De Økonomiske Råd
Formandskabet

PRODUCTIVITY 2023

SUMMARY AND RECOMMENDATIONS

THE REPORT'S MAIN CONCLUSIONS

The report's first chapter contains assessments of and recommendations for current economic policy, with a particular focus on topics that have an impact on productivity.

Chapter II shows that productivity growth in Denmark in the period since the global financial crisis has been higher than in a number of other countries. Together with terms of trade gains, this has increased prosperity in Denmark. The chapter also contains an analysis that shows that reallocation is an important driving force for productivity growth in Denmark. Another analysis takes a closer look at the relationship between energy prices and productivity.

Chapter III examines the consequences of automation in Danish manufacturing firms. The chapter finds that there has been an increase in the number of firms investing in automating machinery, but there has not been a dramatic development. An analysis shows that manufacturing firms that invest in automation increase productivity and employment, but reduce the labour share.

SUMMARY AND RECOMMENTATIONS

The Productivity Report from the Chairmanship of the Danish Economic Councils, which constitutes the National Productivity Board, consists of three chapters. The following contains a brief presentation of the conclusions of the three chapters.

PRODUCTIVITY REPORT 2023

Chapter I	Current economic policy
Chapter II	Trends in productivity
Chapter III	Automation in the manufacturing sector

CHAPTER I, CURRENT ECONOMIC POLICY

Chapter I comments on current economic policy proposals with relevance to productivity. The discussion is divided into four topics:

- Taxation
- Education and labour market
- Measures introduced due to the high inflation
- Green initiatives.

Lower tax on family-business generational change can reduce productivity

The current coalition government's legislative program includes several initiatives in the area of taxation. One of these initiatives is a reduction in the tax on the transfer of a business within a family. Lower tax on business transfers will provide an increased incentive for businesses to be handed over to the next generation. However, there is evidence that family-run businesses achieve worse results than other businesses. Therefore, there is a risk that this initiative would affect productivity negatively.

Increased deductions for expenditure on R&D require better grounds for decision-making

Another proposal is to make the current, temporary increase in deductions for firms' research and development expenditure permanent. The government has not presented evidence that shows positive effects of increasing the existing subsidies for research and development by pri-

vate firms, and the grounds for increasing the deduction should, therefore, be provided before any eventual decision is made to increase the deduction permanently.

Top tax changes are a trade-off between distribution and efficiency

The Government's legislative program also contains a proposal to reduce the marginal tax rate for some of those who, under the current rules, pay the top tax rate. At the same time, an increase in the marginal tax rate is proposed for the highest incomes. The first part of the proposed changes (the increase in the top tax threshold) is likely to increase both labour supply and productivity, while the opposite is true for the second part (the increased top tax rate for the highest incomes). Overall, this is a classic trade-off between effects on efficiency and effects on distribution.

The effect of plans for master's programs depends on how they are actually implemented

The Government has also proposed shortening the length of up to half of the places in master's degree programmes. Shorter master's programs would be expected to lower productivity; however, the proposed reform contains many other elements. Therefore, the overall effect of the plan depends on the specific implementation.

Lower salary threshold for foreign employee recruitment scheme is a good idea

The Government also proposes to lower the eligibility threshold salary for the foreign employee recruitment scheme. The Chairmanship has previously recommended that the threshold be lowered, as this could contribute to a structural increase in the workforce and in productivity, see, e.g., *Produktivitet, 2022* (Productivity, 2022) and *Dansk Økonomi, forår 2017* (Danish Economy, spring 2017).

Decisions about job centres require better grounds

The Government's legislative program also aims to close the job centres and restructure the active labour market program. It is possible to transfer some of the measures aimed at the unemployed to private actors, as proposed in the Government's program. However, it is not obvious that this will have a favourable effect on the exits from unemployment or that it will reduce public expenditure. Therefore, the Chairmanship recommends that any decision about closing down the job centres be based on an overall assessment of the costs and benefits.

Rent ceilings can weaken mobility and productivity

One measure that was introduced in 2022 due to the high inflation is the rent ceiling. The rent ceiling creates uncertainty about returns to housing investments; thus, it increases uncertainty about the future supply of rental housing. What's more, the intervention increases the risk of lock-in effects being created, which can reduce mobility in both the housing and the labour markets and thus potentially weaken productivity.

State aid is a bad idea, especially from a Danish perspective

The EU Commission's proposal for state aid for green investments is a reaction to the US Inflation Reduction Act of 2022, which includes state aid for businesses in the US. Denmark benefits greatly from free world trade, and Danish participation in competition for increased state aid would be expected to result in a welfare loss.

Climate policies can also affect productivity

In the past year, a number of cross-party climate-policy agreements have been concluded. Climate policy, like all other policy areas, has the potential to influence the efficiency and productivity of the Danish economy, as it affects firms' and citizens' parameters.

Green tax reform pulls in the direction of more uniform taxation of CO_2

In June 2022, the Agreement on Green Tax Reform for Industry etc. was concluded. The most important element in the agreement is the DKK 750 per tonne tax on emitted CO_2. A uniform CO_2 tax is a cost-effective instrument for reaching the climate goals, and the agreement is a step in that direction. However, the agreement contains a number of deviations from uniform taxation, which makes the cost of reaching the goals higher than necessary.

Government subsidies should only be used in exceptional cases

In June 2022, an agreement was also reached on the establishment of a green fund. The agreement means green investments can be subsidised. Government subsidies should only be used if it can be shown that a market failure exists and that subsidies are the most effective instrument for addressing the market failure, see, e.g., *Økonomi og Miljø, 2022* (Economy and Environment, 2022).

Expansion of district heating should be conditional on economic analyses

Finally, an agreement has been reached on more green heating and the phasing out of natural gas. Expanding district heating and phasing out natural gas can contribute to increased security of supply, but it is important that projects are subjected to cost-benefit analyses. There is the risk that a forced expansion of, for example, the district heating network would lead to reduced productivity if the requirements for profitability were relaxed.

CHAPTER II, THE TREND IN PRODUCTIVITY

Chapter II describes the long-term trend in productivity in Denmark. The chapter contains two analyses. The first analysis examines the extent to which Danish firms achieve productivity gains by changing their product mix. In the second analysis, the short-term productivity effects of rising energy prices are estimated. In addition, the chapter discusses the cases in which productivity gains can increase labour supply and improve public finances.

Relatively high Danish productivity growth since the global financial crisis

Hourly productivity in the private, non-agricultural sectors in Denmark has increased approximately 1½ percent annually since the turn of the millennium. In the period since the global financial crisis, productivity growth in Denmark has been higher than in a number of other countries. This can be particularly attributed to relatively high productivity growth in the manufacturing sector; however, relatively high productivity increases in the trade and transport sectors have also contributed.

Productivity growth from changed product composition

Productivity growth gives rise to prosperity. In addition, Danish prosperity has further increased as a result of terms of trade. The benefits from improved terms of trade have to be viewed together with an advantageous specialisation of Danish manufacturing. Certain types of innovations can contribute to both productivity growth and improved terms of trade. This particularly applies to so-called product innovation, where new products are introduced or existing ones are improved; thus, they can command a higher price. An analysis of Danish manufacturing firms in the period 2000-19 shows that approximately one third of productivity progress within the firms was driven by the firms continually changing their product mix.

Persistent increased energy prices can weaken productivity

In the coming years, there is the potential for productivity growth to be hampered by higher energyprices and greater uncertainty. Prolonged high energy prices will, all else equal, weaken productivity. The effects depend partly on the extent to which firms are able to substitute away from relatively expensive energy sources, and partly on the energy intensity of production. An analysis of Danish manufacturing firms indicates that higher energy prices lead to a significant drop in hourly productivity in the short term, while the underlying efficiency in the production process, measured by total factor productivity, does not change.

Measures that increase productivity can potentially strengthen public finances

In addition to the fact that productivity growth gives rise to prosperity, potentially also through terms of trade effects, productivity growth can also affect the labour supply and public finances. Today, it is typically assumed that productivity increases do not affect the long-term labour supply and that they are roughly neutral for public finances. However, there is a lack of empirical understanding in this area. Discussions in Chapter II show that it is plausible that certain types of productivity growth can strengthen the labour supply and, thereby, public finances. There is thus a need for empirical research in this area.

CHAPTER III, AUTOMATION IN THE MANUFACTURING SECTOR

Chapter III examines the consequences of automation in manufacturing firms. The analysis is motivated by a newer field of research that examines the significance of the emergence of robots and other automating machinery. The chapter focuses on the effects of this development in Denmark based on a review of relevant economic theory, existing empirical studies, an overview of the spread of automation in the manufacturing sector as well as an analysis of automation in Danish manufacturing firms.

Automation is expected to increase productivity, but may also increase inequality

Automation means that robots and other forms of technology replace workers in tasks currently undertaken by workers. Automation likely leads to increased productivity, but can also reduce the share of value-added paid out as wages to workers, because the use of labour relative to capital falls. Wage growth is expected to be slower, particularly for the groups of workers who lose many tasks to the new technologies. This can increase income inequality. Ultimately, under certain conditions, automation can reduce real wages and employment for affected groups of workers.

Education and new tasks can mitigate negative consequences

Several factors can mitigate the negative consequences of automation. First, education and further training can change the skills of the workforce, enabling workers to carry out tasks that are difficult for machines to do. Second, technological development can also create new tasks for workers and thus compensate for the automated tasks.

Existing empirical studies generally confirm theoretical expectations

Empirical studies in other countries find that automation increases the productivity of firms, but lowers the wage share, thus, confirming theoretical expectations. Typically, there is also a positive effect on the number of employees in the automating firms. However, this increase can come at the expense of the number of employees elsewhere in the economy because, for example, competing firms lose market share to automating firms. Therefore, automation does not necessarily have an overall positive effect on employment.

Automating machines are more widely used, …

The chapter shows that there has been an increase in the number of Danish manufacturing firms investing in automating machinery such as robots and automatic milling, cutting and welding machines. There has also been an increase in the number of installed industrial robots.

... but the development has not been dramatic

However, investment in automating machinery has not increased significantly relative to other types of investment. Thus, automating machinery makes up a small and constant share of total investment in the

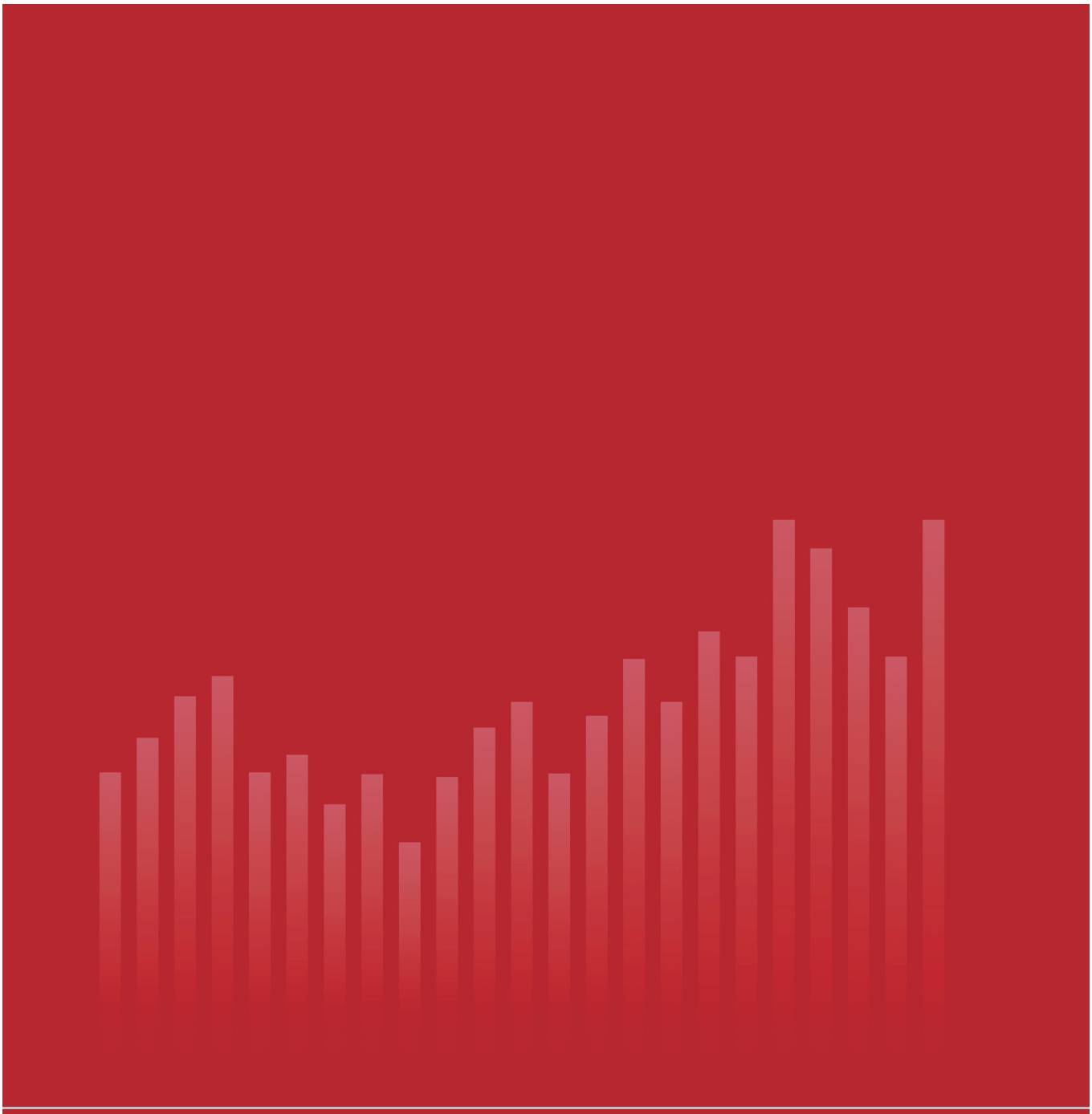
manufacturing sector. One of the reasons for this may be that there has been an increase in investment in intangible capital, particularly software and research and development, at the expense of investment in physical capital.

Automation increases productivity and employment, but reduces the wage share

An analysis presented in the chapter shows that productivity and employment increase, while the labour share decreases when Danish manufacturing firms start investing in automation. Thus, there is a productivity gain, but a larger share of the gain accrues to the owners. The analysis finds that automation increases productivity by 7 percent, which is in line with the findings in similar studies for other countries.

There are no strong grounds for regulating automation

The analysis does not indicate that socioeconomic gains differ from private gains from automation. Thus, there is no basis for regulating automation through subsidies nor taxes. In theory, under certain circumstances, automation could lead to an inefficient reduction in employment, which favours taxation to slow down or reduce the extent of automation. However, neither the analysis presented in the chapter nor studies from other countries point to any negative effect on employment. Therefore, there is no strong economic basis for limiting the extent of automation.



Productivity, 2023