The Danish pharmaceutical industry and TTIP
1. Summary and introduction
2. The importance of pharma in the Danish economy
3. Benefits of TTIP from pharma for Denmark
4. Benefits of TTIP for main pharma companies
5. Benefits of TTIP from pharma in other sectors
Summary and introduction
The overall purpose of the study is to quantify the benefits to the Danish economy following from an ambitious pharma chapter in the Transatlantic Trade and Investment Partnership (TTIP) currently being negotiated by the EU and the US.

In the study we assess:

- Benefits of TTIP in terms of Danish exports, GDP growth and job impacts stemming from the Danish pharmaceutical industry.
- Benefits of TTIP for main pharmaceutical companies.
- Benefits of TTIP in other sectors that supply inputs to the production of pharmaceutical products.
Summary and introduction

Main findings

An ambitious TTIP agreement provides benefits to Denmark:

- DKK 3 billion worth of additional exports of pharmaceuticals and DKK 8-16 billion additional total exports.

- 63 percent of growth in goods exports to the US from TTIP comes from the pharmaceutical industry.

- 1500 additional export related jobs – 650 in the pharmaceutical industry and 850 in supplying industries.

- DKK 1 billion additional contribution to Danish GDP from pharma and DKK 6-11 billion increase in total Danish GDP.

- DKK 170 million and DKK 120 million in additional wage income taxes and corporate income taxes respectively from the pharmaceutical industry.

Even after negotiations have been successfully completed, benefits will emerge gradually and are unlikely to fully emerge before 2020.
Summary and introduction

TTIP can reduce costs for pharmaceutical companies

- There are **significant non-tariff barriers** to trade between the US and the EU in the pharmaceutical sector, including different regulatory regimes and IPR systems.

- The EU and US have regulatory regimes and IPR systems with the highest quality standards and an inclusion of an ambitious pharma chapter into TTIP should aim at creating a regulatory framework by strengthening regulations to the highest standards on a global level, without lowering quality nor compromise on patient safety.

- An ambitious pharma chapter that **harmonises regulatory regimes** and reduces non-tariff barriers to pharmaceutical trade between the EU and the US by 25 percent will **significantly reduce costs** of market access for pharmaceutical companies on both sides of the Atlantic.
Summary and introduction

Achieving benefits requires an ambitious pharma chapter

In order for the benefits to materialise trade negotiators will have to deliver improvements on some key differences in IPR and regulatory regimes between the EU and the US, without lowering quality nor compromise on patient safety.

As tariffs in the pharmaceutical industry are low, the impact of the TTIP on the sector is largely dependent on the reduction in non-tariff barriers.
Summary and introduction

Achieving benefits requires an ambitious pharma chapter

For pharmaceutical products some of the main costs of non-tariff barriers are related to:

- *Authorisation* of drugs (incl. clinical practices, study requirements and joint scientific advice)
- *Recognition* of inspections of good manufacturing and clinical practices (GMP/GCP)
- *Differences* in intellectual property rights systems
Summary and introduction

TTIP increases Danish pharmaceutical exports

- Our estimates suggest that an ambitious pharma chapter in the TTIP will increase bilateral pharmaceutical exports from Denmark to the US by approximately **DKK 8 billion**.

- Other countries will also benefit from the regulatory harmonisation between the US and the EU since it is easier to comply with one set of high safety and regulatory standards than two.

- With increased international competition Danish companies will also face more competition in the European market. We find that TTIP will increase total Danish pharmaceutical exports by approximately **DKK 3 billion**.
Our results suggest that the pharmaceutical industry is the industry that provides the largest benefits from an ambitious TTIP accounting for up to 40 percent of the total increase in exports from TTIP.

An ambitious TTIP will increase the direct contribution of the pharmaceutical sector to Danish GDP by app. DKK 1.2 billion compared to a total gain of DKK 6-11 billion.

The pharmaceutical sector alone accounts for up to a fifth of the total impact on Danish GDP resulting from an ambitious TTIP.
The Danish pharmaceutical industry and TTIP

Summary and introduction

**TTIP supports new jobs**

- When exports increase, production in Denmark will increase and the pharmaceutical companies producing in Denmark will hire more workers.

- A rise in pharmaceutical exports accruing from TTIP worth app. 3 billion DKK will generate an additional 650 jobs in the pharmaceutical industry.

- A rise in pharmaceutical exports will also increase the pharmaceutical companies’ demand for inputs to their production in Denmark and abroad.

- TTIP will thus increase employment in supplying companies by app. 850 jobs.

- Combined, an ambitious pharma chapter supports additional **1500 jobs** in Denmark.
Summary and introduction

**TTIP increases tax payments from companies and workers**

- Increased production and more jobs in the pharmaceutical industry is also going to benefit government in terms of increased tax revenue.

- As corporate earnings increase corporate income tax payments will increase. We find an increase in corporate tax payments of app. DKK 120 million from pharmaceutical companies in Denmark.

- As workers earnings increase and more people are employed in the pharmaceutical industry wage income tax payments are also set to rise. We find an increase in wage income taxes of app. DKK 170 million from workers employed in the pharmaceutical industry.

- This is only for the pharmaceutical industry and does not account for other changes in tax payments.
Summary and introduction

Pharma job creation in 2020 with an ambitious pharma chapter

Without-TTIP 2013

- Total jobs in Denmark: 47,100
- Pharma industry headcount: 20,400
- Supported jobs in other sectors: 26,700

With-TTIP 2020

- Total jobs in Denmark: 55,750
- Pharma industry headcount: 24,150
- Supported jobs in other sectors: 31,600

+8,650 jobs in 2020
+3,750 in pharma
+4,900 in other sectors

Of which TTIP impact
+1,500 jobs
+650 in pharma
+850 in other sectors

Note: The baseline FTE headcount for 2020 is an estimate from LIF June 2014. The impact figures from TTIP are calculated based on this 2020 baseline. Estimates are rounded to nearest 50.

Source: Copenhagen Economics based on CGE-simulations by prof. J. F. Francois 2013 and input-output model calculations.
Summary and introduction

**TTIP benefits will emerge gradually**

- The harmonisation of regulatory and IPR systems achieved in an ambitious TTIP agreement is likely to be implemented gradually.

- Since regulatory harmonisation is unlikely to happen overnight and the full effects from an ambitious TTIP can only be expected after companies have adjusted their procedures and supply chains we expect a certain time lack before the full benefits emerge. Accordingly we assess the impact on job creation relative to a 2020 baseline for the pharmaceutical industry.
The importance of pharma in the Danish economy
The importance of pharma in the Danish economy

**Pharma is an important industry in Denmark today**

The pharmaceutical industry plays an important role in the Danish economy today. With production corresponding to 2.6 per cent of GDP, as a direct employer of more than 20,000 people in Denmark and with rapid growth in recent years the pharmaceutical industry is becoming increasingly important for the Danish economy and in particular industrial growth in Denmark.

In recent years the pharmaceutical industry has grown significantly. Since 2000 the sector has been the only net job creating manufacturing industry and has nearly doubled in size in terms of number of employees providing a net increase in employment of **9,000** since 2000 according to data from Statistics Denmark.

<table>
<thead>
<tr>
<th>Headcount</th>
<th>11,200</th>
<th>16,700</th>
<th>18,000</th>
<th>20,400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>2000</td>
<td>2005</td>
<td>2010</td>
<td>2013</td>
</tr>
</tbody>
</table>

Source: Copenhagen Economics based on data from Statistics Denmark
The importance of pharma in the Danish economy
Pharma is important for Denmark because...

Pharma accounts for a growing share of GDP

<table>
<thead>
<tr>
<th>Year</th>
<th>Share of Danish GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>1.5%</td>
</tr>
<tr>
<td>2001</td>
<td>1.9%</td>
</tr>
<tr>
<td>2002</td>
<td>1.7%</td>
</tr>
<tr>
<td>2003</td>
<td>2.6%</td>
</tr>
</tbody>
</table>

Source: Copenhagen Economics based on data from Statistics Denmark

Pharma creates highly productive jobs

Value added per hour in DKK

<table>
<thead>
<tr>
<th>Category</th>
<th>Value added per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing avg. (excl. pharma)</td>
<td>446</td>
</tr>
<tr>
<td>Pharma</td>
<td>1270 ( \times 2.8 )</td>
</tr>
</tbody>
</table>

Note: Data from 2013
Source: Copenhagen Economics based on data from Statistics Denmark

Pharma is important for job creation

<table>
<thead>
<tr>
<th>Job count, index 2000=100</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
</tr>
<tr>
<td>2001</td>
</tr>
<tr>
<td>2002</td>
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<tr>
<td>2011</td>
</tr>
<tr>
<td>2012</td>
</tr>
<tr>
<td>2013</td>
</tr>
</tbody>
</table>

Pharma: +9,000 jobs
Manufacturing (excl. pharma): -127,000 jobs

Source: Copenhagen Economics based on data from Statistics Denmark

The cluster is among the strongest in Europe

European cluster observatory rating

<table>
<thead>
<tr>
<th>Country</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ireland</td>
<td>2</td>
</tr>
<tr>
<td>Switzerland</td>
<td>2</td>
</tr>
<tr>
<td>Denmark</td>
<td>2</td>
</tr>
<tr>
<td>Belgium</td>
<td>2</td>
</tr>
<tr>
<td>Hungary</td>
<td>2</td>
</tr>
<tr>
<td>Turkey</td>
<td>2</td>
</tr>
<tr>
<td>Italy</td>
<td>2</td>
</tr>
<tr>
<td>Germany</td>
<td>1</td>
</tr>
<tr>
<td>Poland</td>
<td>1</td>
</tr>
<tr>
<td>France</td>
<td>1</td>
</tr>
<tr>
<td>Spain</td>
<td>1</td>
</tr>
<tr>
<td>Greece</td>
<td>0</td>
</tr>
<tr>
<td>Ukraine</td>
<td>0</td>
</tr>
<tr>
<td>Russia</td>
<td>0</td>
</tr>
<tr>
<td>Austria</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: Based on the European Unions Cluster Observatory Star rating system
Source: Copenhagen Economics based on data from the European Commission cluster observatory data
The Danish pharmaceutical industry and TTIP

The importance of pharma in the Danish economy

Pharma is important for Danish exports

Pharmaceuticals is a main export good

Pharmaceuticals account for 12% of total goods exports

Total goods: 614.9 bill. DKK

Pharmaceuticals 73.6 bill. DKK

Pharma exports to the US is increasing

Pharma: 18.6 bn 43% of exports

Other goods: 23.6 bn 56% of exports

Total goods: 42.3 bn

Growth in exports since 2000

Pharma accounts for 24% of growth in goods exports since 2000

Pharma: +49 bn

Total goods: +206 bn

Source: Copenhagen Economics based on data from Statistics Denmark

Pharma is a main driver of export growth

Pharma accounts for 91% of growth in goods exports to the US since 2000

Pharma: +16.5 bn

Total goods: +18.2 bn

Source: Copenhagen Economcis based on data from Statistics Denmark

Note: Data for 2014

Source: Copenhagen Economcis based on data from Statistics Denmark
Benefits of TTIP from pharma for Denmark
Benefits of TTIP for Denmark

**TTIP will affect Danish total trade**

TTIP will increase access to the US market for EU exporters and vice versa and directly affect bilateral trade.

**Trade to other markets will be affected via**

**Trade diversion**

An increase in Danish exports to the US may be due to an overall increase in exports and/or a reduction in exports to other destinations.

**General equilibrium effects**

- An increase in the relative competitiveness of EU exporters on the US market may impact Danish exports/imports to or from other markets via global value chains.
- An increase in Danish production due to TTIP may increase labour demand too resulting in an upwards pressure on wages, causing the overall impact of the TTIP to dampen somewhat.
- The general equilibrium model does not consider the path to the new equilibrium.

TTIP will therefore affect both Danish *bilateral* trade with the US and Danish total trade.

Spillover effects are only included in the *total trade* impact figures.
The Danish pharmaceutical industry and TTIP

TTIP will affect Danish total trade by reducing tariffs and NTBs

An ambitious pharma chapter in TTIP will

Remove tariffs on all pharmaceutical goods

Average trade weighted tariffs in the US for pharma/chemical imports from EU: 1.33%
Average trade weighted tariffs in the EU for pharma/chemical imports from US: 2.02%

Reduce non-tariff barriers (NTBs) by 25% for both goods and services

Cost equivalent of NTBs in the US for pharma/chemical imports from EU: 19.1%
Cost equivalent of NTBs in the EU for pharma/chemical imports from US: 13.6%

This scenario corresponds to the scenario in the EU Commission assessment (CEPR 2013)
Benefits of TTIP for Denmark

Spillovers

Reducing NTBs (e.g. harmonisation or simplification of regulations) have a multilateral effect. This means that the reduction in NTBs on the EU and US market may also lower access barriers for exporters from third countries because regulation is harmonised and third countries can be more certain that they meet the high safety and regulatory standards of both the EU and the US. This is modelled as a spillover from the NTB-reduction on other countries.

Spillovers are assumed to be 10% of the direct reduction of NTBs.*

Example
An NTB reduction of 25% on EU’s exports to the US → NTB reduction of 2.5% for other exporters to the US.

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Benefits of TTIP for Denmark

**Benefits require an ambitious pharma chapter**

In order for benefits to materialise in the pharmaceutical industry trade negotiators will have to deliver improvements on some key intellectual property rights and regulatory differences between the EU and the US.

An ambitious pharma chapter which significantly reduces non-tariff barriers on pharmaceutical products, could involve some of the following aspects:

- An efficient system of intellectual property rights
- Mutual recognition of good manufacturing and clinical practice inspections (GMP/GCP)
- Allowing exchange of confidential information between EU member states/EU institutions and the US Food and Drug Administration
- Streamlining regulatory requirements in general and for paediatric studies in particular
- Harmonising terminology for pharmaceutical products
- Enhancing bilateral cooperation on joint assessment approaches
Benefits of TTIP for Denmark

Macroeconomic impacts of TTIP on the Danish economy

- TTIP is expected to increase Danish GDP by between 0.3% -0.6%. Relative to the level of GDP in 2014, this is equal to an increase of up to 11 billion DKK.

- TTIP is expected to increase Danish exports by between 0.8% - 1.5%. Relative to 2014 levels, this is equivalent to an increase of up to 16 billion DKK.

- TTIP is expected to increase Danish imports by between 0.8% - 1.6%. Relative to 2014 levels, this is equivalent to an increase of up to 15 billion DKK.

Macro-economic impacts from TTIP

<table>
<thead>
<tr>
<th></th>
<th>Excl. Spillovers</th>
<th>Spillovers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GDP</strong></td>
<td>0.2%</td>
<td>0.3%</td>
</tr>
<tr>
<td><strong>Value of exports</strong></td>
<td>0.7%</td>
<td>0.8%</td>
</tr>
<tr>
<td><strong>Value of imports</strong></td>
<td>0.8%</td>
<td>0.8%</td>
</tr>
</tbody>
</table>

8-15 bill. DKK

Note: Spillovers are computed as the EU-US (trade) weighted share of total spillovers arising from a combined simulation of the impacts on the Danish economy of an EU FTA with US, Japan, Korea and Canada.

Source: Copenhagen Economics based on CGE-simulations by prof. J. F. Francois 2013
The Danish pharmaceutical industry and TTIP

Benefits of TTIP for Denmark

**Pharma accounts for 40 percent of export growth from TTIP**

- Pharma can be expected to account for a large share of the increase in exports following TTIP.

- While total exports are expected to increase by DKK 8 billion, just over DKK 3 billion will be from the pharmaceutical industry.

- Accordingly the pharmaceutical industry will account for 40 percent of the increase in total exports from TTIP.

**Growth in total exports**

Source: Copenhagen Economics based on CGE-simulations by prof. J. F. Francois 2013
### Benefits of TTIP for Denmark

**Large growth in pharma exports relative to other sectors**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Percentage Increase</th>
<th>Value (billion DKK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharma</td>
<td>4.4%</td>
<td>3.2</td>
</tr>
<tr>
<td>Food</td>
<td>1.9%</td>
<td></td>
</tr>
<tr>
<td>Machinery</td>
<td>1.5%</td>
<td></td>
</tr>
<tr>
<td>Metal goods</td>
<td>0.6%</td>
<td></td>
</tr>
<tr>
<td>Sea transport</td>
<td>0.4%</td>
<td></td>
</tr>
</tbody>
</table>

**Pharma benefits potentially twice as large as “runner-up” sectors**

Note: The figure shows the percentage increase in sector exports to all destinations. Sector ranking in ambitious free trade agreement. Spillovers not included.

Source: Copenhagen Economics based on CGE-simulations by prof. J. F. Francois 2013

Danish exports of pharmaceutical products are expected to increase by 4.4%. Relative to the level of exports of pharmaceuticals in 2013, this is equivalent to an increase of 3 billion DKK.

This impact may be somewhat lower if the reduction of NTBs on pharmaceuticals in the US market ‘spill over’ and benefits exporters from non-EU countries, increasing their access to the US market and increasing competition.
Benefits of TTIP for Denmark

Pharma accounts for up to a fifth of GDP impact

- An ambitious pharma chapter in TTIP will increase the direct contribution of the pharmaceutical industry to Danish GDP by app. 1.2 billion DKK.

- With the total GDP impact estimated at between six and eleven billion DKK, the pharmaceutical sector alone accounts for up to a fifth of the total impact on Danish GDP resulting from an ambitious TTIP.

GDP impacts from pharma

<table>
<thead>
<tr>
<th>Billion DKK</th>
<th>Pharma</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pharma accounts for up to 22% of increases in Danish GDP from TTIP

Note: Spillovers are not included in the total. Including spillovers the total GDP effect is 11 billion DKK. Hence pharma accounts for app. 10 and 22 percent of the total GDP increase. Spillovers are not considered for each industry individually. Pharma’s share of GDP is calculated as pharma’s share of gross value added.

Source: Copenhagen Economics based on CGE-simulations by prof. J. F. Francois 2013
Benefits of TTIP for Denmark

Bilateral impacts: Large growth in pharma exports to the US

- Following TTIP total exports to the US is expected to increase by 13 billion of which 63 percent or just over 8 billion will be from the pharmaceutical industry, based on 2014 data.

- Danish total exports to the US are expected to increase by 14%, while exports of pharmaceuticals to the US are expected to increase by 45%.

- Pharma exports to the US is expected to increase more than total exports of pharmaceuticals mainly due to increased competition in the EU market and trade diversion from the EU to the US.

### Impacts on Danish-US trade

<table>
<thead>
<tr>
<th></th>
<th>Export</th>
<th>Import</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>13 bill. DKK (14%)</td>
<td>8 bill. DKK (45%)</td>
</tr>
<tr>
<td></td>
<td>9 bill. DKK (17%)</td>
<td>0.2 bill. DKK (34%)</td>
</tr>
</tbody>
</table>

Note: Spillovers are excluded. Numbers in parentheses denotes increase in percent.

Source: Copenhagen Economics based on CGE-simulations by prof. J. F. Francois 2013
Benefits of TTIP for Denmark

Job growth in pharma from TTIP

- Since the implementation of the measures in an ambitious TTIP agreement is not an overnight process we assess the job effect using a 2020 baseline.

- With an ambitious pharma chapter in TTIP and underlying growth in the pharmaceutical industry employment is expected to grow by 3,750 from 2013 to 2020. Of these **650 additional jobs are from TTIP**.

- Basing the impact figure on an expected 2020 baseline introduces some uncertainty. Depending on the actual development of the pharmaceutical industry this number may be slightly larger or smaller.

### TTIP Job impact with 2020 baseline

<table>
<thead>
<tr>
<th>Thousand</th>
<th>Without-TTIP</th>
<th>With TTIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>23,500</td>
<td>24,150</td>
</tr>
<tr>
<td>+650</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Copenhagen Economics input-output model, and CGE-simulations by prof. J. F. Francois 2013
Benefits of TTIP for Denmark

**Higher tax payments from companies and workers**

Increased production and more jobs in the pharmaceutical industry will also directly benefit the public sector in terms of increased tax revenue. As corporate earnings increase corporate income tax payments will also increase. And as more people are employed in the high wage pharmaceutical industry and as workers earnings increase due to higher productivity following TTIP wage income tax payments are set to rise.

In order to assess the impact on tax payments we need to assume the level of average tax rates on additional corporate income and wage income taxes. We calculate tax payments from additional income with TTIP using average effective tax rates for corporate income and wage income based on data from Statistics Denmark.
Benefits of TTIP for Denmark

Higher tax payments from companies and workers

If marginal tax rates on additional wage income is higher than the average wage income tax rate the assumption would provide a low estimate. This would be the case if most additional wage income is earned by workers who receive higher wages following TTIP as marginal wage income tax rates are generally higher than average wage income tax rates. If on the other hand additional wage income is earned mainly by new workers in the pharmaceutical industry who do not pay higher marginal taxes than existing workers the assumption provides a more accurate estimate. As both effects are in play we find that the estimate on additional wage income taxes from the pharmaceutical industry with TTIP is conservative.

As average and marginal corporate income taxes are determined by the corporate income tax rate, rules on depreciation and financing structure corporate tax regulation is more complex than wage income tax regulation. Corporate income taxes will fluctuate more from year to year and will be dependent on how additional corporate revenue is utilized within the pharmaceutical industry. In 2012 the effective average tax rate for the pharmaceutical industry in Denmark was app. 14 percent (data from Statistics Denmark). According to the Danish Productivity Commission (2014) the effective marginal corporate income tax rate was 14.7 percent in 2012. Based on this we find the assumption of marginal tax rates being equal to average tax rates for corporate income to be reasonable.
We find an increase in tax revenue from the pharmaceutical industry of around **DKK 290 million**.

Corporate income tax payments are set to increase by app. 120 million DKK.

In addition to this tax payments on wage income from workers in the pharmaceutical industry are expected to increase by app. DKK 170 million.

DKK 290 million in tax revenue correspond to more than the financing need for the Danish Governments initiative for better cancer treatment announced in the budget law for 2015 (the initiative runs from 2015-2018 with a total financing requirement of DKK 1.1 billion over the four year period).*

### Increased tax payments

<table>
<thead>
<tr>
<th>Tax Type</th>
<th>Additional annual tax revenue with TTIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate income tax</td>
<td>+120</td>
</tr>
<tr>
<td>Wage income tax</td>
<td>+170</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>+290</strong></td>
</tr>
</tbody>
</table>

*Source: Copenhagen Economics based on data from statistics Denmark and CGE-simulations by prof. J. F. Francois 2013

*Source: Aftale om Finansloven for 2015 (Budget 2015)
Benefits of TTIP for main pharmaceutical companies
Benefits for main pharmaceutical companies

Main companies in the Danish pharmaceutical industry

- The pharmaceutical industry in Denmark consists of the large well-known pharmaceutical companies as well as a broad spectrum of smaller pharmaceutical and biotech companies.
- The key players in the industry today are Novo Nordisk A/S, Lundbeck A/S and LEO Pharma A/S who all have both significant R&D and production facilities as well as headquarters in Denmark.
- The companies all invest significantly in research and development with up to 20% of annual revenue dedicated to research and development activities.
- The three companies account for a significant share of the sector today employing approximately 90 percent of the total number of employees in the Danish pharmaceutical industry.

Novo Nordisk A/S

Main disease areas are diabetes, obesity, haemophilia and growth hormone therapy. Novo Nordisk A/S employs more than 40,000 people globally, with approximately 15,000 in Denmark. Headquarter in Bagsværd and multiple production locations of which the largest is in Kalundborg, Denmark.

Lundbeck A/S

Focuses on brain diseases including depression, schizophrenia, alzheimers disease etc. Lundbeck A/S employs 5,500 people globally of which approximately 2,100 are in Denmark. Lundbeck A/S has headquarters and production in Valby, Denmark

LEO pharma A/S

LEO Pharma A/S is focused on skin diseases (psoriasis, actinic keratosis, eczema and skin infections). The company employs 4,800 people globally of which approximately 1,500 are in Denmark. LEO Pharma A/S has headquarters and production in Ballerup, Denmark.

Source: Company webpages, annual reports and investor relations
Benefits for main pharmaceutical companies

Main companies account for 90% of pharma jobs

Total headcount in pharma: 20,400

Combined the three main companies employ \textbf{18,300} people corresponding to \textbf{90 percent} of the total employment in the pharmaceutical industry.

\textbf{53 percent} of jobs in the three companies are in product supply.

Source: Statistics Denmark and data from Novo Nordisk A/S, Lundbeck A/S and LEO Pharma A/S respectively
Benefits for main pharmaceutical companies

Main companies and their global reach

- On top of a combined headcount of 18,300 in Denmark, the three companies have significant activities outside Denmark both in terms of R&D, manufacturing and sales.

- Together with the activities in Denmark, the global reach of each company make up their individual supply chains and determine the external trade of each of the three companies.

- On a global level the three companies employ app. 50,000 people i.e. 37 percent of global headcount is in Denmark. This share is far larger than sales figures would predict indicating that growth in global markets will have significant impact on Denmark.

- The map on the following page shows the EU and North American R&D and manufacturing sites of the three companies. When the companies expand these activities outside Denmark it will also provide benefits for the Danish economy in terms of direct job creation in related functions in the Danish part of the company and from higher earnings that are sent back to Denmark.

- All of the companies have headquarters in Denmark and sales activities in more than 100 countries (not depicted on the map).

Source: Company webpages, annual reports and investor relations
Benefits for main pharmaceutical companies

Danish pharma companies’ R&D and manufacturing sites

Note: The companies collaborate on R&D with research institutions globally hence this overview does not reflect the full global reach of the companies research activities. Moreover the companies have local packaging facilities globally. These are often located in markets with local content requirement regulation. Several manufacturing and R&D facilities are located outside the geographical scope of the map.

Source: Company websites of Novo Nordisk A/S, H. Lundbeck A/S and LEO Pharma A/S.
Benefits for main pharmaceutical companies

Global growth in main companies provides benefits in Denmark

- The US is the largest market for pharmaceuticals globally and accounts for approximately one third of global pharmaceutical sales.*

- An ambitious pharma chapter in TTIP will provide all three companies with a better platform for harvesting the vast growth potential in the US market.

- Growth in the US will increase the companies economic activities both in the US and in Denmark, cf. box about the recent growth experience of Novo Nordisk A/S.

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Sales growth in the US has driven job creation in Denmark for Novo Nordisk A/S

In recent years Novo Nordisk A/S has grown faster than the remaining pharmaceutical industry in Denmark and has therefore been increasing its share of the pharmaceutical industry employment in Denmark.

The rapid expansion of Novo Nordisk A/S is reflected by global growth in the number of employees from 29,300 to 38,500 (or an increase of 31 percent) between 2009 to 2013 of which a large part has been in Denmark.

This level of job creation has largely been driven by growth in the North American market where sales has increased by app. DKK 20 billion between 2009 and 2013.

Novo Nordisk A/S is expecting growth to continue and the company is alone planning to hire an additional 6,000 people in Denmark by 2022. This job creation is additional to the benefits that TTIP would provide.

Source: Novo Nordisk A/S annual report 2013

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*Source: OECD Health Statistics*
Benefits for main pharmaceutical companies

**TTIP and economic benefits for main companies**

We find that an ambitious pharma chapter in TTIP will provide direct economic benefits for the main pharmaceutical companies, reinforcing their presence in Denmark while expanding their global reach by:

- Increasing the companies ability to supply high quality products to patients across the U.S. and Europe.

- Increasing the companies ability to deliver pharmaceutical products and innovations faster to patients across the U.S. and Europe.

- Reinforcing the necessary conditions for companies to maintain a sustainable business due to effective protection of intellectual property.
Benefits of TTIP from pharma in other sectors
Benefits of TTIP from pharma in other sectors

**Growth in pharma creates jobs in other sectors too**

- When the pharmaceutical industry increases output and hire more workers it also requires more inputs from suppliers and supporting industries.

- Therefore, growth in the pharmaceutical industry spurred by TTIP will also bring indirect economic benefits to other sectors in Denmark.

- In order to get the full picture of the pharmaceutical industry’s impact on the Danish economy from TTIP this indirect effect needs to be added.

- The total impact on job creation then comes from two distinct channels:
  1. **Direct** – the value added created within the industry
  2. **Indirect** – the value added created in domestic sectors as a result of the industry’s purchases of goods and services for its own process of production

- Here we assess the **indirect effects** in terms of job creation in other sectors from an ambitious pharma chapter in TTIP.
Benefits of TTIP for Denmark

**Indirect job growth in other sectors from TTIP**

- With an ambitious pharma chapter in TTIP as well as underlying growth in the pharmaceutical industry the number of indirect jobs created by the pharmaceutical industry is expected to grow by 4,900 from 26,700 to 31,600 between 2013 and 2020. Of these **850 jobs are from TTIP**.

- The impact is assessed using the 2020 baseline for the pharmaceutical industry because regulatory harmonisation is expected to happen gradually and not from day one. On top of this, the full effects can only be expected after companies have adjusted their production and supply chains.

### TTIP Job impact with 2020 baseline

<table>
<thead>
<tr>
<th>Year</th>
<th>Jobs (thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020 without TTIP</td>
<td>30,750</td>
</tr>
<tr>
<td>2020 with TTIP</td>
<td>31,600</td>
</tr>
</tbody>
</table>

**Source:** Copenhagen Economics input-output model, and CGE-simulations by prof. J. F. Francois 2013
Benefits of TTIP from pharma in other sectors

**Pharma is contributing to basic R&D and innovation**

- On top the direct and indirect economic impacts the pharmaceutical industry makes significant contributions to the Danish economy through investments in basic R&D. The main companies invest up to 20 percent of annual revenue in R&D.

- Innovation spillovers also stem from the pharmaceutical industry. When pharmaceutical companies generate new knowledge through R&D, researchers in other institutions can leverage this knowledge in their own research. Furthermore research findings from the pharmaceutical industry can become spin-off companies – the most notable example being Novozymes as a spin-off from Novo Nordisk A/S.

- The indirect effects related to R&D and innovation may be substantial, but are not included in this assessment of the impact from the TTIP.
Appendix: Method for assessing the effect from TTIP
Methodology

Method for assessing the effects

The estimated impacts of the TTIP on the Danish economy are obtained from a counterfactual analysis, in which the impacts on the Danish economy are computed as the difference between the various parameters with and without a reduction of trade barriers. The methodology is the same as used by CEPR (2013) but tailored to the Danish economy.

Unlike the former study, the analysis takes into account the impact arising also from the, already agreed, Free Trade Agreements with Korea and Canada as well as the potential FTA with Japan. Thus under the counterfactual scenario all four FTAs are assumed to be fully implemented. The contribution of the TTIP towards the full impact is derived subsequently.

This is a more realistic scenario as it takes into account how TTIP interacts with other FTAs which we know for sure will be implemented (Korea, Canada) or for which negotiations are being undertaken (Japan).

The isolated impact of TTIP arising from the reduction in tariffs and NTBs on goods and services is derived from the combined impact of all four FTAs.

In doing so, we assume that the share of the spillover effects attributed to the TTIP is equivalent to the US share of total EU trade with all four countries corresponding to $\frac{2}{3}$ of the total spillover effects.
Methodology

Global CGE models in short

- Production and consumption are modelled across borders
- Include intermediate linkages between sectors (like processed food buying meat from agriculture).
- Include cross-border linkages between sectors (like pharma production in Denmark using US inputs)
- Sectors are also linked via competition for resources in primary factor markets (capital, labour, and land).
### Methodology

**Timeline for TTIP**

The TTIP trade negotiations is an extended process with many details across different sectors to be negotiated. Currently the EU and the US has held seven negotiation rounds with round eight to commence in 2015. After TTIP is signed some measures are likely to be implemented gradually and all measures will only take effect after some period of time. Total benefits of TTIP accrue, when companies and consumers have adjusted to new market conditions.

<table>
<thead>
<tr>
<th>June 2013</th>
<th>July 2013</th>
<th>July 2013 - January 2015</th>
<th>2016 (expected)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU Member States approve negotiations</td>
<td>First TTIP negotiation round</td>
<td>Negotiations ongoing Round eight to begin in 2015</td>
<td>Decision on the negotiated text by EU governments and the European Parliament</td>
</tr>
</tbody>
</table>
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