



Impacts of automation on the labour market in Hungary

The new (digital) revolution generates significant changes in the labour market. The result of the 'skilled-biased technological change' suggests the following expectations: the demand for unskilled workers will decrease and the demand for high educated labour force will significantly increase. The full automation of certain professions will result in a decrease in the number of work places. In the IEER research the possible effects of automation on the Hungarian labour market were studied with a primary focus on the effects on districts and counties.

The new industrial revolution and its impacts

The possible decline in the labour force demand as a consequence of the technological advancement has been a discussion topic in sciences since the Industrial Revolution, but these concerns proved unfounded until the 21st century. The New Industrial Revolution (Digital Revolution or The Fourth Industrial Revolution) has fuelled several novel phenomena in the labour markets. Fast changes in the technical content can be expected in professions affected by digitalization. Automation could be applied to several tasks or to professions that have not yet been considered to be mechanizable or programmable. This will result in an increased demand for highly qualified and a decreased demand for medium-qualified work force (Autor, Handel, 2013; Autor et al. 2016).

Since the 70s there has been an extremely wide gap between the wages of lower and

highly qualified workers; and that gap will further increase as a result of automation. The volume of the speed of changes is a novelty itself: as a consequence of technological development the composition of labour force according to qualifications could change year by year in certain industries. The demand for skilled and unskilled work force changes rapidly as well.

In the US, there is a high risk of job loss for 47% of workers in industries affected by automation in the future, according to some pessimistic estimates. Some other approaches suggest that there are only a few jobs that could be wholly replaced by new technologies, but at the same time certain tasks will be done by robots instead of people.

Some occupations might disappear, or the content of certain occupations could be transformed, and thus due to automation a significant number of the labour force could become inactive or unemployed. If the inactive work force cannot be employed in other fields, then we could expect a decrease

in the employment rate. The possible negative impacts of automation could primarily be eased by improving employers' flexibility and adaptability.

In the field of automation Asia is at the forefront. According to a study entitled World Robotics by International Federation of Robotics (IFR) 70% of robot sales took place in five countries (in China, in Japan, in the USA, In South-Korea and in Germany) in 2014. South Asia and several countries in Europe are considered to be part of the emerging market. Automation is not yet at a high level in Central-Eastern European countries, but the cited study predicts an increase in robot purchases in the upcoming years. The trend of automation is expected to appear in Hungary as well in the near future, thus its possible effects on the labour market could be worth studying.

Replaceable vocations by existing technologies

Automation does not affect each and every vocation to the same extent. Experts of the issue generally agree that primarily routine blue or white collar jobs could be completely replaced by robots or computer programmes. Machines could mostly be supplementary to more complex jobs that require manual skills, creativity or social skills.

In our analysis on Hungary we focused on the replaceable jobs by using a narrow definition. Those jobs were coined as replaceable jobs where human labour force has already been replaced by automation technologies in given parts of the world.

Hence, the study does not include either technologies in the piloting phase that will be launched in the future or the possible effects of technological development.

Based on the above definition fifty-five vocations out of the Hungarian Standard Classification of Occupations (FEOR) have been identified as wholly replaceable in case of the introduction of already existing technologies in Hungary.

Eighteen vocations out of the fifty-five are related to industries, mostly to the processing industry (textile, food and canning) and to mechanical engineering. Eleven jobs belong to clerical work or administrative work, where certain computer softwares could replace certain scope of activities/duties, e.g. data recording, bookkeeping or the process of registration/handling of databases. In the field of logistics and vehicle driving ten jobs have been identified as replaceable, e.g. jobs connected with loading and shipping preparations, and also the driving of rolling stock vehicles. Automation could significantly affect the construction industry. Nine jobs such as painting, wainscoting, masonry or roofing could be replaced by the application of existing technologies. Finally, in the service industry primarily sales, controlling and cleaning jobs could be replaced.

Automation exposure of Hungarian districts

In our study the NAV (National Tax and Customs Administration) data concerning employment in August 2015 were taken into

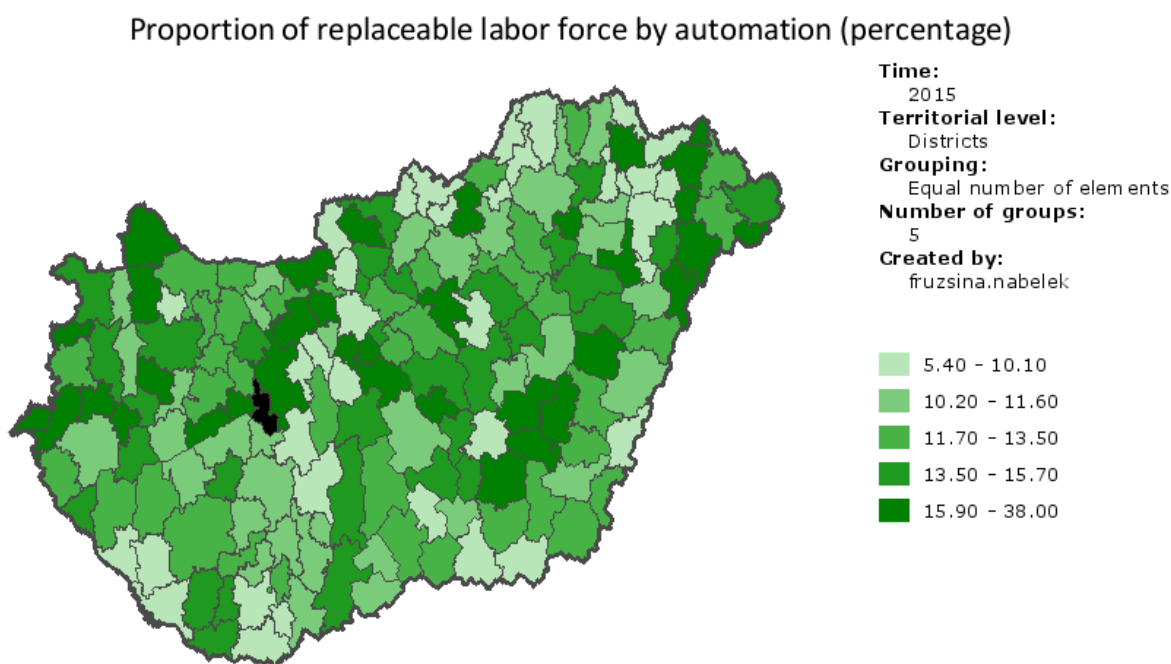
account. Focusing on jobs belonging to the above mentioned industries in Hungary, about 12% (513,000 employees) of the total employment (4 251 913 people) would be affected by automation. The least affected region would be Budapest with only 10% compared to the aggregate ratio of 13% in other regions in the country. Apart from Budapest, the greatest number of replaceable jobs can be found in those regions where employment rate is relatively high.

The rate of replaceable jobs is the highest in Csenger district (Szabolcs-Szatmár-Bereg county) where it is 38%. The rate of jobs that could be automated is also high (around 30%)

in the following places: in Bicske district (Fejér county) it is 35%, in Gyál and Budakeszi districts (Pest county) it is 29%.

Apart from Budapest the most employees (20,157 people) who have jobs that could be automated work in the latter district. In the most affected 43 districts where at least 15% of the jobs could be automated seven districts are in Pest county, five-five in Szabolcs-Szatmár-Bereg county, in Vas and in Veszprém counties, respectively (See Figure 1).

Figure 1: Proportion of replaceable labour force by automation (percentage)



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Source: http://www.regionalkata.org/en_US/maps/show/id/293

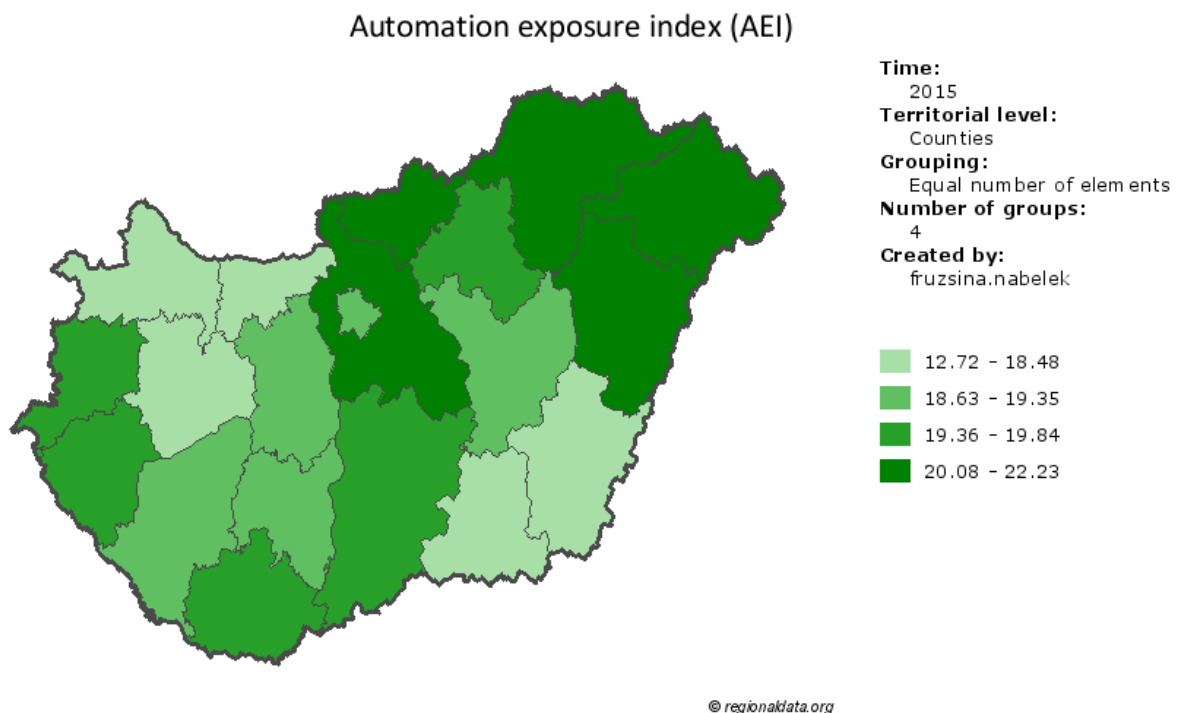
At the same time it can be seen that in certain counties there are districts where the number of jobs that could be automated is outstandingly high. In these districts the majority of the employed work in jobs that could be automated.

On the one hand, automation affects those places where the rate of employment is high, but on the other hand the most vulnerable districts are those ones where the rate of unemployment is high, and at the same time automation could also put the already existing jobs at risk in the future. The vulnerability of the districts was measured with the Automation Exposure Index (AEI) which consists of three indicators: the rate of registered jobseekers in the given district, the rate of long-term jobseekers and the rate of the employed that could be replaced by

automation. The higher values of the index ranging from zero to a hundred mean a higher exposure, i.e. in those fields the possible negative effects of automation might be more prevalent.

The possible negative effects of automation would mostly concern those counties which are the least developed of all. These counties are: Szabolcs-Szatmár-Bereg county where districts have the AEI average of 22.2, Nógrád county with 21.5, Borsod-Abaúj-Zemplén county with 20.7, and Hajdu-Bihar county with 20.5. According to the index the least exposed counties are: Komárom-Esztergom (17), Veszprém (16.8) and Győr-Moson-Sopron (12.7). In case of Budapest the index is 19 (See Figure 2).

Figure 2: Automation exposure index (AEI) by counties

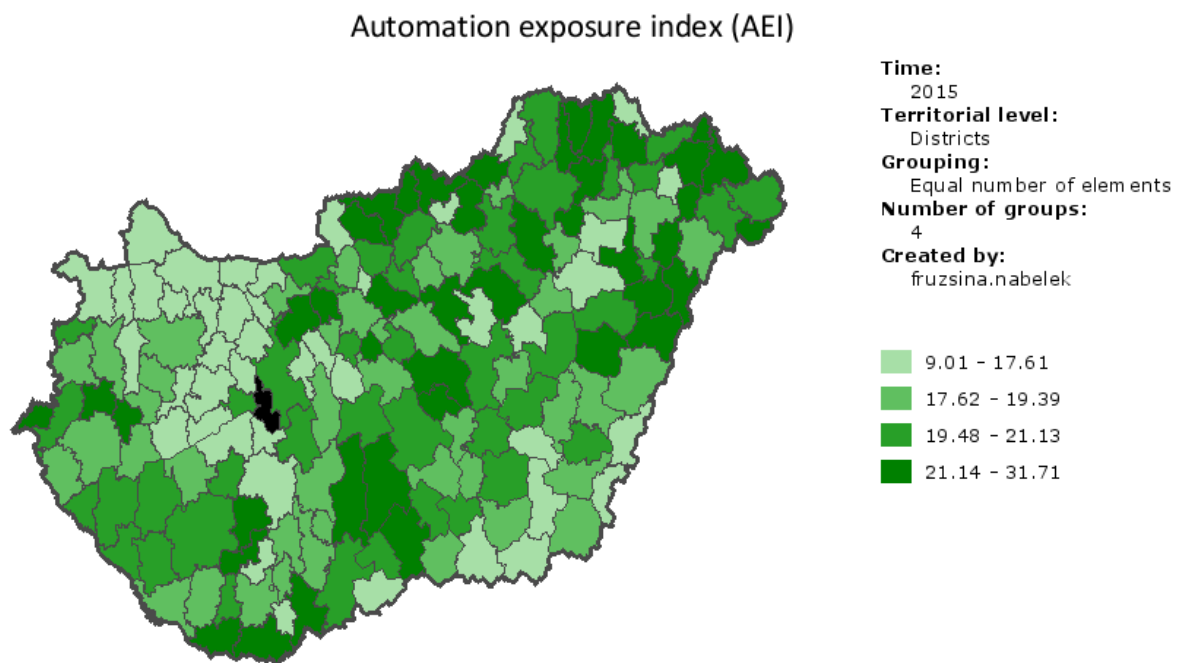


Source: http://www.regiondata.org/en_US/maps/show/id/294

Csenger is the most exposed district according to the index with the value of 31.7. Those having a higher value than 25 are the districts of Záhony (27.9), Bicske (27), Budakeszi (26.9), Baktalórántháza (26.6) and Gyál (25.9). The following districts have a value close to 25: Tiszaújváros, Rétság and Nagykőrös. The least

exposed districts are Pannonhalma (12), Sopron (11.3) and Kapuvár (9). Szob, Csorna, Tapioca, Gárdony, Mosonmagyaróvár and Tét districts have a value well below 15 (See Figure 3).

Figure 3: Automation exposure index (AEI) by districts



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Source: http://www.regionaklata.org/en_US/maps/show/id/295

The exposure to automation has a medium strong negative correlation with the District Development Index (DDI) that measures development in the districts. It means that the

less developed a district is, the more likely it is to be exposed to the negative effects of automation according to our estimates.

The background and possible effects of the free trade agreement between Canada and the EU

The EU representatives signed the Comprehensive Economic and Trade Agreement (CETA) with Canada on 30 October 2016. After CETA becomes enacted in 2017 the majority of the import duties between the EU and Canada trade will be lifted, and furthermore there will be free movement of services between the two economies. The trade liberalisation creates new markets for European SMEs with export capabilities. According to preliminary estimates by the Commission this could increase the trade between the two parties by 20% and it could create 80,000 new work places. The Agreement unquestionably has economic advantages, but at the same time it also concerns some sensitive issues, for instance agriculture, national standards and investment protection. In the following analysis the main goals and some problematic issues of the agreement will be reviewed.

The background of the agreement

In May 2009, the EU and Canada started negotiations on a free trade agreement that were finished in September 2014. The approval procedure lasted for two years, because the agreement was to be approved not only by the European Parliament and the European Council but by all the 28 EU member states. After long negotiations the agreement was signed in October at the EU-Canada summit, and the agreement will be enacted in 2017.

The EU currently has free trade agreements with 34 countries, and has or had trade negotiations with more than 80 countries. For the EU, CETA apart from the planned trade agreement with the USA (TTIP) is the most significant trade and economic agreement with a highly industrialised country.

The goals of the agreement

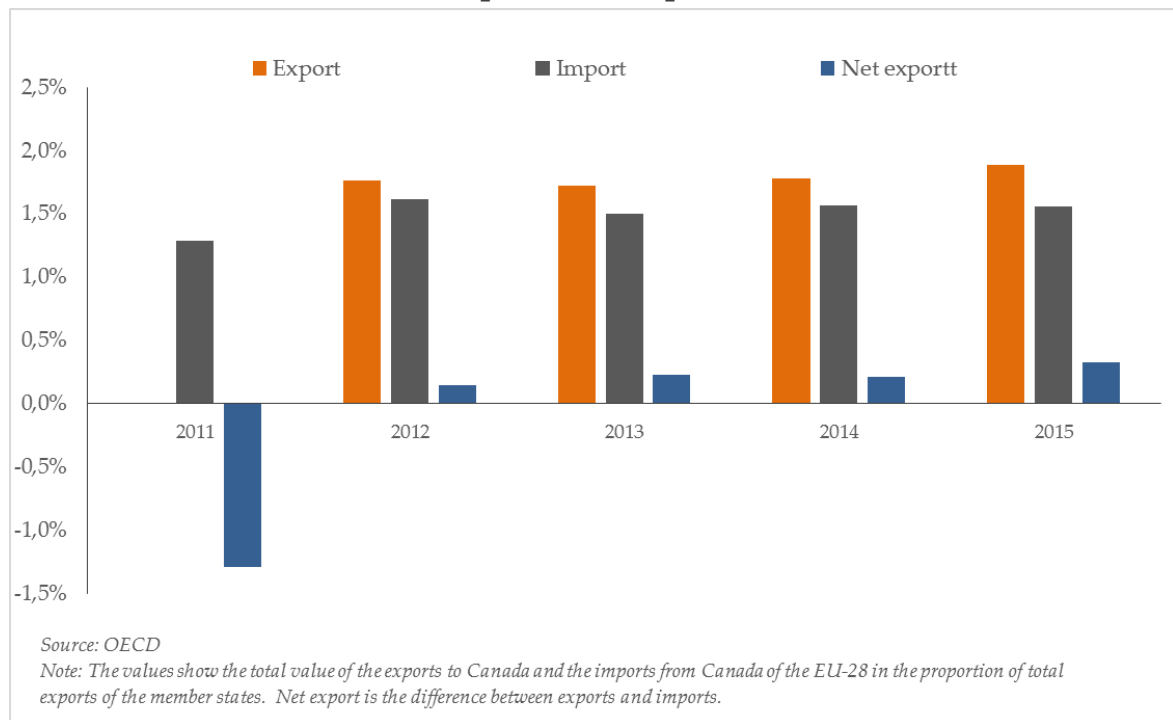
The goals set by the EU in connection with the agreement are to boost the economy by export

stimuli in accordance with the EU 2020 strategy, to help European companies penetrate foreign markets and to create more work places.

Growth

The 2008-2009 crisis caused an economic decline in both economies. From the years following the crisis till 2014 Canada's GDP grew at a faster pace than that of the EU. In 2015 the GDP of the EU 28 member states grew by 2.2%, and it was the first time that the EU had had a higher growth rate than Canada (1.1%). According to the Commission's preliminary impact assessment after lifting the trade barriers between the EU's 500 million people and the Canadian 36 million people markets, the EU will have about 0.02-0.03% GDP growth while Canada will have a 0.18-0.36% GDP growth.

Figure 1: The Canadian exports and imports of EU-28 member states within the total exports and imports (2015)



Customs duties reduction and the improvement of export capabilities

From 2014 both economies' exports and imports have decreased in the global market. The EU is Canada's second largest trade partner following the USA, while Canada held the 11th position in the ranking of the EU's most important trade partners in 2015. Figure 1 shows the rate of export and import targeting Canada within the EU's total trade. In this period, 1.7-1.9% of the EU's total exports went to the Canadian market, while the imports from Canada were 1.3-1.6% of the EU's total imports. 8% of the total Canadian exports went to the EU, while 10-11% of Canada's imports were from the EU 28 member states. The EU trade balance was positive for the whole period, and it means

that in the EU - Canada trade the EU is the net exporter.

After the agreement is enacted, 98% of the customs duties on the majority of the goods would immediately be eliminated. According to estimates the tariffs removal would mean a 400-million-Euro saving after the 2017 enactment, at the end of full liberalisation the savings would amount to 600 million Euros for European exporting companies. Table 1 shows the EU export to Canada by product groups. The EU's most important exports come from machinery and means of transport (43.9%), chemicals and pharmaceutical products (17.2%) and products from processing industries (20.3%). Canada's main exports to the EU come from airplanes, diamond, iron ore, medications, and different kinds of fuel. The winners of the agreement

from the EU are those industries that produce for exports, i.e. the vehicle sector, mechanical engineering, pharmaceutical industry and the processing industries.

Table 1: Distribution of EU exports to Canada by product groups (2015)

Product group	Value of export (million euro)	Percentage in total export
Total	35.199	100.0%
Machinery and transport equipment	15.448	43.9%
Chemicals and related prod. n.e.s.	6.058	17.2%
Manufactured goods classified	3.633	10.3%
Miscellaneous manufactured articles	3.413	9.7%
Mineral fuels. lubricants and related materials	1.944	5.5%
Beverages and tobacco	1.491	4.2%
Food and live animals	1.429	4.1%
Other	1782	5.0%
Of which:		
Crude materials. inedible. except fuels	729	2.1%
Commodities and transactions n.c.e.	332	0.9%
Animal and vegetable oils. fats and waxes	118	0.3%
Other	603	1.7%

Source: DG Trade

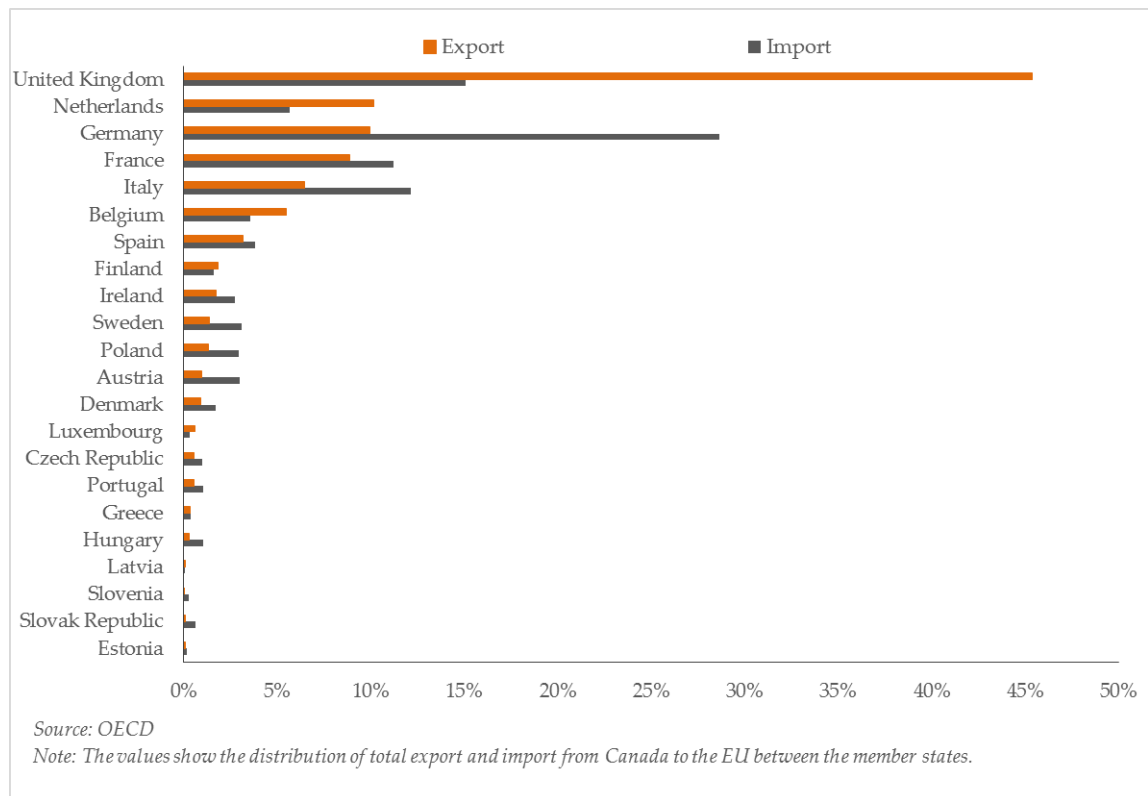
The removal of customs duties affecting the agriculture provides an opportunity for European food products with high added value to be launched in the overseas market. The Commission draws special attention to the fact that significant advantage can be gained for European agricultural companies – thus for SMEs producing quality produce – from processed agricultural produce exports. It applies mostly to those companies that export traditional European wines and alcoholic drinks, cereal products (pasta and pastry), sweets, vegetables and fruits.

Services

Apart from the reduction of customs duties, CETA includes fields that go beyond the

frames of any traditional trade agreements. The agreement provides access to participate in Canadian public procurement tenders for European companies. With this step Canada makes it possible for EU companies to bid in federal, provincial and municipal public procurement tenders that earlier were only available for Canadian companies. Furthermore, in accordance with the agreement Canada grants access to service markets for European companies without any discrimination. European companies will have more opportunity to provide more services, for example, in the fields of maritime transport, telecommunications and in finance.

Figure 2: Distribution of Canadian exports and imports to the EU member states (2015)



Questions about CETA

Critics of CETA point to the fact that the agreement with Canada, in essence, comprises all those issues that have been questioned in connection with the planned Transatlantic Trade and Investment Partnership (TTIP) with the USA.

The most heated arguments target the Investment Court System (ICS) that was created for the protection of foreign investors. This system is intended to ensure that all actors from partner countries can have equal conditions to resolve investment disputes. Critics of CETA claim that ICS would give extensive rights to thousands of big companies to initiate legal proceedings

against governmental decisions on health, environmental or public interest regulations by circumventing the EU's judicial system.

A further issue that could be questioned is the impact assessment studies on the agreement, because they were conducted before Brexit. Figure 2 shows Canadian import and export coming to the EU distributed by member states. In 2015, the two thirds of Canadian import from the EU originated from four large economies: Germany (28.5%), the UK (15%), Italy (12%), and France (11%). Furthermore, Canada had a 47-billion-dollar export to the EU, and almost half of it (45%) went to the UK. As a

consequence of the aforementioned, the impact of the agreement on the EU economy would be less positive after Great Britain leaves the Union. But at the same time, CETA might well serve as a favourable basis for the EU and the UK trade negotiations after Brexit.

Finally, there is a significant disagreement between the Union and Canada with regard to the agricultural sector. The EU regulations ban the trade of GMOs (food or seeds) and the import of meat containing hormone growth, but Canada is considered to be a market leader in biotechnology. In the EU 5% of the work force are employed in agriculture. The EU's agricultural sector could hardly compete with Canada's large-scale farming, thus the cheap Canadian agricultural products entering the EU market in great volume could jeopardise the living of

22-25 million employees in the European agriculture.

Conclusion

In the analysis, the main goals and some questionable issues of the trade agreement between the EU and Canada were discussed. The aim of the reduction of customs duties is to create heavy industry and processing industry work places with higher wages via expanding exports. The liberalisation of services creates new markets for the European service sector. CETA as a 'new generation' in the field of free trade agreements includes regulations on investments, standards, and public procurement. The agreement, which is likely to be favourable for large multinational companies, might have some yet unclear impacts on the societies of the old continent and on the sector of the SMEs.

International trends

Development of production, consumption and employment in certain globally significant economies, compared with expectations and values of the previous period.

		Period in review	Actual data	Expectations	Previous period
Germany	Unemployment Rate (percentage)	(Nov)	6.0	6.0	6.0
	Manufacturing Purchasing Managers Index	(Nov)	54.3	54.4	54.4
	IFO Business Climate Index ¹	(Nov)	110.4	110.5	110.4
France	INSEE Business Climate Index ²	(Nov)	103	102	103
USA	Unemployment Rate	(Nov)	4.6%	4.9%	4.9%
	CB Consumer Confidence Index	(Nov)	107.1	101.2	100.8
	Manufacturing Purchasing Managers Index	(Nov)	54.1	53.9	53.9
China	Manufacturing Purchasing Managers Index	(Nov)	51.7	51.0	51.2

¹ <https://www.cesifo-group.de/ifoHome/facts/Survey-Results/Business-Climate/>

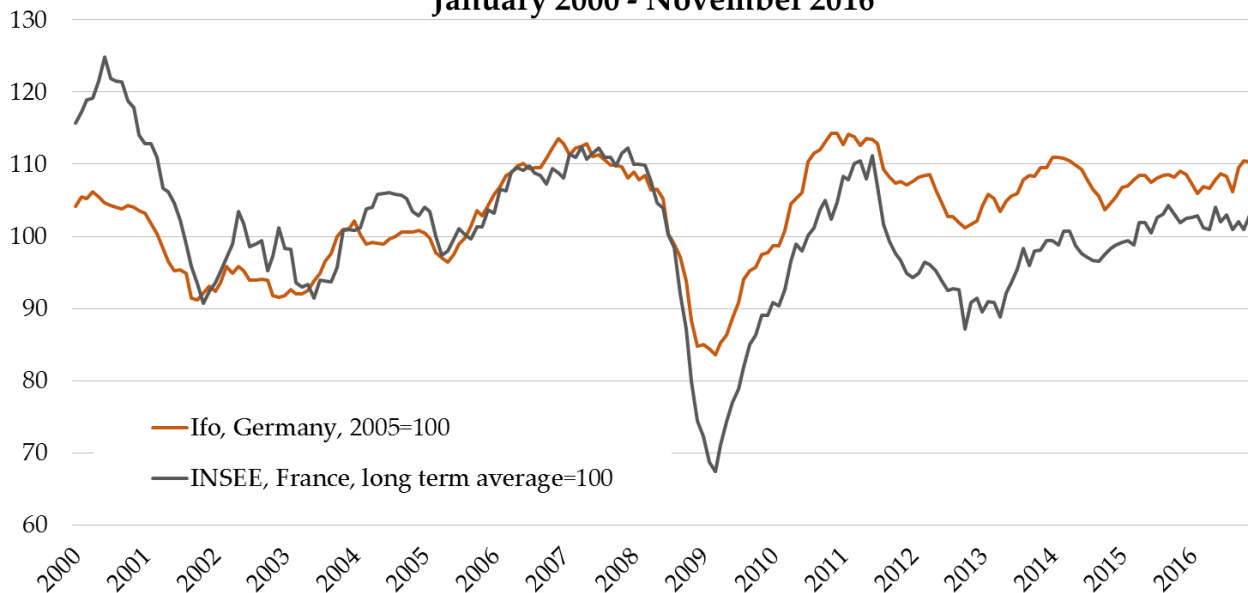
² <http://www.insee.fr/en/themes/indicateur.asp?id=105>

Source of the remaining data: <http://worldeconomiccalendar.com>

The performance of the German economy has slightly decreased in the last month. The unemployment rate remained at the same level in November as it was expected. The manufacturing purchasing manager index (PMI) and the IFO business climate index however performed slightly worse than in the last month. The French INSEE business climate index rose in November as it was expected. In the United States the CB consumer confidence index performed better than the expectations and the previous period. The manufacturing PMI increased stronger than projected as well. The Chinese PMI after a longer period continued to rise in November.

Long-term changes in business confidence indices

**Business confidence in Germany and France,
based on the Ifo and INSEE business climate surveys,
January 2000 - November 2016**



Source: www.cesifo.de, www.insee.fr

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In case of publication please refer to as follows:

HCCI IEER: Monthly Bulletin of Economic Trends,
November 2016, Budapest,
07-12-2016