

Assessing the Risk of a Wage-Price Spiral: Evidence From a Survey of Matched Employers and Employees

Antoine Bertheau*, Jeppe Druedahl**, and Søren Hove Ravn**

**University of Copenhagen and *Norwegian School of Economics

Introduction

Motivation. Recent inflation dynamics in Denmark and other advanced economies have been extraordinary. After several decades of low and stable inflation, the inflation rate started rising significantly during 2021, reaching a peak of around 10 percent in Denmark in the fall of 2022. While inflation has since come down, core inflation rates remain elevated across industrialized countries (see [Barro and Bianchi, 2023](#) for a recent account). A key question for policymakers and academics is to what extent the high inflation levels will persist (see [Danmarks Nationalbank](#)).

Research question. The persistence of inflationary episodes is closely intertwined with wage determination (e.g., [Danmarks Nationalbank](#)). Higher inflation erodes real wages, inducing workers and unions to demand higher wages. In this research project, we aim to shed light on the extent and speed to which inflation transmits into higher nominal wages. Ultimately, our research question is to assess the risk of a wage-price spiral in Denmark, currently and in future episodes of high inflation.

Theoretical background. The concept of a wage-price spiral is a fundamental idea in the academic literature (see, e.g., [Blanchard, 1986](#), and [Lorenzoni and Werning, 2023a](#) and [2023b](#)), and has played a prominent role in recent policy debates in Denmark (e.g., [Harr, 2023](#)) as well as other countries. The idea is that rising inflation prompts workers to demand nominal wage increases to catch up with (or remain ahead of) inflation. The resulting increase in production costs then induces firms to raise their prices to maintain existing mark-ups. This may lead workers to ask for another round of wage increases, thus giving rise to a spiral.¹ This economic mechanism will likely be even more relevant in a small open economy like Denmark. In this context, [Auclert et al. \(2023\)](#) have recently studied how a foreign energy price shock is transmitted to a small open economy. These authors highlight the crucial role played by the degree of real-wage rigidity ([Blanchard and Gali, 2007](#)) in the domestic economy: The higher is the aversion of domestic workers or unions to accept a (temporary) decline in real wages; the higher is the risk that the economy may end up in a wage-price spiral. In summary, at the heart of this central economic

¹ This idea was popular to explain wage-price dynamics in Europe when most wages were set at the sectoral level. This is not the case anymore in most European countries (in particular in Scandinavia), as documented by [Bhuller et al. \(2022\)](#).

mechanism is the question of how wages are determined at the firm level.² This is, ultimately, an empirical question. However, our knowledge of how wages are set in practice at the firm level is very limited.

The main challenge. The key reason for this lack of knowledge is that data on wage-setting practices at the firm level are almost non-existent.³ Even equipped with the best administrative register data possible (as in Denmark), answering how wages are set and respond to inflation shocks is an elusive task.

Contribution. We will contribute to a better knowledge of the research question “How does inflation transmit to changes in nominal wages?”, proceeding in three steps.

1. We propose to collect survey data in collaboration with Statistics Denmark. We will design and field an innovative survey asking employers and employees about wage determination. This survey will be the first to combine the views/beliefs of employers and employees (i.e., a two-pronged survey design) on this question. We are interested in understanding the transmission of inflation not only onto *wage demands*, but also onto *agreed wages*. In this respect, the firm’s point of view is crucial: To what extent is the firm able to pass an increase in wages through to its own price setting? In other words, we wish to study - as emphasized by [Lorenzoni and Werning \(2023b\)](#) - the competition (or conflict) between workers/unions (who seek to maintain their real wages) and firms (who wish to protect their mark-up).

2. We will link our survey to register data. The link between our survey and register data is essential, as it can shed light on the behavior of employers and workers originating from a misperception of a firm’s wage compared to other firms or the misperception of a worker’s outside option (i.e., how much they can get paid in another firm). This step will also allow us to study sectoral differences in the responses obtained in step 1. Is it the case, for example, that exporting firms are less willing or able to pass higher labor costs on to their prices, as compared with firms serving the domestic market? An additional scientific dividend with our linked survey-admin dataset is that we can better understand why firms and workers behave the way they do (as discussed in the next section).

3. We will set up a general equilibrium search model and calibrate it with our new facts. The model will help us analyze how different wage-setting practices at the firm level have the potential to feed inflation dynamics. Interpreting our findings through the lens of a structural model will strengthen the contribution of our project, as the model can then be applied to inflationary episodes in other countries or time periods.

² According to [Dansk Arbejdsgiverforening](#), 80 percent of workers were **not** covered by collective agreements with normal wages (normalløn) in 2017. Hence, wages are set mainly at the firm level. Collective agreements contain minimum wages (minimallønsoverenskomst), but these wage floors are relevant only for relatively few entry-level positions.

³ This contrasts with growing data availability on inflation expectations of firms and workers (see, e.g., [Weber et al., 2022](#)). While this data can be very useful to understand inflation dynamics, they do not allow us to answer the research question of the current project.

Plan: A Two-Pronged Survey Linked With Administrative Data, Combined with a Theoretical Framework

In this section, we elaborate on our contribution.

Survey overview. Our two-pronged survey design will be crucial to understand the risk of a wage-price spiral.⁴ To provide causal evidence, we will use a state-of-the-art survey design containing treatment information (see [Haaland et al., 2023](#)). We plan to implement exogenous variation by providing respondents with different information about expected inflation, and different scenarios for workers and firms. This will allow us to compare the effect of different scenarios, and how employers and employees react to such a change.

On the **employee/worker** side, we will ask questions aimed at quantifying the pass-through of inflation to wage demands and expectations. This would involve questions along the following lines: How much does inflation affect your wage demands? Are your wage demands shaped more by past or expected future inflation? How much can your employer increase prices without affecting the demand for their goods/services? We will first ask employees what the actual inflation rate is, then ask about their wage demands, then inform them about actual (and expected) inflation, and in turn allow them to change their wage demand response. By providing respondents with different information regarding the outlook for inflation (e.g., from different forecasting institutions), we induce systematic variation in responses, facilitating a causal interpretation.

On the **employer/firm** side, the focus will be on the pass-through of wages / labor costs into prices. Here we plan to vary the information we provide about the expected path for wage inflation, and ask how this leads firms to change their prices. Motivated by recent work by [Moscarini and Postel-Vinay \(2022\)](#), we will also elicit the role of competition for workers between employers to understand the pass-through of wage costs onto prices. Finally, we plan to develop a measure of “own-wage uncertainty” in line with recent work aimed at understanding “own-price uncertainty”, i.e., firms’ uncertainty about their own future prices (see [Yotzov et al., 2023](#)). We will derive two measures, one for workers and one for employees, to measure disagreement and investigate the implications thereof.

Linking survey to register data. Our survey will provide us with our core results. However, we do not expect results to be similar depending on employer and employee characteristics. To put the responses from our survey in context, we will link survey respondents with administrative data on firms, their employees, and the labor and product market conditions under which the firms operate. Specifically, we plan to match our survey with worker-level registers (BFL, IND, IDAP, IDAN, UDDA, LONN), firm-level registers (FIRM and FIRE), and registers from external sources

⁴ An early example of the benefits from working with matched employer-employee data is the study by [Troske \(1999\)](#), who used such a dataset to study the employer size-wage premium in the US.

(vacancy and unemployment data from STAR, collective bargaining agreement from DA). In this step, we will follow closely [Bertheau et al. \(2023\)](#). As mentioned above, this step will allow us to study whether the responses of firms and their employees differ systematically across certain characteristics, e.g., whether the firm operates in the “tradeable” or the “non-tradeable” sector.⁵ The past research of Antoine Bertheau demonstrates the importance of the link between survey questions and administrative data to provide a richer answer to a given research question.⁶ Combined, we will obtain a unique dataset that can allow us to make important progress in understanding inflation dynamics.

Theoretical framework. In the third part of the project, we aim to provide a theoretical interpretation of our findings within the framework of a macroeconomic model in the New Keynesian tradition. We envisage a model of a small open economy, which will allow us to build on the recent work of Jeppe Druedahl and Søren Hove Ravn (see [Druedahl et al., 2022](#)). In this context, the pass-through of inflation onto wage demands, and of labor costs onto prices, play a crucial role in determining the dynamic path of inflation after an initial shock. Our empirical results will allow us to inform the model in this regard. More specifically, we will build on recent work by [Moscarini and Postel-Vinay \(2022\)](#) and [Pilossoph et al. \(2023\)](#), which have provided novel insights into the link between wage setting and inflation dynamics. A key ingredient of the model is on-the-job search, as it is documented that a large fraction of employees search on the job (see [Faberman et al., 2022](#)). Once calibrated to match our empirical findings, the model will serve as a laboratory for studying the effects of inflationary shocks under various scenarios, and for deriving lessons for potential stabilization policies in the face of such shocks.

Impact

As stated above, the link between inflation and wage determination is central for researchers and policy makers. As our empirical exercise will be based on Danish data, it will of course be extremely useful to have this new dataset on firm wage-setting and inflation. Our research will be valuable to policy institutions such as Danmarks Nationalbank, the Ministry of Finance, and the National Employment Policy Agency (STAR).

Moreover, this research has the potential to generate interest at the highest level from policymakers and economists. There are several reasons why this is the case: i) the link between inflation dynamics and wage dynamics is one of the key principles of modern macroeconomics focusing on the business cycle (e.g., [Blanchard and Galí, 2007](#)). ii) Denmark is one of a few countries where we can a) run a two-pronged survey and b) link the responses to not only worker-level registers, but also firm-level data on, e.g., financial accounts. Also, the labor market characteristics

⁵ Likewise, data on firms' financial position will allow us to relate our findings to firms' productivity; the key measure to describe firm heterogeneity in macroeconomic models.

⁶ See, e.g., [Bertheau et al. \(2023\)](#) and [Bertheau and Hoeck \(2023\)](#).

of Denmark are in some sense "in-between" the US and most of continental Europe, which should interest many economists and policymakers.⁷ It would be the first linked employer-employee survey on these topics. Therefore, we believe our research findings have a good chance of publication in the top 5 economic journals with a high impact factor, due to the importance of the questions studied, and the innovative research design we plan to implement.

Timeline and Work Distribution

During the spring of 2024, we will design the survey. We will field the survey in the late spring or the early fall of 2024. We will complete our empirical analysis during the end of the fall of 2024, and present our findings at conferences. We will produce a research paper to submit in the spring of 2025. All members of the research team will design the survey. Antoine Bertheau will oversee the data analysis and pinpoint the results for the empirical literature. Jeppe Druedahl and Søren Hove Ravn will link our empirical results on wage-price spirals to macroeconomic theory and models.

⁷ See [Kreiner and Svarer \(2022\)](#) and [Bhuller et al. \(2022\)](#).

Bibliography

Auclert, Adrien, Hugo Monneray, Matthew Rognlie, and Ludwig Straub, 2023. "Managing an Energy Shock: Fiscal and Monetary Policy", NBER Working Paper No. 31543.

Barro, Robert and Francesco Bianchi, 2023. "Fiscal Influences on Inflation in OECD Countries, 2020-2022", NBER Working Paper No. 31838.

Bertheau, Antoine, and Christian Hoeck, 2023. "Firm Beliefs About Wage Setting." Working Paper.

Bertheau, Antoine, Marianna Kudlyak, Birthe Larsen, and Morten Bennedsen, 2023. "Why Firms Lay Off Workers instead of Cutting Wages: Evidence from Linked Survey-Administrative Data." SSRN Working Paper.

Bhuller, Maudeep, Karl Ove Moene, Magne Mogstad, and Ola L. Vestad, 2022. "Facts and Fantasies about Wage Setting and Collective Bargaining", *Journal of Economic Perspectives*, vol. 36, p. 29–52.

Blanchard, Olivier, 1986. "The Wage Price Spiral", *Quarterly Journal of Economics*, vol. 101, p. 543–566.

Blanchard, Olivier, and Jordi Gali, 2007. "Real Wage Rigidities and the New Keynesian Model", *Journal of Money, Credit, And Banking*, vol. 39, p. 35–65.

Druedahl, Jeppe, Søren Hove Ravn, Laura Sunder-Plassmann, Jacob Marott Sundram, and Nicolai Waldstrøm, 2022. "The Transmission of Foreign Demand Shocks", Working Paper.

Faberman, Jason, Andreas Mueller, Ayşegül Sahin, and Giorgio Topa, 2022. "Job Search Behavior among the Employed and Non-Employed", *Econometrica*, vol. 90, p. 1743–1779.

Haaland, Ingar, Christopher Roth, and Johannes Wohlfart, 2023. "Designing Information Provision Experiments", *Journal of Economic Literature*, vol. 61, p. 3–40.

Harr, Thomas, 2023. "En blød landing er det mest sandsynlige", speech given at Nykredit on June 8.

Kreiner, Claus T., and Michael Svarer, 2022. "Danish Flexicurity: Rights and Duties", *Journal of Economic Perspectives*, vol. 36, p. 81-102.

Lorenzoni, Guido, and Ivan Werning, 2023. "Wage Price Spirals", Working Paper.

Lorenzoni, Guido, and Ivan Werning, 2023. "Inflation is Conflict", NBER Working Paper No. 31099.

Moscarini, Giuseppe and Fabien Postel-Vinay, 2023. "The Job Ladder: Inflation vs. Reallocation", NBER Working Paper No. 31466.

Pilossoph, Laura, Jane M. Ryngaert, and Jesse Wedewer, 2023. "Job Search, Raises, and Inflation", Working Paper.

Troske, Kenneth R., 1999. Evidence on the Employer Size-Wage Premium from Worker-Establishment Matched Data, *Review of Economics and Statistics*, vol. 81, p. 15–26.

Weber, Michael, Francesco D'Acunto, Yuriy Gorodnichenko, and Olivier Coibion, 2022. "The Subjective Inflation Expectations of Households and Firms: Measurement, Determinants, and Implications", *Journal of Economic Perspectives*, vol. 36, p. 157–184.

Yotzov, Ivan, Lena Anayi, Nicholas Bloom, Philip Bunn, Paul Mizen, Özgen Öztürk, and Gregory Thwaites, 2023. "Firm Inflation Uncertainty", *AEA Papers and Proceedings*, vol. 113, p. 56–60.