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## Price level dynamics, wages and distribution

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# Price level dynamics, wages and distribution

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# Price level dynamics, wages and distribution

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**Abstract:** Inflationary processes are closely linked to wage-price spirals – such spirals can be triggered by many factors, including natural resource price shocks, depreciation and inflationary demand. Empirically, the correlation between changes in nominal unit labour costs and the price level is strong for almost all OECD countries, at levels above 0.8. The clear policy conclusion is to make wages and the nominal exchange rate anchors for the price level, which implies that nominal wages should increase according to trends in productivity and the target inflation rate of the central bank. Wage developments without structural changes in the medium term have limited effects on functional income distribution on a macroeconomic level. The structural factors in question include the existence and spread of markets with monopolies, oligopolies and monopsonies as well as corporate governance systems and the power of trade unions to influence profit sharing in companies with rent.

**Keywords:** Wage-price spiral, inflation, functional distribution

**JEL classification:** E12, E31, E64

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## 1. Introduction

A particularly controversial question in economic thinking is what role wages play in determining price level changes and functional income distribution. Wage costs are directly or indirectly included in all goods and services. We argue that in the medium term, wages are a key determinant of the price level and, in the absence of structural changes to the economy, have no substantial effect on functional income distribution. In the short term, many factors, for example, the phase in the business cycle or capacity utilisation, can influence the extent to which higher wages are rolled over to prices or the profit share changes. More importantly, wage developments are pivotal elements of inflationary and deflationary processes and play a significant role in cumulative price level changes. Functional income distribution can shift and depends on the bargaining power of trade unions in monopolies, monopsonies and oligopolies and the market power of companies to generate rents, among other factors. However, as important as these structural factors are for the distribution of income, they generally adjust only in the long term and have minor repercussions for medium-term inflationary processes.

According to Keynes (1936), the production level is independent of the nominal wage level and is determined by real aggregate demand as long as capacities are available. The long-term trend of real output is based on short-term developments and the latter do not fluctuate around a long-term trend. Long-term development is the outcome of short-term development phases which depend on a myriad of economic and political factors. Long-term growth models make sense when examining certain scenarios, but they have no direct relevance for understanding the historical developments of economies. For example, it is not possible to develop a stable investment function, as investments depend on a “state of confidence” (Keynes, 1936, p. 148) that is exogenous to the respective historical situation.

However, in this article, we do not focus on the determination of output and employment, but rather on the determination of the price level and cumulative price level changes. A key aim of this contribution is also to draw policy conclusions for wage policy. We discuss the topic from a Keynesian perspective which goes back to Keynes’s (1930) *Treatise on Money* and is also assumed in Keynes’s (1936) *General Theory*. The next section discusses the factors that play a role in inflationary or deflationary developments. In section 3 we show the effect that wages have empirically had on price level changes. Policy conclusions are drawn in section 4.<sup>1</sup>

## 2. Determination of the price level and its changes

Not many economists believe in the quantity theory of money today. The quantity theory of money fell out of fashion particularly after the 1970s as a wave of national and international financial market deregulations caused increasing instability in the relationship between price level changes and the growth rates of monetary aggregates. Monetary targeting, which was introduced by central banks following the final breakdown of the Bretton Woods system in 1973, was abandoned from the 1980s on. Today, central banks follow inflation targeting or at least announce an official inflation target. As the quantity theory of money has been discredited, costs have been centred as the main factor in explaining price level changes, at least in the medium term.

In the following, we present a more differentiated form of Keynes’s (1930, p. 120) “fundamental equation for the value of money.” National accounting tells us that gross or total output (TP) produced within one year is the sum of intermediate goods ( $I_{nt}$ ) plus gross domestic product at market prices (GDP). GDP is the sum of depreciation (D), indirect taxes minus subsidies ( $T_i$ ), domestically earned wages (W) and domestically earned profits. The latter can be divided into equilibrium profits ( $Q_E$ ) and disequilibrium profits ( $Q_D$ ). Thus, we get  $TP = W + Q_E + I_{nt} + D + T_i + Q_D$ . Gross output is real gross output multiplied by the price index of gross output ( $TP_r \cdot P_{TP}$ ). The same applies to intermediate products ( $I_{nt} \cdot P_{Int}$ ). The capital stock in an economy is the real capital stock ( $K_r$ ) multiplied by the price index of capital goods ( $K_r \cdot P_K$ ). Annual depreciation is  $D = a \cdot K_r \cdot P_K$ , with the annual depreciation rate (a) multiplied by the capital stock. Equilibrium profits are the equilibrium profit rate (q) multiplied by the capital stock,  $Q_E = q \cdot K_r \cdot P_K$ . To show the revenues of indirect taxes ( $T_i$ ), let us take the value-added tax, which is the tax rate (t) multiplied by the nominal net domestic product (NDP), the latter is given by real net domestic product ( $NDP_r$ ) multiplied by the price index of net real domestic product ( $P_{NDP}$ ). We get

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<sup>1</sup> The theoretical parts of this contribution are based on Heine and Herr (2024) to a substantial extent.

$T_i = t \cdot NDP_r \cdot P_{NDP}$ .<sup>2</sup> Equating gross output (TP) with the definition above ( $TP_r \cdot P_{TP}$ ), and dividing the equation by  $TP_r$  yields the definition of the price index of the total product.<sup>3</sup>

$$\text{Equation 1} \quad P_{TP} = \frac{W}{TP_r} + \frac{q \cdot P_K \cdot K_r}{TP_r} + \frac{P_{Int} \cdot Int_r}{TP_r} + \frac{a \cdot P_K \cdot K_r}{TP_r} + \frac{t \cdot NDP_r \cdot P_{NDP}}{TP_r} + \frac{Q_D}{TP_r}$$

There are two more factors which influence the price level. The first is the cost of imports, which depends on the exchange rate and foreign price levels. The effect of the exchange rate on the price level depends on the import quota. The effects of foreign costs are given by the expression  $e \cdot P_{Im} \cdot Im_r / TP_r$  where (e) stands for the nominal effective exchange rate (an increase indicates depreciation), and the import quota with real imports ( $Im_r$ ) is multiplied by the foreign price index ( $P_{Im}$ ) divided by domestic gross output. Depreciations and increasing foreign prices trigger a cost-push in the domestic economy. The second factor comes from exogenous price changes in natural resources which include commodities such as oil, gas and rare earths, but also natural resources like cereals or raw materials such as cotton. Natural resource prices are potentially volatile as they are subject to a variety of pressures including geopolitical disputes, droughts and other disasters, and are often produced by oligopolistic cartels. The price effect of natural resources is given by the price index of natural resources ( $P_n$ ) multiplied by the quantity of natural resources ( $N_r$ ) divided by gross output,  $P_n \cdot N_r / TP_r$ .

Dividing the numerator and denominator of unit labour costs by hours worked (H) yields:

$$\frac{W}{TP_r} = \frac{\frac{W}{H}}{\frac{TP_r}{H}} = \frac{w}{\pi}$$

with nominal hourly wages (w) divided by labour productivity ( $\pi$ ).

Disequilibrium between aggregate demand and aggregate supply which leads to changing prices is reflected in disequilibrium profits ( $Q_D$ ). From national accounting, we get:

$$Q_D = I - S_H + BB + CAB$$

with net investment (I), savings from equilibrium income of households ( $S_H$ ), government budget balance (BB) where  $BB = G - T$  (government demand (G) minus tax revenues (T)) and the current account balance (CAB) where  $CAB = Ex - Im + Y_F$  (exports (Ex) minus imports (Im) plus net income flows from abroad ( $Y_F$ )).<sup>4</sup> Let us assume an equilibrium with full capacity utilisation and price reactions by firms, and higher investment, lower equilibrium savings, higher budget deficits and higher current account surpluses lead to disequilibrium profits.

<sup>2</sup> For the sake of simplicity, we assume consumption taxes such as taxes on petrol or alcohol.

<sup>3</sup> To make the formula clear let us take  $P_{TP} = \frac{W}{TP_r} + \frac{q \cdot P_K \cdot K_r}{TP_r}$  as an example. If  $W = \$90$ ,  $TP_r = \$100$ ,  $q = 0.1$ ,  $P_{K_r} = 1$ ,  $K_r = \$200$  we get:  $P_{TP} = (\$90 / \$100) + (0.1 \cdot 1 \cdot \$200 / \$100) = 1.1$ .

<sup>4</sup> According to national accounting  $GDP = I_G + C + G + Ex - Im$  where (C) stands for consumption demand and ( $I_G$ ) for gross investment. National income (Y) is  $Y = GDP + Y_F - T_i - D$ . As net investment is equal to  $I = I_B - D$  it follows  $Y = C + I + G + Ex - Im + Y_F - T_i$ .

National income is also defined as  $Y = W + Q_{E+F} + Q_D$  where  $Q_{E+F}$  stands for equilibrium profits plus net income flows from abroad. To keep the equations simple, it is assumed that net foreign income flows are only profits and all income flows to private households. Income is then also  $Y = S_H + C + T_d + Q_D$  where ( $S_H$ ) stands for equilibrium household savings and ( $T_d$ ) for direct taxes minus social transfers.

Since  $Y = Y$ , we can equate the two definitions of income:  $C + I + G + Ex - Im + Y_F - T_i = S_H + C + T_d + Q_D$ . It follows:  $Q_D = I - S_H + (G - T) + (Ex - Im + Y_F)$  with total tax revenues as  $T = T_d + T_i$ .

Our final equation showing all relevant factors influencing the price level follows:

Equation 2

$$P_{TP} = \frac{w}{\pi} + \underbrace{\frac{q \cdot P_K \cdot K_r}{TP_r} + \frac{P_{Int} \cdot Int_r}{TP_r} + \frac{a \cdot P_K \cdot K_r}{TP_r} + \frac{t \cdot P_{NDP} \cdot NDP_r}{TP_r} + \frac{P_n \cdot N_r}{TP_r} + \frac{e \cdot P_{Im} \cdot Im_r}{TP_r}}_{\text{Cost factors}} + \underbrace{\frac{I - S_H + BB + CAB}{TP_r}}_{\text{Disequilibrium between demand and supply}}$$

Let us first discuss cost factors before coming to disequilibrium between demand and supply. We mainly discuss the case of increasing prices, but the results can be transferred to decreasing prices. We take the USA as an empirical example.

#### *Unit labour costs*

Unit labour costs are included in literally all goods and services. In 2019, the share of labour compensation in GDP at current national prices was 59% in the USA, 62% in France, 64% in Germany and 56% in Japan (FRED, 2024). If the level of unit labour costs – which depends on productivity and nominal wages – increases, a substantial cost push throughout the whole economy and a subsequent increase in the price level cannot be avoided. In the medium term, labour productivity depends on technological development, changes in natural conditions (for example difficulties in obtaining scarce natural resources) and work intensity. In the short-term, statistically measured productivity and thus unit labour costs depend on the business cycle and the possibility that firms strategically adjust employment to reflect production. Nominal wages depend on many factors including unemployment rates, wage bargaining systems and labour market institutions in general. Fortunately, decreasing nominal wage levels and related deflationary developments are relatively rare in historical terms. This is because “workers, though unconsciously, are instinctively more reasonable economists than the classical school, inasmuch as they resist reductions of money wages, which are seldom or never of an all-round character” (Keynes, 1936, p. 14). Wages can increase “spontaneously”, based on the power and strategy of trade unions, and wage increases may be “induced” by changing price levels which are caused by multiple factors – depreciation, natural resource price shocks, demand-driven inflation in a boom phase, etc. (Keynes, 1930, p. 151). Price shocks are the key trigger for induced wage increases as real wages are reduced which causes trade unions to follow a policy intended to defend real wages. In such cases cumulative price level processes are likely.

#### *Intermediate goods*

Increasing prices for intermediate goods is the most direct and quick channel for transferring a cost increase to the entire economy. Many firms produce products which are intermediate products for other firms. Let us take the USA. In 2023, the gross output of the US economy was \$47,837 billion and GDP was \$27,360 billion which implies that 74.8% of GDP was made up of intermediate goods (FRED, 2024). This shows how quickly cost increases can potentially roll through the economy.

#### *Depreciation*

Increasing costs increase the prices of capital goods. Wear and tear of capital goods flows into the price of goods and services in the form of depreciation. It should be noted that depreciation takes into account the replacement value of the capital stock, e.g., of a machine. Higher prices for new capital goods will increase the value of depreciation firms calculate. In the USA in 2022, the net stock of fixed assets (without private households) at current prices had a value of \$85,943 billion. The depreciation rate was assumed 4.9% which results in depreciation costs of 17.7% of GDP (FRED, 2024).

## *Profit mark-ups*

The equilibrium profit mark-up, defined by the equilibrium profit rate, can only partly be considered as a cost. When a company takes credit and has to pay interest, it must earn the interest, otherwise it goes bankrupt. In this case, one can speak about costs as a part of profits. Of course, in the medium term, no wealth owner will invest in equity, for example, shares, when the rate of return does not reach the interest rate. In this case, opportunity costs become important. In the USA in 2023, total business debt was 75.6% of GDP (Fed, 2024). This means a substantial part of profits are direct costs which firms have to cover.

Both the interest rate as a minimum for the profit rate and the power of companies in the market to earn rents are important for profit mark-ups. On the selling side of firms, there are widespread oligopolistic and even monopolistic structures which allow high rents. Kalecki (1938; 1971) correctly argues that oligopolistic and monopolistic mark-ups can explain large parts of profits. Among others, Stiglitz (2019) emphasised that, for example in the USA, the increasingly excessive rent-seeking of corporations via the intensifying importance of brands, sophisticated marketing strategies, artificially created and opaque pricing systems, and political acceptance and support for very powerful – mostly multinational – corporations allowed a sharp increase in profits. This development is widespread, not restricted to the USA and reflects economies of scale and scope as the typical characteristics of industrial production and internet services which leads to oligopolistic structures if not politically controlled. However, powerful players have also emerged on the purchasing side of firms. Lead companies in global value chains specialising in high value-added activities use their power as monopsonies or oligopsonies to minimise the prices of inputs. In the case of foreign direct investment, profit inflows from other countries, often from the Global South, increase the profits of multinational companies. Multinational companies are usually in a rent-seeking paradise with high rents on both their selling and buying sides (Teipen *et al.*, 2022). This implies that, in the long run, the profit rates of firms will not adjust to the same level as rents in different firms and different industries and can be earned over longer periods or even permanently. The equilibrium profit rate in Equation 2 includes such different profit rates.

The power of trade unions also plays a role here. Strong trade unions can bite into rents, as firms are reluctant to roll over all increasing costs to prices in periods of increasing wage costs as this reduces demand for the produced good or service (Kalecki, 1971, p. 161; Hein, 2015). However, in the event of a wage increase in all companies, the individual demand functions of oligopolies and monopolies will shift outwards and increase the scope for passing on higher wage costs.

The role of trade unions and corporate governance structures play an important role in long-term changes in mark-ups. If management seeks a compromise between the various interest groups in the company (especially owners and employees), then rents based on market power are shared between labour and capital. An example of this is the development in the USA following World War II, which was shaped by the New Deal of the 1930s. According to Galbraith (1967), the typical stakeholder capitalism in that period was characterised by management comparable to state bureaucracies that sought compromises among the various stakeholders in the firm. Profit sharing with workers was the rule. This type of capitalism existed in virtually all Western countries. In the 1980s, the shareholder corporate governance system began to take hold (Rappaport, 1986), reflecting the deregulation of financial markets, a more powerful role of agents in the financial system, a more short-term orientation toward maximising profits, higher remuneration of management, more deregulated labour markets, and last but not least, weaker trade unions. Gerald Epstein (2005) called this development the “financialisation” of the economy which contributes to higher mark-ups (for details see Heine and Herr, 2024). In the USA, unit labour costs increased by 525% between 1957 and 2023, unit profits increased by 560%. Unit profits remained low in the 1950s and 1960s, and started to increase particularly in the 2000s (FRED, 2024). Empirically, functional income distribution shifted in favour of profits; this is true not only in the USA but in many countries around the world. This trend can be observed particularly since the 1990s (Dünhaupt, 2017; Guerriero, 2019; Stockhammer, 2017). In our interpretation, this reflects financialisation, oligopolistic and monopsonistic tendencies and weaker trade unions.

To summarize, at any time there exists a structure of markups in the economy which exists independently of disequilibrium between demand and supply (Keynes, 1930, p. 111). This markup can change, but these changes are medium- and long-term. Looking at the empirical development in the

USA for example, it becomes obvious that changes in markups can influence the price level over longer periods, however, these changes cannot be used to explain inflationary or deflationary dynamics.

### *Taxes*

If the value-added tax increases almost all goods will be affected. There is not much debate that this will increase the price level. The same is the case for customs or excise duties or taxes such as a CO<sub>2</sub> tax or a mineral oil tax which are quickly passed on to the economy as a whole.

### *Price shocks of natural resources*

Changes in commodity prices are potentially extremely disturbing factors for the price level, and food prices can change quickly in the case of a poor harvest. One example of such a shock is the price increases of one barrel of crude oil in the 1970s triggered by the Yom Kippur War between Israel and a coalition of Arab states – from \$25.10 to \$63.93 in 1973 and eventually to \$150.81 in 1979 (Macrotrends, 2024). Because of the Russian-Ukrainian war starting in February 2022, the euro price for one MWh of natural gas increased from €5.30 in mid-2020 and peaked at over €339 in mid-2022, falling back to around €33 in April 2024 (Trading Economics, 2024). Such price shocks affect the whole economy as natural oil and gas are included in almost all products. In a cross-country analysis calculated by the Federal Reserve in 2023, it was determined that a 10% increase in oil prices leads to a 2.3% increase in the energy consumer price index. Further effects can be found in increasing food prices and core inflation. Overall, a 10% increase in oil prices leads to a 0.4% increase in the Consumer Price Index (CPI) whereas the energy price index increases quickly within two quarters, food and core inflation increase more slowly at up to eight quarters (Alp *et al.*, 2023). This means that increasing oil prices by 25% increases the price level by 1%.

Rising price levels due to rising natural resource prices lead to falling real wages. If the producers of natural resources are located abroad, the entire country importing the resources becomes poorer. If the producers are located domestically – for example, companies that produce oil in the USA – this leads to redistribution within the country. In both cases, the real wages of employees and the real income of the mass of the population, including pensioners or people living on social transfers, fall. Such developments can easily spark deep distributional conflicts. In the 1970s, the oil price shocks in several countries triggered increasing nominal wages to defend real wages. If nominal wages increase in only one sector, real wages in this sector increase or remain static. In a case where nominal wages increase across all sectors, the following increase in the price level does not allow for substantial real wage increases. In the 1970s, wage-price spirals developed with escalating inflation rates. In almost all countries, after varying degrees of procrastination, central banks pushed up interest rates which resulted in stabilisation crises, recessions and high unemployment. Politically, this paved the way for the neoliberal revolution. In 1980 Ronald Reagan was elected in the USA; in 1979 Margret Thatcher in the United Kingdom (for details see Heine and Herr, 2024).

What we can learn here is that, across many historical periods, significant price level shocks resulted in substantially lower real wages which triggered wage-price spirals that led to inflationary processes which were then fought by central banks with restrictive monetary policy, ultimately resulting in low GDP growth or a recession. Central banks have the power to stop inflationary processes via a stabilisation crisis. It must be considered that rising inflation rates following price shocks place an extreme burden on the real income of the lower-income classes. Intense pressure to increase nominal wages may occur. However, increasing all nominal wages to compensate for a shock, for example in oil or gas prices, will lead to economic instability instead of resulting in higher real wages. Therefore, low-income population groups should be supported by a specific wage policy for lower wage earners and a committed social policy on the part of the state (see below).

### *Exchange rate and import prices*

Since depreciation directly increases the prices of imported goods and exchange rates can change quickly and substantially, exchange rate movements can trigger extremely strong shocks and inflationary developments – even more than natural resource price shocks. If there are sharp devaluations that



increase the price level dramatically and reduce real wages accordingly, the country finds itself in an extremely difficult situation. This is because severe reductions in real wages are difficult to communicate to the population and often lead to increasing levels of poverty for parts of the population. However, if such a situation leads to strong nominal wage increases, then inflation increases further. Then the danger of a cumulative devaluation-wage-price spiral forms which leads to escalating inflation rates. Typically, hyperinflations are driven by the collapse of the exchange rate caused by a high inflation rate and the erosion of confidence in the domestic currency combined with a wage-price spiral (Robinson, 1938). Historically, numerous examples can be pointed to in the Global North and Global South (Fischer *et al.*, 2002; Heine and Herr, 2024). An example of this is Turkey in the 2020s (Akçay and Güngen, 2022).

This section has outlined the factors that determine cost levels and their potential dynamics. Finally, we now focus on constellations in which aggregate supply deviates from aggregate demand which results in price effects. In the context of inflation theories, this is discussed as demand inflation or demand deflation.

### *Disequilibrium between demand and supply*

Disequilibrium between demand and supply in the goods market depends on the interaction of all four economic sectors. More concretely, it depends on the interaction between net investment, the planned savings of households, the budget balance of public households and the current account balance. Excess demand can lead to quantity and/or price reactions by firms. In terms of price reactions, in a scenario of full capacity utilisation, excess demand allows firms to increase prices. In many constellations, excess demand leads to price and quantity reactions, for example when initial bottlenecks in some sectors are reached in a boom phase. To the extent that excess demand leads to increasing prices, firms realise disequilibrium profits. If these profits lead to further investment or the additional consumption of owners of firms, disequilibrium profits increase further. “Thus, however much of their profits entrepreneurs spend on consumption, the increment of wealth belonging to entrepreneurs remains the same as before. Thus, profits ... are a widow’s cruse which remains undepleted however much of them may be devoted to riotous living” (Keynes, 1930, p. 125). Joseph Schumpeter (1934) argues that high investment, financed by the banking system including the central bank, exceeding planned savings increases prices and allows firms to appropriate those goods they need to increase the real capital stock. In the case of a lack of demand, price-quantity reactions can also be expected. Decreasing prices leads to losses (or less than equilibrium profits). If firms react with less investment and owners with less consumption the widow’s cruse becomes a Danaid jar which can never be filled (Keynes, 1930, p. 125).

Imbalances between demand and supply can influence the price level but only in exceptional, major and long-lasting cases is this a cause of inflationary or deflationary developments. However, demand-driven inflation may trigger inflationary wage increases. A strong boom with excess demand in the context of capacity shortages is a typical constellation for demand inflation with high profits, high demand for labour and an environment for high inflationary wage increases. Such a constellation was typical in many countries of the Global North at the end of the 1960s (Heine and Herr, 2024).

### *The expected role of wage costs for price level developments*

If costs increase, firms will sooner or later increase prices. Even a half-educated economist will not be able to deny that rising oil prices, rising consumption taxes, rising import prices or rising unit labour costs will drive up prices. Monopolies and oligopolies, but also firms in monopolistic competition have the power to change prices as soon as costs change. However, firms will not usually increase or decrease prices immediately following changing costs. A quick adjustment may happen, for example, when the value-added tax increases and all firms are confronted with the same cost increases and act jointly. This can also happen if prices in countries with high inflation are adjusted hourly according to the exchange rate. But in typical cases, in the short term, the ability of companies to strategically pass on rising costs to prices depends on a myriad of factors. New Keynesian approaches have emphasised that price changes are costly for companies, as this can require changing price lists and printing new catalogues, and that price increases therefore only take place with a time lag. If the individual room for manoeuvre for price increases is small, there may be a build-up process that gradually increases the price level (Mankiw and

Romer, 1991).<sup>5</sup> Price reactions also depend on the type of economic shocks experienced. When considering demand shocks, price reactions seem to be faster than in the case of supply shocks (Gumiel and Hahn, 2018). The intensity of international competition, which can make price increases for tradable goods more difficult, also plays a role. It is not possible to develop a stable rule for the speed at which prices adjust to costs, this simply depends on the specific historical constellation. We can follow Keynes (1936), who speaks of a moving equilibrium. This means that the adjustment of prices to costs almost always lags behind the development of costs with an unstable time lag. In the medium term and particularly in the long term, however, a very close relationship between changes in cost levels and price levels can be expected.

Around 60% of GDP is made up of direct wage costs. In many inputs, wage costs are indirectly included. But the role of wages for the price level goes beyond this. Typically, price shocks – stemming from changes in natural resource prices, depreciation or demand inflation – trigger inflationary wage-price spirals. The more nominal wages react to a price level shock, the closer the development of unit labour costs and the price level becomes. Considering these arguments together with a longer-term perspective, a very high correlation between unit labour cost changes and price level changes can be expected. “Theoretical models generally do not put into question that in the long run labour cost inflation and price inflation are closely interrelated and that we should eventually expect wage inflation, adjusted for productivity, to move together with price inflation.” (Bobeica *et al.*, 2019, p. 4f.) This also implies that without structural changes, wage policy is a blunt sword to change functional income distribution.

### **3. Correlation between changes in wages, unit labour costs and price level**

Our empirical analysis focuses on the correlation between unit labour costs and price levels across 31 OECD countries. Countries were selected based on relevance and availability of data, and analysis was conducted for the total economy (all sectors, all activities) in each country. Table 1 shows the correlation coefficients between unit labour costs and the GDP deflator as well as CPI.

We sourced unit labour cost data (annual growth rate) from two OECD datasets (2024A; 2024B). The first dataset (OECD, 2024A) was discontinued in 2012, and the second dataset (OECD, 2024B) continues the collection of annual unit labour cost data. Where the datasets overlap, we used the more recent data. We have used the maximum available years for each country, with the actual years covered shown in parentheses after the country name. GDP deflator and CPI data (annual growth rate) from the World Bank (2024A, 2024B) were selected to reflect the rate of price changes in the economy as a whole.

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<sup>5</sup> We follow these arguments, but we do not see wage and price rigidities as a reason for crisis-like developments and unemployment. On the contrary, rigid nominal wages are desirable (see below).

**Table 1: Correlation coefficient between unit labour costs (ULC) and the GDP Deflator and consumer price index (CPI) for various OECD countries, specific years in parentheses**

Country	ULC & GDP Deflator	ULC & CPI
Australia (1971 - 2017)	0.81	0.82
Austria (1971 - 2022)	0.78	0.64
Belgium (1971 - 2021)	0.91	0.85
Canada (1971 - 2022)	0.88	0.9
Czechia (1993 - 2022)	0.92	0.79
Denmark (1967 - 2022)	0.87	0.82
Estonia (1996 - 2022)	0.81	0.72
Finland (1971 - 2022)	0.86	0.86
France (1961 - 2022)	0.95	0.92
Germany (1971 - 2022)	0.81	0.61
Greece (1971 - 2022)	0.9	0.87
Hungary (1993 - 2022)	0.94	0.92
Ireland (1971 - 2022)	0.79	0.84
Israel (1996 - 2021)	0.8	0.76
Italy (1971 - 2022)	0.96	0.93
Japan (1971 - 2011)	0.96	0.95
Korea (1971 - 2022)	0.94	0.87
Latvia (1996 - 2021)	0.89	0.69
Lithuania (1996 - 2022)	0.82	0.79
Luxembourg (1971 - 2022)	0.39	0.72
Netherlands (1970 - 2022)	0.79	0.73
Norway (1971 - 2022)	0.32	0.68
Poland (1993 - 2022)	0.96	0.93
Portugal (1971 - 2021)	0.85	0.82
Slovak Republic (1994 - 2022)	0.74	0.64
Slovenia (1996 - 2022)	0.75	0.67
Spain (1971 - 2022)	0.94	0.9
Sweden (1971 - 2022)	0.86	0.76
Switzerland (1991 - 2021)	0.65	0.61
United Kingdom (1971 - 2022)	0.9	0.87
United States (1971 - 2021)	0.94	0.93

Source: OECD (2024A, 2024B); World Bank (2024A, 2024B)

The results show a strong and significant relationship between unit labour costs and the price level. Considering the GDP deflator, most countries have a correlation coefficient of over 0.8. The correlation between unit labour costs and CPI for most countries is slightly less, except for Germany. The explanation for this is that GDP covers a broader basket of goods and CPI includes goods which are not produced, for example, land prices included in renting flats. A high correlation was expected, but taking into account the many other factors that influence prices, it is astonishing that the correlation is so high. It shows the overwhelming importance of wage costs for prices. It must remain open whether wage

increases follow price increases or vice versa (Sbordone, 2002). Typically, the inflationary dynamic starts with a price-wage spiral and not a wage-price spiral.<sup>6</sup>

Only Luxembourg (0.39), Norway (0.32) and Switzerland (0.65) show a weaker correlation between unit labour costs and the GDP deflator. This can be explained by the relatively small size of these countries and their relatively stable development of nominal wages. In general, we can assume that the larger the import quota, the larger nominal exchange rate movements and price shocks from natural resources will be, and the weaker the reaction of nominal wages to such shocks and the lower the correlation between unit labour costs and inflation will be. Thus, looking at historical development, it is understandable that the correlation between wage costs and the price level became weaker when comparing the 1970s with the 2000s (Peneva and Rudd, 2017).

#### 4. The wage norm

Above it was shown that wage costs play a central role in the determination of the price level. This leads directly to the desirability of making wage development an anchor for the price level. Keynes (1936, p. 270) was very clear on this point: “In the light of these considerations I am now of the opinion that the maintenance of a stable general level of money-wages is, on a balance of considerations, the most advisable policy . . . the money-wage level as a whole should be maintained as stable as possible, at any rate in the short period.” This implies that in the ideal case, wage levels should increase according to productivity development plus the target inflation rate. If this wage norm is followed unit labour costs increase according to the target inflation rate. The statistically measured annual productivity development which is influenced by the business cycle should not be the guideline for wage development, instead, medium-term productivity development should serve as a guideline. This implies that price shocks should not lead to reactions by nominal wages and real wage cuts during inflationary price shocks should be accepted. *The Keynesian recommendation is, opposite to the neoclassical credo, nominal wage rigidity and real wage flexibility.*

It is difficult for trade unions and societies in general to follow such a recommendation. However, what happens if this cannot be achieved can be seen in the inflationary period of the 1970s and the subsequent deep recession and political changes as well as in the Great Depression in the 1930s (Heine and Herr, 2024).

The probability of functional wage policy increases if it is embedded in a basket of macroeconomic policies. This is the topic of the conclusion.

#### 5. Conclusion

In equilibrium, the price level is determined by the costs of production. Although imbalances between supply and demand can have a modifying effect on the price level, they do not explain either the level itself or cumulative changes in the form of inflationary or deflationary processes. Within the cost factors, nominal wages are of particular importance both qualitatively and quantitatively. Quantitatively, because they make up the largest part of direct and indirect production costs, and qualitatively because only they can constantly feed an inflationary, i.e., cumulative, process (Hein, 2023).

In the post-Keynesian debate, the interaction between wages and prices is discussed as conflict inflation (for an overview see Hein, 2023). One can speak about conflict inflation when certain real wages or real wage cuts are not accepted and nominal wages are adjusted. But with the same justification we could speak of conflict inflation between oil producers and firms in cases of higher oil prices or between producers of imported goods and firms in cases of depreciations. We prefer to speak about the power of firms, given by the market, to roll over increasing costs regardless of the types of costs involved. Firms have the power to set prices and are therefore fundamentally “in the driver's seat” in capitalist economies.

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<sup>6</sup> We also looked at other correlations. The correlation between unit labour costs and the nominal effective exchange rate for most countries is weakly related, with the highest positive value in Germany (0.36) followed by the Netherlands (0.33) and Austria (0.32). For most countries the correlation is weak and negative, for example, the UK (-0.06) and France (-0.24) (OECD, 2024A, 2024B; IMF, 2024). These correlations fit the expectations.

Four central economic policy conclusions can be derived.

Firstly, the empirical data show a very close medium-term correlation between nominal unit labour costs and the price level. An aggressive wage policy cannot be used to correct the functional distribution of income in favour of wage earners. Apart from short-term fluctuations only changing institutional and structural conditions in the economy can change functional income distribution. This is supported by the empirical development of the adjusted wage share of GDP – for example from the early 1970s to the 2020s this share changed from 70% to 64% in Germany, 67% to 61% in the USA, 64% to 65% in the UK and 69% to 60% in Italy (AMECO, 2024). These developments can hardly be explained by nominal wage developments which were completely different over time between the countries mentioned. But even if it is assumed that nominal wage policy has slight distributional effects, there can be no doubt that the inflationary effects of increases in unit labour costs are far more substantial.

According to the wage norm, nominal wages should increase in line with the central bank's target inflation rate plus the trend increase in productivity. This wage norm applies not only in the event of a price level shock but also in the event of economic downturns or crises. If this norm cannot be realized, economies are at risk of entering inflationary processes with the consequence of costly stabilization crises induced by monetary policy or finding themselves in deflationary waters. Consequently, wage policy must assume the function of an internal stability anchor for the price level accepting real wage flexibility, while other economic policy instruments must be used to influence the employment level.

Secondly, trade unions will be overburdened if they try to follow the wage norm alone. This is because exogenous price level shocks such as energy price increases or depreciations cause real wages to fall. Members of trade unions usually demand a policy of securing real wages. This is exacerbated by the fact that lower wage groups in particular are negatively affected by such shocks, as are recipients of state social benefits and low pensions (cf. Tober, 2022). For this reason, trade unions and governments must work together. For trade unions, this implies that the real wages of the lower wage groups should be stabilized while maintaining the wage norm. One strategy would be to implement absolute instead of percentage wage increases for a certain period. The state, on the other hand, must provide relief for low-income earners by, for example, increasing low pensions and social benefits or targeted social transfers. Sharp and rapid price increases for goods important for production and consumption such as oil or gas could be limited by government-imposed price ceilings – for example, the government could take over payments for raw materials to the extent that their price exceeds the set ceiling (Weber *et al.*, 2024).

Thirdly, uncontrolled depreciation can play a devastating role in these dynamics, as it leads to a sharp increase in costs for many prices over an extremely short period. As a result, real wages fall substantially. If attempts are made to compensate for this by increasing nominal wages, the countries affected are threatened with a devaluation-wage-devaluation-price spiral. If the foreign debt of the devaluing country is denominated in foreign currencies, the real debt stocks increase. The regularly recurring debt crises, particularly in countries of the Global South, reflect this situation. Against this backdrop, a relatively stable nominal exchange rate represents a second anchor for the stability of an economy. Regulation of international capital flows and prevention of high current account imbalances are needed to reduce exchange rate volatility. Keynes's idea for the Bretton Woods system can still serve as a blueprint for reform of the international financial system (Herr, 2011).

If the nominal wage and exchange rate anchors hold, then monetary policy should allow price level shocks to pass through the economy and not react with restrictive monetary policy. The price level would then fluctuate after a shock, but stabilise again after a while. In the event of a price level shock, it would be very costly economically for a central bank to stabilise the inflation rate via falling nominal wages.

Fiscal policy should react expansively to price level shocks in natural resources. This is because such shocks inevitably reduce real income and real demand, resulting in weak growth or a recession.

It would be helpful to have a permanent and powerful "round table" at which representatives of public households, the central bank, trade unions and employers, as well as pension systems and welfare organizations, sit. A kind of "social pact" with all relevant social groups would be desirable when putting together a macroeconomic policy package that stabilises the economy, maintains social cohesion and prevents distributional struggles.

Fourthly, processes of deregulation, for example in financial as well as in labour markets, resulted in financialisation with its negative effects. This, together with the growing strength of multinational oligopolies and oligopsonies, led to a different type of capitalism when compared to the 1950s and 1960s. These are the main reasons for changing functional income distribution.

Future challenges have grown – from solving ecological problems to ageing societies to the likelihood of high military expenditures. Kotz *et al.* (2024) calculated that global warming and heat extremes will push up annual food inflation between 0.92% and 3.23% and general inflation between 0.32% and 1.18%. Higher costs also can be expected for many natural resources. All these developments will depress real wage growth in the foreseeable future. Distributional conflicts may escalate during inflationary developments. A new variant of regulated capitalism would be desirable and even necessary with macroeconomic functional wage development as one element, secured and supported by strengthened wage negotiation systems and by state distribution and employment policies.

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