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Lucyna Górnicka and Gerrit Koester (editors)

A forward-looking tracker of negotiated wages in the euro area

Eurosystem wage tracker experts

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Contents

Abstract 2

Executive summary 3

1 Introduction 4

2 Wage-setting in euro area countries and the role of negotiated wage growth 6

2.1 Collective bargaining design and the availability of micro data on wage agreements in euro area countries 6

2.2 The ECB's indicator of negotiated wage growth 9

2.3 Role of negotiated wage growth in assessing wage developments in the euro area 10

3 Tracker of negotiated wages: methodology 14

3.1 Data 14

3.2 Tracker of negotiated wages 17

3.3 Wage tracker of latest agreements 27

4 Assessing wage pressures in the euro area using wage trackers 30

4.1 Recent developments in negotiated wage growth 30

4.2 Identifying wage growth turning points using wage trackers 31

Box 1 The Indeed tracker of posted wages 33

4.3 Analysing drivers of wage pressures using agreement-level data 35

5 Cross-checking wage forecasts based on the forward-looking wage tracker 39

Box 2 Forecasting negotiated wages at the Bundesbank 40

5.1 Scenario analysis 41

5.2 Augmented forward-looking wage trackers 43

Box 3 Forecasting performance of the forward-looking wage trackers 45

6 Summary and conclusions 48

7 References 50

Abstract

This paper introduces innovative, newly developed forward-looking indicators of negotiated wage growth in the euro area using data on collective bargaining agreements from seven countries: Germany, France, Italy, Spain, the Netherlands, Austria and Greece. The paper demonstrates how agreement-level data can be used to study drivers of aggregate negotiated wage growth, as well as monitor the breadth of wage increases and account for time-varying factors such as one-off payments, when assessing wage pressures. Lastly, the paper shows that the new indicators can provide reliable signals about current and future developments of wage pressures in the euro area while also serving as important cross-checking tools for negotiated wage growth forecasts.

Keywords: Negotiated wages, collective bargaining, wage rigidity, wage forecasting

JEL codes: E24, J31, J50

Executive summary

This report presents innovative forward-looking wage trackers for the euro area that are based on a newly compiled database of wage agreements. Forward-looking indicators are constructed for the euro area based on seven countries for which wage agreement data are available: the five largest euro area countries (Germany, France, Italy, Spain and the Netherlands) in addition to Austria and Greece. The new indicators closely track the official time series of past realised negotiated wage growth while also providing important and reliable signals of current and near-term developments with respect to wage pressures in the euro area.

The new wage trackers can enhance the analysis of wage developments across multiple dimensions. The database of individual agreements in seven euro area countries sheds light on the extent to which new agreements affect economy-wide wage developments and on how broad-based the pressures are. The data enable the tracking of developments in the latest collective agreements. The relevance of signals from the latest contracts is assessed by combining the data with information on the share of employees covered by agreements that have been renewed within a given period.

Wage trackers focusing on recently concluded agreements have leading properties in signalling turning points of wage growth. Average wage growth in recently signed agreements (to the extent that they cover a substantial share of employees) can provide more timely information on wage pressures than is the case with wage growth that is based on total agreements. This is especially true for collective agreements that are signed for longer than one year, as in many euro area countries. Wage rises agreed in recent negotiation rounds are also a signal of negotiation sentiment and of the direction in which aggregate negotiated wage growth could develop.

A forecast performance assessment demonstrates that forward-looking wage trackers can serve as reliable cross-checking tools for wage-forecasting purposes. This is particularly the case for augmented wage trackers, which are based on country-specific estimations of the role of key macroeconomic variables in predicting the outcomes of wage agreements that are due to expire over the forecast horizon.

Looking ahead, the ECB and National Central Banks (NCBs) plan to further enhance the forward-looking wage trackers and their implementation for assessment and forecasting purposes in the Eurosystem. Planned improvements include extending the database coverage (the number of countries and contracts covered, time span, information on one-off payments and indexation clauses, among other things), establishing representative sectoral wage trackers and using forward-looking wage trackers as input and cross-checking tools for regular wage forecasts in the Eurosystem.

1 Introduction

The importance of labour costs in total costs across many sectors (especially in services) means that wage inflation and price inflation are closely interconnected.[1] Given the role of wages as a fundamental determinant of inflation, one of the key elements in the pursuit of the ultimate monetary policy goal of price stability is a sound and comprehensive analysis of wage pressures.[2]

Collective wage agreements not only provide reliable, timely and forward-looking information about wage pressures but also are useful for assessing and forecasting wage and price pressures, especially in times of high uncertainty. Based on the staggered, infrequent and decentralised nature of wage-setting in euro area countries, monitoring wage agreements[3] can help to assess and forecast wage and price developments. This is even more the case when high inflation – as observed in recent years – raises concerns over the possible emergence of a wage-price spiral.

As wage negotiations are intrinsically forward-looking, ongoing negotiations and newly concluded agreements are informative when it comes to studying the emergence of wage pressures in real time. In this report we show that the information available on individual collective bargaining agreements provides timely signals of wage pressures. First, agreement-level data are used to compute a "forward-looking" wage tracker, i.e. average year-on-year negotiated wage increases going forward as envisaged in collective bargaining agreements currently in effect. Using information on the number of workers covered by individual agreements along with their end dates, the wage tracker also helps to assess the extent to which upcoming wage negotiations that have not yet been concluded can substantially change the wage growth outlook. With this respect, the forward-looking wage tracker can be used to assess the implications of forthcoming wage increases in future negotiations for average negotiated wage growth under alternative assumptions about the negotiation outcomes.

This report presents novel forward-looking wage trackers for the euro area that are based on a newly compiled database of wage agreements. The wage trackers have been constructed for seven euro area countries for which wage agreement data are available: the five largest euro area countries (France, Germany, Italy, Spain and the Netherlands) in addition to Austria and Greece. Taken together, the seven countries covered by the wage tracker account for nearly 90% of total compensation of employees in the euro area. The country wage trackers are aggregated into a forward-looking tracker of negotiated wage growth in the euro area. The report also highlights that these innovative indicators closely track available time series of negotiated wage growth realised in the past while also providing reliable signals of current and near-term developments relating to wage

[1] See e.g. Lane, P. R. (2023, 6 March), Underlying inflation, Lecture at Trinity College Dublin.

[2] See e.g. Nickel et al. (2019).

[3] Throughout the report, the terms "agreement" and "contract" are used interchangeably.

pressures in the euro area. The new wage trackers also enable the tracking of wage pressures emerging from recently concluded agreements, allow to assess the breadth of wage increases across agreements, and can serve as a tool to analyse the impact of alternative inflation paths on negotiated wage growth going forward. Finally, they help to cross-check projections of negotiated wage growth in the euro area.

This report presents a detailed description of the methodology used to construct the new wage trackers, along with the underlying database. Section 2 reviews the institutional framework for collective bargaining in euro area countries and discusses alternative indicators that are commonly used to assess wage pressures. Section 3 describes the agreement-level database and the methodology developed for constructing wage trackers. Section 4 illustrates how the newly constructed indicators can help to assess current wage pressures emerging from collective bargaining agreements in the euro area. Section 5 demonstrates how the forward-looking wage trackers can help to cross-check wage forecasts. Finally, Section 6 summarises the key findings and presents key conclusions.

2 Wage-setting in euro area countries and the role of negotiated wage growth

2.1 Collective bargaining design and the availability of micro data on wage agreements in euro area countries

Wages in the euro area are predominantly set via collective bargaining. Collective agreements in the euro area as a whole as well as on average in the five largest economies, cover more than 75% of total employees (Table 1).[4] In three euro area countries (France, Italy and Belgium – Table 1) collective bargaining effectively covers all employees.[5] The automatic or quasi-automatic administrative extension of sectoral wage agreements explains this very large coverage of sectoral wage bargaining. The vast majority of employees are covered in most other countries (Germany, Spain, the Netherlands, Austria, Portugal, Finland, Slovenia and Luxembourg). In countries such as Greece, Slovakia and Lithuania, where only 50% or less of total employees are covered by collective bargaining, firm-level bargaining tends to play a more prominent role than sector-level bargaining.

Collective wage-setting in the euro area is typically staggered, with agreements having an average duration of around two years, albeit characterised by substantial heterogeneity across countries. Wage contracts are usually agreed for a term of one to four years. In Austria the contract duration is typically only one year, while contracts in Germany and the Netherlands tend to run on average for two years. Longer contract durations of three to four years are common in Italy and Spain. In France there is no explicit contract duration. In practice the period between two agreements is generally one year but may vary over time. The one-year average duration is mainly driven by the legal obligation to negotiate wages at least once a year across all sectors, but there is no obligation to reach an agreement (see Fougère et al. 2018 for additional details).

Most countries do not have a wage negotiations calendar. Although, from a statistical point of view, collective wage negotiations for the euro area as a whole tend to be concluded mainly in the first quarter of each year,[6] this strongly reflects developments in France and Spain and Austria.[7] However, in other large countries (e.g. Germany, Italy and the Netherlands) there is no clearly defined calendar for wage negotiations.

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[4] The numbers on coverage also include the public sector for those countries in which wages in this sector are also determined by collective bargaining (see Table 3 for further details).

[5] In France this refers to all employees in the private sector. Wages for public sector employees are negotiated in a separate framework.

[6] See Koester et al. (2020).

[7] See Avouyi-Dovi et al. (2013) for a detailed analysis of wage agreement seasonality and Gautier et al. (2022) for an analysis on how negotiated wage increases are transmitted to actual wages in France. In Spain a portion of the statistically significant increase in registered agreements in the first quarter of the year is attributable to the inclusion of agreements signed in past years and not to the actual timing of negotiations.

Table 1

Overview of wage bargaining systems in selected euro area countries[8]

	Germany	France	Italy	Spain	The Nether-lands	Austria	Greece	Portugal	Finland	Belgium	Slovenia	Slovakia	Lithuania	Lux-embourg
Collective agree-ment coverage (of total employees)	51% formal; 73% effective	100%	100%	80%	80-85%	94%	15-20%	85%	90%	100%	68%	50%	15-20%	59%
Average length	Differs by sector (avg: 25 months in 2019, 19 months in 2020 and 24 months in 2021)	No fixed length but usually one year (obli-gation to negotiate at least once a year)	3 years	Usually 2-3 years (but some agree-ments 3-4 years)	1-2 years (average 19 months)	12 months (but can also be 24 months)	min 1 year and max 3 years	2/3 of contracts 1 year; 15% 2 years	1-2 years	2 years (starting in odd year)		Usually 1 year but can also be 3-4 years	4 years (in 2021)	2-3 years (3 years is max)
Calendar	No pattern	Most agree-ments signed in first quarter of the year	No pattern	Usually agree-ments start on 1 Jan and end on 31 Dec – but often subs-tantial renegotiat ion lags	Through-out the year - but kick off in each autumn (with wage demand of largest union)	Whole year (metal sector as wage leader usually in No-vember); most agree-ments start in Jan or May	No pattern	No pattern		Beginning of the odd year (sector level over the course of the first year)	Most agree-ments start in January		No pattern	Most agree-ments start in January
Level	Sector-level	Firm- and sector-level	Sector-level	Sector/ region (usually sector-province combi-nation)	Sector- and firm level	Sector-level, region-sector-level	Firm-, sector-, national-level	Sector-level	Sector-level	Firm-, sector- and national level	Firm- and sector-level	Firm- and sector-level	Flexible; working time: different levels	Firm- and sector-level
One-offs	Recently very common; often used in times of high un-certainty	Few sectoral agree-ments include one-offs	One-offs exist but are usually limited	Delays in negotia-tions can lead to revisions to previous year figures	One-offs are becoming more important	Usually rare but recently more frequent	Limited role			Limited role			Irregular payments account for around 7% of gross earnings	
Use in wage forecasting	Yes	Partially - mainly as cross check	Yes	Yes – key ingredient to wage forecasts	Yes - forward looking indicator/ scenario analyses	Yes	Partially - as cross check	Some	No	Partially as cross check and add. Infor-mation	No	No	No	Yes

Source: National Central Banks and ECB - survey questionnaire July 2022 – updated September 2023.
Notes: Data available for 14 countries. Note that the average agreement duration and frequency of one-off payments may vary over the years. The coverage rate of 94% for Austria is based on an analysis conducted by Statistics Austria and is somewhat lower than the OECD's estimate of 98% cited in Table 3. Green is for countries for which the wage tracker is available, yellow for countries for which the wage tracker is being developed and red for countries for which micro data on wage agreements is not available.

The sectoral level is most important for wage bargaining in euro area countries. Sectoral bargaining is important in all euro area countries although here as well there are important differences in the average size of agreements. In Germany, for example, wage bargaining usually focuses on a relatively limited number of large and important sectors, while wage bargaining takes place on a more granular level both in France (where also firm-level bargaining plays an important role and covers about 15% of all employees, mainly in large firms) and in Spain (where sectoral agreements are additionally negotiated at a provincial level).[9] In Italy, despite a large number of agreements (often covering a small number of employees), a large share of workers are covered by sector-specific agreements

[8] For wage-setting purposes in euro area countries, wage indexation mechanisms and minimum wages also play an important role. For details see the discussion in Koester and Wittekopf (2022) and in Koester and Grapow (2021).

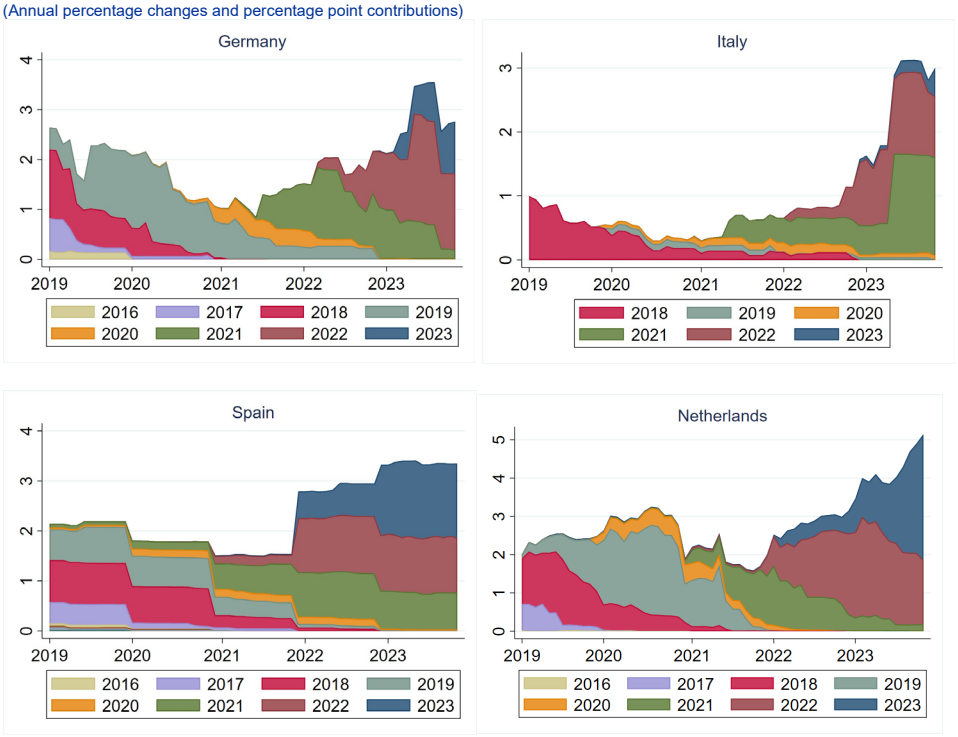
[9] In France there used to be more than 700 different bargaining sectors, some of which covered a very small number of employees; however, many small bargaining sectors have been merged with larger ones since 2014. The total number of bargaining sectors looks set to gradually converge to 100-150 over the next few years.

on collective bargaining outcomes. In these two countries, as well as in Germany, most agreements signed in 2023 were agreed at rates of between 5% and 10%. In comparison, the distribution of wage increases in collective agreements was much wider in countries such as Italy, the Netherlands and Spain. Notably in Spain, the range of wage increases seems particularly broad, which could potentially reflect the very decentralised nature of the collective bargaining process and, thus, the weaker position of the workers' unions, as well as the larger role played by firm-specific factors in the negotiations.

Chart 13

Contributions of wage agreements to ECB baseline wage tracker (excl. one-offs) by signing year

(Annual percentage changes and percentage point contributions)



Source: Deutsche Bundesbank, Banque de France, Banco de España, the Dutch employer association (AWVN), Banca d'Italia.
Notes: Each chart shows contributions of agreements signed in different years to the aggregate negotiated wage growth at a given point in time.
Latest observation: December 2023.

Data on individual agreements also illustrate how quickly – and for how long – changes in collective agreements affect aggregate negotiated wage growth in a given country. Chart 13 shows – for the four countries with the longest average duration of collective agreements – the contribution of agreements signed in different years to the baseline country wage trackers over time. The contribution of agreements signed before inflation began to surge in autumn 2021 (these agreements tended to include much lower wage growth than agreements reached after the start of 2022) to structural wage growth in 2023 has declined considerably in the Netherlands, but they still play a large role in other countries such as Italy and Spain. This is because the relatively longer average duration of collective agreements in the latter countries compared to the Netherlands leads to an increase

in the inertia of negotiated wage growth. In Germany, agreements signed in 2021 were an important contributor to aggregated wage growth until mid-2023. There, large sectors such as wholesale and retail, as well as the public sector, had agreed on relatively long agreements in 2021, dragging down aggregate wage growth in Germany until very recently (when these two agreements were re-negotiated). Since a long average agreement duration reduces the pass-through speed of shocks to negotiated wages, it could potentially lead to a longer persistence of the current high wage growth in the future. Therefore, changes in average length of wage contracts and the agreed profile of wage increases are also important to monitor.

In summary, wage trackers show some plateauing of wage growth at high levels and highlight the role of country-specific characteristics when it comes to assessing the outlook. Divergent developments in negotiated wage growth across countries partly reflect differences both in terms of collective bargaining agreement duration and consequently in terms of how quickly new agreements replace the ones signed before the recent surge in inflation. Looking at recent developments there is evidence for some cooling of wage pressures in the euro area. However, the latest collective agreements up to Q4 2023, do not show a clear indication of a turning point for negotiated wage growth yet and the long average contract duration in some countries could potentially lead to quite some persistence of the current high wage growth rates in the future.

The new wage trackers can enrich the analysis of wage developments across multiple dimensions. The underlying database of individual agreements illustrates not only the importance of individual country contributions but also the extent to which new agreements affect wage developments and how broad-based the pressures are in individual countries, as well as in the euro area. The data enable close tracking of developments in the latest agreements, and the relevance of these latest agreements can be assessed in combination with information on the share of agreements due to expire in a given period or already renewed.

5 Cross-checking wage forecasts based on the forward-looking wage tracker

Inflation, labour market conditions and productivity developments play a prominent role in forecasting wage growth in the euro area. Wage developments can be assessed against empirical regularities by estimating a Phillips curve for wages, which links wage growth to economic or labour market slack, as well as past or expected inflation and productivity. In this context, the ESCB Wage Expert Group (see Nickel et al. 2019) has found that cyclical drivers, as captured by a standard Phillips curve, explain much of the wage growth developments in the euro area during pre-COVID time period and proposes a set of Phillips curve specifications as suitable cross-checking tools for medium-term wage forecasts for the euro area. Most of the consistently well-performing wage Phillips curve specifications rely on the unemployment rate as a measure of slack.

Given their forward-looking dimension, wage trackers could be useful as an additional cross-checking tool for negotiated wage growth forecasts. Box 2 describes how the Bundesbank uses the collective agreement data when forecasting negotiated wage growth. Below, we show how wage trackers introduced in Section 3 can be applied as cross-checking tools for wage forecasts. As already discussed, the forward-looking part of the baseline wage tracker reflects average negotiated wage growth based on all agreements in force at any given moment in the future. While capturing future wage growth as already agreed in collective bargaining contracts should help to forecast wage growth reliably, the number of employees covered by the baseline tracker decreases over time as more and more agreements are due to expire. As a result, the signal from the indicator becomes less relevant as one moves further out into the future. To be able to compare signals about future negotiated wage growth from the forward-looking wage tracker with forecasts for negotiated wage growth, one consequently needs to make assumptions on how to extend agreements that are due to expire over the forecast horizon. In this section, we describe scenarios that are used to extend the baseline wage tracker under various assumptions for productivity and inflation. Additionally, we derive “augmented wage trackers”, which are based on country-specific estimations of the role of key macroeconomic variables for future wage agreements. We then compare the forecast performance of the baseline and “augmented” wage trackers for negotiated wage growth against a subset of wage Phillips curves. The analyses presented here should be viewed as mainly illustrative; follow-up work, including among other things an in-sample evaluation of the wage trackers, is planned.

Box 2
Forecasting negotiated wages at the Bundesbank[41]

The Bundesbank's negotiated pay rates statistic is the key database for the German wage projection in the Eurosystem staff projections. This database covers around 21 million employees (around half of the total employees) and includes detailed information on more than 500 collective sectoral wage agreements, as well as civil servants' wage adjustments as of January 1991.[42] For instance, it includes information on the duration of sectoral wage contracts and on future pay hikes. The database thus comprises the time profile of pay hikes according to the collective wage contracts, including also regular annual payments (e.g. vacation payments) or special payments (e.g. one-off inflation compensation premia). It therefore reveals an exact pattern of the future negotiated wage profile. The projection of collective wage increases can then serve as a key input for predicting actual wages and compensation per employee.

Data on industry-specific agreements are regularly fed into the Bundesbank projections. The starting point for the forecasting exercise is industry-specific wage contracts. The projection horizon is divided into two periods. The first period covers the remaining duration of the sectoral contracts, for which information on the wage profiles is set out in the contracts. The second period refers starts after a contract's expiration and before the end of the projection period. Following expiration of the individual wage contract, a new wage contract for the subsequent 12 months is projected by setting a sector-specific pay increase for this period. In a further step a follow-up 12-months-ahead pay increase is added. The assumptions for the projected wage profile are based on historical wage growth, the pass-through from inflation to wages and industry-specific developments.[43] Moreover, the wage forecast is conditional on the overall scenario of the macroeconomic projection exercise. It is important to note that the expected wage increases refer to the total pay volume for the subsequent 12 months, which usually applies to wage components that are regularly lifted by pay rates ("dynamic adjustment"). This means that the wage projection is based only on scheduled payments.[44] The industry-specific wage increases are based on a subset of the total sample of wage contracts, which covers around two-thirds of all employees in the database, spanning all major sectors such as the metal and electrical industry, as well as the public sector. Wages are projected uniformly in the remaining sectors.

During the projection exercise, a range of sensitivity analyses with various assumptions for the wage projection are conducted. Moreover, econometric models serve as additional cross-checks on the wage projections. These models include the Bundesbank's semi-structural macroeconometric model[45] and traditional wage equations based on Phillips curve relationships.

Compared to the ECB wage tracker, the projection of collective wages (after contracts have expired) is based on a broader set of information. This results in more nuanced wage forecasts – for example, with respect to industry-specific pay increases in major sectors. Similarly to the ECB

[41] Prepared by Daniel Radowski, Deutsche Bundesbank.

[42] For West Germany individual wage contract data date back to January 1984. In addition, there are a few older time series for aggregate data that start in January 1958. Please note that these older time series are calculated using a different methodology and for a much smaller sample.

[43] To this end, the Bundesbank considers, for example, (sector-specific) productivity growth in addition to sentiment indicators. Moreover, we closely monitor press releases and statements issued by social partners.

[44] Note that for the June 2023 Eurosystem staff projections, the Bundesbank incorporated the widespread use of the tax-free inflation compensation premia in its wage projection.

[45] See Haertel et al. (2022)

wage tracker, the Bundesbank database facilitates the calculation of agreed pay rates for a subset of contracts, e.g. those that have only recently been settled. This enables the monitoring of early signs of increasing wage pressures. The highly detailed information on all pay components also makes it possible to decompose negotiated wage growth into, e.g. the contribution of permanent wage increases, usual one-offs and inflation compensation premia. Moreover, the forecast exercise produces time series of projected wage increases for the total economy, the largest sectors and many individual industries for East and West Germany separately.

5.1 Scenario analysis

Forward-looking wage trackers collate information indicative of future wage growth based on already concluded collective bargaining contracts. This information, while relevant for assessing future wage pressures, is only partial, as more and more contracts are due to expire over the forecast horizon, with coverage of the forward-looking wage trackers declining in parallel.

Agreement-level data can be used to project negotiated wage growth under alternative scenarios for contracts that are due to expire over a projection horizon. Using information on the end dates and number of workers covered by individual collective bargaining agreements, it is possible to assess the extent to which upcoming wage negotiations could potentially change the outlook for negotiated wage growth in comparison to the agreements that have not yet expired. For example, a scenario analysis can be performed to assess the impact of wage rises in agreements scheduled for re-negotiation in future quarters on aggregate negotiated wage growth, were they to be re-negotiated at the same wage growth rates as in the latest negotiation rounds.

We consider three main scenarios for the renewal of wage contracts, each differing with respect to the pass-through of inflation to wage growth. The first scenario assumes that wage pressures remain at the same level as in the most recent negotiation rounds, with agreements that are due to expire over the forecast horizon being re-negotiated at the same wage rate. The second and third scenarios exploit the fact that labour productivity and price inflation have historically been the most important drivers of wage growth (see Nickel et al. 2019). As the importance of various inflation measures that serve as the basis for wage negotiations might change over time, the second scenario assumes that contracts that are due to expire are renewed at a rate of labour productivity growth plus HICP excluding food and energy. This contrasts with the third scenario, which assumes that changes in energy and food prices are additionally taken into account in wage negotiations and therefore uses HICP (headline) inflation as the relevant inflation measure.

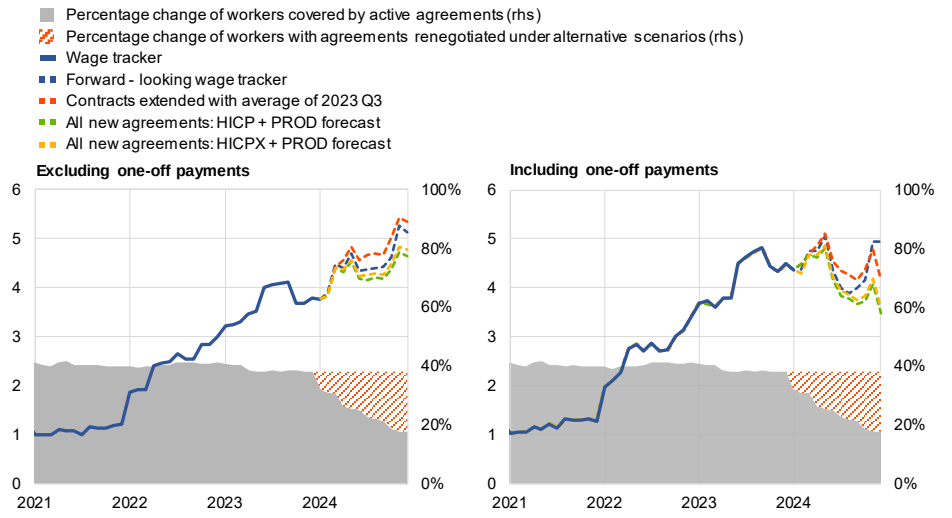
Scenario analysis is performed at the country level taking the latest forecast data into account. In all scenarios *country-specific* data on wage growth in latest agreements are used, as are the latest *country-specific* ECB or Eurosystem staff projections. Country-level results are then compiled to give a euro area aggregate.

Scenario analysis based on the wage tracker enables the derivation of benchmarks for negotiated wage growth over the subsequent quarters. Chart 14 compares the path of the forward-looking euro area wage tracker (including and excluding one-offs) until end-2024 for the three scenarios. First, the red dashed line shows the average negotiated wage growth if all new agreements to be re-negotiated over 2024 were to settle on a wage increase equal to the rate, as set in the collective agreements concluded in 2023Q3 (the last quarter for which all data is available), which equalled on average 5.4% including one-offs and 5% excluding one offs in the euro area (Scenario 1). The yellow dashed line shows the second scenario, in which all new agreements settle on a wage increase equal to the latest (December 2023) Eurosystem forecast of HICPX inflation for 2024 plus the projected labour productivity growth. The third scenario (green dashed line) assumes that all agreements expiring over the scenario horizon will be extended at a wage rate equal to the latest Eurosystem staff projections of headline inflation for 2024 plus projected country-specific annual labour productivity growth.[46]

Chart 14

Scenario analysis of negotiated wage growth in the euro area

(Annual percentage changes)



Note: Euro area aggregate based on Germany, France, Italy, Spain, The Netherlands, Austria, Greece .
Latest data point: December 2024 for scenario analyses. Latest historical data point: December 2023.

Forward-looking wage trackers including and excluding one-offs indicate wage growth in 2024 slightly above 2023 levels. For 2023, the forward-looking wage trackers indicate an average year-on-year growth of negotiated wages of 4.2% when including one-offs, substantially higher than an average of 3.7% when excluding one-offs. For 2024, the forward-looking baseline trackers indicate a slight further increase in negotiated wage growth to around 4.5% - both including and excluding one-off payments. That the trackers including and excluding one-offs are so similar indicates

[46] For reference, the Eurosystem staff projections of December 2023 envisage euro area year-on-year HICP inflation and HICP excluding energy and food inflation both at 2.7% in 2024 on average. Labour productivity in the euro area is foreseen in the December projections to increase by 1.0% in 2024.

that in 2024 the negative base effects of one-offs paid out in 2023 and the upward effects of additional one-off payments broadly cancel out.

If wage agreements that are due for renegotiation from now until end 2024 were concluded at the same rate as in Q3 2023, negotiated wage growth in 2024 would be broadly similar to what the forward-looking wage trackers indicate. In this case negotiated wage growth including one offs would be at the same level as the forward-looking wage tracker (4.5%) and slightly above the level of the forward-looking tracker when one-offs are not accounted for (4.7%).

A full pass-through of the on-going disinflation in 2024 to wage agreements over the next quarters would lead to a lower aggregate negotiated wage growth in 2024. As the December 2023 projections foresee very similar values for HICP and HICPX inflation in 2024, the scenarios in which all agreements are re-negotiated at a rate equal to the projected HICP or HICPX inflation plus productivity growth are very similar. These scenarios would signal negotiated wage growth in 2024 to be at 4.1%-4.3%, which is somewhat lower than suggested by the forward-looking wage trackers or by the scenario based on latest agreements.

Negotiations over the first quarter of 2024 are likely to be decisive for the development of wage pressures over 2024. As a large share of contracts will run out and is due for renegotiation over the first quarter of 2024 (Chart 14), the wage growth agreed in these renegotiations can be expected to have a decisive impact on the development of wage pressures in 2024. This reflects the importance of a detailed monitoring of wage negotiations over the first months of 2024.

5.2 Augmented forward-looking wage trackers

The rates at which new agreements going forward will be re-negotiated can also be estimated based on historical relationships between negotiated wage growth and other macroeconomic variables. As we have argued, wage growth in new agreements is more responsive to the current macroeconomic environment (including changes to inflation and unemployment) than is aggregate negotiated wage growth, which adjusts only gradually as old agreements expire and new agreements are concluded. Estimating the role of drivers such as inflation and labour productivity for wage growth in latest agreements can thus help to infer wage growth in agreements that are due to expire over the next few quarters.

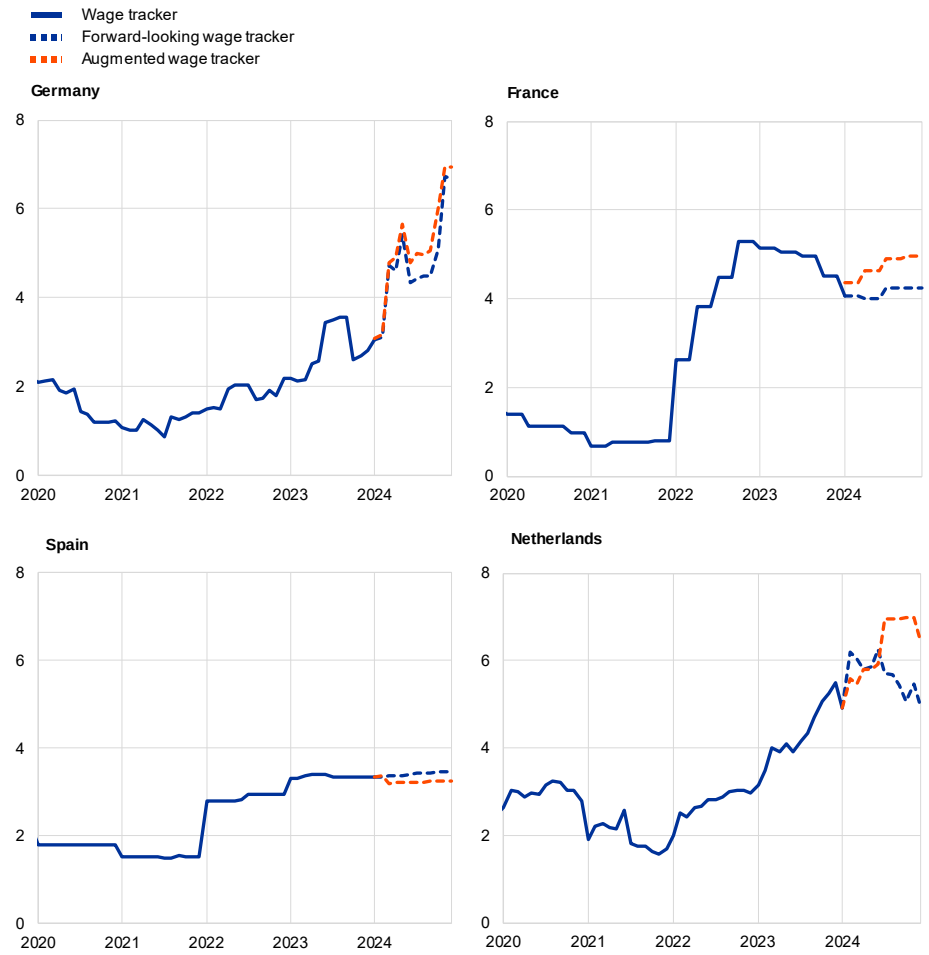
Below, we construct an "augmented" forward-looking wage tracker in two steps. First, we regress the time series of structural wage growth (i.e. excluding one-off payments) in the latest agreements on a few key macroeconomic variables that are of key importance in wage negotiations: measures of inflation, labour market slack and productivity. To obtain meaningful estimates, it is necessary to have sufficiently long time series of agreement-level data, with significant variation over time. This excludes Austria and Greece, where the sample is very short, as well as Italy, where there was little variation in wage growth in the latest agreements before 2021. We focus on negotiated wage growth excluding one-offs, as the estimates

from the regressions of structural wage growth on macroeconomic variables are more statistically significant than in the case of wage growth including one-off payments (given the volatile character of the latter). Next, we use coefficient estimates from these regressions and the latest Eurosystem staff projections of the macroeconomic variables to produce forecasts of wage growth in future negotiation rounds. In the second step, we compute the *augmented forward-looking wage tracker* by assuming that the agreements expiring over the next few quarters are extended at the wage growth rates derived in step 1.

Chart 15

Augmented forward-looking wage trackers for selected countries

(Annual percentage changes)



Notes: Augmented forward-looking wage trackers are computed using the two-stage approach described in Box 3. When computing augmented wage trackers, structural negotiated wage growth (excluding one-offs) is shown.
Latest data point: December 2024. Latest historical data point: December 2023.

The augmented forward-looking wage trackers remain relatively close to the baseline wage trackers at the current juncture. Chart 15 shows the results for four countries: Germany, France, Spain, and the Netherlands. The augmented wage tracker indicates higher negotiated wage growth compared to the forward-looking wage tracker in 2024 in Germany, France and the Netherlands, and slightly lower growth in Spain. In France the augmented wage tracker shows future wage growth

stabilising at current growth rates. In Overall, the two versions of the indicator are relatively close to each other in all four countries. The fact that the augmented wage tracker is currently very close to the baseline version of the forward-looking tracker could also indicate that wage growth agreed in recent bargaining rounds is broadly in line with what would be implied by developments in macroeconomic fundamentals: inflation, unemployment and productivity.

A forecast performance assessment shows that the baseline and augmented wage trackers can serve as reliable cross-checking tools for wage-forecasting purposes. To assess the quality of signals for future negotiated wage growth from the baseline forward-looking wage tracker and its augmented version, we compare the root mean squared forecast errors of their out-of-sample forecasts with forecasts based on two well-performing Phillips Curve (PC) specifications for negotiated wage growth (Box 3). The two wage trackers perform closely in line with the two wage PCs at short-term forecast horizons but often outperform them over longer horizons. For Spain and France, the augmented wage trackers seem to outperform the two PCs across horizons. In sum, the results of our simple forecast performance exercise suggest a high potential of the wage tracker as a reliable cross-checking tool for wage-forecasting purposes. In addition to refinements in the modelling of the augmented wage tacker, expanding the coverage of the agreement-level database underlying the wage tracker should help to further improve the usefulness of the augmented forward-looking wage tracker as a cross checking tool for wage forecasts.

Box 3
Forecasting performance of the forward-looking wage trackers[47]

Real-time forecasting performance of the wage trackers is assessed against two versions of the wage Phillips Curve. To assess the real-time forecast performance of the forward-looking wage tracker and its augmented version, we use the Phillips Curve (PC) framework for negotiated wage growth as a benchmark. We compute two alternative wage PC specifications, which include lagged negotiated wage growth (NW) measures of slack, measures of year-on-year inflation (headline, core, excluding energy, depending on the particular country) (π) and productivity per employee growth (prod):

$$\mathrm{NW_q} = \alpha + \beta * \mathrm{NW_{q-1}} + \gamma * \pi_{q-i} - \delta * \mathrm{slack_{q-j}} + \zeta * \mathrm{prod_{q-k}} + \varepsilon_q, \qquad (1)$$

where $\mathrm{NW_q}$ stands for year-on-year negotiated wage growth in quarter q. For each country, we consider two PC specifications: one using the unemployment rate and one using the unemployment gap as a measure of slack. We then compute forecasts of negotiated wage growth up to six quarters ahead using the vintage of ECB forecasts of the three explanatory variables available in a given quarter.

We also compute real-time forecasts using the baseline and augmented forward-looking wage trackers. For the augmented version of the tracker, we first estimate the following regression of wage growth in latest agreements:

[47] Prepared by Giulia Gardin and Lucyna Górnicka

$$\widetilde{NW}_q = \alpha + \beta * \pi_{q-i} - \gamma * slack_{q-j} + \delta * prod_{q-k} + \varepsilon_q, \qquad (2)$$

where $\widetilde{NW}_q$ stands for wage growth over next 12 months, as agreed in collective agreements signed in quarter q. We experiment with measures of slack, inflation and productivity and then choose specifications that maximise the goodness of fit. Table 7 shows the explanatory variables selected for each country. We then use coefficients from regression (2) and the vintages of (B)MPE forecasts of the explanatory variables to project $\widetilde{NW}_q$ up to six quarters ahead.

Table 7: Country-level regressions of wage growth in latest agreements: selected explanatory variables

Country	Explanatory variables in equation (2)
France	headline inflation (r), unemployment gap (r), lagged dependent variable
Germany	headline inflation (r), GDP growth (r)
Spain	core inflation (f), unemployment rate (r), productivity per worker (r)
The Netherlands	core inflation (f), productivity per worker (r), lagged dependent variable

Notes: (r): realized value, (f): forecasted value.

We use the projected $\widetilde{NW}_q$ to extend collective bargaining agreements expiring over the next six quarters. Finally, we compute the aggregate negotiated wage growth forecast by combining the forecasted wage growth in new agreements with wage growth in the baseline forward-looking wage tracker, which shows wage growth in agreements that will not have expired over a given projection horizon.

The forecast performance comparison demonstrates the high potential of the wage tracker to serve as a reliable cross-checking tool for wage-forecasting purposes. Table 8 shows the results of the real-time forecast exercise, comparing the performance of the two PCs and the two versions of the wage tracker in terms of the root mean squared forecast error for three horizons: namely, two, four and six quarters ahead. For Spain, both versions of the wage tracker exhibit forecast errors that outperform one or both of the wage PCs, while for France it is the augmented version that has smaller forecast errors across horizons compared to the two wage PCs. In Germany and in the Netherlands the two wage PCs are outperformed by the augmented forward-looking tracker at the six-quarters-ahead horizon only. The results for Germany and the Netherlands clearly show that more work needs to be done in terms of identifying best performing specifications of the regression of wage growth in latest agreements for the wage tracker to compete with the wage PCs. Nevertheless, our straightforward exercise highlights the wage tracker's clear potential to be used as a cross-checking tool for forecasting purposes.

Table 8: Real-time forecasting of negotiated wage growth: root mean squared forecast error comparison

Country	Model	2 quarters ahead	4 quarters ahead	6 quarters ahead
Germany	Wage PC (1)	0.36	0.49	0.59
	Wage PC (2)	0.33	0.43	0.56
	Baseline WT	0.51	0.53	0.81
	Augmented WT	0.44	0.51	**0.50**
The Netherlands	Wage PC (1)	0.31	0.49	0.74
	Wage PC (2)	0.31	0.49	0.71
	Baseline WT	0.55	0.74	0.82
	Augmented WT	0.36	0.58	**0.68**
Spain	Wage PC (1)	0.29	0.28	0.42
	Wage PC (2)	0.28	0.28	0.46
	Baseline WT	**0.12**	**0.23**	**0.30**
	Augmented WT	**0.18**	**0.27**	**0.39**
France	Wage PC (1)	0.49	0.81	1.06
	Wage PC (2)	0.49	0.82	1.07
	Baseline WT	**0.14**	0.83	1.83
	Augmented WT	**0.17**	**0.51**	**0.92**

Notes: Wage PC (1) stands for the wage Phillip's curve specification with unemployment rate as a measure of slack, while Wage PC (2) denotes the wage Phillip's curve specification using the unemployment gap as a measure of slack instead. Baseline WT stands for the baseline wage tracker, augmented WT for the augmented version of the wage tracker. Evaluation sample: 2013-2022 for the baseline WT for the Netherlands and Germany, augmented WT for Germany; 2014-2022 for the augmented WT for the Netherlands, for the baseline and augmented WT for Spain; 2010-2022 for the baseline and augmented WT for France.

6 Summary and conclusions

Tracking developments in collective wage agreements can be very useful in assessing wage pressures and forecasting wage growth in the euro area. Given the importance of collective bargaining in many euro area countries, negotiated wage indicators enable wage growth to be tracked for a vast majority of employees and. In the medium term, negotiated wages are the main driver of total growth in compensation per employee in the euro area.

Contrary to existing indicators of negotiated wages, we not only track contemporaneous developments in wage growth but also exploit the agreement-level data to compute a "forward-looking" wage tracker. The baseline forward-looking wage tracker covers the average future year-on-year negotiated wage increases as envisaged in the collective bargaining agreements currently in force. Additionally, we develop trackers of wage growth agreed in the most recent wage negotiations, which can be used to gauge the changes in the outlook for wage dynamics based on agreements reached in the most recent period under study. To calculate these wage trackers, we deploy a detailed database on individual collective bargaining agreements. The database covers more than 55 million employees in the euro area. Data for all five largest euro area countries are available from 2013 onwards, but in some countries the data series start much earlier.

The euro area wage trackers have been very closely aligned with indicators of negotiated wage growth. This implies that coverage of the forward-looking wage tracker is large enough to give important and reliable signals about current and future wage developments in the euro area. At the same time, the two indicators are not perfectly aligned, which can also partly result from the fact that indicators of negotiated wage growth are not harmonised across countries (for details see Koester et al. 2020). The link between the series of negotiated wages and the wage tracker is somewhat less closely aligned when including one-off payments, reflecting differences in national approaches on how to integrate one-off payments.

The new wage trackers can enhance the analysis of wage developments along multiple dimensions. The newly established database of individual agreements in seven euro area countries serves not only to illustrate the importance of individual country contributions to negotiated wage growth in the euro area but also to see the extent to which new agreements affect wage developments and how broad-based the pressures are. The data makes it possible to closely track developments in the latest agreements, and the relevance of signals from the latest agreements can be assessed in combination with information on the share of agreements that have been renewed or are due to expire in a given period.

Wage trackers focusing on recently concluded agreements have leading properties in signalling turning points of wage growth. As long as recently signed agreements cover sufficiently many workers, wage growth in those agreements can provide more timely information on wage pressures than wage

growth based on all agreements, especially when collective agreements are signed for more than one year, as is the case in many euro area countries. This is because any changes in the agreed wage growth in individual agreements feed through only gradually to aggregate negotiated wage growth as old agreements expire and new agreements are concluded. Wage rises agreed in recent negotiation rounds are also a signal not only of current negotiation sentiment but also of the direction in which aggregate negotiated wage growth could develop if, for example, high wage increases were to become more broad-based. Hence, the wage trackers of latest agreements tend to lead the baseline wage trackers and can help to signal turning points in wage growth early on.

A forecast performance assessment shows that the baseline and augmented wage trackers can serve as reliable cross-checking tools for wage forecasting purposes. An analysis of root mean squared forecast errors of the out-of-sample forecasts shows that the wage trackers can beat well-performing Phillips Curve (PC) specifications for negotiated wage growth, especially at a horizon extending beyond two quarters ahead. This is the case for augmented wage trackers in particular, which are based on country-specific estimations of the role of key macroeconomic variables for wage agreements that are due to expire over the forecast horizon. Looking ahead, further refinements in the modelling of augmented forward-looking wage trackers and expansion of the agreement-level database coverage should help to further improve the usefulness of the forward-looking wage tracker as a cross-checking tool for wage forecasts.

Wage trackers are an example of very successful cooperation in the Eurosystem, and there are plans for further enhancements, including for their use in assessment and forecasting. ECB and NCBs have jointly developed the new forward-looking wage trackers to enhance the assessment of wage pressures in individual countries and the euro area – combining the expertise of the ECB on the euro area and of the NCBs on national wage-setting and data. The forward-looking wage trackers are a major innovation in the Eurosystem toolbox for assessing negotiated wage developments and are unmatched also outside of the Eurosystem. Planned improvements include extending the coverage of the database (including in terms of the number of countries and contracts covered, time span, information on one-off payments and indexation clauses), establishing representative sectoral wage trackers and applying forward-looking wage trackers as an input and a regular cross-checking tool for wage forecasts in the Eurosystem.

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EDITORS

Lucyna Górnicka
European Central Bank, Frankfurt am Main, Germany; email: Lucyna_Anna.Gornicka@ecb.europa.eu
Gerrit Koester
European Central Bank, Frankfurt am Main, Germany; email: Gerrit.Koester@ecb.europa.eu

MAIN CONTRIBUTORS

Daniel Radowski, Deutsche Bundesbank, Frankfurt am Main, Germany
Erwan Gautier, Banque de France, Paris, France
Raffaella Nizzi/Fabrizio Colonna, Banca d'Italia, Rome, Italy
Mario Izquierdo Peinado, Banco de España, Madrid, Spain
Maikel Volkerink, De Nederlandsche Bank, Amsterdam, The Netherlands
Alfred Stiglbauer, Oesterreichische Nationalbank, Wien, Austria
Christos Antonopoulos, Bank of Greece, Athens, Greece

Gerrit Koester, European Central Bank, Frankfurt am Main, Germany
Lucyna Górnicka, European Central Bank, Frankfurt am Main, Germany
Matthias Bing, European Central Bank, Frankfurt am Main, Germany
David Wittekopf, European Central Bank, Frankfurt am Main, Germany
Evgeni Piryankov, European Central Bank, Frankfurt am Main, Germany

CONTRIBUTORS

Sergio Puente/ Angel Luis Gomez Jimenez, Banco de España, Madrid, Spain
Yves Saks/Barbara Coppens, National Bank of Belgium, Brussels, Belgium
Cláudia Duarte/Fernando Martins, Banco de Portugal, Lisbon, Portugal
Francesco D'Amuri/ Gaetano Basso, Banca d'Italia, Rome, Italy
Reamonn Lydon, Central Bank of Ireland, Dunlin, Ireland
Justina Zajankauskaitė/Kristupas Pribuišis, Bank of Lithuania, Vilnius, Lithuania
Mojca Lindič/Gašper Ploj, Bank of Slovenia, Ljubljana, Slovenia
Marios Polemidiotis, Central Bank of Cyprus, Nicosia, Cyprus
Harri Pönkä/Meri Obstbaum, Bank of Finland, Helsinki, Finland
Pavlos Petroulas, Bank of Greece, Athens, Greece
Cindy Veiga, Central Bank of Luxembourg, Luxembourg, Luxembourg
Michal Doliak/Jan Beka, Bank of Slovakia, Bratislava, Slovakia
Aurora Monza, European Central Bank, Frankfurt am Main, Germany
Marc Roca i Llevadot, European Central Bank, Frankfurt am Main, Germany
Gaetano Polichetti, European Central Bank, Frankfurt am Main, Germany
Nicola Benatti, European Central Bank, Frankfurt am Main, Germany

BOXES

Box 1: The Indeed tracker of posted wages
Bruno Fagandini, Lucyna Górnicka, Peter Healy and Gerrit Koester, European Central Bank, Frankfurt am Main, Germany
Box 2: Forecasting negotiated wages at the Bundesbank
Daniel Radowski, Deutsche Bundesbank, Frankfurt am Main, Germany
Box 3: Forecasting performance of the forward-looking wage trackers
Giulia Gardin and Lucyna Górnicka, European Central Bank, Frankfurt am Main, Germany

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

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