Labor-intensive firms are a catalyst for monetary policy and its distributive effects

- Study shows that interest rate increases decrease the ratio of labor compensation to value added in the short term
- Labor-intensive firms reduce labor costs relatively strongly
- More harmonized European labor market institutions could make monetary policy effects more uniform in the euro area
Labor-intensive firms are a catalyst for monetary policy and its distributive effects

By Jan Philipp Fritsche

- Balance sheet data from over two million firms in the euro area show that interest rate increases reduce the share of wages and salaries of value added in the short term.
- Labor-intensive firms react relatively strongly to interest rate increases by adjusting labor costs.
- In highly leveraged firms, value added changes comparatively strongly.
- Harmonizing European labor market institutions could result in more uniform monetary policy effects across the euro area countries.

FROM THE AUTHORS

“The effectiveness of monetary policy is partly determined by distributive effects. These differ strongly between firms and European regions. Thus, the ECB’s monetary policy has different effects in different countries. Harmonizing European labor market institutions should be considered.”

— Jan Philipp Fritsche —

MEDIA

Audio Interview with J. P. Fritsche (in German)

www.diw.de/mediathek
Labor-intensive firms are a catalyst for monetary policy and its distributive effects

By Jan Philipp Fritsche

The mandate of the European Central Bank (ECB) is to ensure price stability. According to the ECB Council, price stability can best be ensured by a medium-term inflation rate of two percent.1 To achieve this objective, the ECB utilizes interest rate changes. Such changes mark the beginning of a long cause-effect chain that is expected to affect inflation rates via various channels (Box 1). However, this chain also gives rise to redistributive effects: If the costs of employees fall more sharply than value added in firms as a result of an interest rate increase, there is redistribution to the detriment of employees and to the benefit of shareholders.2

Although this redistributive effect is postulated by New Keynesian models, there has been no empirical evidence so far.3 In a new study, it is empirically proven which effects interest rate increases have on the share of overall paid wages and salaries of value added (labor share) of the firms.4 It is also analyzed what impact the average labor share and the average share of leverage of the balance sheet total (leverage ratio) of firms have.

Interest rate increases decrease the labor share

The effects of monetary policy shocks—i.e., an unexpected quarter percentage point increase in the key interest rate—are broken down to the firm level via balance sheet data to conduct the empirical analysis (Box 2). On average for the companies, the labor share, which is around 72 percent, experiences a significant decline following a monetary policy shock. In the first year following the shock, the labor share falls by about 0.4 percentage points (Figure 1).

---

1 Bundesbank, Zusammenfassung der geldpolitischen Sitzung des Rates der Europäischen Zentralbank (Frankfurt am Main: 2021) (in German, available online, accessed on August 23, 2021. This applies to all other online sources in this report unless stated otherwise.).
2 Here, a firm’s value added of a firm is defined as the sum of its profits, taxes, cost of employees, interest, and depreciation. Thus, it measures a firm’s contribution to GDP.
This decline is driven by the decreasing costs of employees. Initially, value added declines only slightly, but reacts more strongly after two and three years—which brings the labor share, together with a renewed increase in labor costs, closer to its starting level.

**Firms can be distinguished by average labor share and leverage ratio**

The leverage ratio and labor share can be used to discriminate between firms and their business models. While in some industries production is very much based on the use of leverage, machinery, and hardly any labor—manufacturing of tobacco products being one example, with an average labor share of 25 percent and an average leverage ratio of 72 percent—in other industries production is very labor-intensive, such as research and development, which has a labor share of 72 percent and a leverage ratio of 30 percent.

The leverage ratio and the labor share can approximate how a firm divides its costs between leverage and labor costs, respectively. It is assumed that firms react differently to monetary policy shocks depending on their cost structure. Labor-intensive firms tend to be able to manage their costs more easily through personnel policies after a monetary policy shock, while highly leveraged firms can influence their costs by modifying their balance sheets. Both the labor share and the leverage ratio contain specific company information that would not be available were the two variables considered separately.

---

**Box 1**

**Transmission of interest rate increases in New Keynesian models**

Initially, an increase in interest rates has a direct impact on capital costs in the repurchase and interbank markets and credit institutions adjust financing conditions for their customers in the real economy. Depending on the business model, firms then invest less in new machinery or hire fewer people. This decreases aggregate demand. Fewer capital goods are produced and wage increases tend to be lower. In addition, more expensive consumer credit reduces demand for consumer goods. In such an environment, price increases are unlikely and the inflation rate decreases. At the same time, value added decreases at the firm level. If the cost of employees falls more sharply than value added, there is a redistribution in favor of the shareholders.


**Figure 1**

**Effects of an interest rate increase on average for all firms**

<table>
<thead>
<tr>
<th>Percentage points (labor share) and percentage changes (cost of employees and value added)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor share</td>
</tr>
<tr>
<td>Cost of employees</td>
</tr>
<tr>
<td>Value added</td>
</tr>
<tr>
<td>Notes: The charts show the response of the labor share in percentage points and the percentage change in the cost of employees as well as value added, in each case after zero to four years following a monetary policy shock. The (dark) green areas indicate the 95 (68) percent confidence interval. Sources: Amadeus BVD; author's own calculations.</td>
</tr>
</tbody>
</table>

© DIW Berlin 2021

The labor share declines in the first year following an interest rate increase before beginning to rise again.

**Firms with a high labor share react strongly by adjusting cost of employees**

Labor-intensive firms are especially affected by interest rate increases, even when the leverage ratio is relatively low. The labor share of these firms reacts significantly in response to increases, mainly through a decline in labor costs (Figure 2). One year following the monetary policy shock, employees receive one percentage point less than shareholders relative to value added.
Response of costs of employees is low in firms with high leverage ratios

The annually changing leverage ratio can be used to calculate the impact of monetary policy shocks at the firm level (Box 2) while the (average) leverage ratio of firms can be used to categorize them by business models and industries.

In firms with a high leverage ratio and a high labor share, the labor share falls in the year of the monetary policy shock (Figure 3). This is not mainly driven by adjustments of labor costs but rather an (insignificant) increase in value added. In the case of firms with a high leverage ratio, this increase does not necessarily have to be achieved in the short term by expanding production capacity; it can also be achieved by stock clearings or taking steps to reduce the balance sheet or to increase profitability. Two years following the interest rate increase, value added is significantly lower than in the initial year. The labor share increases (insignificantly) above its original level.

Labor share response is an indicator of effective monetary policy

The above results are not only interesting from a distributional perspective, but also show that the effectiveness of monetary policy depends on the labor share: Wages and salaries determine the purchasing power of most households, as they are their main source of income. When the labor share sinks, other declines follow: the purchasing power of the majority of the population decreases compared to value added, their demand decreases, and the inflation rate decreases too.

Thus, monetary policy has a relatively strong impact via its influence on particularly labor-intensive manufacturing companies. Following an interest rate increase, these companies make a greater adjustment to the labor share compared to other firms. If, however, the labor share hardly responds at all, an interest rate increase will have little effect on demand and thus the inflation rate.

Inequality across euro area regions makes stabilizing monetary policy in the euro area more difficult

At the European level, this means that the ECB’s monetary policy has a stronger impact in the countries and regions in which firms have particularly labor-intensive production. The heterogeneity of the average firm-based labor share is high in the different regions of the euro area founding countries (Figure 4). In Germany, for example, the difference between the eastern and western regions reaches up to 30 percentage points. This heterogeneity applies to the comparisons of individual countries as well: In France, the labor share tends to be high while it tends to be low in Portugal.

This makes it difficult for the ECB to stabilize inflation rates across the euro area and can lead to macroeconomic imbalances. If labor costs fall more sharply in labor-intensive regions than in others after an interest rate increase, this curbs inflation rates in these regions more strongly. Conversely, the effect of monetary policy tends to be more impaired in regions with low labor shares, which often coincide with country borders. In a worst-case scenario, this heterogeneity may also lead to divergences in countries’ business

Notes: The charts show the response of the labor share in percentage points and the percentage change in the cost of employees as well as value added, in each case after zero to four years following a monetary policy shock. The (dark) green areas indicate the 95 (68) percent confidence interval. Only firms belonging to both the 25 percent of firms with the highest labor share and the 25 percent of firms with the lowest leverage ratio were included.

Sources: Amadeus BvD; author’s own calculations.

The labor share falls particularly sharply in labor-intensive firms, driven by a decline in cost of employees.
cycles, making it more difficult to conduct stabilizing monetary and fiscal policies in the euro area.

Conclusion: additional tools can alleviate distributive effect

The results highlight the heterogeneous impact of monetary policy on employees, shareholders, different types of firms, and across countries.

While the redistributive effect between employees and shareholders seems to be particularly significant for national policymakers and the general public, the ECB and other actors with a more macroeconomic or European perspective might be more interested in the heterogeneity in the transmission of monetary policy. The question for all actors is whether monetary policy can have a more homogeneous effect on the economy by using other tools and how redistributive effects and imbalances can be offset. Therefore, policy makers should discuss the redistributive effect and check if it is in line with their political agenda.

From a macroeconomic perspective, a monetary policy with a more symmetric effect across the euro area is desirable, both across firms and countries. To this end, a convergence of labor and capital markets among the euro area countries would be welcome. However, greater integration of the European labor market is essential to accelerate such a convergence and it is thus worthwhile to discuss harmonizing...
MONETARY POLICY

the European labor market institutions. Similarly, the banking union and the capital markets union could address structural imbalances. Regional differences in the use of production factors may also have to do with the availability of such factors: If the capital market and loans are less readily available, firms not characterized by high leverage ratios that are less responsive to monetary policy are more likely to develop. In this context, ECB loan programs targeting households and firms could also be discussed.

Figure 4

Labor shares across euro area regions

Notes: The graphic displays the average firm-based labor shares in the NUTS-3 regions of the founding euro area countries. The (dark) green regions have a comparatively (very) high labor share while the (dark) red regions have a (very) low labor share.

Sources: Amadeus BvD; author’s own calculations.

© DIW Berlin 2021

The labor share in the euro area varies greatly between regions and countries.

Jan Philipp Fritsche is a research associate in the Macroeconomics Department at DIW Berlin | jfritsche@diw.de

JEL: D22, D31, E23, E32, C52

Keywords: Monetary policy, firm heterogeneity, labor share, financial frictions, DSGE model validation