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INTERNATIONAL MONETARY FUND

DENMARK

SELECTED ISSUES

June 1, 2023

Approved By
European Department

Prepared by Raju Huidrom and Gohar Minasyan with support from Fuda Jiang (all EUR).

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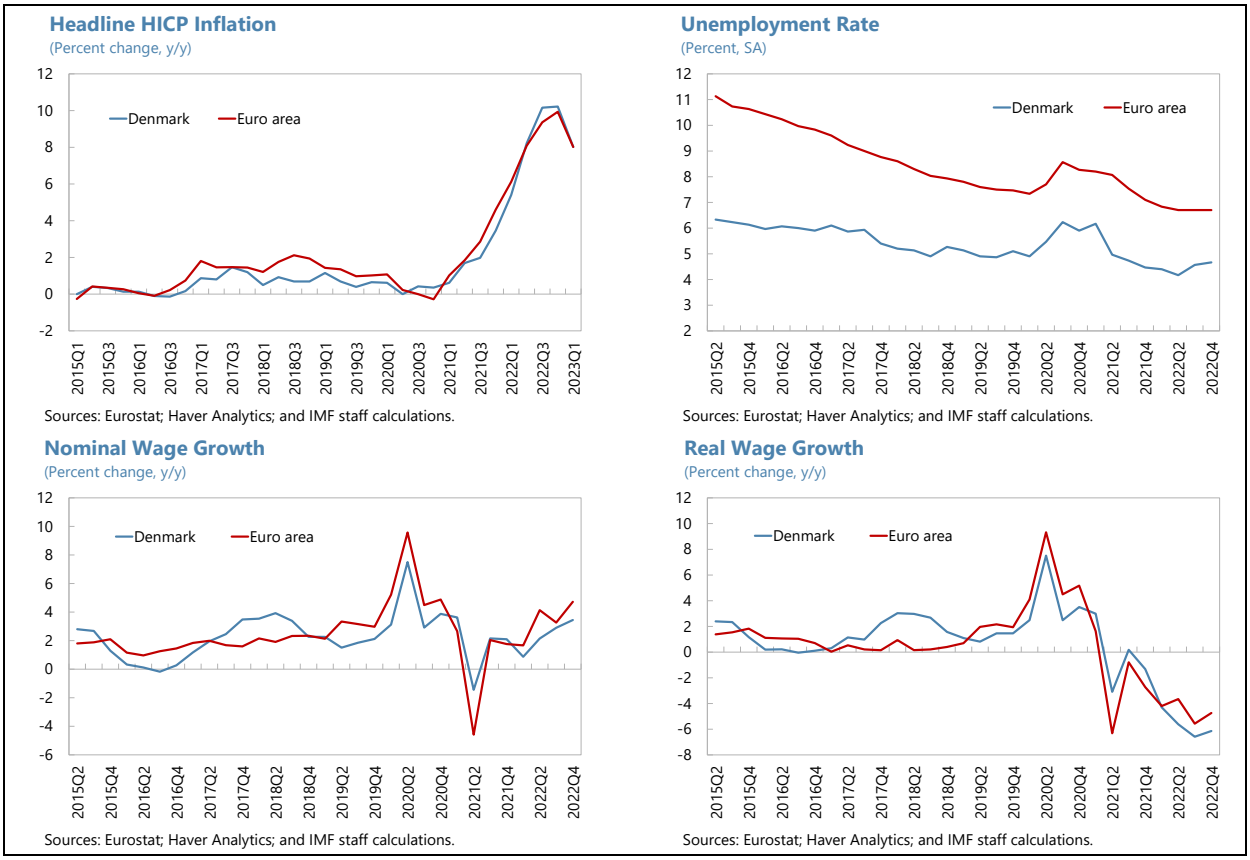
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WAGE AND INFLATION DYNAMICS IN DENMARK[1]

Nominal wage growth in Denmark has so far been modest and outpaced by high inflation, putting real wage growth in negative territory. Amid still-tight labor markets, this has raised concerns about wage pressures going forward and the eventual impact on inflation. The analysis suggests that wage formation in Denmark has historically been partly backward-looking, and economic slack also has played a role. Given these, high inflation realized thus far and the tightness in the labor market implies that wage pressures are expected to remain elevated in the near term. Some of these wage pressures, in turn, are expected to be passed on to core inflation, sustaining high inflation. Thus, determined policies to fight inflation are important.

A. Introduction

1. Nominal wage increases in Denmark have been modest despite elevated inflation and still-tight labor markets. As in many countries in Europe, headline inflation in Denmark surged during 2022 mainly due to high energy prices. Given moderating energy prices, headline inflation has eased from a peak of 11½ percent (year-over-year) in October 2022; nonetheless, it remains elevated. Labor markets remain relatively tight with the unemployment rate in the lowest range since the late 2000s. At the same time, nominal wage growth has remained modest, around 3½ percent (year-over-year) in 2022:Q4—well below headline inflation, thus placing real wage growth into negative territory.



[1] Prepared by Raju Huidrom with support from Fuda Jiang (all EUR).

2. This has raised concerns about wage pressures going forward, and the eventual impact on inflation. Wage pressures will likely arise from workers' demands to compensate for the erosion of real incomes sustained thus far. Indeed, recent collective agreements called for wage growth of about 5 percent annually over the next two years, higher than in the past. These wage pressures could feed into inflation, which—along with the still-tight labor market—could make the elevated inflation to persist. In an extreme case, higher wages and inflation could be self-reinforcing, resulting in a wage-price spiral. Thus, understanding the drivers of wage and inflation is imperative since this underpins the appropriate policy response.

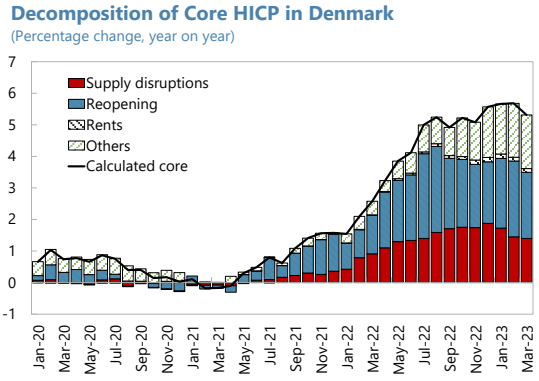
3. This chapter analyzes wage and inflation dynamics in Denmark. The main questions explored are as follows. First, what are the historical drivers of nominal wages in Denmark, and how important are the roles of inflation and economic slack? Second, how would inflation and slack matter for wages in the near term? Third, how would these wage dynamics, in turn, impact inflation? Finally, what are the key policy priorities?

B. Inflation Dynamics: A Deeper Dive

4. To assess the key drivers of inflation, factors contributing to core inflation and the GDP deflator are decomposed. Energy prices are expected to continue moderating, and this should help to reduce headline inflation mechanically. To gauge inflationary pressures in the near term, the more relevant indicator is core inflation. Importantly, the extent to which core inflation is driven by demand and supply factors is crucial in the conjuncture. Another relevant aspect is the role of profit margins and wages for inflation. For this, the analysis looks at inflation from the production side and decomposes the GDP deflator.

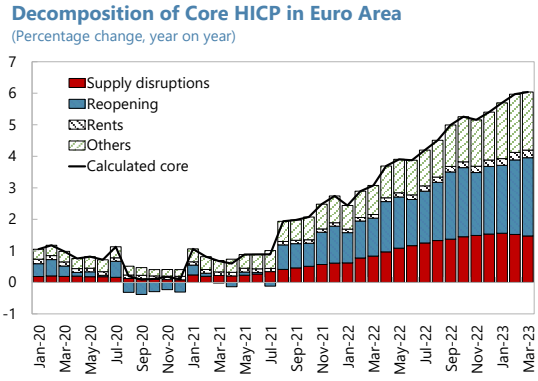
5. Pent-up demand contributed to core inflation. Following Gonçalves and Koeste (2022), core inflation is decomposed into a group that is deemed sensitive to post-pandemic reopening—reflecting pent-up demand—and the other that is sensitive to supply chain disruptions. This is a bottom-up approach that categorizes the disaggregated components of core inflation depending on their sensitivities to reopening and supply chain disruptions.[2] The analysis suggests that supply chain disruptions contributed to core inflation in Denmark, particularly in 2022. Pent-up demand, however, had a more sizable contribution to core inflation. The relative split between the two components in Denmark is broadly similar to that in the euro area. The analysis does not directly account for second-round effects from energy prices; hence, the precise contribution of demand and supply factors is hard to pin down. Nonetheless, it suggests that demand factors were likely at play, consistent with the view that Denmark's strong recovery from the pandemic contributed to high inflation.

[2] See Annex I.A for details. Rent for housing and the remaining others make up the rest of core inflation.



Decomposition of Core HICP in Denmark
(Percentage change, year on year)

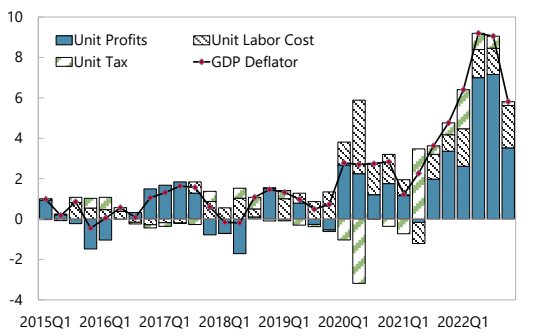
Sources: Eurostat; Haver Analytics; and IMF staff calculations.



Decomposition of Core HICP in Euro Area
(Percentage change, year on year)

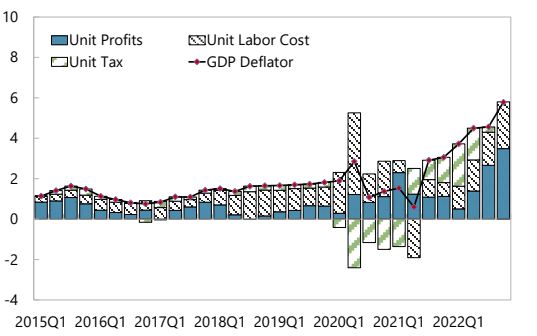
Sources: Eurostat; Haver Analytics; and IMF staff calculations.

6. High profit margins contributed to growth in the GDP deflator. Based on a national account identity, GDP deflator is decomposed into unit labor cost (employee compensation), unit profit (gross operating surplus and mixed income), and taxes. In Denmark, as in the euro area, the contribution of unit labor cost was relatively small in 2022, consistent with the fact that wages remained moderate. On the other hand, unit profit in Denmark had a sizable contribution relative to its unit labor cost and also relative to unit profit in the euro area. While unit profit in the aggregate is driven by the energy sector (mining and utilities), a sizable portion is explained by the trade, travel, accommodation, and food sector.[3] All in all, these results suggest that the role of profits should be acknowledged for inflation dynamics (Hansen, Toscani, and Zhou, Forthcoming).



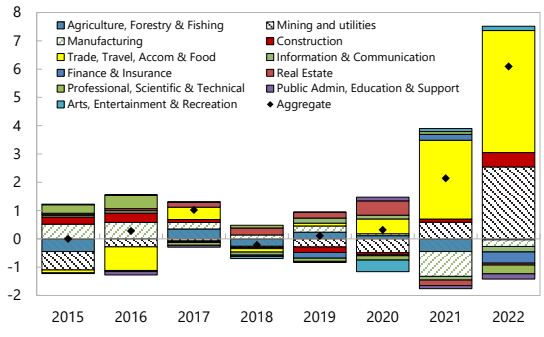
GDP Deflator Growth: Decompostion
(Percent y/y, Percentage points)

Sources: Eurostat; Haver Analytics; and IMF staff calculations.



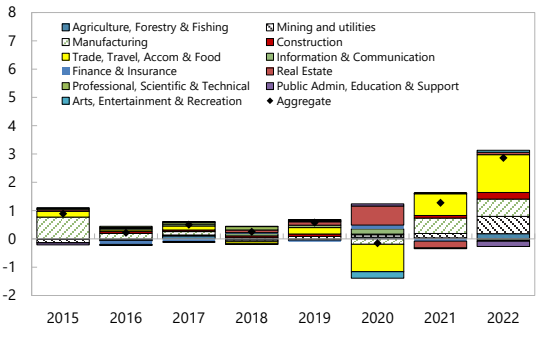
GDP Deflator Growth: Euro Area
(Percent y/y, Percentage points)

Sources: Eurostat; Haver Analytics; and IMF staff calculations.



Unit Profit Decomposition: Denmark
(Percent, percentage points)

Sources: Eurostat; Haver Analytics; and IMF staff calculations.



Unit Profit Decomposition: Euro Area
(Percent, percentage points)

Sources: Eurostat; Haver Analytics; and IMF staff calculations.

[3] Based on Eurostat data, sectoral profits are derived as sectoral GVA minus employee compensation.

7. Historical evidence suggests that the contribution from wages to price deflators will likely pick up. The experience of the euro area during the first and second oil price shocks suggests that unit labor cost, while relatively muted initially when hit by energy price shocks, will likely increase subsequently (Hansen, Toscani, and Zhou, Forthcoming). Workers will likely recoup the loss in real incomes sustained thus far, consistent with the fact that recent collective bargaining agreed on wage growth at around 5 percent annually over the next two years, higher than in the past. Thus, wage pressures and how they feed into inflation are key. These issues are discussed in the next section.

C. Empirical Approach

8. Two complementary approaches are deployed. First, a wage Philips curve model: this investigates how nominal wage dynamics depend on headline inflation, slack, and other determinants. Second, an interacted panel vector autoregressive (IPVAR) model: this is used to assess how wage pressures are passed on to core inflation and how that passthrough depends on inflation expectations and corporate profitability.

Wage Phillips Curve

9. The baseline regression model is:

$$w_t = \beta_0 + \beta_1 w_{t-1} + \beta_2 ugap_{t-1} + \beta_3 \pi_{t-4} + \beta_4 prod_t + \beta_5 ecm_{t-4} + \varepsilon_t ,$$

where *w* denotes nominal wage growth. The unemployment gap (*ugap*) is based on a trend unemployment rate estimated using the Hodrick-Prescott (HP) filter. Headline inflation (π)—which is lagged in the regression—is a proxy for adaptive inflation expectations.[4] The error-correction term (*ecm*) is based on an estimated long-term relationship between the level of real wages and productivity (Annex I.B). Levels of real wages and productivity tend to be cointegrated; thus, any deviation of real wages from that long-term relationship should correct over the short term (IMF 2019). Finally, the regression controls for contemporaneous productivity growth (*prod*) and lagged nominal wage growth. The model is estimated using quarterly data for Denmark during 2000–22. [5]

10. The estimated wage Philips curve is consistent with priors. The slope of the Phillips curve—the estimated coefficient before the unemployment gap—is negative. Lagged inflation correlates positively with nominal wage growth. Though wages are not formally indexed to inflation in Denmark, this suggests that wage formation historically tends to be partly backward looking. The coefficient of the error-correction term is negative—it puts downward pressures on nominal wage growth if real wages are above its estimated long-run relationship with productivity, and upward pressures if they are below. All estimated coefficients are statistically significant. The model is robust to alternative specifications (Annex I.C). Rolling (16-year) regressions suggest the rising importance of slack and (lagged) inflation for wage dynamics in recent periods.

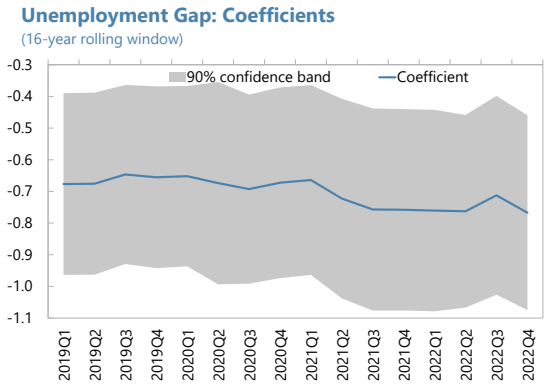
[4] See Annex I.C for a discussion on forward-looking inflation expectations. Whether economic slack is determined by supply and demand is important. But the wage Phillips curve approach is agnostic on this.

[5] Details of the variables and data sources are presented in Annex I.C.

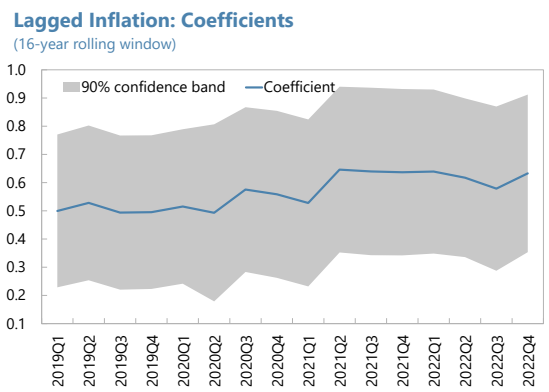
Wage Phillips Curve Regression[1]

Variables	Nominal wage growth										
	Baseline	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Lagged nominal wage growth	0.191**	0.268***	0.198**	0.188**	0.222**	0.264***	0.270***	0.334***	0.270***	0.179*	0.154
	(0.092)	(0.091)	(0.094)	(0.091)	(0.090)	(0.093)	(0.091)	(0.104)	(0.090)	(0.094)	(0.097)
Unemployment gap	-0.704***	-0.547***	-0.817***	-0.758***	-0.625***	-0.579***	-0.534***	-0.352*	-0.583***	-0.738***	-0.735***
	(0.166)	(0.167)	(0.159)	(0.169)	(0.162)	(0.172)	(0.171)	(0.201)	(0.165)	(0.174)	(0.181)
Lagged headline inflation	0.538***		0.538***	0.555***						0.597***	0.715***
	(0.146)		(0.149)	(0.145)						(0.170)	(0.171)
Productivity growth	0.451***	0.405***	0.457***	0.489***	0.421***	0.378***	0.389***	0.329***	0.411***	0.450***	0.510***
	(0.092)	(0.090)	(0.094)	(0.095)	(0.087)	(0.090)	(0.089)	(0.116)	(0.090)	(0.093)	(0.093)
Error correction term	-0.117**	-0.132**		-0.133**	-0.123**	-0.120*	-0.125**	-0.195**	-0.139**	-0.111*	-0.130**
	(0.059)	(0.061)		(0.059)	(0.059)	(0.062)	(0.061)	(0.077)	(0.061)	(0.060)	(0.062)
Inflation expectations		0.275								-0.157	0.285
		(0.213)								(0.231)	(0.171)
Germany lagged wage growth				0.15							
				(0.100)							
Consumer inflation expectations					-0.0248***						
					(0.009)						
Germany inflation expectations						-0.0375					
						(0.158)					
Euro area 1-year SPF inflation expectations							0.23				
							(0.256)				
Euro area 2-year SPF inflation expectations								1.135			
								(0.802)			
Euro area 5-year SPF inflation expectations									2.403		
									(1.487)		
Constant	1.067***	1.212**	1.009***	0.664	2.073***	1.791***	1.307**	-0.447	-2.846	1.286***	0.365
	(0.322)	(0.488)	(0.327)	(0.418)	(0.316)	(0.443)	(0.540)	(1.416)	(2.837)	(0.457)	(0.319)
Observations	84	87	84	84	87	87	87	64	87	84	84
R-squared	0.45	0.367	0.422	0.466	0.406	0.354	0.36	0.41	0.374	0.453	...

Source: IMF staff estimates.
1/ Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Model 10 constraints the sum of coefficients on lagged inflation and expected inflation to unity.

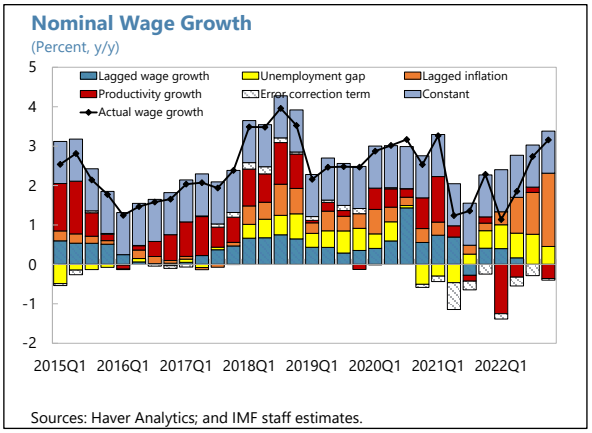


Source: IMF staff estimates.



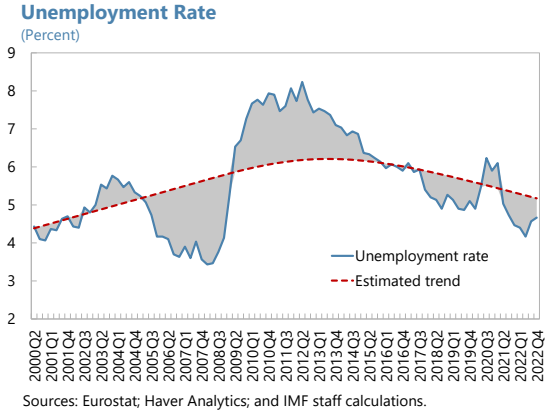
Source: IMF staff estimates.

11. Lagged inflation has strongly underpinned nominal wage dynamics in recent periods, and there is a role for slack. Lagged inflation explained as much as half of the nominal wage growth during 2022. Tightness in the labor market also contributed to wage increases. In 2022, real wage deviated negatively from the estimated long-run relationship, but given that the error correction term enters the regression with a lag, this would feed into wage increases in the future. Productivity growth mostly asserted a downward wage pressure in 2022.

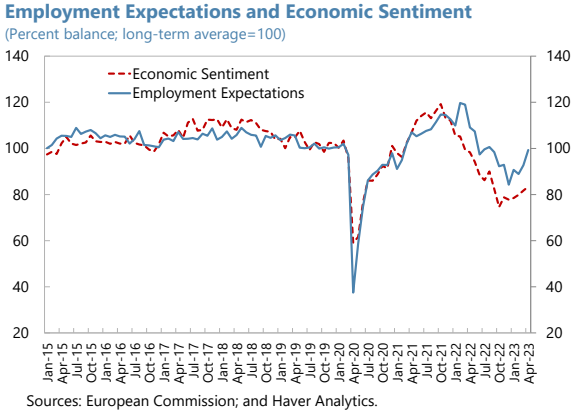


Sources: Haver Analytics; and IMF staff estimates.

12. Given the high inflation realized thus far and still-tight labor markets, wage pressures are expected to remain elevated in the near term. As wage formation is partly backward looking, high (headline) inflation that is already realized would assert wage pressures in the near term. This would be reinforced by the fact that the labor market remains tight, as indicated by the negative unemployment gap. More forward-looking indicators confirm this. For instance, the survey of employment expectations is turning around after dipping during 2022:Q4 suggesting a pick-up in labor demand; other indicators, such as the job vacancy rate and labor shortages, paint a similar picture (see Staff Report Recent Developments). The outcome of recent collective bargaining—about 5 percent growth annually during 2023–24—is broadly in line with the wage formation process that the wage Philips curve model suggests.



Sources: Eurostat; Haver Analytics; and IMF staff calculations.



Sources: European Commission; and Haver Analytics.

Wage Passthrough to Core Inflation

13. The degree of wage passthrough to inflation can be affected by (i) how anchored inflation expectations are; and (ii) how profitable corporates are. Theory suggests that better-anchored inflation expectations can limit wage passthrough as firms may be reluctant to raise their prices even when faced with higher wage costs as they expect increases in costs to be only temporary (Taylor 2000). Regarding corporate profitability, firms are likely to absorb wage costs (conditional on demand) when corporate profitability is more robust. In the conjuncture, the extent to which inflation expectations are anchored and corporate profitability robust would determine wage passthrough to core inflation.

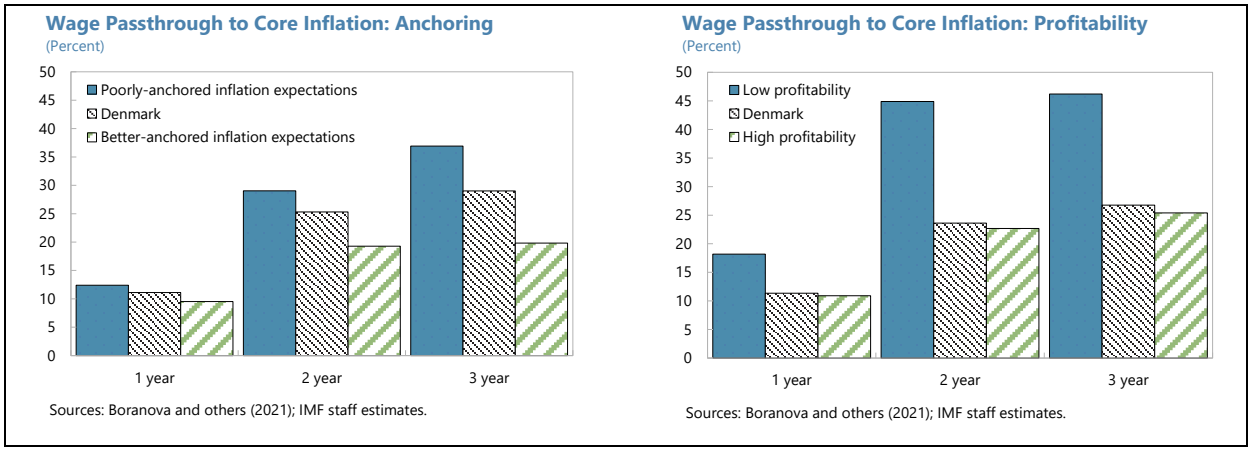
14. An IPVAR model is deployed to analyze the role of inflation expectations and corporate profitability for wage passthrough. The model is:

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ \alpha_{0,it}^{21} & 1 & 0 & 0 \\ \alpha_{0,it}^{31} & \alpha_{0,it}^{32} & 1 & 0 \\ \alpha_{0,it}^{41} & \alpha_{0,it}^{42} & \alpha_{0,it}^{43} & 1 \end{bmatrix} \begin{bmatrix} \pi^{m}{}_{it} \\ w_{it} \\ \pi_{it} \\ u_{it} \end{bmatrix} = \sum_{l=1}^{L} \begin{bmatrix} \alpha_{l,it}^{11} & \alpha_{l,it}^{12} & \cdots & \alpha_{l,it}^{14} \\ \alpha_{l,it}^{21} & \alpha_{l,it}^{22} & \cdots & \alpha_{l,it}^{24} \\ \alpha_{l,it}^{31} & \vdots & \ddots & \alpha_{l,it}^{34} \\ \alpha_{l,it}^{41} & \alpha_{l,it}^{42} & \cdots & \alpha_{l,it}^{44} \end{bmatrix} \begin{bmatrix} \pi^{m}{}_{it-l} \\ w_{it-l} \\ \pi_{it-l} \\ u_{it-l} \end{bmatrix} + X_i + U_{it} \text{ , where}$$

$$\alpha_{l,it}^{jk} = \beta_{1,l}^{jk} + \beta_{2,l}^{jk} factor_{it}$$

For a given country i in period t, π^m represents import price inflation, w nominal wage growth adjusted for trend productivity, π core consumer price inflation, and u the unemployment gap. The IPVAR model is essentially a panel VAR but with model coefficients evolving deterministically according to an "observed" factor (conditioning variable). Thus, model dynamics are conditional on the chosen factor. In our analysis, the anchoring of inflation expectations and corporate profitability are used one at a time as the conditioning factor to generate conditional wage passthrough estimates.[6] The model is estimated for a panel of 27 European countries, covering both advanced and emerging (to exploit cross-sectional and time series variation in the factors) using quarterly data before the pandemic (up to 2019:Q1). The main goal is to present some general results and deduce some inference for Denmark. A detailed discussion of the model—including identification and variable definitions—is in Boranova and others (2021).

15. The analysis suggests that wage passthrough to core inflation is smaller when inflation expectations are better anchored and when corporate profitability is higher. The immediate impact of a wage shock on core inflation is relatively small but increases over time. The passthrough ratio—the ratio of the cumulative response of core inflation due to a wage shock over the cumulative response of wage to its own shock—is much larger at the end of the third year than at the end of the first year. Importantly, the passthrough is smaller when expectations are better anchored: less than 20 percent of wage growth would be passed on to core inflation (at the end of the third year) when expectations are better anchored, but that ratio can reach close to 50 percent when expectations are poorly anchored. Similarly, wage passthrough is smaller when corporate profitability is more robust. Indicative wage passthrough ratio for Denmark—based on the latest available anchoring and corporate profitability—is in the range of 25–30 percent (at the end of the third year).

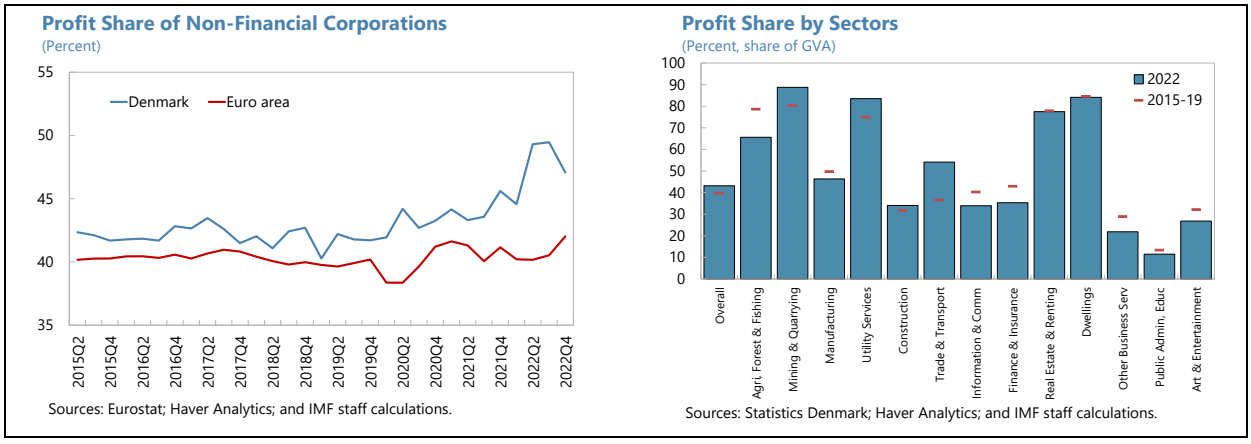


[6] Anchoring of inflation expectations is based on Bems and others (2021) and measures the deviation of Consensus inflation forecasts from the inflation target—less deviation implies better anchoring. Corporate profitability is defined as the gross operating surplus and mixed income of nonfinancial corporations as a share of their GVA.

16. Near-term inflation expectations remain elevated, albeit a slight decline most recently. Inflation expectations for Denmark over the next 12 months (derived from Consensus Forecasts) remain elevated at around 4½ percent. It has, however, edged down most recently—the direction is also consistent with surveys of consumer expectations of inflation. Beyond the near term, inflation expectations in the euro area—key for gauging Denmark's inflation outlook under its fixed exchange rate regime against the euro—remain well anchored: for instance, the 5-year expectations from the Survey of Professional Forecasters—around 2¼ percent—are close to the 2 percent target. Taken together, these suggest that high inflation would persist in the near term, even though expectations remain anchored for now.



17. Corporate profitability remains relatively high. Aggregate corporate profitability in Denmark remains high relative to the euro area. The increase in corporate profitability during 2022 was driven by the energy and transport sectors. Analysis by the Danmarks Nationalbank suggests that without these sectors, aggregate profitability in 2022 (around 46 percent) would be below the pre-pandemic level. Nonetheless, it would still be higher than that in the euro area (around 42 percent). Thus, corporate profitability in Denmark remains broadly robust. This should help allow firms to absorb some of the expected wage pressures, thus attenuating the passthrough to inflation. Beyond the aggregate picture, though, there could be more variation in profit margins at the firm level. For firms with thin profit margins, the passthrough from wages could be higher. Wage discipline in these firms is, therefore, important for keeping a lid on inflation.



D. Conclusions and Policies

18. Wage pressures are expected to remain elevated in the near term, sustaining high inflation. Even though wages are not formally indexed to inflation in Denmark, the empirical analysis suggests that wage formation has historically been partly backward looking. Economic

slack—i.e., labor market tightness—also has played a role; thus, the wage Phillips curve is alive. Given this historical account of wage dynamics, high (headline) inflation realized thus far and still-tight labor markets imply that wage pressures are expected to remain high in the near term. Some of these wage pressures, in turn, are expected to be passed on to core inflation, thus making inflation persistent. The passthrough would be larger if inflation expectations become deanchored.

19. Thus, determined policies to fight inflation are important. These will also have a direct impact on the slack. Importantly, near-term fiscal policy should therefore support disinflation.

Annex I. Technical Details

A. Decomposition of Core Inflation

1. Following Gonçalves and Koeste (2022), the components of HICP core inflation at the 2-digit level are categorized into four groups: (i) sensitive to supply chain disruptions; (i) sensitive to re-opening, reflecting pent-up demand; (iii) rent; and (iv) and the remaining. The components in each category are then aggregated using the corresponding HICP weights.

Categorization of Core Inflation Components

Category	HICP Details	Category	HICP Details
Reopening	Clothing	**Others**	Maintenance & repair of the dwelling
	Footwear		Water supply & miscellaneous services relating to the dwelling
	Transport services		Medical products, appliances & equipment
	Recreational & cultural services		Out-patient services
	Package holidays		Hospital services
	Catering services		Other services in respect of personal transport equipment
	Accommodation services		Postal services
			Telephone & telefax equip. & telephone & telefax services
Supply Chain Disruptions	Furniture & furnishings, carpets & other floor coverings		Audio-visual, photographic & information processing equip.
	Household textiles		Other major durables for recreation & culture
	Household appliances		Other recreational items & equipment, gardens & pets
	Glassware, tableware & household utensils		Newspapers, books & stationery
	Tools & equipment for house & garden		Education
	Goods & services for routine household maintenance		Personal care
	Purchase of vehicles		Personal effects n.e.c.
	Spare parts & accessories for personal transport equipment		Social protection
	Maintenance & repair of personal transport equipment		Insurance
			Financial services n.e.c.
Rent	Rent for housing		Other services n.e.c.

Source: Gonçalves and Koeste (2022); and IMF staff.

B. Long-Run Regression

2. The log-level of real wage is regressed on the log-level of real productivity. To derive real wage, the nominal wage level is deflated using headline HICP, which is then converted into an index by setting the long-term average (2000–22) as 100. The index of real productivity level is defined similarly. The estimated coefficient for real productivity is close to unity—consistent with the view that in the long run, real productivity determines real wages—and statistically significant.



Sources: Eurostat; Haver Analytics; and IMF staff calculations.

Long-Run Wage Regression[1]

Variables	Real wage level (log)
Productivity level (log)	1.173***
	(0.043)
Constant	-0.799***
	(0.197)
Observations	92
R-squared	0.893

Source: IMF staff estimates.
1/ Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

C. Wage Phillips Curve: Database and Robustness

3. Database. Nominal wage is defined as gross wages and salary per hour. Productivity is similarly defined as gross value added per hour. Headline inflation is based on the harmonized HICP index. Nominal wage, productivity, and headline inflation are transformed as year-on-year growth rates of the corresponding levels/indices. The unemployment gap is the deviation of the actual unemployment rate from a trend unemployment rate estimated using the Hodrick-Prescott (HP) filter. These variables are sourced from Eurostat (for cross-country consistency) via Haver Analytics. Inflation expectations in the next 12 months are derived from Consensus Forecasts using a weighted average of current and one-year ahead inflation forecasts, following Buono and Formai (2018). Consumer expectations of inflation for Denmark are from the OECD and SPF (Survey of Professional Forecasters) inflation expectations for the euro area are from the European Central Bank.

4. Robustness. The main results are robust to alternative specifications of the regression model (Table in para 10). In addition to lagged inflation, which is a proxy for adaptive expectations, forward-looking inflation expectations in the near term are included in the regression. The estimates are either statistically insignificant or have the "incorrect" sign, plausibly reflecting identification issues since near-term inflation expectations tend to correlate with lagged inflation. In addition to inflation expectations for Denmark, inflation expectations for Germany and for the euro area (both near and medium terms) are also considered; but they turn out to be statistically insignificant. Separately, including German wages produces a positive and statistically significant coefficient, indicating that wage dynamics in Germany matter for wages in Denmark.

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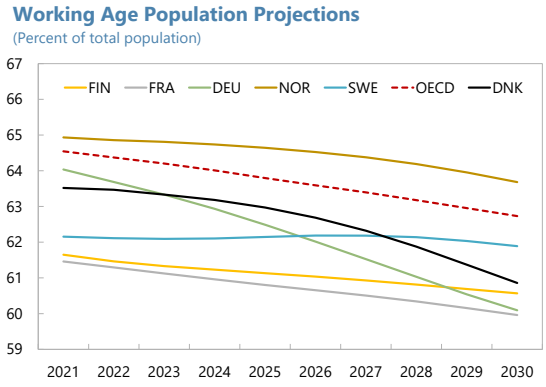
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CANCELLATION OF A PUBLIC HOLIDAY IN DENMARK[1]

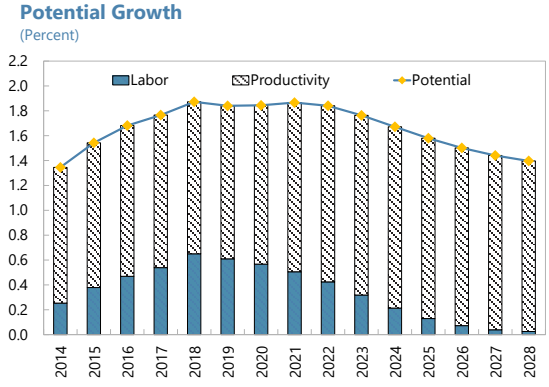
Denmark cancelled a public holiday to increase labor supply, GDP, and fiscal revenues. This chapter discusses the expected labor supply impact of this change and compares it to alternative options for increasing labor supply.

A. Introduction

1. Like many other advanced economies, Denmark is facing demographic headwinds, which pose a challenge to maintaining high rates of growth over the long term. To tackle this challenge, increasing labor supply is seen as a policy goal.[2] In general, potential policies to increase labor supply could cover, on the extensive margin, higher labor force participation and lower structural unemployment, and on the intensive margin, increasing the retirement age and trying to tilt the labor-leisure balance in terms of overall hours worked, including annual holidays and personal leave days. On many of these dimensions Denmark has achieved very good results, in large part thanks to its successful flexicurity model. This, however, makes further gains difficult, forcing policymakers to look beyond conventional measures.



Source: OECD.



Source: IMF, World Economics Outlook.

2. The Danish government decided to cancel Store Bededag (Great Prayer Day) as a public holiday. The decision was approved by parliament in February 2023 and will become effective in 2024. Store Bededag is celebrated on the third Friday after Easter, i.e. always on a weekday; therefore, it's cancellation implies an increase in annual statutory working hours by 0.45 percent[3]. The tripartite agreement among the government, the employers, and the unions stipulates that employees with monthly salary contracts will get a 0.45 percent increase in their annual salary, while those with hourly contracts (accounting for about 20 percent of employment in the private sector) will be compensated according to hours worked on the new working day.

[1] Prepared by Gohar Minasyan with support from Fuda Jiang (all EUR).

[2] The Danish Government, Denmark's National Reform Programme, May 2023.

[3] Annual working days after deducting statutory annual leave and other public holidays will increase from 222 to 223.

3. Cancellation of a public holiday is a rare policy experiment. Historically, the trend has been one of more leisure and less work: shorter hours, more annual paid leave, and more holidays. Some exceptions to this trend include declaring Pentecost Monday a "solidarity day" in France in 2004 and canceling four public holidays in Portugal in 2012 (that were reinstated in 2016).[4] In both cases, the policy changes were undertaken as part of a comprehensive package of measures, making it difficult to isolate the effects of the holiday cancellations. As countries try to find new ways to boost labor supply, GDP, and fiscal revenues in the face of declining working-age populations, Denmark's initiative offers an interesting case study.

B. Estimating the Expected Impact on Labor Supply

4. Two complementary approaches are used in this chapter to estimate the expected impact of the cancellation of Store Bededag on labor supply. The first approach, following the Ministry of Finance, uses the historically observed correlation between agreed and actual work hours in Denmark, and the second approach uses results from cross-country empirical literature on the causal effect of public holidays on economic growth. Since both approaches have advantages and drawbacks, their results provide a range of estimates for the expected impact of the holiday cancellation on labor supply.

Using a "Norm effect" Estimate

5. Correlation between statutory and actual work hours depends, in part, on "norm effects." In response to the cancellation of Store Bededag, hourly workers may choose not to work and be paid for an extra day. Those with monthly contracts may adjust their work hours or even take an extra "sick day" as a silent protest and, in the longer run, demand more annual leave days in wage negotiations. In practice, however, "norm effects"— i.e., the tendency to follow the rules and behave similarly to others —can play a role in determining individual decisions. This may be because of the benefits of "going along" and because transaction costs of adjusting behavior may not be worth it, especially when the change is marginal. Norm effects are shown to explain, in part, the high correlation between agreed and actual work hours in OECD countries.[5] Social coordination effects also may play a role, as the value of leisure can be higher when leisure time is coordinated with others.[6]

6. While intuitive, norm effects are difficult to predict. The Ministry of Finance estimates that the correlation between statutory and actual annual working hours in Denmark has been around 0.75 for the period since the 1980s. Based on this estimate, it predicts that the cancellation of Store Bededag (a 0.45 percent increase in statutory work hours) will result in a 0.34 percent

[4] On the other hand, several countries have introduced or considered introducing new public holidays for the purposes of stimulating consumption and growth, including China, Italy, and Hong Kong. See, for example, Ramasamy, et al. (2008).

[5] See, e.g. Causa (2009).

[6] E.g. Alesina et al. (2015) argue that the "social multiplier" explains part of the difference in working hours between the US and Europe.

increase in actual work hours. However, the norm estimates of 0.75 is based on historical data of continuous labor-leisure balance "improvement," mostly as a result of collective agreements, which reflected, in part, the changes to preferences and other parameters affecting households' work-life balance choices. Since the cancellation of the holiday is opposite to this trend towards more leisure and less work, it appears optimistic to expect that the norm effect would apply symmetrically.

Using Results from Empirical Literature on Causal Impact of Public Holidays on Growth

7. Cross-country estimates of the causal effect of public holidays on economic growth can help gauge the expected impact of the cancellation of Store Bededag on labor supply. Literature is scarce on causal effects of public holidays on work hours, however, a recent paper (Rosso and Wagner, 2022) that looks into the causal effect of public holidays on economic growth is relevant. By exploiting exogenous calendar variation (holidays falling on a weekend versus weekday), to identify the causal effect of holidays on growth, it finds a statistically significant working-day elasticity of GDP of around 0.2.[7] Mapping this result to labor supply using the labor share of 2/3 for Denmark, would imply that the 0.45 percent increase in statutory work hours due to cancellation of Store Bededag would increase actual work hours by 0.14 percent.[8]

8. Two competing factors can be highlighted in applying Rosso and Wagner's estimates to the case of cancellation of Store Bededag. First, calendar variation, which Rosso and Wagner use, does not result in variation of wages, while in case of cancellation of Store Bededag, workers will be paid for the extra workday. This matters for the distribution of the extra value added between labor and capital. Since propensity to consume from labor income is likely higher than from capital income, the multiplier effect would be larger if workers are paid extra wages for the extra workday rather than if employers keep the extra income, resulting in a larger overall GDP impact.[9] Second, while calendar variation is transitory, the cancellation of Store Bebedag is permanent and, if households see this as a permanent deterioration to their labor-leisure balance, they may try to find ways to restore it. While these two factors work in opposite directions, in the near term the first effect will likely dominate the latter, implying that the labor supply impact of cancellation of Store Bededag would be larger than the estimate based on the elasticity from Rosso and Wagner of 0.14 percent.

[7] Rosso and Wagner (2022) use calendar data (holidays falling on a weekend versus weekday that transitorily increases or decreases working days for a year) and annual national accounts statistics that are not working day adjusted for a panel of 200 countries over 2000–19. Their estimates imply that a 1 percent reduction (increase) in statutory work hours due to calendar variation reduces (increases) GDP by 0.2 percent.

[8] Since labor share (i.e., labor compensation as a share of national income) is 2/3 for Denmark, a 0.2 elasticity of GDP implies an elasticity of labor supply of 0.2*2/3=0.3. This in turn implies that the 0.45 percent increase in statutory work would increase actual work hours by 0.3*0.45=0.135 percent.

[9] Onaran, 2016 shows that the marginal propensity to consume from profit income is lower than the marginal propensity to consume from labor income for all G20 countries. Relatedly, Fisher et. al, 2020 (among others) show that the marginal propensity to consume is lower at higher wealth quintiles.

9. Negative demand side effects are likely to be small. The literature on the economic impact of public holidays often focuses on their effects on consumption.[10] Following Barrera and Garrido (2017), domestic tourism spending can be used as proxy for consumption related to a public holiday.[11] The share of domestic tourism spending in GDP in Denmark is relatively low (at 3.4 percent in 2019) compared to most country cases discussed in the literature in this context.[12] This suggests that the impact could be between 0.01 and 0.06 percent of GDP, depending on whether only the domestic tourism spending of Store Bededag (Friday) or of the whole long weekend is foregone.[13]

10. In summary, the cancellation of Store Bededag is expected to increase labor supply by around ¼ percent (0.14–0.34 percent). Using the historically observed correlation between agreed and actual work hours in Denmark gives an upper bound estimate of 0.34 percent for the expected increase labor supply, while using estimates from cross-country empirical literature gives a lower bound of 0.14 percent. Whether or not the long-term impact on labor supply will be smaller than the short-term impact, is ambiguous, because the factor of households finding ways over time to claw back the lost leisure may be compensated by the factor of the norm effect solidifying over time.

C. In Comparison: Other Channels to Increase Labor Supply

11. This section compares some alternative channels through which labor supply could increase by a similar magnitude as the cancellation of the public holiday. The calibration of each of these channels – incentivizing longer hours worked, disincentivizing early retirement, and increasing employment of immigrants – is meant as an illustration and not as specific policy proposals.

Incentivizing Longer Hours Worked

12. Relatively low average hours worked per employed in Denmark are reflective of social choice but would still respond to changes in marginal tax and benefit rates. The average hours worked per employed in Demark is around 34 hours per week, which is relatively low, even compared to other Nordic countries. Several factors contribute to this, including a higher prevalence of part-time work in general, more students combining study with work, and relatively lower hours for men, possibly linked to a more equal sharing of home responsibilities between men and women. Nevertheless, because of the relatively high employment rate, total hours worked per capita

[10] E.g. Ramasamey, et al. (2008) argue that public holidays help boost aggregate consumption. Relatedly, several studies, including East et al, 1993, Sugie et al. (2003), and Bhatnagar and Ratchford (2004) show that having free time is the most important contributor to shopping.

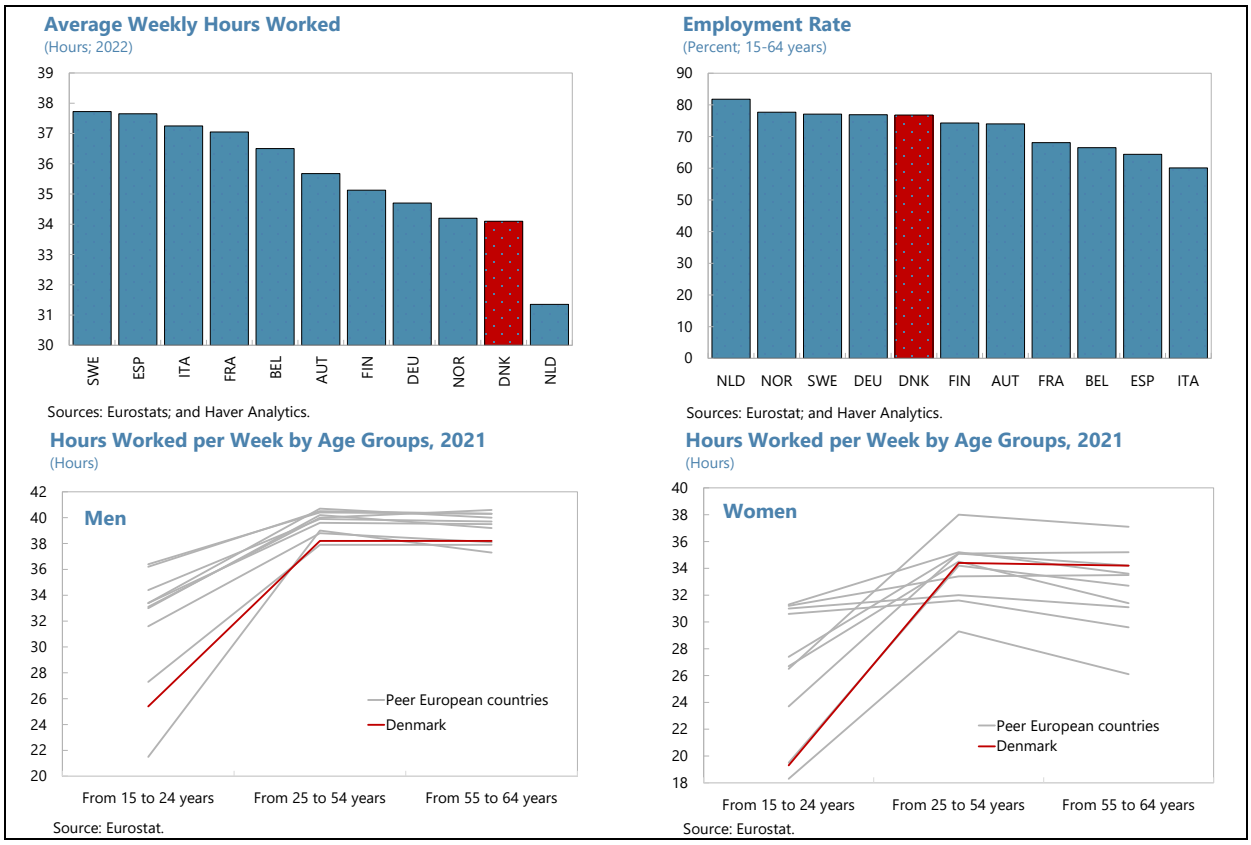
[11] Barrera and Garrido (2017) argue that there is an "optimal number of public holidays", and this number depends on the ratio of consumption on domestic tourism related activities to overall consumption.

[12] Being a rich and small country, international tourism accounts for a relatively larger share of Danish households' consumption.

[13] The simple calculation is based on 3.36/52 =0.06 for the upper bound and 3.36/365=0.01 for the lower bound.

compare more favorably to peers than hours worked per employed.[14] This implies that work hours are more equally distributed among the population, which may be the preferred equilibrium for the society as a whole. Still, at the household level, labor supply elasticity to effective income is positive, which implies that tax and benefit policy can affect labor supply, both on the intensive and the extensive margin.[15]

13. The government's recent income tax proposal aims at incentivizing more work and higher earnings. The plan includes a reduction of marginal tax rates (except for very high-income earners) and an increase in the earned income credit. It is estimated to increase labor supply by 0.18 percent, slightly lower than the expected impact of the cancellation of the public holiday, at the cost of some deterioration of the Gini index as well as some fiscal cost. However, the government's proposal does not include any changes to the benefits system. IMF (2019) illustrated that the tradeoff between equity and efficiency could be improved by reforming the structure of marginal effective tax rates while maintaining the guaranteed minimum income (which is important for not compromising the highly dynamic and efficient labor market model of Denmark) in a revenue neutral way, leading to a 0.5 percent increase in labor supply, with a slight deterioration of the Gini index (from 0.203 to 0.216).[16]



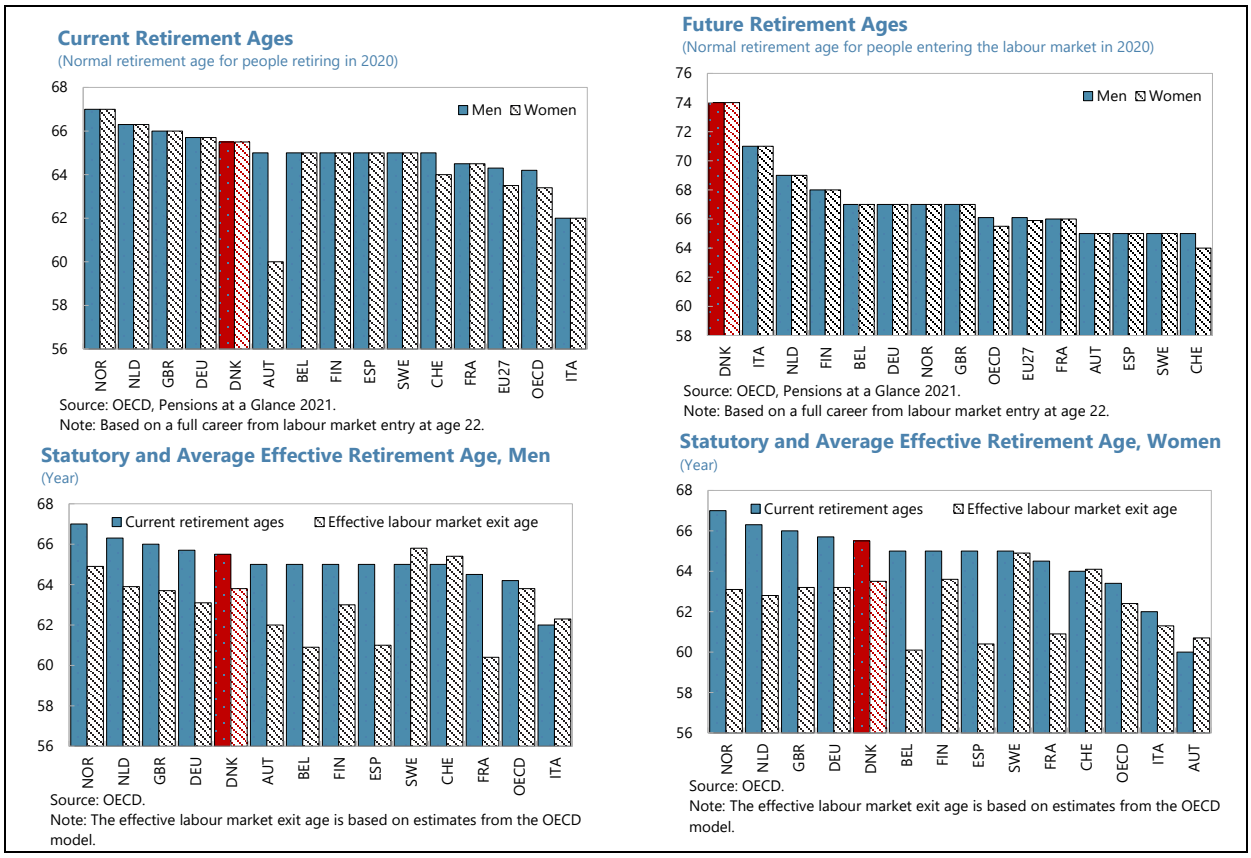
[14] See Weiskopf et al. (2018) and Denmark Ministry of Finance (2017).

[15] Bingley, P. (2018).

[16] See Annex I in IMF Denmark 2019 Article IV Consultation Staff Report. The analysis used household survey data, the OECD 2019 Tax-Benefit model, and estimates of hours (intensive) elasticity at 0.10 and average participation (extensive) elasticity at 0.20.

Disincentivizing Early Retirement

14. Tightening the conditions for early retirement would help push further the boundary on lifetime labor supply. Denmark's ambitious one-to-one indexation of retirement age to life expectancy implies that its statutory retirement age, currently about average compared to European peers, will be the highest for people who entered the labor market in 2020. The actual to statutory retirement age difference in Denmark is also smaller than in most European peers (although larger than the OECD average), with the ratio of people who retire early to the total declining in recent years to around 50 percent. This declining trend should be maintained despite the rising statutory retirement age. The authorities are considering reforms to some of the early retirement schemes that should help achieve this. As an illustration, increasing effective employment by ¼ percent (the estimated effect of the cancellation of the public holiday) would require reducing the ratio of people using retirement schemes from 50 percent to 48 percent.

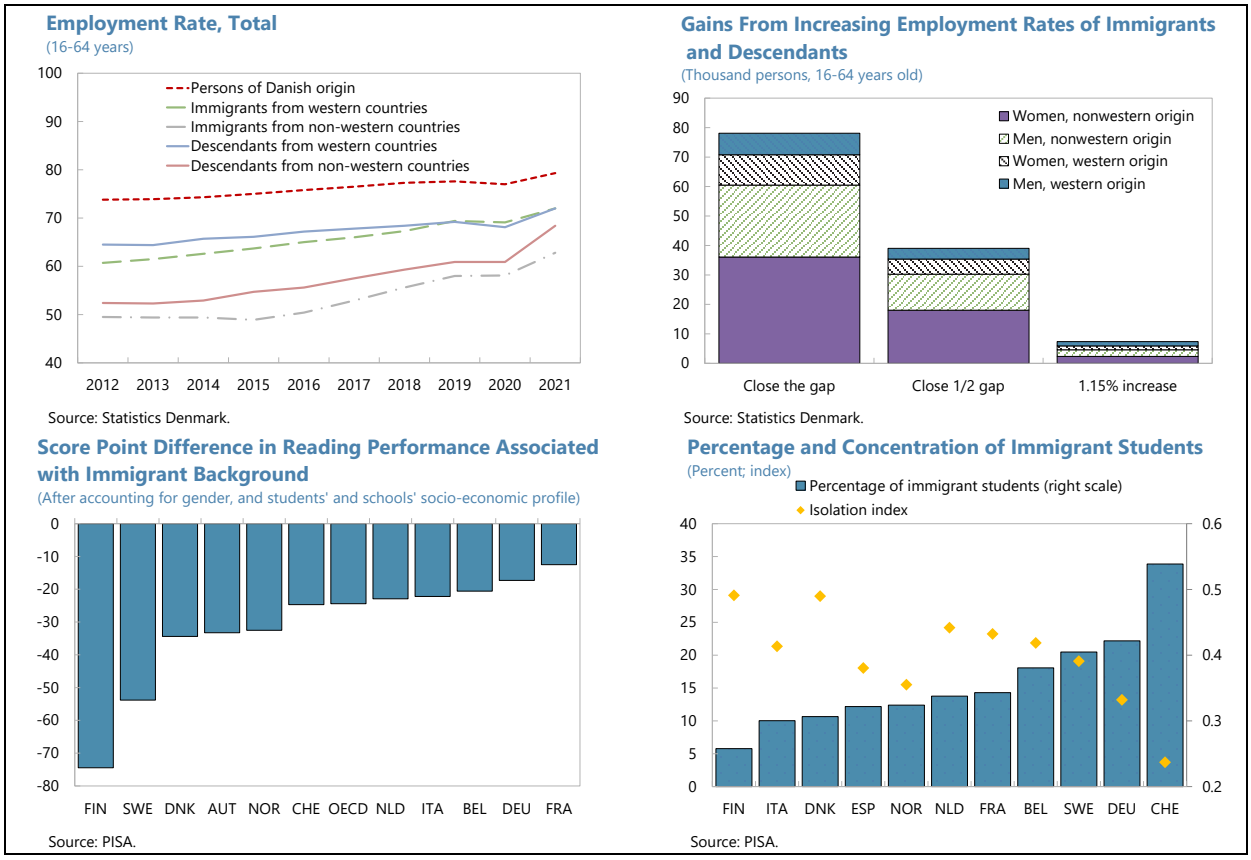


Increasing Employment of Immigrants

15. A relatively modest improvement in employment rates of immigrants and descendants would make a tangible gain to overall employment. Employment rates of immigrants and descendants, especially those with non-western backgrounds, have improved in recent years, although significant employment gaps compared to persons of Danish origin remain (6–20 percentage points depending on immigrants' origin).[17] If all immigrants and descendants were

[17] Within each group, the gaps are higher for women than for men.

employed at the same rate as people of Danish origin, the total number of employed would increase by 2.7 percent, which may be an ambitious goal in the near future. However, as an illustration, increasing effective employment by ¼ percent (the estimated impact of the holiday cancellation) would require raising the employment rate of each of the immigrant or descendant group by 1.15 percentage points. This seems possible even in the near term, given that the employment rate of immigrants and descendent increased by 4 percentage points between 2019 and 2021.[18] While these recent improvements are largely due to cyclical reasons, as labor market tightness may have opened up opportunities for more immigrants and descendants, some of these gains could potentially become lasting as they help them get the needed job market experience and skills. In this respect, the government's continued effort to support on-the-job training for new entrants into the labor market with immigrant backgrounds (of all ages) would help.



16. To fully utilize the potential of immigrant labor, it is also important to close the gaps in education. OECD's PISA data for 2018 suggest that Denmark ranked relatively poorly in educational attainment gaps by origin and ancestry. This is correlated with the "isolation index" of children with immigrant backgrounds, which is relatively high in Denmark.[19] Some recent data,

[18] More recent data show that foreign nationals with wage income in Denmark, excluding those covered by the Ukraine Special Act, increased by 10.4 percent in 2022 compared to 2021.

[19] According to the PISA definition, the isolation index measures whether immigrant students are more concentrated in some schools. The index is related to the likelihood of an immigrant student to be enrolled in schools that enroll non-immigrant students. It ranges from 0 to 1, with 0 corresponding to no segregation and 1 to full segregation.

however, offer grounds for optimism.[20] Continuous improvement of educational outcomes of students with immigrant backgrounds will empower them to get a job with higher value added. Better integration of schools may need to be prioritized, as a recent study by the Ministry of Economy suggested, children who grew up in segregated areas have a lower probability of getting an education and participating in the labor market.[21] Further, while beyond the scope of this chapter, reducing isolation and improving the integration of children with immigrant backgrounds would help reduce parallel societies that challenge overall social cohesion.[22]

D. Main Takeaways and Future Work

17. The cancellation of the public holiday is expected to have a small positive impact on labor supply. It is a rare policy initiative, making it difficult to estimate its expected economic implications. Nevertheless, based on recent cross-country empirical analysis on the causal effects of public holidays on economic growth as well as the historical correlation between statutory and actual work hours in Denmark, labor supply can be expected to increase by about 0.14–0.34 percent. In terms of magnitude, this effect is comparable to reducing the ratio of people using early retirement schemes by 2 percentage points or increasing the employment rates of different categories of immigrants and descendants by 1.15 percentage points each. A similar labor supply impact should also be possible to achieve through a revenue–neutral tax and benefit system reform.

18. Efforts to explore alternative measures to increase labor supply should continue. Thanks to its successful flexicurity model, Denmark has been able to achieve a well-functioning labor market characterized by high labor market participation and low structural unemployment. This implies that further efforts to sustainably increase employment may involve some policy tradeoffs that need to be carefully considered. In particular, reforming the tax and benefit system, tightening conditions for early retirement, and efforts to close the employment gaps of immigrants could be considered in terms of equity considerations, fiscal costs, impact on productivity, and ease of implementation, including political economy considerations.

[20] A recent study has found that performance of descendants from non-western countries after controlling for parents' education, employment and income has been improving in recent years and in 2020–21 even surpassed the performance of students of Danish origin: https://kraka.dk/sites/default/files/public/analyse_-_betydningen_af_koen_og_herkomst_for_karakterer.pdf.

[21] Denmark Ministry of Economy (2018) (2).

[22] Denmark Ministry of Economy, (2018) (3) defines 8 indicators of parallel societies including: passive culture (long periods without employment or education), crime, and ethnic composition in residential areas, primary schools, and daycare centers.

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