

# Inflation and labour markets

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## Abstract

While labour markets were not the key source of the recent spike in inflation, they could become important for the persistence of inflation. By late 2022, most EME central banks reported strong labour markets but a low risk of adverse wage-price spirals. Wage indexation has fallen sharply over the last decades and so has the pass-through of wage increases back to consumer prices. Labour costs in EMEs now account for only 20–35% of total production costs in EMEs on average, and increased exposure to international market contestability may have put a lid on the power to raise prices. That said, indexation remains important for minimum wages and informal indexation to past inflation implies that central banks should remain vigilant so as to avoid a transition from a low- to a high-inflation regime.

JEL classification: E30, E50, J30, F60.

Keywords: emerging markets, globalisation, indexation, informality, inflation, labour cost, labour market, minimum wage, Phillips curve, unemployment, wage-price spiral, wages.

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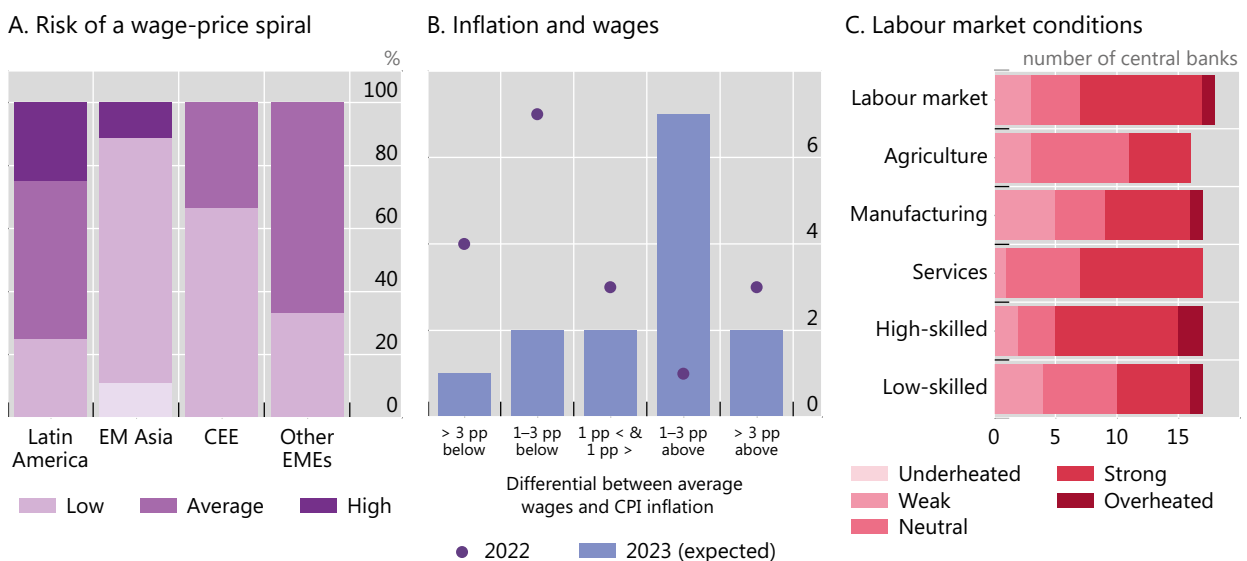
## Introduction

Inflation has returned in both emerging market economies (EMEs) and advanced economies (AEs). The timing and intensity of the surge in 2021 differed across jurisdictions, but by late 2022 inflation stood well above central bank targets almost everywhere. Initially, the prices of only a limited number of goods went up, including those of food, energy and selected manufactures, but over time inflation became more broad-based. While inflation appears to have peaked in many EMEs, there are questions regarding how quickly it will decline, if at all, from its current high levels.

While labour markets in EMEs have generally tightened, they do not appear to have been a key source of inflation so far. This could change, though, as workers might at some point seek to recoup the significant and widespread losses in their purchasing power. Whereas the vast majority of EME central banks regard the risk of outright wage-price spirals as low or average (Graph 1.A),<sup>2</sup> many expect average wages gains to outstrip headline inflation in 2023 (Graph 1.B). Wage pressures could be especially strong for highly skilled workers, for which the market is typically much tighter (Graph 1.C). This could drive up unit labour costs, which would in turn put pressure on firms to increase prices. The services sector could be most affected, owing to pent-up demand and a much higher weight of labour costs.

Perceived risk of wage-price spirals and labour market tightness

Graph 1



Source: BIS survey responses.

Against this background, this note takes a step back and explores the links between inflation and labour market conditions in EMEs. It begins by proposing a framework to examine the engine of inflation – the wage-price nexus. The next section reviews some of the structural features in which EME labour markets differ

<sup>2</sup> The responses could reflect a more restrictive definition of wage-price spirals than the one used in this paper. In this note, wage-price spiral, or equivalently price-wage spiral, is used as a shorthand for a self-reinforcing feedback loop between price and wage increases that permits sustained inflation. The process need not be explosive or raise inflation over time. See Borio et al (2023).

from those in AEs as well as from each other and explores the implications for the inflation process. The third section analyses the relationship between labour market conditions, wages and inflation in EMEs. The fourth section applies this analysis to the current situation and discusses the risk that substantial wage increases keep inflation high for some time. An annex looks at the role of labour market indicators in the monetary policy process. The note draws on the responses to the targeted survey and country notes.

## The wage-price nexus: the inflation engine

Understanding the wage-price nexus is key to deciphering the inflation process. The extent to which self-sustaining spirals can take hold depends critically on the “pricing power” of both firms and workers. All else equal, higher pricing power will go hand in hand with higher inflation.

An important question is what determines pricing power. There are two types of factors: those that are independent of the inflation rate, and inflation itself. Independent factors, in turn, can be divided into cyclical and structural. The degree of slack in labour and product markets – a key variable in the Phillips curve – is the main cyclical factor. Structural factors include globalisation, technology and demographics as well as the political priorities that influence the structure of labour and product markets. In turn, higher inflation increases agents’ incentives and ability to raise wages and prices, which in turn helps to sustain inflation. It can also leave a long-lasting imprint on structural features of wage- and price-setting, most notably the degree of indexation. Of course, all these factors interact. For instance, inflationary pressures from tight labour markets can be stronger if inflation is high and if the (structural) supply elasticity of labour is low.

In order to reduce some of this complexity, it can be useful to use a “two-regime” view of inflation, as in Borio et al (2023) and BIS (2022). This stylised view identifies a low- and a high-inflation regime.

In a low-inflation regime, measured inflation mostly reflects sector-specific price changes that are only loosely correlated with each other. In other words, price co-movement across different goods and services is small. In addition, wages and prices are also loosely linked with each other. As a result, price shocks tend to dissipate quickly and inflation tends to be *self-stabilising*.

In a high-inflation regime, matters are very different. The common component of price changes is much greater and inflation becomes highly sensitive to changes in salient prices, such as those of food and energy, as well as to fluctuations in the exchange rate. Importantly, wages and prices are more tightly linked, which means that price shocks can have substantial knock-on effects. As a result, in a high-inflation regime inflation is *not* self-stabilising.

This view also sees transitions from low-to high-inflation regimes as self-reinforcing. As inflation rises, it becomes more of a focal point for agents’ behaviour, fuelling the transition. Thus, the risk is that inflationary shocks may be strong and persistent enough to trigger a transition. This risk, in turn, will depend on structural factors that influence the pricing power of workers and firms, in turn influenced by the history of inflation itself.

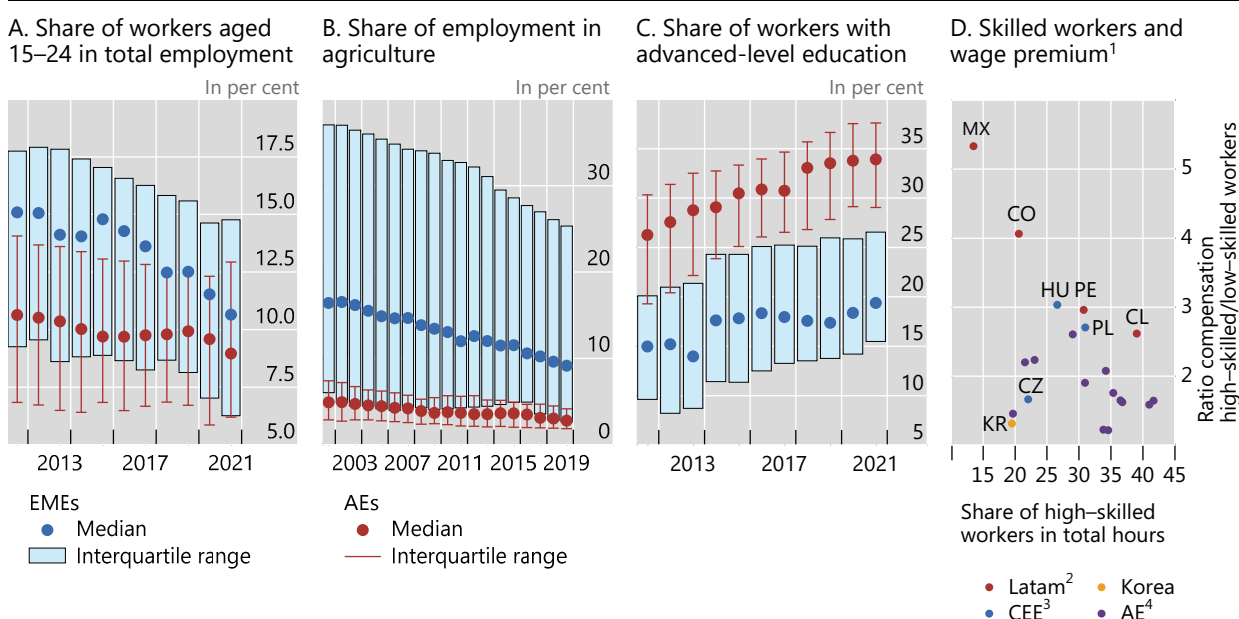
## Structural characteristics of EME labour markets

Labour markets in EMEs tend to be quite different from those in AE in ways that can affect their role in the inflation process. Three features stand out: (i) a large and elastic supply of relatively low-skilled workers coexisting with a much smaller and far less elastic one for high-skilled workers; (ii) a high degree of informality; and (iii) a major role for minimum wages. These features affect the pricing power of labour and wage formation, and thus inflation dynamics.

EMEs tend to have a larger and more elastic supply of low-skilled workers than AEs, which limits workers' pricing power. This is due partly to demographic factors, such as the typically younger and faster-growing population in EMEs, but economic factors also play a role. In particular, EMEs tend to have a much larger agricultural sector that tends to pay very low wages and to serve as a reservoir of (unskilled) workers. Large numbers of workers have moved from rural to urban areas as economic opportunities have arisen. While still important, these differences have naturally narrowed over the years as the demographic transition reached EMEs and a large part of the rural population moved away from agricultural activities (Graphs 2.A and 2.B).<sup>3</sup>

Labour supply is becoming less elastic, skilled workers earn large premiums

Graph 2



<sup>1</sup> Skilled workers: those with a completed college degree or higher educational attainment. Low-skilled workers: those with no formal qualification. Median figures of 2010–17 or latest available; except for KR (2008–09). Compensation for each skills group is computed based on total hours worked, total compensation and corresponding shares by skill group reported in the KLEMS database for the total economy. <sup>2</sup> Chile, Colombia, Mexico and Peru <sup>3</sup> Czechia, Hungary and Poland <sup>4</sup> Austria, Belgium, Germany, Denmark, Finland, France, Italy, Japan, the Netherlands, Portugal, Sweden, the United Kingdom and the United States.

Sources: ILO; KLEMS data sets; World Bank. BIS staff calculations.

<sup>3</sup> For example, China's exceptionally strong growth over the past few decades was supported by a large-scale migration from the countryside to the cities. Between 1982 and 2020, total employment in agriculture fell by 45%.

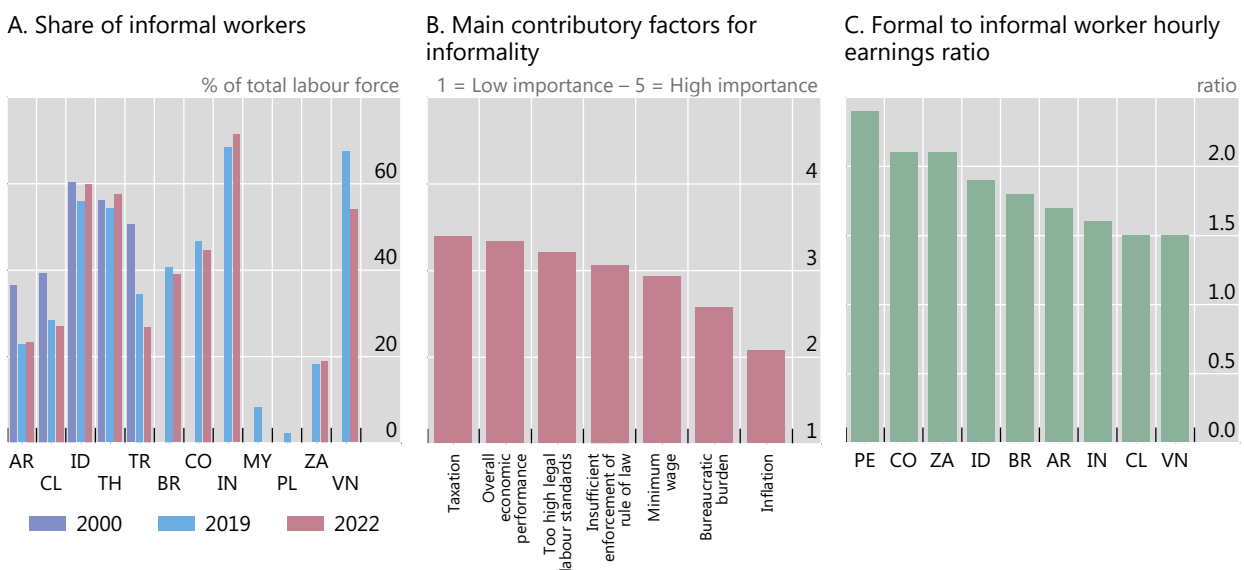
One important remaining gap relates to education. The share of skilled workers – those with a college degree or higher – in the workforce is significantly lower in EMEs than in AEs (Graph 2.C).<sup>4</sup> This comes with an inelastic supply of skilled workers and the associated outsized skills premium in EMEs. While in AEs the ratio of earnings of high-skilled workers to low-skilled ones is about 1.5, it is five times in, say, Mexico (Graph 2.D).

A second key difference vis-à-vis AEs is a large informal sector. The share of workers employed informally ranges from the low single digits in Poland to well over one half in India, Indonesia, Peru, Thailand and Vietnam (Graph 3.A).<sup>5</sup> Reasons for the high degree of informality include taxes, high standards and the bureaucratic burden in the formal labour market, high minimum wages and a poor enforcement of legal standards (Graph 3.B). Since family and self-employed workers often work informally, a large share of employment in the agricultural sector is informal (around 94% globally). In India, agriculture’s employment share of over 40% contributes to a large informal sector (see country note).

A large degree of informality affects inflation through a variety of mechanisms. It increases the supply elasticity of labour in the formal economy, which diminishes workers’ pricing power. It reduces the wage bargaining power of workers, since informal workers are generally unorganised and have few alternative employment options. And it dampens business cycle fluctuations, acting as a shock absorber.

## High share of labour market informality in EMEs

Graph 3



Sources: OECD, KIBIBIH database; BIS survey responses.

There is substantial evidence of this shock absorber role during downturns, as the informal sector provides a safety net for workers made redundant in the formal one. This helps to limit income losses and supports aggregate demand, thereby mitigating price volatility. That said, this buffer is far from perfect. The lower

<sup>4</sup> Based on industry level data, this translates into a low share of the total hours worked by skilled workers, which in EMEs is about 20% while in AEs it is above 35%.

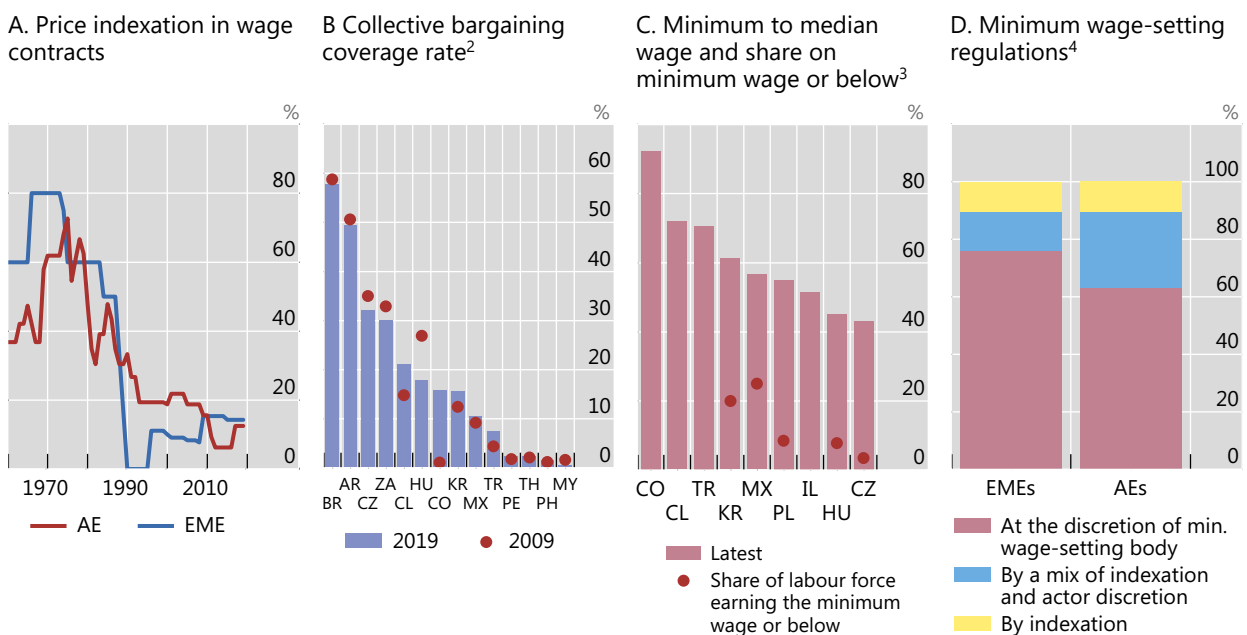
<sup>5</sup> The definition of informality is inevitably country-specific.

productivity of the sector results in much lower wages than those in the formal sector.<sup>6</sup> For example, household surveys show that in Argentina, Brazil, Chile, India, Indonesia and Vietnam, a formal worker earns at least 1.5 times more than their informal peer per hour worked. And the ratio exceeds 2 in Colombia, Peru and South Africa (Graph 3.C).<sup>7</sup> Thus, all else equal, a shift to the informal sector would tend to reduce aggregate demand.

As in advanced economies, wage indexation has become less prevalent in EMEs in recent years (Graph 4.A), which should reduce inflation persistence.<sup>8</sup> The decline in formal indexation arrangements owes both to the lower levels of inflation in most countries as well as to policy actions aimed at reducing indexation.<sup>9</sup>

### Minimum wages and collective wage bargaining arrangements

Graph 4



<sup>1</sup> Share across 33 AEs and 16 EMEs upon data availability. <sup>2</sup> The collective bargaining coverage rate is defined as the share of the number of employees whose pay and/or conditions of employment are determined by one or more collective agreement(s) as a percentage of the total number of employees. In some cases, data for 2019 and 2009 are the latest and earliest available respectively. <sup>3</sup> Data on share of labour force earning the minimum wage or below are available for only five economies. <sup>4</sup> Based on available data extracted from the OECD/AIAS, *ICTWSS* database for 29 EMEs and 19 AEs.

Sources: OECD; OECD/AIAS, *ICTWSS* database; BIS survey responses.

<sup>6</sup> OECD/ILO (2019) estimates that average labour productivity in the informal sector of emerging and developing economies is less than half that in the formal sector.

<sup>7</sup> In addition, since informal workers tend to be excluded from the financial system, more informal work can weaken the credit channel and dampen monetary policy transmission (see country note from India, and Alberola and Urrutia (2020)).

<sup>8</sup> See, for instance, estimates in López-Villavicencio and Saglio (2017), who find a steady decrease in wage indexation over time as inflation fell.

<sup>9</sup> The note from the Central Bank of Argentina points out that the government has managed to avoid the widespread inclusion of indexation clauses in wage bargaining during the recent high inflation period. The note from the Central Bank of Chile remarks that indexation of nominal wages to past inflation in 2021–22 was 50% lower than pre-pandemic.

That said, even in the absence of formal indexation, there could still be mechanisms that link wage settlements to past inflation, for instance if economic agents are backward-looking or are compensated for past losses in their purchasing power.<sup>10</sup> This can come through collective bargaining agreements, which cover a sizeable part of the workforce in some countries, for instance in Argentina and Brazil (Graph 4.B), as well as through minimum or public sector wages.

Minimum wages matter far more in EMEs than in AEs. Since they are often fairly high compared with median wages, they are binding for a large part of the labour force (Graph 4.C). An extreme case is Colombia, where the minimum-to-median wage ratio is almost 90%. In addition, minimum wages often serve as a benchmark for private sector wage negotiations, as do other wages set by the governments, including those for its own employees (eg in Argentina and Indonesia). Many empirical studies have also found that average wages in the informal sector in EMEs tend to rise with the minimum wage in the formal sector (eg Boeri et al (2011)). All this means that changes in minimum wages spill over to large swathes of the wage distribution. Again, Colombia is an extreme case, with changes in the minimum wage affecting all quintiles of the wage distribution, even the upper one.<sup>11</sup>

The adjustment mechanism for minimum wages differs across countries and tends to be closely linked to inflation. While in a minority it is rules-based, in most it is discretionary. This is even more so in EMEs than in AEs (Graph 4.D). When rules-based, it is typically indexed to inflation.<sup>12</sup> Several central bank notes point out that inflation is a key input into discretionary adjustments – an element of informal indexation. The adjustment frequency also varies significantly, eg twice a year in Chile, once a year in the Philippines and Turkey,<sup>13</sup> and sometimes even much less frequently in economies without formal mechanisms.

## Wages and inflation

The engine of sustained inflation is ultimately a self-reinforcing feedback loop between price and wage increases – wage-price spirals, in short. While it is difficult to disentangle causality, a regression analysis indicates that the sensitivity of wage growth to past inflation is larger in EMEs than in AEs (Graph 5.A).<sup>14</sup> This sensitivity has been relatively steady in recent decades, with a pass-through of between 45%

<sup>10</sup> See eg country note from South Africa, which points out that “inflation expectations, particularly by labour unions, tend to be backward-looking”.

<sup>11</sup> In turn, the impact on inflation will naturally depend on firms’ pricing power. There is evidence that firms pass on increases in the minimum wage to their customers. For instance, Harasztosi and Lindner (2019) find that, when the minimum wage was raised persistently between 1996 and 2008 in Hungary, lifting the minimum median wage ratio from 35% to 55%, around 75% of the increase was paid by consumers and only 25% by firm owners.

<sup>12</sup> In Poland, the minimum wage level also depends on future price developments. The government is obliged by law to raise the minimum wage within a year if the (projected) annual inflation rate exceeds 5%.

<sup>13</sup> During the pandemic, the Philippine regional wage boards suspended minimum wage adjustments. But with larger-than-expected increases in 2022, minimum wage growth reverted to its pre-pandemic trend.

<sup>14</sup> See also Borio et al (2023).

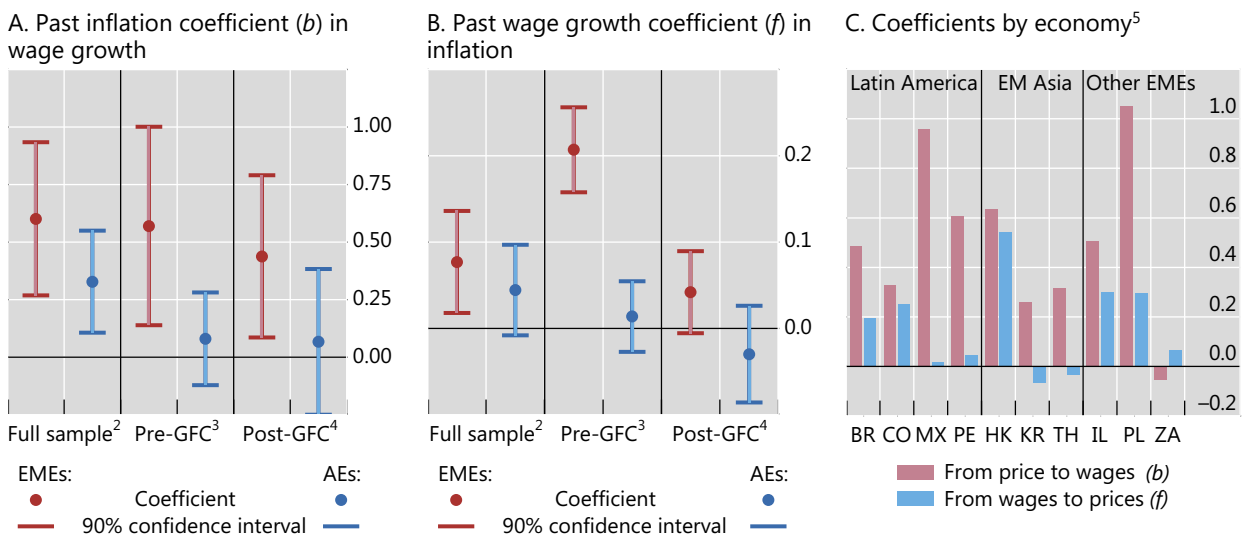
and 60% within a year. In the other direction, the effect of past wage growth on inflation has been much more limited in both EMEs and AEs, and not statistically significant after the Great Financial Crisis (GFC) (Graph 5.B).<sup>15</sup>

At first sight, the relatively high pass-through from inflation to wages in EMEs may seem at odds with a very elastic supply of (unskilled) labour with little bargaining power. That said, it could reflect three things. First, informal workers are heavily concentrated in retail trade and services and may not have the skills to easily transfer to other sectors, which would drive up the bargaining power of workers there. Second, the lower elastic supply of skilled workers, who have a disproportionate weight in total wages owing to a large skill premium. Furthermore, it could reflect the importance of the minimum wage and its regular de facto indexation to inflation, particularly in economies with historically high inflation.

Regionally, the exercise conducted above also shows that the average past inflation coefficient (*b*) in wage growth is strongest in Latin American countries and weakest in emerging Asia (Graph 5.C). This is partly related to the much more extensive inflation history in Latin America, which may have left a legacy on wage determination conventions. Indeed, the country-specific estimated coefficients tend to be higher in countries that have experienced high levels of inflation at least once over the last 40 years.

Wage growth responds to past inflation, but the reverse feedback is weak<sup>1</sup>

Graph 5



<sup>1</sup> Estimations are based on a panel of quarterly data for 14 EMEs, with fixed effects:

Panel A:  $\text{wage growth}(t+4) = a + b \times \text{inflation}(t) + c \times \text{unemployment gap}(t) + d \times \text{labour productivity growth}(t)$ , and

Panel B:  $\text{inflation}(t+4) = e + f \times \text{wage growth}(t) + g \times \text{unemployment gap}(t) + h \times \text{labour productivity growth}(t)$ .

<sup>2</sup> Full sample = 1994–2022. <sup>3</sup> Pre-GFC = 1994–2007. <sup>4</sup> Post-GFC = 2008–22. <sup>5</sup> Central estimates based on a much smaller sample, varying between 33 and 107 observations, depending on economy.

Sources: OECD; ILO; BIS calculations.

<sup>15</sup> Of course, the very recent period estimations using aggregate indicators need to be treated with caution as developments may differ across sectors. That said, after more than three years since the start of the pandemic, many of these effects have already been washed out.



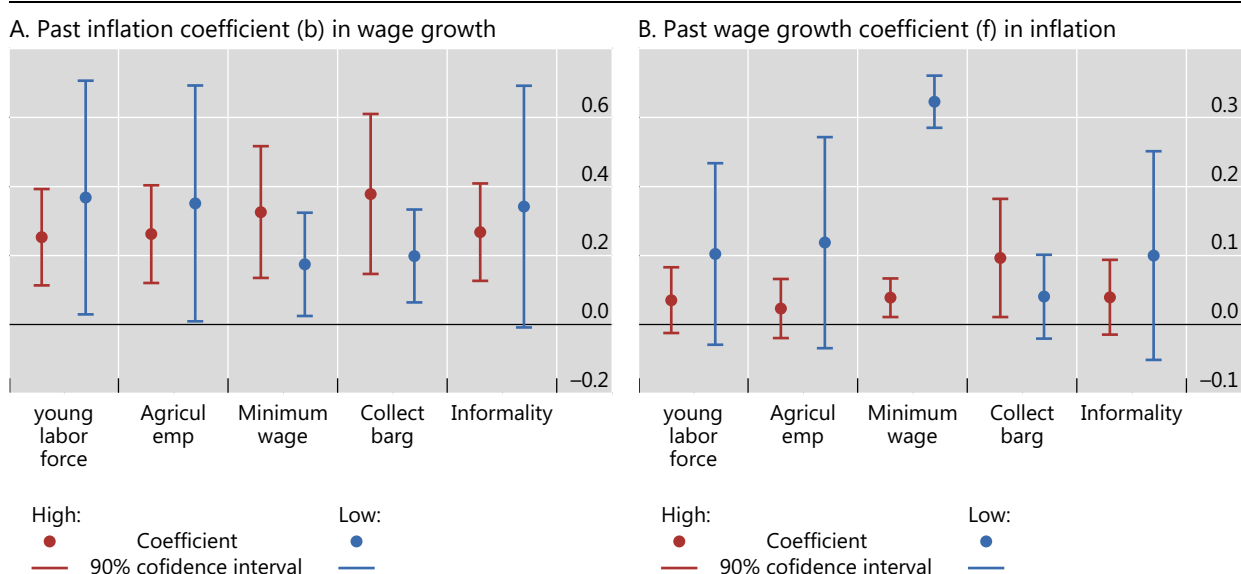
Going in the reverse direction, the pass-through from wages back to inflation has typically been small. It has also declined from an average of 21% before the GFC, to just 4% since then (and has become statistically insignificant) (Graph 5.B). In AEs, this pass-through has been even lower, though, perhaps because of the lower average levels of inflation.

As an indicative exercise, the sample was split along several dimensions depending on whether countries had above or below median indicators. The central estimates suggest that workers are compensated more for past inflation when the workforce is less young, less agricultural, less informal, and under higher minimum wage regulations and collective bargaining. That said, the smaller samples in these cases do not allow us to say that these differences are statistically significant (Graph 6.A). In the reverse direction, wages tend to impact inflation more when workers are older, less agricultural and formal, and also when workers are covered less by minimum wages but are under collective bargaining agreements. (Graph 6.B)

## Workers' compensation for past inflation increases with minimum wages and collective bargaining <sup>1</sup>

Coefficients

Graph 6



<sup>1</sup> Estimations are based on a panel of quarterly data for 14 EMEs, with fixed effects:

Panel A:  $wage\ growth^s(t+4) = a^s + b \times inflation^s(t) + c \times unemployment\ gap^s(t) + d \times labour\ productivity\ growth^s(t)$ , and

Panel B:  $inflation^s(t+4) = e^s + f \times wage\ growth^s(t) + g \times unemployment\ gap^s(t) + h \times labour\ productivity\ growth^s(t)$ . Where  $s$  denotes the state of the economy: high or low. Sample 1994–2022.

Sources: OECD; ILO; national data ; BIS.

Overall, the very modest feedback from wages to prices could also reflect the low share of labour costs in the total costs of production and the impact of globalisation. Labour costs account for a lower share of total costs in EMEs than in AEs (Graph 7.A), presumably reflecting lower wages.<sup>16</sup> This makes it easier for firms to absorb

<sup>16</sup> At the same time, though, production in EMEs tends to be more labour-intensive, although this does not seem to offset the impact of lower wages, at least at the aggregate and sector levels.

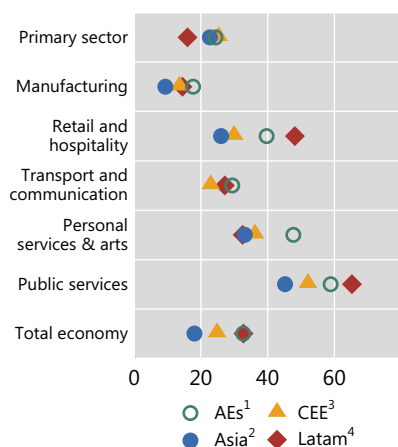
increases in wages rather than passing them on to their customers. Globalisation has probably also played a role in the general reduction of pass-through from wages to prices. This is because, if production is globally distributed rather than local, domestic wages will matter even less for final prices. Also, the scope for price-setters to simply pass local cost increases through into final prices will be more limited if markets are highly contestable (through both trade and outsourcing of production to lower-production-cost countries).

Last but not least, the pass-through from wages to inflation could also be low or non-existent if higher wages are compensated by increased productivity, leaving unit labour costs unchanged. In the medium to long term, wage developments in EMEs have been roughly in line with labour productivity, at least on average (Graph 7.B). That said, the average masks very large differences across countries.

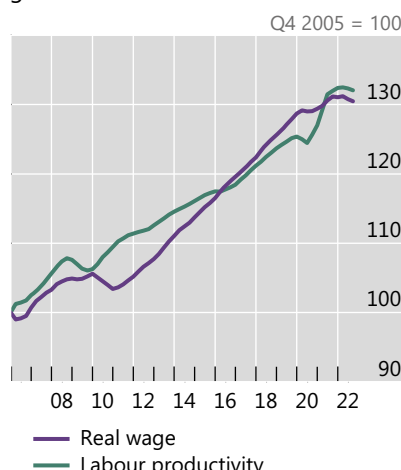
### Wage growth has again become more sensitive to output

Graph 7

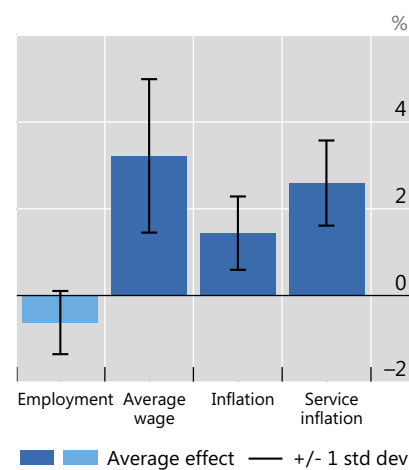
A. Share of labour compensation on total gross output



B. In the long run, real wage growth aligns with labour productivity growth<sup>5</sup>



C. Minimum wage increases followed by higher inflation in services<sup>6</sup>



<sup>1</sup> AT, BE, DE, DK, FI, FR, IT, JP, NL, PT, SE, UK, US <sup>2</sup> IN, KR <sup>3</sup> CZ, HU, PL <sup>4</sup> CO, MX, PE. The plot shows the median across broad sectors for 2010–17 (in the case of KR for 2008–09). <sup>5</sup> Labour productivity is gross domestic output at fixed prices divided by total employment. Real wage is average wage divided by national CPI. Simple averages across economies. Based on information for BR, CL, CO, CZ, HK, HU, IL, KR, PE, PH, TH and ZA. <sup>6</sup> Based on the estimated Phillips curve:  $wage\ growth(t) = a + b \times inflation(i, t-4) + c \times output\ gap(i, t-4) + d \times labour\ productivity\ growth(i, t-4) + country\ fixed\ effects(i) + e(i, t)$ . The estimation was done on a panel with quarterly data from BR, CL, CO, MX, PE, CZ, HU, PL, HK, KR, PH, SG, TH, IL and ZA between 2000 and 2022. Alternatively, the (negative of the) unemployment gap was used instead of the output gap. Gaps are simply the difference between the respective variable and its trend obtained through a one-sided HP filter. <sup>6</sup> Light-blue colour bar indicates not statistically significant. Estimated average effects of 10 episodes in which the ratio of national minimum to aggregate wages was raised by more than 10% within a year, without subsequent reversal. The effect was obtained by regressing the respective variable of interest against a minimum wage hike dummy (contemporaneous and lagged), year and country fixed effects

Sources: ILO; IMF; OECD; World Bank; KLEMS data sets; BIS calculations.

Large increases in minimum wages qualify the overall picture of a low pass-through from wages to inflation, especially in the services sector, where unskilled workers are more prevalent (Graph 7.A). An event study of 10 episodes in EMEs in which the ratio of national minimum to aggregate wages was raised by more than 10 percentage points shows a substantial impact on average national wages and

inflation.<sup>17</sup> The estimated average effect of these large increases on CPI inflation was 1.4 percentage points and for services inflation 2.6 percentage points within one year (Graph 7.C).<sup>18</sup>

## Labour markets and inflation: post-pandemic and beyond

Going forward, whether wages will catch up with price increases will be a key determinant of the disinflation process. Nominal wage growth picked up in many EMEs (Graph 8.A).<sup>19</sup> The pace of wage growth was strongest in central and eastern Europe (CEE), rising at double-digit rates in late 2022. Especially at the beginning of the pandemic, strong growth partly reflected a “composition effect”, as it was primarily low-wage workers employed in contact-intensive activities that dropped out of the labour force.<sup>20</sup> This effect reversed in 2021 and 2022 when these workers returned. High inflation meant that a rising nominal wage growth did not translate into higher real wages (Graph 8.B). After recording increases in 2020, many EMEs saw stagnating or even declining real wages in 2022. In many economies, for instance Argentina, Peru and Czechia, real wages are still below pre-pandemic levels; and in all but a few they are below the level implied by the pre-pandemic trend (Graph 8.C).

The rapid nominal wage growth in most EMEs reflects a combination of tight labour markets and rising inflation. Employment and labour force participation rebounded quickly from the initial Covid-19 shock and returned to pre-pandemic levels in most EMEs by the end of 2022 (Graph 9.A). Unemployment rates also fell back to pre-Covid levels (Graph 9.B).<sup>21</sup> Some economies, for example, Czechia and Singapore, also report high job vacancies to unemployment rates (Graph 8.C). In others, these rates are low, although this could also reflect limited incentives to report vacancies. In Chile, a central bank survey shows that 88% of sampled firms experienced difficulties in finding workers in early 2022, even though employment remained well below pre-pandemic levels.

<sup>17</sup> These post-2000 episodes were from China (2x), Czechia, Korea, Mexico, Hungary (2x), Poland (2x) and Thailand. The median minimum wage increase across these 10 episodes was 20.3%.

<sup>18</sup> Interestingly, these minimum wage increases did not reduce employment in a significant way. This evidence aligns well with that of the previous academic literature on minimum wages (eg Cengiz et al (2019) and Dube (2019)), and the country note from Hungary.

<sup>19</sup> Availability of timely data as well as definition of wages and sectoral coverage varies across countries. The analysis focuses, to the extent possible, on wages defined as rates paid for nominal time of work (hour, week or month), comprising basic wages and salaries, cost-of-living allowances and other guaranteed and regularly paid allowances, and measured for the whole economy.

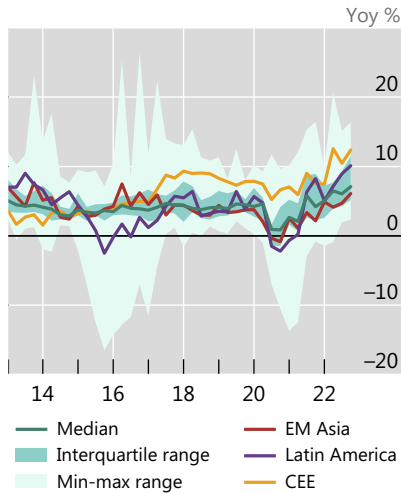
<sup>20</sup> See ILO (2022). The Bank of Israel note develops methods to improve the quality of the analysis.

<sup>21</sup> The recovery was far from even, with contact-intensive sectors tending to lag the recovery. In some economies, for instance in Brazil and Israel, employment in the accommodation and food services and transportation sectors was still below pre-pandemic levels up to Q3 2022, while that in the information and communications and financial services sectors (dominated by high-skilled labour) had risen by almost a fifth.

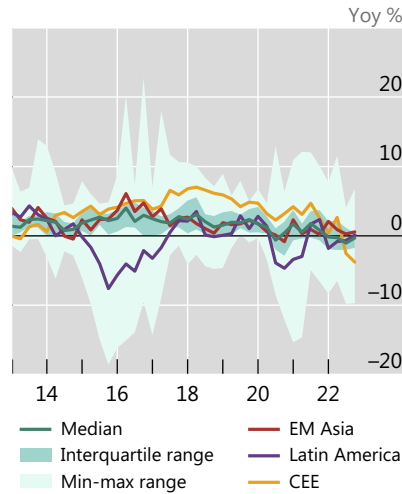
## Recent losses have left real wages below pre-pandemic levels

Graph 8

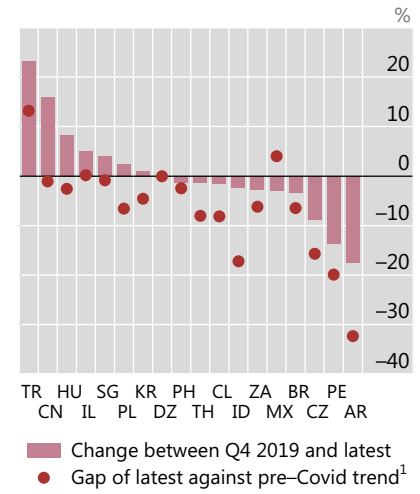
A. Nominal wage growth picked up after the pandemic ...



B. ... but real wage contracted in some economies



C. Real wages are below pre-pandemic levels in many economies



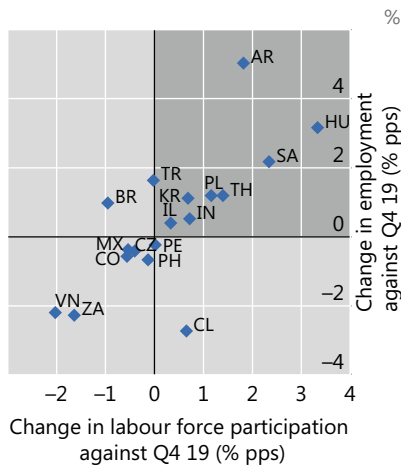
<sup>1</sup> Log-linear trend from 2010 to 2019.

Sources: Refinitiv Datastream; national data; BIS calculations.

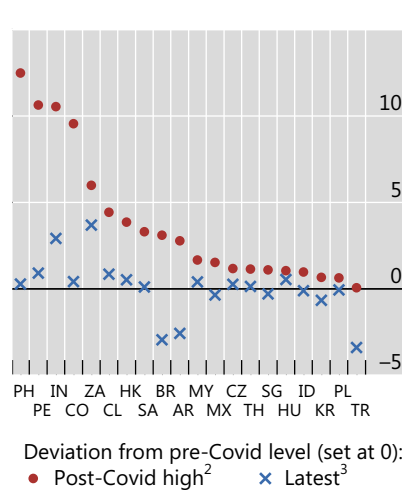
## EME labour markets are showing signs of tightness

Graph 9

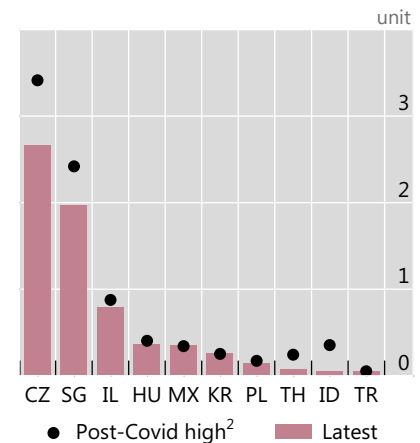
A. Employment and participation rates mostly above pre-Covid



B. Unemployment<sup>1</sup>



C. Vacancies to unemployed<sup>4</sup>



EM Asia: IN, KR, PH, TH and VN. Latin America: AR, BR, CL, CO, MX and PE. Central and eastern Europe (CEE): CZ, HU and PL. Other EMEs: IL, SA, TR and ZA.

<sup>1</sup> Definitions differ across countries. Deviation from Q4 2019 figures (pre-Covid level). <sup>2</sup> Maximum value for Q1 2020–Q1 2022. <sup>3</sup> Data up to Q4 2022, but AR, BR, CO, PH, TH, SA, ZA and TR up to Q3 2022. <sup>4</sup> Unfilled vacancies to unemployed population aged 15 and over. <sup>5</sup> For SG, from 2012–22; for MX for 2019–22. For ID, from 2012–21; for KR, from 2018–22 (based on projected data for unemployed in 2022).

Sources: ILO; Refinitiv Datastream; national data.

Developments in informal employment largely mirrored those in the formal labour market. In contrast to the usual countercyclical behaviour discussed above, informal employment fell sharply during the early stages of the pandemic and recovered subsequently. This unusual behaviour is at least partly due to the fact that many workers in contact-intensive activities are employed informally (ILO (2022)).

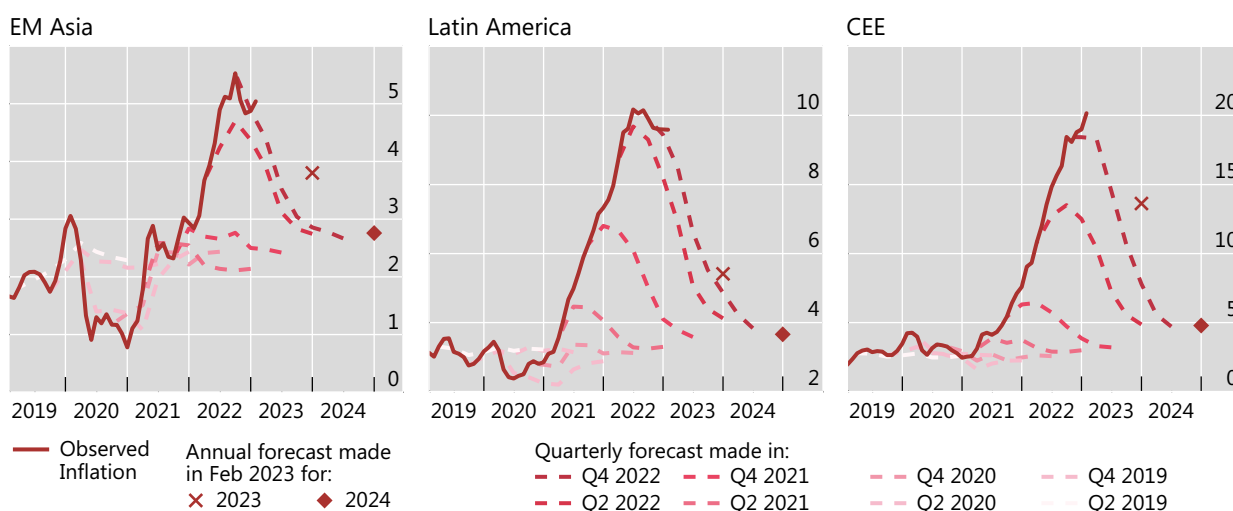
In some economies, changes in migration flows help explain recent wage dynamics. In several Asian economies, for instance Malaysia, Singapore and Thailand, migrant workers left the country during the pandemic and by end-2022 had only partly returned as the demand for labour recovered.<sup>22</sup> The opposite happened in Poland, where a large number of Ukrainian refugees joined the labour force.

Rising inflation also contributed to the significant wage growth seen in 2022, in line with the relatively large pass-through from inflation to nominal wages documented in the previous section. At the same time, inflation went up faster than anticipated (Graph 10), which could explain the stagnation or even decline in real wages during that year. This is also in line with the decline in formal indexation mechanisms documented above.

### Inflation surprised on the upside and is expected to decline only gradually<sup>1</sup>

In per cent

Graph 10



<sup>1</sup> Simple average across regions. EME Asia: CN, HK, IN, ID, KR, MY, PH, SG, TH and VN. Latin America: BR, CL, CO, MX and PE. CEE: CZ, HU and PL.

Sources: Refinitiv Datastream; national data; Consensus Economics.

The extent to which high wage increases will make disinflation more difficult depends on several factors:

One such factor is the evolution of labour market tightness itself. In some countries, for instance Chile, labour markets have become less tight already. In others, eg in Singapore and Thailand, they are expected to become less tight owing to a combination of monetary tightening, slowing growth and increased labour supply owing to returning migrants. This should reduce wage pressures.

<sup>22</sup> See eg notes from Malaysia, Singapore and Thailand.

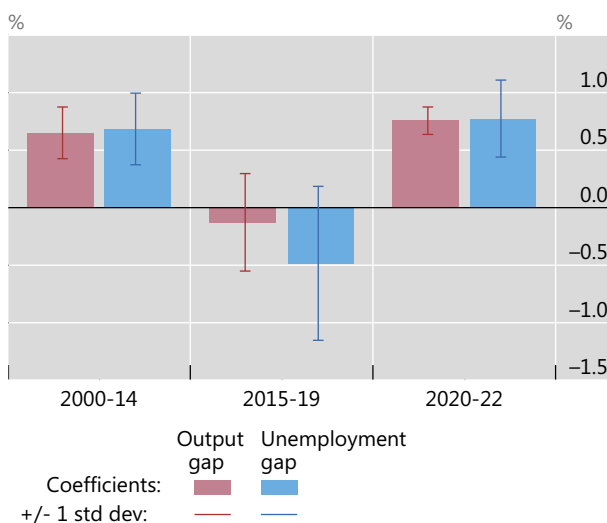
A second factor is the outlook for inflation. Professional forecasters expect inflation to gradually decline in 2023 and 2024. Evidence on the expectations of employers, unions and households is more sketchy, but there are signs at least in some Latin American countries that they could expect only a very slow disinflation, which could increase demands for higher wages and the willingness on the employer side to grant them.

A third factor concerns the bargaining power of labour and the behaviour of benchmark wages, in particular the minimum wage. There is evidence that wage increases have become more sensitive to unemployment and output gaps across EMEs since the Covid-19 pandemic. The central estimate is that average wages will increase by 0.75 percentage points for every percentage point change in the output gap. That is, the wage Phillips curve appears to have steepened (Graph 11.A). This could reflect that the bargaining power of labour has strengthened, owing to withdrawals from the labour force and sectoral mismatches. Such an interpretation is supported by the outward shift of the Beveridge curve in some countries: post-Covid, vacancy rates are substantially higher than similar unemployment rates in the past would have suggested. It is unclear, though how persistent these effects will

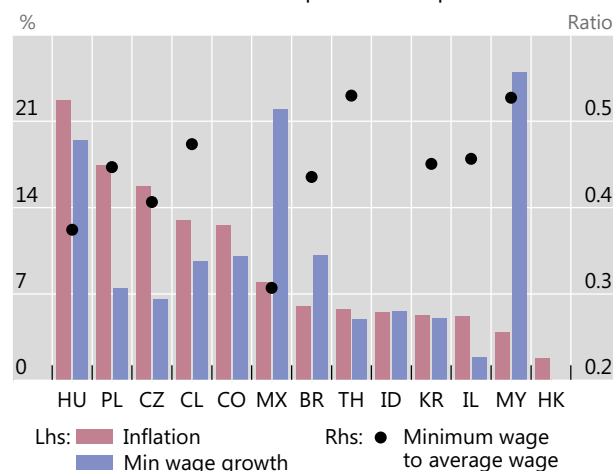
## Phillips curves have steepened

Graph 11

A. EMEs' wage Phillips curve has steepened<sup>1</sup>



B. Inflation outpaced minimum wage increases in most EMEs in 2022, with some important exceptions<sup>2</sup>



<sup>1</sup> Based on the estimated Phillips curve:  $wage\ growth(t) = a + b \times inflation(i, t-4) + c \times output\ gap(i, t-4) + d \times labour\ productivity\ growth(i, t-4) + country\ fixed\ effects(i) + e(i, t)$ . The estimation was done on a panel with quarterly data from BR, CL, CO, MX, PE, CZ, HU, PL, HK, KR, PH, SG, TH, IL and ZA between 2000 and 2022. Alternatively, the (negative of the) unemployment gap was used instead of the output gap. Gaps are simply the difference between the respective variable and its trend obtained through a one-sided HP filter. <sup>2</sup> Data for 2022 end-year.

Sources: OECD; World Bank; Refinitiv Datastream; national data; BIS calculations.

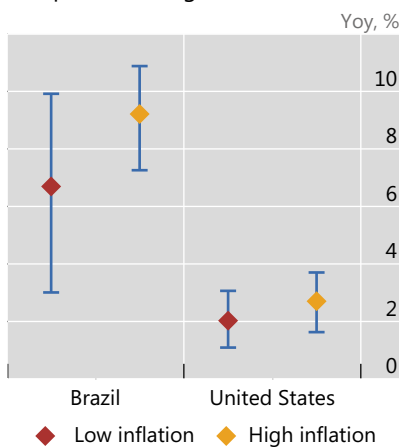
be.<sup>23</sup> <sup>24</sup> But it could also reflect increases in minimum wages and their impact on the wage distribution. There have been some significant increases in minimum wages in some countries recently (Graph 11.B), with more in the pipeline (eg Colombia, Malaysia and Mexico).

A fourth factor concerns the potentially self-reinforcing nature of transitions to high-inflation regimes. Separate estimates suggest that the output gap elasticity is 0.5 when inflation is below 5%, doubling to 1.0 when inflation is above 10%. And there is evidence that wage increases co-move more strongly across sectors and with inflation itself when inflation is higher – suggesting that inflation acts as a stronger focal point for behaviour. For example, in past years of high inflation in Brazil –

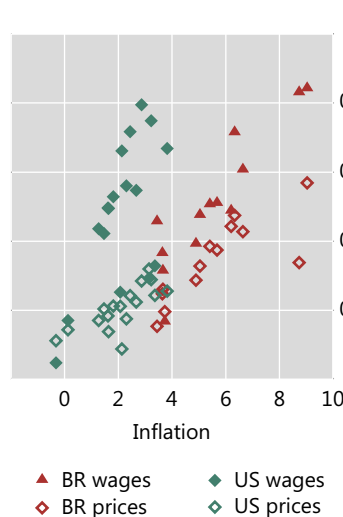
## High inflation becomes a coordinating device in wage- and price-setting

Graph 12

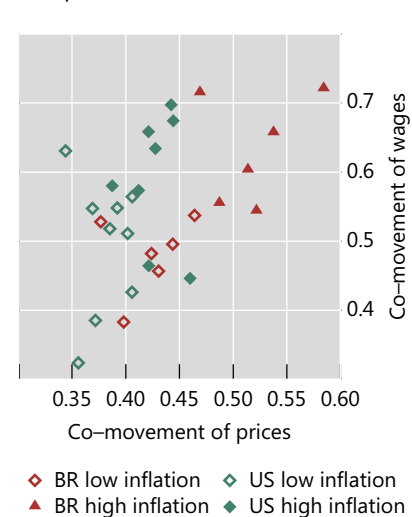
A. Dispersion of wage increases compresses in high inflation<sup>1</sup>



B. Co-movement of wage and price increases with inflation<sup>1,2</sup>



C. Tighter co-movement of wages and price increases as inflation rises



<sup>1</sup> For Brazil, annual median sectoral wages are computed from employee-firm linked data. Firms are classified in 563 sectors following Brazil's industry classification (CNAE). For the United States, wage data is for 474 sectors reported by the BLS. <sup>2</sup> For Brazil, sectoral end-year inflation based on IBGE's IPCA 384 segments/products. For the United States, sectoral data for 108 sectors as reported by the BLS. <sup>3</sup> Following Mink et al (2007), co-movement across sectors is computed as the sum of the absolute distance of sectoral wage (or price) increases from a reference point, scaled by the sum of absolute wage (or price) increases across sectors (multiplied by -1). The plot scales the measure to vary from 0 to 1, increasing in co-movement. The plots use as reference point the average annual inflation rate. The results are qualitatively similar if the average wage increase across sectors is used as reference point.

Sources: RAIS/CAGED; IBGE; BLS; BIS calculations.

<sup>23</sup> For example, the Beveridge curve in Thailand shifted to the right in 2020 (ie, there are more job vacancies for any given level of unemployment) owing to labour demand-supply mismatches: job vacancies for low-skilled factory workers, which had been filled by migrant workers pre-pandemic, were not attractive for the unemployed with better education. In Singapore, shortfalls of non-resident workers in certain sectors caused a rise in the vacancy-unemployment ratio. See Bank of Thailand (2022) and Monetary Authority of Singapore (2022).

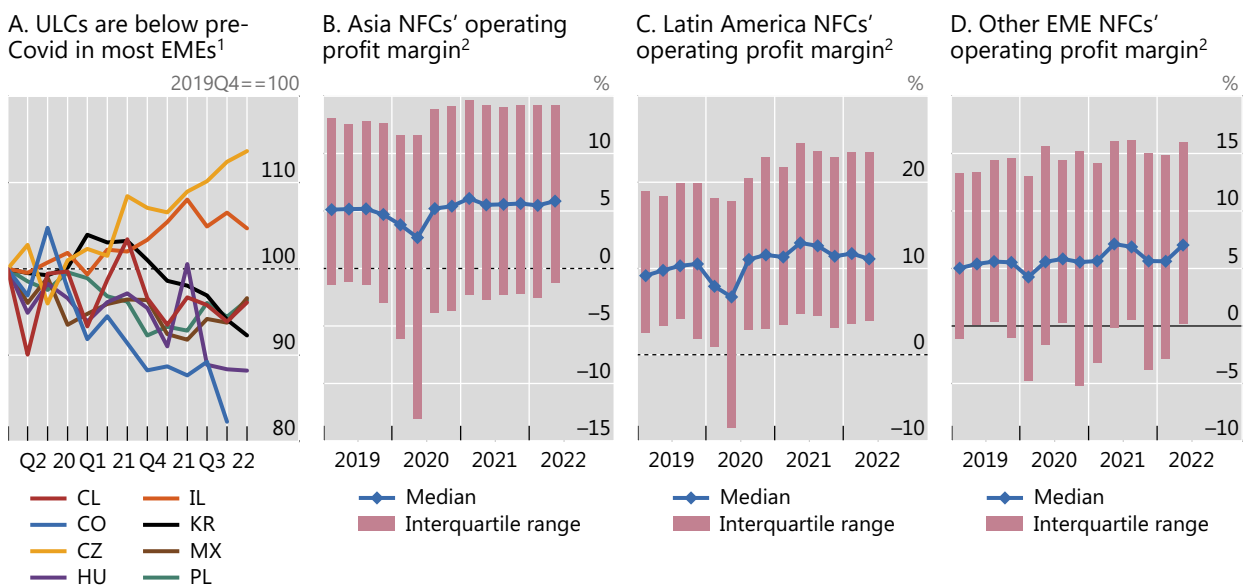
<sup>24</sup> Alternatively, we also estimated a vector error correction model of wage formation, taking account of the long-run cointegration between real wages and labour productivity. When estimated for the panel, the results indicated that only past inflation and the output or unemployment gap were statistically significant drivers of wage increases within a one-year horizon. The residual of the cointegration vector and exchange rate variations had effects that were not statistically significant. These panel results do not rule out the possibility that these terms could be important in specific countries.

defined as above median inflation – the dispersion of wage growth across sectors was typically higher (Graph 12.A). Furthermore, the higher inflation, the higher was the co-movement of sectoral wage increases with inflation (Graph 12.B) and the tighter the relationship between wages and prices (Graph 12.C). Similar dynamics are observed in the United States.

Finally, an important factor influencing the impact of wages on inflation in the near term is the ability and willingness of firms to absorb higher labour costs without increasing prices. At least until mid-2022, labour costs and profits did not seem to have been negatively affected by the pickup in nominal wages. Indeed, unit labour costs (ULCs) fell in most economies compared with pre-pandemic levels (Graph 13.A), presumably reflecting increased automation and other pandemic-induced productivity-enhancing investments.<sup>25</sup> Lower ULCs and higher prices can explain why firms’ profits also held up quite well in 2021–22 in most EMEs, despite higher transport, energy and other input costs (Graphs 13.B–D).

Firms’ profits held up well amid lower unit labour costs

Graph 13



<sup>1</sup> Unit labour costs in total economy, based on employed workers. <sup>2</sup> Operating profit margin is the ratio of operating income to total revenues. Asia: HK, KR, ID, IN, MY, PH, SG, TH. Latin America: AR, BR, CL, CO, MX, PE. Other EMEs: CZ, HU, IL, PL, SA, TR, ZA. In all cases, based on the sample of non-financial corporations that reported quarterly balance sheet statements in Q1 2022 and Q2 2022.

Sources: OECD; Refinitiv Datastream; Capital IQ; BIS calculations.

<sup>25</sup> The exceptions are Czechia and Israel, which had very tight labour markets in 2022.

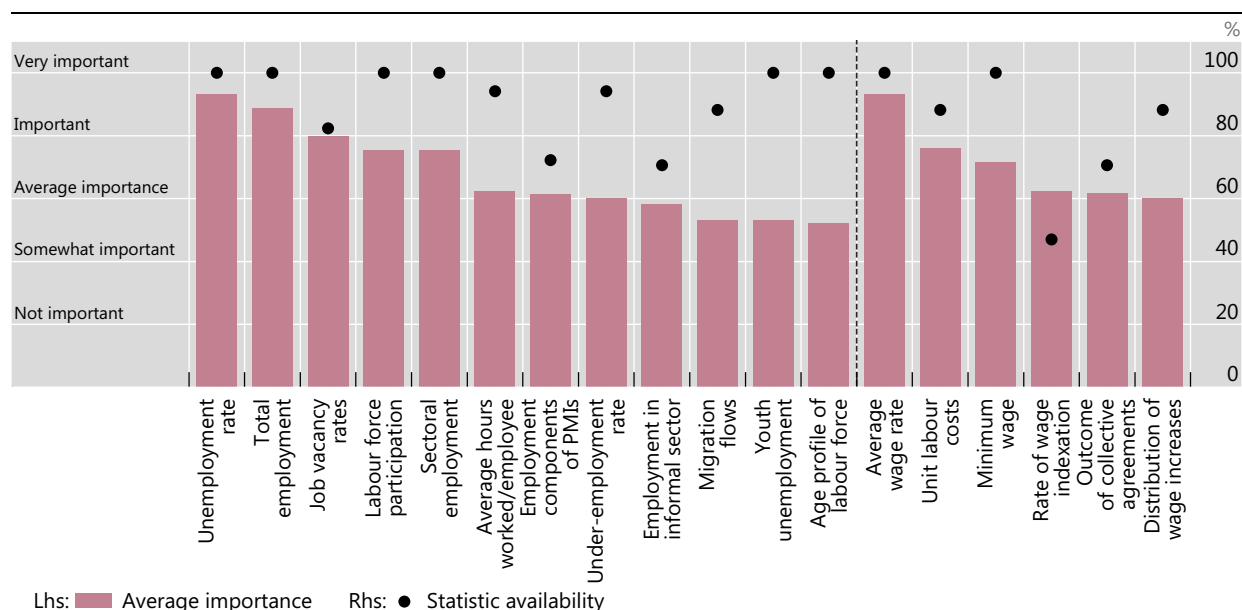


## Annex: labour market indicators in the policy process

Central banks monitor labour market conditions closely, and place high importance on assessing them. The indicators regarded as most important are aggregate ones, such as unemployment and employment, wages, job vacancies and ULCs. These indicators are particularly important for estimating Phillips curves, a key input informing monetary policy decisions. For these indicators, data availability is generally not an issue (Graph 14).

Importance and availability of labour market indicators

Graph 14



Source: BIS survey responses.

However, in an environment where labour markets are recovering amid great uncertainty, central banks may need to look beyond these broad aggregates. Job flows data (eg the number of new hires or separations) can be useful in improving the monitoring of the recovery after large shocks, such as the Covid pandemic. An increase in employment during a particular period can be caused by a rising number of hires or falling number of layoffs, which could have quite different implications for the inflation outlook.<sup>26</sup> Unfortunately, such data tend to be less easily available.

The Covid crisis also showed that developments at the sector level can be very relevant for the inflation process. The pandemic and its containment measures had a very uneven impact on employment and wages across sectors. This distorted the signal embedded in aggregate indicators such as average wage and labour productivity. Furthermore, some sectors may feature strongly in the aggregate labour markets data but have only a minor impact on inflation. A case in point is the technology sector in Israel. Since the lion's share of its output is exported, the large wage increases in that sector will affect inflation much less than the sector's large

<sup>26</sup> In Israel, to improve the understanding of the unemployment situation during the pandemic, a new unemployment rate that included furloughed workers was introduced to monitor the broader-definition job losses across sectors, particularly in the contact-intensive industries.

economy-wide wage bill would have suggested (see country note). Such sectoral data often come from structural employment and earnings survey, which are more readily available in AEs than in EMEs. And long reporting lags can add to the problem.

Wage data are also an issue, especially in the informal sector. Not many EMEs compile official data on informal wages. An alternative is to monitor the developments of minimum wages, assuming that wages in the informal sector move in lockstep.

Micro-level data are important to answer questions such as whether the Covid shock led to scarring in the labour market. Admittedly, this issue is less relevant for inflation today but can have a long-term bearing on inflation through its impact on the level and path of potential output. For example, if unemployment causes the depletion of skills that erodes the employability of certain groups of workers, the high levels will persist for a while, even after the economy has fully recovered. School closures, which were lengthy in some EMEs, could also reduce the skill level of future labour market entrants. Unfortunately, the data necessary to answer such questions are scarce in many EMEs.

In some jurisdictions where official survey data are less granular or published with long lags, central banks can employ new data-mining technologies to help improve monitoring and analysis.<sup>27</sup> For example, the Hong Kong Monetary Authority has started to apply data science techniques such as web-scraping to browse online job advertisements and extract near real-time information on changes in labour demand. This information has the additional advantage of containing highly granular features, such as employment type, education level and skill requirements, and sometimes remuneration. The Reserve Bank of India has also developed a coincident monthly index for informal sector activity, improving its monitoring of this important sector.<sup>28</sup>

<sup>27</sup> Instead of examining the wage-price dynamics, the Bank of Poland note employs micro-level data to estimate the labour market's reaction to economic policy shocks, so as to improve the understanding of policy design and implementation for achieving the objective of sustained employment.

<sup>28</sup> See Bhowmick et al (2022).

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