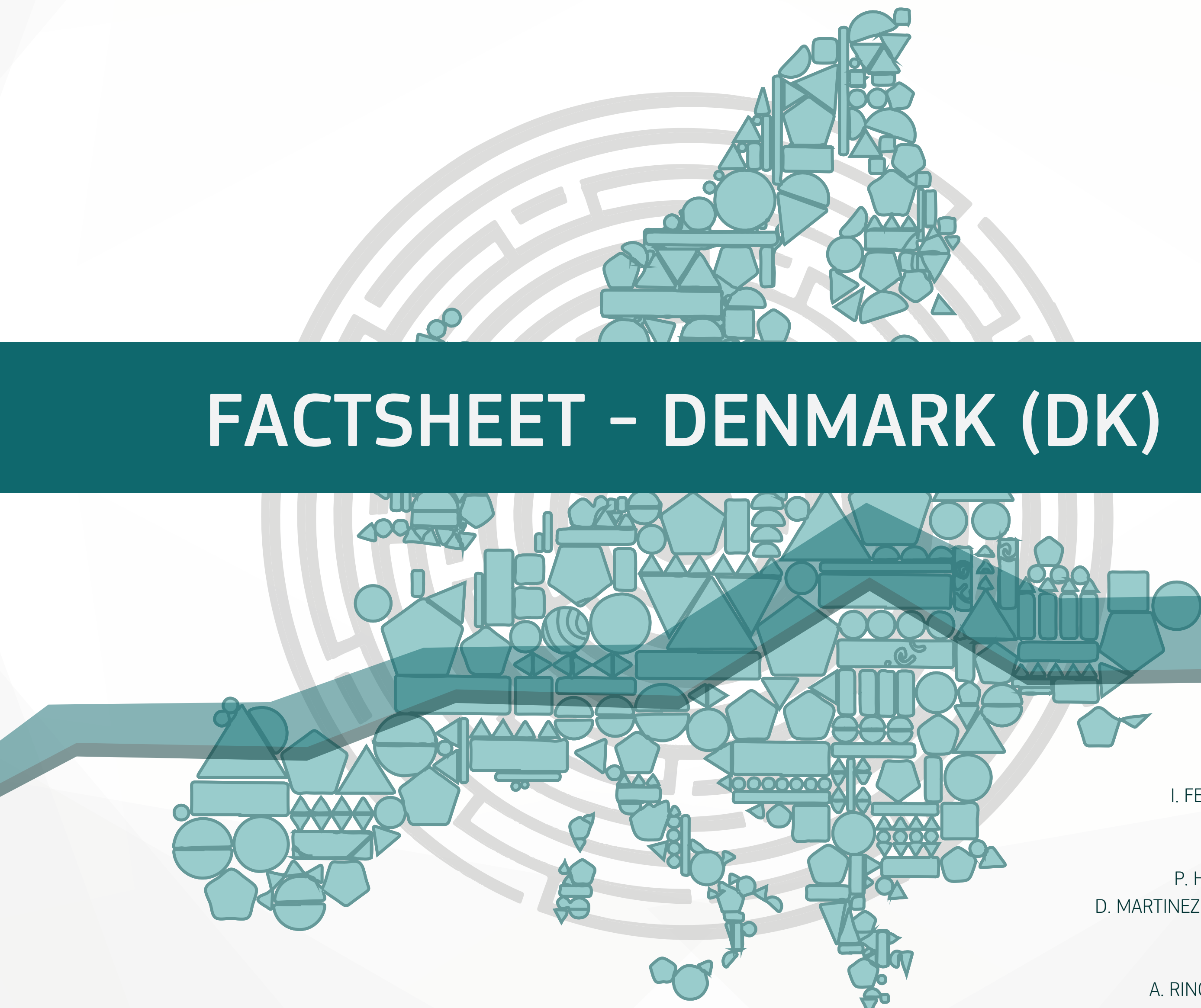
European Commission

ANNEX A3 JRC TECHNICAL REPORT

Productivity in Europe

Trends and drivers in a service-based economy



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Key messages

- **Structural change alone has been responsible for a loss equal to 0.28 percentage points of average labour productivity growth in the period 1970-2016 in Denmark.** This is due to both the decrease in the weight of the manufacturing and agricultural sectors and the rise of relatively sluggish service sectors, such as accommodation and food services, regulated professional services and non-market services.
- **Despite the rise in entry rates in recent periods in the Danish business service sector, entry levels are still well below the average rate in Europe for larger-than-micro firms.** Thus there is room to improve productivity growth by stimulating business entry, especially of larger-than-micro firms, and business dynamism in general.
- **Denmark's allocative efficiency is above the EU average in both the service and manufacturing sectors.** In manufacturing (services) about 40 percent (about 52 percent) of job creation takes place in the most productive quarter of companies.

1 Impact of structural change and productivity in services

Table 1. DK – Average labour productivity growth in the period 1910-2017 computed using the 1-digit sector nominal value added weights prevailing in each base year, including and excluding services (%).

Base year	All industries (including services)	All excluding services
1970	2.60	3.53
1980	2.42	3.60
1990	2.45	3.72
2000	2.55	3.98
2010	2.43	4.04
2017	2.32	3.50
actual	2.28	3.20

Source: STAN and EU KLEMS, 2019.
Note: the real estate sector is excluded from these computations.

Danish average real labour productivity growth in the 1970-2017 period would have been about 0.28 percentage points higher (about 14 % higher) compared to the actual one if the economic structure prevailing in 1970 had remained the same (see Table 1).[1] In addition, when excluding services from the computation of the counterfactual average labour productivity growth rates, the latter increase from 2.60 % (services included) to 3.53 % (services excluded) when using 1970 value added weights, and from 2.32 % to 3.50 % with 2016 weights. This implies that the *servicification* of the economy has been a major drag to overall productivity performance.

Table 2 shows the drivers at the 1-digit level of such negative impact of structural change on productivity growth. Two main observations emerge. First, the weights of the agricultural and manufacturing sectors have shrunk from 1970 to 2017, by about 79 % and 16 %, respectively. Since these sectors have experienced

[1] The difference between the 1970 base-year counterfactual and the actual growth rate in the first column of table 1 isolates the impact of structural change.

relatively better performance in terms of productivity growth, the reduction in their shares has negatively impacted on economy-wide productivity growth. However, the fall in the weight of the manufacturing sector is the smallest among the countries analysed[2], whereas its average labour productivity growth has been relatively high. This partially offsets the negative effect on productivity of the *tertiarization* process. Second, certain service sectors have increased their economic weight significantly while having performed relatively poorly in terms of productivity growth. These include accommodation and food services, regulated professional services and non-market services.

Table 2. DK – Value added shares and average labour productivity growth, 1970-2017 (%).

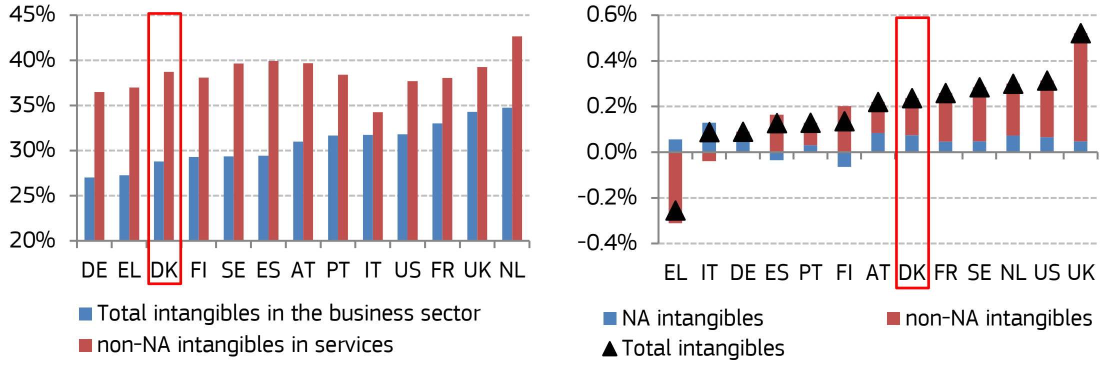
	Value added share 1970	Value added share 2017	Average labour productivity growth
Agriculture, forestry and fishing	5.6	1.8	7.1
Mining and quarrying	0.3	1.3	9.9
Manufacturing	20.6	16.1	3.4
Electricity and water supply, waste management and others	2.1	2.6	2.5
Construction	9.3	5.9	1.7
Wholesale and retail trade; repair of motor vehicles and motorcycles	18.1	14.6	3.9
Transportation and storage	6.8	6.3	2.0
Accommodation and food service activities	1.5	1.8	-0.7
Information and communication	2.6	5.0	5.0
Financial and insurance activities	5.2	6.5	2.8
Professional, administrative and other activities	3.9	10.4	1.0
Other services (community, social, and personal services)	24.0	27.7	0.5
Services overall	*62.1*	*72.3*	*1.8*

Note: the real estate sector is excluded.

[2] This includes all EU-15 Member States except EL, IE and PT.

2 Role of intangibles in productivity in services[3]

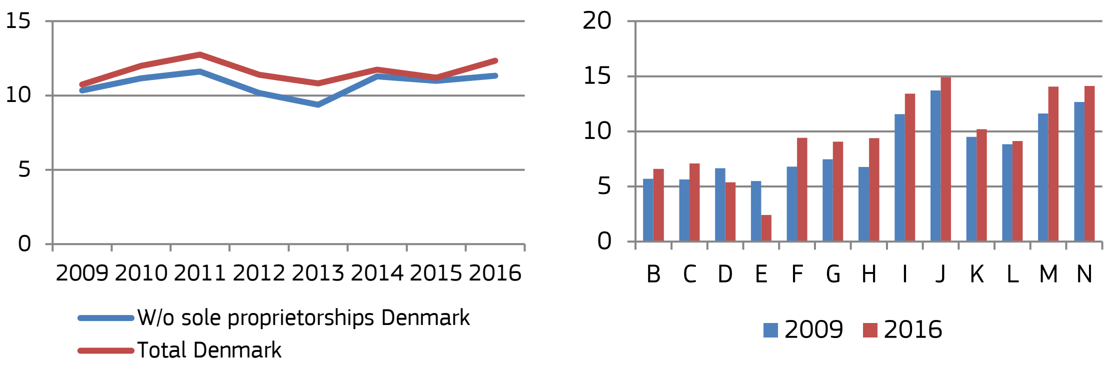
Figure 1. Investment-to-capital ratio (left) and contribution of intangible capital growth to productivity growth (right) in 2015.



Denmark ranks worse than average among EU-15 countries in terms of total intangible investment-to-capital ratio in the business sector (29 % versus the average, 31 %). However, Denmark's performance is average in terms of non-National Accounts intangibles investment rate in the service sector (38-39 %). As non-National Accounts intangibles have a major role in production in the services sector, and the service sector is the dominant sector, thus Denmark ranks in the middle range of EU-15 countries based on the contribution from intangible investment to productivity.

3 Role of firm demography in productivity growth

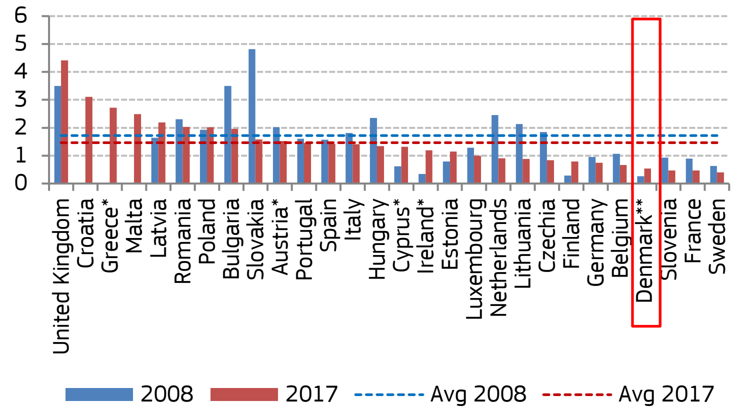
Figure 2. DK – Entry rates in business services (left-hand side) and in 1-digit industries[4] (right-hand side), percentages



[3] National Accounts intangible assets: Software and database, Reasearch and development, Mineral exploration and artistic originals. Non-National Accounts intangible assets: Design, Brand, Organisational capital, Training.

[4] One-digit industries include: Mining and quarrying (B); Manufacturing (C); Electricity, gas, steam and air conditioning supply (D); Water supply; sewerage, waste management and remediation activities (E); Construction (F); Wholesale and retail trade; repair of motor vehicles and motorcycles (G); Transportation and storage (H); Accommodation and food service activities (I); Information and communication (J); Financial and insurance activities (K); Real estate activities (L); Professional, scientific and technical activities (M); Administrative and support service activities (N); Education (P); Human health and social work activities (Q); Arts, entertainment and recreation (R); Other service activities (S).

Figure 3. Entry rate for firms with at least 10 employees in business services, percentages.

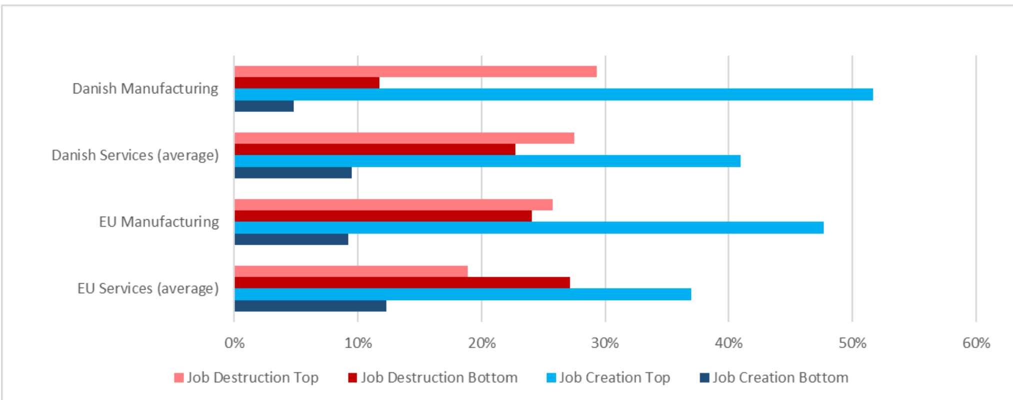


*: data for 2016, **: data for 2009 and 2016

Entry rates (without sole proprietorships) in services increased between 2009 and 2016 from 10.3 % to 11.3 %. There is a widespread increase in entry during the same period across industries. Entry rate increased also for larger-than-micro firms in the business services sector (0.3 % in 2009 versus 0.5 % in 2016), a segment of the corporate sector where entry rates are shown to be relevant for aggregate productivity growth. Despite the rise in entry rate, the level is still well below the average rate in Europe for larger-than-micro firms (average in 2017: 1.5 %). Thus there is room to improve productivity growth by stimulating business entry, especially of larger-than-micro firms, and business dynamism in general, in Denmark.

4 Labour dynamics and productivity

Figure 4. DK and EU – Job creation (growing firms) and destruction (shrinking firms) along the productivity distribution.



Note: the graph shows the share of jobs created / destroyed by the companies in the top (p75 and above) and bottom (below p25) parts of the productivity distribution. The figures represent averages over the sample period.

We observe that current labour reallocation dynamics are in line with an economy that is increasing its allocative efficiency as at the top of the distribution relatively more jobs are created than destroyed. Furthermore, the opposite is true at the bottom.

In Denmark we see that allocative efficiency increases in both the service and manufacturing sectors. In manufacturing (services) about 40 percent (about 52 percent) of job creation takes place in the most productive quarter of companies. Both of these shares are higher than the EU average. At the same time, a lower share of jobs is created in the bottom of the productivity distribution than in the EU in both sectors.

Results for Denmark indicate higher than EU share job destruction at the top. Combined with higher than average job creation at the top, results indicate competition and or restructuring of market at the high end of the productivity distribution.

5 Policies for addressing low productivity growth

Among the reasons for the unsatisfactory growth in productivity we can find the lack of competition in the building and construction sector and in domestically oriented service sectors (EC, 2017)[5]. Moderate investment levels, and low inflation and interest rates have also contributed to sluggish productivity growth as these factors limit the reallocation of resources.

The Danish government has paid special regard to the relationship between productivity and increased competition, smooth and limited regulation and high efficiency of the public administration. Concerning the latter, the appointment of a Minister for Public Innovation illustrates the attention to continuously secure an efficiently operating public sector. On August 25th, 2018, the Government announced the removal or simplification of 300 rules and regulations that were found obsolete or unnecessary. Improving productivity in the services sector has been a policy focus, in particular via increasing competition in services. Concerning R&I, in addition to reinforcing the links between R&I actors and the need to increase the quality and availability of human resources, Denmark has enlarged the funding programmes.

[5] European Commission. 2017. COUNCIL RECOMMENDATION on the 2017 National Reform Programme of Denmark and delivering a Council opinion on the 2017 Convergence Programme of Denmark 1-4. Brussels: European Commission

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