

# BENCHMARKING THE MARKET FOR INNOVATION FINANCE

## English Summary

*The Danish Investment Fund (DIF)*

*DIF is a financial organisation that contributes to the development of Danish business and trade.*

*Our mission is to strengthen development and innovation in the Danish economy by procuring financing for promising projects in small- and medium-sized enterprises.*

*Operating independently in the capital market, DIF facilitate the supply of venture capital in terms of start-up equity and high-risk loans. The financing is provided on commercial terms.*

*In the light of our mission, we have set ourselves the ambitious goal: to make the Danish market for finance of innovation the best-functioning one in Europe.*

*Our capital base is currently DKK 2,400 million, part of which we use for direct business funding, and part of which we use to co-finance venture funds. In addition, we manage VækstKaution, a national loan guarantee scheme for private companies.*

## 1. INTRODUCTION

The vision of the Danish Investment Fund is to make the Danish market for finance of innovation the best-performing in Europe. In order to examine how far the Fund is from achieving this goal – and to see if the market improves on year to year basis – it is useful to design a methodology that allows the Danish market for innovation finance to be compared against similar markets across Europe. The present analysis describes the benchmarking framework, which will be used by the Danish Investment Fund for tracking and monitoring developments in the Danish market for innovation finance going forward. This analysis also highlights the scope of the challenge to create the best-functioning market in Europe here in Denmark.

A comparison of access to innovation finance should include both the supply and demand sides of the market. Factors, which influence either the supply of or demand for innovation finance should therefore be part of the analysis. But the pattern of performance can vary across individual factors, which is why it is important to bring the evidence into a broader perspective – and draw a more holistic picture of how an individual country performs. This is achieved by constructing **two composite indicators**, which link together the different sub-indicators: An index, which illustrates the **supply of capital** for innovation finance and an index that shows the surrounding **framework conditions**.

Concerning supply of capital Denmark is ranked as no. 6 - after countries like Sweden, UK, Netherlands and Finland. The results indicate that there is still a lot of work to be done before the goal of becoming the best-functioning market for innovation finance can be achieved. However the Danish market has shown remarkable progress in the last couple of years. When it comes to framework conditions, Denmark is ranked as no. 9. Substantial changes in the framework therefore are needed in order to improve conditions for the supply of capital.

By developing a benchmarking methodology for the market for innovation finance, the Danish Investment Fund intends to continuously update the picture of market functioning. This will give a detailed account of market developments in Denmark compared to other European countries – and it will be possible for the Danish Investment Fund to adjust current activities and initiate new initiatives to accelerate the process towards meeting our vision about Europe's best-functioning market for innovation finance.

## 2. SUMMARY

The Danish Investment Fund was established in 1992 to support the industrial evolution in Denmark by enhancing access to capital for innovative Danish companies. Given the breadth of the mandate it is vital to come up with a suitable standard by which to measure the degree of success. This is the rationale behind the Danish Investment Fund's new objective – to contribute to making the Danish market the “best-performing” market for innovation finance in Europe. This also explains the intention to evaluate how the Danish market fares on a year to year basis.

Leaving aside the monitoring purposes for the Danish Investment Fund, the present analysis does offer valuable insight into the workings of the market for innovation finance, mainly as a description of the most important market drivers. Moreover, the analysis yields a snapshot of market conditions in European countries.

### 2.1 Background and methodology

To evaluate if the market improves from year to year, it is important to be able to compare the Danish market for innovation finance with similar markets in other European countries.

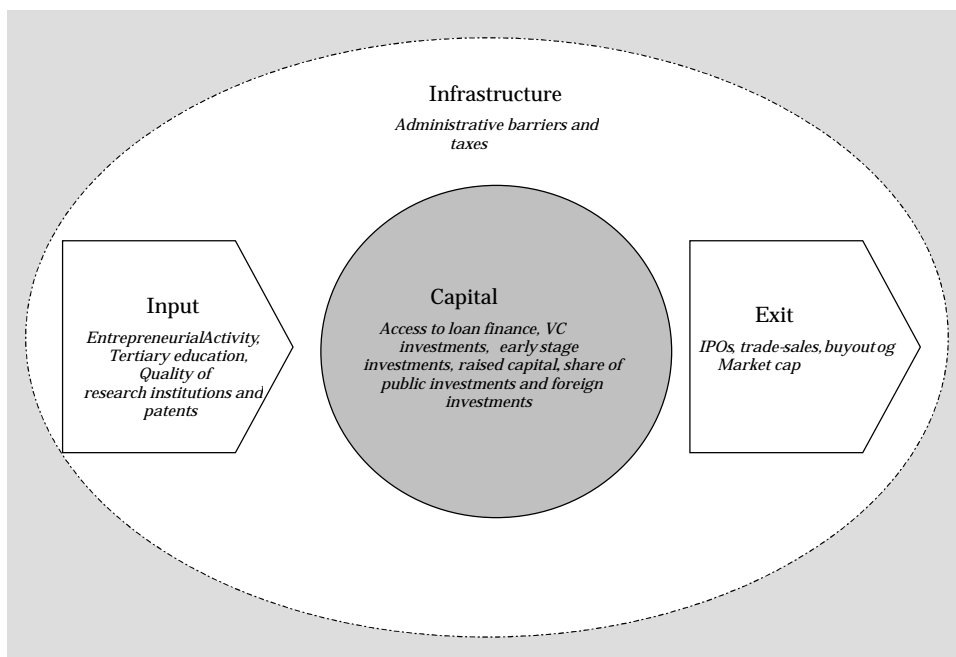
The volume and composition of the market for innovation finance is a measure of how efficient the market is. The greater the size of market, the more efficient it is assumed to be. Market composition also matters on the assumption that a larger market share for early stage investments reflects superior access to capital for new promising projects. A low share of public investments is also perceived as a sign of strength, as are large proportions of cross-border investments, which indicate that the market is well integrated into the global economy.

Individual indicators give partial evidence on the adequacy of capital for innovation. To consolidate the information into an aggregate account, a composite indicator is constructed for all countries. The relative value of this composite indicator determines the ranking of each country. While realised returns on venture capital investments might be the ultimate gauge of market functioning, the absence of comparable country-specific data means, however, that the benchmarking exercise is confined to the indicators listed above.

The supply of capital is only part of the story though, as overall framework conditions have a strong impact on market development.

The volume and composition of capital supply generally is a function of three main dimensions - the inflow of entrepreneurs and the commercialisation of academic research (Input), access to exit windows (Exit) and with taxes and regulation (Infrastructure), see figure 1. These different dimensions that together make up the framework conditions are also aggregated into a composite indicator, which shows how well the national framework conditions support the market for innovation finance.

Figure 1. Critical factors for the market for innovation finance



Source: The Danish Investment Fund

It follows that the results of the benchmark analysis comprise two mutually dependent composite indicators; each one tying together indicators across a range of subareas. One composite indicator, which is tied directly to the supply of capital in the market for innovation finance, and another indicator, which illustrates the framework conditions of the market.

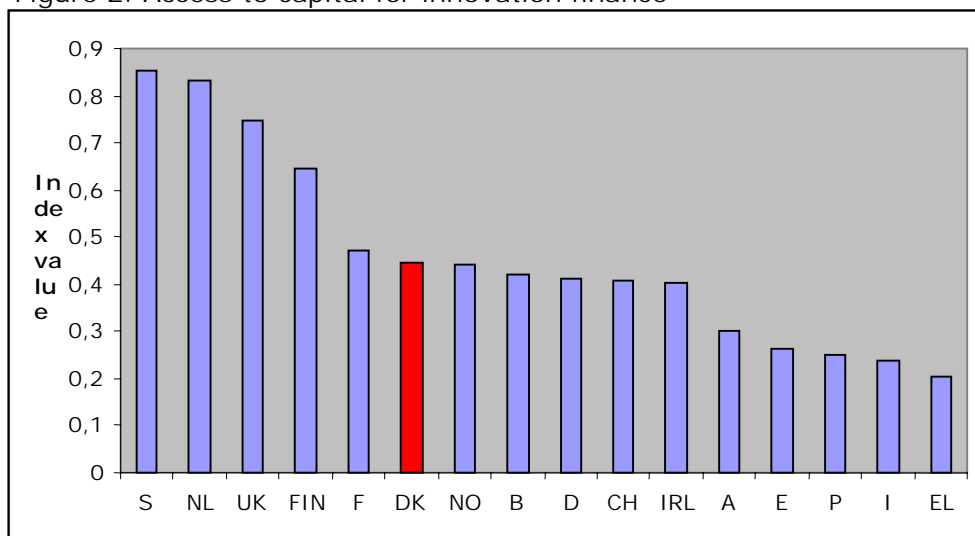
The underlying indicators have all been selected to meet the following criteria: The indicators must be - relevant and meaningful, normative, comparable across countries, and available without substantial delay. Quantitative information on all indicators appears in the Annex.

## 2.2 Access to capital

To evaluate if the market for innovation finance is well functioning in terms of access to capital, six indicators have been selected; venture capital and private equity raised, venture capital investments, early stage investments, the share of public investments, cross-border investments and access to loan finance. These indicators are given equal weights in the composite indicator. However, foreign investments are divided into two indicators; inbound and outbound investments, which are both given equal weights.

The purpose of creating a composite indicator for access to capital is to be able to rank national markets. The composite indicator shows that Denmark currently is ranked as no. 6 out of 16 countries, which is just above average among the selected European countries, see figure 2.

Figure 2. Access to capital for innovation finance



Source: The Danish Investment Fund

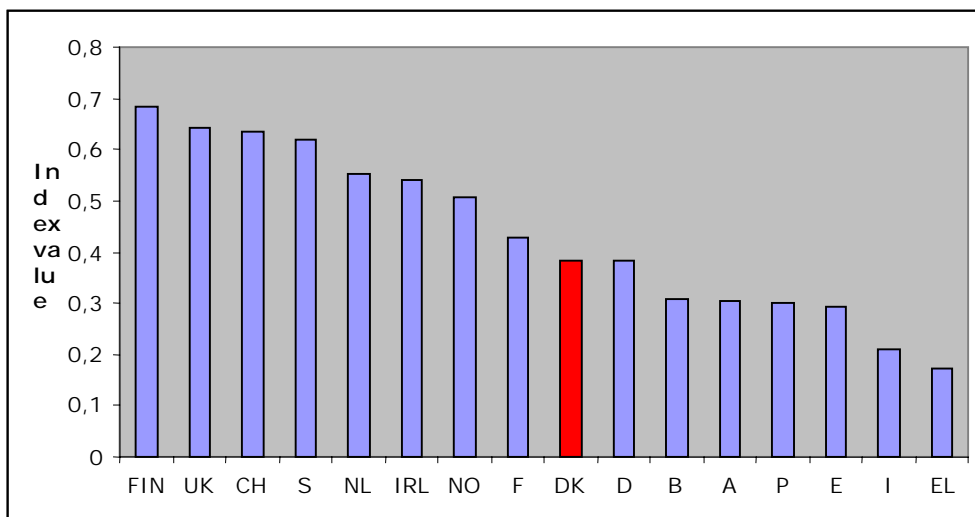
To mitigate possible biases arising from the weights assigned to individual indicators, a sensitivity analysis has been carried out. This analysis verifies that the overall grouping of countries is barely affected by the weighting. Sweden, Netherlands, UK and Finland clearly belong to the leading group. Denmark follows in the large middle group alongside Norway, Ireland, and Germany for instance. Regardless of the combination of weights used Denmark is never ranked in the top-5, but neither is the country ranked lower than no. 12.

### 2.3 Framework conditions

The extent to which framework conditions support the creation and funding of innovative companies is assessed by looking at the three areas; Input, Exit and Infrastructure. Analogous to the measure of access to capital, these three areas are given equal weights in a composite indicator for framework conditions. Individual indicators within each area are also given equal weights.

Regarding framework conditions, Denmark is ranked 9 – which is just below average, see figure 3. The ranking is primarily a result of Denmark's poor performance on Exit windows. By comparison, the Danish score is around average on the Input and Infrastructure. Finland, UK, Sweden and the Netherlands are all in top-5 as is the case for access to capital.

Figure 3. Framework conditions for innovation finance



Source: The Danish Investment Fund

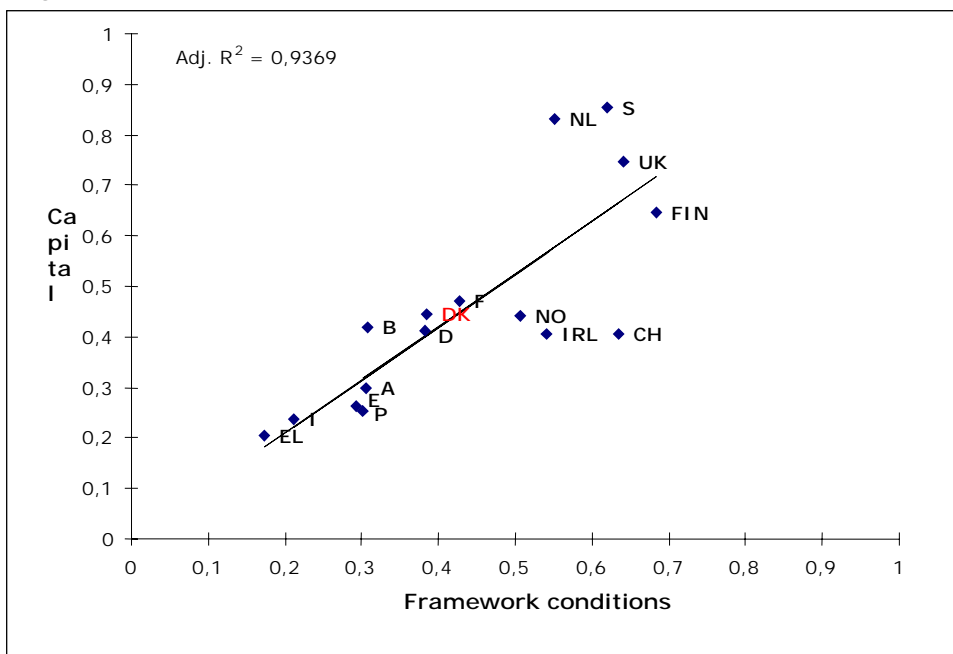
Denmark has a relatively high level of education and an entrepreneurial activity above average. But in contrast to other countries with a similar potential for commercialisation of knowledge, the achievement of patented innovations is low in Denmark.

The composition of top-5 is not very sensitive to the combination of weights, as Finland and UK are ranked in top-5 in more than 90% of the combinations. For Sweden and Netherlands, the numbers are 87% and 59%. Denmark is consistently ranked between 5 and 12.

## 2.4 Correlation between capital and framework conditions

Several empirical papers have shown how a stronger research base and a well functioning stock market may increase the supply of risk capital. But the feed-back mechanism cuts both ways. A thriving market for innovation finance similarly boosts patenting activity because it increases the likelihood, that innovative projects will receive funding. This mutually supportive relationship is borne out by the positive correlation between access to capital and framework conditions across countries, as illustrated by figure 4.

Figure 4. Correlation between access to capital and framework conditions



Source: The Danish Investment Fund

## 2.5 Challenges, strategic goals and action points

According to the analysis of access to capital, Denmark is among the leading countries in Europe with respect to access to loan finance. Moreover, investment activity in the market for venture capital is rising. The amount of early stage investments is also on an upward trend, partly due to a series of strategic measures taken in recent years. These measures include the establishment of several government funded incubators, the creation of dedicated seed-funds, and the expanded room for manoeuvre enjoyed by the Danish Investment Fund, which can now also use equity to finance portfolio companies.

Nevertheless, the job is far from done given the gap vis-a-vis the leading countries; Sweden, Finland, UK and the Netherlands. Looking ahead, the challenge for Denmark thus remains one of catching up with these countries. Enhanced opportunities for institutional as well as private investors to invest pension savings in unlisted companies might further market developments.

For the Danish Investment Fund, it is clear that its funding activities have a much greater impact on the supply of capital in the Danish market for innovation finance – than on framework conditions. This suggests that the most reasonable way to measure the Fund's success, and notably the propagation effects of its investment activities, involves tracking developments on availability of capital over time. In operational terms, a relevant ambition to strive for consists of improving Denmark's ranking by one position every year – from the current position as no. 6 in Europe. Achieving this goal requires a substantial increase particularly in capital raised and annual investment activity. Regarding the contribution of the Danish Investment Fund this means that it should keep on working actively to raise new venture capital funds, co-invest with private venture companies in underfunded market segments, and attract more foreign investors to the Danish market.

However, corresponding enhancements are needed in the area of framework conditions too. But when it comes to framework conditions the role of the Danish Investment Fund is much more indirect. Therefore, it is not realistic to set up goals for the Fund's activities in this respect. Instead, others have to step in to bring about those improvements in framework conditions that evidently are needed.

A particularly weak spot is the exit market, where Denmark ranks in the bottom third across all the indicators chosen: Number of IPO's, number of trade-sales, market cap of the stock exchange, and buyout investments. Closer cooperation between national stock exchanges combined with various initiatives to increase trading in less liquid stocks can help make IPOs both more feasible and desirable as exit routes. In terms of the buyout segment, higher professionalism and closer integration with foreign markets likely will increase the probability that venture capital investors can make a profit from selling off Danish portfolio companies.

Regarding the Danish score on Input it ranks slightly above average. But as has been emphasized by the Danish Venture Capital Association, DVCA, more industryoriented research programs at universities and the

enrolment of more students with engineering and scientific background should facilitate commercialization.<sup>1</sup> Commercially oriented technology transfer units similarly are needed to streamline the spin-off process from Danish universities and established companies.

Regarding Infrastructure, Denmark also comes in average. Thus, the Danish government continues to work on reducing administrative burdens, specifically by coordinating the registration of company information across public entities. The overall tax level remains high, but a recent proposal to Parliament aims to postpone taxation of stock options until the day when the underlying shares are sold. For small venturebacked companies that are facing high pressure to conserve liquidity while under development, this might have a large impact.

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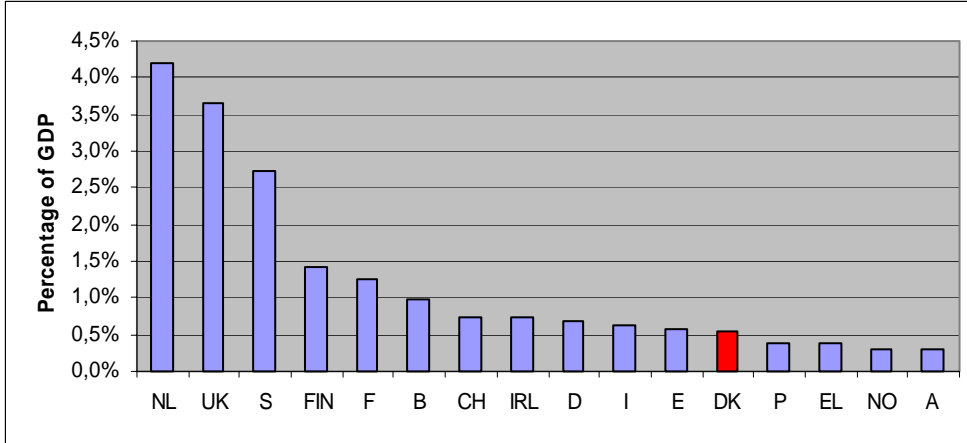
<sup>1</sup> DVCA (2003), Gode rammevilkår for højteknologiske virksomheder

## ANNEX

### Individual indicators on Access to Capital and Framework Conditions

#### Access to Capital

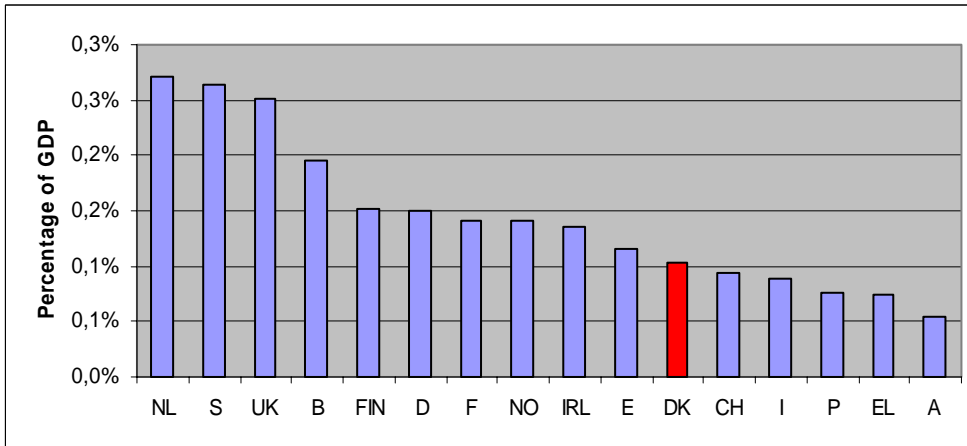
Capital raised (private equity and venture capital)



Source: EVCA YEARBOOK (1997,1998, 1999, 2000, 2001, 2002)

Note: Three-year average 1999-2001

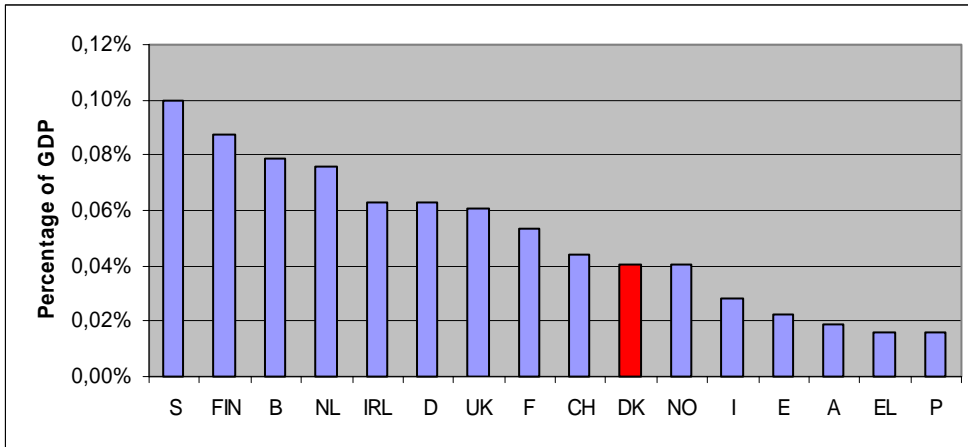
Venture capital investments



Source: EVCA YEARBOOK (2000, 2001, 2002)

Note: Three-year average 1999-2001

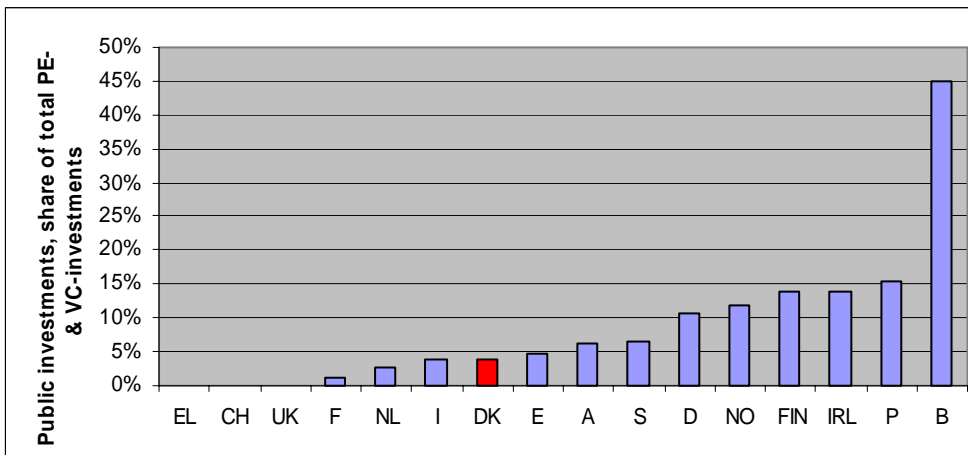
### Early stage investments



Source: EVCA YEARBOOK (2000, 2001, 2002)

Note: Three-year average 1999-2001

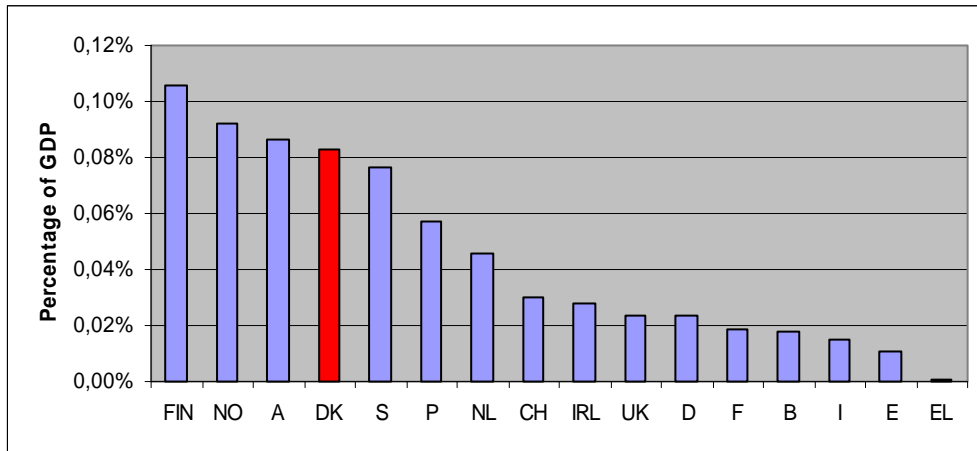
### Public venture capital investments



Source: EVCA YEARBOOK (2000, 2001, 2002)

Note: Three-year average 1999-2001

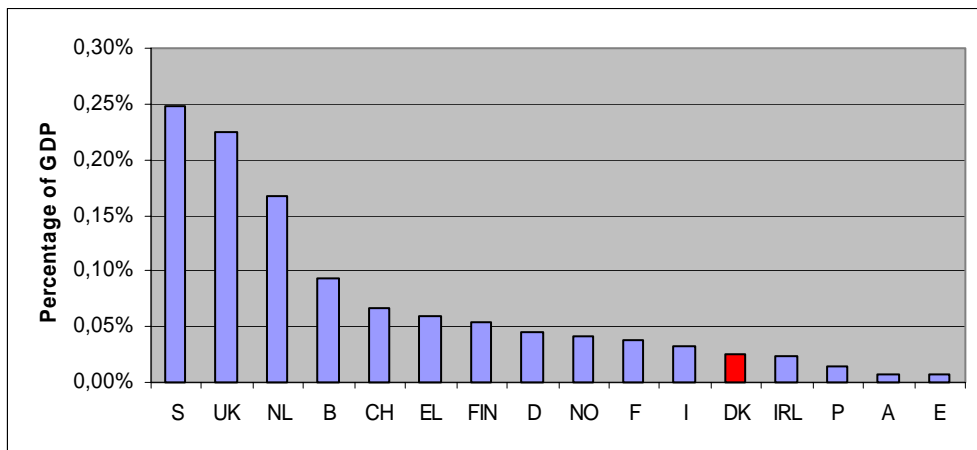
Cross-border private equity and venture capital investments in domestic companies



Source: EVCA YEARBOOK (2001, 2002)

Note: Two-year average 2000-2001

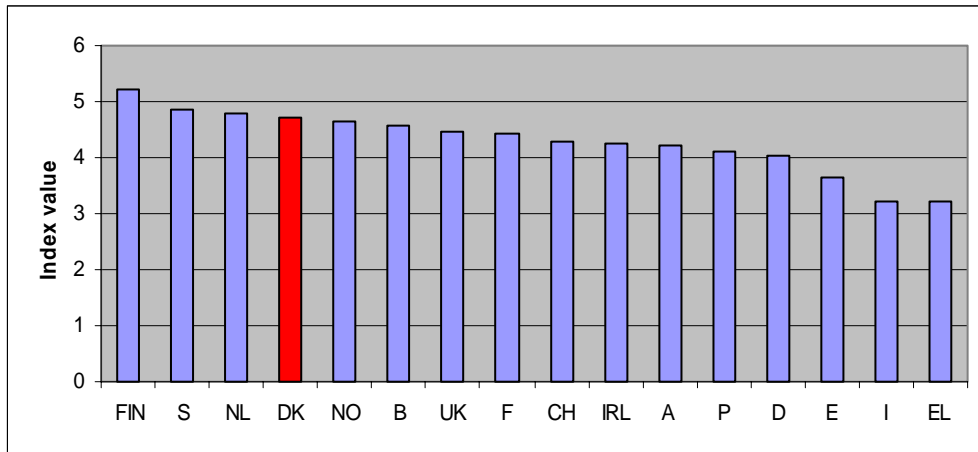
Cross-border private equity and venture capital investments made by domestic private equity and venture capital funds



Source: EVCA YEARBOOK (2000, 2001, 2002)

Note: Three-year average 1999-2001

### Access to loan finance



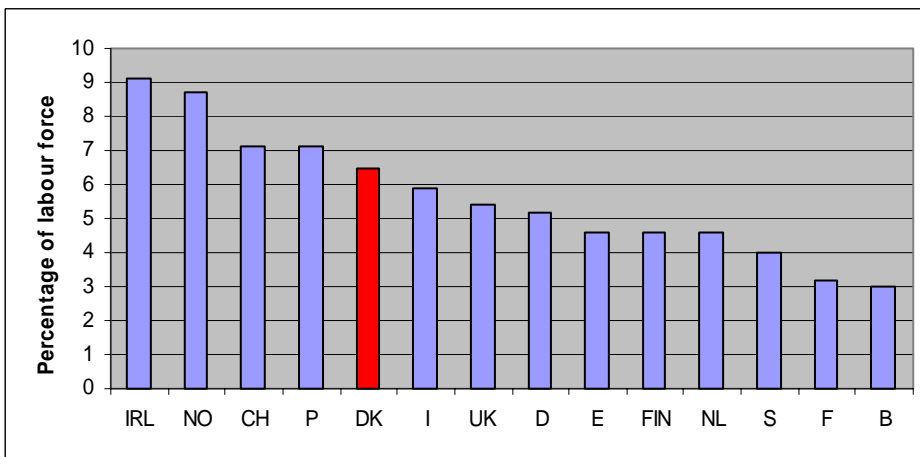
Source: Global Competitiveness Report (2000, 2001, 2002)

Note: Three-year average 1999-2001

### Framework conditions

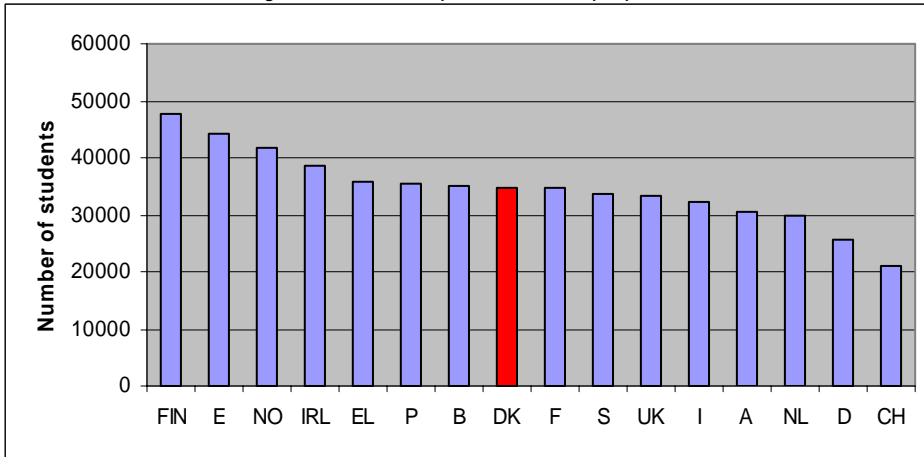
#### 1) Input

#### Entrepreneurial activity, share of adult population



Source: Global Entrepreneurship Monitor (2002)

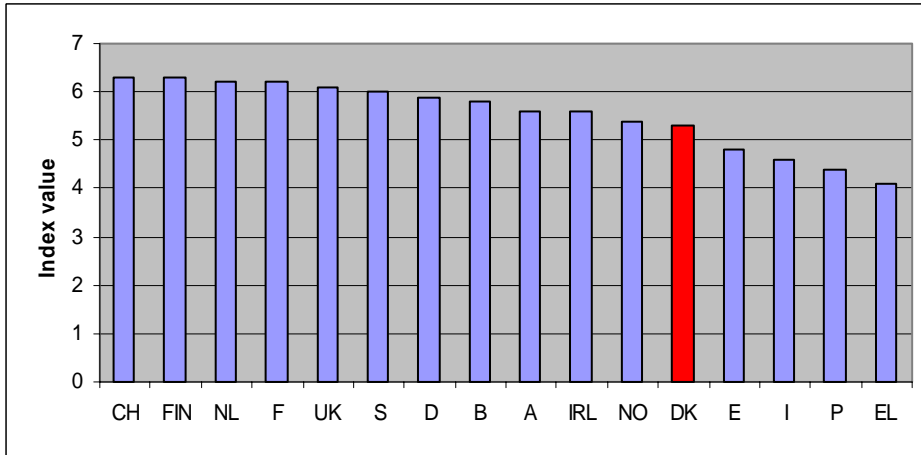
Enrolment in tertiary education, per million population



Source: EUROSTAT YEARBOOK (2002)

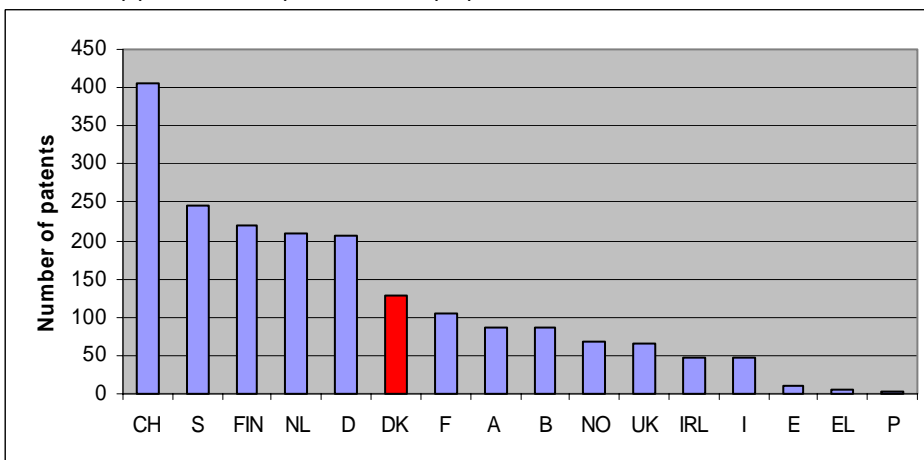
Note: Three-year average 1997-1999

Quality of research institutions



Source: Global Competitiveness Report (2002)

Patent applications, per million population

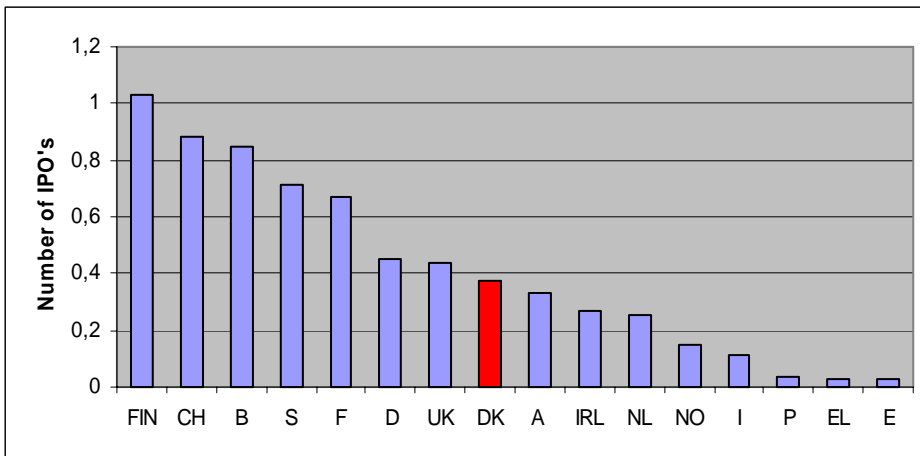


Source: European Patent Office (2000, 2001, 2002)

Note: Three-year average 1999-2001

## 2) Exit

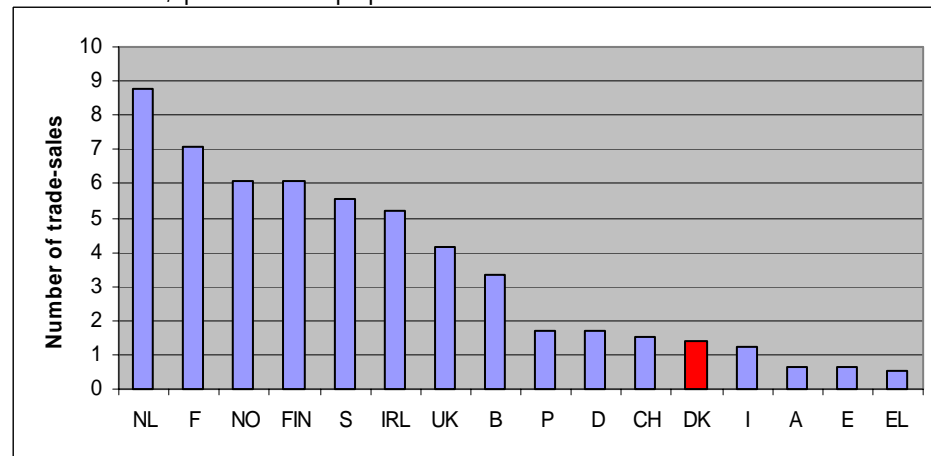
### IPO's, per million population



Source: EVCA YEARBOOK (2000, 2001, 2002)

Note: Three-year average 1999-2001

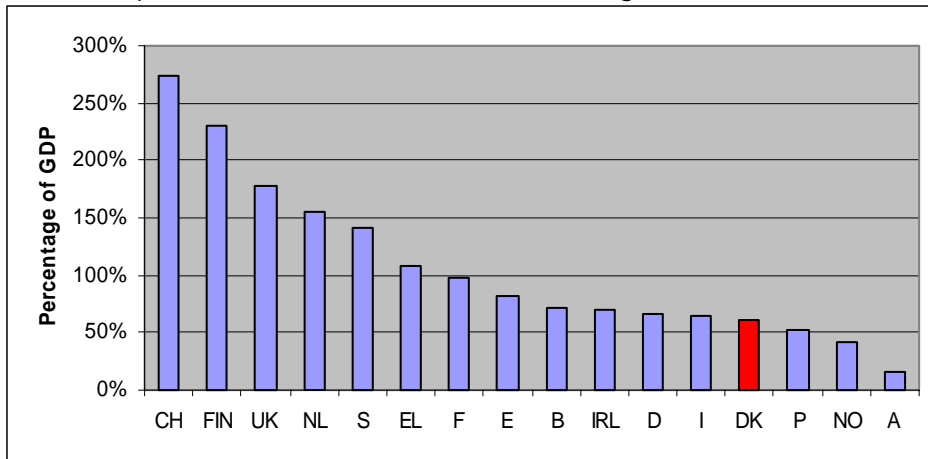
### Trade-sales, per million population



Source: EVCA YEARBOOK (2000, 2001, 2002)

Note: Three-year average 1999-2001

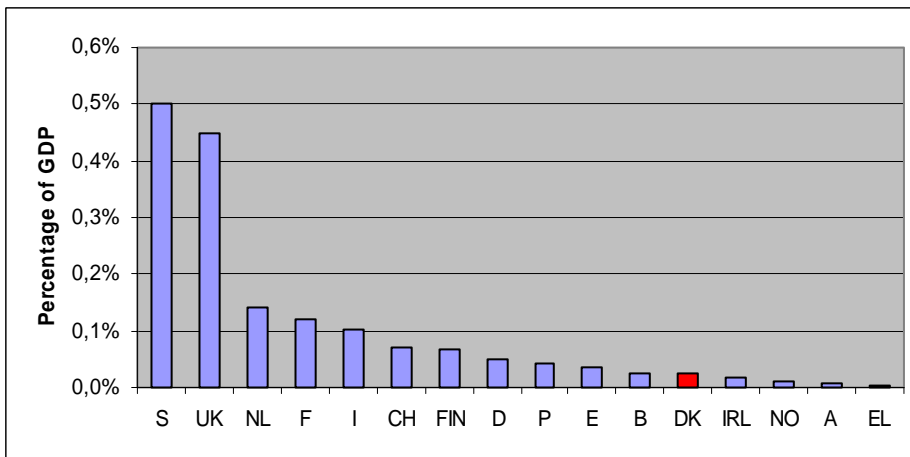
### Market capitalization of national stock exchange



Source: World Federation of Exchanges, Euronext

Note: Three-year average 1999-2001

### Buyout investments

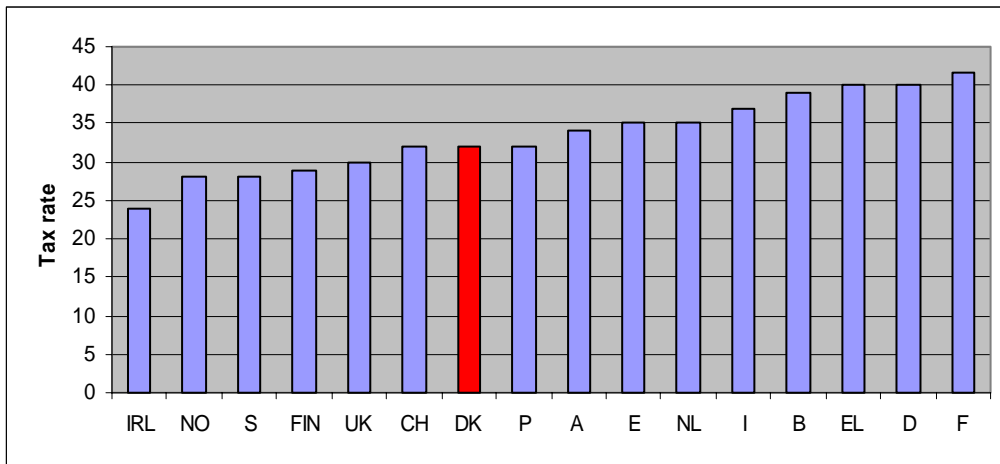


Source: EVCA YEARBOOK (2000, 2001, 2002)

Note: Three-year average 1999-2001

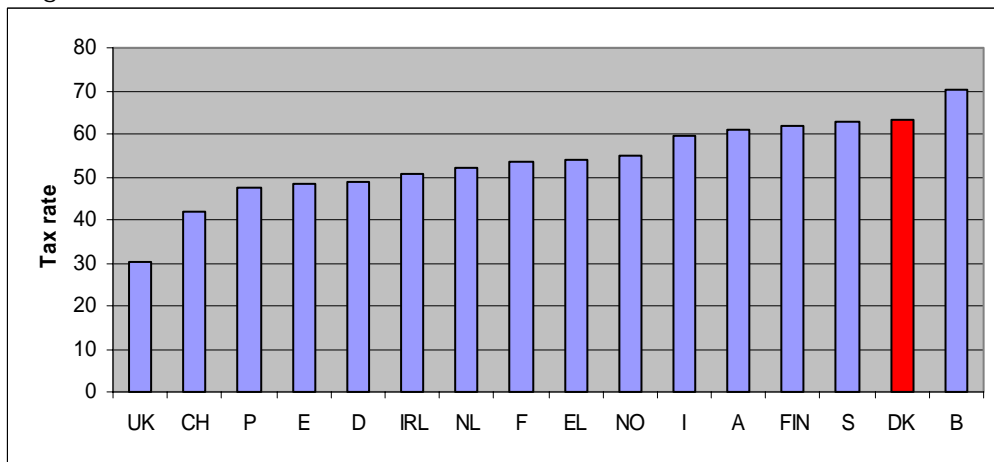
### 3) Infrastructure

#### Statutory corporate tax rate



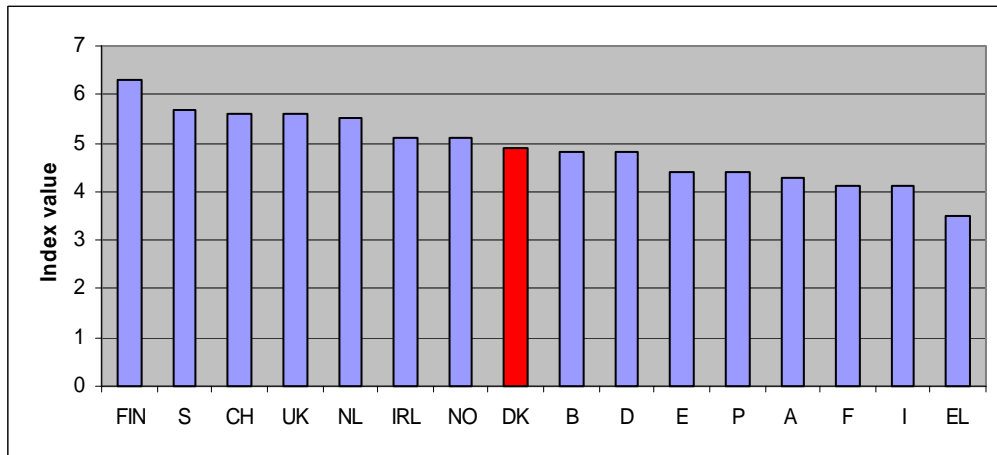
Source: Global Competitiveness Report (2002)

#### Marginal income tax rate



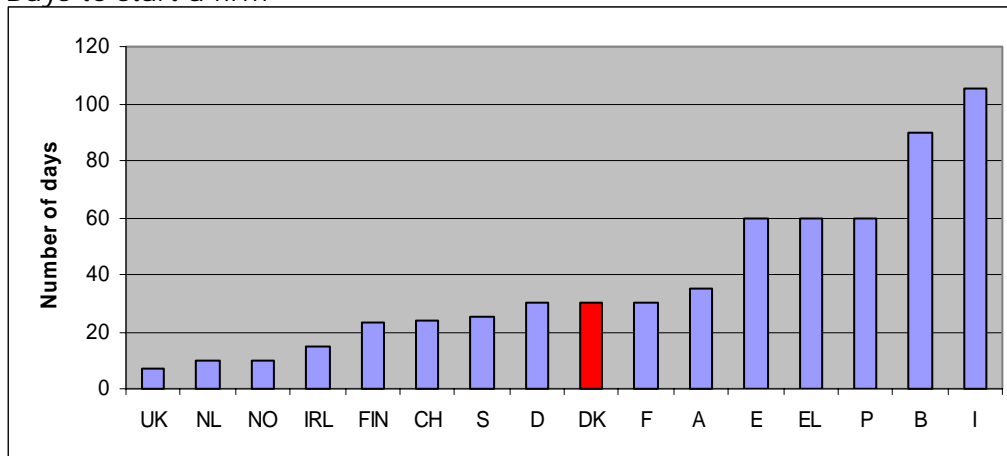
Source: OECD (2002), Taxing Wages

#### Administrative burdens



Source: Global Competitiveness Report (2002)

Days to start a firm



Source: Global Competitiveness Report (2002)

List of indicators

	Denmarks ranking	Leading countries
<b>Composite indicator: Capital</b>	<b>6</b>	<b>Sweden, Netherlands, UK</b>
Private equity and venture capital raised	12	Netherlands, UK, Sweden
Venture investments	11	Netherlands, Sweden, UK
Early stage investments	10	Sweden, Finland, Belgium
Inbound investments	4	Finland, Norway, Austria
Outbound investments	12	Sweden, UK, Netherlands
Share of public private equity and venture capital investments	7	Greece, Switzerland, UK
Acces to loan finance	4	Finland, Sweden, Netherlands
<b>Composite indicator: Framework conditions</b>	<b>9</b>	<b>Finland, UK, Switzerland</b>
<b>1) Input</b>	<b>7</b>	<b>Finland, Switzerland, Norway</b>
Entrepreneurial activity	5	Ireland, Norway, Switzerland
Tertiary education	8	Finland, Spain, Norway
Quality of research institutions	12	Schweizerland, Finland, France
Patent applications	6	Schweizerland, Sweden, Finland
<b>2) Exit</b>	<b>11</b>	<b>Sweden, Finland, UK</b>
IPO's	8	Finland, Switzerland, Belgium
Trade-sales	12	Netherlands, France, Norway
Market Cap	12	Schweizerland, Finland, UK
Buyout investments	13	Sweden, UK, Netherlands
<b>3) Infrastructure</b>	<b>8</b>	<b>UK, Ireland, Switzerland</b>
Corporate tax rate	7	Ireland, Norway, Sweden
Marginal income tax rate	15	UK, Switzerland, Portugal
Administrative burdens	8	Finland, Sweden, Switzerland
Days to start a firm	9	UK, Netherlands, Norway

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