) are indexed to the seven-year wage-fund growth average (three-year historic data, current data and three-year forecast), thus comprising a combination of backward and forward-looking indexation. The other pensions in that country are indexed in a backward-looking way with inflation (state pensions) and an indicator of living conditions (social assistance pensions). In Latvia, old-age pensions are indexed on the basis of the backward-looking consumer price index and 50% of the real increase in the social insurance contribution wage. A higher increase is applied to old-age pensions with a longer insurance period.

- (iv) **No automatic indexation system** applies only in Ireland, with public pension increases decided as a rule in the annual budget law.

Chart 3

Public pension indexation across euro area countries



Source: WGPf questionnaire, Eurosystem staff macroeconomic projections for the euro area, December 2021 and authors' calculations.

Notes: The four categories in the two panels are identical in terms of country coverage (see text for description). In panel b), the second bar (category) includes France, where about 67% of the pension bill stems from basic pensions, automatically indexed to prices (included in the blue part of the bar) and 33% from complementary pensions, where the revaluation depends on specific regimes (no automaticity, grey part of the bar). The small yellow part of the bar relates to pensions in Lithuania, which are adjusted with a mixed (forward and backward-looking) indicator.

The mechanisms governing indexation of pensions have fundamental impacts both on the long-term adequacy of pensions and on the financial sustainability of public schemes. Price- and wage-indexation rules broadly aim at preventing long-term losses in pensioners' purchasing power over the retirement period (Hohnerlein, 2019). In the majority of countries deviations from full price indexation can occur due to specificities of automatic formulae or government decisions. This may reflect the introduction of automatic mechanisms to address redistribution objectives (e.g. yielding bigger increases to low-income pensioners, as in Italy and Portugal) or financial sustainability and inter-generational equity concerns (OECD, 2021). In particular, elements of conditionality have been introduced, linking indexation (and other parameters such as retirement age or contribution rates) to economic, demographic or fiscal developments. Still, policy-makers generally retain some flexibility to make ad-hoc interventions by muting or reinforcing the automatic mechanisms depending on the prevailing circumstances.

3 Public wage and pension expenditure

3.1 Country overview of wage and pension expenditure

Taking into account the above-mentioned indexation schemes and other relevant factors, average public wages and pensions grew in 2020 at rates above the recent historical average (2013-19) in most euro area countries (Chart 4). This reflected the lifting of past restrictions in the context of a generally looser fiscal policy and, for public wages, also temporary factors related in particular to pandemic crisis bonuses, most significantly in the health sector. For the euro area aggregate, the average public wage grew at 2.7% in 2020 (2.5% in 2019) versus only 1.7% on average over 2013-19. The average public pension recorded a similar growth rate at 2.6% in 2020 (3.0% in 2019) versus 1.9% on average over 2013-19.

In general, in the Baltic and some other smaller countries, average public wages and pensions grew at rates higher than those of the euro area aggregate. While more recently (in particular, starting in the second half of 2021), this trend has been underpinned by higher inflation rates especially in the Baltic states, other factors, such as increases in the minimum wage and bonuses in various sectors, have also explained the high wage increases. The high debt countries recorded, overall, lower growth rates of both wages and pensions.

In relation to GDP, public wage, compensation of employees and pension expenditure increased significantly in 2020 in almost all countries, especially as GDP fell during the COVID-19 crisis (Chart 5). At the euro area aggregate level, public wages rose to 7.8% of GDP in 2020 from 7.2% in 2019 and 7.3% on average over 2013-19. Slovenia, Lithuania, Malta and Finland were the countries with the largest wage bill as a share to GDP in 2020, at over 10%. In terms of compensation of employees, which shows total employment costs¹⁵, spending increased to 10.7% of GDP in 2020 from 9.9% in 2019 and 10.1% of GDP on average over 2013-19. Greece, Cyprus, Belgium and France were the countries with the largest spending on compensation of public employees relative to their GDP, exceeding 13% in all cases. Public pensions in relation to GDP increased to 12.7% in 2020 at the euro area level from 11.6% in 2019 and 11.8% on average over 2013-19. Italy and Greece were the countries with the largest public pension bill relative to their GDP in 2020, at over 16%.

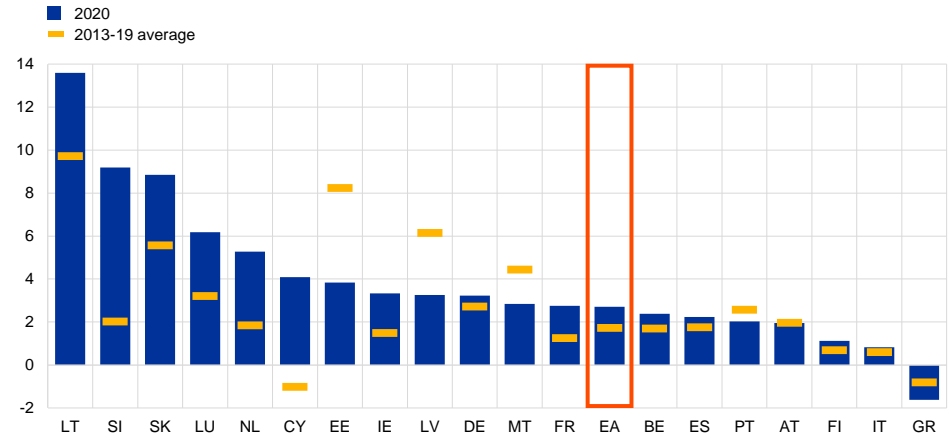
¹⁵ Countries may differ in what is regarded as the employer's share of social contributions and what is the employee's share. Wages and salaries include only the employee's part of social contributions, while compensation of employees also includes the employer's part. Data and comparisons can also be affected by reclassification and changes in the burden of social security contributions between employers and employees. As an example, for Lithuania wages as a share of GDP in 2019-20 are much higher than the average for 2013-19; however, this is largely due to a tax reform in 2019, when the employer's and employee's social security rates (except for the unemployment and accidents at work social security rates) were merged into one rate and assigned to the employee. As a result, the employer's social security rate was reduced, while the employee's rate was increased. This also implied that all gross wages were recalculated (multiplied by 1.289) and showed a strong increase, while statistics on compensation of employees remained unaffected by the reform.

Chart 4

Average public wage and pension growth rates by country

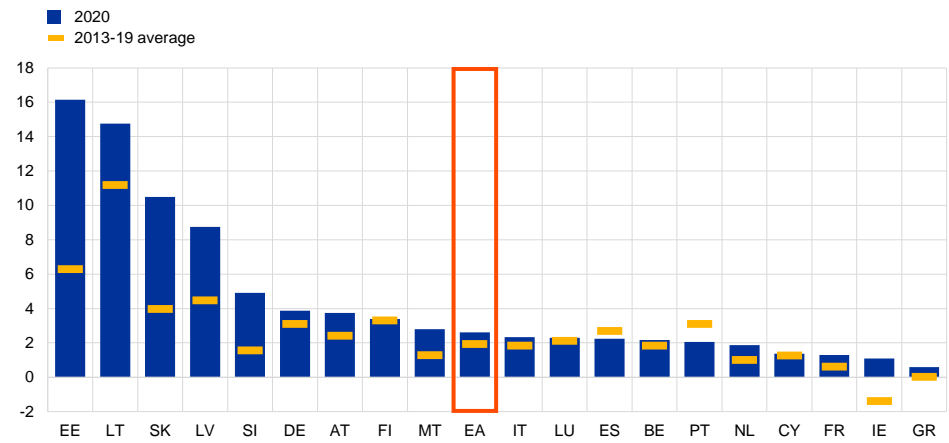
a) Average public wage

(growth rates, percentage)



b) Average public pension

(growth rates, percentage)



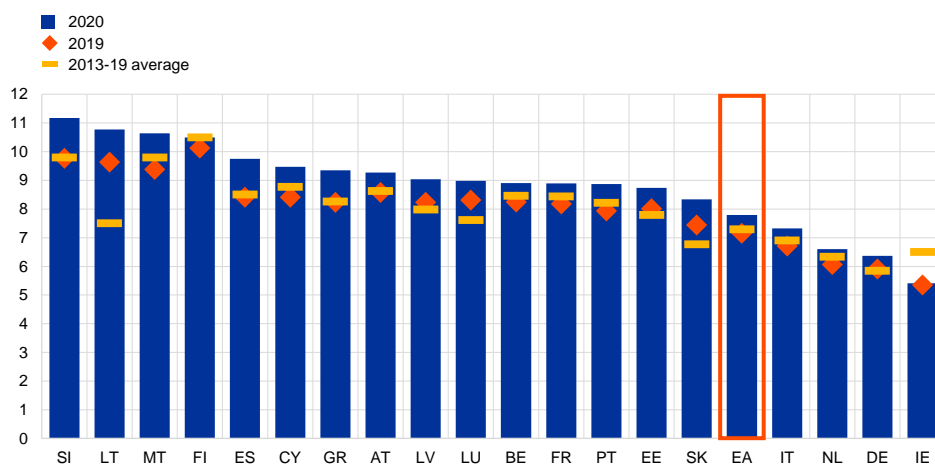
Source: Eurosystem staff macroeconomic projections for the euro area, December 2021. See Chart 1 for definitions used in the calculations.

Chart 5

Public wage, compensation and pension expenditure as a share of GDP by country

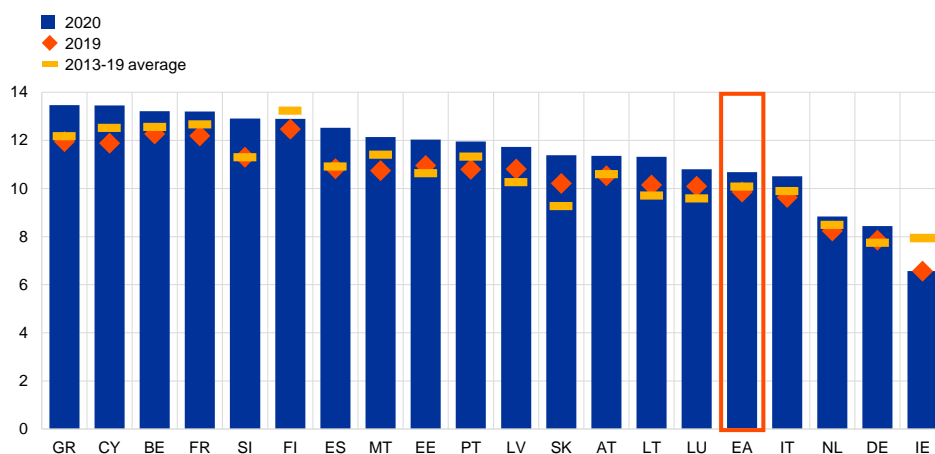
a) Public wage expenditure (wages and salaries, government sector)

(percentage of GDP)



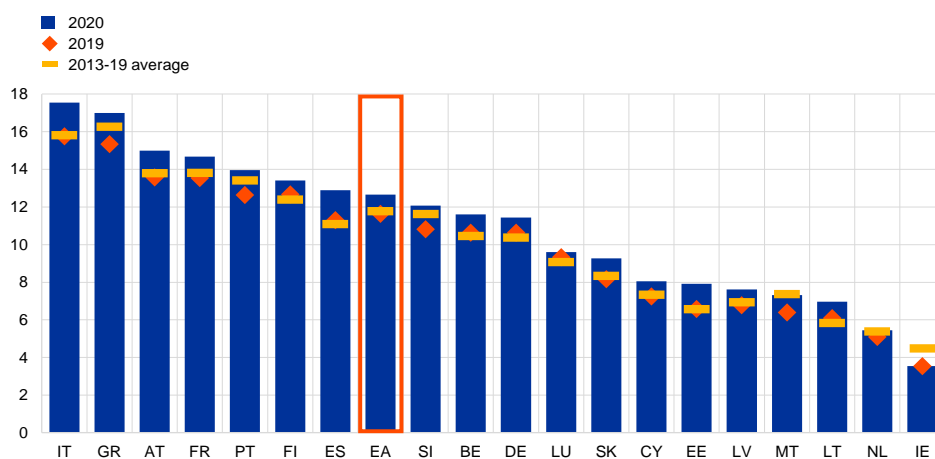
b) Compensation of public employees (compensation of employees, government sector)

(percentage of GDP)



c) Public pension expenditure

(percentage of GDP)



Source: Eurosystem staff macroeconomic projections for the euro area, December 2021. See Chart 1 for definitions used in the calculations.

3.2 Euro area public wage and pension projections

In the December 2021 Eurosystem staff macroeconomic projections,¹⁶ negotiated public wages for the euro area aggregate were forecast to grow cumulatively by less than inflation from 2021 to 2024, while average pensions were projected to grow at higher rates than inflation (Chart 6).

As regards wages, agreed (negotiated) public wages at the euro area aggregate level were projected to grow cumulatively by less than inflation, but the figures were revised upwards compared with the previous vintage (the September 2021 ECB staff macroeconomic projections¹⁷). The projected annual growth was 1.8% on average over 2021-24, with the largest growth rate in 2022 (at 2.6%), when euro area inflation was also projected to run at the highest rate (3.2%). Including the wage drift (which covers factors other than agreed or negotiated wages), euro area average public wages were projected to grow at rates close to expected inflation. Total public wage expenditure, which reflects also the increase in the number of employees, was projected to grow at much higher rates and was revised more substantially upwards in comparison with the September 2021 projections.¹⁸ However, the growth rate of the public wage bill generally lags behind that of the nominal potential GDP.

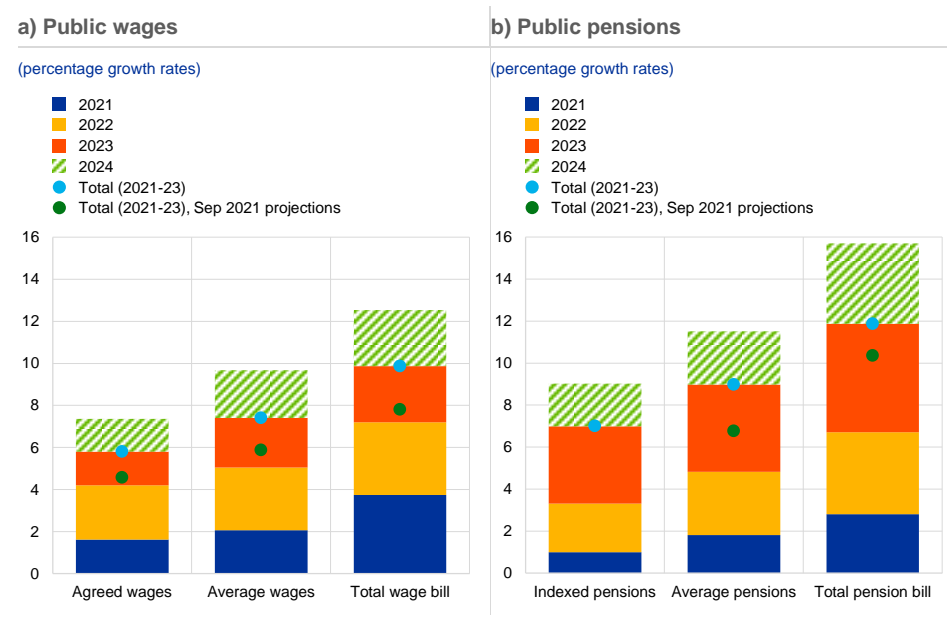
¹⁶ The projections were finalised on 1 December 2021 and based on the policy measures approved or likely to be approved at the time. Owing to uncertainty with regard to its timing and implementation, the announced minimum wage increase in Germany was not included in the baseline projections. For more details, see the [Eurosystem staff macroeconomic projections for the euro area, December 2021](#).

¹⁷ For an overview of the macroeconomic and fiscal projections in this projection vintage, see [ECB staff macroeconomic projections for the euro area, September 2021](#).

¹⁸ The annual average growth rate of government employees in the euro area was 0.7% between 2000 and 2009, dropping to 0.02% between 2010 and 2019. In the December 2021 projections, it was expected to rise again to 0.7% over the forecast horizon (by far the largest increase being projected for 2021, at 1.6%).

Chart 6

Public wage and pension growth projections: euro area aggregate



Source: Eurosystem staff macroeconomic projections for the euro area, December 2021 (unless otherwise specified) and ECB staff macroeconomic projections for the euro area, September 2021.

Notes: Average public wages include agreed wages (mostly wage increases resulting from negotiated wage agreements) and wage drift (usually a residual, which should conceptually reflect factors such as: (i) employee career development/promotion scales; (ii) impact of structural changes, part-time work; and (iii) wages and bonuses outside collective agreements, where such agreements exist). Average public pensions include the part of pensions related to indexation or other formula (indexed pensions) and other factors. Total wage (pension) bill growth rate reflects the growth rate of average wages (pensions) and of the numbers of public employees (pensions). The blue dot shows the total (cumulative) growth rates over the 2021-23 period, which is relevant for the comparison with the September 2021 projection horizon (green dot), which did not include 2024. Indexed pension data not available in the September 2021 projections.

Indexed pensions for the euro area aggregate were projected to grow cumulatively over the forecast horizon at a rate above lagged inflation (9.0% over 2021-24 versus an inflation rate of 7.8% over 2020-23). Average pensions, which include other factors apart from indexation, were projected to grow at rates well above (lagged or contemporaneous) inflation at the euro area aggregate level (11.5% over 2021-24 versus a cumulative inflation rate of 7.8% over 2020-23 or 9.3% over 2021-24). Average pension growth was also revised upwards more substantially over the forecast horizon compared with the September 2021 projections. The largest increase was projected for 2023, broadly corresponding to a higher lagged (2022) projected inflation. This was broadly the case for all the big economies. Total public pension expenditure growth over the projection horizon is even higher, generally above the growth rate of nominal potential growth, reflecting also the increase in the number of pensioners.¹⁹

Since the cut-off date of the December 2021 Eurosystem projections, further upward revisions in inflation and economy-wide wages were reflected in the subsequent

¹⁹ Growth in the number of pensioners in the euro area has been very steady, at around 0.85% on average for the 2010 to 2019 period, but in the December 2021 projections it was expected to increase to 1.1%, on average, over 2021-24.

macroeconomic projections and ongoing risks were acknowledged.²⁰ This especially translated into higher projected growth rates for public pensions over 2023-24, and in some countries, also into higher public wage growth.

²⁰ See, for instance, the Eurosystem staff macroeconomic projections for the euro area, June 2022. Capturing changes in fiscal assumptions and projections between the cut-off date of the December 2021 Eurosystem staff projections and late May 2022, the June 2022 projections revised upwards the cumulative euro area growth rates for the total pension and compensation of public employee expenditure over 2021-24 by about 2.9 and, respectively, 1.8 percentage points. This reflected: (i) lower than projected outcomes for 2021, but also (ii) significantly higher cumulative growth rates over the June 2022 projection horizon (2022-24).

4 Conclusions

If the responses of wages – both private and public – and of pensions to an increase in inflation lead to second-round effects, this can make an inflationary shock more persistent. These effects are especially relevant in the presence of automatic wage and pension indexation. This occasional paper presents an overview of the indexation schemes and other mechanisms for setting public wages and pensions across the euro area countries.

It concludes that price indexation of public wages is relatively limited in the euro area, while public pensions are overwhelmingly automatically indexed, either fully or partially, to prices and wages.

With respect to public wages, although formal mechanisms of price indexation are relatively limited in the euro area, inflation plays (or can play) an important role in informing wage-setting negotiations. In general, price indexation mechanisms prevent purchasing power from declining in the presence of inflation. An updated empirical analysis on annual panel data for the euro area countries over the period 2001-20, with robustness checks across various country and time sub-samples, generally finds a close positive relationship between public and private wages, with bi-directional causation. Panel regression analysis estimates a reaction of average private wage growth mostly between 0.3 and 0.5 percentage points for a 1 percentage point increase in public wage growth, while controlling for other determinants of wages.

In the last two decades, the growth of euro area average public wages and pensions has exceeded inflation (both contemporaneous and lagged), except during the sovereign debt crisis period, in which fiscal consolidation decisions entailed expenditure cuts in these areas. In the case of public wages, the growth rate above inflation may also reflect specific career-related revisions along the progression scale for general government employees. Regarding pensions, average growth above inflation may be explained by positive composition effects (for instance, new pensioners receiving higher pensions than those leaving the system) or discretionary increases applying, for instance, to low-income beneficiaries. The fact that pensions are, in several countries, at least partially indexed to economy-wide wages may also play a role, as wages also grew faster than prices.

On the basis of the December 2021 Eurosystem staff macroeconomic projections, the risk of significant second-round effects from public wages driving persistent inflationary developments appears subdued. At the euro area aggregate level, wage growth in the public sector was projected to be consistently below that in the private sector, suggesting that positive spillovers from the public to the private sector are unlikely beyond what incorporated in the projections. The path of average pension growth over the projection horizon follows one-year lagged HICP inflation closely, reflecting the prevalence of mostly backward-looking schemes. Still, average pension growth is expected to remain well above inflation.

Further upward revisions in inflation and economy-wide wages since the cut-off date of the December 2021 Eurosystem staff macroeconomic projections were reflected in the June 2022 projections, especially in higher projected growth rates for public pensions over 2023-24. In some countries, they have also been directly reflected in public wages. At the same time, both the fiscal and the macroeconomic outlook over the medium term are surrounded by heightened uncertainty as a result of the war in Ukraine.

Appendix

This Appendix includes country fiches summarising the WGPF questionnaire responses to these four main questions:

- Does your country have an automatic price indexation system for public wages and pensions?
- Does your country have an automatic indexation system based on other nominal variables or real indicator?
- If yes to the above questions, what is the reference indicator used for indexation? What are the main features? Summarise if mainly backward-looking (BL), forward-looking (FL) or mixed.
- If no automatic indexation, does your government communicate/use in practice a reference in setting average public wage or pension growth? Please specify and provide any other relevant information.

A.1 Belgium

Prepared by Pierrick Stinglhamber and Stefan Van Parys (Nationale Bank van België/Banque Nationale de Belgique)

	Public wages	Public pensions
Does your country have an automatic price indexation system for public wages and pensions?	yes, fully automatic	yes, fully automatic
	Automatic indexation of public sector wages and social benefits (including pensions) is provided for by law. However, the government has sporadically decided to temporarily suspend this mechanism, as was the case in 2015, when the so-called "index jump" was decided by the government.	
Does your country have an automatic indexation system based on other nominal variables or real indicator?	no automaticity	yes, partially automatic
	Legislation on "welfare adjustment" (private sector): The Generation Pact (2005) introduced a structural "welfare adjustment" mechanism for income replacement and social assistance benefits, including pensions of employees and self-employed. More precisely, the law foresees an annual increase of (i) 1% for minimum and lump sum social benefits (including minimum pensions), (ii) 1.25% for the boundaries used to calculate replacement incomes (including the maximum salary used in the pension calculation), and (iii) 0.5% for all replacement incomes (including the other pensions). Since then, the federal government decides every two years how much money will be made available for this purpose, basically applying the above-mentioned law. The government can deviate from this fixed increase based on contextual factors. For example, in the period 2011-2014 only 60% of the welfare adjustment was granted. The welfare adjustments concern increases in addition to inflation-linked indexation. The social partners break down the available amount between the various categories of benefits, including pensions. Recent application: the agreement for the period 2021-2022 provides for a 2% increase in pensions from 1 July 2021.	
If yes to the above questions, what is the reference indicator used for indexation? What are the main features? Summarise if mainly backward-looking (BL), forward-looking (FL) or mixed.	"health index"	"health index" + "welfare adjustment"
	Legislation on "health index": Civil servants' salaries and social benefits are increased when the cost-of-living measure increases by 2%. The impetus for indexation is given each time the so-called "smoothed health index" reaches a threshold called the "pivot index". The health index is equal to the consumption price index excluding alcohol, tobacco and fossil fuels. The smoothed health index is the four-month moving average of the health index. Social benefits are then adjusted from the month following the month in which the pivot index was reached. The adjustment of civil servants' salaries takes place one month later. Recent application: the pivot index for social benefits and wages in the public sector was reached in December 2021. Consequently, social benefits and public sector wages are adjusted to the cost of living, i.e. increased by 2%, in January and February 2022 respectively.	
If no automatic indexation, does your government communicate/use in practice a reference in setting average public wage or pension growth? Please specify and provide any other relevant information.	NA	NA

A.2 Germany

Prepared by Johannes Clemens (Deutsche Bundesbank)

	Public wages	Public pensions
Does your country have an automatic price indexation system for public wages and pensions?	no automaticity	no automaticity
Does your country have an automatic indexation system based on other nominal variables or real indicator?	no automaticity	yes, fully automatic.
	For pensions, annual adjustments depend mainly on nominal wage growth of the insured.	
If yes to the above questions, what is the reference indicator used for indexation? What are the main features? Summarise if mainly backward-looking (BL), forward-looking (FL) or mixed.	NA	Statutory pensions are automatically adjusted on a backward-looking basis (t-1). The adjustment is determined by three factors: (i) rate of change in the average employee's earnings subject to compulsory contributions, (ii) change in the contribution rate and (iii) changes in the ratio of pension recipients to contribution payers ("sustainability factor"). The adjustment formula is set out in book six of the Social Security Code. Annual adjustment takes place on 1 July, formally enshrined in a government directive that has to (and generally will) be agreed by the upper house ("Bundesrat"). In contrast, pensions for civil servants follow civil servants' wages without any delay.
If no automatic indexation, does your government communicate/use in practice a reference in setting average public wage or pension growth? Please specify and provide any other relevant information.	No clear reference. Public wages and salaries are subject to negotiations between employers and unions or individual employees. Negotiations for public wages take into account: (i) macroeconomic environment and (ii) overall wage development in other major sectors.	NA

A.3 Estonia

Prepared by Katri Urke and Orsolya Soosaar (Eesti Pank)

	Public wages	Public pensions
Does your country have an automatic price indexation system for public wages and pensions?	no automatic link	yes, partially automatic indexation
	<p>Pensions are indexed each year following the formula given in the State Pension Insurance Act. Indexation takes account of both the change in the price level and the change in receipts of taxes on the payroll (see the answer below). The index needs to be approved each year by the government. The state pension is not indexed if the indexation would cause pensions to decrease, so if the value of the index is less than 1.000. In addition, the State Pension Insurance Act defines a couple of cases when the government is allowed to approve a lower value for the index than the one provided by the indexation formula, meaning the indexation is partially automatic. If the index was previously less than 1.000 and the pensions were not cut or if the pensions were indexed with a lower index than that provided by the indexation formula, the government has to subtract or add the part of the index that was not reduced or increased when it approves the new value of the index within the next five years.</p> <p>Wages: we consider the Estonian public wage system to be non-automatic as the automatic indexation mandated by law affects only about 0.3% of all public sector employees (mainly judges and members of parliament). The index used for indexing their wages is the same as that for pensions.</p>	
Does your country have an automatic indexation system based on other nominal variables or real indicator?	no automatic link	yes, partially automatic indexation
	Please see the answers above and below.	
If yes to the above questions, what is the reference indicator used for indexation? What are the main features? Summarise if mainly backward-looking (BL), forward-looking (FL) or mixed.		backward-looking
	<p>For the pension index, 20 per cent depends on the annual increase in the consumer price index in the previous year, and 80 per cent on the annual increase in receipts of the pension insurance part of social tax in the previous year. Thus, the indexation is fully backward-looking. When the index is calculated, the annual increase in the consumer price index is multiplied by 0.2, the annual increase in receipts of the pension insurance part of social tax is multiplied by 0.8, and the results are added together.</p>	
If no automatic indexation, does your government communicate/use in practice a reference in setting average public wage or pension growth? Please specify and provide any other relevant information.		NA
	<p>Rises in public wages are generally decided during the process of approving the annual budget law. The reference used for communicating the increase in public wages is usually the growth in the general average wage, which is backward-looking, or the wage level in comparable positions in the private sector. Central government conducts and publishes an analysis of wages in central government positions, comparing them to the compensation paid in similar jobs in the private sector to identify significant deviations. Local governments have substantial autonomy in setting the wages of the officials they employ directly.</p> <p>In setting wages for teachers, the political parties and governments have for years expressed a wish to increase the average wage of teachers to 120% of the national average wage, and the minimum wage for teachers to the level of the Estonian average wage. The initial target was to reach this goal in 2019/2020. The target was not met though, and the current government intends to move forward with this plan. In this sense, the wages of teachers can be considered to be indexed in a forward-looking way that targets a somewhat faster increase than the growth expected in the average wage in the next year.</p> <p>In essence similar arguments are raised during public discussions about wage increases in internal security, meaning for the police and border guard, rescue workers, firefighters and similar, though the targets are not as clearly set for them as they are for teachers.</p>	

A.4 Ireland

Prepared by David Staunton (Central Bank of Ireland)

	Public wages	Public pensions
Does your country have an automatic price indexation system for public wages and pensions?	no automaticity	no automaticity
	There is no automaticity in Ireland. Pension increases tend to be introduced annually at Budget time, while public sector pay agreements occur on an ad-hoc basis.	
Does your country have an automatic indexation system based on other nominal variables or real indicator?	no automaticity	no automaticity
If yes to the above questions, what is the reference indicator used for indexation? What are the main features? Summarise if mainly backward-looking (BL), forward-looking (FL) or mixed.	NA	NA
If no automatic indexation, does your government communicate/use in practice a reference in setting average public wage or pension growth? Please specify and provide any other relevant information.	No	No
	Public sector wages are negotiated between Unions and Government taking account of a wide range of economic information. Decisions to change pension payments, when they occur, do not reflect specific references.	

A.5 Greece

Prepared by Maria Vergou and Maria Flevotomou (Bank of Greece)

	Public wages	Public pensions
Does your country have an automatic price indexation system for public wages and pensions?	no automaticity	yes, fully automatic
	For public wages, a nominal freeze is currently in effect. For public pensions, a nominal freeze is in effect until 2022. The automatic pension indexation formula applies as of 2023.	
Does your country have an automatic indexation system based on other nominal variables or real indicator?	no automaticity	yes, fully automatic
If yes to the above questions, what is the reference indicator used for indexation? What are the main features? Summarise if mainly backward-looking (BL), forward-looking (FL) or mixed.	NA	Minimum of $[(0.5 \cdot \text{GDP growth}_{t-1} + 0.5 \cdot \text{CPI growth}_{t-1})]$ ²¹
	For public pensions, a nominal freeze is in effect until 2022. The automatic pension indexation formula applies as of 2023. It is backward-looking.	
If no automatic indexation, does your government communicate/use in practice a reference in setting average public wage or pension growth? Please specify and provide any other relevant information.	NA	NA
	According to L. 4024/2011, starting wages per educational category were calculated to equal the relevant minimum wage of the private sector at that time (taking into consideration that the public sector had 12 wage payments per year). However, the law didn't envisage an official link to the minimum wages.	

²¹ The legislation on the pension indexation formula (Law 4387/2016) does not specify whether GDP growth refers to nominal or real GDP. In the context of the December 2021 BMPE the formula has been applied using nominal GDP growth.

A.6 Spain

Prepared by Jorge Martínez-Pagés (Banco de España)

	Public wages	Public pensions
Does your country have an automatic price indexation system for public wages and pensions?	no automaticity	yes, fully automatic
	<p>There is no automatic price indexation for public wages, although the evolution of the ICP is carefully considered when the Government and unions negotiate public wage increases.</p> <p>Before 2014, pensions were indexed to ICP-inflation. They increased with forecast inflation for the year and then if actual inflation (at November of year t) was higher, pensioners received a compensation in January of year t+1. If actual inflation was lower, there was typically no compensating reduction. The indexation system was replaced by a system not automatically linked to inflation from 2014 until 2021. A new pension reform was approved in 2021, with application starting in 2022, establishing a fully automatic indexation to previous year prices.</p>	
Does your country have an automatic indexation system based on other nominal variables or real indicator?	no automaticity	no automaticity
If yes to the above questions, what is the reference indicator used for indexation? What are the main features? Summarise if mainly backward-looking (BL), forward-looking (FL) or mixed.		12-month average of annual ICP growth up to November of year t-1 (BL).
	<p>From 2022 onwards, pension increase for year t is statutorily set equal to the 12-month average of annual ICP growth up to November of year t-1, if this is positive, and zero, otherwise.</p>	
If no automatic indexation, does your government communicate/use in practice a reference in setting average public wage or pension growth? Please specify and provide any other relevant information.	No	NA
	<p>The Government takes into account the evolution of prices (cost of living) and other economic variables in negotiating and setting public wage increases, but there is no formal reference communicated or used in this context. For example, public wage increases in 2018-2020 were agreed on a pluriannual framework that set increases of 1.75, 2.5 and 2% for that period, respectively, with the intent of recovering previous purchasing power losses in the years of the sovereign crisis. Additional increases were conditional on the development of the economy (GDP).</p>	

A.7 France

Prepared on the basis of input from Banque de France

	Public wages	Public pensions
Does your country have an automatic price indexation system for public wages and pensions?	no automaticity	yes, partially automatic
	<p>Basic pensions are automatically indexed:</p> <ul style="list-style-type: none"> - to inflation on 1 January (since 2018) if inflation is positive, but they are constant in the case of deflation, - exceptions can be decided: in 2019, the pension revaluation was set at 0.3% (instead of 1.6%) and in 2020 pensions above €2,000 were increased by only 0.3% (vs 1% for low pensions) <p>Complementary pension revaluations depend on pension regimes and are not automatically indexed.</p>	
Does your country have an automatic indexation system based on other nominal variables or real indicator?	no automaticity	no automaticity
	<p>For public wages: the public wage index was frozen for 2022 at the cut-off date of the December 2021 Eurosystem staff projections. Projections considered that specific agreements could lead to targeted wage increases, such as (i) on low public wages to align them to the minimum wage increases; (ii) on specific sectors, for instance health and education.</p>	
If yes to the above questions, what is the reference indicator used for indexation? What are the main features? Summarise if mainly backward-looking (BL), forward-looking (FL) or mixed.	NA	Consumer price index, excluding tobacco (BL) for basic pensions.
If no automatic indexation, does your government communicate/use in practice a reference in setting average public wage or pension growth? Please specify and provide any other relevant information.	NA	NA
	<p>For public wages: set almost entirely by wage grids, which rely on a common public wage index. The various grids differ across local or national levels, or across government agencies. Public wage dynamics are set through: (i) agreements on the wage index (government announcement once a year); (ii) agreement on revaluing all low wages in all grids; (iii) sectoral agreements, which lead to revisions of specific wage grids.</p>	

A.8 Italy

Prepared by Fabrizio Renzi and Marco Savegnago (Banca d'Italia)

	Public wages	Public pensions
Does your country have an automatic price indexation system for public wages and pensions?	yes, partially automatic	yes, fully automatic
	<p>For public wages, expectations about inflation are taken into account during the bargaining process involving contract renewals. The agreed compensation per employee is based on the resources set aside by the Government (which has typically determined an increase in average wage higher than inflation). If, however, inflation turns out to be higher than the increase in public wage over the three-year contract period, the difference is necessarily compensated during the following three-year period.</p> <p>For pension indexation, most pensions (those below a specified threshold) are fully indexed; those pensions higher than a specified threshold are instead subject to partial indexation. However, at the aggregate level the effective indexation rate is close to 100% of the previous-year inflation.</p>	
Does your country have an automatic indexation system based on other nominal variables or real indicator?	no automaticity	no automaticity
If yes to the above questions, what is the reference indicator used for indexation? What are the main features? Summarise if mainly backward-looking (BL), forward-looking (FL) or mixed.	Mixed	Mainly BL
	<p>For wages, the reference benchmark is the HICP net of energy.</p> <p>As regards pension indexation, the relevant index is the consumer price index for white and blue collar workers, computed by Istat. The index excludes only tobacco products.</p>	
If no automatic indexation, does your government communicate/use in practice a reference in setting average public wage or pension growth? Please specify and provide any other relevant information.	No	NA

A.9 Cyprus

Prepared by Aris Avgousti (Central Bank of Cyprus)

	Public wages	Public pensions
Does your country have an automatic price indexation system for public wages and pensions?	yes, partially automatic	yes, partially automatic
	<p>Following an agreement between the Government and trade unions of the public sector, public sector wages in Cyprus are adjusted by an automatic price indexation system. In particular, the adjustment equals a payment of 50% of the increase in the Cost of Living Allowance (CoLA) index, provided that there was positive growth in the second and third quarter of the previous year.</p> <p>The Government needs to approve the CoLA index at the beginning of each year (i.e. early January); therefore, the indexation is considered partially automatic. In 2013-2017, the Government suspended the automatic price indexation to correct fiscal imbalances – also as part of the economic adjustment programme in 2013-2016.</p> <p>Pensions are adjusted with the same automatic price indexation formula as public sector wages.</p>	
Does your country have an automatic indexation system based on other nominal variables or real indicator?	no automaticity	no automaticity
If yes to the above questions, what is the reference indicator used for indexation? What are the main features? Summarise if mainly backward-looking (BL), forward-looking (FL) or mixed.	Public wages are adjusted with a payment of 50% of the increase in the Cost of Living Allowance (CoLA) index, provided that there was positive growth in the second and third quarter of the previous year. The CoLA index is backward looking, corresponding to previous year's CPI adjusted to exclude excise duties. The adjustment is implemented at the beginning of each year, and it cannot be negative (if, for example, there was negative inflation in the previous year).	Pensions are adjusted with the same automatic price indexation formula as public sector wages.
If no automatic indexation, does your government communicate/use in practice a reference in setting average public wage or pension growth? Please specify and provide any other relevant information.	NA	NA

A.10 Lithuania

Prepared by Gintare Zelionkaite (Lietuvos bankas)

	Public wages	Public pensions
Does your country have an automatic price indexation system for public wages and pensions?	no automaticity	yes, partially automatic
	<p>Indexation of state pensions (pensions which are awarded to persons with distinguished achievements for the state, officials, military servants, judges, etc.) is based on inflation. This type of pension accounts for only a small share of total pensions, therefore importance of inflation for total pension indexation is low.</p> <p>Indexation of social assistance pensions is based on indicator of the cost of living (minimum consumption needs).</p>	
Does your country have an automatic indexation system based on other nominal variables or real indicator?	no automaticity	yes, partially automatic
	<p>Wage fund is the main item used for indexation of pensions.</p> <p>Indexation of old-age pensions and some other types of pensions (survivors, disability, etc.) is based on wage fund growth as of 2018. As of 2022, old-age pensions can be indexed additionally if there is a surplus in social security funds and other criteria are met.</p>	
If yes to the above questions, what is the reference indicator used for indexation? What are the main features? Summarise if mainly backward-looking (BL), forward-looking (FL) or mixed.	NA	<p>Old-age, survivors, disability pensions are indexed by the seven-year wage-fund growth average (three-year historic data, current data and three-year forecast). Thus, BL and FL have equal weighting.</p> <p>State pensions are indexed by inflation for the previous year; thus BL.</p> <p>Social assistance pensions are indexed by indicator of living conditions (minimum consumption needs); thus BL.</p>
If no automatic indexation, does your government communicate/use in practice a reference in setting average public wage or pension growth? Please specify and provide any other relevant information.	<p>The law requires that "salary base", which is one of the wage formula components for public sector employees, be approved annually taking into account "average annual inflation of the previous year, minimum wage and the influence of other factors influencing the size and change of the average public sector wage". Thus, salary base setting is mainly BL.</p> <p>However, the remuneration system for public sector employees is unbalanced and there is a tendency to regulate the remuneration of employees in individual areas of the public sector through separate laws and to link the remuneration with other indicators, e.g. with the national average wage or minimum wage.</p>	NA

A.11 Luxembourg

Prepared by Olivier Delobbe and Florian Henne (Banque centrale du Luxembourg)

	Public wages	Public pensions
Does your country have an automatic price indexation system for public wages and pensions?	yes, fully automatic	yes, fully automatic
Does your country have an automatic indexation system based on other nominal variables or real indicator?	no automaticity	no automaticity
	Public pensions are also adjusted with respect to the evolution of real wages every two years. Under the current system, when real wages increase, public pensions increase proportionally.	
If yes to the above questions, what is the reference indicator used for indexation? What are the main features? Summarise if mainly backward-looking (BL), forward-looking (FL) or mixed.	The reference indicator used is the six-month moving average of the National Index of Consumer Prices (NICP). The NICP measures domestic inflation and specifically covers consumer spending of residents in Luxembourg. The NICP thus differs from the HICP. The weighting of the NICP is based on final consumption expenditure of residents on national territory, while the HICP reflects expenditures made by both residents and non-residents.	Same as for public wages.
	The prevailing wage indexation scheme is backward-looking and applies both to the public sector and the private sector (there is only one wage indexation mechanism in Luxembourg). Nominal wages (and social transfers) are automatically adjusted upwards by 2.5% whenever the six-month moving average of the National Index of Consumer Prices (NICP) has increased by 2.5% since the preceding wage indexation. There are thus no pre-set dates for the indexation adjustments, but the latter are conditional on the evolution of NICP inflation.	
If no automatic indexation, does your government communicate/use in practice a reference in setting average public wage or pension growth? Please specify and provide any other relevant information.	NA	NA

A.12 Latvia

Prepared by Baiba Brusbārde (Latvijas Banka)

	Public wages	Public pensions
Does your country have an automatic price indexation system for public wages and pensions?	no automaticity	yes, fully automatic
Does your country have an automatic indexation system based on other nominal variables or real indicator?	no automaticity	yes, fully automatic
If yes to the above questions, what is the reference indicator used for indexation? What are the main features? Summarise if mainly backward-looking (BL), forward-looking (FL) or mixed.	NA	State pensions are reviewed once a year on 1 October considering the backward-looking consumer price index and 50% of the real increase of the social insurance contribution wage in line with the following conditions: a) if the value of the actual consumer price index and contribution wage index is lower than digit "1", the State pension shall not be reviewed; b) if the actual increase percentage of the wage subject to insurance contributions is higher than 15%, the value of 15% is used to determine the contribution wage index. However: 1) pensions only up to a certain amount are indexed (or part of the pension; as of 1 October 2021 this is €470/month); and 2) the index applied depends on the length of the period of insurance: instead of 50% the following percentage of the actual increase of the amount of wages is applied: 60% if the length of the period of insurance is from 30 to 39 years or if the old-age pension has been granted for work in hazardous, hard, or particularly hazardous, particularly hard working conditions; 70% if the length of the period of insurance is from 40 to 44 years; 80% if the length of the period of insurance is 45 years and more. At the end, as of 1 October 2021 the following indices are applied to old-age pensions: 1.0423 if the total insurance period is up to 29 years; 1.0446 if the total insurance period is from 30 to 39 years or if the old-age pension has been granted for work in harmful, severe or particularly harmful, particularly severe working conditions (even if the insurance period is less than 30 years); 1.0512 if the total insurance period is from 40 to 44 years; 1.0578 if the total insurance period is 45 and more years; 3) there is also a granted supplement (premium) for each year of insurance accumulated until 31 December 1995. It is set by law and is currently 1.74 if the old-age pension was granted before 31 December 1996, or 1.16 euro if the old-age pension was granted as of 1 January 1997.
If no automatic indexation, does your government communicate/use in practice a reference in setting average public wage or pension growth? Please specify and provide any other relevant information.	No clear reference. Wage increase is subject to fiscal space. However, a reform is planned for public wages (to be launched by 2023), setting an automatic indexation for certain institutions and officials (including Parliament and local governments) with reference to backward-looking prices and wages (t-2/t-1) aligned with coefficients.	NA

A.13 Malta

Prepared by John Farrugia and Juergen Attard (Central Bank of Malta)

	Public wages	Public pensions
Does your country have an automatic price indexation system for public wages and pensions?	Yes, partially automatic	Yes, partially automatic
	This indexation mechanism is known as the Cost of Living Adjustment (CoLA). The CoLA is given out to all employees (i.e. both private and public sector employees). The CoLA mechanism came in force in 1990 following an agreement between Government, trade unions and employers' associations. It is regulated by the Wage Increase Standard Order (Subsidiary Legislation 452.65).	
Does your country have an automatic indexation system based on other nominal variables or real indicator?	No automaticity	Yes, partially automatic
	Persons born before 1 January 1962 (including present retirees) have their pension updated based on the CoLA as well as any increases in wages presently awarded through collective bargaining to the occupation or salary scale previously occupied by the person in retirement. Following the 2006 pension reform, persons born after 1 January 1962 will have their pension updated annually by 70 per cent of the percentage increase in the national average wage for the previous calendar year, plus 30 per cent of the inflation rate for that same year.	
If yes to the above questions, what is the reference indicator used for indexation? What are the main features? Summarise if mainly backward-looking (BL), forward-looking (FL) or mixed.	<p>The CoLA is based on a backward-looking formula. The rate of inflation is determined by the Retail Price Index (RPI), which is based on the prices for a large set of goods and services monitored by the National Statistics Office. The annual increase is determined by the 12-month average of the RPI up to September, rounded to the nearest 58 cents. The CoLA for year t+1 is usually announced during the Budget Speech and comes into effect in January of t+1.</p> <p>By law, employers must ensure that the annual wage increase is at least equal to the CoLA. A full-time employee is entitled to the full increase, while a part-time employee is entitled to part of the cost of living increase in proportion to the hours worked.</p>	<p>Every year the minimum and maximum pensionable income are adjusted by the CoLA. Two-thirds of the weekly cost of living increase is always added to the pension rate while the other third is given out as a cost of living bonus. Both are issued in one pension payment, payable every four weeks. Thus, the yearly CoLA is received in full by pensioners as well. The minimum and maximum pension for each year are set in a dedicated Legal Notice.</p>
If no automatic indexation, does your government communicate/use in practice a reference in setting average public wage or pension growth? Please specify and provide any other relevant information.	NA	NA

A.14 Netherlands

Prepared by Gerard Eijsink and Jip Italianer (De Nederlandsche Bank)

	Public wages	Public pensions
Does your country have an automatic price indexation system for public wages and pensions?	no automaticity	no automaticity
	In the Netherlands, there is no mandatory automatic price indexation by law, either for wages or pensions. For wages, a system of price indexation can be agreed upon by the negotiating parties of collective wage agreements in different government sectors, but as far as we can tell this is not common practice.	
Does your country have an automatic indexation system based on other nominal variables or real indicator?	no automaticity	yes, fully automatic
	<p>WAGES: there is no automatic indexation based on other nominal variables, although within collective wage agreements indexation based on such indicators could be agreed upon.</p> <p>PENSIONS: state pensions are pegged to the statutory minimum wage in the Netherlands. For single elderly, this is 70% of the minimum wage, while for (fiscal) couples this is 100% of the minimum wage*. The minimum wage in the Netherlands is linked to average trend of collectively negotiated wage agreements. This is done twice a year, in January and July, based on mixed (forward-looking and corrected) data. In January of year T, the minimum wage is increased by 50% of the increase in contractual wages for year T as forecast by the CPB in autumn T-1. In July of year T, the minimum wage is increased by the increase in contractual wages for year T, as forecast by the CPB in spring T-1, minus the 50% increase from January (to avoid a double increase). The January increase is also corrected for the difference between the spring and autumn forecasts of T-1 for the year T-1. Since there is no actual outturn data used (only forecasts), this approach can be considered mixed; mainly forward looking, but corrected with differences in forecasts that benefits also from newly available information.</p> <p>*In the recently published coalition agreement plans for a 7.5% raise of the minimum wage are presented, without an accompanying raise of state pensions. If implemented, this would mean the abovementioned 70% and 100% would no longer hold.</p>	
If yes to the above questions, what is the reference indicator used for indexation? What are the main features? Summarise if mainly backward-looking (BL), forward-looking (FL) or mixed.	NA	Mixed (FL adjusted)
	PENSIONS: the reference indicator for pension indexation is the minimum wage, which is updated in January and July based on biannual forward-looking data from the Netherlands Bureau for Economic Policy Analysis (CPB), corrected for adjustments in the forecast.	
If no automatic indexation, does your government communicate/use in practice a reference in setting average public wage or pension growth? Please specify and provide any other relevant information.	There is no reference in setting wage growth for the public sector. It is negotiated in collective public wage agreements.	NA

A.15 Austria

Prepared by Doris Prammer and Lukas Reiss (Oesterreichische Nationalbank)

	Public wages	Public pensions
Does your country have an automatic price indexation system for public wages and pensions?	no automaticity	yes, partially automatic
	The relevant law foresees in principle an automatic indexation of pensions to past inflation rates. However, the law also allows for a different pension increase if the Government so decides. Hence, deviating from the automatic adjustment process has been common practice, with a view to increasing low pensions above past inflation rates.	
Does your country have an automatic indexation system based on other nominal variables or real indicator?	no automaticity	no automaticity
If yes to the above questions, what is the reference indicator used for indexation? What are the main features? Summarise if mainly backward-looking (BL), forward-looking (FL) or mixed.		By law: average CPI inflation rate from August t-2 to July t-1
If no automatic indexation, does your government communicate/use in practice a reference in setting average public wage or pension growth? Please specify and provide any other relevant information.	Yes, namely average CPI inflation rate from October t-2 to September t-1. This rate is communicated at the beginning of the negotiation procedure.	NA

A.16 Portugal

Prepared by Maria M. Campos (Banco de Portugal)

	Public wages	Public pensions
Does your country have an automatic price indexation system for public wages and pensions?	no automaticity	yes, partially automatic
Does your country have an automatic indexation system based on other nominal variables or real indicator?	no automaticity	yes, partially automatic
If yes to the above questions, what is the reference indicator used for indexation? What are the main features? Summarise if mainly backward-looking (BL), forward-looking (FL) or mixed.	NA	Pension indexation is determined by a backward-looking formula which links it to real GDP growth and inflation and differentiates across pension cohorts. The main benchmark is the average inflation in the previous 12 months, adjusted up or downwards depending on average real GDP growth over the previous eight quarters. The adjustment factor is such that it implies larger increases for lower pensions. Moreover, in recent years, the government has decided to implement additional extraordinary increases for the lowest pensions.
If no automatic indexation, does your government communicate/use in practice a reference in setting average public wage or pension growth? Please specify and provide any other relevant information.	Yes	NA
	The Government typically takes the inflation rate projected in the context of the budget as reference for public wage updates in the bargaining process with unions. Past inflation has also been used in some years, while in others arbitrarily stipulated increases have been proposed. In any case, this is mostly a starting point for the negotiations, which can result in the definition of a certain nominal increase, even if no agreement was reached. The actual wage increase may differ across government employees (depending, for example, on wage bracket or for specific professional categories).	

A.17 Slovenia

Prepared by Andreja Strojjan Kastelec (Banka Slovenije)

	Public wages	Public pensions
Does your country have an automatic price indexation system for public wages and pensions?	No automaticity.	Yes, partially automatic.
	<p>Public wages: in Slovenia, there is no automatic general price indexation for "basic" public wages. Nevertheless, there are some components of public sector employee receipts that are connected to price developments (representing a minor part of compensation of employees). The agreement signed in May 2021 (Agreement on the abolition of austerity measures relating to reimbursements and other remuneration of civil servants, the postponement of the payday for budget users and the annual leave allowance for 2021) foresees an adjustment of meal allowances every six months in line with the increase in food prices. Additionally, family separation allowances, daily allowances for business trips within Slovenia, tenure awards and solidarity payments are adjusted once a year (in January) to take into account the year-on-year increase in CPI inflation in December of the previous year. Inflation also represents the lowest amount of adjustment of minimum wage. Pensions: the current pension law was implemented in 2013. Regular pension indexation takes into account price and wage developments. The adjustment of pensions can, however, differ from this general rule. For example, austerity measures were introduced during the economic crisis (resulting in no indexation of pensions), while in good/better times there might be irregular indexation of pensions and/or selective increases of low pensions. In Slovenia, certain social transfers are also subject to price indexation (for example, child benefits).</p>	
Does your country have an automatic indexation system based on other nominal variables or real indicator?	No automaticity	Yes, partially automatic
	Pension adjustment is based also on wage developments.	
If yes to the above questions, what is the reference indicator used for indexation? What are the main features? Summarise if mainly backward-looking (BL), forward-looking (FL) or mixed.		Increase in average monthly gross wage (60%) and CPI (40%) of the previous year (BL), as published by the Statistical Office.
	Regular indexation of pensions takes place once a year in February (with payment of increased pension also for January). The pension adjustment is expressed as a percentage and is the sum of the two observed partial increases. In case of deflation, the reduction is not taken into account. According to the law, the minimum adjustment is half of CPI growth of the previous year.	
If no automatic indexation, does your government communicate/use in practice a reference in setting average public wage or pension growth? Please specify and provide any other relevant information.	No	NA
	There is no reference in setting wage growth for the public sector (except nationwide minimum wage, which applies to the public sector as well and also serves as the minimum amount of annual holiday payment). Everything is negotiated.	

A.18 Slovakia

Prepared by Barbora Palášthyová and Vratislav Pisca (Národná banka Slovenska)

	Public wages	Public pensions
Does your country have an automatic price indexation system for public wages and pensions?	no automaticity	yes, fully automatic
Does your country have an automatic indexation system based on other nominal variables or real indicator?	yes, partially automatic	no automaticity
	In 2014-2017 an indexation formula of pensions was defined as the weighted average of inflation and increase in average wages. In 2014, the weight of inflation was 60% and thereafter it increased by 10 percentage points per year. Therefore, the weight of inflation has been 100% since 2018. Moreover, a temporary minimum indexation of pensions was introduced in 2017 and expired in December 2021. During this period individual pensions were revalued by a nominal value of at least 2% of an average pension.	
If yes to the above questions, what is the reference indicator used for indexation? What are the main features? Summarise if mainly backward-looking (BL), forward-looking (FL) or mixed.	For constitutional officials, judges and prosecutors, indexation is based on average monthly wage of an employee in the economy of the Slovak Republic for the previous calendar year. However, it may be reduced – depending on the size of the budget balance (BB) in the previous year (cut by 15% if $BB < -7\%$ of GDP; by 10% if -7% of GDP $< BB < -5\%$ GDP; and cut by 5% if -5% GDP $< BB < -3\%$). For healthcare workers, the indexation is based on average monthly wage of an employee in the economy of the Slovak Republic for the calendar year two years preceding the calendar year for which the indexation is set. Therefore, for those mentioned above, it is fully backward-looking (BL).	Indexation of pensions equals previous year inflation for pensioner households. Pensions are revalued always from 1 January(t) (of year t), according to the year-on-year inflation from April(t-1). It is therefore a fully backward-looking formula.
If no automatic indexation, does your government communicate/use in practice a reference in setting average public wage or pension growth? Please specify and provide any other relevant information.	No clear reference	NA

A.19 Finland

Prepared by Jarkko Kivistö (Suomen Pankki – Finlands Bank)

	Public wages	Public pensions
Does your country have an automatic price indexation system for public wages and pensions?	no automaticity	yes, partially automatic
Does your country have an automatic indexation system based on other nominal variables or real indicator?	no automaticity	yes, partially automatic
If yes to the above questions, what is the reference indicator used for indexation? What are the main features? Summarise if mainly backward-looking (BL), forward-looking (FL) or mixed.		Earnings-related pensions' indexation is based on consumer price index (CPI) (80% weight) and wage and salary earnings index (20% weight). National pensions (7.8% of total pension expenditures) are fully indexed to consumer price index (80% or 100%).
	For pensions: BL - Index for year t is based on annual price and wage changes in t-1 Q3.	
If no automatic indexation, does your government communicate/use in practice a reference in setting average public wage or pension growth? Please specify and provide any other relevant information.	Public sector wages are collectively agreed in the employer-employee union negotiations separately for the central government level and for the local government level. Usually the public sector negotiations follow the wage negotiations of the export industries, which provide a reference for public sector wage agreements.	

References

- Afonso A. and Gomes P. (2008), “[Interactions between private and public sector wages](#)”, *Working Paper Series*, No 971, ECB, Frankfurt am Main, November.
- Attinasi, M.G., Berardini, F. and Palazzo, A.A. (2019), “[Do public wages in the euro area explain private wage developments? An empirical investigation](#)”, *Working Paper Series*, No 2231, ECB, Frankfurt am Main, January.
- Dieppe, A., Legrand, R. and van Roye, B. (2016), “[The BEAR toolbox](#)”, *Working Paper Series*, No 1934, ECB, Frankfurt am Main, July.
- ECB (2021a), “[ECB staff macroeconomic projections for the euro area, September 2021](#)”.
- ECB (2021b), “[Eurosystem staff macroeconomic projections for the euro area, December 2021](#)”.
- ECB (2022), “[Eurosystem staff macroeconomic projections for the euro area, June 2022](#)”.
- Fernández de Córdoba, G., Pérez, J.J. and Torres, J.L. (2009), “[Public and private sector wages interactions in a general equilibrium model](#)”, *Working Paper Series*, No 1099, ECB, Frankfurt am Main, October.
- Gyourko, J. and Tracy, J. (1989), “[The Importance of Local Fiscal Conditions in Analyzing Local Labor Markets](#)”, *Journal of Political Economy*, Vol 97, No 5.
- Holm-Hadulla, F., Kamath, K., Lamo A., Pérez J.J. and Schuknecht, L. (2010), “[Public wages in the euro area – towards securing stability and competitiveness](#)”, *Occasional Paper Series*, No 112, ECB, Frankfurt am Main, June.
- Hohnerlein, E.M. (2019), “[Pension indexation for retirees revisited – Normative patterns and legal standards](#)”, *Global Social Policy*, 19(3).
- Koester G. and Grapow, H. (2021), “[The prevalence of private sector wage indexation in the euro area and its potential role for the impact of inflation on wages](#)”, *Economic Bulletin*, Issue 7, ECB, Frankfurt am Main, 2021.
- Lamo, A., Pérez, J.J. and Schuknecht, L. (2007), “[The cyclicity of consumption, wages and employment of the public sector in the euro area](#)”, *Working Paper Series*, No 757, ECB, Frankfurt am Main, May.
- Lamo, A., Pérez, J.J. and Schuknecht, L. (2008), “[Public and private sector wages – co-movement and causality](#)”, *Working Paper Series*, No 963, ECB, Frankfurt am Main, 2008.
- Matcheke, X. (2003), “[Are the election cycles in wage agreements? An analysis of German public employees](#)”, *Public Choice*, Vol 114, Nos 1-2, January.

Nickel C., Bobeica, E., Koester, G., Lis, E. and Porqueddu, M. (editors) (2019), “[Understanding low wage growth in the euro area and European countries](#)”, *Occasional Paper Series*, No 232, Frankfurt am Main, ECB, September, revised December 2020.

OECD (2021), *Pensions at a Glance 2021: OECD and G20 Indicators*, OECD Publishing, Paris.

Pérez, J. J. and Sánchez, A.J. (2010), “[Is there a signalling role for public wages? Evidence for the euro area based on macro data](#)”, *Working Paper Series*, No 1148, ECB, Frankfurt am Main, January.

Poterba, J.M. and Rueben, K.S. (1995), “[The Effect Of Property-Tax Limits On Wages And Employment In The Local Public Sector](#)”, *American Economic Review*, Vol. 85, No 2, *Papers and Proceedings of the Hundredth and Seventh Annual Meeting of the American Economic Association Washington, DC, 6-8 January, 1995, May*, pp. 384-389.

Acknowledgements

We are grateful to Oscar Arce, Philipp Rother, Nadine Leiner-Killinger (ECB), Claudia Braz (Chairperson of the WGPF), WGPF members other than the co-authors listed below, in particular Dimitrios Papaioikonomou (Bank of Greece) and to members of the ESCB Monetary Policy Committee for useful comments on previous drafts on the same topic, including the part featuring in the December 2021 Fiscal Policy Note.

Cristina Checherita-Westphal (editor, coordinator)

European Central Bank, Frankfurt am Main, Germany; email: Cristina.Checherita-Westphal@ecb.europa.eu

João Domingues Semeano

(formerly at European Central Bank, Frankfurt am Main, Germany)

Elena Ahonen

(formerly at European Central Bank, Frankfurt am Main, Germany)

Pierrick Stinglhamber and Stefan Van Parys

Nationale Bank van België/Banque Nationale de Belgique, Brussels, Belgium

Johannes Clemens

Deutsche Bundesbank, Frankfurt am Main, Germany

Katri Urke and Orsolya Soosaar

Eesti Pank and Tallinn University of Technology, Tallinn, Estonia; email: katri.urke@eestipank.ee; orsolya.soosaar@eestipank.ee

Maria Vergou and Maria Flevotomou

Bank of Greece, Athens, Greece; email: mvergou@bankofgreece.gr; mflevotomou@bankofgreece.gr

David Staunton

Central Bank of Ireland, Dublin, Ireland; email: David.staunton@centralbank.ie

Jorge Martínez-Pagés

Banco de España, Madrid, Spain; email: martinezpages@bde.es

Aris Avgousti

Central Bank of Cyprus, Nicosia, Cyprus; email: arisavgousti@centralbank.cy

Gintare Zelionkaite

Lietuvos bankas, Vilnius, Lithuania; email: gzelionkaite@lb.lt

Olivier Delobbe and Florian Henne

Banque centrale du Luxembourg, Luxembourg, email: Olivier.delobbe@bcl.lu; florian.henne@bcl.lu

Baiba Brusbārde

Latvijas Banka, Riga, Latvia, email: Baiba.Brusbarde@bank.lv

John Farrugia and Juergen Attard

Central Bank of Malta, Valletta, Malta; email: farrugiah@centralbankmalta.org; attardj@centralbankmalta.org

Fabrizio Renzi and Marco Savegnago

Banca d'Italia, Rome, Italy; email: fabrizio.renzi@bancaditalia.it; Marco.Savegnago@bancaditalia.it

Doris Prammer and Lukas Reiss

Oesterreichische Nationalbank, Wien, Austria; email: doris.prammer@oenb.at; lukas.reiss@oenb.at

Gerard Eijsink and Jip Italianer

De Nederlandsche Bank, Amsterdam, the Netherlands; email: g.j.eijsink@dnb.nl

Maria Manuel Campos

Banco de Portugal, Lisbon, Portugal; email: mmcampos@bportugal.pt

Andreja Strojjan Kastelec

Banka Slovenije, Ljubljana, Slovenia; email: andreja.strojjan-kastelec@bsi.si

Barbora Palášthyová and Vratislav Pisca

Národná banka Slovenska, Bratislava, Slovakia; email: barbora.palasthyova@nbs.sk; vratislav.pisca@nbs.sk

Jarkko Kivistö

Suomen Pankki – Finlands Bank; email: jarkko.kivisto@bof.fi

© European Central Bank, 2022

Postal address 60640 Frankfurt am Main, Germany
Telephone +49 69 1344 0
Website www.ecb.europa.eu

All rights reserved. Any reproduction, publication and reprint in the form of a different publication, whether printed or produced electronically, in whole or in part, is permitted only with the explicit written authorisation of the ECB or the authors.

This paper can be downloaded without charge from the [ECB website](#), from the [Social Science Research Network electronic library](#) or from [RePEc: Research Papers in Economics](#). Information on all of the papers published in the ECB Occasional Paper Series can be found on the ECB's website.

PDF ISBN 978-92-899-5240-8, ISSN 1725-6534, doi:10.2866/515428, QB-AQ-22-042-EN-N