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Wage Growth in Europe: Evidence From Job Ads

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Wage Growth in Europe: Evidence From Job Ads

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Key Points:

- Timely data on wage growth has historically been limited, especially in Europe.
- While central banks monitor wage developments for signs that could impact the inflation outlook, finding accurate wage growth data has been difficult.
- We have developed a new monthly wage growth tracker based on data from millions of online job postings on Indeed in six euro-area countries and the UK.
- Growth in euro-area posted wages accelerated in 2022, reaching 5.2% year-on-year in October – more than three times the pre-pandemic rate – while growth in the UK was 6.2% and appears to have peaked at this level.
- Wage growth has also become increasingly broad-based, with most occupational categories seeing annual growth in posted wages above 3%.
- These trends align with central banks' expectations for wages to continue to grow well above pre-pandemic rates in the near-term.

A New Way to Track Wage Data

Faced with the risk of persistently high inflation, both the European Central Bank (ECB) and the Bank of England increased their main policy rates substantially in 2022. Policymakers have signalled that [more increases](#) are coming. To calibrate the scale and pace of the interest rate changes needed to sustainably achieve inflation targets, central banks pay close attention to current incoming [wage data](#), looking for signs of cost pressures in the labour market.

To track wage developments, the ECB uses national accounts data on workers' compensation and data on [negotiated wages](#), neither of which are perfect. For example, national accounts data is only available at a considerable lag of 90 days.

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Negotiated wage data could be more backward- than forward-looking, given the lengthy time periods over which negotiations tend to take place. Finally, negotiated wages are not available for all euro-area countries.

Our new wage growth tracker complements existing data by enabling a timely and deeper analysis of trends. We track wages posted in job ads on Indeed in six euro-area (EA) countries – France, Germany, Ireland, Italy, Netherlands and Spain – and the UK. When we quote ‘euro-area’ figures, we’re referring to the employment-weighted average of these six countries.

Post-pandemic wage growth trends

Our initial analysis, conducted through the end of October 2022, found that growth in euro-area posted wages accelerated sharply in the first half of this year, from 2.5% in January to 4.2% in June and continued to accelerate during the third quarter. The first growth spurt coincided directly with the re-opening of economies after the pandemic.

That growth continued in October 2022 – average year-on-year euro-area wage growth in our tracker was 5.2%, more than three times the 2019 average of 1.5%. But not all growth is created equal. Among the euro-area countries we analysed, October wage growth was highest in Germany (7.1%), followed by France (5.0%), Ireland (4.7%), Italy (4.2%), Netherlands (4.0%) and Spain (3.5%).

Growth in posted wages started to accelerate earlier in the UK. It peaked at 6.4% in June 2022 and has remained above 6% since. As of October, year-on-year wage growth was 6.2%, double the 2019 average of 3.1%.

Wage growth has also become more spread out. In the year to October, 60% of occupational categories in the euro area and more than 80% in the UK have seen growth in excess of 3% – a rough benchmark that allows for 1% productivity growth over the 2% inflation target set by the ECB and the Bank of England. This suggests high wage growth has spread broadly across segments of the labour market, well beyond a few “pandemic winners.”

Indeed will continue to publish this data [monthly](#), adding more countries over time as data becomes available.

Why Look at Wages in Job Postings?

There are three main reasons why wages in job postings are valuable for analysing the labour market.

1. **Their *timeliness* relative to other wage indicators.** The Indeed wage data can be extracted and analysed within several days after the end of each month. This compares favourably with a lag of around 90 days for the national accounts that include data on the compensation of employees.
2. **Their value as an *indicator of labour market tightness, i.e. if vacant jobs are plentiful and available workers are scarce.*** Our analysis shows that wages in job postings are indicative of the wages of new hires (see Appendix), and research

shows that new-hire wages tend to rise or fall by more than the wages of continuing workers when the unemployment rate goes up or down.³

A case in point is that in the Atlanta Fed's monthly [Wage Growth Tracker](#). In the three months leading up to September 2022, the gap between the wage growth of job switchers (a subset of new hires) of 7.9% and job stayers of 5.3% in the US is the largest it has been in any expansion since 1997.

3. **They relate to the marginal worker and are likely to reflect employers' expectations for demand.** In the US, for instance, the wages of job switchers respond earlier to changes in the outlook than the wages of job stayers. Comparing the timing of the peak of wage growth for workers who change jobs with wage growth for continuing workers, we found that the wages of job switchers tend to lead economic peaks, while the wages of job stayers do not.

How We Measure Growth in Posted Wages

To measure growth, we collect data on wages from 24 million job postings available on Indeed between January 2018 and October 2022⁴ in France, Germany, Ireland, Italy, the Netherlands, Spain and the UK. The euro-area countries account for 81% of total euro-area employment (see Table 1). Sample size depends on the number of job vacancies in each country, the share of vacancies that are posted online, and the share of online job postings that contain wage or salary information, among other factors.⁵

The dataset includes the advertised hourly wage or a monthly or annual salary, as well as the date when the job was first posted, its location and the job title. The job title is a more detailed Indeed classification than standard occupation codes (SOC or ISCO). There are roughly between 3,000 and 7,000 unique job titles in each country's sample. Job titles can explain a great deal of the cross-sectional variation in advertised wages in online job ads (see Table A2 in the appendix), with R-squared statistics of around 0.70 in a log wage regression that includes job title fixed effects.⁶ Given this explanatory power of job titles for wages, in our wage tracker we focus on within-job-title variation over time.

³ See, for example, [Lozej & Lydon \(2018\)](#), [Martins et al. \(2012\)](#), [Carneiro et al. \(2012\)](#), [Albagli et al. \(2019\)](#), [Gertler et al. \(2020\)](#), [Haefke et al. \(2013\)](#), [Stuber \(2016\)](#).

⁴ All results will be updated to 31st October 2022 before publication.

⁵ More information about Indeed job posting data is available on the [Indeed Hiring Lab website](#).

⁶ [Marinescu & Wolthoff \(2020\)](#) get very similar results using job titles in a sample of US online job postings.

Table 1 | Wage tracker dataset and official labour market statistics

	Wage tracker dataset (Indeed)			Employment & job vacancies (Eurostat & ONS)		
	<i>Job postings in the dataset (millions)</i>	<i>Distinct job titles (number)</i>	<i>Share of job postings with salary data (Q2 2022) (%)</i>	<i>Country share of total euro area employment Q2 2022 (%)</i>	<i>Job vacancies Q2 2022 (‘000s)</i>	<i>Job vacancy rate Q2 2022 (%)</i>
Germany	1.4	4,918	10%	27%	2,010	4.5%
France	5.5	4,021	33%	19%	376	2.4%
Italy	0.3	2,970	10%	15%	395	2.2%
Spain	0.3	3,130	13%	13%	138	0.8%
Netherlands	2.0	4,940	32%	6%	476	5.0%
Ireland	0.3	4,526	33%	2%	35	1.6%
EA6 Total	9.8			81%	3,430	3.2%
UK	14.3	7,472	49%		1,246	4.2%
Total	24.1				4,676	

Source: Indeed, Eurostat, ONS. French job vacancy statistics from Eurostat are for firms with 10 employees or more. Eurostat does not report the number of job vacancies in Italy so we estimate it using the vacancy rate and the number of employees.

To calculate the average rate of wage growth, we follow an approach similar to the [Atlanta Fed Wage Growth Tracker](#), but we are tracking jobs, not individuals. We begin by calculating the median posted wage for each country, month, job title, region and salary type (hourly, monthly or annual). Within each country, we then calculate year-on-year wage growth for each job title-region-salary type combination, generating a monthly distribution. Our monthly measure of wage growth for the country is the median of that distribution. Alternative methodologies, such as the regression-based approaches in [Marinescu & Wolthoff \(2020\)](#) and [Haefke et al. \(2013\)](#) produce similar trends.

Are data from job postings representative?

Not all job postings include wage information: the share ranges from 10% in Germany to almost 50% in the UK (Table 3). This begs an obvious question: how representative is the data we use to construct our wage growth tracker?

[Previous analysis](#) of Indeed job postings showed that the cross-sectional distribution of wages in job ads is very similar to that in national surveys, such as the European Union Statistics on Income and Living Conditions (EU-SILC). For most percentiles of the wage distribution from EU-SILC, the job posting data is a close match (see Figure A1 in the appendix for more details). There is one main exception – the top decile, where actual wages tend to be higher than posted wages, reflecting perhaps the impact of negotiations for higher-paid workers.

To track how wages are changing over time, we cross-check how the trend in posted wages compares to other sources. Figure 1 compares the data from job ads with compensation per employee from Quarterly National Accounts and average weekly earnings from the ONS in the UK case (the data are indexed to Q1 2019=100). Though we shouldn't expect the trends to be identical, it is reassuring that our wage estimates broadly track official sources, including the acceleration in growth during 2022.

Figure 1 | Posted wages & compensation per employees (National Accounts) (2019Q1=100)



Source: Indeed job postings and ECB data warehouse (SDW) for compensation per employee; ONS average weekly earnings for the UK. In some countries, the use of job retention schemes during the pandemic leads to step changes in the series. The trend for Indeed data in these charts is the coefficient on log wages from a wage regression with job title and region fixed effects. Data is to 30 Sep 2022.

Wage Growth Has Accelerated

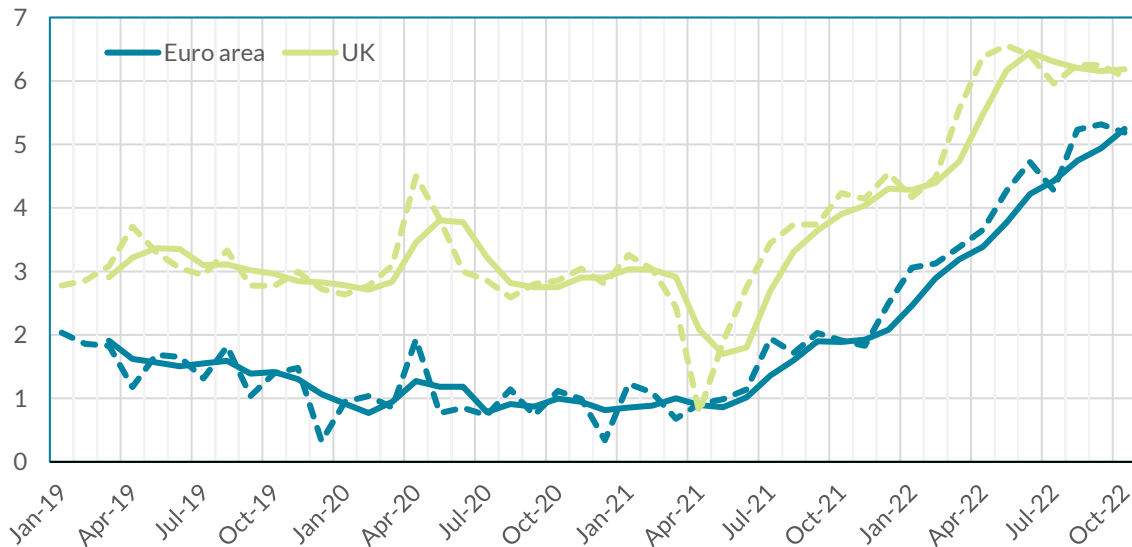
In the euro area, we observe a sharp uptick in posted wage growth during the first half of 2022, tied to the post-pandemic re-opening (Figure 2). By October, annual growth was 5.2%. This acceleration in wage growth is consistent with [ECB expectations](#) for average wages to grow at rates well above their pre-pandemic trend in the near term.⁷

⁷ In the [ECB September 2022](#) projections, compensation per employee was projected to grow at 4.8% and 4.0% in 2023 and 2024. This compares with an average annual growth figure for 2017-19 of 2.0%.

In the UK, wage growth has generally been higher than in the euro area – the UK has experienced both higher inflation and a [decline in labour supply](#). Posted wage growth peaked at 6.4% in June 2022 before falling back gradually to 6.2% by October. It remains to be seen whether this decline means that wage growth is past its peak or whether it will resume in the coming months.

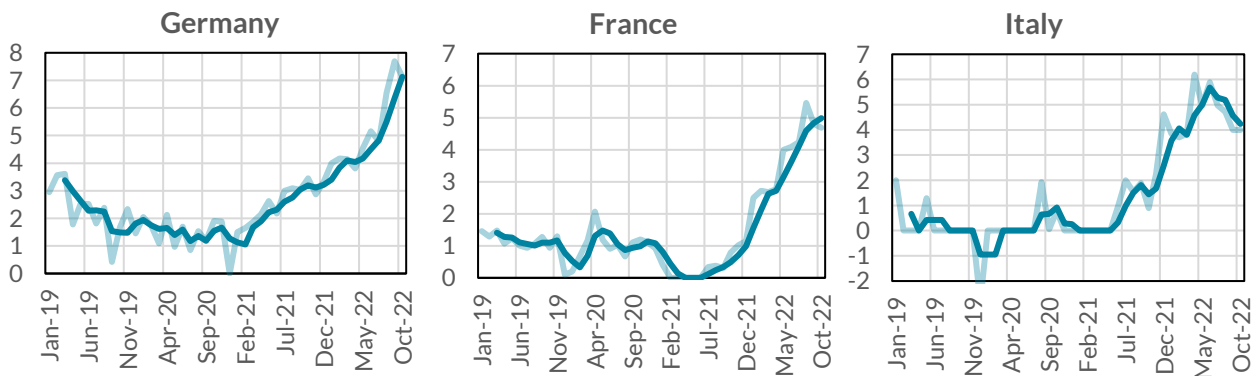
Individual euro-area countries show similar growth patterns: an acceleration of wage growth during the first half of 2022, with some signs of plateauing in the third quarter, but with growth rates remaining higher than in the pre-pandemic period. Germany is the one country we studied where year-on-year wage growth has not yet decelerated. Instead, it continued to increase during the third quarter, reaching 7.1% in October. Germany currently leads the ranking countries by wage growth and it is followed by France (5.0%), Ireland (4.7%), Italy (4.2%), Netherlands (4.0%) and Spain (3.5%).⁸

Figure 2 | Nominal year-on-year wage growth in job postings (per cent): Euro area and UK

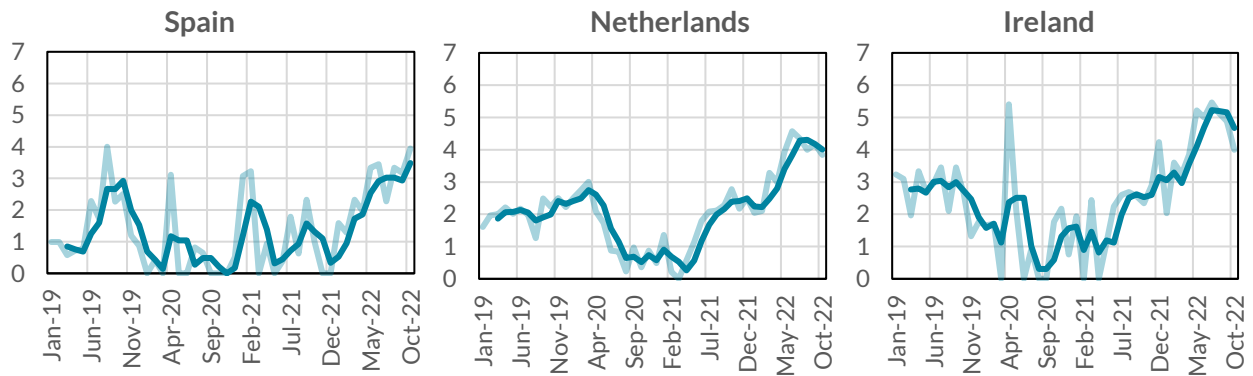


Source: Indeed and authors' calculations. Notes: EA is an employment-weighted average of France, Germany, Ireland, Italy, the Netherlands and Spain (see Figure 3). The solid line is a three-month moving average (t-2, t-1, t). The dashed line is monthly data. Data is to 31 October 2022.

Figure 3 | Nominal wage growth in job postings, by EA country



⁸ The relatively low rate of wage growth we observe in Spain is consistent with data on negotiated wages and could be driven by the low job vacancy rate relative to other euro area countries (Table 3)



Source: Indeed and authors' calculations. The dark line is a three-month moving average. The lighter line is monthly data. Data is to 31 October 2022.

Wage Growth Has Become Broad-Based

It's critical to consider whether the acceleration in wage growth during 2022 is a broad-based phenomenon or if it reflects faster wage growth in a small number of jobs where the demand-supply balance is tight.

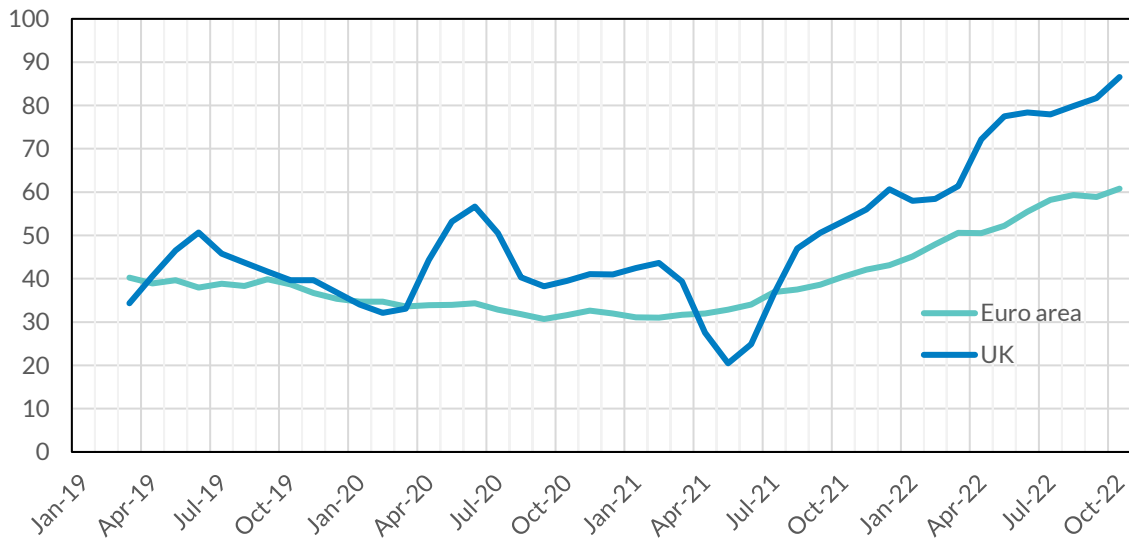
To assess this, we re-estimate our wage growth tracker for each of the 54 occupational categories we studied. The categories (listed in the Appendix) track to the Indeed taxonomy. To measure how broad-based wage growth actually is, we count the number of job categories in each month where annual nominal wage growth is 3% or higher. A 3% nominal wage growth threshold would be consistent with 1% productivity growth, plus the 2% inflation target (see [Lane, May 2022](#)).

Figure 4 shows the results for the euro area and the UK. Since the low point of the pandemic in early 2021, when posted wages were growing at a rate of 3% or higher in fewer than 40% of occupational categories in the euro area, the share has broadened to over 60% in October.

There is a similar pattern in each of the six euro area countries (Figure 5). In October, the share of occupations with annual wage growth of 3% or greater ranged from 51% in Spain to 68% in Germany. This was well above pre-pandemic levels of around 30% to 50% for most countries.

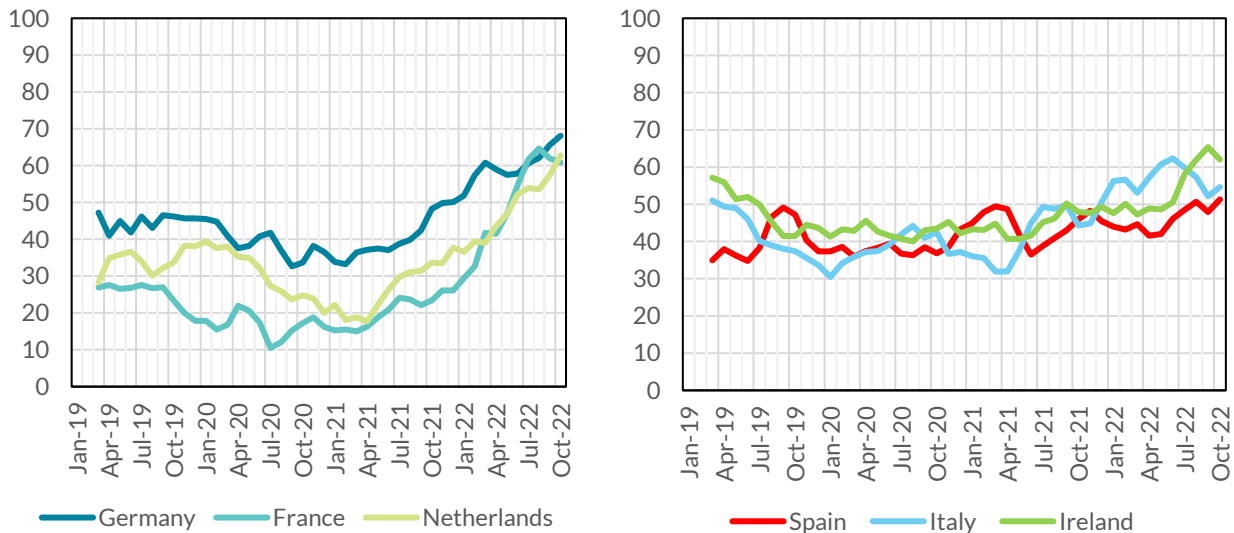
The UK pattern is similar, too, taking into account the fact that average wage growth has been higher. As of October, posted wages had grown more than 3% year on year in 87% of occupational categories.

Figure 4 | Share of occupational categories with over 3% year-on-year nominal wage growth (average of six euro area countries)



Source: Indeed and authors' calculations. Notes: EA series is an employment-weighted average of the six euro area countries shown individually in Figure 4. Data is to 31 October 2022.

Figure 5 | Percentage of occupational categories with over 3% year-on-year nominal wage growth: EA countries



Source: Indeed and authors' calculations. Data is to 31 October 2022.

Jobs Where Wages Are Growing Fastest

The size and granularity of the dataset allow us to delve below the headline trends. Tables 2 and 3 show the 10 occupational categories with the highest year-on-year growth in posted wages from 2019 to 2022.

The pandemic shifted the landscape. Six categories are in the euro area top 10 in both 2019 and 2022: cleaning and sanitation, food preparation/service, customer service, loading and stocking, retail and installation and maintenance. Nevertheless, in each of

those six categories, wage growth has risen substantially since the pre-pandemic period. In terms of wage growth, the UK top-10 comparison is similar to the euro area, if slightly stronger in 2022.

Table 2 | Occupational categories with the largest year-on-year increases in posted wages (average of six euro area countries, October 2019 vs. 2022)

EA, October 2022 (wage growth)			EA, October 2019 (wage growth)		
1	Community & Social Service	8.7%	1	Nursing	3.7%
2	Cleaning & Sanitation	8.1%	2	Construction	3.0%
3	Food Preparation & Service	7.9%	3	Production & Manufacturing	2.8%
4	Driving	7.6%	4	Cleaning & Sanitation	2.8%
5	Customer Service	6.8%	5	Retail	2.7%
6	Loading & Stocking	5.8%	6	Installation & Maintenance	2.5%
7	Retail	5.7%	7	Loading & Stocking	2.3%
8	Childcare	5.4%	8	Customer Service	2.3%
9	Sales	5.2%	9	Food Preparation & Service	2.2%
10	Installation & Maintenance	5.1%	10	Security & Public Safety	2.1%

Table 3 | Occupational categories with the largest year-on-year increases in posted wages (UK, October 2019 vs. 2022)

UK, October 2022 (wage growth)			UK, October 2019 (wage growth)		
1	Personal Care & Home Health	8.3%	1	Cleaning & Sanitation	4.9%
2	Loading & Stocking	7.7%	2	Food Preparation & Service	4.3%
3	Production & Manufacturing	7.6%	3	Loading & Stocking	4.2%
4	Customer Service	7.2%	4	Retail	4.0%
5	Cleaning & Sanitation	7.1%	5	Nursing	3.9%
6	Software Development	6.9%	6	Security & Public Safety	3.8%
7	Security & Public Safety	6.9%	7	Production & Manufacturing	3.8%
8	Food Preparation & Service	6.6%	8	Personal Care & Home Health	3.6%
9	Retail	6.6%	9	Driving	3.5%
10	Installation & Maintenance	6.5%	10	Administrative Assistance	3.1%

Source: Indeed and authors' calculations. Notes: The data are median three-month lagged average growth rates across countries. Only categories that represent at least 1.5% of observations in the last two years of the dataset are shown. Occupations in bold-green are in the top 10 in both 2019 and 2022. Data to 31 October 2022.

Individual country patterns are on the whole quite similar, with several occupational categories appearing in the top 10 in most of the countries in our dataset (see Table A4 in the appendix). Food preparation and service, cleaning and sanitation, driving, loading and stocking, and administrative assistance appear in the top 10 of almost all countries. Retail, sales and customer service also appear frequently.

Wage Growth Tracker Future Outlook

Posted wages reflect, to some degree, expectations about the value of future job matches. Our wage growth tracker is a forward-looking indicator of both average wage growth and of the outlook for the labour market. It's a powerful cross-check to established wage growth indicators and can help paint a more complete picture of not only the present but also the future.

Posted wage growth accelerated in the first half of 2022 to reach roughly two to three times pre-pandemic levels. Early signs are that wage growth in job ads has plateaued at these historically high levels – and actually fallen in some countries. Combined with gradually declining [job postings](#) in certain countries, this suggests that some employers are starting to rethink their demand for labour as they balance the currently tight labour market against an increasingly uncertain and deteriorating economic outlook.

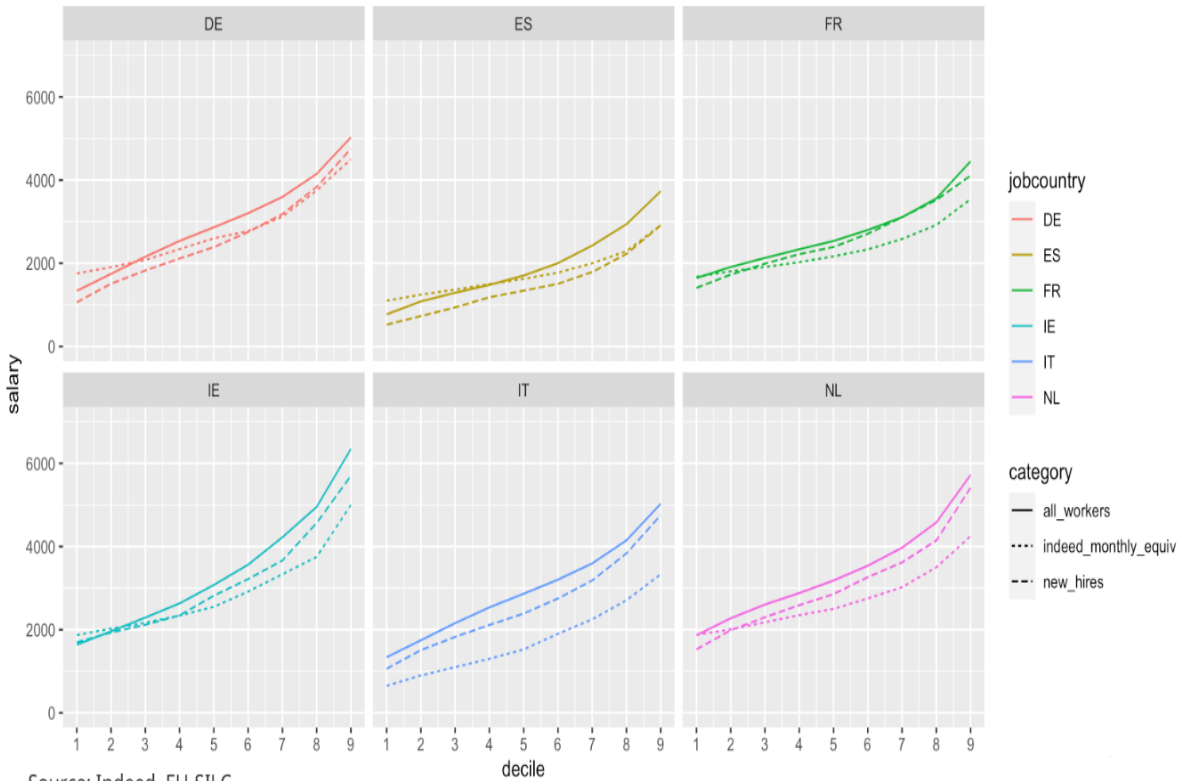
We will continue to watch these trends for possible turning points. Monthly updates will be published and downloadable as CSV files on the Indeed Github, adding more countries globally as the data become available.

Appendix

Figure A1 | Percentiles of the monthly wage distribution: Indeed job postings vs EU-SILC (2019)

Distribution of advertised and actual salaries

Deciles of salaries advertised on Indeed and salaries of all workers and new hires in EU-SILC data, 2019



Source: Indeed, EU-SILC

Job titles and posted wages

Variation in the composition of workers can have a substantial impact on estimated wage growth, as [the ECB has shown](#). We, therefore, focus on the median of within-job title wage growth. Table A2 shows that the addition of the job title beyond broad occupational groupings does a much better job of explaining the cross-sectional variation in the data. Table A3 lists some examples of job titles.

Table A2 | R-squared with different occupation and job title fixed effects

	17 occupations	54 occupations	job titles
Germany	0.53	0.58	0.71
France	0.38	0.42	0.60
Spain	0.21	0.26	0.46
Italy	0.41	0.44	0.59
Netherlands	0.38	0.43	0.61
Ireland	0.27	0.43	0.70

Source: Own estimates on Indeed data. See Table A3.1 for a list of occupations.

A3. Occupational categories and job titles

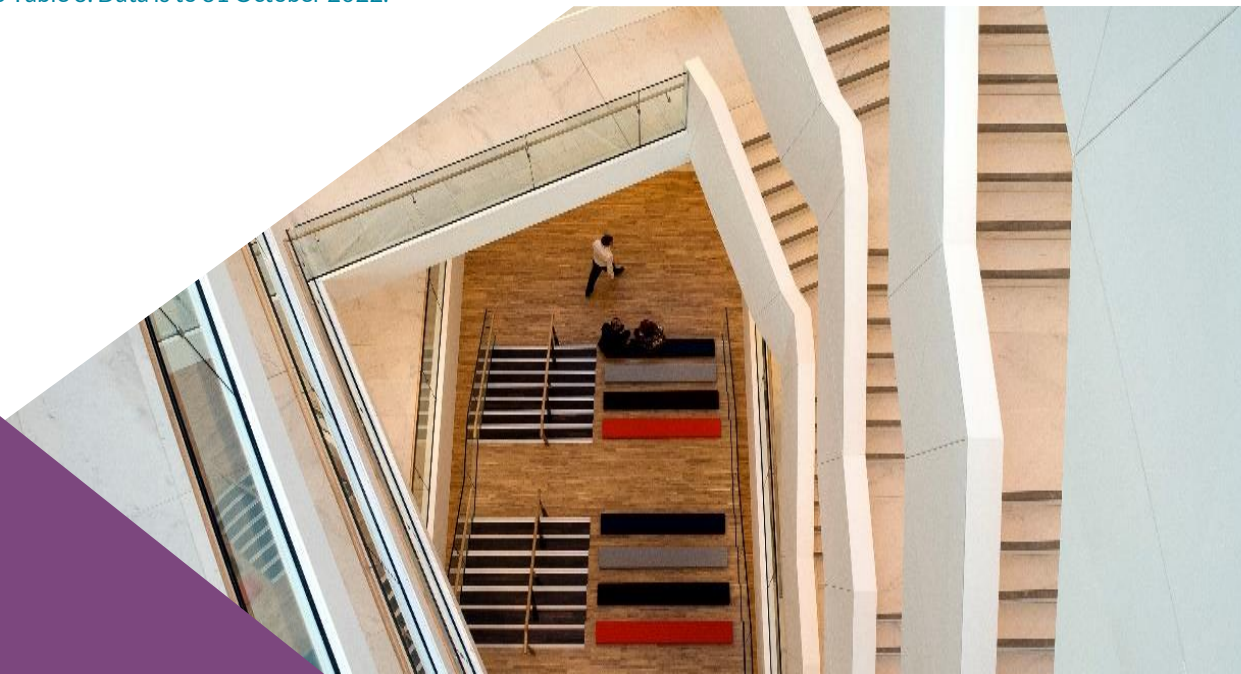
Occupational sector	Example job titles
Accounting	Accountant, Financial Analyst
Administrative Assistance	Administrative Assistant, Receptionist
Architecture	Architect, Interior Designer
Arts & Entertainment	Designer, Artist
Banking & Finance	Risk Manager, Relationship Banker
Beauty & Wellness	Hair Stylist, Salon Manager
Childcare	Preschool Teacher, Baby-Sitter
Civil Engineering	Civil Engineer, Environmental Health And Safety Specialist
Cleaning & Sanitation	Housekeeper, Cleaner
Community & Social Service	Case Manager, Social Worker
Construction	Labourer, Equipment Operator
Customer Service	Customer Service Representative, Front Desk Agent
Dental	Dental Assistant, Dental Hygienist
Driving	Truck Driver, Delivery Driver
Education & Instruction	Teacher, Instructor
Electrical Engineering	Electrical Engineer, Controls Engineer
Food Preparation & Service	Cook, Server
Hospitality & Tourism	Porter, Concierge
Human Resources	Recruiter, Human Resources Manager
IT Operations & Helpdesk	IT Manager, Systems Administrator
Industrial Engineering	System Engineer, Process Engineer
Information Design & Documentation	Business Analyst, Data Analyst
Installation & Maintenance	Technician, Maintenance Technician
Insurance	Insurance Agent, Underwriter
Legal	Compliance Officer, Legal Assistant
Loading & Stocking	Warehouse Worker, Forklift Operator
Logistic Support	Supply Chain Specialist, Dispatcher
Management	Shift Manager, General Manager
Marketing	Marketing Manager, Digital Marketer
Mathematics	Analyst, Data Scientist
Media & Communications	Photographer, Writer
Medical Information	Patient Services Representative, Coding Specialist
Medical Technician	Medical Assistant, Patient Care Technician
Nursing	Registered Nurse, Licensed Practical Nurse
Personal Care & Home Health	Caregiver, Support Worker
Pharmacy	Pharmacy Technician, Pharmacist
Physicians & Surgeons	Optometrist, Physician
Production & Manufacturing	Machine Operator, Assembler
Project Management	Project Manager, Program Manager
Retail	Retail Sales Associate, Cashier
Sales	Sales Associate, Sales Representative
Scientific Research & Development	Scientist, Laboratory Assistant
Security & Public Safety	Security Officer, Security Guard
Software Development	Software Engineer, Full Stack Developer
Sports	Coach, Fitness Instructor
Therapy	Physical Therapist, Occupational Therapist
Veterinary	Veterinary Technician, Veterinarian

Table A4 | Occupational categories with the largest year-on-year increases in posted wages by country (October 2022)

France			Germany		
1	Retail	6.6%	1	Cleaning & Sanitation	12.5%
2	Food Preparation & Service	6.5%	2	Food Preparation & Service	12.2%
3	Childcare	6.4%	3	Community & Social Service	11.6%
4	Loading & Stocking	6.3%	4	Driving	11.0%
5	Cleaning & Sanitation	6.1%	5	Customer Service	10.9%
6	Nursing	5.9%	6	Retail	10.0%
7	Production & Manufacturing	5.8%	7	Loading & Stocking	9.2%
8	Personal Care & Home Health	5.8%	8	Sales	7.3%
9	Administrative Assistance	5.5%	9	Nursing	6.7%
10	Driving	5.2%	10	Education & Instruction	6.5%
Ireland			Italy		
1	Customer Service	8.6%	1	Installation & Maintenance	8.7%
2	Sales	8.2%	2	Accounting	7.4%
3	Loading & Stocking	8.0%	3	Nursing	6.7%
4	Administrative Assistance	6.7%	4	Cleaning & Sanitation	6.4%
5	Human Resources	6.0%	5	Driving	5.7%
6	Retail	5.1%	6	Food Preparation & Service	5.4%
7	Driving	4.9%	7	Production & Manufacturing	4.2%
8	Management	4.6%	8	Loading & Stocking	3.6%
9	Construction	4.4%	9	Sales	3.5%
10	Food Preparation & Service	4.4%	10	Administrative Assistance	2.9%
Netherlands			Spain		
1	Food Preparation & Service	6.9%	1	Driving	7.6%
2	Community & Social Service	6.9%	2	Construction	7.2%
3	Cleaning & Sanitation	5.8%	3	Software Development	7.0%
4	Customer Service	5.6%	4	Customer Service	6.1%
5	Loading & Stocking	5.3%	5	Accounting	5.9%
6	Administrative Assistance	5.3%	6	Cleaning & Sanitation	5.6%
7	Driving	5.2%	7	Sales	4.7%
8	Production & Manufacturing	4.4%	8	Food Preparation & Service	4.6%
9	Nursing	4.1%	9	Administrative Assistance	4.1%
10	Sales	4.0%	10	Installation & Maintenance	3.8%

Source: Indeed and authors' calculations

Notes: See notes to Table 3. Data is to 31 October 2022.



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