Banc Ceannais na hÉireann
Central Bank of Ireland
Eurosystem

# Signed Article
## QB3 – September 2023

# Contents

# Earnings growth under high inflation

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## Abstract

The Irish economy is currently experiencing a tight labour market and high inflation. Using the framework of the Phillips curve – which relates changes in wages to labour market tightness and inflation - we find that since 2018, nominal earnings growth has been lower than this model would predict. The gap between observed and estimated earnings growth based on the Phillips curve widened to 1.3 percentage points in 2022. Our analysis finds that this gap most likely reflects a delayed catch-up of wages to the sharp drop in real incomes in 2022. Fiscal supports and savings may also have contributed to dampening wage pressures by providing temporary cushioning to households. Our results suggest that a degree of real wage catch up is likely over the medium term. However, with the economy now operating at full capacity, it is important that the fiscal stance does not add further stimulus to the economy.

## 1. Introduction

Ireland's labour market is at full employment. The number of employed persons expanded to a new peak of 2.64 million in the second quarter of 2023. At the same time, the job vacancy rate (1.3 per cent) remains elevated compared to the long-run average and the labour force participation rate (at 65.7 per cent) is at levels last recorded in the mid-2000s. The ILO unemployment rate stood at 4.4 per cent in Q2 2023, this is broadly similar to the early 2000s when unemployment averaged below 5 per cent in each year from 2000 to 2006. In addition, a supplementary measure of labour

[1] Irish Economic Analysis. With thanks to Vasileios Madouros, Robert Kelly, Martin O'Brien, Thomas Conefrey, Gerard O'Reilly, Niall McInerney and Graeme Walsh for comments and to the Labour team in the CSO for granular data access. Remaining errors are our own. The views expressed here do not necessarily reflect the views of the Central Bank of Ireland nor the European System of Central Banks. Corresponding author: enda.keenan@centralbank.ie

market slack – the potential additional labour force (PALF) – stood at 99,200 persons or 2.4 per cent of the working age population.[2] While this pool of additional labour supply may serve to support further job growth and ease wage pressures in certain sectors, its relative share of the working age population has declined from the 2.8 per cent recorded prior to the pre-pandemic.

Alongside this tight labour market, inflation is high by historical comparison and expected to remain so in the short-term. Headline consumer price inflation (HICP) in Ireland moderated to 4.9 per cent over the year to August 2023, while core inflation (excluding volatile energy and food components) measured 4.8 per cent. The sharp increase in inflation was driven primarily from higher energy prices in 2022. As a net energy importer, this represented a negative terms of trade shock for the Irish economy, resulting in a drop in national income. Fiscal policy has been used to help partially shield households and businesses from the effects of high inflation but cannot offset the full extent of the negative terms of trade shock for all households.

In this *Article*, we use compensation per employee (CPE) as our preferred measure of earnings. This measure is derived from the National Accounts and encompasses gross wages and salaries as well as the value of social contributions paid by employers. It is highly correlated to total labour costs data from the Earnings, Hours and Employment Costs Survey (EHECS) and benefits from having the longest available time series. It is also used as the wage projection variable in *Quarterly Bulletin* analysis.[3] The most recent data shows that CPE experienced annual growth of 2.9 per cent in the year to Q1 2023, but in real terms, growth is negative at 4.3 per cent.[4]

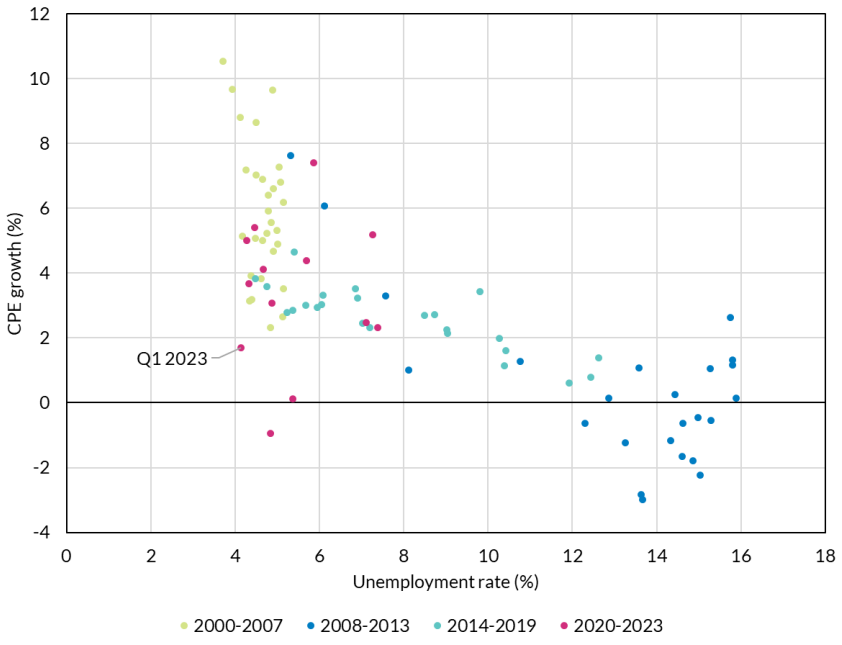
The relationship between earnings growth and unemployment – or slack – can be described using the earnings Phillips curve, which asserts a negative

[2] PALF consists of two groups classified as outside of the labour force: 'Available for work but not seeking' and 'Seeking but not immediately available'. These groups have a historically higher transition rate to employment compared to other cohorts outside of the labour force.
[3] EHECS hourly earnings data only begins in Q1 2008. There is a strong relationship between EHECS and CPE data as hourly earnings typically comprise 85 per cent of firm labour costs shown in Figure 4. See Box A for further details.
[4] CPE is calculated by dividing Compensation of Employees from the National Accounts by the number of employees in the State to generate a per worker series. To analyse annual changes in real terms, CPE is deflated by the Personal Consumption Deflator (PCD), which is highly correlated with the CPI. Many macroeconomic variable have their own specific deflator series.

relationship between the two series (Phillips, 1958).[5] Previous Central Bank research (Linehan, Lydon, McIndoe-Calder, Reddan & Smyth, 2017) found evidence of a non-linear relationship between earnings growth and unemployment for the period 2000-2017, with growth more sensitive to periods of very low or high unemployment. However, the curve for Ireland today (shown in Figure 1) appears less amenable to non-linear formulations. This has prompted a return to questions about the effectiveness of the Phillips curve in generating insights into the evolution of earnings in Ireland.[6]

In this *Article*, we examine the key determinants of earnings growth in Ireland and provide an updated Phillips curve analysis by extending the estimation to the end of 2019 and revisiting the specification of the Phillips curve equation. In the earnings Phillips curve framework we deploy, slack is captured using a newly developed measure which includes both persons in unemployment and those in PALF with previous work experience. Using this measure is a key change from previous Central Bank analysis which allows us to capture a wider pool of potential workers whilst also contributing to the literature exploring the use of alternative measures of slack.

**Figure 1: Earnings Phillips curve (Q4 2000 to Q1 2023)**




*Source:* CSO and authors' own calculations.

[5] The original Phillips curve described the relation between unemployment and price growth.
[6] Earlier research, such as Faubert, (2020), has queried the usefulness of the Phillips curve as an analytical tool for Ireland.

Our analysis seeks to answer the following three research questions:

(i) How well does the earnings Phillips curve explain earnings growth in Ireland up to the pandemic, as measured by CPE?

(ii) Is post-pandemic earnings growth where we would expect it to be *given* current labour market conditions?

(iii) Could stronger real earnings growth emerge over the short-to-medium term?

The results of our refreshed Phillips curve analysis suggest that the earnings Phillips curve remains a useful tool for explaining earnings developments in Ireland. The model tracks actual developments very closely from 2013 to 2018. A gap of 1.1 percentage points emerges at the end of 2019 as the economy approached full employment and actual earnings growth was lower than predicted. Since then, while unemployment has approached historically low levels and the composition of employment has considerably altered from the pre-pandemic period, recent earnings growth has been relatively moderate. At the end of 2022, our analysis finds the gap between model estimates of earnings growth and observed growth has widened slightly to 1.3 percentage points.

A decomposition of the difference between actual and estimated earnings growth suggests that inflation accounts for the majority of the gap. Under our estimate of the Phillips curve, the sharp increase in inflation would have been expected to result in higher earnings growth than was observed in 2022. Given the inflation surge was large and unexpected, it is likely to take time for earnings to adjust to price developments. A slower adjustment may also reflect access to cost of living supports and household savings which may have altered expectations and reduced demand for immediate earnings adjustment. Structural factors, for example a change in workforce composition or preferences, could also be playing a role.

Nevertheless, the magnitude of the gap is similar to other periods of notable changes in employment composition and, based on these previous episodes, we would expect the gap to close over the coming quarters with the cumulative differences between predicted and actual earnings growth dissipating.[7] However, the degree and speed of real earnings catch-up will likely vary by sector reflecting differences in the balance of labour supply

[7] Previous occurrences of changes in employment composition would be the notable decline in construction employment following the GFC. This sector accounted for 10.7 per cent of average employment in 2007, which then fell to 6.6 per cent in 2009.

and demand in each. Our findings have implications for considering the likely path of earnings and prices in the years ahead, and in turn, for Ireland's future labour supply and demand. Given the economy is now operating at full capacity, the analysis highlights how further policy actions to provide additional large, untargeted fiscal supports could be inflationary and risks triggering potentially damaging overheating dynamics.

The remainder of this *Article* is structured as follows. Section 2 outlines how earnings have evolved in Ireland in recent years. Section 3 examines current labour supply and demand, and presents the augmented slack rate to be deployed later in our empirical analysis. Section 4 describes other factors which are important for determining earnings growth in Ireland. In Section 5, we estimate the earnings Phillips curve and discuss the results. Finally, Section 6 concludes.

## 2. Earnings growth

Following the Global Financial Crisis (GFC) of 2008-2009, growth in aggregate nominal earnings was relatively stagnant in Ireland. Annual growth in nominal CPE averaged 1.3 per cent between 2011 and 2018, during which time the average inflation rate was marginally above zero. However, as the economy approached full employment, nominal growth picked up to average 3.2 per cent in 2019 or 2.5 per cent in real terms.

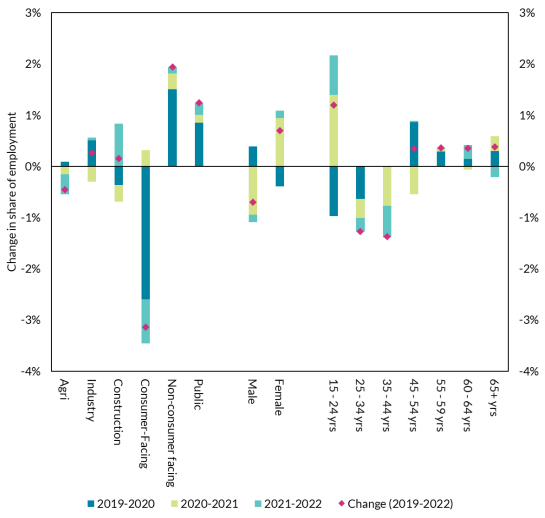
The subsequent pandemic period significantly changed the composition of Ireland's workforce as the disruption to business activities saw different types of workers leave employment, particularly those who were younger, working part-time or in lower paid roles.[8] As a result, there were changes in the relative shares of lower and higher earners, and in turn, an overall upward shift in aggregate earnings growth, peaking in Q3 2021 at 4.9 per cent.

The changes in workforce composition can be seen in Figure 2, which breaks down changes in the share of employment by sector, gender and age. The largest, notable decline is amongst workers in the consumer-facing services sectors, which is yet to recover to its 2019 share of employment. Non-consumer facing private sectors, by contrast, increased their relative share of employment in each year. These substantial changes in underlying employment during the pandemic complicate the analysis of changes in average earning levels during this period. To illustrate the extent of the

[8] See IGEES (2022) "Trends in Post-PUP Employment" for further details on flows of workers between sectors.

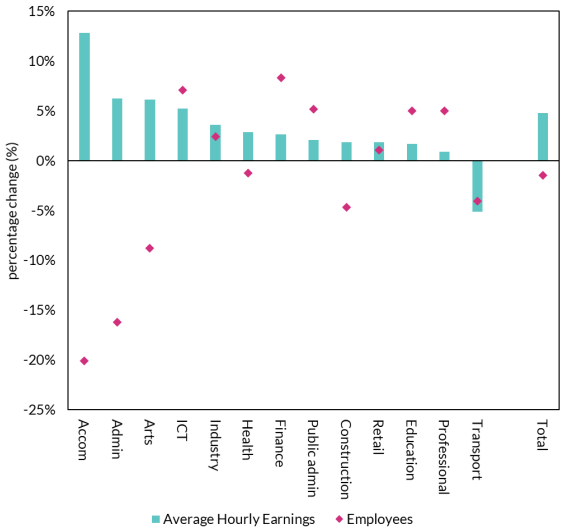
challenge, we analyse earnings data from EHECS by sector (Figure 3). This shows, for instance, the Accommodation & Food services sector recording average hourly earnings growth of 12.8 per cent over the period 2019 to 2020, but this sector experienced employment loss of 20.1 per cent.

**Figure 2: Change in share of employment relative to previous year by sector and demographic group**




*Source:* CSO and authors' own calculations.
Note: Consumer facing sectors include Admin, Accom, Retail, Transport and Other. Non-consumer facing sectors include ICT, Finance and Professional.

**Figure 3: Annual change in hourly earnings and employees by sector (2019 – 2020)**




*Source:* CSO and authors' own calculations.
Note: Hourly earnings defined as the wages received by the employee from the employer for hours worked and are not inclusive of overtime, bonuses or non-wage costs such as employer social insurance etc.

As a result of these compositional changes, it is difficult to rely on data from the pandemic period as an accurate reflection of underlying earnings dynamics, i.e. earnings changes excluding the impact of compositional effects. Non-wage labour costs are also impacted by pandemic distortions due to how wage subsidy schemes were treated and reported by firms in surveys such as EHECS. See Box A at the end of this Section for further detail.

At the aggregate level, earnings growth can be analysed using National Accounts data, whereby the total economy earnings bill is driven broadly by two main components: employee levels (labour quantity) and CPE (labour costs). Figure 4 shows a decomposition of the total compensation of employees. Throughout the pandemic recovery (Q2 2021 to Q2 2022), substantial changes in the number of employees was the dominant factor driving increases in earnings; a reflection of more young and lower-earning workers either returning to their previous roles or entering into new employment in 2021 and 2022 (Boyd, Byrne, Keenan & McIndoe Calder,

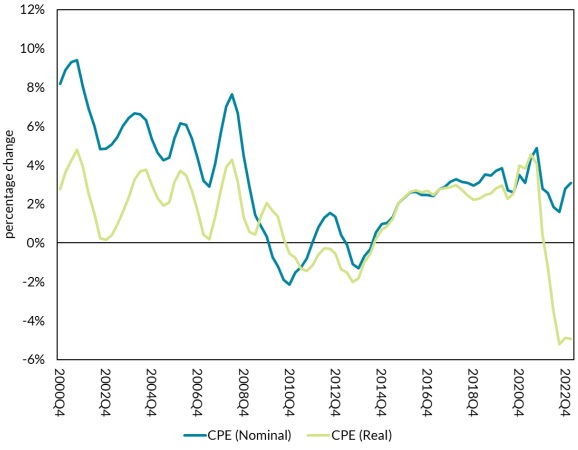
2022). These earnings dynamics, where income growth is driven by employment growth, are similar to those that existed in the Irish economy from 2013 to 2017, as analysed by Linehan et al (2017).

Up to Q1 2023, nominal earnings growth in Ireland has been moderate despite the backdrop of relatively low and falling unemployment. Growth in earnings (as measured by CPE) increased by 2.9 per cent annually in the first quarter of 2023. However, continued elevated levels of inflation resulted in negative real growth of 4.3 per cent in Q1 on an annual basis, which represents the sixth consecutive quarter of real earnings decline (Figure 4).

**Figure 4: Decomposition of annual growth in compensation of employees**


*Source:* CSO and authors' own calculations.
Note: Changes in the number of hours worked can also affect the aggregate economy wage bill but the contributions are relatively low.

**Figure 5: Annual growth rate of compensation per employee (CPE)**

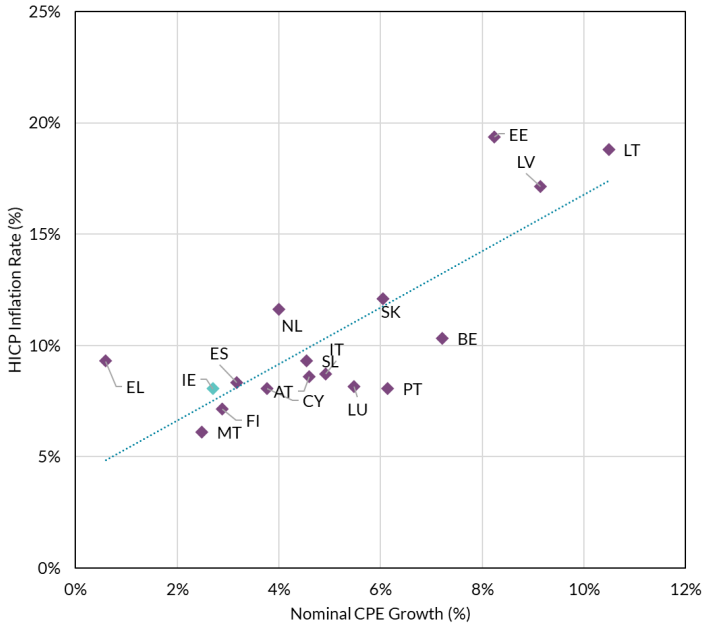



*Source:* CSO and authors' own calculations.
Note: Data are calculated as a four-quarter moving average.
Last observation: Q1 2023

Ireland is not unique in experiencing negative growth in real earnings of late. Similar trends have been observed in countries such as the US and UK. Across the euro area, analysis of CPE data shows that no country experienced positive real earnings growth in 2022, reflecting the impact of the negative terms of trade shock experienced by economies across the euro area. For both earnings growth and inflation, Ireland was positioned towards the lower end of the euro area in 2022, with the largest increases in CPE observed in economies with higher headline inflation (Figure 6).[9]

[9] Eurostat data for Q1 2023 shows a continuation of negative real CPE growth for 11 of the 17 euro area countries for which data are available. Real earnings growth in Figure 6 is calculated using HICP inflation rather than the Personal Consumption Deflator.

## Figure 6: Nominal CPE growth and HICP inflation (2022, average)

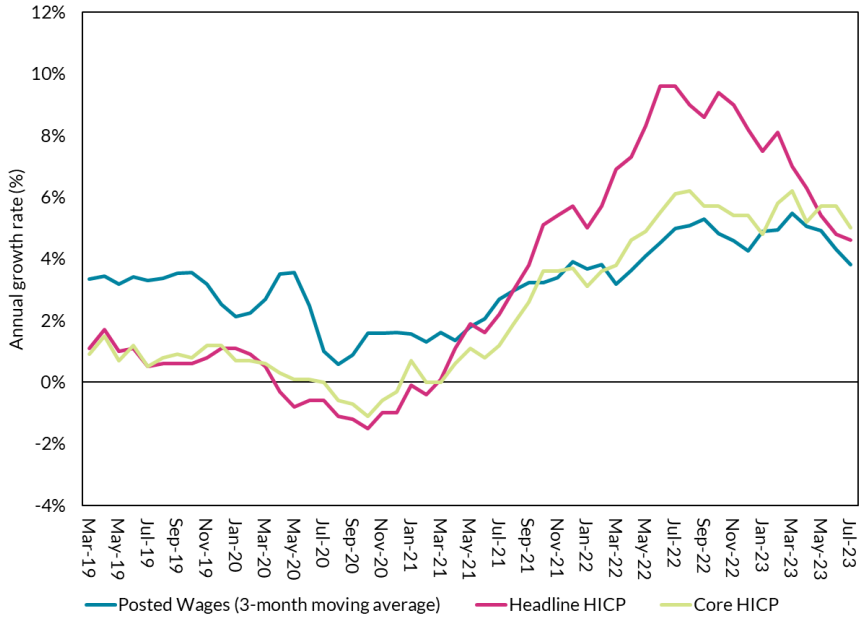



*Source:* Eurostat and authors' own calculations.
Note: Data reflects annual growth rates in HICP and nominal CPE respectively over the year to end 2022.

Looking ahead, posted wages as published by job advertisement website *Indeed*, can provide insight into the possible future path of earnings growth. Posted wages are a useful forward-looking indicator that can be used alongside traditional backward-looking earnings data to assess earnings dynamics.[10] Figure 7 shows that posted wages increased by 4.8 per cent in Q2 2023 compared to Q2 2022, with growth moderating further to 3.8 per cent for July 2023. The series had been moving in tandem with Core HICP since 2019 (as employment expanded and labour demand increased) and a slowdown in posted wages may suggest a moderation in labour demand against the backdrop of monetary policy tightening.

[10] Posted wages are a wage growth tracking series produced by Indeed to produce employment-weighted series for various euro area countries. See Adrjan and Lydon (2022) "Wage Growth in Europe: Evidence from Job Ads"

## Figure 7: Annual growth rate of Indeed.ie posted wages and inflation (March 2019 – July 2023)




*Source:* Indeed and CSO.

## Box A: Impact of Pandemic Wage Supports on Measured Earnings

The two main CSO data sources on earnings– National Accounts' Compensation of Employees (COE) and EHECS – sometimes provide different headline estimates of earnings developments, making it hard to decipher actual changes in earnings in the economy. In this *Box*, we summarise the distortionary issues impacting earnings data, with a particular focus on the issues for non-wage costs in EHECS, arising from the treatment of wage subsidy schemes during the pandemic.

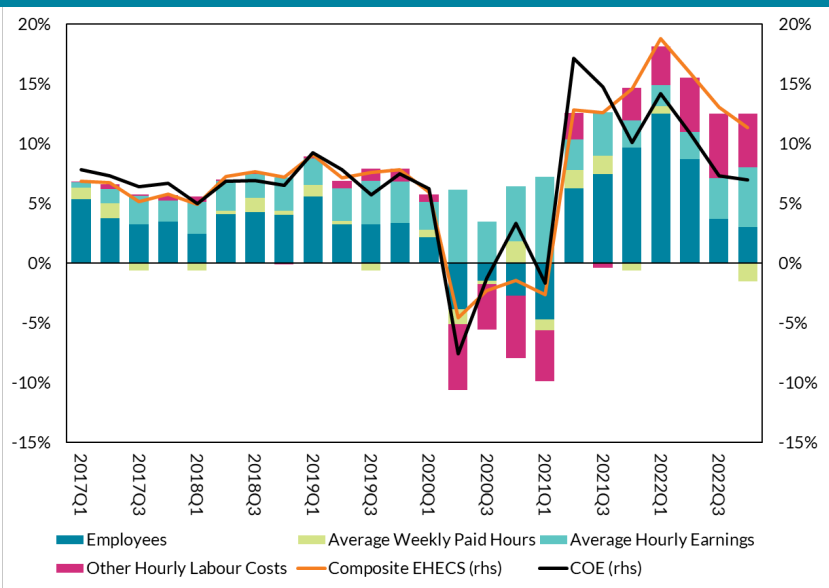
Changes in COE are driven by a combination of changes in the number of those at work, the average number of remunerated hours worked, and total labour costs which are then subdivided amongst hourly earnings levels and other hourly labour costs. Each of these variables are collected in the EHECS firm-level survey and allow for the construction of a composite quarterly EHECS series to match aggregate National Accounts data and monitor movements in the underlying components of the aggregate economy earnings bill (Figure 1).

Annual growth rates can be calculated from Q1 2009 onwards with both series showing a high degree of alignment in the pre-pandemic period. Slight differences emerge following the onset of the pandemic and the associated compositional issues arising from changes in the workforce. When comparing the annual growth rates of

the two series, COE increased by 11.4 per cent in 2022 compared to 14.9 per cent growth in the composite EHECS labour costs series.

Total labour costs – consisting of hourly earnings levels and other hourly labour costs have increased by 7.6 per cent annually in 2022.[11] However, this is not all earnings growth received by the employee. In fact, most of it reflects a return to the pre-pandemic trend, as various pandemic support schemes were phased out and accounting treatments of wage subsidies were subsequently normalised.

**Figure 1: Composite EHECS component growth**




*Source:* CSO; National Accounts, EHECS and authors' own calculations.

Note: Composite EHECS series is equal to total hourly labour costs times the number of hours worked and employment and is then scaled to each quarter.

The income-support schemes introduced during the pandemic were intended to assist firms and maintain worker income levels. They included the Temporary Wage Subsidy Scheme (TWSS) established in March 2020, and its replacement, the Employment Wage Subsidy Scheme (EWSS) from September 2020 onwards (Keenan and Lydon, 2020). In EHECS, both TWSS and EWSS payments were included in hourly earnings levels as this income is administered directly from employers through the firm payroll system. However, the amounts received by firms under these schemes are also included within 'other hourly labour costs'. Specifically, these are treated as 'subsidies and refunds', intended to offset part or all of the cost of wages and salaries. Other more typical examples of 'subsidies and refunds' would be Government payments associated with sick leave or maternity/paternity breaks.

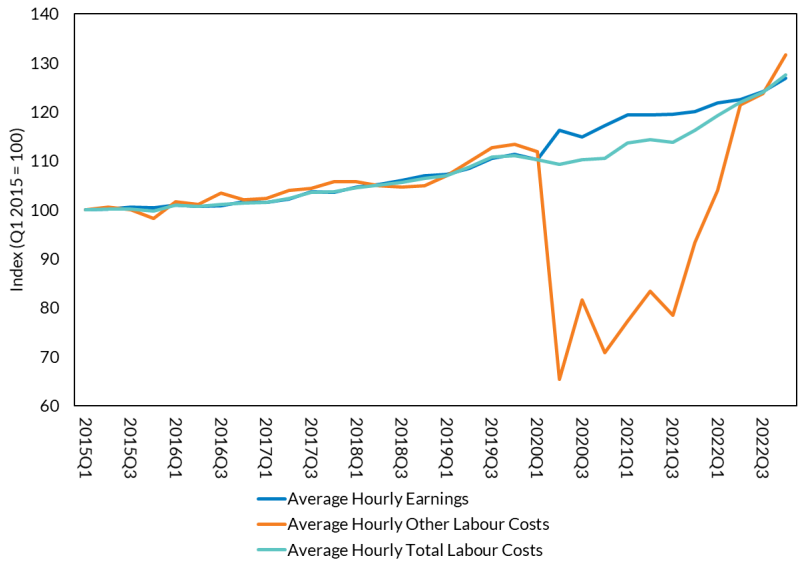
On a net basis, 'subsidies and refunds' are usually a small deduction for firms that has relatively little effect on the overall other hourly labour costs averaged over the

[11] In 2022, hourly earnings rose by an average of 3.2 per cent, while other hourly labour costs rose by 4.4 per cent.

entire firm or sector. However, such was the take-up of wage subsidy schemes during the pandemic that it resulted in large negative values for certain sectors. For example, prior to the pandemic, a firm paid the wage of a worker on sick leave, maternity leave or working as part of the SOLAS scheme before then availing of the relevant subsidy from the government. The subsidy is then recorded as a refund when completing the quarterly EHECS form. The TWSS/EWSS payments were treated in the same way. However, the scale of EWSS take-up in severely-affected sectors meant that when these refunded payments were deducted from 'other labour costs' it resulted in substantially lower total labour costs values or even negative values in the most adversely-affected sectors.[12]

Therefore, the large increase in 'other labour costs' recorded in early 2022, as shown in Figure 2, reflects the return to the pre-pandemic trend of the non-wage element following the closure of the EWSS. 'Other labour costs' increased by 45 per cent annually in Q2 2022, compared to a relatively modest increase in average hourly earnings of 2.6 per cent. These developments are particularly notable at the sectoral level as Accommodation and Food services, a sector acutely affected by the pandemic restrictions through both declining employment levels and take-up of income support schemes, experienced an almost 100 per cent annual increase in total labour costs in Q2 2022 following the phasing out of the EWSS scheme.

**Figure 2: Indexation of Total Labour Costs**




*Source:* CSO; EHECS.

[12] The TWSS/EWSS scheme directly supported 29.9 per cent of all employments active in October 2020, going as high as 81.9 per cent in the Accommodation and Food sector. See CSO EAADS 2021.

## 3. Current labour supply and demand

One of the most important determinants of earnings developments is the level of spare capacity – or slack – available in the labour market, which is indicative of the reserve supply of labour. Traditionally, this is measured using the ILO unemployment rate (as illustrated by the earnings Phillips curve in Figure 1). However, this measure may not accurately reflect the large flows of workers from inactivity to employment as part of the pandemic recovery and the ILO methodological treatment of persons on pandemic support schemes.[13]

To better capture the effect of flows into and out of the labour force, we include the Potential Additional Labour Force (PALF) as an alternative measure of slack. This group encompasses the inactive population who have a relatively strong labour force attachment (which can be identified for example, by whether an individual has previous work experience or not). This is relevant when thinking about slack as many workers bypass unemployment status by going directly to/from inactivity. Data from the Labour Force Survey (LFS) shows that transition rates are higher for those who have previously worked than for other inactive groups.[14] We identify persons with previous work experience as they may have relatively greater human capital or face lesser barriers to employment re-entry than those with no previous work experience and thereby, have relatively more impact on the wage bargaining process.

Deploying alternative measures of labour market slack in Phillips curve analysis is becoming more widespread in the literature (for example Byrne and Zekaite (2018) and Byrne and Zakipour-Saber (2020)). To that end, using LFS microdata, we generate an "augmented slack rate" which is defined as follows:

$$Augmented\ Slack\ Rate = \frac{U* + PALF*}{U* + PALF* + Employed}$$

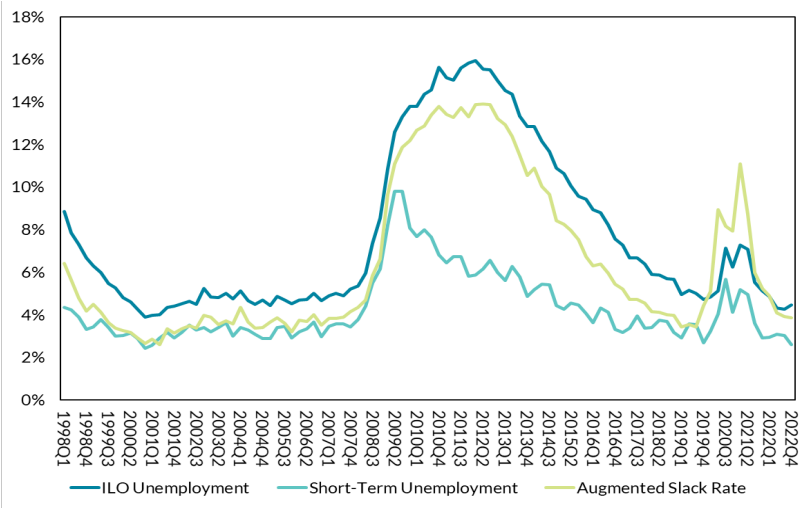
[13] See Byrne and Keenan (2020) for further details.
[14] The average transition rate to employment for PALF with previous work experience (13.9 per cent) is similar to the unemployment-employment transition rate (16.9 per cent), while for those in PALF without previous work experience, it is closer to the inactive-employment transition rate (3.9 per cent).

where $U^*$ and $PALF^*$ are the number of unemployed and PALF persons with previous work experience respectively. $Employed$ is the number of individuals classed in ILO employment at the aggregate level.[15]

A further measure of slack is the short-term unemployment rate. This reflects those unemployed for less than 12 months, distinguishing this cohort from those whose duration of unemployment exceeds one year. This is a useful measure as it has been well established in the economic literature that there is a negative relationship between the duration of unemployment and prospects for re-employment e.g. McGregor (1978). Furthermore, Ball and Mazumder (2015) surmise in a similar earnings Phillips curve analysis that increases in short-term unemployment can place greater downward pressure on earnings than long-term unemployment, as the latter group has a weaker attachment to the labour force. Similarly, Bermingham et al. (2012) use the trend in the short-term unemployment rate as their preferred measure of slack in their Phillips curve analysis for Ireland.

Figure 8 plots the three labour slack measures. Short-term unemployment, as a sub-component of the ILO unemployment rate, has the lowest level of the three measures and a less steep decline between the end of the GFC and the start of the pandemic. The most recent data for Q1 2023 shows it to be only 0.2pp above its historical low point.

**Figure 8: Unemployment, short-term unemployment and augmented slack rates (Q1 1998 – Q4 2022)**




*Source:* CSO and authors' own calculations.

[15] LFS microdata contains previous employment and sector data for two thirds of PALF respondents. We can match data for persons back to individual NACE sectors to calculate slack subject to CSO conditions on data size classifications.

Our augmented slack rate tracks both unemployment measures well. It was close to the short-term unemployment measure up to 2008 and equalled it in Q3 2019 before rising during the pandemic, where it exceeded the ILO measure, indicating more slack in the labour market than suggested by the traditional unemployment measure.[16] In more recent quarters, slack (like short-term unemployment) is falling whereas the ILO unemployment rate remains relatively flat. Based on the advantages of using a broader measure of capacity in the labour market that considers individuals close to the labour market but not formally counted as unemployed, the Phillips curve estimation in Section 5 uses the augmented slack rate.

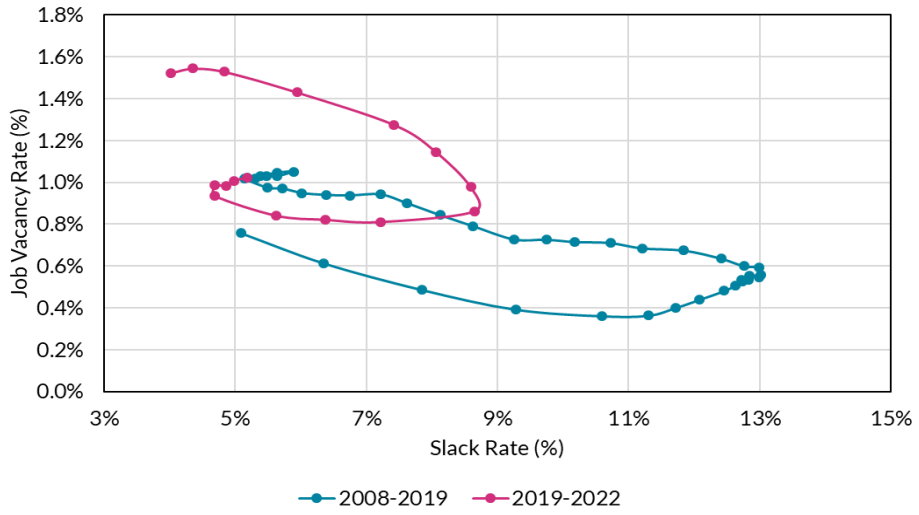
On the labour demand side, the tightness of Ireland's labour market is traditionally illustrated using job vacancy data. As of Q2 2023, the job vacancy rate for the total economy remains above its long-term average at 1.3 per cent. The relationship between slack and vacancies can be illustrated visually using the Beveridge curve, whereby the steeper the curve, the tighter the labour market conditions. Figure 9 plots two versions.

The first presents the aggregate data across two different time periods and shows that current market conditions are much tighter than in the previous 2008-2019 period, as characterised by lower slack and higher vacancy rates. The second plot presents a sectoral view and shows that while at an economy-wide level there is evidence of labour market tightness, non-consumer facing sectors appear to be experiencing tighter labour market conditions than the consumer facing sectors.

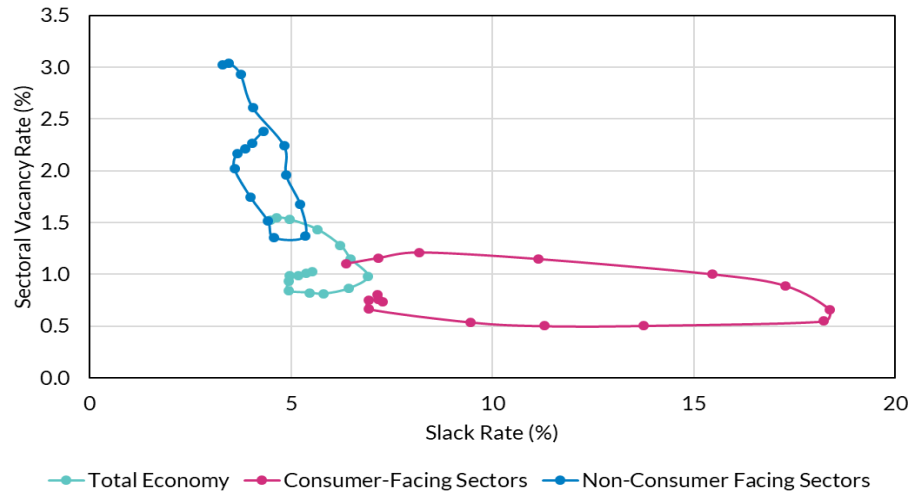
[16] Byrne and Keenan (2020) identify the methodological difficulties of interpreting the unemployment rate or other slack measure during the pandemic period. As these difficulties are present across many slack measures and impact the long-run relationship with explanatory variables, we exclude the pandemic period from the Phillips Curve analysis.

## Figure 9: Beveridge curves

**a. Aggregate (Q4 2008 – Q4 2022)**




**b. By sector (Q1 2019 – Q4 2022) ***




*Source:* CSO and authors' own calculations.
Note: Data are calculated on a four-quarter moving average. Consumer facing services include Retail & Wholesale Trade, Accommodation, Admin Support, Transport and Other. Non-consumer facing services include ICT, Finance and Professional. Data for slack are calculated using LFS microdata with Q4 2022 being the most recently available period.
* In order to create a sectoral slack measure, persons must be in either unemployment or PALF and have previous work experience within a specified NACE sector.

Labour market tightness influences earnings growth through its impact on the ability to fill vacancies and workers' bargaining power. As new workers are hired, the pool of available labour shrinks, leading to more tightness. This creates conditions for earnings increases (which are more pressing the tighter the labour market becomes), as firms compete to hire workers while at the same time they may need to increase earnings to retain their existing workforce.

These dynamics can be seen in Table 1 which shows that sectors with positive real earnings growth display higher job vacancy rates. In contrast, vacancy rates are lowest for the consumer-facing and construction sectors. These sectors also have relatively high slack rates, indicating a larger potential labour supply that may lessen pressure on earnings demands. Hence, slack is negatively related to earnings growth and understanding its potential path is critical for the outlook of earnings.[17] Since Q4 2019, the share of job switchers has grown in the non-consumer facing and public sectors at the expense of the consumer-facing sector with the overall level of switchers remaining relatively unchanged. This alteration in worker flows may reflect the change in real earnings over this period.[18]

**Table 1: Real earnings growth, slack rate, vacancy rates and job switching by sector (average, %)**

| | Real earnings growth | Augmented slack rate | Vacancy rate | New hires as % of total job switchers |
|---|---|---|---|---|
| Sector | Q4 2019-Q4 2022 | Q4 2022 | Q4 2022 | Q4 2022 *(Change from Q4 2019)* |
| Consumer-facing | -3.0 | 5.6 | 0.8 | 32.8 *(-15.2)* |
| Construction | -2.7 | 3.9 | 0.9 | 6.0 *(-0.3)* |
| Industry | -1.3 | 2.6 | 1.1 | 9.9 *(2.1)* |
| Non-consumer facing | 1.5 | 3.4 | 2.6 | 26.5 *(9.3)* |
| Public | 3.6 | 3.0 | 1.4 | 24.7 *(3.8)* |
| Total | 1.7 | 3.9* | 1.3 | |

*Source:* CSO and authors' own calculations.
Note: Agriculture excluded from analysis. Augmented slack rate calculated by authors using earlier formula in Section 3. Real earnings growth in the table is derived from EHECS data. Q4 2022 is compared to Q4 2019 as it eliminates the distorting compositional issues associated with the pandemic period.
* Likely represents a lower bound as previous sector of employment unknown for some individuals.
^Job switchers are defined as persons moving from one employment to another within a given quarter.

## 4. Other earnings determinants

Aside from the simple earnings-slack relationship, there are other factors that affect the development of earnings. In this section, we outline the most important additional factors for Ireland, which should be captured in an earnings Phillips curve framework to reflect the specific characteristics of the Irish labour market. Those are:

1. **Inflation expectations.** Workers form expectations of how prices might grow in the future and in turn, incorporate this into their earnings demands. Annual inflation, as measured by the Harmonised

[17] Real earnings growth in the public sector is also a reflection of the payment of lump sum salary arrears and negotiated increases as part of the public sector pay deal.
[18] The job switching rate at Q4 2022 measured 7.8% of total employment, up marginally from 7.4 per cent in Q4 2019 and above the long-run average of 6.8 per cent.

Index of Consumer Prices (HICP), averaged 8.1 per cent in 2022. While this rate has moderated to 5.8 per cent in July 2023, it still represents rates not seen since the 2000s. Under such circumstances, workers may demand higher earnings to compensate for their loss of purchasing power and any future expected losses. A positive relationship therefore exists between inflation expectations and earnings growth.

To better understand consumer expectations, the Central Bank of Ireland Expectations Survey (CBIES) was launched in February 2023. Keenan and Zekaite (2023) recently summarised the data collected over February and May 2023, which showed that workers, on average, expect inflation to be 6.1 per cent for the 12 months from May 2023 to May 2024. This figure exceeds workers' expectations for nominal earnings growth, suggesting that Irish workers expect a real earnings decline over the next 12 months. Despite this, the survey also found that 46 per cent of respondents stated that they are "not currently planning to take any action" to seek higher earnings. While expectations data are not error free, the results do not indicate widespread earnings demands in line with or in excess of current inflation.

2. **Productivity.** How effective workers are at adding value is another important determinant that is positively related to earnings growth. Since the 1970s, the economic importance of foreign direct investment (FDI) and multi-national enterprises (MNEs) have grown in Ireland (Osborne-Kinch, Mehigan & Woods, 2020). There is a large presence of MNEs in the more productive traded sectors of the Irish economy such as high tech manufacturing and ICT services. These are sectors that are currently experiencing higher earnings growth (Table 1).

   While GDP per worker is typically used as the preferred productivity metric in wider literature, the unsuitability of GDP as a measure of both the size of the Irish economy and its rate of growth has been well documented for over 20 years (Byrne et al, 2021). This requires selecting a productivity series that removes the distortionary effects of MNE activity and better reflects developments in the domestically-oriented part of the economy. O'Brien (2023) identifies that productivity growth in the non-MNE domestic sectors averaged 1.6 per cent per annum from 2001 to 2022 This analysis uses

domestic Gross Value Added (GVA) that is GVA within the non-MNE domestic sectors, as the preferred measure of output.[19] This series is then adjusted on a total hours worked basis to calculate a measure of productivity growth.

3. **Effective exchange rates.** Exchange rate movements are a third factor to consider given their impact on the price of traded goods. Here, two channels are possible for how currency movements could impact prices and in turn, earnings.

   The first channel relates to the impact on the domestic prices of goods and services that Irish workers consume. All else constant, an appreciation in the euro would result in a lower effective price for imports (meaning one euro could buy more of a good or service valued in another currency). This implies reduced inflation and therefore, dampened wage demands. This channel is supported by evidence, such as Reddan and Rice (2017), who find the pass-through associated with a simulated positive, exogenous shock to the nominal effective exchange rate is large and fast for import prices.

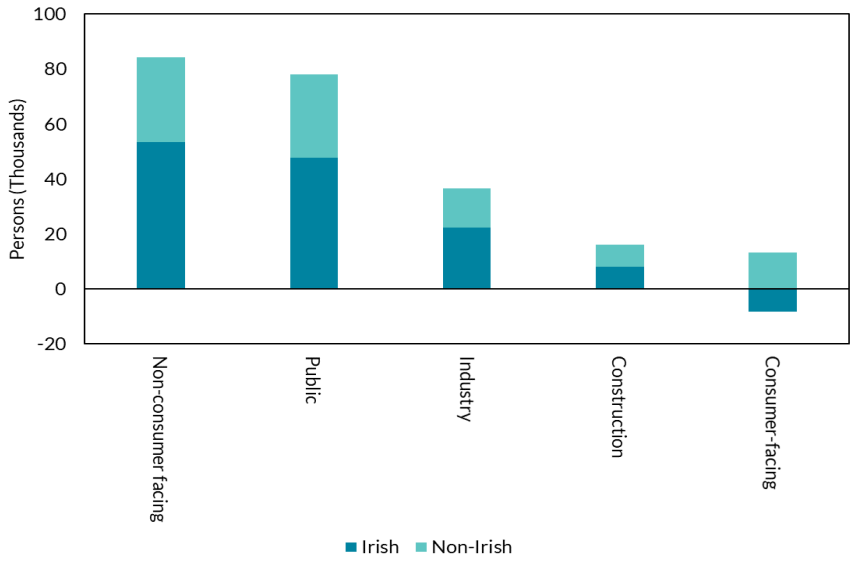
   The second channel relates to the impact on the export prices of goods and services that Irish workers produce. All else constant, an appreciation in the euro would make Irish exports more expensive, leading to a decline in trade competitiveness. As a result, wage growth could be restricted in exporting sectors if exporting firms are not willing to absorb the total revenue cost arising through lower profitability or increased productivity. Empirical studies to date, including the previous earnings Phillips curve analysis by Linehan et al., (2017) find a negative relationship between exchange rate movements and earnings, explaining this in the context of the second channel which they refer to as 'margin pressures'.

   Aside from exchange rate movements, it is worth noting that as a small open economy, Ireland is also susceptible to importing inflation directly, particularly through higher energy prices (Byrne and Zakipour-Saber (2020). This is relevant for our analysis as a significant driver of the inflation surge in 2022 was energy prices, which are largely priced in dollars, a currency which experienced appreciation against the euro throughout much of 2022.

[19] The Foreign-MNE dominated sectors include NACE 2 digit activities such as *Software and communications activities* and *Chemicals and chemical products*. See CSO for further details.

4. **Migration trends.** Historically, inward migration has been correlated with employment growth and is expected to remain a key source of future growth in the work force (Byrne and McIndoe-Calder, 2019). Annual population and migration estimates indicate that net inward immigration in the year to April 2022 increased to its highest level since 2008, at over 61,000 persons; of which, 46,000 were from non-EU and non-UK countries.[20] In the same year, the majority of annual labour force growth (80 per cent) was due to the demographic effect of non-Irish nationals joining the workforce.

**Figure 10: Net employment gain by nationality (Q4 2019 – Q4 2022)**




*Source:* LFS microdata and authors' own calculations.

Figure 10 shows that public and non-consumer facing sectors (where earnings growth between Q4 2019 and Q4 2022 has been comparatively higher) also experienced higher employment growth in foreign workers over the same period. Therefore, migration flows are an important determinant of potential additional labour supply, which can alleviate labour market tightness and in turn, the domestic pressure for earnings increases. As a result, it is expected that a negative relationship exists between migration flows and earnings growth.[21] For our Phillips curve estimation in Section 5, we use LFS

[20] See Conefrey and Keenan (2022) "Population Change and Migration in Ireland – Recent Evidence" Central Bank of Ireland Quarterly Bulletin. Box E, QB4 2022.
[21] Byrne and McIndoe-Calder (2019) find that due to the increasing skills and education level of the workforce, attracting migrants may occur at higher wage differentials going

microdata to calculate the number of recent migrants (resident less than 12 months) that are in employment as a share of total employment.[22]

## 5. Earnings Phillips curve estimation

To estimate the determinants of earnings growth in Ireland more formally, we draw on the earnings Phillips curve framework and follow an approach similar to previous work by Linehan et al. (2017) which covered 2000-2017.

We estimate the following model using quarterly data on a sample covering Q1 2000 to Q4 2019 to assess predicted earnings growth prior to the onset of the pandemic. We exclude data for the period Q1 2020 – Q4 2022 from our estimation given the distortions to measured earnings growth during the pandemic, as discussed in Box A.

(1) $$inflation\ exp_{t-1} = \alpha_0 + \alpha_1 * \frac{\pi_t + \pi_{t-1} + \pi_{t-2} + \pi_{t-3}}{4} + \theta_t$$

(2) $$\Delta CPE_t = \beta_0 + \beta_1 inflation\ exp_{t-1} - \beta_2 slack_{t-1}$$
$$-\beta_3 \Delta\ migration_{t-1} - \beta_4 \Delta neer_{t-1} + \beta_5 \Delta prod_{t-1} + \epsilon_t$$

Inflation expectations are proxied by the moving average of the observed personal consumption deflator (PCD) in the previous four quarters (equation (1)). In our main model, indicated in equation (2), we apply an instrumental variable regression whereby the inflation rate is treated as an endogenous variable in relation to nominal earnings growth, as denoted by equation (1), and instrumented using the lag of inflation. Using a lag allows us to account for the delay that exists between expectations and wage demands, while inflation expectations have a strong relationship with lagged inflation (Ehrmann, 2021).[23]

The dependent variable ($\Delta CPE$) in equation (2) is the year-on-year change in log nominal CPE from the National Accounts. Inflation expectations are

forward than seen in the 2004-2007 period, implying that the wage dampening effect of net inward migration may be subdued when compared to the pre-GFC period.

[22] We consider only recent migrants in employment as we want to observe the effect of persons that impact the aggregate wage-bargaining process through the provision of labour. LFS data shows that the employment rate for non-Irish persons aged 15-64 years is higher than Irish persons (Q4 2022 data showed 76.6 per cent compared to 72.4 per cent).

[23] The use of lagged inflation to proxy inflation expectations is supported by research such as Leddin (2010) who found that there is an important "retrospective element" to the wage determination process.

proxied using the first lag of the PCD deflator($inflation\ exp_{t-1}$).[24] While, for labour market slack, we use the newly developed slack rate from Section 3, which includes both persons in unemployment and PALF with previous work experience ($u_t$). Alternative models were tested using the ILO unemployment rate and the short-term unemployment rate, but the slack rate was found to be the most accurate labour measure in predicting CPE growth.

The model also incorporates the annual change in the share of recent migrants in total employment ($\Delta\ migration_{t-1}$), log difference of the nominal effective exchange rate ($\Delta neer_{t-1}$) which reflects the Irish trade-weighted exchange rate for the 12 largest trading partners, and log difference of domestic GVA per total hours worked ($\Delta prod_{t-1}$).[25] These variables are included in first difference to ensure their stationarity and lagged to account for delays in the pass-through of these variables to earnings growth given that earnings, particularly the wage component, is typically fixed in the short-term.[26]

The coefficients associated with the earnings Phillips curve are presented in Table 2. All of the variables are statistically significant at the 95 per cent confidence level and show the expected signs. Inflation expectations and productivity (as measured by change in domestic GVA per hour worked) are positively related to earnings growth. In contrast, the level of labour slack, change in nominal effective exchange rate and the change in recent migrants in employment are negatively related.

Key differences are noted between our estimation and the previous earnings Phillips curve analysis by Linehan et al. (2017). Unlike the earlier work, we do not find significant non-linear effects for our slack rate. In addition, our coefficient for inflation expectations implies a pass-through of around 40 per cent from price growth to earnings growth, which is less than the earlier estimate for this variable. These differences emphasise the importance of refreshing the analysis on a regular basis to account for developments in Ireland's labour market and economy over time.

[24] We obtain first stage results to measure the relevance of the instrumental variable. The results indicate useful predictive power for inflation with an R-squared of 0.93 and the F-stat (208.3) far exceeds the 2SLS critical value of 16.4.
[25] Recent migrants are identified in the LFS as persons who are resident in Ireland for less than one year.
[26] Data were smoothed to reduce volatility. Unit root tests and residual plots were used confirm that all variables are stationary.

### Table 2: Coefficients from earnings Phillips curve estimation of annual earnings growth

| | Q1 2000 – Q4 2019 |
|---|---|
| Inflation expectations | 0.388*** |
| Slack | -0.519*** |
| Change in nominal effective exchange rate | -0.050** |
| Change in share of recent migrants | -0.814*** |
| Change in domestic GVA per hour worked | 0.118** |
| Constant | 5.648 |
| R-squared | 0.851 |

*Source:* Authors' own calculations.
Note: Results based on a pooled IV regression of quarterly data. OLS standard errors are used. The dependent variable is the year-on-year change in log of nominal CPE. Inflation expectations are instrumented using the first lag of the personal consumption deflator.

Figure 11 plots the fitted values for CPE growth alongside the actual growth. Considering the plot for the period of our estimation sample (Q1 2000-Q4 2019), the Phillips curve performs reasonably well in estimating earnings growth, particularly between 2013 and 2018, which coincides with a period of recovery after the GFC and a relatively stable composition of employment.

The estimated earnings growth series captures turning points in the realised data well. However, it fails to fully capture some peaks and troughs related to changes in the composition of employment around the time of the GFC. The predicted values also diverge from the actual series from Q1 2019, where slightly higher earnings growth values are estimated by the model compared to the realised outturn. The gap between predicted and actual CPE growth in Q4 2019 was 1.1 percentage points.

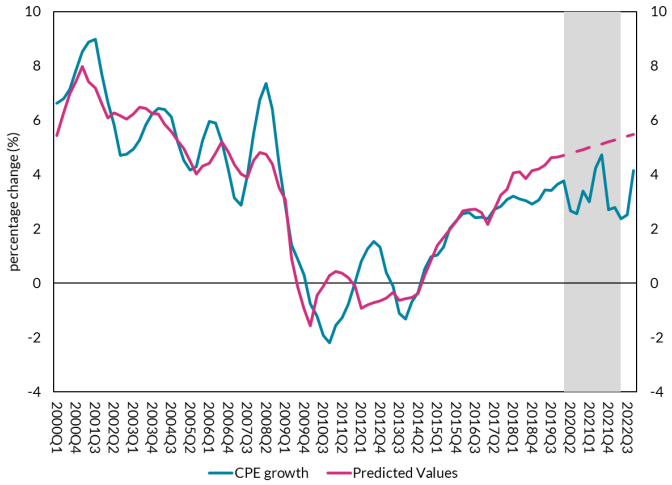
Looking ahead to the most recent period, Figure 11b shows the predicted values of our model to Q4 2022. Data from Q3 and Q4 2022, when the income-support schemes were fully phased out, are incorporated in this extension. Pink dotted lines over the 2020Q1 and 2022Q2 period represent the trend implied by the predicted values of the estimated model between Q4 2019 and Q3 2022.[27] The plot shows that the estimated earnings gap has widened slightly to 1.3 percentage points in Q4 2022. Altogether, these results imply that post-pandemic earnings growth has been slightly lower than predicted by the model based on observed macroeconomic conditions.

[27] Using a smoothed trend allows us to abstract from the challenges associated with fitting an earnings Phillips curve during the pandemic period.

## Figure 11: Phillips curve predictions

**a. Phillips curve estimations (Q1 2000 –Q4 2019)**


**b. Phillips curve estimations (Q1 2000 – Q4 2022)**



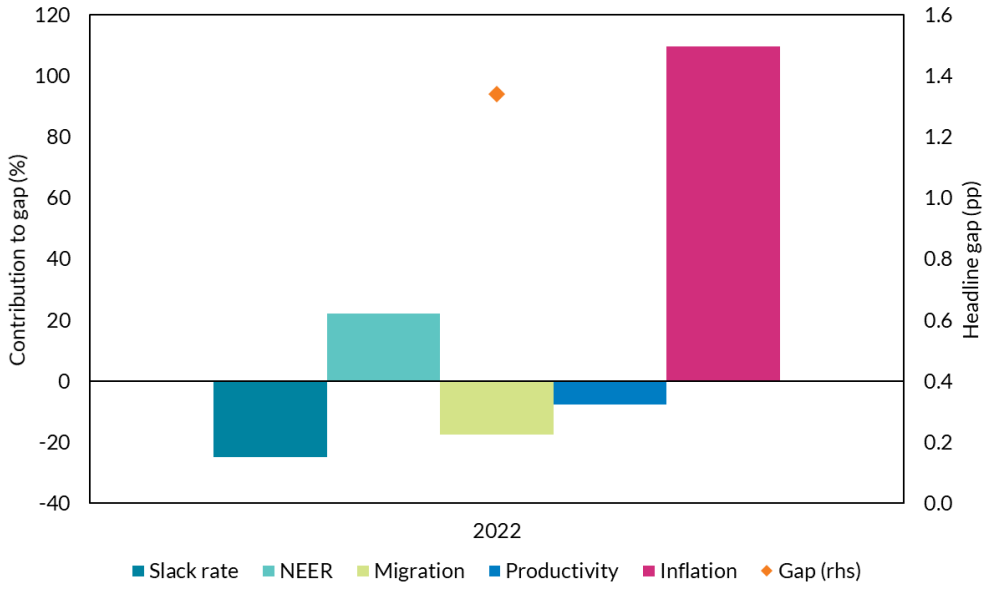

*Source:* CSO and authors' own calculations.
Note: Grey shaded area represents pandemic period of Q1 2020 – Q2 2022.

In an effort to understand the drivers of this gap, we decompose the difference between actual and estimated earnings growth. The decomposition is implemented as follows. Working sequentially, we allow all the explanatory variables to vary except one, which we hold constant at its Q3 2017 levels, and calculate proxy fitted values for 2022 using our Phillips curve model.[28] We then measure the difference between the proxy fitted values and actual earnings growth. This difference provides the contribution of developments in the explanatory variable that is held constant to the gap between actual and estimated earnings growth. We repeat this exercise until

[28] 2017Q3 represents the smallest gap between the estimated Phillips curve and observed earnings growth data.

we have a difference (or "contribution") calculated for each explanatory variable. These differences are shown in Figure 12. The contributions are shown relative to the headline gap, i.e. the bars represent the share of the gap accounted for by each explanatory variable using 2017 as a base year for comparative purposes. The decomposition analysis allows for explanatory variables to contribute non-additively to the headline gap (so the contributions do not sum to 100).

**Figure 12: Decomposition of Gap between Actual and Estimated Earnings Growth**




*Source:* Authors' own calculations.
Note: The decomposition is implemented as follows. We sequentially hold the explanatory variables constant at their Q3 2017 levels and calculate proxy fitted values. We then compare the contribution of developments in each of the explanatory variables to the overall gap between actual and estimated earnings.

The overall gap (indicated by the orange dot) between actual and estimated earnings growth is positive and increased between 2017 and 2022. However, there is heterogeneity in the role of individual explanatory variable developments over this period in the headline gap. For example, in 2022 if productivity growth had been similar to 2017, the gap between actual and estimated earnings growth would have been smaller than is the case when using observed changes in productivity in 2022. This means that developments in productivity between 2017 and 2022 have exerted upward pressure on the estimate of earnings. The scale of this upward pressure, in terms of the headline gap, amounts to around 22 per cent.

Looking at 2022, developments in slack, the exchange rate, migration and productivity, over the 2017-2022 period, contribute between -10 per cent and 24 per cent to the headline gap. But, it is inflation developments over

the period that explain the vast majority of the difference between estimated and observed wage growth in 2022. This is consistent with the high inflation in 2022 being largely unexpected by wage earners. This implies that it may take longer for the pass through of higher consumer prices to earnings growth than had the inflation surge been expected.

That the contribution of the other explanatory variables to the gap is relatively muted provides confidence that the Phillips curve remains a useful tool for analysing earnings growth, including for forecasting. Assessing the evolution of the gap over the near term may suggest a clear structural break in the earnings Phillips curve in Ireland, however assessment to date does not provide strong evidence for this to be driving a large portion of the gap between actual and estimated earnings growth. We do not however, rule out the possibility that structural changes may be driving at least some of the gap and trace some of these potential channels below.

**Explaining the gap**

The economics literature and the nature of the Irish economy suggest several possible explanations for the gap between the Phillips curve estimation of earnings and actual earnings growth since 2019. Those are:

1. **Natural lag in wage adjustment process.** Wages, a key component of earnings, are not fully flexible in the Irish labour market. Some firms may operate a cycle which only allows salary negotiations and promotions at certain times of the year. The public sector is characterised by strict pay scales which are modified only after pay settlements are agreed, and the minimum wage (set by public policy) is only updated on an infrequent basis. These rigidities mean there is a natural lag in nominal wages adjusting to prices. Given the inflation surge in 2022 was large and unexpected, the gap is most likely driven by delayed adjustment of wages, as firms and workers wait to see if inflation turns out to be persistent and if so, the degree of that persistence. This explanation is supported by the results of the earlier decomposition exercise (presented in Figure 12) showing that inflation was the main contributor to the earnings gap in 2022.

   Positive real wage growth (and in turn positive real earnings growth) is, however, likely to materialise in the medium term given the overall tightness of the labour market. Ireland has previously experienced

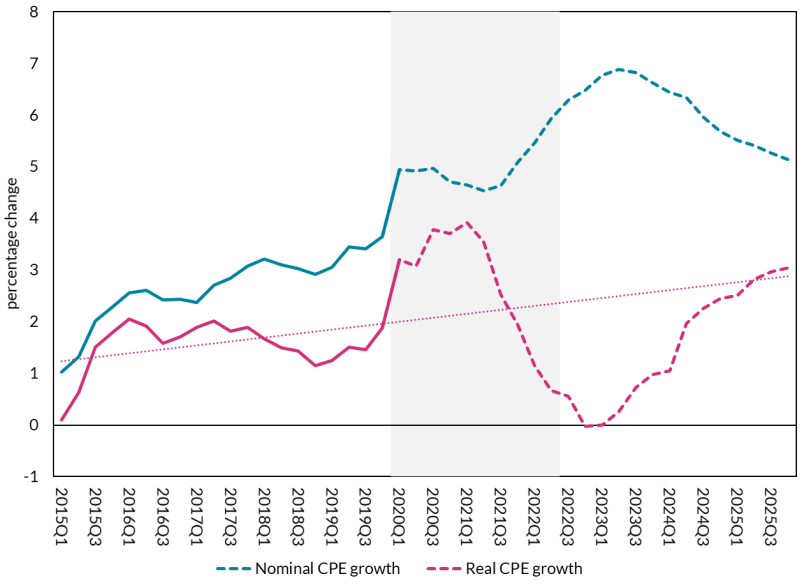
real wage catch-up following economic downturns.[29] The speed at which aggregate wages adjust depends on a number of factors such as the persistence of inflation, sector-level wage negotiations and productivity, and household saving buffers among others. The projected inflation profile in the *Quarterly Bulletin* points to core inflation gradually easing over the medium-term horizon and monetary policy actions taken, together with continued effective communication from the ECB in relation to monetary policy strategy to curb inflation growth over this period, should help in anchoring inflation expectations.

How people perceive past outcomes is also important to the wage process (Leddin, 2010) and could be further delaying the adjustment of wages. For instance, workers and firms may be planning to use the public sector pay agreements to benchmark their own future wage negotiations, which take time to complete. ECB analysis points to public wages in the euro area expected to grow at rates that are cumulatively higher than inflation over the projection horizon. However, stronger rates tend to appear in countries with higher inflation in 2022 reflecting backwards-looking compensation.[30] In addition, it is unclear at this stage the extent to which workers will expect future earnings growth to match price growth as opposed to a future earnings level which corresponds to the new price level.

To assess potential earnings developments over the medium-term horizon, we estimate an out-of-sample forecast for CPE using the model coefficients from Table 2 and holding all explanatory variables constant at Q4 2019 values with the exception of inflation, which we allow to follow the projection path out to Q4 2025, as outlined in the *Quarterly Bulletin* forecasts. We allow only inflation to change over time, as it is shown to be the primary driver of the earnings gap in 2022. The results are presented in Figure 13.

[29] For example, during the early 1990s under the Programme for Economic and Social Progress (PESP).
[30] Checherita-Westphal and Vlad (2023) "Inflation and the response of public wages in the euro area" ECB Economic Bulletin, Issue 5/2023.

## Figure 13: Scenario forecast of nominal and real earnings growth




*Source:* CSO and authors' own calculations.
Note: Grey shaded area represents pandemic period of Q1 2020 – Q2 2022. The linear trend line is estimated on real annual CPE growth from Q1 2015 to Q4 2019 and projected forward.
These estimates are calculated under a specific scenario whereby inflation follows a gradually moderating path out to Q4 2025. Changes to the slack rate and other explanatory variables that are held constant at Q4 2019 values. The predicted values shown in the chart may differ from CPE estimates in the central forecast as shown in the main Quarterly Bulletin.

The estimated path, as shown by the dotted lines, suggests that nominal CPE would increase by an average 6.7 per cent in 2023 under these specifications before then gradually slowing in 2024 and 2025, respectively. In real terms, CPE growth would slowly return to its pre-pandemic trend by the end of 2025 thereby compensating workers for increases in the price level. Survey evidence collected from the CBIES suggests that the majority of respondents seem to expect earnings to catch-up with inflation developments over the medium term (Keenan and Zekaite, 2023).

2. **Structural changes in the labour market.** While our results suggest a cyclical explanation is most likely behind the current gap, it could also partly reflect some structural change in the labour market. For instance, the rise of remote working following the pandemic could be revealing a change in workers' preferences around labour contracts. Workers may be accepting lower earnings growth in exchange for the ability to work flexibly or remotely.

   Looking at data from 34 countries, Aksoy, Barrero, Bloom, Davis, Dolls & Zarate (2022) find around a third of full-time employees either work from home entirely or on a hybrid basis. The authors find

employees, on average, value the option to work from home between 40 per cent and 60 per cent of their time at around 5 per cent of pay. We also find early tentative evidence, from the LFS microdata, that working from home may have lessened wage pressures, though further, detailed research is needed to confirm this result.[31]

Another structural factor to consider is the impact of the change in workforce composition. This was highlighted earlier in Section 2, but may not be fully captured in our model. In addition, the augmented slack measure in our Phillips curve estimation is intended to reflect spare capacity in the form of number of potential workers. However, it does not consider capacity through the lens of hours worked. While LFS data for Q2 2023 shows employment is 12.1 per cent higher than its pre-pandemic level, growth in total actual hours worked has not yet resumed its long-term trend. Average hours per worker are 3.2 per cent below pre-pandemic levels, while the part-time composition of employment has remained broadly similar to its Q4 2019 share.

It is therefore possible that there is more labour slack available than captured currently in the model, if average hours worked were to converge towards previous levels. ECB analysis at the euro area level finds, however, that the public sector accounted for a sizeable share of growth in employment since the pandemic (similar to Ireland) with typically lower average hours worked contributing to declines at the aggregate level.[32] Other possible explanations suggest an element of labour hoarding despite the differences amongst job retention schemes across various countries. However, this may become less attractive to firms faced with rising labour and financial costs, leading to a normalisation of average hours worked.

Related to this is net migration. While our model captures the change in the share of recent migrants in employment, it does not capture the future potential flows, which could add further potential labour supply and in turn, help contain wage pressures.

New labour market entrants typically have lower wage bargaining power due to the time involved in building up skills, experience and confidence to change jobs, which are all factors associated with

[31] We run a regression using microdata from the LFS where the dependent variable is gross pay and find the coefficient for 'whether an individual worked from home' is positive in 2019, but turns negative in 2022.
[32] See Arce et al (2023) "More jobs but fewer working hours" ECB Blog, 7th June 2023.

increasing wages (and in turn, earnings). LFS microdata shows that the share of workers with less than 12 months experience in their current role averaged 7.7 per cent in 2022, compared to 6.8 per cent before the pandemic.

The labour force participation rate has increased by 3.1 pp since the pandemic to 65.7 per cent in Q2 2023. Boyd et al (2022) present evidence that the participation expansion supporting the employment recovery relates to youth and women over 35 years. In particular, the higher levels of female participation could be sustained given demographic changes in recent decades such as educational attainment that has seen greater labour force attachment amongst this cohort. While sensitive to the economic cycle, these gains can provide a boost to overall labour supply and support economic growth.

3. **Non-wage sources of compensation.** The pandemic and subsequent high inflation period were accompanied by substantial fiscal supports for firms and households alike. SILC data shows that households received, on average, €2,059 in Covid-19 income supports in 2020 and €1,677 in 2021. These amounts correspond to 7.2 per cent and 5.6 per cent of nominal net equivalised household disposable income respectively. However, it was as high as 12.4 per cent for some households.[33]

   Subsequently, over 2022-23, the Government provided €5.3bn of financial support to households and firms to address cost of living pressures.[34] The supports included increased child benefit for 650,000 families; a rent tax credit of €500 estimated to benefit 400,000 tenants, and up to 1.3 million individuals receiving a €200 cost of living lump sum payment.[35] Conefrey, Hickey, Lozej, Staunton & Walsh (2023) estimate that around two-thirds of the measures were untargeted; most notably an energy credit worth €600 was available to all households.

[33] This figure reflects households in income decile 4 in 2021 (SILC, 2022).
[34] This figure is derived from data taken from the Department of Finance's document "The Fiscal Response to the Cost of Living Challenge". It does not include revenue measures. For more detail, see footnote 55 of Conefrey et al. (2023).
[35] Figures sourced from Government press releases on child benefit payments; rent tax credit, and cost of living lump sum payments.

These measures provided direct income support to households, but are not captured by CPE in our model. Adding the estimated energy credit expenditure in 2022 to Central Government data for social benefits amounts to €4,816 per person, up from €4,026 in 2019.[36] The Government's own analysis estimates that the cost of living supports boosted net equivalised weekly disposable income by 1.6 per cent, and by 3 per cent when the full Budget 2023 measures are considered.

The scale of these supports, and anticipation of future supports in Budget 2024, may have dampened the pressure for workers to be compensated quickly via salary increases and altered expectations regarding the business cycle. The nature of the supports may also have played a role. ECB analysis indicates that, across the euro area, discretionary fiscal support over 2022-23 was split fairly equally between measures which affected prices directly (by limiting energy costs) and measures which boosted incomes. In Ireland, however, the measures were almost entirely income supports.

The mechanisms through which government supports have cushioned households during the pandemic and high inflation periods remains an area of active research. For example, cross-euro area analysis by Dao, Dizioli, Jackson, Gourinchas & Leigh (2023) finds that the fiscal measures may have suppressed inflation in 2022 by 1 to 2 percentage points, and helped to anchor long-term inflation expectations. However, the authors caution that had the increase in energy prices been more persistent, or the economy more overheated, then they could have had greater inflationary consequences and contributed to an increase in core inflation which risked de-anchoring expectations. Therefore, policymakers should be mindful that further, large increases in overall public spending could add to inflationary pressures, with the potential for triggering harmful overheating dynamics.[37]

4. **Built-Up Household Savings** Many workers may have built up a stock of financial buffers during the pandemic, which could have provided further resilience against cost of living pressures. Panel data from the

[36] Calculation assumes that the majority of additional expenditure associated with other cost of living supports is captured in social benefits data.
[37] See Conefrey, Hickey, Lozej, Staunton & Walsh (2023) for a wider discussion around managing public finances in a full employment economy.

Household Finance and Consumption Survey (HFCS) shows that almost half of Irish households were able to save more during the pandemic. [38] Lydon and McIndoe-Calder (2022) show that pandemic savings were more likely to have been accumulated by higher income households, who are also least likely to draw down on these, even accounting for pent-up post-pandemic consumption.

Aggregate data shows the household savings rate moved from 10 per cent to 22 per cent during the pandemic, although recent quarters have seen this rate moderate closer to its long-run average. Similarly, Central Bank data shows that while household deposit levels increased annually by as much as 18.2 per cent in February 2021, the rate of growth has since decelerated to 3.5 per cent in July 2023, though the latest stock figures for July remain 36.4 per cent above January 2020 amounts. This savings buffer may have acted to, and indeed continue to, curb pent-up earnings demand for households higher in the distribution.

## 6. Conclusion

In this *Article*, we provide an updated Phillips curve analysis for Ireland which shows that the Phillips curve remains a useful framework for explaining wage growth and performs well when slack is captured using an augmented slack rate which includes both persons in unemployment and those in PALF with previous work experience. Predictions for earnings growth in Q4 2019 are 1.1 percentage points higher than observed earnings growth. However, in terms of the post-pandemic period, the gap between Phillips curve estimates and actual earnings growth widens, with observed earnings growth around 1.3 percentage points lower in Q4 2022.

There are a number of possible explanations for actual aggregate earnings growth being weaker than expected under our Phillips curve estimation. Conducting a decomposition of the difference between actual and estimated earnings growth, we find a cyclical explanation is most likely. As the inflation surge was large and unexpected, the adjustment of wages (and in turn, earnings) may be slower. The availability of cost of living supports and households own savings buffers, may have further contributed to a slow adjustment by providing temporary cushioning which in effect insulated

[38] The HFCS provides survey data on household balance sheets across the euro area. The most recent 2021 survey showed that of the Irish panel households able to save more, specifically between March to June 2020, the majority (92 per cent) reported this was due to the closure of shops and reduced expenditure.

(earning) households from the full effects of price increases during 2022. This may have resulted in workers being less likely to demand earnings adjustments for price increases.

While we find current earnings growth to be conservative in light of the recent high inflation episode, our analysis nevertheless suggests a period of real earnings catch-up is likely over the medium term, as earnings adjust to more fully reflect conditions in the economy and labour market. Employment growth is strong and substantially above pre-Covid trend. Even if all persons in PALF at Q4 2022 with previous work experience were to flow into employment or unemployment, the LFPR would only increase by an estimated 0.7pp.[39] High rates of future net inward migration may continue to provide some additional capacity, but attracting migrants in the context of tight labour markets across Europe will be challenging and is dependent on investment in infrastructure, particularly housing.

With the economy operating at full employment, ongoing tightness in the labour market combined with continued demand for labour will place upward pressure on wages, and in turn, earnings. The extent of this will likely vary across sectors in line with their respective balances of labour supply and demand.

The most recent inflation forecast points to inflation slowing in Ireland and the euro-area, which may alleviate pressure for stronger wage demands. But if inflation were to prove more long-lasting and workers perceive inflation to be more persistent, we may observe stronger wage demands that could in turn, translate into higher earnings growth. Given the economy is now at full capacity, there is also a risk that an additional package of large, untargeted cost of living supports could add to demand, generate further inflationary pressures, and threaten overheating.

Looking ahead, increases in earnings in line with productivity growth could help maintain participation rates, attract new workers, and restore household purchasing power, which would support aggregate consumption and employment levels. The extent to which higher earnings, may be passed on to consumer prices is dependent on future market conditions and the pricing decisions of firms. Policies to enhance labour force participation and employment growth over the medium term will be important to build further capacity in the economy, reduce overheating risks and support earnings growth in line with productivity.

[39] This analysis is based on Q4 2022 data.

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