

De Økonomiske Råd 
Formandskabet

PRODUCTIVITY 2019
SUMMARY AND
RECOMMENDATIONS

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SUMMARY AND RECOMMENDATIONS

The present report from the Chairmanship of the Danish Economic Council constitutes the second annual productivity report. It consists of three chapters:

PRODUCTIVITY REPORT 2019

- Chapter I Productivity trends
- Chapter II A new measure of productivity in primary schools
- Chapter III Productivity and resources in senior high schools

Chapter I of the Productivity Report describes the overall trends in productivity, while chapters II and III focus on productivity in the public sector. In chapter II a new measure of productivity in primary and lower secondary schools is presented, and chapter III presents an analysis of efficiency and resource allocation in Danish senior high schools.

The following section presents a brief summary of the most important conclusions in the report. The subsequent section presents assessments of recent policy measures that might affect productivity.

CONCLUSIONS

Chapter I describes the overall productivity trends. The average annual growth rate of productivity in the private non-agricultural sector in Denmark has been below 2 percent for a prolonged period.¹ This is a tendency shared by several other western economies.

Chapter I also presents an international comparison of productivity levels for various sectors of the economy. The comparison is based on the industry-specific purchasing power parities constructed by

1) The term “private non-agricultural sector” is used to denote non-agricultural private manufacturing and service sectors.

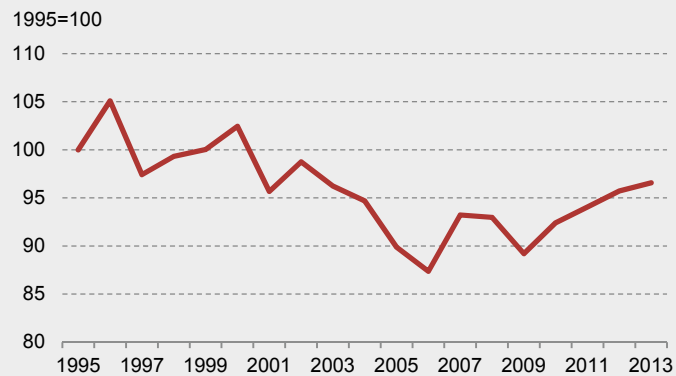
Eurostat and, therefore, only considers European countries (the sample is further restricted to those European countries that were among the founding members of the OECD). In manufacturing, Denmark is one of the countries with the highest level of productivity. This is also the case for the parts of the service sector that are exposed to international competition. With respect to domestic services, productivity in Denmark is, however, at the lower end of the considered sample of countries. This finding underlines the importance of identifying unnecessary government regulations that impedes competition in the parts of the service sector that don't face international competition.

Chapter II presents a new measure of the evolution of productivity in the Danish primary and lower secondary school sector. The new measure uses results from the PISA tests to calculate the amount of learning (i.e. production) per student. Existing measures of production in primary and lower secondary schools are less suitable for measuring productivity since they are based on the number of teaching hours the students have received and thus don't capture changes in the quality of teaching. Quality changes can, for instance, arise due to changes in teachers' preparation time, reforms or new technology. These changes will be captured by the new measure.

The new measure indicates that productivity has been more or less constant over the period 1995-2013, see figure A. Even though the measure is an improvement on existing measures, it is not perfect. For instance it is not currently possible to incorporate the part of value added that relates to the children's well-being. Thus, the results presented should be considered as preliminary.

FIGURE A PRODUCTIVITY IN PRIMARY AND LOWER SECONDARY SCHOOLS

Learning-adjusted productivity was almost constant in Danish primary and lower secondary schools from 1995 to 2013.



Notes: The figure shows value added in constant prices in primary and lower secondary schools divided by total working hours. Value added is computed using PISA test scores as a measure of the total amount of learning obtained per student. The figure shows the main estimates, where the test scores have been adjusted to take into account the effect of changes in the grade composition, country of origin and parental education of the tested students.

Source: Own calculations based on register data, Ministry of Education, Statistics Denmark and www.nces.ed.gov.

The analysis is part of an ongoing effort to develop productivity measures for the public sector that take into account quantity as well as the quality of public services. As far as possible, future measures should be adjusted to account for changes in quality.

Chapter III focuses on the relationship between resource allocation and efficiency in the Danish senior high school sector. An analysis presented in the chapter explores how changes in government funding of general senior high schools affects production measured by student outcomes such as completion, exam grades and progression

to the further educational system. The analysis is based on changes in funding arising from a reform of the system in 2008. The analysis finds no statistically significant effect of the changes in funding on the outcomes examined.

However, one should be cautious in using the analysis to predict the effect of changes in funding starting from funding levels that are markedly lower than in the years that the analysis considers. This is because the effect of funding is expected to be higher for lower initial funding levels.

In recent years the funding levels to the senior high school sector have, in general, been reduced. Even though the analysis considers the funding changes from 2007 to 2012, the results provide an indication of the effects of funding reductions in recent years. The recent reductions have taken place within the limits of the funding levels on which the analysis builds. That the analysis finds no statistically significant effects suggests that the recent reductions in funding levels have had, at most, a limited effect on educational outcomes.

Thus, the analysis indicates that the reductions in funding in recent years have increased productivity measured by educational outcomes relative to educational expenditures. An important caveat is that the educational outcomes used in the analysis do not necessarily represent a perfect measure of the production of senior high schools.

However, the results of the analysis cannot be used to assess the consequences of future reductions in funding. This is because the average funding level has been reduced to a level which is at the lower end of the spectrum covered by the analysis.

The lack of a statistically significant effect of changes in funding may reflect several factors. For one, it could be that the changes in funding have affected factors that have a limited effect on educational outcomes. Another explanation could be that the funding levels were so high before the reductions that the marginal effect of funding was small, even though the funding at each school was spent as efficiently as possible given the state of technology and known teaching methods. Thus, since there is no statistically significant effect of the reduced funding, the analysis indicates that there is no reason for the chairmanship and the economic ministries to change the current

practice of not assessing dynamic effects of changing expenditure per student in the upper secondary school sector.²

CURRENT POLICY MEASURES

In recent years the government has proposed a number of measures which may affect productivity. The following discussion more closely examines some of the measures aimed towards investment. Although it might seem natural to include an assessment of the government's proposed reform of the public sector, it is not discussed. Thus, several of the elements in this reform are only described in very general terms, and it is not possible to provide a qualified assessment of the productivity effects of the reform.

MEASURES INTENDED TO AFFECT INVESTMENTS

In November 2017 the Danish parliament passed an agreement on a range of initiatives intended to influence growth and entrepreneurial activity. As part of the agreement certain deductions for persons who invest in small and medium-sized unlisted companies were introduced. In order to qualify for the deduction a number of criteria must be met. The company invested in must, for instance, not be too large, as defined by employment, revenues and balance sheet, and the company must be in a growth or start-up phase.³ According to the agreement, the purpose is to strengthen the entrepreneurial culture and ameliorate the access to venture capital.

From an economic point of view, targeted measures such as these tax deductions should be justified by the existence of market failures such as positive externalities accruing from investments in these particular types of companies. Thus, such a measure should be justified by showing that the social return on the types of investments exceeds the private return. One type of market failure could be capital

2) The Danish Ministry of Finance does allow for an effect of a change in the educational level on productivity and labour market attachment. There is, however, no direct link between educational expenditure and the educational level.

3) A company is defined as being in a start-up phase if it has been active in a given market for less than seven years after its first commercial sale. A company is in a growth phase if it has need for an initial capital injection amounting to more than 50 percent of yearly revenues and has a business plan to penetrate a new product market or geographical market.

market imperfections, e.g., arising from missing or asymmetrical information that results in companies not having access to a sufficient amount of funding such that even profitable projects do not obtain funding.

In the absence of such market failures, the tax deductions will result in an unjustified preferential tax treatment of small and medium-sized unlisted companies. This will direct savings and investment activity towards these companies with a low social return. Thus, to justify this type of deduction the existence of such market failures should be clearly demonstrated or at least shown to be probable.

An additional element of the agreement is an increase in the tax deduction rate for investments in research and development from 100 percent to 110 percent. The purpose is to strengthen incentives to develop new technologies. Government support to research and development in Denmark is significantly below the median for the OECD countries. This, however, does not justify an increase in the tax deduction.

Government support for research and development can be justified if the benefits of an innovation not only accrue to the developer but potentially also to other companies. Each company does not take these external benefits into account. In this case companies will invest too few resources in research and development compared to what is optimal from a social point of view. Therefore, government support can help raise investments to a level that increases overall productivity in society.

Another reason for government support of research and development is that there may be financial market imperfections that prevent otherwise profitable investments being funded. For example, it may be difficult and costly for banks and other lenders to collect enough information about a project to assess the likelihood that it will be successful and allow for repayment of the loan. This may be a particular issue in relation to investments in research and development, since these concern intangible assets, which typically cannot be used as collateral. This contrasts with investments in physical assets, since these types of assets can often be used as collateral.

There are, however, also arguments against government support of research and development. The effect of such support may be constrained if there is only a limited number of people available in the labour market who have the necessary skills to engage in research and development. In this case, research subsidies may lead to higher

wages without any increase in the amount of resources allocated to research and development.

If the government support primarily benefits already existing large companies, it may also contribute to maintaining their position in the market and making it difficult for new and small companies to become established in the market. In this case, government support of research and development may hamper productivity.

Summing up, it is not clear whether an increase in the tax deductibility of expenditure on research and development will increase welfare and productivity, as the theoretical arguments point in different directions. Thus, a more thorough analysis of the proposal - based on experience from other countries and a review of the relevant economic literature – is warranted.

