Accounting for post-pandemic inflation in the US: profit margins, income distribution and pricing

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Abstract

We draw on national accounts data and firm-level data from Compustate to consider the evidence on pricing, corporate behaviour and distribution in the US. We calculate profit margins for aggregated sectors at several levels: the non-financial corporate sector, industrial sectors and publicly listed firms. We calculate price deflator decompositions for the non-financial corporate sector. We find that, while corporate profit margins were meaningfully higher in recent data points than in the pre-pandemic period, the increase in margins largely took place at the start of the pandemic as economic activity contracted, and in advance of the period of rising prices and expanding economic activity. Initial increases in profit margins coincided with the provision of large government subsidies to the corporate sector. During the period of high price inflation, profit margins were either flat or falling. We conclude that the evidence does not allow for firm conclusions to be drawn about the relationships between corporate pricing, distribution and inflation.

1 Introduction

The outbreak of inflation which followed the Covid pandemic led to extensive debate about a potential relationship between rising prices and corporate profit-seeking. Explanations for the inflation initially focused on supply shocks arising from the pandemic and the Russian invasion of Ukraine, the demand effects of expansionary monetary and fiscal policy, and the subsidies, cash transfers and other support schemes provided by governments. Another potential explanation emerged towards the end of the pandemic: amidst the confusion, it was argued, firms were taking the opportunity to increase price markups (Bivens, 2022). Weber and Wasner argue that post-pandemic inflation should be understood as "predominantly a seller's inflation that derives from . . . the ability of firms with market power to hike prices" (2023, p 183).

This view quickly gained influence. Iin 2023, Isabel Schnabel, a member of the European Central Bank board, claimed that "if you do the macro decomposition, part [of inflation] is driven by profits, full stop. It's a fact" (quoted in Weber, 2023). The latest version of *The Economy*, the open source textbook produced by the CORE Econ team, includes 'profit-push (or sellers') inflation' as a fourth category alongside cost-push, demand-pull and expectations-driven inflation.

Data on income distribution provide some support for the claim that opportunistic corporate pricing played a significant role in generating inflation: Weber and Wasner note that US corporate profits as a percentage of value added increased during the pandemic. A number of empirical exercises decompose price increases into contributions from wage costs, increases in profits and other factors, for both the US and European countries.[1] Some claim to identify a link between increased corporate markups and price increases. The sellers' inflation hypothesis is not without dissent, however: Lavoie (2023) argues that increased post-pandemic profit margins can be explained without requiring the assumption that markups increased.

In this paper we draw on data from three sources to consider the evidence on pricing, corporate behaviour and distribution in the US: we use the National Income and Production Tables and the Industry Accounts provided by the Bureau of Economic Analysis to calculate profit margins and deflator decompositions for aggregated sectors. We use firm-level data from Compustat to calculate profit margins for publicly listed companies incorporated in the US, and to explore the relationship between rising measured profit margins and the structure and composition of the corporate sector.

We find that, while corporate profit margins were meaningfully higher in recent data points than in the pre-pandemic period, the increase in margins largely took place at the start of the pandemic as economic activity contracted, and in advance of the period of rising prices and expanding economic activity. Initial increases in profit margins coincided with the provision of large government subsidies to the corporate sector. During the period of high price inflation, profit margins were either flat or falling.

We revisit price decomposition exercises and argue that care must be taken when using such exercises to impose causal explanations: these exercises do not contain more information than measures of profit and wage shares in value added and therefore can be potentially misleading.

We show that trends in profit margins during the pandemic are congruent with longer-run trends in the distribution of income: as is well documented, the labour share has been falling for several decades in the US, and shares of profit in income have increased substantially since around the early 2000s. Using firm-level data, we show that increases in margins are concentrated in a relatively small proportion of firms, and that shifts in market structure contributed more than within-firm markups to the observed rise in aggregate margins. These shifts in the structure of the corporate sector are not unique to the pandemic period, but are also evident in the decades prior to the pandemic. We show that administrative costs are an increasingly important component of total costs for firms with substantial market share, and that measured markups follow a different trajectory once these costs are included.

We conclude that the evidence does not allow for firm conclusions to be drawn about the relationships between corporate pricing, distribution and inflation. Declining margins for much of the corporate sector during the period of high price inflation and concentration of of margin increases among a relatively small proportion of firms do not appear to provide *prima facie* support for the assertion that opportunistic markup increases were a primary driver of inflation. Nonetheless, profit shares and aggregate margins had reached historical highs by 2023 or 2024, demonstrating that some firms at least had succeeded in preserving or raising profit margins

[1] These include Bivens (2022), European Commission (2023), Glover et al. (2023), Haskel (2023), Horstein (2023), Konczal and Lusiani (2022), Matamoros (2023), Picciotto (2023), Storm (2023), Vernengo and Caldentey (2023), and Weber and Wasner (2023)

since 2019.

We proceed as follows. Section 2 reviews the literature and debates on post-pandemic inflation. Before turning to the empirical evidence, Section 3 considers some accounting issues and constraints imposed by data availability. Section 4 examines data from the National Income and Production accounts to consider profit and wage shares in corporate value added and price decomposition exercises. Section 5 turns to the Industry Accounts to examine the evolution of profit margins for aggregated industry sectors. Section 6 uses Compustat firm-level data to examine the structure and composition of aggregated profit margins. Section 7 concludes.

2 The debate on inflation and corporate behaviour

The pandemic saw large disruptions in production in the US and elsewhere. Economic activity contracted and unemployment rose sharply. The government provided substantial support to both firms and households in the form of subsidies, grants and direct additions to household income. Alongside fiscal stimulus, the pandemic saw shifts in spending patterns and changes in the structure of household savings: consumer spending shifted from services to manufactured goods and the household sector accumulated large cash balances. As economic activity recovered from around late 2020, disruptions in production translated into price increases. International shipping was an important bottleneck, particularly for commodities and manufactured goods. The Russian invasion of Ukraine was followed by sharp increases in prices of fuel and food. Consumer prices rose rapidly from around the start of 2021 until around the middle of 2022.

Profit margins calculated using aggregate national accounts data rose sharply at the start of the pandemic before partially reverting to lower levels. Employee compensation as a share of corporate value added was lower by 2022 than in the immediate pre-pandemic period. There was wide variation in the shifts observed in industry-level and firm-level profit margins both in timing and overall change in position: some firms and industries saw large permanent or temporary gains, while others saw losses or limited changes.

These stylised facts, in conjunction with evidence taken from earnings calls of selected companies, have been widely interpreted as evidence for 'seller's inflation': the hypothesis that firms used generalised price increases as a smokescreen to raise prices opportunistically, raising profit margins and contributing to overall price inflation. The hypothesis has attracted substantial popular support but has also generated debate: some argue that more plausible explanations for the stylised facts are available.

These debates are characterised by a lack of clarity on a number of issues, including definitions of terms such as 'seller's inflation', and how to interpret relationships between distributional data (profit margins, income shares) and price indices. Open questions remain about the process and sequence by which behaviours interact to generate inflation in the various possible accounts and about relevant counterfactuals: what would a situation of general price inflation in which sellers' inflation did not play a role look like?

There are a number of unresolved issues raised by these exercises, including questions about how empirical evidence should be interpreted: to what extent have profit margins and/or markups increased? What can be inferred from changes in the distribution of income between wages and profits? If margins have increased, what is the causal connection, if any, with inflation?

These questions are related to technical issues: what are the appropriate empirical measures? How should markups and margins be calculated? Lavoie (2023) notes that with fixed overhead costs and fixed markups set on the basis of unit direct costs, the overall unit cost for a firm will fall as output increases and the fixed overhead cost is spread over an increasing number of units of output. With a fixed markup, the profit margin of a firm will rise as production increases. Even setting this issue aside, the relationship between markups and profit margins is not direct—even for a given level of production—if costs include a non-labour component. If firms set prices by marking up over costs including intermediate inputs, then any increase in input cost will translate into higher profit margins and a lower wage share at fixed margins.

In response, Storm (2023), Weber et al. (2025) and others argue that sellers' inflation does not require an increase in markups – simply defending markups in the face of higher input costs will be sufficient to shift distribution from wages to profits. Indeed, even a *reduction* in markups can be compatible with a shift in distribution from wages to profits. This highlights the difficulty in assigning price inflation to a particular behavioural cause: what is the relevant counterfactual?—What proportion of cost increases must absorbed by firms for overall price increases not to be deemed profit-driven? What would we expect to observe in the presence of inflation but in the absence of 'seller's inflation'? Given that sellers' inflation is an amplification mechanism, how can its contribution to price increases and distributional shifts be quantified – how much did increases in profit margins contribute to price inflation? Ultimately, *any* general increase in prices requires firms to raise their prices – at what point does this become 'sellers' inflation'?

To try and shed light on these questions, we revisit empirical exercises related to the seller's inflation debate by collating and re-examining empirical evidence from national accounts, industry-level datasets, and firm-level data. We consider the conceptual and aggregation issues involved in interpreting this evidence. We pay careful attention to the sequence of movements in data series and compare these to the sequence implied by the sellers' inflation hypothesis. We find that, in aggregate, corporate profit margins increased sharply at the start of the pandemic, before price rises had begun. This increase follows the provision of large-scale government subsidies to firms. Aggregate profit margins do not increase further during the period of price rises. During this period, however, there are substantial significant underlying shifts: government subsidies were withdrawn, interest costs fell and nominal wage costs rose rapidly. By the end of the pandemic, aggregate after-tax corporate profits were around two percentage points of GDP higher while interest and wage costs were lower as a share of GDP.

3 Profit margins, markups, income shares and prices

Empirical studies draw on a range of quantitative measures to identify connections between distributional outcomes and firms' pricing decisions. Decisions on which measures to use are influenced by data availability. Detailed and comprehensive information about the prices set by firms and the structure of costs they face is not available; studies generally rely on related but not equivalent data such as series for total revenue, gross output and various measures of total costs to calculate ratios which are used as proxies for price markups.

Exercises which attempt to connect pricing decisions with distributional outcomes such as wage or profit shares require consistent datasets in which the components of prices – unit labour

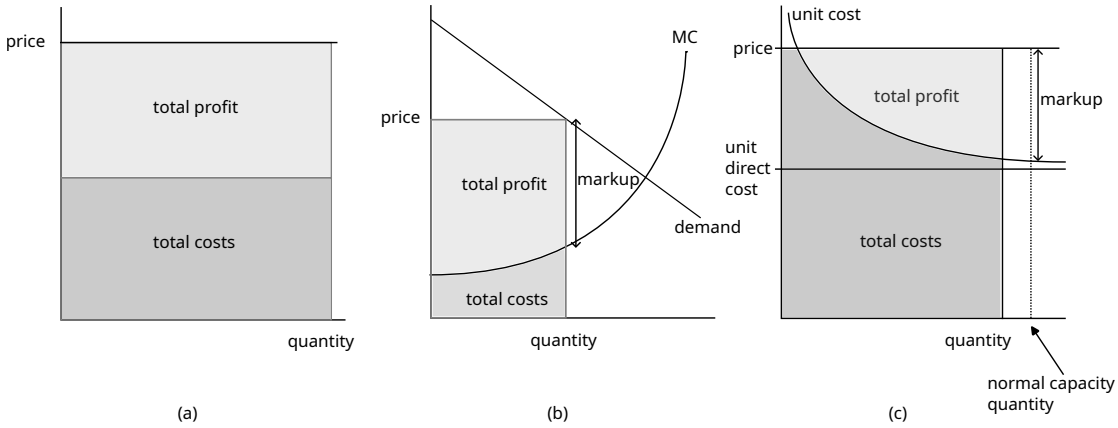

Figure 1: Profit margins and markup pricing

costs, unit profits and so on – sum to the relevant price or index. Producer price indices, for example, provide useful information about the prices set by firms, but cannot be reconciled directly with cost data and thus with distributional indicators such as wage shares. Data availability and the need for accounting consistency thus present challenges in inferring relationships between pricing behaviour and distributional outcomes.

To illustrate these issues, consider a stylised firm which sells a volume of output, q at price, p, generating revenue S. The firm faces total costs TC which comprise labour costs, WB (the wage bill), and total other costs, TOC. Profit, Π equal sales revenues less total costs,

$$\begin{aligned}\Pi &= S - TC \\ &= pq - (WB + TOC)\end{aligned}$$

and the definition of the profit margin, m is straightforward: it is the ratio of profit to revenue.

$$m = \frac{\Pi}{S} = \frac{\Pi}{\Pi + TC}$$

This can be represented geometrically by plotting the volume of sales on a horizontal axis and the sales price on the vertical (assuming that all units sell at the same price). The area pq then represents total revenue. This can be divided into areas representing profits and costs, as in Figure 1 (a).

This representation should not be interpreted as implying a particular structure of costs and pricing: if the available data series are sales revenue, profits and total costs, the 'knowns' of the exercise are shown as areas in this representation. Even if price and quantity are also known, we can only calculate unit cost (the vertical height of the intersection between the two areas) as an *average* cost at this specific level of output. We cannot, without further information or assumptions, infer how costs vary as output varies or how prices are set: we do not know what the profit margin will be at other levels of output and cannot infer that it will remain constant.

To illustrate, Figure 1 shows two possible representations of costs. Pane (b) shows a conventional microeconomic account of pricing and costs: a downward-sloping demand curve meets an upward-sloping marginal cost curve. A profit maximising firm operating in an imperfectly competitive product market will produce a level of output below the point at which price equals

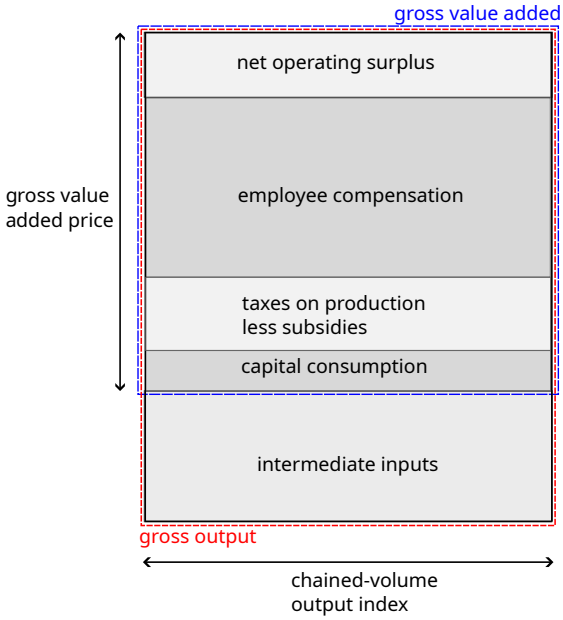

Figure 2: National accounts data

marginal cost. Profits and costs will be represented by the non-rectangular areas shown. The markup of price over cost, μ, is usually represented in percentage terms relative to cost; in this case, cost refers to marginal cost:

$$\mu = \frac{p - MC}{MC}$$

Pane (c) shows an alternative representation in which unit direct costs are constant but the presence of overhead costs means that unit cost is falling. If firms set a mark-up over unit direct costs, or over some measure of unit costs at normal capacity utilisation, then the profit margin will vary as output varies, while the markup remains constant (Lavoie, 2024).

In either case, knowledge of total revenue, profits and costs cannot be used directly to infer the markup over some measure of direct or marginal costs: all that can be calculated is a 'realised' markup, μ_r, as the ratio of sales revenue to total cost:

$$\mu_r = \frac{S}{TC}$$

This realised markup contains no more information than the profit margin: there is a monotonic relationship between the two. Nonetheless, this is the measure that is used, one way or another, in almost all of the exercises that try to answer questions about pricing, distribution and inflation.

This issue is relevant not only for firm-level data, but also when when interpreting national accounts data. Data series are generally available for the nominal value of the total output of the economy or a sector, and for the components of that output, such as total labour compensation, total input costs and so on, also in nominal terms. Volume-terms indices are compiled to provide a measure for the 'quantity' of output.[2] A stylised representation is shown in Figure 2.

To get to a measure for 'price', an implicit deflator or price per unit is usually calculated – rather than being compiled directly from price data – by dividing nominal value added by

[2]Volume-terms indices (or, equivalently, chained-volume indices) attempt to provide a measure of what is more commonly referred to as 'real' output.

volume-terms output. For example, in Figure 2, the 'gross value added price' is calculated by dividing gross value added (an area) by volume-terms output (a horizontal distance). While implied deflators often exhibit similar movements to price indices (for example, consumer price indices) these deflators do not measure prices directly. Exercises that attempt to decompose price inflation into contributions from unit labour costs, unit profits and so on, are generally done using implicit price deflators alongside measures of total revenue, total costs and profits.

Unit costs of production are likewise calculated by dividing measures of total nominal costs by volume-terms output: unit labour cost, for example, is calculated by dividing employee compensation by volume-terms output. There is thus no way to calculate a markup over direct or marginal cost from national accounts data.

Since changes in output will generally lead to shifts in the ratio of costs to price, as in panels (b) and (c) of Figure 1, care must be taken in interpreting changes in the profit margin and realised markup: these can result from changes in output with fixed markup as well as from changes in markup.

The representation in Figure 2 includes components of national accounts data which cannot be straightforwardly allocated to profit or labour income: capital consumption and taxes on production less subsidies are both substantial proportions of value added, but there is no unequivocally correct way to allocate these. Net operating surplus is a measure of profit before taxes and interest payments are deducted. Whether these deductions should be regarded as components of the costs which are incorporated into markup decisions is likewise an open question. Should deprecation be considered as part of profit, or as a cost of production? Should interest payments be considered a component of costs, a component of profits or neither? What about taxes? While there is no definitive answer to these questions, choices about these classifications have important implications for the trends of calculated profit margins and income shares.

These components of the national accounts had significant effects on the dynamics of distributional shares during the pandemic, in particular. For example, capital consumption tends to grow at a fairly constant rate year on year, even as output varies. During the pandemic when the volume of output fell sharply, depreciation spending was largely unchanged, so that per-unit capital consumption rose sharply. This issue is of particular relevance for studies that treat implied deflators as price levels and the composition of nominal revenues of value added as the drivers of changes in the price level: in this example, spending on depreciation could be regarded as a significant driver of price increases; this is not an obviously sensible interpretation.

Another shortcoming of national accounts data for imputing markups and profit margins is that aggregate data treats the corporate sector as if it were vertically integrated: the value added of the sector as a whole is reported. Intermediate inputs produced and used within the domestic corporate sector do not appear as costs for the sector. Imported intermediate inputs are, however, not part of domestic value added and so comprise an additional cost component. Since data series for the amount spent on intermediate inputs are not part of the national accounts, profit margins cannot be calculated for the aggregate corporate sector using national accounts data: only shares of value added can be calculated, as illustrated in Figure 2.

4 National accounts data

As the previous section explains, when attempting to identify relationships between inflation, corporate behaviour and distributional outcomes, a clear understanding of the accounting relationships which connect price indices to distributional decomposition is required. The timing of price moves and distributional changes is also important: if we want to understand causal sequence, temporal sequence provides at least some clues.

The pandemic began in China in late 2019 and arrived in the US in January 2020. By March 2020, the US had the highest number of cases in the world. Economic activity contracted, driven particularly by sectors such as hospitality, catering, retail and travel. Output fell for two consecutive quarters so that volume-terms GDP in the third quarter of 2020 was around nine percent below the pre-pandemic peak in the final quarter of 2019. Output then recovered to exceed the pre-pandemic peak by the final quarter of 2020. From 2021 until 2025, volume-terms GDP grew at an annualised rate of around two and half per cent.

Figure 3 shows a selection of price indices for the period 2015–2025. Indices are shown in levels because this is arguably clearer than using annualised growth rates which can give the impression that price increases occur later than is actually the case. Headline price indicators (CPI, PCE, the GVA deflator) grew at steady moderate rates in the five years or so prior to the pandemic; fuel and import prices were, as is generally the case, more volatile. As the pandemic struck in early 2020, prices for fuel, imports and processed intermediates fell sharply; headline indices saw much smaller falls. Simultaneously with recovery in US economic activity in the second half of 2020, import and fuel prices began to rise, reaching pre-pandemic levels by the start of 2021. Headline inflation indicators began to rise more sharply from the final quarter of 2020; rapid price increases continued until mid 2022. From mid-2022, energy and import prices fell while increases in headline indicators moderated. The period of strong headline price growth lasted for six or seven quarters between the end of 2020 and the the middle of 2022.

Figure 4 shows the gross value added of the non-financial corporate sector in nominal terms between 2015 and 2015 along with its constituent components. Volume terms gross value added is imposed on the same figure for comparison: its trajectory is similar to that of GDP, falling by around nine percent.

Of the components of gross value added, 'gross operating surplus' refers to the sum of all the categories except 'employee compensation' and 'taxes on production less production'.[3] The latter refers to those taxes and subsidies which are not levied directly on either labour incomes or profits, and are thus treated as a separate category of income in the national accounts. Subtracting capital consumption from gross operating surplus gives net operating surplus.[4] This can be decomposed into interest payments, transfer payments, corporate taxes and after-tax profits. How these categories should be treated is an open question: when considering mark-up behaviour, should interest paid by corporates be considered a cost of production or a component of profits, for example? How these questions are answered can have important implications for the interpretation of results.[5]

[3] We use measures of operating surplus adjusted for the valuation of inventories and capital consumption. This ensures accounting consistency and avoids price changes mechanically affecting profit measures. See Appendix A.2 for further discussion.

[4] The distinction between 'gross' and 'net' in the national accounts refers to measures taken before or after depreciation respectively.

[5] The decision by Weber and Wasner (2023) to categorise all components of gross value added other than

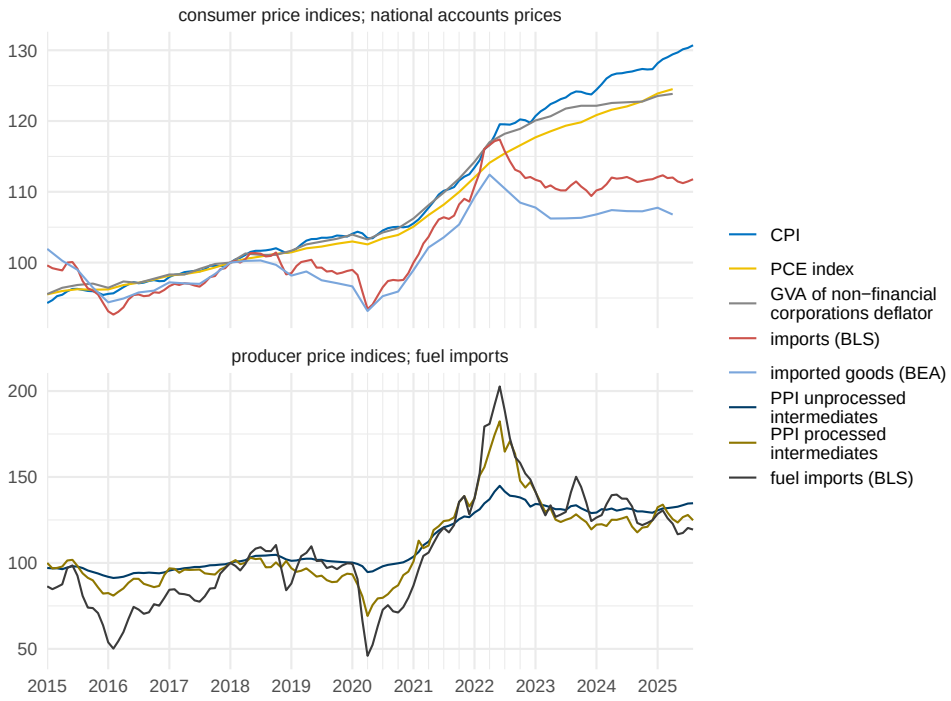

Figure 3: Selected price indices for the period Q1 2015 – Q2 2025, indexed to 100 in Q1 2018.

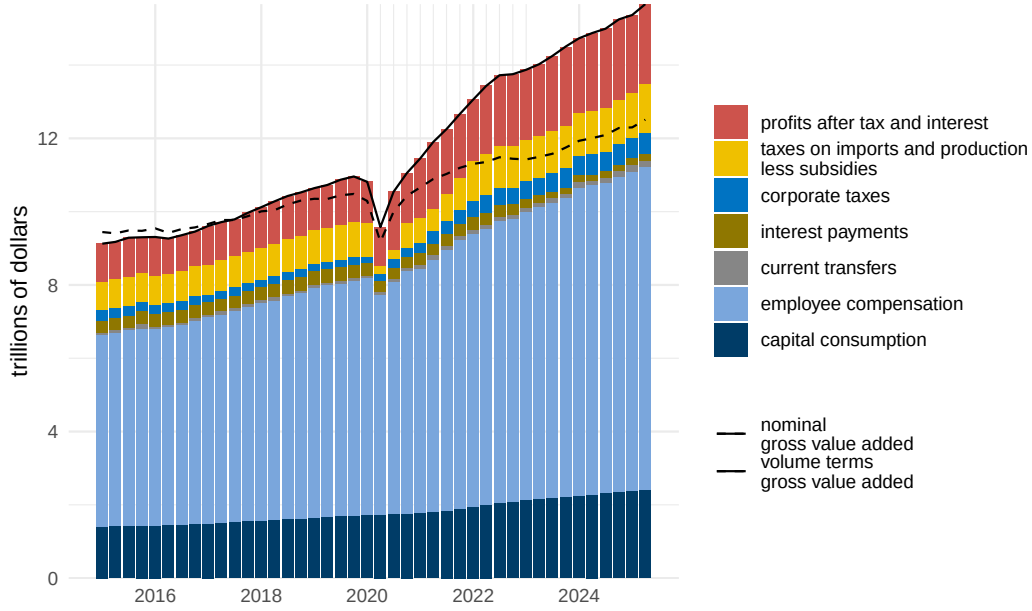

Figure 4: Gross value added of the non-financial corporate sector; quarterly data, source: NIPA table 1.14; volume terms data in 2018Q1 dollars

The total height of each bar in Figure 4 represents, at least notionally, a two-dimensional magnitude: the volume of output multiplied by the price of output (as in Figure 1a). Since we are dealing with aggregate measures, output volumes and prices are represented by index numbers. Measures of nominal and volume terms gross value added are compiled from various data sources by statistics agencies. The gross value added price, in contrast, is calculated by dividing nominal gross value added by volume terms output: we can think of this as dividing the area of a rectangle by its width in order to calculate its height (see Figure 2).[6] In the period before the pandemic, nominal gross value increased as a result of steady increases in both its quantity and price components. During the pandemic, the contraction in nominal gross value added was driven almost entirely by a drop in volume while, from around 2021, prices rose rapidly.

In order to calculate indicators for unit labour costs, unit profits, and so on, total nominal magnitudes for components of gross value added are divided by volume terms output. Nominal unit labour cost, for a given period, is calculated, for example, by dividing employee compensation by volume terms gross value added. This tells us the *average* cost, in terms of nominal labour compensation, of producing a unit of output – when the volume of production is at the level that occurred in the period in question.

Before coming to deflators and their components, we consider how shares of gross value added have varied over time. Figure 5 shows these shares between 2015 and 2023, while Figure 6 shows the same data for the post-war period. Although total employee compensation was about half a trillion dollars lower in the first quarter of 2020 than in the previous quarter, compensation as a share of gross value added increased by over three percentage points. This is because nominal gross value added fell by a greater amount, in percentage terms, than employee compensation. The share of capital consumption shows a spike for the same reason: capital consumption was largely unchanged while gross value added fell. Corporate profits initially fell slightly as a share of value added as economic activity contracted. By the third quarter of 2020, however, as economic activity had begin to increase, profits increased not only as a share of gross value added, but also in nominal terms. This was possible because of the large and unprecedented public subsidies provided to the corporate sector: the initial increase in the profits of the US corporate sector did not come, via higher prices, at the expense of workers and consumers, but as a result of government subsidies – in all quarters of 2020, employee compensation as a share of value added was higher than before the pandemic.[7]

The spike in the labour share was short-lived: by the second quarter of 2021, employee compensation had fallen to around 58 per cent of gross value added, and it fell further during 2022. The increase in corporate profits was persistent, however: following the initial spike in the second quarter of 2020, the profit share was volatile but for the rest of the period remained around three percentage points higher, on average, than prior to the pandemic. Alongside the fall in the share of compensation, a slowdown in spending on capital consumption and a sustained fall in

employee compensation as profits lead, for example, to expansion of corporate subsidies in 2020 showing up as a *fall* in profits in their results.

[6] 'Gross value added price' and 'gross value added price deflator' can be used almost interchangeably: the latter is simply the former multiplied by a hundred.

[7] These subsidies included the Coronavirus Aid, Relief and Economic Security Act (CARES) of 2020, the Paycheck Protection Program and Health Care Enhancement Act of 2020, and the American Rescue Plan Act of 2021

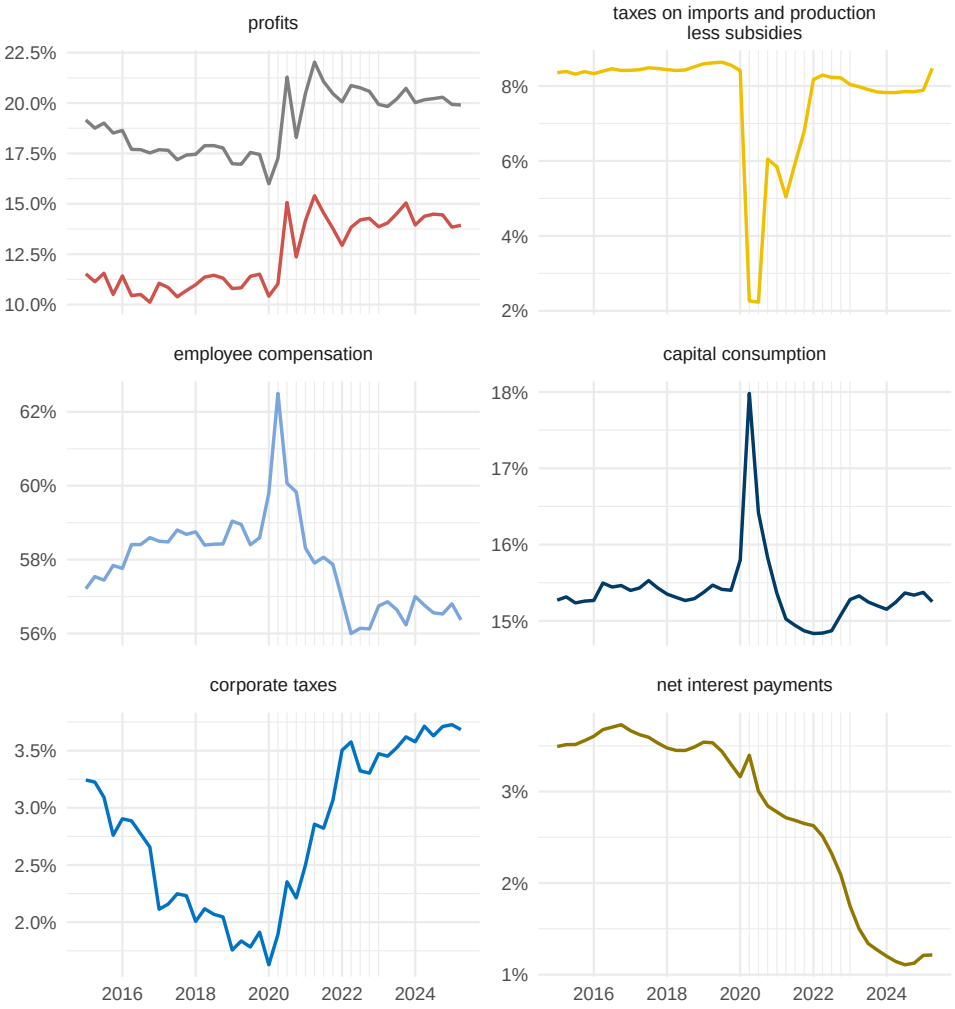

Figure 5: Shares of gross value added of the non-financial corporate sector; quarterly data, 2015Q1–2025Q2. Two measures of profit are shown: net operating surplus (grey) and profit after tax and interest (red). Source: authors' calculation based on Bureua of Economic Analysis data, NIPA table 1.14

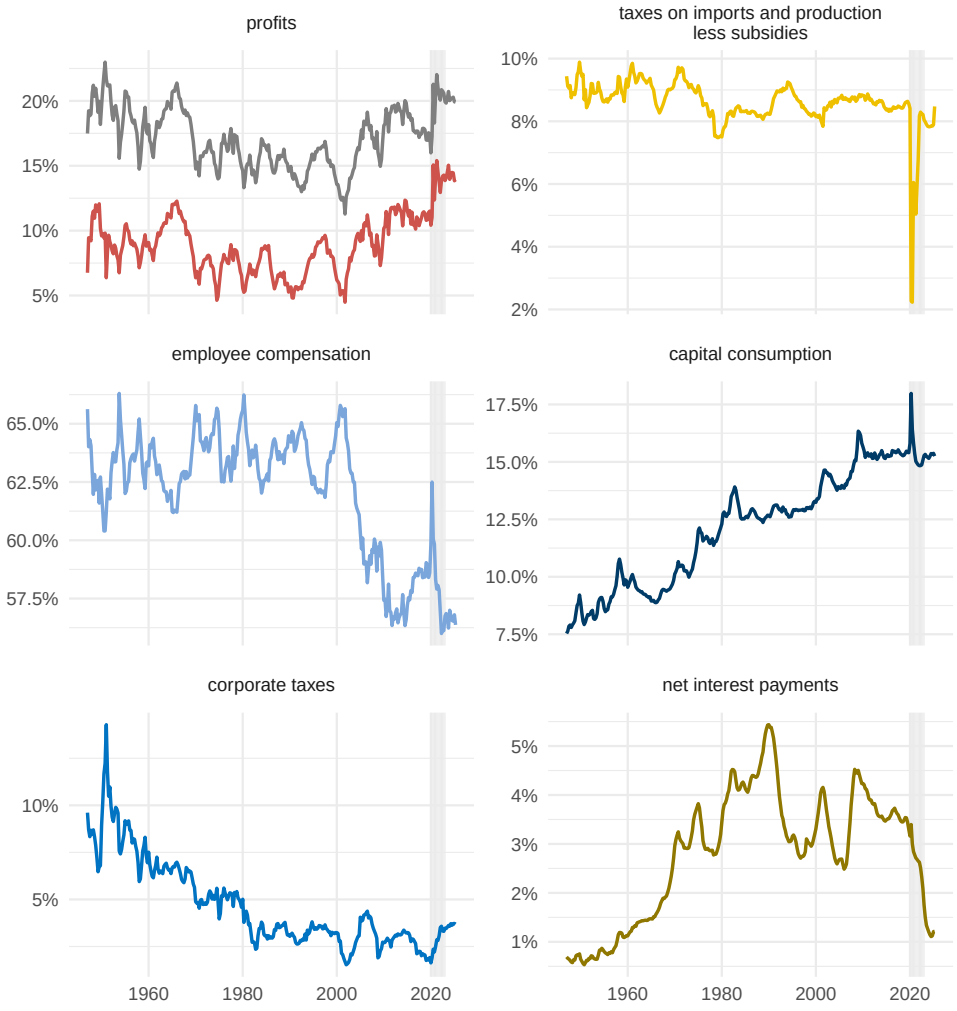

Figure 6: Shares of gross value added of the non-financial corporate sector; quarterly data, 1947Q1–2025Q2. Two measures of profit are shown: net operating surplus (grey) and profit after tax and interest (red). Source: authors' calculation based on Bureua of Economic Analysis data, NIPA table 1.14

the interest payments of the corporate sector enabled after-tax profits to maintain a historically high share of gross value added.

In making the case for a causal connection between corporate markup pricing and price inflation, a number of studies have used decomposition of the gross value added price. Although this 'price' index is somewhat artificial – as explained above, it is not compiled directly but calculated as a ratio of nominal and volume terms measures – it follows a similar trajectory to consumer price indices (see Figure 3). Analysing the components of this index may therefore provide information on the drivers of increases in price indices. On the basis of such decompositions, Bivens (2022), Weber and Wasner (2023) and Storm (2023) argue that price increases are driven by, or at least substantially 'captured by' profits. Figure 7 shows a decomposition of the gross value added price per unit for both the period 2015–2025 and a longer post-war period. The long run figure shows annualised 36 month growth rates while the short run figure uses 12 month growth rates (in both cases, the transformation was applied in order to smooth some of the high frequency information).

While the sum of the components must sum to the growth of nominal gross value added, it would be a mistake to think of these as *contributions* to the change in price level, because these components are not independent. To illustrate, consider the early phase of the pandemic. As noted above, very large government subsidies were provided to the corporate sector during 2020. Although unemployment rose substantially as output contracted, government support kept many businesses afloat. In national accounting terms this translates into a large drop in taxes on production less subsidies. This drop is visible in Figure 7 as a large negative component of gross value added price growth in early 2020. It would be an error, however, to interpret this as implying that the provision of subsidies to the corporate sector served to hold down prices. Rather, given the drop in consumer spending, parts of the corporate sector faced major losses and thus bankruptcies and business failures. In the absence of government support, this would have led to higher unemployment, lower employee compensation, lower corporate taxes and so on: in this counterfactual scenario both the size and structure of gross value added would have been quite different. The negative bar represents emergency income reallocation rather than a price suppression mechanism.

When considering data visualisations such as that in Figure 7, it is worth bearing in mind that the structure of the coloured bars is determined entirely by changes in the shares in gross value added of the components: there is no more raw information in these bars than in Figure 5: the former simply re-expresses shares shown in the latter in "unit" terms. For each period the absolute height of the bars is determined by the change in gross value added price, but their relative sizes are determined by shares of value added. Any causal connections between these relative sizes and changes in the gross value added deflator must be imposed by the viewer.

Figure 7 suggests the following interpretation: in the five years prior to the pandemic, inflation was low and stable, and the shares of employee compensation and after tax profits were relatively stable, following an increase in the share of employee compensation around the middle of the decade. At the start of the pandemic, government subsidies preserved corporate profits, keeping businesses afloat and thus also supporting employee compensation. As economic activity recovered in the second half of 2020, profits increased substantially. Subsidies had been reduced by this point but were still substantial. By 2021, when rapid price rises set in, most of the increase in the profit share had already taken place: for three consecutive quarters from mid

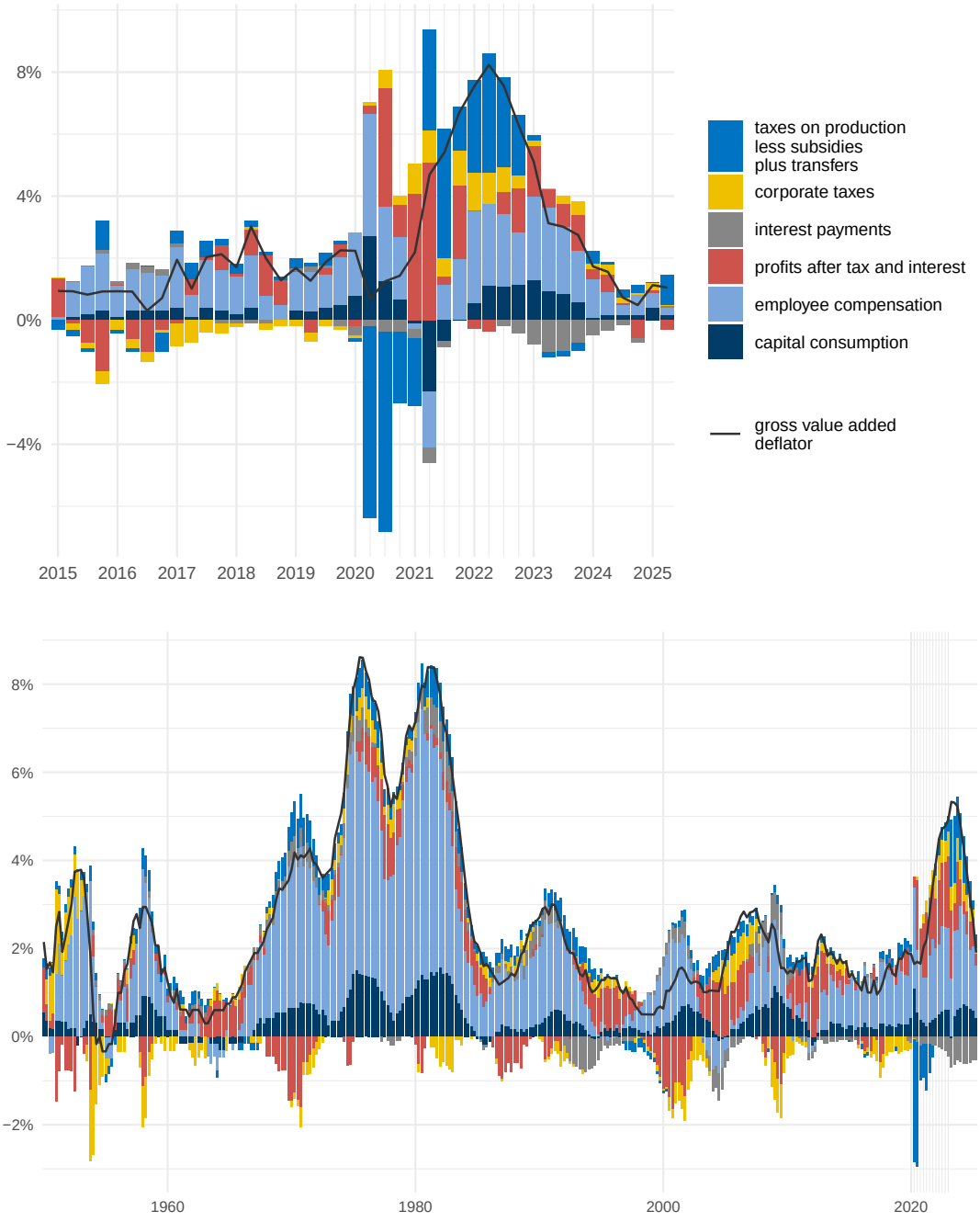

Figure 7: Unit cost components of growth in the price deflator for gross value added of the non-financial corporate sector, quarterly data; top pane shows 12 month growth rate between 2015Q1 and 2023Q?; bottom pane shows 36 month growth rate between 1947Q? and 2023Q? Source: authors' calculations based on Bureau of Economics Analysis data.

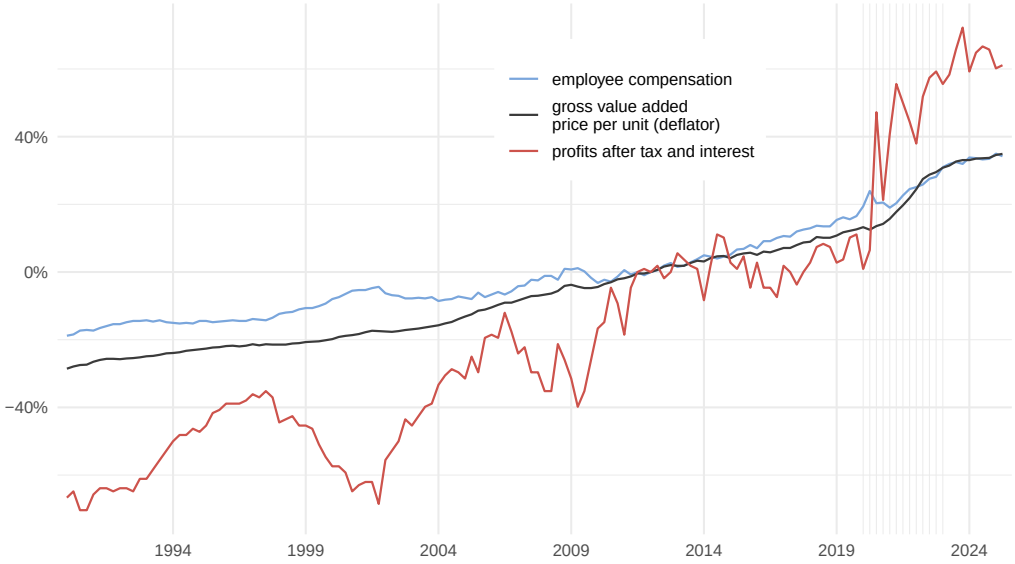

Figure 8: Growth relative to 2012Q1 of the gross value added deflator, unit labour cost and unit profits after tax and interest

2021 until the start of 2022, when prices were rising rapidly, total nominal profit actually fell.

From the start of 2022 onwards, by which point subsidies had been withdrawn, the profit share remained fairly stable. The stability of profits net of tax and interest is the result of a substantial drop in interest payments alongside a steady increase in corporate taxation through the pandemic. There is little difference in the trajectory of the two profit measures shown: the gap between pre- and post- tax and interest measures narrows somewhat after the pandemic as a result of the drop in net interest payments. By the end of the pandemic, the post-tax and interest profit share was around two and half percentage points higher than its pre-pandemic share while employee compensation was around two percentage points lower.

Does this evidence support the sellers' inflation hypothesis? The long-run figure suggests that there is something unusual about the period of pandemic price inflation, at least when compared to previous periods of rising prices. Previous bursts of inflation show a more substantial wage growth component. On the other hand, the increase in the profit share during the pandemic largely precedes the period of high price growth. It is therefore not straightforward that price inflation was driven primarily by increased markups, or that increased markups were a response to higher prices. An alternative hypothesis is that, as economic activity rebounded from the pandemic recession, corporate profit margins were initially augmented by subsidies, which remained in place through much of 2021. As subsidies were withdrawn, corporations attempted to defend these higher margins as pay growth began to take off. An alternative, or perhaps complementary, hypothesis is that a rising share of profits in gross value added, and a falling labour share, represents continuation of a longer run trend: this pattern can be seen in the long-run data in Figure 6 starting from around the early 2000s.

The evolution of the wage and profit components of the gross value added deflator are compared in Figure 8, with growth rates calculated relative to the first quarter of 2012. While average unit labour cost grew somewhat more slowly than the gross value added deflator since

around the early 2000s, after-tax profit has grown much more strongly throughout this period. The jump during the pandemic, although sharper previous episodes, is comparable in magnitude to the jumps in the early 2000s and early 2010s.

The analysis in this section suggests that caution should be taken when making comparisons of wage and profit shares between fixed points in time. The data series are volatile, and the selection of time periods and profit measures can allow the researcher to show what are apparently clear patterns in income distribution. For example, the labour share of value added in 2012 was almost identical to the level in 2023. It would be misleading however, to use this comparison to claim that the labour share was broadly unchanged during the pandemic.

5 Industry level data

A significant shortcoming of national accounts data when considering the relationship between markups, profits margins and pricing is that these data provide an incomplete picture of firms' costs. As discussed in Section 3, the national accounts measure of corporate gross value added excludes the costs of imported inputs. Using these data we can calculate shares of profits in gross value added but cannot calculate profit margins and realised markups over a full set of costs. Highly aggregated data also masks potential distributional and compositional phenomena; for example, an increase in aggregate profit margins can arise either as a result of the profit margins of all firms increasing, or as a result of an increased market share for firms with high profit margins.

We draw on the industry accounts published by the Bureau of Economic Analysis, and the Computstat database of firm-level data to examine corporate profit margins over a more complete set of costs, and at various levels of aggregation. In this section, we present calculations using data from Bureau of Economic Analysis' gross output tables. These provide industry-level decompositions of nominal gross output into employee compensation, taxes on production less subsidies, gross operating surplus, and cost of intermediate inputs.

This provides sufficient information to calculate a profit margin over costs. Given the variables, $Y, GOS, COMP, TPS$ and INP, representing nominal gross output, gross operating surplus, compensation of employees, taxes on production less subsides, and intermediate input costs, respectively, the gross profit margin can be calculated using,

$$m = \frac{GOS}{Y}$$

where

$$Y = INP + COMP + TPS + GOS$$

Instead of calculating profit margins, however, much of the literature, particularly the literature using firm-level data, attempts to calculate a markup (see Section 6). In order to aid comparison with approximations to markups presented in Section 6, we present results in terms of a realised markup: the ratio of nominal output to nominal costs,

$$\mu_r = \frac{Y}{COMP + TPS + INP}$$

This is, of course, simply the ratio of output to costs rather than a genuine measure of any kind of markup. Use of this ratio, however, provides measures in units which are comparable to the firm-level realised markups presented in Section 6 and in the related literature.

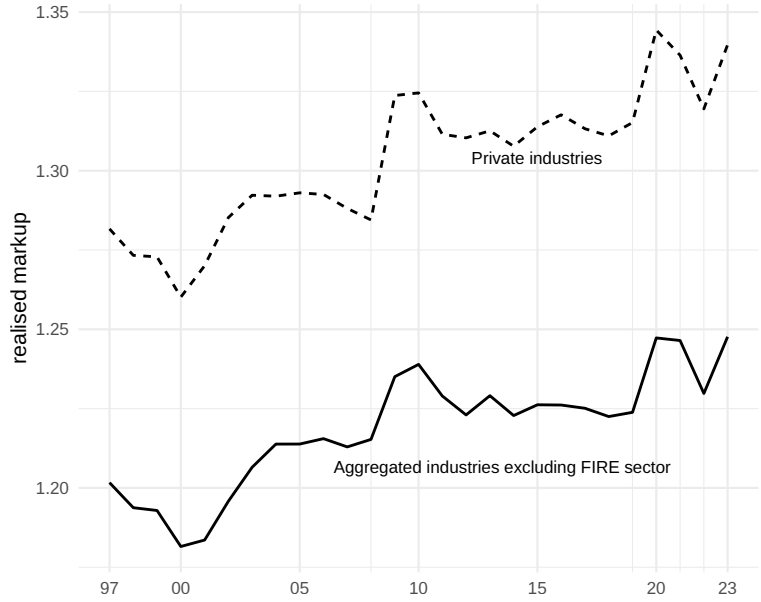

Figure 9: Realised markup, private industries and aggregated industries excluding the FIRE sector, 1997–2023. Source: author's calculations based on Bureau of Economic Analysis KLEMs dataset

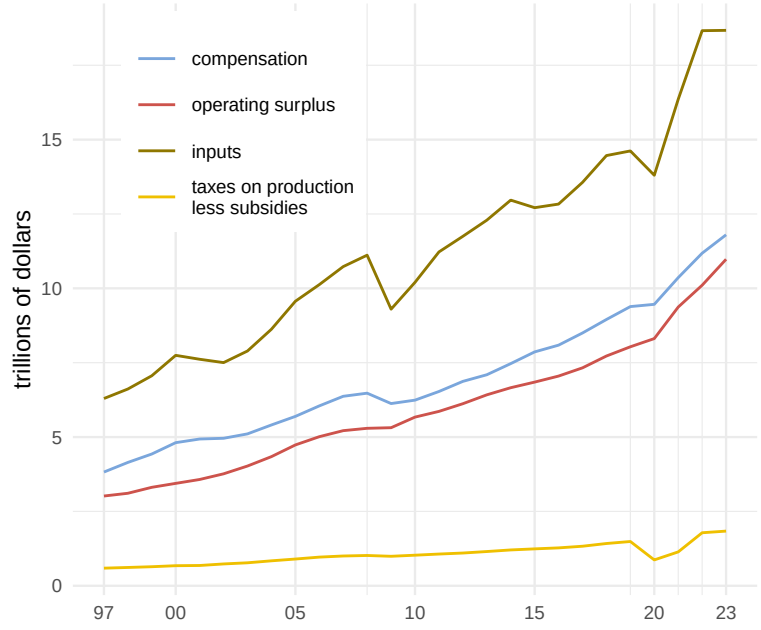

Figure 10: Components of gross output in nominal terms, aggregated 'private industries', 1997–2023. Source: author's calculations based on Bureau of Economic Analysis KLEMs dataset.

The Bureau of Economic Analysis provides annual data series starting in 1997.[8] Data are provided for industrial sectors (for example, 'manufacturing' and 'construction') at several different levels of aggregation. Manufacturing, for example, is further divided into manufacturing of durables and non-durables, with each of these further disaggregated into specific product types. The Bureau of Economic Analysis also provides series at a higher level of aggregation for 'private industries' as a whole. These data series are likely to suffer from double-counting of input costs: since the gross output of upstream industries contributes to the inputs of downstream industries, summing over the input costs of all industries will overstate the share of input costs in gross value added. This should be kept in mind when considering realised markups calculated on the basis of these series.[9]

The realised markup for the aggregate 'private industries' is shown in Figure 9 alongside a calculated aggregate measure which excludes the FIRE sector.[10] On both measures, the realised markup rose from a low point in 2000, and showed a sharp jump in 2009 followed by partial reversion. In common with the national accounts data, there is a sharp increase in the realised markup in 2020 followed by falls in the following two years, which reverse most of the gains made in 2020. The measure excluding the FIRE sector shows a smaller drop in 2021 than the 'private industries' measure. On both measures, the realised margin in 2022 is only slightly higher than the level in 2019, prior to the pandemic. In 2023, there is another sharp increase in realised margins; for the measure excluding the FIRE sector, realised margins in 2023 reached the historic high achieved in 2020.

Figure 10 shows the components of gross output for the 'private industries' aggregate in nominal terms for the period 2015–2023. The sharp increase in the realised markup in 2020 coincides with the provision of corporate subsidies discussed in the previous section as well as a fall in spending on inputs (a similar drop in spending on inputs and associated increase in realised margin occurred in 2009). The decline in the realised markup between 2020 and 2022 coincides with rapid increases in input costs, the withdrawal of subsidies, and occurs despite gross operating surplus growing somewhat more rapidly than employee compensation.

The realised markup for each top level industrial sector is shown in Figure 11. The markup is calculated for all industries that had a share of output in excess of five per cent in 2019, with the exception of the FIRE industry. The 'utilities' and 'mining' sectors are also included: despite each being relatively small, these industries have a significant impact on the costs of other industries via intermediate inputs.

An increase in realised markup in 2020 occurred in all sectors except 'information' and 'mining'. The largest industrial sector, 'manufacturing', has seen a steady rise in realised markups since the early 2000s. While the realised markup in this sector increased during the pandemic, the increase is not large in historical context: the jump in 2009 is much larger, for example. All of the increase in the realised markup in the manufacturing sector occurred in 2020; there was

[8] Storm (2023) makes quarterly calculations of profit margins using series from the industry accounts but takes data for compensation of employees, which are not available at quarterly frequency in the industry accounts, from a different table, the NIPA Personal Income and Outlays. These data differ substantially from the compensation of employees in the industry gross output tables.

[9] The data series for 'private industries' are not equal to the aggregate sums of lower-level aggregates; gross output for 'private industries' is not equal to the sum of gross output of the top level industrial aggregates: summed top level aggregates produce figures around five per cent higher than the 'private industries' series.

[10] This measure was calculated by summing over all sectors for gross output and each of its components, with the exception of the FIRE sector. The realised markup was calculated from these summed series.

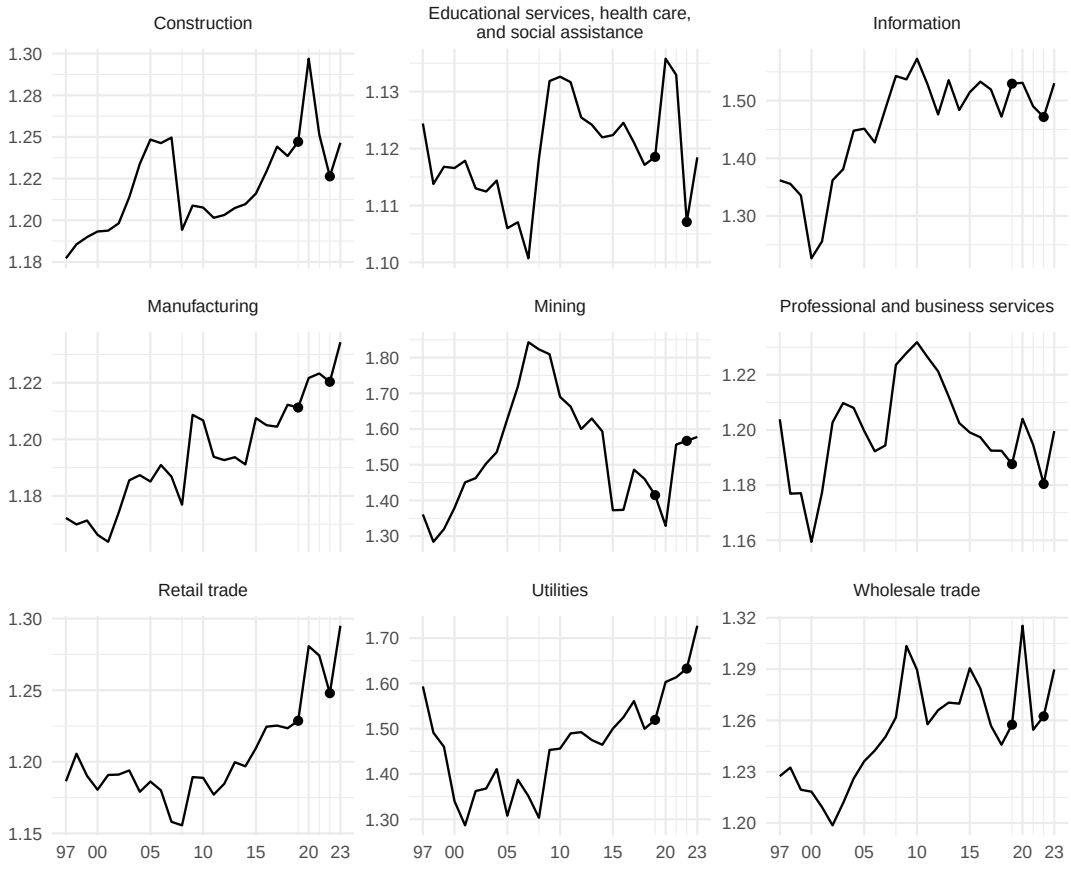

Figure 11: Realised markup; selected industries, 1997–2023, with 2019 and 2022 highlighted. Source: authors' calculations based on Bureau of Economic Analysis KLEMs dataset.

no further increase during the period of rapid price increases between 2020 and 2022. However, in 2023, the realised markup increased again to the highest level since 1997.

Of the remaining sectors, 'utilities', 'mining' and 'retail trade' are the only three where realised markups are meaningfully higher in 2022 than in 2019; In sectors making up over sixty percent of the gross output of private industries, markups were either flat or fell between 2020 and 2022, the period of rapid price growth. In 2023, however, all industrial sectors saw an increase in realised markups. Of these, mining and utilities are both relatively small: each represents less than two per cent of the gross output of private industries. However, these upstream sectors are likely to have a substantial effect on the pricing of downstream sectors due to their influence on input costs (Nikiforos & Grothe, 2023).

Figure 16 (in the Appendix) shows the components of gross output for selected industrial sectors. As with the national accounts data, spikes in operating surplus in 2020 coincide with the provision of government subsidies; in several sectors, employee compensation as a share of gross output also increases in 2020. In some sectors, falls in spending on intermediate inputs also contribute to increase operating surplus in 2020.

These data indicate that only a few industrial sectors experienced large increases in profit margins between 2019 and 2022, while most saw little or no increase from pre-pandemic levels and some experienced a decline. In most sectors, the largest increases in margins occurred in 2020, simultaneously with falls in input costs and provision of subsidies, and before the period of generalised price inflation. In manufacturing, construction and services industries, compensation as a share of gross value added was no lower after the pandemic than before it.

6 Firm level data

Firm-level data provided by Compustat offer another source of information on the evolution of corporate profits and costs during the pandemic and in longer run context. The Compustat dataset covers publicly traded firms in the US. These tend to be larger firms, so the dataset contains a small number of firms relative to the total in operation; these are claimed to account for around one third of US employment and over 40% of sales (De Loecker et al., 2020). The dataset has been widely used to examine corporate concentration and markup pricing. Nonetheless, concerns have have been raised about the quality and coverage of the data, when compared to the more comprehensive but much lower frequency Economic Census (Decker & Williams, 2023).

As noted in Section 3, measures of costs and prices required to calculate markups are generally unavailable. Many studies attempt to impute markups from the available data by imposing assumptions about cost structures, elasticities and so on. For example, Davis (2023), Konczal and Lusiani (2022), and Nikiforos and Grothe (2023) adopt the method proposed by De Loecker et al. (2020) to impute markups using Compustat data. We take the more straightforward approach of presenting the ratio of sales to costs, as in the previous section, to provide a realised markup. This has the advantage of presenting the statistical information without imposing any theoretical structure. Since the manipulation applied in these studies is effectively a linear transformation, our approach involves no loss of information in comparison, and the only meaningful difference is that units are multiplied by a scaling factor and thus cannot be directly compared.[11]

[11] Although the method used by De Loecker et al. (2020) is more elaborate than ours and includes the calculation of an input-elasticity factor, their results are nonetheless driven by a decrease in costs relative to sales.

Working with Compustat data presents challenges resulting from lack of certainty over what is included in the various data series. The following firm-level variables are provided: sales, $SALE$, cost of goods sold, $COGS$, selling, general and administrative expenses, $XSGA$, and net interest payments $XINT$. These do not correspond exactly to the aggregated statistics provided by the Bureau of Economic Analysis and nor do they correspond to theoretical concepts.

It is tempting to treat $COGS$ as a measure of variable or direct costs and $XSGA$ as a measure of fixed or overhead costs. However, Compustat defines $COGS$ as encompassing "*all* expenses directly allocated by the company to production, such as material, labour, *and overhead*." (Standard & Poor's, 2021, emphasis added). This variable includes, for example, heat, light, and power costs as well as licenses, insurance, and safety costs. These items are not generally treated as part of variable or direct costs.

Further, the variable $XSGA$, defined as "all commercial expenses incurred in the regular course of business pertaining to the securing of operating income" (Standard & Poor's, 2021), also appears to include some items usually treated as part of variable or direct costs: items in this category include "expenses associated with delivering finished goods to a customer", employee insurance, other employee benefits, and lease rentals (Traina, 2018).

Finally, Compustat states that it does not take responsibility for ensuring that firms accurately report their costs under these two categories; if firms allocate costs to the incorrect category, this will show up in the data.

Caution is therefore required in interpreting these cost variables. We treat $COGS$ as a proxy for direct costs, and $XSGA$ as a proxy for administrative costs, but proceed on the basis that there is likely to be substantial blurring of the boundary between these variables. We therefore calculate two separate ratios using $COGS$, and $COGS + XSGA$ in the denominator respectively. We also calculate markups over a full set of costs including interest payments, $XINT$. In all cases, $SALE$, the variable representing sales, is used as the numerator.

The broader markup measures which include administrative and interest costs are more directly comparable to the measures of markups calculated from industry-level data in Section 5 and to the shares of value added calculated in Section 4: these measures include *total* labour costs in the denominator and, in the case of the industry accounts, total input costs – and thus do not distinguish direct costs from other costs. Further, as we show later, there is evidence that the structure of production has shifted such that firms for which $XSGA$ is a larger cost component have gained market share. Excluding this variable from calculations therefore presents a danger that we miss out on useful information.

As in Davis (2023) we exclude observations with negative figures recorded for assets, sales and direct costs. We include all incorporated firms except those in the utilities and FIRE sectors. We trim ratios to the 1st and 99th percentiles to exclude outliers. Since we use the variable $XSGA$, we also exclude observations with negative values for this variable. If $XSGA$ is not reported we use the difference between operating expenses, $XOPR$, and the cost of goods sold. if $XINT$ is missing, we replace the missing value with zero.

The sales-weighted ratio of the three markup measures is shown in Figure 12. There is a clear

Karabarbounis and Neiman (2019) show that using a simple ratio of sales to costs results in the same increase in markups as De Loecker et al. (2020)'s calculations. Whether using a simple ratio or multiplying by a constant input elasticity of 0.85 as in Nikiforos and Grothe (2023), Konczal and Lusiani (2022) and Davis (2023), the resulting indicator will only capture an *ex post* ratio of average profits or sales to costs, rather than any actual pricing behaviour of firms.

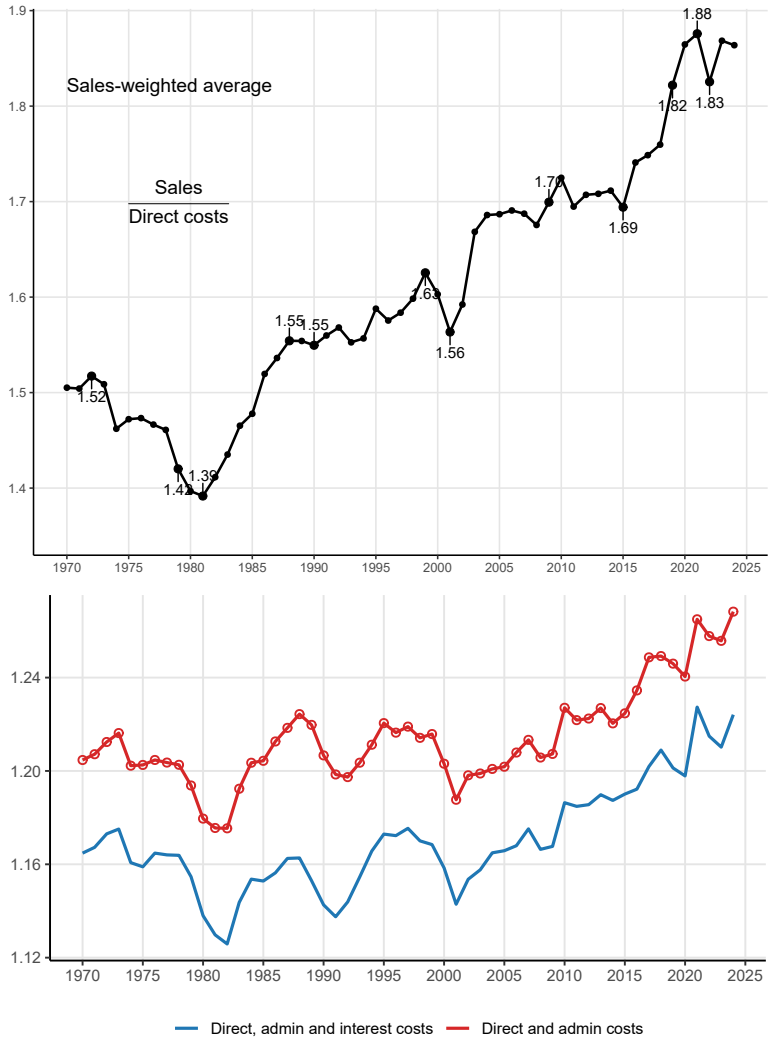

Figure 12: Three measures of the realised markup, annual data 1970–2024. The top pane shows the ratio of sales to direct costs. The bottom pane adds administrative costs and interest costs to the denominator. Source: authors' calculation using Compustat data

divergence between the trajectory of markups over direct costs and markups over the wider cost measure. The former measure has a clear upward trend since the early 1980s, increasing from around 40% to almost 90% during the pandemic. In contrast, the markup over broader costs increases from around 20% to around 30% over the same period. The increase in markups and the associated fall in the labour share over this period is well documented and widely discussed.

During the pandemic, the two series show different trajectories. The markup over direct costs shows a similar pattern to that seen in the aggregate national accounts data: there is an increase in markups in 2020, as economic activity contracted, and ahead of price increases. The markup then increases marginally in 2021 before dropping to around 2019 levels in 2022. The increase in the markup between 2019 and 2020 is high in historical context, but comes immediately after an even larger increase between 2018 and 2019.[12]

In contrast, the markup over direct costs plus administrative costs declined from 2017 up to and including 2020. An increase occurred in 2021, followed by further slight declines until 2023. The divergence in 2020 is consistent with overhead costs representing a larger share of total costs when economic activity was low in 2020. Following the increase in 2021, the realised markup fell for the next two years, before increasing again in 2024. It is possible that firm-level data does not align precisely with national accounts data because accounting dates do not align: the patterns in the firm-level data are similar to those seen in the national accounts, but the peak during the pandemic occurs in 2021 rather than 2020. Another possible explanation for the divergence between firm-level and national accounts measures is that the firms in the Compustat database have changed their weight in total ouput: an increased market share for Compustat-listed firms could account for the fact that the profit share in gross value added reaches historical highs in the most recent data points in the national accounts data but not the firm-level data.

We next consider the distribution of markups within firms. Figure 13 shows the realised markup over direct costs disaggregated by sales-weighted percentiles. There is a steady increase the skew of the distribution of markups: the distance between the average markup of the top ten percent of firms by sales (the ninetieth percentile) and the mean has increased steadily. The average markup of firms in the seventy-fifth percentile has also increased, and has quite closely tracked the overall sales-weighted average.

Firms in the bottom half of the distribution, in contrast, have not seen increases in markups: markups have been either flat or, for those lower down the distribution, declining.

Markups only increased during the pandemic for firms in the upper percentiles, with the largest increases occurring in the top ten per cent of firms. In those percentiles where increases in markup do occur, the largest increases occur before the period of rapid price inflation. The top ten per cent of firms are unusual in that markups for these firms rose between 2020 and 2021; elsewhere in the distribution, markups are flat or falling between 2020 and 2023

Following De Loecker et al. (2020) and Davis (2023), we calculate decompositions of the realised markup into contributions from changes in markup within firms, net entry of new firms, and changes of market share. Figure 14 shows this decomposition for all three measures of the realised markup. On all measures of the markup, changes in market share have been an important component of the long-run increase in markups. In the case of the markup over direct

[12]The divergence in the trajectories of the series in Figure 12 results from the fact that for those firms with largest market shares, administrative costs, or at least the costs captured in the variable *XSGA* have increased relative to variable costs, *COGS*, as shown in Figure 17 in the Appendix.

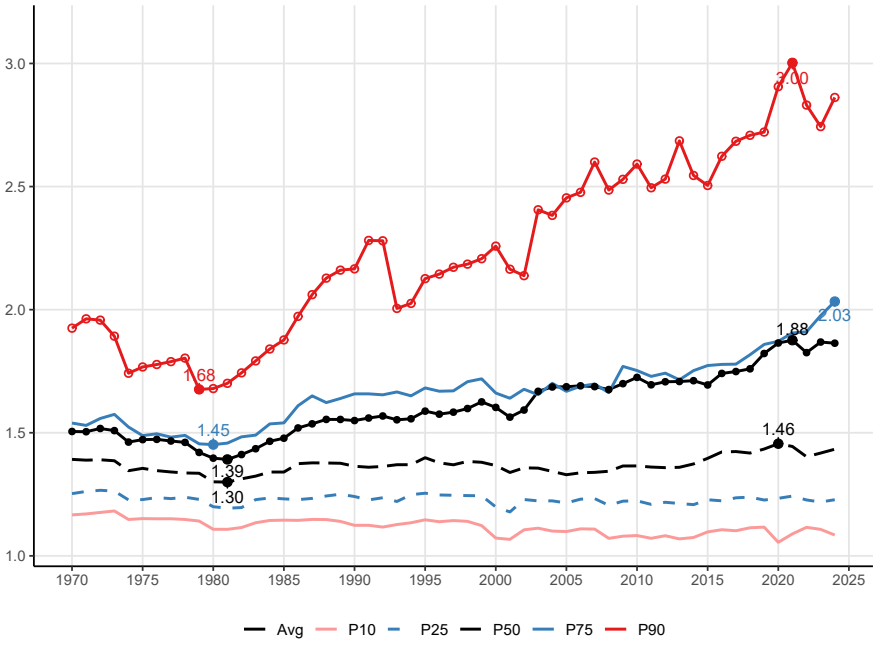

Figure 13: Sales-weighted realised markup. Source: authors' calculation using Compustat data

costs only, from the early 2000s until around 2015, within-firm markup increases were a greater component of the overall trend than changes in market share. From 2015 until the pandemic, the two components were equally weighted. During the pandemic, however, shifts in market share took over as the more substantial component of increased average markups.

For measures of the markup which include administrative and interest costs, the market share component is substantially greater and consistently exceeds the within-firm measure. When interest costs are included in the denominator of the markup, the within-firm component is almost always negative, while the market share component steadily rises throughout the period.

Until this point we have followed the literature in calculating sales-weighted averages. However, this measure is significantly different to the measures calculated in the previous sections using aggregate data: it is an average of *per-firm* markups, with the markup of each firm weighted by sales. In contrast, when using aggregate data, markups (or profit margins) are calculated to summing total revenue and dividing by total costs. The difference is as follows: the sales-weighted average of firm markups answers a question like: "What markup is applied to the typical dollar of sales in the economy?" or "If I picked a random unit of sales in the economy, what markup was applied to it?" This measure reflects the market power of firms in proportion to their sales, so larger firms have more influence on the aggregate. It emphasises consumer exposure to pricing power rather than the overall split of value added into wages and profits. By contrast, the ratio of total sales to total costs answers the question: "If we combined all firms into a single representative firm, what markup would that firm appear to have?" This measure aggregates revenues and costs directly before calculating a markup, making it the natural counterpart to national accounts data.

We illustrate the significance of this distinction in Figure 15 which compares the sales-weighted measure to the 'ratio of sums' measure for both the ratio of sale to direct costs,

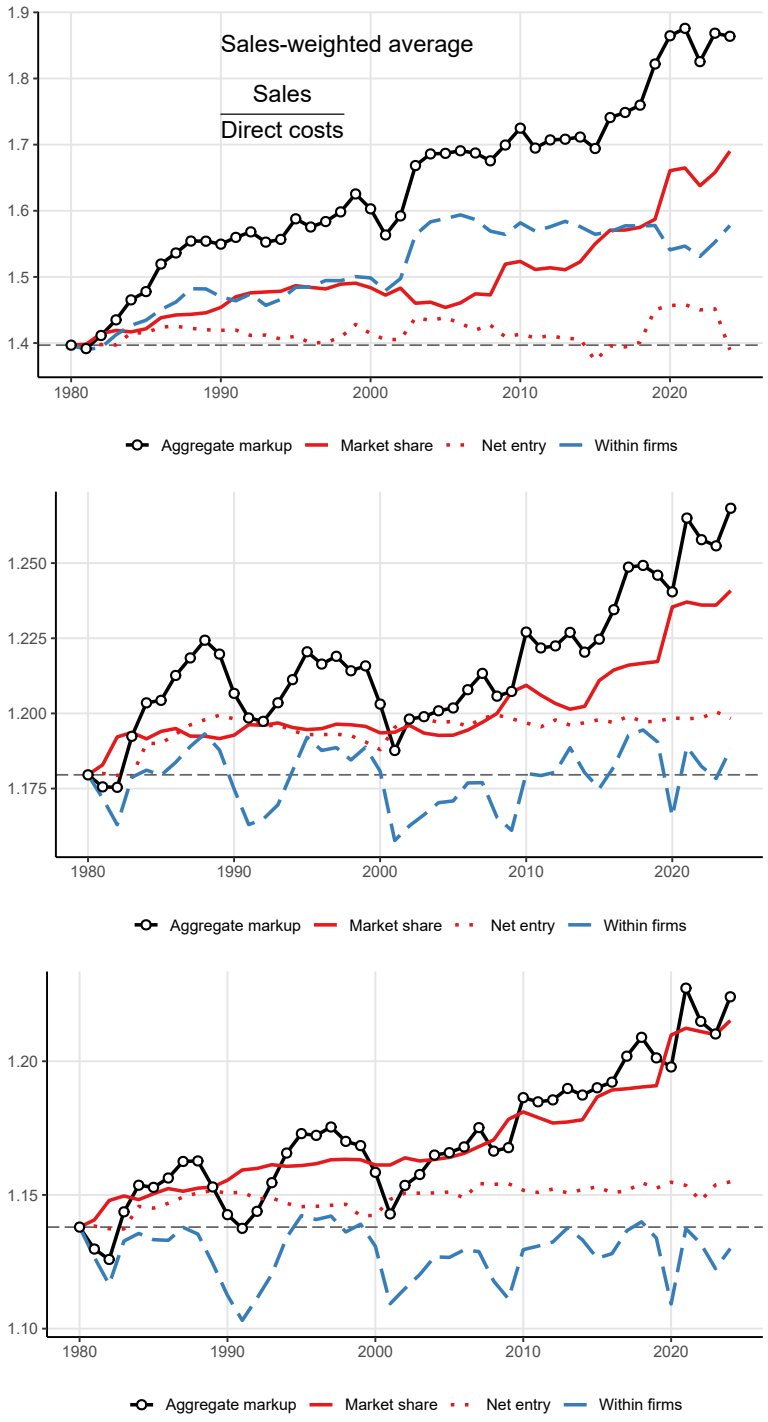

Figure 14: Decomposition of changes in the sales-weighted realised markup since 1980 into within-firm, market share and net entry components. The top pane shows realised markup calculated as sales over direct costs. The middle pane includes administrative costs in the denominator. The bottom pane includes direct, administrative and interest costs in the denominator. Source: authors' calculation using Compustat data

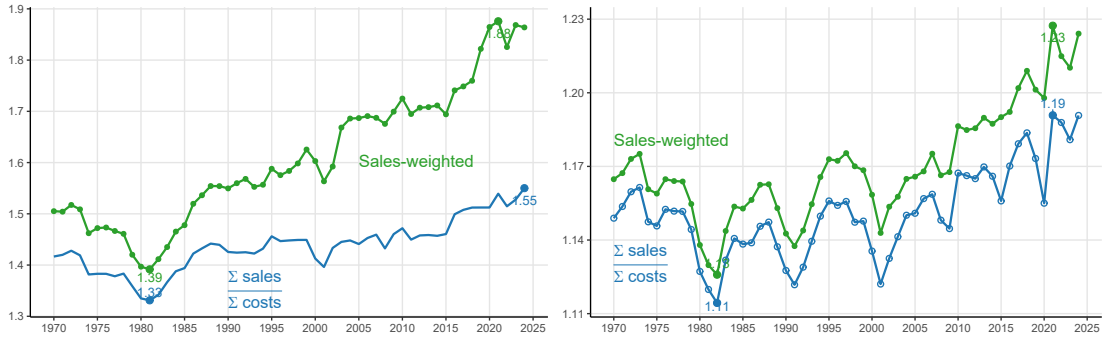

Figure 15: Comparison of realised markups calculated on a sales-weighted basis and by using the ratio of summed values. The left hand pane has only direct costs in the denominator; the right hand pane includes administrative costs and interest payments. Source: authors' calculation using Compustat data

and with administrative costs and interest payments added to the denominator. The post-1980 increase in the markup is much greater in the sales-weighted ratios than in the ratio of sums calculation.

Overall, the firm-level data paint a picture that is broadly comparable with that suggested by the aggregate data: markups increased at the start of the pandemic and then fell back. The timing of this increase in the firm-level data, on some measures, is later than in the aggregate data, coming in 2021 rather than 2020. In the firm-level data, increases in the markup during the pandemic are not unprecedented in historical context, and appear consistent with continuation of longer-run trends rather than significant shifts in trajectory. The firm-level data also suggest that shifts in industry and market composition are an important part of the increase in markups, both during the pandemic and over the longer run.

7 Conclusion

The pandemic and its aftermath were periods of severe economic disruption and restructuring. As well as rapid price inflation, this was reflected in large shifts in output, employment, the structure of production, global trade and relative prices. Any understanding of the behavioural drivers and distributional outcomes of this period has important implications for policy: a response which is appropriate to inflation driven by excess demand or labour market pressure may not be appropriate for inflation driven by increased corporate markups; a policy response appropriate to generalised markup increases may not be appropriate if aggregate measures are driven by shifts in shares of sales and production. While several theoretical accounts of the drivers of pandemic inflation have been proposed, an understanding the economic processes that unfolded between 2019 and 2022 ultimately requires empirical analysis.

Our ability to obtain a clear picture of these processes is hampered by limitations in the availability and reliability of data. In this paper we have attempted to pull together as much of the available information as possible and to sketch as much detail as that information permits. Nonetheless, we still have only partial views of our object of interest. While we cannot draw firm conclusions on the basis of these sketches, we can offer some observations.

As the pandemic struck, in the first half of 2020, economic activity contracted. Import

and commodity prices fell. Unprecedented government subsidies were provided to the corporate sector. For much of the sector, profit margins increased sharply. The labour share in value added also increased sharply, as wage income held up even as economic activity contracted. At this point, price inflation was low or even negative. Economic activity increased from a low point in the second quarter of 2020, and by the end of 2020 was close to pre-pandemic levels. From around the final quarter of 2020, prices began to increase rapidly. During this period profit margins declined, with the exception of a few sectors such as mining, utilities and retail. Since this period saw expansion of activity, as the economy recovered from the contraction in 2020, increases in profit margins might be expected, as the contribution of overheads fell relative to direct costs. However, given the withdrawal of subsidies, margins did not increase during this period. Nonetheless, by 2023, the profit share in the value added of the non-financial corporate sector, and aggregate measures of profit margins had reached historically high levels.

During the period of rapid price inflation there is therefore little evidence that firms were raising markups. This does not preclude the possibility that firms were attempting, as subsidies were withdrawn, economic activity expanded and the prices of inputs increased, to defend the profit margins achieved when subsidies were in place.

Examination of the data over a longer run suggests that the shifts seen during the pandemic may be part of longer run trends in which the share of profit in gross value added has increased and the share of employee consumption has declined. Declining corporate taxes have contributed to an increase in the after-tax profit share. Firm level-data show that the increase in profit margins is related to shifts in the structure of the corporate sector. Increased profit margins appear to be concentrated in a relatively small group of firms. On the basis of a broad-based measure of costs, the increase in profit margins among the firms in our sample appears to be driven entirely by shifts in market share, rather than shifts in prices within firms. It seems plausible that the pandemic served to accelerate already-existing structural shifts in the corporate sector, and this accounts, at least in part, for the observed higher margins by the end of the pandemic.

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A Appendix

A.1 Additional figures

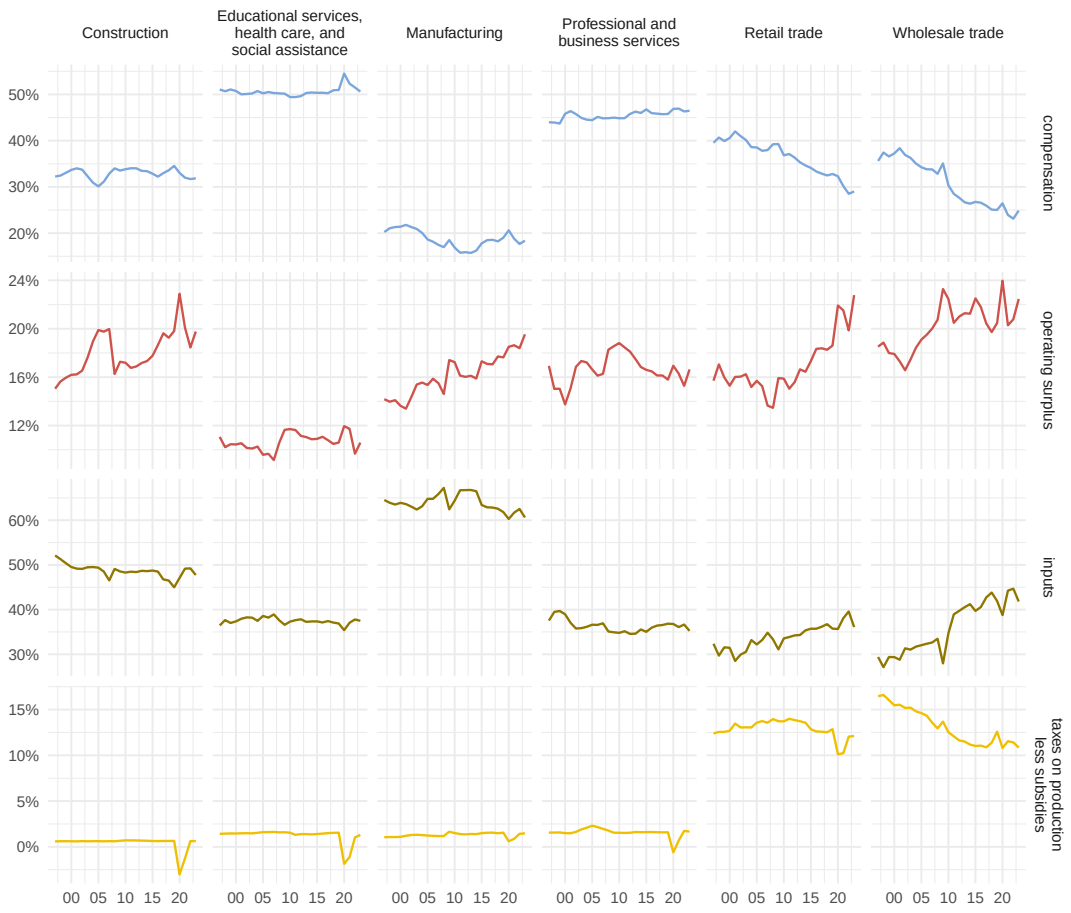

Figure 16: Costs as a proportion of total revenue; selected industries, 1997–2023. Source: Bureau of Economic Analysis KLEMs

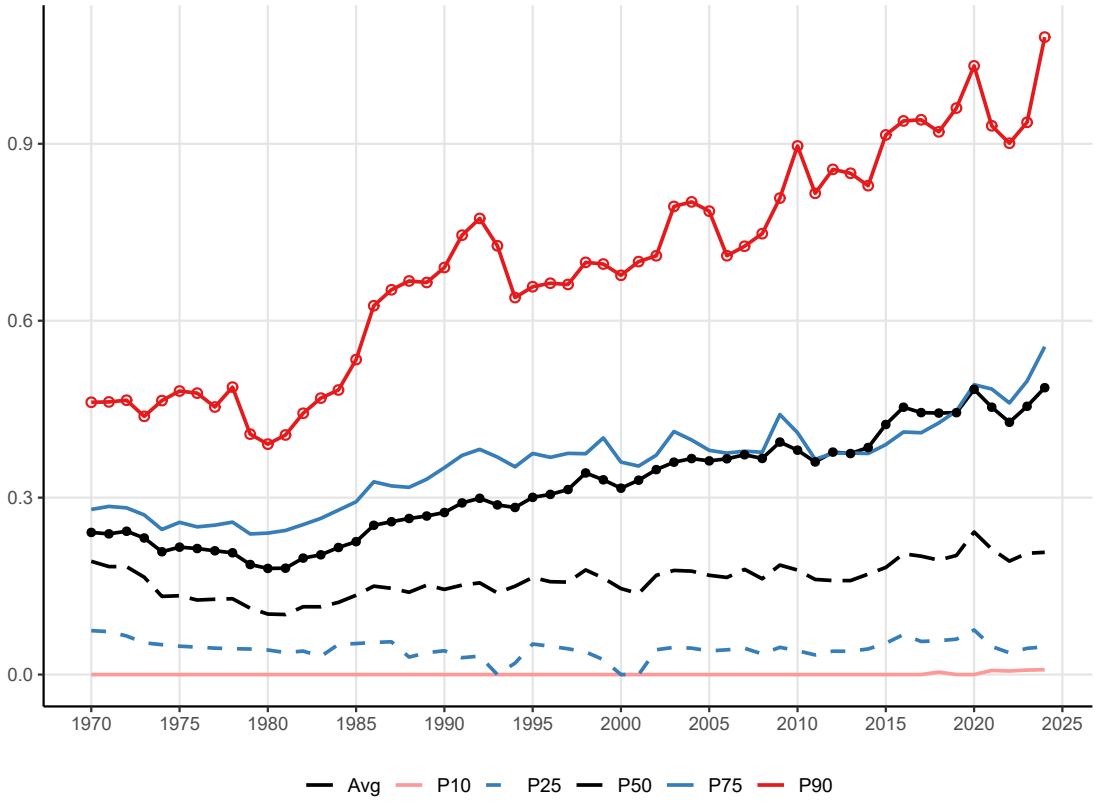

Figure 17: The ratio of administrative costs, *XSGA* to direct costs, *COGS* by sales percentile. Source: authors' calculation based on Compustat data.

A.2 Inventory valuation adjustments and capital consumption adjustments

US NIPA data report aggregate measure of corporate profits both with and without adjustments for inventory valuation ($IVAadj$) and capital consumption ($CCadj$). These arise because corporate accounting records gross profit (profit before interest costs are deducted) on the following basis

$$P = S - (WB - \Delta IN)$$

where IN is the value of inventories held at the end of the period, so ΔIN is the change in the value of inventories. The change in the value of inventories contributes positively to profits because the current account of the corporation is assumed to 'sell' unsold inventories to be held as assets on the capital account at the end of each period, with the capital account tasked with financing these assets.

The change in the value of inventories held has both a quantity component and a price component. The quantity component arises from the fact that sales and production of goods will generally differ, and the difference will show up in the stock of inventories. Stocks of unfinished produced goods will likewise fluctuate. In addition to these quantity changes due to deviations between production and sales *during* the period – which will be accounted for using the cost of production at current prices and wage rates – there will generally be some quantity of inventories at the start of the period which was carried over from the previous period. This part of the stock will have been originally valued at the previous-period cost of production but this valuation will be adjusted if production costs have changed in the current period.

Corporate profits thus include a component which represents a valuation change for the stock of inventories. This is not a capital gain arising because the *sale price* of these inventories has changed (it may not have) but is a adjustment to reflect the fact that the cost of producing inventories changes between periods.

The inclusion of this valuation adjustment means that standard corporate accounting definitions of profits are incompatible with national accounts definitions: the national accounts decompose GDP into expenditures and incomes, but if those incomes include valuation changes, total income will no longer equal total expenditure. The inventory valuation adjustment, $IVAadj$, removes this valuation adjustment from corporate profits so as to ensure coherence with the rest of the flow-based national accounts.

The size of the valuation adjustment for each industry is calculated on the basis of per-industry producer price indices, which are used as a proxy for the cost of inventory production. When the prices of raw materials and thus producer price indices are rising rapidly, the size of the required adjustment will be large.

A similar adjustment is applied to measures of depreciation or 'capital consumption'. The value of the capital 'consumed' in any period is recorded at current costs of production. However, given that this capital stock was generally produced in an earlier period, at lower cost (if prices are rising), a valuation gain is also implied. The capital consumption adjustment, $CCadj$, subtracts this valuation adjustment for the same reasons as described for the inventory valuation adjustment.

The US Bureau of Economic Analysis uses adjusted figures as standard in the national accounts but also makes non-adjusted figures available. The non-adjusted measures are sub-

stantially higher during the period of high inflation. This the result of accounting relationships whereby higher prices mechanically lead to higher profits and is unrelated to pricing decisions, profit margins or income distribution.