Chapter 3

The economic and institutional environment for entrepreneurship and investment in Sweden

This chapter gives an overview of the performance of the overall economy, the macroeconomic developments and challenges, governance and institutions, and the incentives in Sweden for investment by firms, including farms, input suppliers, and food companies. The overall regulatory system and conditions for investment are described, in particular as they relate to agriculture and the food sector. Trade and investment policies are examined, as are the credit and tax incentives for R&D in the context of new technologies and innovations in the food and agriculture sector.

Key points

- Sweden is a knowledge-driven economy characterised by robust economic growth, a strong fiscal position, high employment and a well-functioning labour market.
- Inclusive and sustainable growth over the past two decades has underpinned a high quality of life for Swedes.
- In terms of global competitiveness, Sweden currently ranks 6th out of 138 countries.
- Although the overall performance is good, the quality of Sweden's infrastructure needs to be improved.
- Sweden benefits from high quality public institutions creating a sound business environment through strong protection of property rights, rigorous control of corruption, an independent judicial system and a high level of transparency in decision-making.
- Both European Union (EU) and national legislation govern the regulatory environment for entrepreneurship, including the agro-food sector. In general, national legislation sets norms and standards that are well above the EU requirements in many areas of agriculture and horticulture.
- However, the level and complexity of regulations in Sweden are still onerous for business and well above those in other EU Member states within the agro-food sector.
- The stringency of Sweden’s environmental policies is now amongst the highest in the OECD.
- In the food and agriculture sector, most of the legislation is harmonised with other EU Member states, although in some cases, Swedish legislation takes precedence.
- Sweden maintains one of the highest standards on animal health and welfare in the EU as well as globally.
- A special “guarantee” in relation to standards on salmonella and the use of antibiotics in agriculture is applied.
- Regulations on plant protection products are stricter than the harmonised EU legislation.
- Sweden is highly dependent on international trade and investment and there are few barriers to agro-food trade or Foreign Direct Investment (FDI).
- Farmers are subject to the same rules on taxation and social security as the rest of society.

3.1. Macro-economic policy environment and governance

At the broad level, sound macroeconomic policies, leading to high growth and low and stable inflation, play an important role in setting a favourable environment for investment and innovation on farms and in agri-food businesses, which contributes to higher productivity and sustainable use of natural resources. Overall macroeconomic policies and economic growth have implications for facilitating or retarding food and agriculture sector prospects.

Performance of the economy and medium term prospects for growth

Sweden performs well in many measures of well-being relative to other countries in the OECD Better Life Index. It ranks above the OECD average in almost all dimensions. In particular, Sweden is in the top 20% in terms of environmental quality, health status, civic engagement and governance, and work-life balance. In general, Swedes are more satisfied with their lives than the OECD average (www.oecdbetterlifeindex.org/countries/sweden/).

At the forefront of global competitiveness

The World Economic Forum (WEF) Global Competitiveness Index (GCI) for 2016-17 ranks Sweden sixth out of 138 countries (Figure 3.1). Compared with the OECD average, Sweden scores well on its *public and private* institutions; the *macroeconomic environment; innovation*; and having a *sophisticated private sector*. However, Sweden ranks lower on infrastructure, health, higher education and training, and labour market efficiency, and is at a competitive disadvantage in terms of domestic market size.

- Sweden's **innovation system** performs well: The country has a well-performing knowledge, innovative and competitive economy. Sweden's businesses are innovative (2th) and the country is well equipped to embrace the fourth industrial revolution, with a strong score on technological readiness (4$^{th)}$ and ranked within the top 10 in innovation. The higher education system produces world-class science which is reflected, *inter alia*, in the high relative number of patents filled by universities and public labs (2nd).
- **Macroeconomic environment** is very stable and scores very high (5th). Growth has been robust (4.3% in 2015 and 3.1% in 2016) and all the key macro-economic indicators are conducive to sustainable and inclusive growth, driven primarily by rising productivity, dynamic investments and strong domestic demand.
- **Public institutions** are considered to be of high quality (4th). For all aspects of governance – representation and accountability, political stability, absence of violence/terrorism, government effectiveness, regulatory quality, rule of law and control of corruption – Sweden scores above the OECD average. In particular, for the indicators: representation and accountability and rule of law Sweden gets a maximum score, and also very high for control of corruption, government effectiveness and regulatory quality. Political stability and absence of violence/terrorism is the dimension for which Sweden scores the lowest although significantly above the OECD average. Property rights, including financial assets and intellectual property rights are very well protected. In ethics and corruption the overall rank shows that illegal diversion of public funds, irregular payments and bribes are uncommon. The judicial system is independent from influences of the government, individuals or companies. Government effectiveness ranking is very high, reflecting efficient government spending, a well-functioning legal system in settling disputes and in challenging regulations, as well as a high degree of transparency in government policymaking. However, the relatively low ranking of the burden of government regulation suggests that it is not always easy for companies to comply with public administration requirements (e.g. permits, regulations, reporting).

- Infrastructure does not rank as high as other competitiveness indicators (20th), but the overall quality of transport infrastructure in Sweden compares well with the OECD average.

- The education system is considered to be reasonably good. It ranks 24th for primary education and 15th for its higher education and training (Chapter 4)

- The labour market functions relatively well and Sweden has a high employment rate, with a significant level of women's participation in the workforce. Nevertheless, there is still room for improvement in labour market flexibility as Sweden has dropped 26 places to 120th position. The effect of taxation on incentives to work and restrictive labour regulations are perceived as the two most important factors hampering businesses. The country also faces a difficult housing market as a continued increase in house prices could impede mobility and negatively impact labour market efficiency (OECD, 2017a).

- Markets are considered highly efficient and very supportive of business activity (ranked 11th).

Strong macro-economic performance to be sustained, but challenges have emerged

Economic growth has been robust, averaging 3.7% per year for the period 2015-16 (OECD, 2017b). Low interest rates, an improving global outlook and growing public spending are fuelling a booming economy. Growth is expected to remain solid over the coming years, albeit slowing somewhat as the economy is now operating near full capacity.

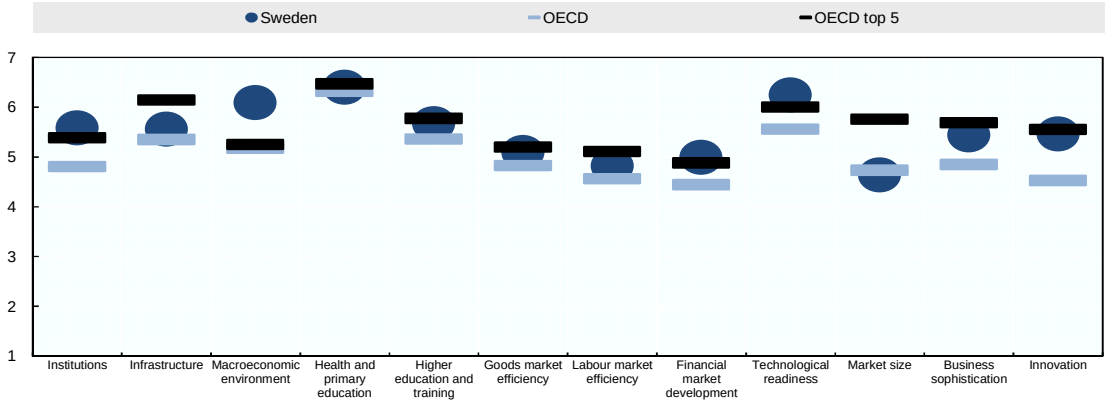
Sweden enjoys a strong fiscal position, with gross government debt (Maastricht definition) at 42.3% of GDP in 2016 (OECD, 2017b). Since 1995, inflation as measured by the consumer price index has been below 2%, on average. The Swedish economy recovered quickly from the 2008-09 financial crisis, and today it is one of the few countries where the GDP per capita is higher than in the pre-crisis period, currently 17% above the OECD average. Output growth has been primarily driven by strong domestic consumption, dynamic investment, labour force expansion, rising productivity and stronger international markets.

At the same time, the decoupling of carbon emissions (CO_2) from output reflects the fact that Sweden is among the most innovative OECD countries when it comes to environment-related technologies. The availability of water and wood, along with the policy choice to use significant amounts of nuclear- generated electricity have kept CO_2 emissions to almost one third of the OECD average and are declining (OECD, 2017a). Decreasing emissions and the adoption of cleaner technologies is also the result of an efficient system of environmental taxation, including both energy and CO_2 taxes (OECD, 2014a).

Figure 3.1. Indicators of Swedish global competitiveness and problematic factors for doing business

A. Global Competitiveness Index, score by component, 2016-17

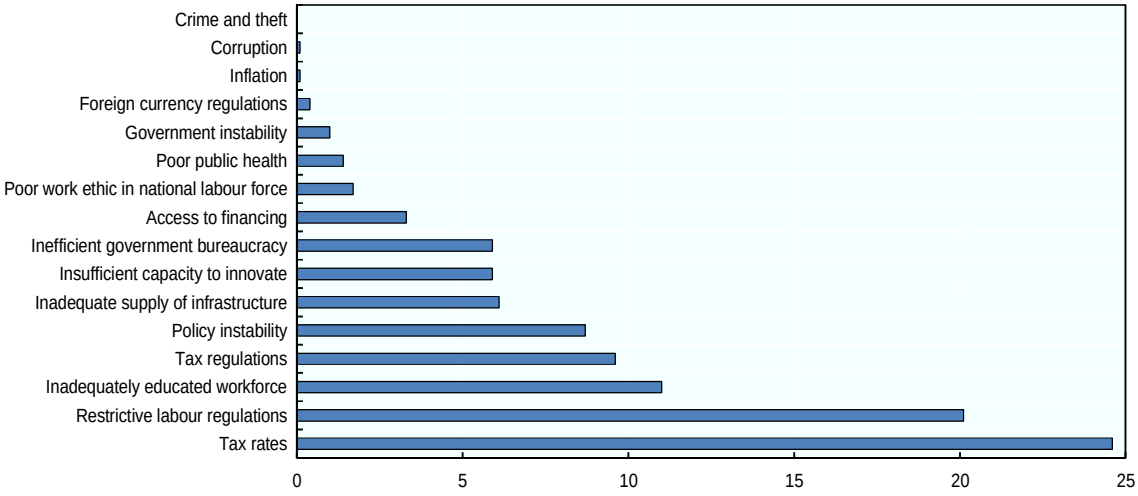
Scale 1 to 7 (best)



B. Global Competitiveness Index, rank by component, 2016-17

Global Competitiveness Index			
Basic requirements	7	Efficiency enhancers (50%)	12
Institutions	4	Higher education and training	15
Infrastructure	20	Goods market efficiency	11
Macroeconomic environment	5	Labour market efficiency	18
Health and primary education	24	Financial market development	10
Basic requirements (20%)	7	Technological readiness	4
Institutions	4	Market size	40
Infrastructure	20	Innovation and sophistication (30%)	5
Macroeconomic environment	5	Business sophistication	6
Health and primary education	24	Innovation	6

C. The most problematic factors for doing business in Sweden, 2016-17



Notes: From the list of factors above, respondents were asked to select the five most problematic for doing business in their country and to rank them between 1 (most problematic) and 5. The bars in the figure show the responses weighted according to their ranking. OECD Top 5 refers to the average of the scores for the top 5 performers among OECD countries for the overall index (Switzerland, Unites States, Germany, Netherlands and Japan). Indices for EU28 and OECD are simple average of member-country indices.

Source: World Economic Forum (2017), *The Global Competitiveness Report 2016-2017: Full data Edition*, Geneva 2016. www.weforum.org/reports/the-global-competitiveness-report-2016-2017-1.

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Government measures for promoting economic growth and jobs

Although the Swedish economy is highly competitive among OECD countries, new challenges have emerged. Unemployment has been gradually declining since 2014, and now stands at 6-7%, close to the structural rate of unemployment. The unemployment rate is levelling off as shortages of qualified labour are intensifying, notably in construction. However, low-skilled workers, especially immigrants, face difficulties finding jobs, reflecting high skill requirements for most jobs in Sweden. Indeed, despite strong output growth, unemployment is increasing among some vulnerable groups. On the other hand, shortages of workers are appearing in some sectors, including construction, education and municipal services (OECD, 2017a). Nevertheless, it is unlikely that these challenges will affect innovation and productivity of the agro-food chain in a significant way.

Measures have been taken to favour a better environment for economic growth and jobs (OECD, 2017a). Regarding the labour market challenges, the government favours lowering labour costs for low-skilled workers through subsidies. The subsidy system will be simplified to increase take-up. This should help increasing the employment rate of vulnerable groups across the country.

Moreover, starting a business has become easier, as a company can be registered in five days. The government has also for some time been promoting women entrepreneurship through business development programmes. The most recent development is the National Strategy for business promotion on equal terms (for women, youth and foreign-born) for the period 2015-20. An increased participation of women and immigrants to the economy has been proven to contribute positively to the economy.

Governance and institutions

Good governance systems and effective institutions provide economic actors with the assurance that the government and its agencies are accountable, transparent and predictable. They are a fundamental pre-condition both to encourage public and private investment in the economy and to enable those investments to benefit investors, consumers and citizens. Moreover, governance systems play an important role in addressing market failure, influencing the behaviour of firms in terms of investment and compliance to regulations, as well as the efficient functioning of farm input and output markets in the food and agriculture sector. Addressing environmental issues and natural resource use are key components of the institutions in designing effective, efficient and publicly acceptable policy tools.

Transparency, accountability and predictability of governance

Every year the Government issues appropriation directions for government agencies. These set out the objectives of the agencies' activities and how much funding is available to them. The Government therefore has quite substantial scope for directing the activities of government agencies, but it has no powers to interfere with how an agency applies the law or decides in a specific case. The government agencies take these decisions independently and report to the ministries.

At the sub-national level, there are two tiers of general government with general competencies: counties (*landsting*) and municipalities (kommuner) (Box 3.1). Agricultural concerns have been under the responsibility of the "Ministry of Enterprise and Innovation'' since 2015. There are several other government agencies in charge of agriculture, food and environmental issues (Box 3.2).

Sweden ranks among the most decentralised countries in the world, in terms of public service delivery, taxation and public expenditure. Swedish sub-national government expenditure accounts for approximately 25% of the country's GDP. Sub-national governments account for about half of total general government expenditure, and enjoy extensive spending and taxing autonomy. An important challenge is to ensure co-ordination for investment across different sub-national entities (OECD, 2017c).

Box 3.1. Tiers of general government at the sub-national level

- The *20 county councils* are run by directly elected assemblies and are mostly responsible for health services (80% of their budget). They may also engage in promoting culture, education and tourism. The responsibility for regional and local public transport is shared between the municipalities and the County Councils (but accounts for less than 6% of County Councils' budgets). Ten County Councils have responsibility for regional development policy.
- The *290 municipalities* are responsible for basic and secondary education, kindergarten, elderly care, social services, communications, environmental protection, fire departments, public libraries, water and sewage, waste management, civil defense, public housing and physical infrastructure.
- The *County Administrative Board* is the representative of the Government in the region and the co-ordinating body for State activities in the county.

Box 3.2. Agricultural authorities

The Ministry of Enterprise and Innovation and the Minister of Rural Affairs handle all policy making matters concerning agriculture, fisheries, horticulture, animal health, food, seed control, agri-environmental concerns, hunting and game keeping that are determined at Government level.

The Swedish Board of Agriculture (SBA) is the implementing agency and the Government's expert authority on agriculture and is responsible for issues related to agriculture and horticulture. The Board is also the governing authority of the district veterinarians, and is responsible for food preparedness.

Agricultural units at the County Administrative Boards handle various forms of agricultural support and are responsible for extension services and training in their regions. They administer and inspect several of the agricultural subsidies at the regional level.

The Environmental Protection Agency (EPA) handles issues concerning environmental protection and conservation. The Agency ensures that decisions on environmental policy are implemented, and works both long-term and proactively for sustainable development. The Agency is an authority subject to the Ministry of the Environment and Energy.

The National Board of Forestry is the monitoring authority for all Swedish forests and ensures that the Government's forest policy is implemented. The authority strives to ensure that all forests are maintained and cultivated, and also emphasises the forest's recreational values.

The National Chemicals Inspectorate (KemI) is the central monitoring authority and handles matters concerning health and environmental hazards related to chemical products. KemI is an authority under the Ministry of the Environment and Energy.

The National Food Administration is the administrative authority for issues relating to food, including drinking water. It acts in the interests of consumers for safe, good-quality food, good practices in food handling and healthy eating habits. The Board monitors food quality and employs inspection veterinarians at slaughterhouses. The National Food Administration is an authority under the Ministry of Enterprise and Innovation.

*The National Veterinary Institute (SVA***)** provides authorities and private individuals with expertise and service in matters of veterinary medicine. One task of the SVA is to investigate the origin, cause, and spread of contagious animal diseases. The National Veterinary Institute is an authority under the Ministry of Enterprise and Innovation.

The Sami Parliament works for a thriving Sami culture based on sustainable reindeer husbandry and other Sami businesses. The Sami Parliament is both a public authority and a parliament elected by the Sami people. It is responsible for funds that promote sustainable reindeer husbandry.

The Swedish Agency for Economic and Regional Growth aims to promote growth in Sweden by increasing the competitiveness of firms, facilitating entrepreneurship and creating attractive environments for companies in the regions. It is responsible for disbursing EU funds to promote regional growth and employment. The Agency is an authority under the Ministry of Enterprise and Innovation.

Vinnova is Sweden's innovation agency to promote sustainable growth by improving the conditions for innovation, as well as funding needs-driven research. Vinnova is a Swedish government agency working under the Ministry of Enterprise and Innovation and is the national contact agency for the EU Framework Programme for R&D.

Ensuring equity in the provision of public services and local accountability in terms of quality and efficiency is a high priority, but funding arrangements may not always be effective in sparsely populated areas, discouraging social innovation and practical inter-municipal co-operation (OECD, 2017c).

Quality of public institutions

According to the WEF Global Competitiveness Index (CGI), Sweden performs very well in the quality of public institutions with an overall ranking of 5 out of 138 countries (Figure 3.2), and fourth amongst the OECD countries. Sweden scores above the OECD average in all categories and compares with the OECD top 5 average for all five dimensions.

The Swedish decentralised model has been proven successful and beneficial to rural entrepreneurship and agro-food businesses: local governments are able to provide high-quality services and subnational authorities are reasonably well equipped financially to deliver their task and meet expenditure responsibilities (OECD, 2017c).

Rural policy however is still defined quite narrowly, to a large extent around the parameters of the CAP Pillar 2 funding. Although recent advances have been made to broaden the focus of the Rural Development Programme, it is still insufficient for enhancing the long-term prosperity and well-being of rural communities. Against this backdrop, Sweden is currently conducting a Parliamentary Inquiry into rural policy and has a strategic opportunity to evaluate and improve its approach to rural development (Chapter 5). The OECD has recommended that Sweden strengthen the role of political bodies at a regional level in regional and rural development in order to help deliver a more integrated approach and realise policy complementarities for rural places (OECD, 2017c).

Mechanisms for ensuring transparency

Sweden has long placed regulatory simplification, and with it stakeholder engagement, at the centre of its Regulatory Reform agenda. Public consultation is a routine part of developing regulations. The principle of public access in Sweden entitles the general public to access official documents with a few exceptions, reflecting a high degree of transparency in decision making.

OECD Indicators of regulatory policy and governance from the OECD 2014 Regulatory Indicators Survey show that Sweden is performing highly (OECD, 2015a). The three composite indicators provide an overview of a country's practices in the areas of stakeholder engagement, Regulatory Impact Assessment (RIA) and *ex post* evaluation. Overall, Sweden scores 2 (out of 4) for RIA and stakeholders engagement, just below the OECD average. Regarding *ex post* evaluation, Sweden also scores 2, which is significantly above the OECD average. Transparency is high for *ex-post* evaluation but is quite low for RIA and stakeholders engagement. There is almost systematic adoption of RIA and stakeholders engagement whereas *ex post* evaluation needs to be more comprehensive.

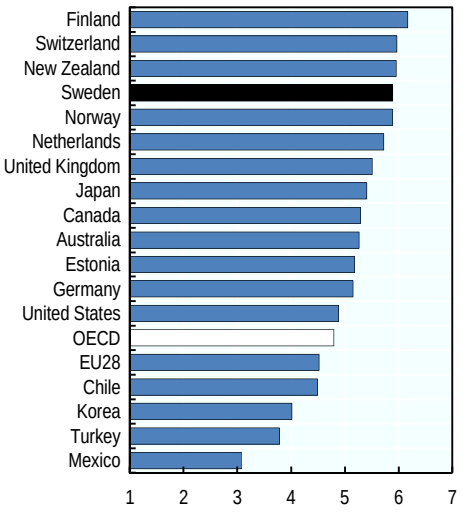
Sustainability criteria in public procurement

In Sweden, the government has taken actions to promote green procurement since 1995. The main output is the national tool for Sustainable Public Procurement (SPP), which has been developed and monitored by the Swedish Environmental Protection Agency (SEPA). This tool is available online and is organised as a database wizard where procurers can choose among sustainability criteria (both environmental and social for various goods, services and work contracts. Local authorities, county councils, government agencies and publicly owned companies all use the national SPP tool. Private purchasers and NGOs can also use the SPP criteria. Since 2014, all actions and information services supporting procuring authorities have been merged under the Swedish Competition Authority (OECD, 2014).

Figure 3.2. Global Competitiveness Index: Quality of public institutions, 2016-17

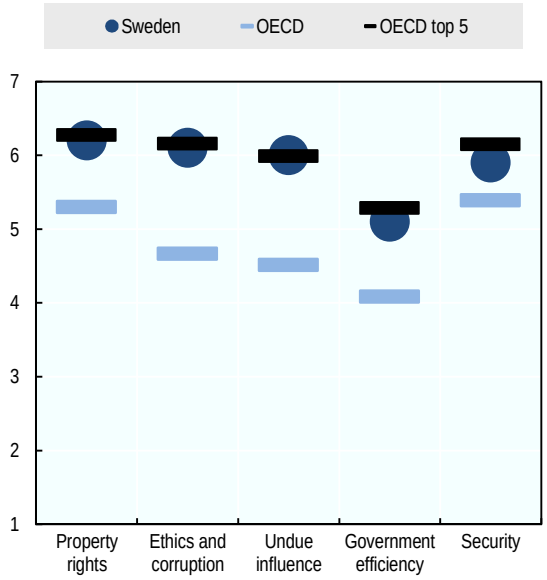
Scale 1 to 7 (best)

A. Total index, international comparison



Indexes for EU28 and OECD represent simple averages of member-country indexes.

B. Sweden's index of quality of public institutions by component



OECD top 5 refers to the average of the scores for the top five performers among OECD countries - Finland, Switzerland, New Zealand, Sweden, and Norway.

Note: Property rights refer to the average of the indices Property rights and Intellectual property rights. Ethics and corruption refers to the average of the indices: Diversion of public funds, Public trust in politicians and Irregular payments. Undue influence refers to the average of the indices for: Judicial independence and Favouritism in decisions of governmental officials. Government efficiency refers to the average of the indices for Wastefulness of government spending, Burden of government regulation, Efficiency of legal framework in settling disputes, Efficiency of legal framework in challenging regulations and Transparency of government policymaking. Security refers to the average of the indices for: Business costs of terrorism, Business costs of crime and violence, Organized crime and Reliability of police services.

Source: World Economic Forum (2016), *The Global Competitiveness Report 2016-2017: Full data Edition*, Geneva 2016. https://www.weforum.org/reports/the-global-competitiveness-report-2016-2017-1.

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3.2. Regulatory environment for entrepreneurship

The overall regulatory environment establishes the conditions under which all businesses, including farms, input suppliers, and food companies, operate and make investment decisions. Regulations that ensure competitive conditions in domestic markets, including low barriers to entry and exit, facilitate innovation and productivity growth, including through structural change. Regulations may enable or impede knowledge and technology transfer directly, contributing to more or less innovation, including in sustainability-enhancing technologies (OECD, 2014a).

National regulations

Sweden is a business friendly country with few barriers to starting and running a business. Swedish competition policy is required to be in compliance with general EU principles. According to the OECD's Product Market Regulation (PMR) index, Sweden is close to the OECD average in terms of its business friendly environment (Figure 3.3B). Over the last decade, Sweden has become less restrictive in terms of entrepreneurship and barriers to trade and investment, similar to the general trend in many OECD countries (Figure 3.3A). The administrative burden on business start-ups is relatively low as compared to other OECD countries. However, the complexity of the procedures and burden of compliance are more challenging (Figure 3.4).

Regulations translate into direct and indirect costs for business and, together with other factors such as the efficiency of the public administration, the degree of development of service sectors determine the conditions for doing business (Figure 3.5). Based on the assessment of key functions to operate a business, the World *Bank's Doing Business* ranks Sweden 10th among the 190 economies surveyed. The key regulatory aspects associated with the ease of starting a business and the adherence to the rules and regulations are ranked relatively high, but obtaining credit is more difficult.

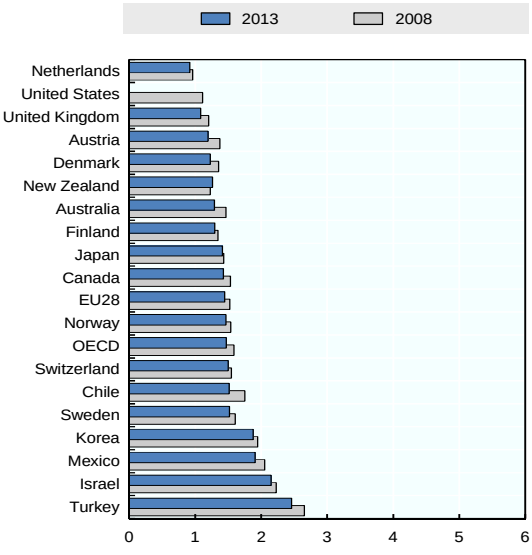
Agri-food enterprises are governed by a number of regulations and conditions. These include both legislation and the industry's own agreements or codes. Legislation is based on the common EU regulations, complemented by national regulations. Regulations and industry agreements provide rules for operating in the market, and involve not only direct costs such as increased administration, but also indirect costs of adapting to external EU regulatory requirements.

To enhance the competitiveness of agriculture, the Swedish Government Commission for Competitive Agriculture has undertaken an analysis of the regulations that are considered of high importance in terms of profitability and competitiveness (SOU, 2015). These include labour costs, animal protection legislation, and plant protection legislation, and permit approval with related environmental impact descriptions in accordance with the Swedish Environmental Code.

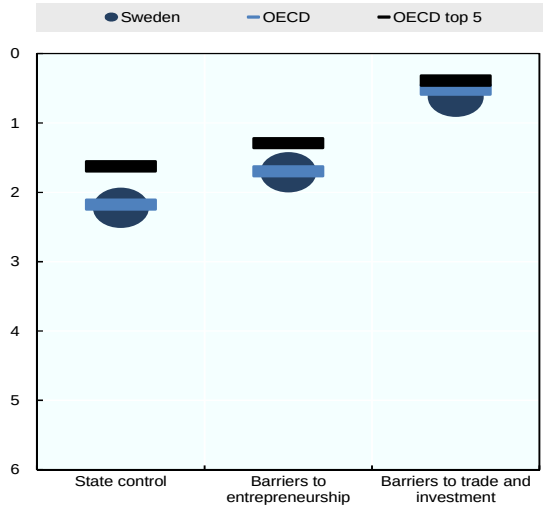
Figure 3.3. OECD Integrated Product Market Regulation (PMR) indicators, 2008 and 2013.

Scale from 0 (least) to 6 (most) restrictive

A. Trends in Integrated PMR index, by country, 2008 and 2013



B. Sweden's Integrated PMR index, by component, 2013



OECD top 5 refers to the average of the scores for the top five performers among OECD countries (Netherlands, United Kingdom, United States, Austria and Denmark), with US data referring to 2008.

Note: Indices for EU28 and OECD are the simple average of member-country indices. OECD PMR indicators measure key regulations in the areas of state control, barriers to entrepreneurship, and barriers to trade and investment.
The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.
Source: OECD Product Market Regulation Database, 2014. www.oecd.org/economy/pmr.

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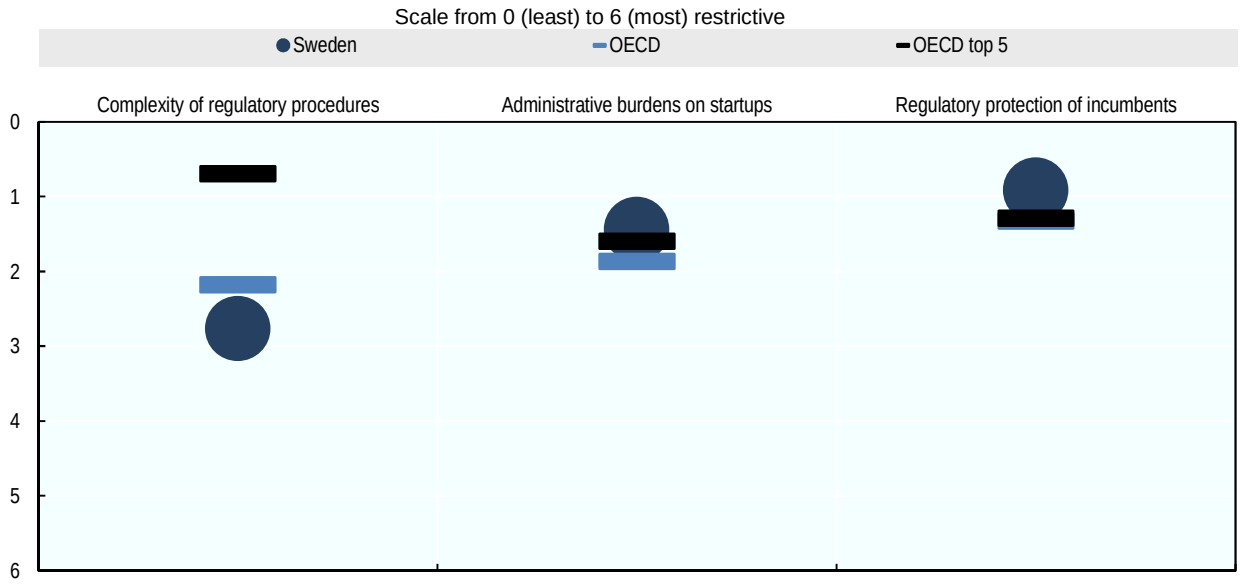
Figure 3.4. Barriers to entrepreneurship, by regulatory area, 2013



Notes. Indices for OECD all are the simple average of member-country indices.
OECD top 5 refers to the average of the scores for the top five performers among OECD countries (Slovak Republic, New Zealand, Netherlands, Italy and United States), with US data referring to 2008.
Source: OECD Product Market Regulation Database, 2014. www.oecd.org/economy/pmr.

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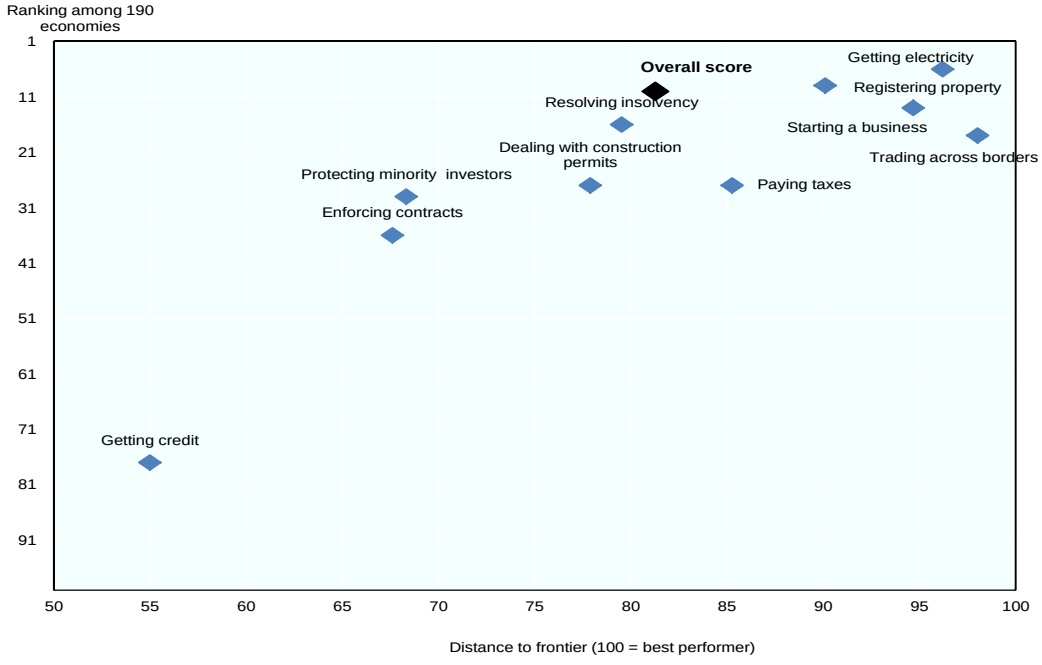
Figure 3.5. Sweden's ranking in the World Bank's Ease of Doing Business Index, 2017



Note: The country ranking is computed on the basis of distance to frontier scores; the "distance to frontier" measure shows the distance of each economy to the "frontier", which represents the highest performance observed on each of the topics across all economies included in Doing Business. An economy's distance to frontier is indicated on a scale from 0 to 100, where 0 represents the lowest performance and 100 the frontier.
Source: World Bank (2017), Doing Business 2018: Measuring Reforming to Create Jobs, http://www.doingbusiness.org/reports/global-reports/doing-business-2018.

StatLink http://dx.doi.org/10.1787/888933709698

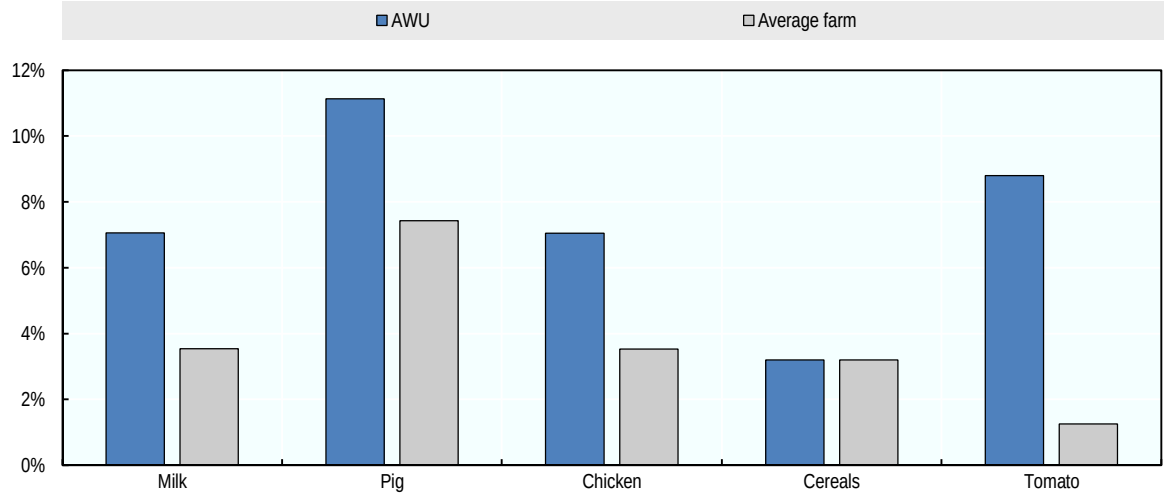
In 2015, the Commission submitted a proposal for changes in the legislation to the Government concerning approaches to developing a more competitive agriculture and horticulture sector (SOU, 2015). This Inquiry covered many areas and highlighted animal welfare as an area where there is a scope for reducing perceived administrative costs to improve the competitiveness of the Swedish agricultural sector. In addition, several initiatives are underway by the Swedish Board of Agriculture (SBA), in collaboration with the Federation of Swedish Farmers (LRF) to simplify the regulations (SBA, 2014a).

Providing an overall assessment of the costs and benefits of Swedish regulations is difficult, as they vary depending on the type of production and the production techniques available to businesses (SBA, 2010). Making comparisons across countries is even more challenging as individual countries have different average business sizes and economies of scale.

Figure 3.6 summarises the estimated administrative costs of meeting the requirements of government and industry regulations in the agricultural sector in recent years. The costs correspond to approximately 4-7% of one Annual Work Unit (AWU). More specifically, the cost for chicken producers is highest, followed by pigs for fattening. This survey shows that businesses often find it hard to distinguish between legislative requirements and other requirements, such as the industry's own requirements. Hence, the survey could not separate the administrative costs of regulations from industry requirements.

In those cases where specific Swedish regulations go beyond common EU regulations, the result can be higher production costs compared with competitor countries within the European Union, thereby having a negative impact on the competitiveness of Swedish production. But the costs of regulations have to be assessed against the benefits to consumers who, through their consumption choices, demand animal welfare standards that go beyond common EU regulations.

Figure 3.6. Administrative costs of meeting the requirements of authorities and industry requirements in different types of agricultural production



Note: AWU = Annual Work Unit
Source: SBA (2012), "Kraven kostar", Report 2012:31.

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Regulations on natural resources

Regulations on natural resources are central to ensuring the long-term sustainable use of natural resources and biodiversity. They also impose limits on the impact of industrial and agricultural activities on the state of the natural resource (e.g. water pollution, soil degradation, GHG emissions). The design of natural resources and environmental policies can influence incentives for innovation and sustainable productivity growth (OECD, 2014a).

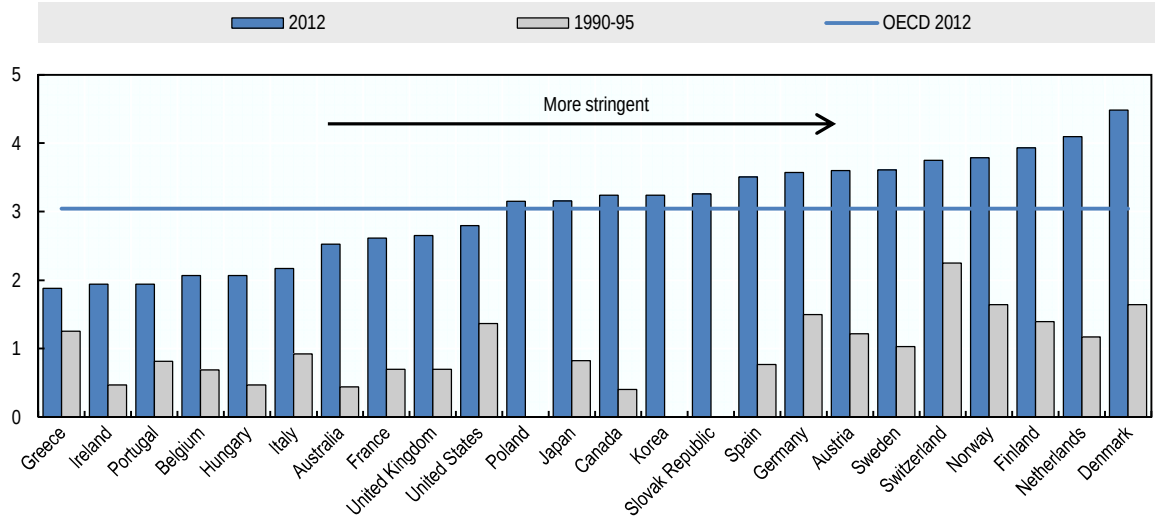
At the economy-wide level, Sweden has a relatively high level of environmental regulation compared to other OECD countries. Moreover, the stringency of Sweden's environmental policy has increased significantly since the early-1990s and, in 2012, was above the OECD average as measured by the Environmental Policy Stringency (EPS) indicator, which covers energy and GHG emissions. In this respect, the level of stringency in Sweden is about the same as in Austria, Germany, Norway, Spain and Switzerland (Figure 3.7).

Environmental regulations

Since 1999 all environmental legislation has been included under the Swedish Environmental Code (SEC). The five key areas of the SEC are: i) protection of the health of people and the environment; ii) protection and management of valuable habitats and cultural heritage environments; iii) conservation of biodiversity; iv) long-term sustainable management of land, water and the physical environment; and v) promotion of the re-use and recycling of products, raw materials and energy.

Most environmental regulations affecting agriculture are incorporated in the overarching framework of EU regulations. The most important EU environmental directives and frameworks for Sweden include: Nitrate Directive; Water Framework Directive; Birds and Habitat Directives; Directive 2000/29/EC on Plant Harmful Organisms; EU Biodiversity Strategy to 2020; EU Forest Strategy; Marine Framework Directive; and Directive on the Sustainable Use of Pesticides.

Figure 3.7. Environmental policy stringency in OECD countries, 1990-2012



Source: Botta and Kozluk (2014).

StatLink http://dx.doi.org/10.1787/888933709736

Sweden also subscribes to about 40 international conventions that relate to the environment of which some have a high relevance for agriculture: United Nations Framework Convention on Climate Change (UNFCCC); Convention on Biological Diversity; Convention on the Conservation of European Wildlife and Natural Habitats; European Landscape Convention; Convention on Wetlands of International Importance, especially as Waterfowl Habitat; World Heritage Convention; Convention on the Protection of the Marine Environment of the Baltic Sea Area (the Helsinki Convention; HELCOM); and Convention on Long-Range Transboundary Air Pollution.

Nutrients

Sweden has few national regulations relating to the use of fertilisers in agriculture (GOS, 2015). The current rules are those applied across the European Union and are determined at the EU level. The rules on the spreading of organic manure are national and determined by the SBA. Sweden has a special exemption from EC Regulation No. 2003/2003 of the European Parliament and of the Council of 13 October 2003 relating to the use of fertilisers. This exemption means that Sweden is allowed to keep a national limit for cadmium in phosphorus fertilisers. However, it is mandatory to have approval as the exemption affects the free movement of goods in the European Union. The exemption applies as long as there is no harmonised limit in the European Union. Sweden has tried to lower the national limit, but the submission was rejected.

Since 1988, Sweden has implemented an Action Plan to reduce nutrient leaching from agriculture. The SBA also finances experimental work and development projects to reduce nutrient leaching. Almost all regulations on the storing and spreading of manure and fertilisers and on crop cover of autumn and winter fields are subject to cross compliance requirements of the EU CAP (Chapter 5). In nitrate sensitive areas (75% of arable land and 63% of pasture land) many of these regulations are also subject to cross compliance requirements (SBA, 2014b).

Some regulations restrict the use of new technologies, while other regulations are target oriented and give greater flexibility. In general, regulations directed towards technology or quantitative limits are dominant, thus limiting opportunities for innovations and, in some cases, incentivise cost-reducing efforts. However, improved dissemination of information and training are playing an increasingly important role in this area. Farm operators are expected to acquire the necessary knowledge to assess the environmental effects of the activities and on ways to protect the environment and human health. Operators are also obliged to carry out self-monitoring. SBA (2014b) has produced a four-step guideline for self-monitoring of fertiliser and nutrient leaching. In each step, there are several measures recommended for identifying risks related to, for example, storing and spreading manure.

Box 3.3. GMO regulations

All activities related to GMOs in Sweden are regulated and the responsibility is divided between several agencies (Swedish Work Environment Authority, Swedish Agency for Marine and Water Management, Swedish Chemical Agency, Swedish Food Agency, Medical Products Agency, Swedish Forest Agency, SBA, Swedish Gene Technology Advisory Board, Swedish Environmental Protection Agency, and Swedish Civil Contingency Agency).

The SBA has responsibility for genetically modified plants, animals and the use of GMOs in animal feed. More specifically, the SBA is the responsible authority to assess (and approve) a GMO plant from an environmental perspective, if, for example, it could have negative consequences for the environment or if it could be a troublesome weed. In the European Union, there are several genetically modified plant crop varieties approved for use in food. However, only a few GM crops are available on the market in Sweden. Currently, there are no GMO animal feed used in Sweden.

As the responsible authority, the SBA has a duty to provide information on GMOs to the public. These actions are guided by rules that are harmonized across the EU. The SBA has on several occasions received criticism, not least from environmental NGOs who contend that the SBA has been too favourable in its assessments of GMO applications.

The Swedish Food Agency is responsible for the introduction of foods that potentially contain or are produced from genetically modified organisms. The regulations are based on EU regulations. Assessments and approvals are made on a scientific basis. Use on farms is limited, due in large part to the fact that contracts with the food industry frequently exclude the use of GMO products, including animal feed.

In addition, within the Action Plan, extension services provide advice free of charge to farmers on how to reduce nutrient leaching. In most parts of the country, farmers are invited to attend courses and advisory meetings adapted to their local conditions and farms. For example, advice may be about optimal times for spreading manure, optimal doses of fertilisers, and how to adapt cattle feeding to the needs of animals. Much of the information is available online.

Regulations and measures on storing and spreading manure and fertilisers

Regulations on storing manure apply to the storage capacity for manure, the design of storage facilities, the covering and filling of containers for urine and liquid manure, and the safety around liquid manure storing. Requirements state the minimum capacities for storing manure, expressed in terms of months of manure production. Requirements differ depending on the region, type of livestock and size of herd. The facilities may vary, but must prevent any leakage to the surrounding area (SBA, 2014b).

The rules about dates and the conditions for spreading manure relate to ecological and cultural heritage values, the incorporation of manure into the soil in winter and the incorporation of urea fertilisers and sewage sludge into the soil. Any fertiliser that falls outside the field on which it is spread is prohibited and no fertiliser is permitted on traditional meadows or pastureland if nature or cultural heritage values would be damaged. Manure and other organic fertilisers that are spread during the period 1 December to 28 February must be tilled into the soil within 12 hours of application (SBA, 2014b).

In nitrate sensitive areas, there are strict additional rules on the dates, time limits and conditions. Fertilisers must not be spread during winter, or on water-saturated, flooded, snow covered or frozen land. There are also rules on the spreading of manure in autumn, the minimum distances to streams and lakes, the incorporation of manure into fallow land, and the specific technology permitted for spreading liquid manure in fields with growing crops.

Regulations and other measures on green cover in autumn and winter

The proportion of arable land that must have a green cover in autumn and winter is regulated in the southern counties, where it varies by county from 50% to 60%. The rules specify which crops are eligible as green cover, as well as the time limits for sowing and soil cultivation (tilling, etc.). Two agri-environmental payment schemes within the 2014-20 Rural Development Programme (RDP) have the objective of reducing nitrogen leaching over the winter period (Chapter 5).

Land acquisition legislation

The Swedish Land Acquisition Act governs the rights of physical persons and legal entities to acquire real estate that is classified as an agricultural unit for taxation purposes. An agricultural unit includes woodland, barren land, pasture or arable land. Physical persons mainly refer to individuals, while legal entities mainly refer to limited companies and financial associations. The basic idea of the Act is that purchase of real estate by a physical person within a municipality should be given precedence over other parties in sparsely populated areas, and that acquisitions by legal entities from physical persons should be viewed restrictively and the basic rule for acquisitions is that land with the same amount of production capacity as the purchased land must be sold to physical persons – so that the balance of ownership of agricultural properties between physical persons and legal entities should thereby be maintained.

The opportunity to give precedence to physical persons' acquisitions of real estate within a municipality has been generally accepted. However, the Act's restrictive view on legal entities' acquisitions from physical persons is currently under review. The increase in demand for agricultural properties that is expected to result from the intended change in legislation will thus probably focus more on the opportunities for increases in land values rather than the opportunities for carrying out

profitable agricultural production. The continued rise in agricultural property prices increases the need for more capital in agriculture (see also Chapter 2). However, the capitalisation of agricultural subsidies into agricultural land has also contributed to the growth in the value of agricultural land in recent years, as the income from farming would have been even lower without these subsidies (Karlsson and Nilsson, 2014; SBA 2015a). The growth in urbanisation has also influenced land prices (Nilsson and Johansson, 2013).

The case for facilitating legal entities acquisition of agricultural properties has primarily been to improve the supply of capital to agriculture, based on rising land prices and low profitability in agriculture. Improving the opportunities for legal entities to acquire agricultural land would bring an increase in the inward flow of capital and a rise in real estate prices.

Permit approval for agricultural activities

Environmentally hazardous production activities require permits or involve reporting obligations depending on their scope or type of activity. The permit stipulates where a facility can be located, which type of activity can be undertaken and the scope of the activity. Other conditions are also regulated through specific terms such as the use of chemical fertilisers and the amount of permissible emissions into the air and water. Changes in the size of production units may also involve reporting obligations or require permits. Farmers submitting applications must establish and pay for an environmental impact assessment. The requirements for such an assessment are extensive and a consultant is usually engaged to undertake the task. The cost varies and depends on factors such as the project's size, location and number of parties involved.

According to EU Directive 2011/92/EU (the Environmental Impact Assessment Directive), member states must ensure that an environmental assessment is carried out and that an environmental impact assessment is drawn up for productive activities that may be deemed to have a significant environmental impact. In Sweden, large facilities for poultry and pigs, as well as other forms of intensive animal husbandry (facilities with more than 400 livestock units) require an environmental impact assessment. It has been noted by the Animal Husbandry and the Environment Commission that environmental impact assessments are required for more agricultural production activities in Sweden than would be the case under the EU Environmental Impact Assessment Directive (SOU, 2013).

Regulations on pesticides

Plant protection to minimise the damage from pests and weeds to crops can reduce economic losses. At the same time, however, the environment needs to be protected against adverse effects, and the health of farmers and farm operators should not be endangered, while the sustainability of the production system and food quality should be maintained. Modern crops depend to a high degree on the appropriate use of chemical plant protection products, which must be weighed against the protection of lakes, rivers and food against plant protection products residues, which is an important concern in Sweden (SBA, 2015b).

The proportion of food that exceeds the required threshold for pesticides is low in Sweden (SNFA, 2014; 2016). According to a report from the European Food Safety Authority (EFSA), pesticide residues occur to a lower extent in food produced in Sweden compared to most other EU Member states (EFSA, 2016).

Ensuring the sustainability of crop protection (and stimulate integrated pest management) through the efforts of advisors has a long history in Sweden and is currently pursued under the National Action Plan on Sustainable Plant Protection for the period 2013-18 (required by the Directive on the Sustainable Use of Pesticides, Directive 2009/128/EC). The first Action Plan to reduce the use of pesticides began in Sweden in the mid-1980s and the last Action Plan, covering the period 2008-13, is the fifth Swedish Action Plan. The SBA has received a mandate in 2011 to develop a strategy to

prepare agriculture and horticulture in Sweden for a decline in the availability of chemical plant protection products in line with developments in the European Union (SBA, 2011).

Legislation on water quality, access and erosion

Provisions relating to water quality requirements are defined in legislation. Environmental quality standards also govern authorities and municipalities when they implement the laws. A national and regional water quality monitoring system gives feedback and this is registered in the Water Information System database (VISS, 2017).

The supply of water for agriculture is generally not a concern in terms of quantity and quality. However, there may be a local shortage or conflict with other demands in society, occasionally, in times of drought, especially in the southeast of Sweden during warm and dry summers. Changing the crop mix, increasing husbandry or crop area, and climate change with a longer crop season and increasing evapotranspiration may aggravate the problem locally. The Swedish Environmental Code (1998) regulates the water access for agriculture. Application and permission are required for extracting irrigation water, where each case is considered by one of the five regional land and environmental courts.

Regulations on products and processes

While legislation may hinder some innovations, it can also be used to create added value for consumers. Regulations on products and processes aim to protect human, animal and plant health and can also impact on natural resource use. Environmental and health related regulations can boost innovation by building consumer and societal trust in the safety and sustainability of new products or processes, but unnecessary or disproportionate regulations can stifle innovation and technological developments (OECD, 2014a).

The regulations on products and processes in Sweden are mainly determined at the EU level, whilst implementation is at the national level (EC, 2017a; GOS, 2016a). Most of the legislation in the food sector is fully harmonised with the EU. The SBA and the Swedish National Food Agency (SNFA) are responsible for the regulations on food and agriculture. Swedish Environmental Objectives specify the level of environmental targets in Sweden (SEPA, 2017), decided in the Swedish Parliament.

The SBA is obliged to investigate the potential consequences of any new regulations (SBA, 2015c). Such an investigation includes a description of the possible effects the proposed regulations can have on rural areas. In addition to the legislation and regulations, there are several voluntary private standards and labels used on Swedish products (Box 3.4).

Box 3.4. Private standards and labels

Från Sverige (From Sweden) is a voluntary country-of-origin label that was introduced in 2016 (Från Sverige, 2017). Från Sverige is used on a wide range of food products that meet the required criteria. Products with a Från Sverige label must be produced in Sweden. For animal products, all animals must be born, bred and slaughtered in Sweden. Vegetables and vegetable products must be grown in Sweden. For composite products, at least 75% of the raw materials and 100% of animal raw materials must be Swedish. Från Sverige is an initiative developed and run by the Swedish Food Federation, Svensk Dagligvaruhandel (Swedish Food Traders) and the Federation of Swedish Farmers.

Products labelled with *Svenskt Sigill* are guaranteed as produced in Sweden (Sigill Kvalitetssystem, 2017). Sigill Kvalitetssystem AB is an independent standard for certification of environmental responsibility, food safety and animal welfare developed by and for companies in the food and agriculture industry. The label is used on all product categories except for fish and fish products.

There are several labels for organic products in Sweden (SNFA, 2017). The basic label is the EU organic label that certifies the product meets the EU regulations on organic products. KRAV is a Swedish label for organic products with higher production requirements than the EU organic label. The major retailers also have their own organic labels for private label products.

The Swedish label *Nyckelhåle*t aims to offer healthy choices (SNFA, 2017). The label guarantees products with less sugar and salt, less and healthier fat (saturated fat not more than 33% of the total fat content) and more wholegrain and fibre than other products within the same category. The label, which is owned by the SNFA and provided to companies free of charge, is primarily used on bread, cereals, pasta, dairy products, fish and meat products.

Regulations on food, animals, plants and purchased farm inputs

Food safety

Sweden differs from many other EU Member states in several areas, notably when it comes to dealing with salmonella and the use of antibiotics in food animal production. For example, if the level of pesticide residues in fresh fruit and vegetable imports exceed Swedish limits, the National Food Agency – which controls such residues in food (SNFA, 2016b) – will decide how and if those products will be sold.

Plant health

Plant health protection products must be approved by the Swedish Chemicals Agency. Each active substance is assessed and authorised jointly with the EFSA. The Plant Protection Regulation (EC) No. 1107/2009 regulates the approval of plant protection products to ensure a high level of protection for humans, animals and the environment, as well as to safeguard agricultural competitiveness. This is in recognition that although the pressure for harmonisation across the EU has increased, member states often apply the regulations differently, resulting in differences in access to plant protection products.

The principle of mutual recognition is central to the EU's internal market (SOU, 2013b). In a European Court of Justice ruling, it was stated that a product lawfully put on the market in one member state cannot, in principle, be denied access to markets in another member state (SOU, 2011). In effect, mutual recognition means that the authorisation granted by a member state should be accepted by other Member states where conditions are comparable.[1] In accordance with the Regulation, the European Union is divided into three zones where agricultural and environmental conditions are comparable. Sweden belongs to the Northern Zone, together with Denmark, Finland, Estonia, Latvia and Lithuania.[2]

In 2014, Sweden was the subject of an audit by the EU Food and Veterinary Office (FVO) in order to evaluate the application of the requirements for the authorisation of plant protection products. The FVO noted in its final report that the system of mutual recognition is not correctly applied in Sweden, mainly because of Sweden's decision not to accept most of the assessments made by another Member state (EC, 2014).

Since the plant protection regulation entered into force between 2011 and 2013, fewer applications for plant protection were approved in Sweden than in Finland, and more companies withdrew their applications for pesticide use in Sweden than in Finland and Denmark (SOU, 2015). The fewer pesticides approved for use in Sweden suggests that the country's agriculture and horticulture are at risk of being disadvantaged in comparison to competing countries in the Northern Zone.

For most crops and pests, a limited number of plant protection products are registered in Sweden, and many of these pesticides have the same active substance (SCA, 2016). This leads to an increased risk of resistance, especially in the cultivation of apples, strawberries, oil seeds, onions and potatoes.

In 2014 when the EU audit was undertaken, countries in the Northern Zone had fewer authorised plant protection products compared to those in the Central Zone (e.g. Germany, France, and the Netherlands), and Sweden had fewer approved active substances than other countries in the Northern Zone. All countries in the Northern Zone had access to about 60% of the total number of active

substances approved in the EU (SOU, 2015). However, it is not the number but rather the active substances approved that is important for production.

The Swedish Government Commission for Competitive Agriculture has stated that in recent years it has not been possible to access approved effective plant protection products. The industry has, in the case of emergencies, applied for derogations to use certain products on apples, onions and strawberries. LRF calculates that the costs would have amounted to hundreds of millions of kronor in lost production if the derogations had not been granted (SOU, 2015). FVO has received comments regarding the Swedish approach to the emergency derogations in situations other than just exceptional cases (EC, 2014).

It was therefore considered important to facilitate the product authorisation process in Sweden as far as possible (SOU, 2015). The Commission also concluded that Sweden's handling of applications through mutual recognition leaves room for further improvement. Hence, Sweden and the Swedish Chemicals Agency need to use a simplified procedure that already exists in the European Union through mutual recognition (SOU, 2015). Specific directions were given to the Swedish Chemicals Agency with the objective of facilitating the authorisation process for plant protection products.

In order to continue developing alternative plant protection strategies to be able to maintain competitive production and satisfy consumer preferences, despite the absence of many plant protection products, increased funding in research, development and innovation is necessary to achieve effective protection covering both preventive (for example crop rotation) and direct (thermal, physical, biological or chemical) methods.

In December 2015, the Swedish Chemicals Agency received a mandate to propose solutions to improve the balance in handling cases of authorisation of plant protection products (SCA, 2016). The objective was to meet the legal timelines while maintaining a high level of protection of human, animal health and the environment, as well as to improve harmonisation across member states. The Chemical Agency has made major improvements to facilitate this process, both internally and externally, and to reduce the handling time for authorisation to put a product on the Swedish market. As a result, there has been an increase in the availability of plant protection products in Sweden. The Swedish Chemicals Agency has received additional resources from the government to further speed up the process.

Even if the availability of plant protection products has changed somewhat since the evaluation was carried out, Sweden still lacks effective products for several common pests (SOU, 2015). This is especially the case for crops grown on a small scale and for minor uses, such as onions, carrots, cabbage, greens and apples. The evaluation also states that alternatives will take several years to develop before they can be used efficiently. During the transitional period, chemical plant protection products are required to control pests and diseases. Therefore, continued efforts are needed to ensure the availability of suitable plant protection products on the Swedish market, especially for minor crops. The evaluation also stated that it is important to continue developing alternative plant protection strategies to be able to maintain competitive production despite the absence of many plant protection products. This requires increased funding for research, development and innovation if effective protection covering both preventive (for example, crop rotation) and direct (thermal, physical, biological or chemical) methods is to be achieved.

Animal health

Sweden's approach is to keep animals in a way that promotes good health and makes it possible to control and eliminate disease if an outbreak occurs. However, it is also essential to prevent infectious diseases from entering the country, and to have the expertise and resources to control and eliminate any diseases that may occur.

Sweden has a long and successful tradition of prevention and eradication of infectious diseases in food-producing animals. The main tools have been strong animal health legislation and good co-

operation with farmers' organisations. Important legislation includes the Epizootic Act that sets out strict rules for farmers to report suspicions of certain diseases, gives the authorities powers to take the necessary and effective measures and also gives the farmer fair compensation so they are willing to report and follow the rules. For less serious, but economically important diseases, good co-operation between farmers' organisations is critical.

Voluntary eradication and control programmes can be authorised and financially supported, working with both animal health legislation and in close collaboration with the stakeholder organisation in order to prevent disease in animals. The degree of support differs according to the type of disease and over time. Often, farmers have started a programme with little economic support, but receive more support at the end, as the final culling phase is more costly. The intent is to make the scheme compulsory to all herds.

There is also close co-operation with farmers' organisation to support biosecurity measures, advisory and educational activities to prevent diseases and common health problems, such as E.coli, in livestock production. This has been very important in eliminating the need for antibiotics in healthy animals. These programmes have resulted in a very good health status from an international perspective, because of the cool climate and the low animal density in some parts of the country (e.g. data from The World Organisation for Animal Health (OIE)).[3]

Animal health legislation

Currently, animal health is regulated by the Epizootic Diseases Act, Zoonotic Diseases Act, Bee Diseases Act, Act on Control of Domesticated Animals, Act on Diagnostic Testing on Animals and associated regulations and provisions issued by the SBA based on these Acts and regulations. In addition, provisions issued by the SBA based on Regulation on the importation of live animals regulate the entry of animals. While Swedish legislation implements existing EU legislation, Sweden differs from the rest of the European Union in relation to standards on salmonella and antibiotics. A unique factor in Swedish policies on infectious disease control is the concerted and rigorous policy efforts to control salmonella in the food chain.

Salmonella

Although the safety requirements on animal feed are harmonised across the European Union, Sweden differs from the rest of the European Union when it comes to dealing with salmonella (National Veterinary Institute, 2016; EC, 2017b). The control of salmonella in animal feed is an essential part of Swedish legislation on food-producing animals. The process of controlling feed for salmonella began in the 1950s through a voluntary agreement between the feed industry and the National Veterinary Institute following an outbreak of salmonella in humans from meat in 1955.

Since 1993, there has been a compulsory National Control Programme in Sweden for reducing the incidence of salmonella in feed. The programme includes mandatory monitoring of all poultry flocks, where regular testing is on-farm. For beef and pork, this includes random checks at slaughter and the autopsy testing of young animals. The combination of the control programmes and the accurate procedures now used in the feed industry have resulted in the Swedish feed industry being declared free from salmonella.

Sweden has the right to require that imported animals and animal products meet the same health status as domestic animals and animal products in relation to salmonella. Due to the requirements of the National Control Programme, the European Commission has granted a special guarantee which gives Sweden the right to set high standards – within the European Union – for imported animals and animal products (Commission Regulation EC No. 1688/2005). This guarantee currently exists only for Sweden, Finland and Norway.

This special guarantee with respect to salmonella increases production costs for Swedish producers resulting in additional demands on producers and farming practices. The special guarantee involves

additional requirements for sampling, analysing and control measures. This gives Swedish producers the opportunity to market their livestock and livestock products as salmonella-free, although this results to higher prices to Swedish consumers.

The use of antibiotics in food animal production

In Sweden, reducing the need to use antibiotics in food animal production and preventing the spread of antibiotic-resistant bacteria are high priorities (GOS, 2016b; Box 3.5). The country has the lowest use of antibiotics for food-producing animals in the European Union (Swedres-Svarm, 2015). In the 1980s, Sweden was the first country in the world to prohibit antibiotics to promote animal growth. Compared with other EU Member states, Sweden has a low incidence of resistant bacteria (Swedres-Svarm, 2015), and the lowest use of antibiotics in food-producing animals (European Medicines Agency, 2015).

Box 3.5. Strategy for maintaining a low level of antibiotic resistance

In order to maintain a low level of antibiotic resistance joint efforts are undertaken by animal keepers, animal health staff, industry organisations and government agencies. Some examples of these operational tools are:

- Restrictions on certain antibiotics (last resort antibiotics) that are especially valuable in order to protect and preserve them for humans.
- New rules to reduce the risk of transmitting infections between animals and humans (zoonosis).
- Hygiene policy and a hygiene guide provide guidance to all animal health personnel.
- Funds for agricultural sector organisations to enhance the implementation of measures at farm level to prevent or control infection and limit the spread of antibiotic-resistant bacteria (antimicrobial resistance).
- Government agencies co-operate on combatting antibiotic resistance and undertake joint activities such as seminars. They also participate in international working groups and discussions on antibiotic resistance, including the European Commission, the OIE and OECD. The impact of this strategy has resulted in Sweden having the lowest use of antibiotics in animals (mg active antibiotic substance per population correction unit), the estimated total biomass of all livestock and slaughtered animals in the country) in the European Union.

Animal welfare

The foundation of Swedish animal welfare legislation is to prevent suffering and to respect the natural behaviour of the animals (Box 3.6**)**. It is consistent with the guidelines agreed in OIE. A key factor in the legislation is preventive: it aims to prevent animals from suffering and states how animals should be kept and treated to prevent this from occurring. As a result, Sweden has a system for the pre-testing of new technology with respect to animals before it can be applied by farmers or other animal keepers. New inventions, equipment for animal shelters, or handling methods must be evaluated before use in order to make sure that they do not have a negative impact on the welfare of animals. In Sweden, animal shelters also need pre-approval from the County Administrative Board before being built to ensure that the shelter will meet the requirements of animal welfare legislation. Sweden has a long tradition of working in close collaboration with stakeholder organisations to enhance both animal health and animal welfare. The training courses stakeholder organisations provide to farmers often include both welfare and health aspects.

An important difference between Sweden and the rest of the European Union is that Swedish cows should graze outdoors during the summer (zero grazing is not allowed). Moreover, it is prohibited to tether sows in stalls and for the tail docking of pigs. In addition, more space, rules on slaughter and transportation are other aspects that are specific to the Swedish animal welfare system.

The poultry industry has a voluntary control programme initiated by the industry to improve animal welfare and animal health. Almost all of Swedish production is included in this programme. The control programme also aims to improve the competitiveness of the sector.

Sweden has traditionally used legislation in order to remove elements that are harmful for animal welfare, as well as requiring elements that are known to be good for welfare. However, legislation may be an impediment to the development of novel solutions and systems. Therefore, Sweden has started a process to make the legislation more flexible and goal-oriented, while trying to maintain the same level of animal welfare (SOU, 2011).

Box 3.6. Animal welfare legislation

The first ban on animal abuse was issued in 1857 and full animal welfare legislation came into force in 1944. The National Animal Welfare Legislation complements the animal welfare legislation of the European Union. EU legislation provides a minimum level in most cases, thus allowing Member states to have measures that are more stringent if the Member state has higher requirements for animal welfare (EC, 2017c). Sweden has such higher requirements, e.g. requiring that all animals must be stunned at slaughter without exception, a total ban on mutilations such as tail docking and beak trimming, requiring grazing pasture for cows, more space and resources for animals. The Swedish Animal Welfare Act was introduced in 1988.

Currently, animal welfare is regulated by the Animal Welfare Act, the Animal Welfare Ordinance, as well as numerous Animal Welfare Provisions issued by the SBA. The National Animal Welfare Legislation protects all animals kept by humans and contains mandatory regulations that all animal owners/handlers/keepers must meet. The Animal Welfare Provisions contains the more detailed rules on how animals shall be kept, handled, and taken care of, and may, for example, specify the amount of space an animal must have or how it should be cared for. These provisions are often species-specific, or specific to certain uses of animals.

Evaluation of animal welfare legislation

As noted above, the Swedish animal welfare legislation has, in many respects, higher animal welfare requirements than animal welfare legislation in many other countries inside and outside of the European Union. However, measuring animal welfare is very difficult. Although scientists have tried to establish a method to measure welfare; e.g. "Welfare Quality" (www.welfarequality.net), there is currently no standardised method that is used in a way that makes it possible to compare the level of animal welfare between countries. However, it is evident that animal welfare plays an important part in good animal health and in lowering the use of antibiotics, which are measurable.

Moreover, it is also difficult to put a financial value on animal welfare. While it is relatively easy to estimate the cost of specific resources and extra labour, it is much more difficult to estimate the benefits of improved animal welfare in terms of the animals' wellbeing, animal health and society's benefit in terms of lowering the risk of antibiotic resistance. Moreover, it is also difficult to value people's concerns or preferences on how animals are treated. To some extent, this can be measured by consumers' willingness to pay for animal source foods from production systems with high welfare and health standards.

Horgan and Gavinelli (2006) conclude that European consumers have shifted demands from production of animals simply as a means of food, to other social goals such as food safety, safeguarding environmental protection, and ensuring that animals are properly treated. They also noted that the mind-set of consumers and producers has undergone a seismic shift from merely preventing cruelty and avoidable suffering to animals, to focusing on promoting animal wellbeing and meeting their most important needs.

Regulations usually involve higher production costs and could adversely affect productivity often resulting in reducing competitiveness relative to foreign suppliers. However, stricter regulation and higher standards could also increase efficiency, promote cost-reducing innovations and create a larger demand for the firm's output in meeting consumer preferences (OECD, 2010a). So far, the empirical link between stricter regulation and higher standards, and competitiveness is inconclusive (OECD, 2010a; 2010b). Regulation and higher standards are not considered major determinants of competitiveness in agriculture.

Regulations in general, and animal welfare regulations in particular, have an influence on production costs. For egg, chicken and pig production, differences in animal welfare regulation cannot explain differences in production costs between the European Union and third countries (Andersson, 2011). The most important determinant of competitiveness in these cases is by far the cost of feed, followed by housing and labour. In the animal welfare regulations, the specific space requirement to ban traditional cages for egg production is estimated to have the largest influence on production costs, which can raise production costs by about 8%. In addition, Andersson's (2011) empirical study found no significant effect of introducing any of the animal welfare regulations on imports of eggs, chicken and pig meat in Sweden. Table 3.1 summarises the main differences between Swedish legislation on animal welfare and the common EU regulations, which have been highlighted by the Swedish Government Commission for Competitive Agriculture.

Table 3.1. Differences between Swedish legislation on animal welfare and the EU Animal Protection Directive

		EU directive	Swedish legislation
Poultry	Space requirements	Maximum 42 kg/m^2	Maximum 20 kg/m^2 or 36 kg/m^2 if linked to monitoring programme
Laying hens	Debeaking	Yes	No
Pigs	Crating	Permitted	Forbidden
	Weaning	3 weeks	4 weeks
Dairy cows	Grazing requirements	No	Yes
Lambs	Tail docking	Permitted	Forbidden
	Grazing requirements	No	Yes

Source: SOU (2015).

Originally, the higher costs associated with the higher standards of animal protection in Sweden were paid for by consumers through higher product prices, as Sweden had its own border protection. However, since joining the European Union, this option has ceased. Developments since joining the European Union have shown that it has been difficult to fully compensate for the additional costs incurred due to animal protection measures via higher domestic prices. Imports have risen significantly since joining the European Union and, according to the Swedish Government Commission for Competitive Agriculture, imports now account for 50-70% of all meat consumed in Sweden (SOU, 2015).

Swedish regulations, which are stricter than the European Union's animal protection provisions, can mean both higher and lower costs for livestock producers. For example, certain requirements can mean that animal buildings are more expensive than in other competing countries, as the number of animals per unit of area is lower. Other requirements can result in higher labour costs. At the same time, the higher Swedish requirements have led to healthier animals, resulting in lower veterinary costs for farmers (SOU, 2015).

A study of the building costs and housing for ewes, suckler cows and bull fattening in Sweden, Ireland and Germany indicated that the costs vary substantially across the species and country (SBA, 2014c). The building cost per animal depends on the housing type and the floor space per animal. The recommended floor space per animal tends to be lower in Ireland than in Germany and Sweden, thus resulting in lower building costs per animal in Ireland and Germany.

The regulation that is most important for livestock building costs in Sweden is the banning of slatted floors for cows and sheep. Swedish cubicle housing for suckler cows and bulls has a comparatively large area per animal and, consequently, the building cost per animal is higher. Slatted housing allow for a smaller area per animal and a lower cost per animal. On the other hand, bedded housing has the

lowest building cost per square metre, but the cost per animal depends on how much floor space per animal is permitted. This is illustrated by the fact that the bedded livestock housing in Sweden is the cheapest for suckler cows (measured per animal), and the most expensive for bull fattening (SBA, 2014c).

The Swedish Animal Protection Ordinance states that cattle older than six months for milk production should be kept outdoors during the summer. A study by the SBA shows that the legal requirement involves additional costs corresponding to around SEK 200-550 per cow per year for exercise pasture and around SEK 1 000-1 200 per cow per year for production pasture (SBA, 2014d). Exercise pasture constitutes the minimum legal requirement for animal production in Sweden. However, not all socioeconomic and ethical values are included in these calculations. According to the Board's study, pasture legislation can limit opportunities for herd expansion, as it can be difficult to obtain access to sufficient pasture in certain areas.

In 2011, a Commission of Inquiry submitted a proposal to the government for changes to the animal welfare legislation (SOU, 2011). Before the government submits a proposal for a new law to Parliament, it often appoints a Commission of Inquiry to examine the various alternatives available. The Inquiry proposed a new Animal Welfare Act, a new Animal Welfare Ordinance and numerous suggestions for changes to the Animal Welfare Provisions. It also carried out a thorough investigation of several problem areas, such as the animal welfare issues in breeding, competition, the definition of natural behaviour, the various permits and approval needed for using animals, as well as the level of detail needed in the legislation.

The Inquiry proposed a reduction in the level of detail in the Animal Welfare Act and the Animal Welfare Ordinance, and added more detailed regulations to the Animal Welfare Provisions in order to make it easier to update these in accordance with scientific evidence and practical experience. The Inquiry concluded that in order for the animal welfare legislation to be clear, legally secure and controllable, each regulation must be assessed individually on the basis of animal welfare risks and flexibility should be furthered improved by farmers participating in control programmes. Furthermore, a scientific council should be formed to assist the SBA with the evaluation of scientific evidence when creating new regulations.

In 2015, a proposal for changes in the Legislation of the Commission of Inquiry, submitted to the Government concerning approaches to developing a more competitive agriculture and horticulture sector, included the following proposals on animal welfare (SOU, 2015):

- The Government should push for stricter EU legislation on animal welfare. Furthermore, the Government should also promote an equivalent application of the legislation at EU level.
- That increased targeting, reduced level of detail and greater flexibility should characterise animal welfare legislation. The Inquiry suggested a review of the Swedish animal welfare legislation, based on a balance between good animal welfare and enhanced competitiveness. Special attention should be paid to regulations regarding the construction of housing and grazing requirements that could increase costs for livestock producers.
- The proposal to establish a scientific council to assess the effects of regulation on animal welfare presented by the 2011 Commission on Inquiry (SOU, 2011) should be implemented. The trade-offs between animal welfare and economic performance should be assessed following the scientific assessment.
- The SBA and the County Administrative Boards should continue their efforts to increase the co-ordination of animal welfare controls so that similar cases are assessed in the same way, so that the legal security of the controls can therefore increase. Increased targeting requires that welfare checks focus on the bigger picture of the animal environment.

- The SBA should investigate the possibilities and consequences of removing the obligation to pre-approve shelters before they are built.

The Inquiry concluded that Sweden's requirements on animal welfare should be the common regulations law in the European Union. The national rules and requirements that go beyond the common level should be well reasoned and carefully examined, including their effects on competitiveness. The Inquiry also concluded that good animal welfare can be perceived positively by consumers, which can strengthen the position of Swedish livestock products on the market. The Inquiry also noted that livestock production has declined and this indicates that the consumers' willingness to pay for good animal welfare is not sufficient to ensure the profitability of livestock producers.

Organic products

The EU regulations on organic products provide for some exceptions in individual member states. The Swedish Law and Regulations on organic production were published in 2013 and 2015. All exemptions are included in the National Regulations from 2015. These exceptions aim to promote increased organic production. For example, there are exceptions when there is a shortage of seed or organic animals to meet the market demand.

3.3. Trade and investment policy

Barriers to trade in goods and services

Sweden is an open economy, strongly integrated into global value chains, and hence particularly exposed to currency movements, international trade growth and developments in its main trading partners. Sweden joined the European Union in 1995. Sweden's export performance has remained steady since the 2008 global downturn with large current account surpluses persisting. However, since 2014 import growth tended to be stronger than export growth despite the depreciation of Swedish krona, and the share of exports to GDP has been declining.

The barriers to trade and investment in Sweden are moderate compared to other OECD countries (Figure 3.8). The Swedish score at 0.62, on the OECD's Index of Regulatory Restrictions to trade was marginally higher than the OECD average, but lower than Japan and Canada. The index is composed of four elements: tariffs, barriers to trade facilitation, barriers to foreign direct investment (FDI) and differential treatment of foreign suppliers.

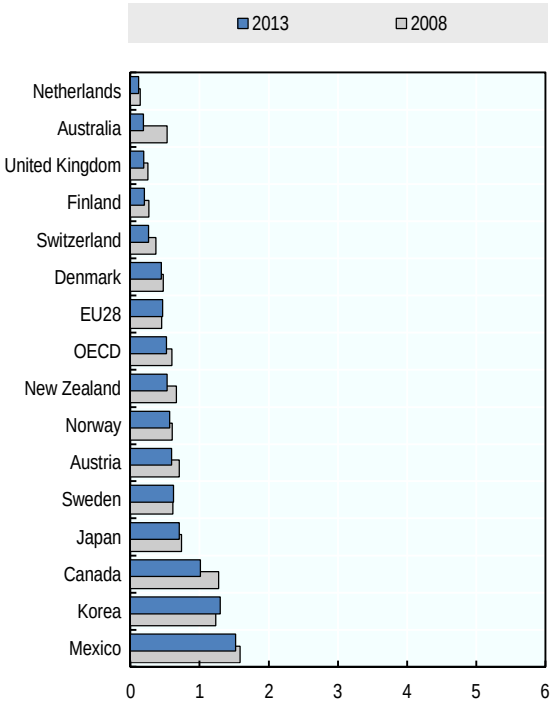
As an EU Member state and part of the customs union, all external tariffs on industrial and agricultural imports are set by the European Union. Agricultural tariffs are higher than industrial tariffs (Figure 3.9). EU tariffs for capital and intermediate goods are higher than in major OECD trade partners. Higher tariffs on intermediate goods increase the cost of specialised inputs and machinery equipment, thus discouraging competitiveness.

Barriers to trade facilitation continue to be relatively high in Sweden (Figure 3.8b). More specifically, this reflects the relatively higher use of barriers such as standards, certification procedures, and Mutual Recognition Agreements to limit trade. While there has been little progress in recent years in reducing the barriers to trade facilitation, it must be considered against the advantages of maintaining high standards to meet the preferences of domestic consumers in Sweden. Nevertheless, there is considerable scope for improving trade facilitation measures compared to the Netherlands, Finland and the OECD average. External border agency co-operation is an area where substantial improvements can be made (Figure 3.10).

Figure 3.8. Index of regulatory restrictions to trade and investment.

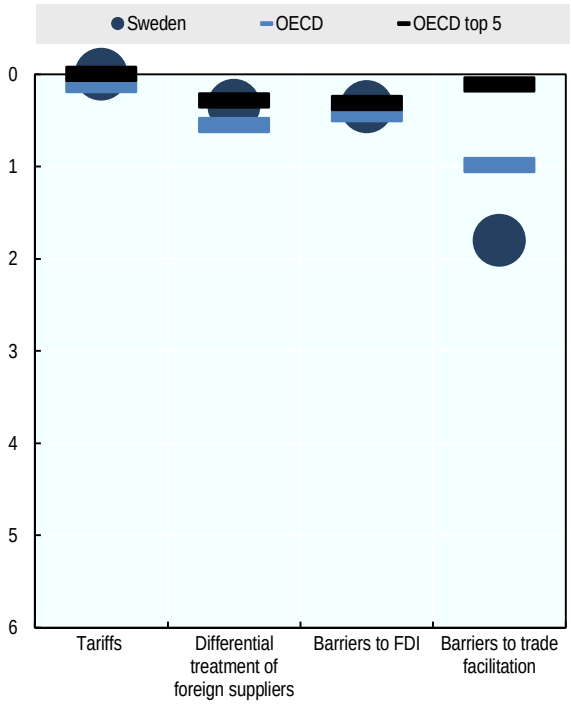
Scale from 0 (least) to 6 (most) restrictive

A. Index of regulatory restrictions to trade, selected countries, 2008 and 2013



Indices for EU28 and OECD are the simple average of member-country indices.

B. Sweden's index of regulatory restrictions to trade by principle components, 2013



OECD top 5 refers to the average of the scores for the top five performers among OECD countries (Australia, Finland, Netherlands, Switzerland and United Kingdom), with US data referring to 2008.

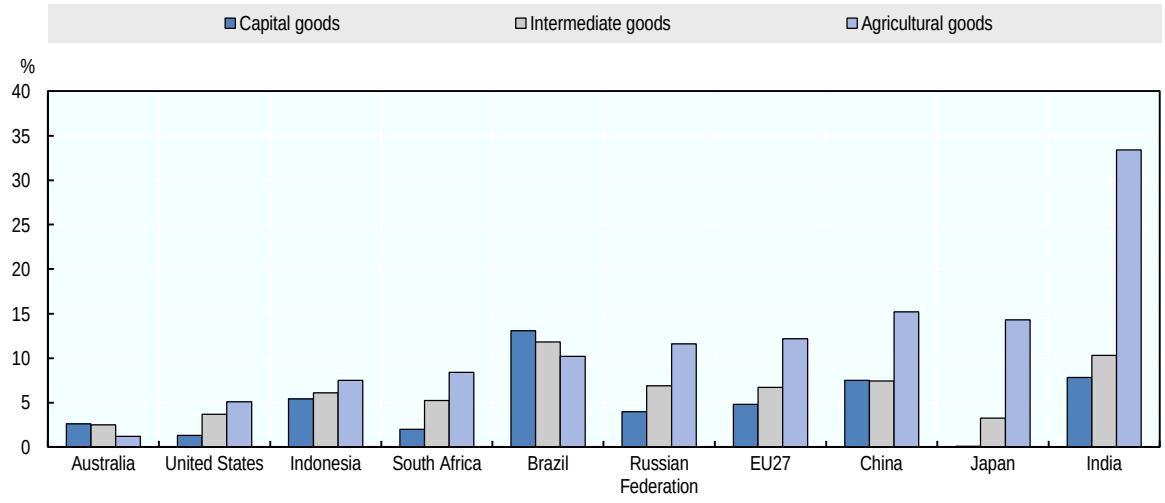
Note: Barriers to trade facilitation refer to the extent to which the country uses internationally harmonised standards and certification procedures, and Mutual Recognition Agreements with at least one other country. Tariff index is based on an average of effectively applied tariff, scaled within a range between 0 and 6 points, whereby a tariff below 3% is attributed zero points and a tariff above 19.6%, 6 points.

Source: OECD Product Market Regulation Database, 2014. www.oecd.org/economy/pmr.

StatLink http://dx.doi.org/10.1787/888933709755

Figure 3.9. Import tariffs for industrial and agricultural goods, 2015 or latest available year, selected countries

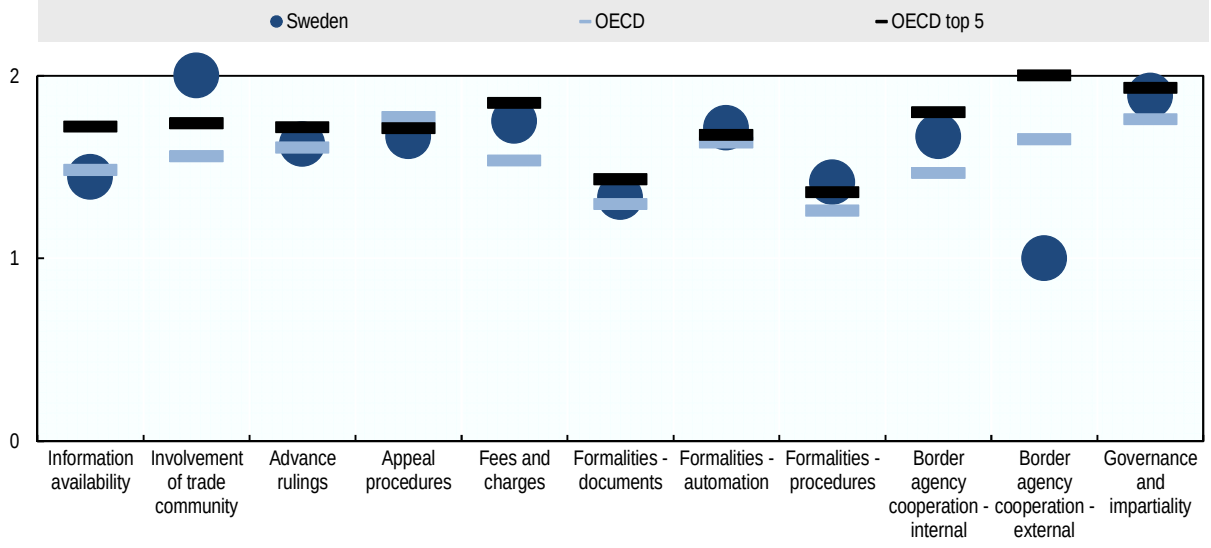
Simple average MFN applied tariff rates1



MFN: Most favoured Nation.
1. Tariff rates for agricultural products include both *ad valorem* duties and specific duties in *ad valorem* equivalent, while tariff rates for agricultural products only include *ad valorem* duties.
Source: UNCTAD Trade Analysis Information System (for non-agricultural products) and World Tariff Profiles, 2014 (for agricultural products).

StatLink http://dx.doi.org/10.1787/888933709774

Figure 3.10. Trade facilitation performance, 2015



Note: OECD top 5 refers to Australia, Netherlands, Ireland, Austria and Canada.
Source: OECD (2015), Trade Facilitation Indicators. http://www.oecd.org/trade/facilitation/indicators.htm.

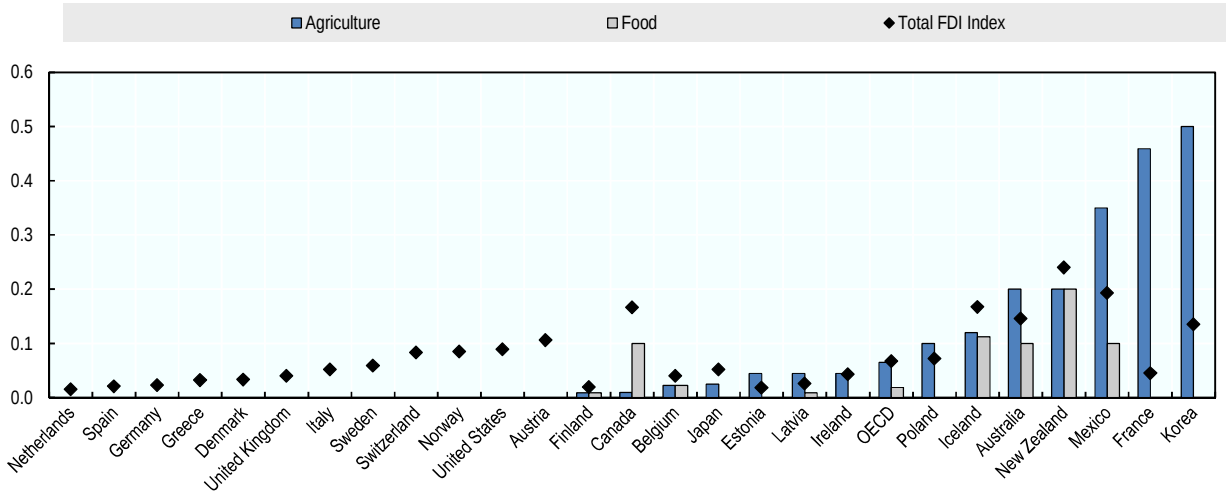
StatLink http://dx.doi.org/10.1787/888933709793

FDI regime and positions

The OECD FDI Restrictiveness Index indicates that Sweden has no restrictions in the food and agriculture sectors (Figure 3.11). As in many other countries, these sectors attract a small share of total inward FDI (Figure 3.12), which flow predominately into food processing. There are no agriculture-related provisions regarding foreign investment or foreign ownership of agricultural land. Sweden applies the same rules for foreign ownership as for Swedish citizens. There is, however, a restriction on ownership of agricultural land for legal (as opposed to persons) entities.

Figure 3.11. FDI Regulatory Restrictiveness Index in selected countries, 2016

Scale from 0 (least) to 1 (most) restrictive



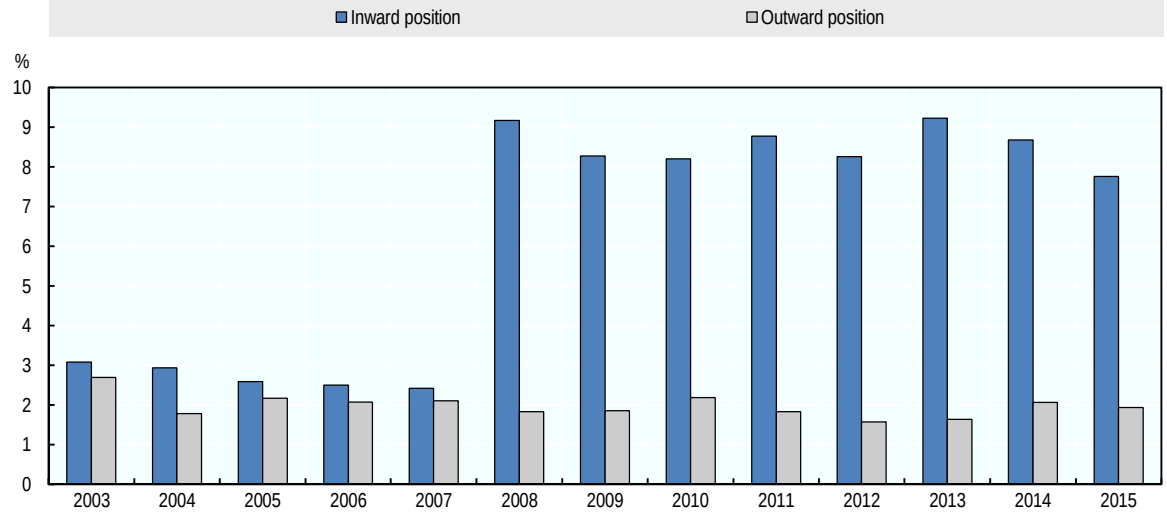
Indices for OECD are the simple average of member-country indices. Four types of measures are covered by the FDI Restrictiveness Index: 1) foreign equity restrictions, 2) screening and prior approval requirements, 3) rules for key personnel, and 4) other restrictions on the operation of foreign enterprises.

Source: OECD (2017).

StatLink http://dx.doi.org/10.1787/888933709812

Figure 3.12. Sweden's FDI in food and agriculture, 2003-15

As a percentage of total FDI



Source: OECD (2017).

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3.4. Finance policy

Efficient financial markets are an essential component in enabling balanced economic development. Access to financial services can be limited or unequal across regions and firms when financial markets fail or when risks are too high. Policies that improve the functioning of financial markets can facilitate productivity enhancing investments in agriculture and farm size growth. Policies may also facilitate access to funding for sustainability enhancing investments. Low cost loans and venture capital are also important sources of funding for innovative firms with high growth sectors potential (OECD, 2014a).

Financial markets in Sweden, as in most countries, have changed dramatically over the past 20 years. During the early 1990s, the long-term interest rate in Sweden was high compared to other countries. Currently, government finances are strong and the current account balance is positive. This, in turn, has resulted in lower interest rates and lower borrowing rates.

Another difference compared with the past is that after the financial crisis (2007-08), banks were required by the government to hold more capital (as collateral) and better liquidity to withstand future financial crises. This action has led to tighter credit checks by the banks compared to earlier years.

Lower interest rates and tighter credit checks have occurred at the same time as major structural changes in the banks' branch networks. With the decline in the number of provincial offices, knowledge of the local market and relationships between branch staff and individual customers can be adversely affected.

Regarding financial market indicators, Sweden ranks well above the OECD average, indicating that the financial system is sound, well-regulated and with good access to loans (Figure 3.13a, b). In Sweden, bank loans are the main source of financing, and about 93% of lending to agriculture and forestry is through bank loans, where a mortgage can be supplemented with a second mortgage, unsecured loans and operating loans. Another form of finance for farmers is credit from suppliers, mainly used in the livestock sector. Livestock or feed credit is offered by Lantmännen (an agricultural co-operative owned by 25 000 Swedish farmers), and Scan (the largest meat producer in Sweden), amongst others.

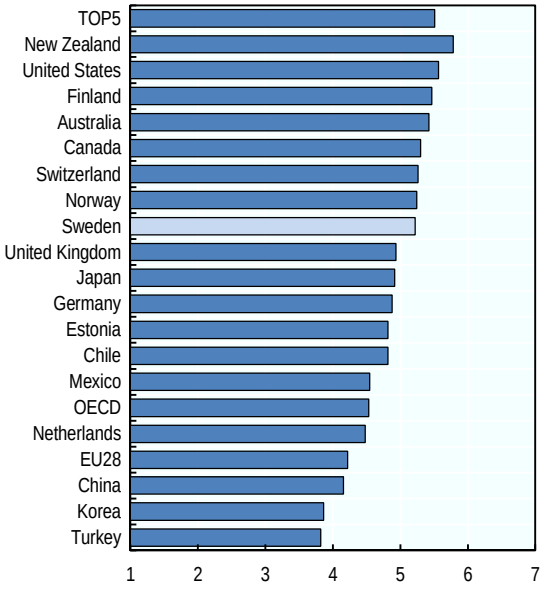
The purpose of supplier credit is to provide short-term finance for the operation of the farm. An additional security for bank financing can be a credit guarantee from a credit guarantee association. A credit guarantee reduces the need for the company and the entrepreneur to provide securities to the bank, while its financial needs can still be met. A guarantee association is a network of regional or industry-specific economic associations. They offer small- and medium-sized enterprises as security for expansion, acquisitions or new start-ups. This arrangement, which is applicable to all sectors, including agriculture, means that the guarantee association signs a guarantee to the bank for a maximum of 60% of the company's capital up to a ceiling of SEK 900 000. The fee for the guarantee is 3%-4% of the amount guaranteed.

Venture capital is used to a limited extent in agriculture (Box 3.7).[4] This is partly due to generally good financial guarantees, mainly land, which means good access to bank financing, but also to the lack of tradition and farmer experience in attracting venture capital.

Figure 3.13. Global competitiveness index: Financial market developments, 2015-16

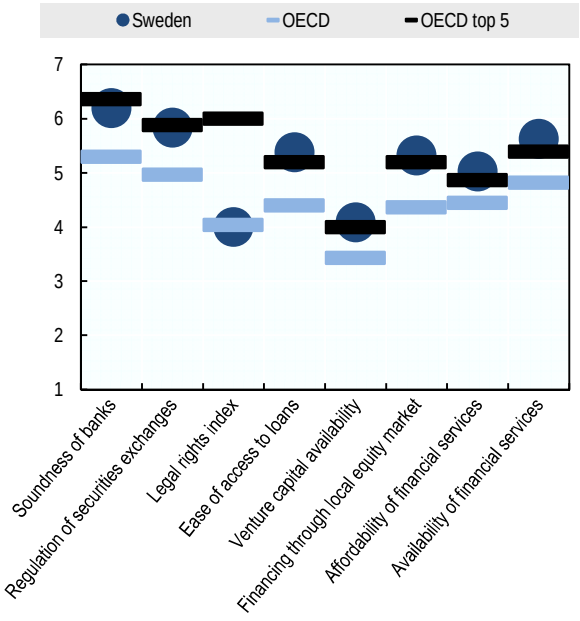
Scale 1 to 7 (best)

A. Total index of financial market development in selected countries



Indices for EU28 and OECD are the simple average of member-country indices.

B. Sweden's index of financial market developments, by component



Top 5 refers to the average of the scores for the top five performers among OECD countries (New Zealand, Canada, United States, Finland and Australia).

The Legal Rights Index is scored on a scale from 1 to 10 based on calculations by the WEF from the World Bank – International Finance Corporation's Doing Business 2016.

Source: WEF (2017), *The Global Competitiveness Report 2016-2017,* www.weforum.org/reports/the-global-competitiveness-report-2016-2017-1.

StatLink http://dx.doi.org/10.1787/888933709850

Box 3.7. Examples of venture capital sources for farmers

- Ekonord is a regional initiative focused on the green economy of the seven northernmost counties. Ekonord provides capital, expertise and networking.
- Inlandsinnovation (part of Saminvest since 1 January 2017) stated and developed businesses in northern Sweden, including the green industry (firms based on agriculture, forestry, and horticulture).
- Almi and Almi Invest provide counselling, loans and risk capital in all stages of entrepreneurship. Almi supplements the market by offering risk-takers loan when not otherwise available. Almi's role is to take on extra risk, and also offer public financing (loans).
- Business "angels" often have experience of running businesses. They also have the time, dedication and capital to invest in promising new business ideas. Business "angels" can also get a good return on their investment (but also see their money lost) and are therefore willing to facilitate the evolution of a business.

3.5. Tax policy

Tax policy[5] affects innovation, productivity and sustainability in many ways: it affects the decisions of firms and households to save or invest in physical and human capital, and thus the adoption of innovation; it raises Government revenues to finance public services, including those enabling innovation such as education and skills, R&D, and strategic infrastructure; it can also be used to provide direct incentives, for example preferential tax treatment for investments in private R&D or for young innovative companies. In addition to its economy-wide impacts, tax policy influences the conduct, structure and behaviour of farms, input suppliers and food companies. Taxes on income, property and land, and capital transfer, including land, may affect structural change, while differential tax rates on specific activities (polluting or environmentally friendly), resources, or input use may affect sustainability (Table 3.2).

Table 3.2. A summary of overall taxes in Sweden in 2014

	Amount (SEK billion)	% of total taxes	% of GDP
Taxes on labour	944	60%	24%
Taxes on capital	168	11%	4%
Taxes on consumption and input goods	456	29%	12%
Total taxes	1 568		40%
of which:			
- taxes transferred to the European Union	8	1%	
- local income tax	619	39%	
- fees for the pension system	214	14%	
- state taxes	1 024	65%	

Source: STA (2015), "Taxes in Sweden", *Tax Statistical Yearbook of Sweden 2015*.

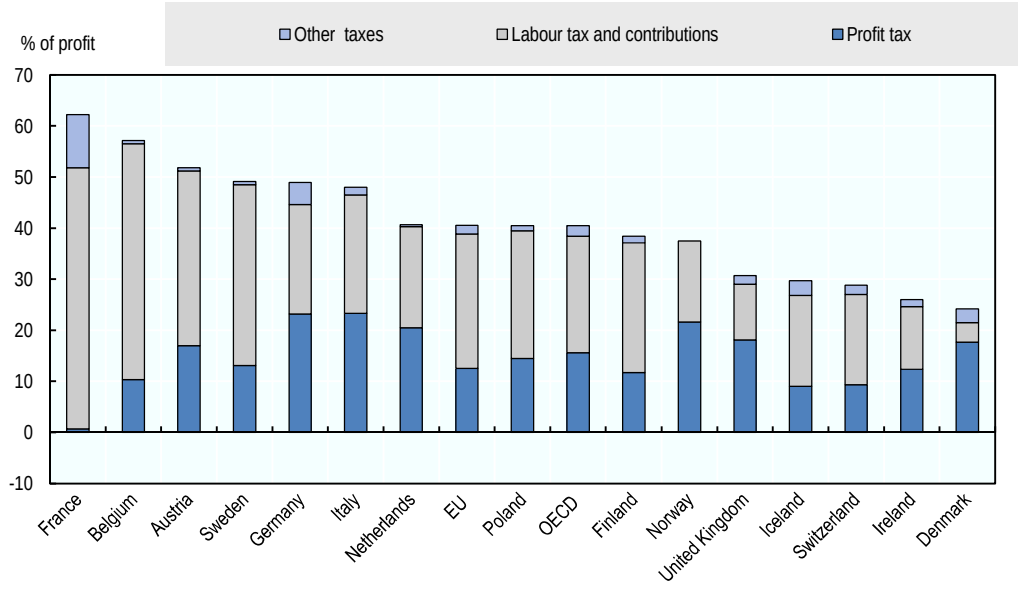
The World Bank's Global Competitiveness Report 2016-17 estimates that the total tax rate as percentage of commercial profits in Sweden is 49% (Figure 3.14). This high rate, which is similar to some other OECD countries, is mainly due to labour taxes and social contributions.

In 1990-91, the Government reformed the Swedish tax system. Tax rates were lowered, while at the same time the taxation base was broadened. Taxation of capital income was separated from taxation of labour income, and a uniform rate of taxation was applied to capital income. The principle aim of the reform was to reduce distortions and welfare losses stemming from high tax rates and a narrow tax base and, at the same time, lighten the redistributive role of the tax system by increasing child allowances and housing benefits.

Swedish farmers face, in principle, the same rules for taxation and social security as the rest of society. There are a few exemptions from the general tax legislation but no exemptions from the legislation regarding social security, or special treatment of agricultural land. Tax rules for depreciation of buildings, machinery and inventories are also the same for all business, including farming.

Figure 3.14. Total tax rate in selected countries, 2017

Percentage of commercial profits



Note: The total tax rate is the sum of taxes and contributions payable after accounting for allowable deductions and exceptions related to commercial profit of businesses before all taxes borne. The groups of taxes covered include: profit or corporate income tax; employer's social contributions and labour taxes; property taxes; turnover taxes and other (such as municipal fees and vehicle and fuel taxes).
Source: World Bank Group and PwC (2017).

StatLink http://dx.doi.org/10.1787/888933709869

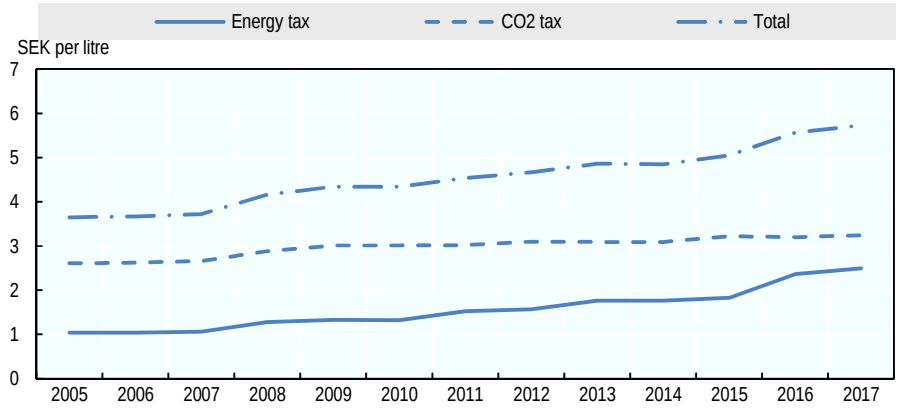
Taxes on consumption and input goods

Taxes on consumption and input goods include value added tax (VAT), as well as excise and customs duties. The standard VAT rate is 25%, but a reduced rate of 12% applies to food, restaurants, hotel accommodation and camping.

For environmental and economic reasons, there is a *tax on energy and CO_2* (Figure 3.15)[6]. The rules for energy and carbon tax on fuel changed on 1 July 2016, which mainly affected businesses in the agricultural and industrial sectors. Diesel fuel is, for example, taxed at SEK 855/m^3 from the energy tax and SEK 3 237/m^3 from the carbon dioxide tax in 2017 (STA, 2017). Electricity is taxed at SEK 0.295 per used kWh from the energy tax (STA, 2017).

These two taxes changed the requirements for reimbursement of up to 100% of the tax on fuel due to a change in EU state aid rules. The reimbursements are for those engaged in agriculture, forestry or aquaculture, industrial or heat/cogeneration, greenhouse growers, those who consume biofuels for heating, the mining industry, and importers and producers of biofuels for motor operation. Exemption from energy and carbon dioxide tax applies to biogas used for vehicles or heating, vegetable oils used for heating, and bio-fuel in motor fuel (STA, 2017).

Figure 3.15. Energy tax and CO_2 tax on diesel (MK1), 2005-17



Source: STA (2015).

StatLink http://dx.doi.org/10.1787/888933709888

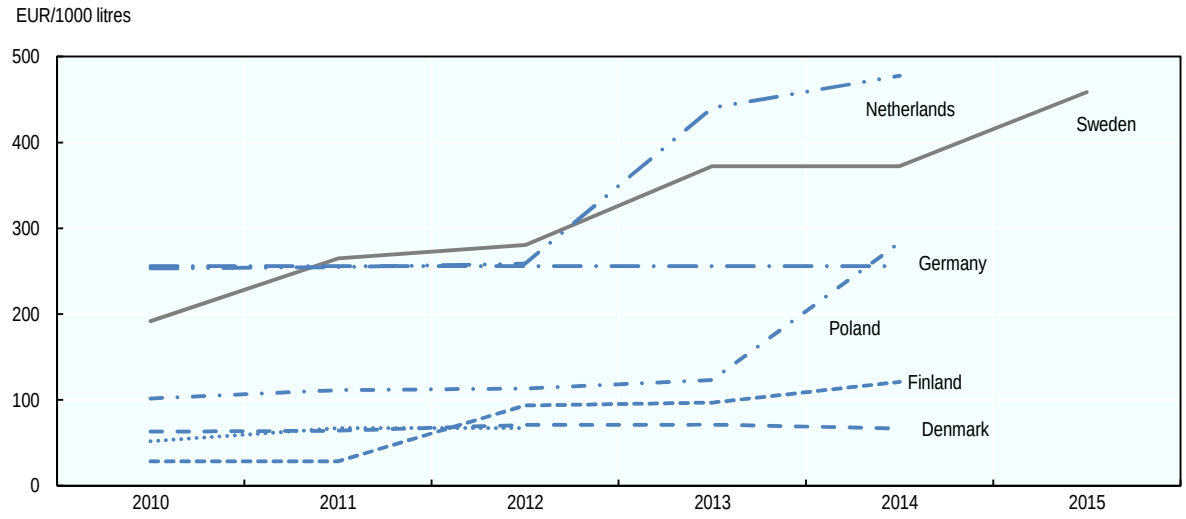
Sweden was one the first countries worldwide, that introduced taxes on pesticides, based on the volume sold, in 1984. The purpose of this tax is to reduce the use of pesticides for health and environmental reasons. The tax was increased stepwise from SEK 4 per kilo active ingredient to SEK 34 per kilo active ingredient in 2015. Manufacturers, wholesalers and importers pay the tax. Total revenue generated in 2015 was SEK 70 million (around EUR 7.5 million). Sales of active substance have fallen by more than 50% since the introduction of the tax. The Swedish pesticide risk indicator (base year 1998) shows a sharp decrease in risk to human health (now relatively constant at 20-40% as compared to 1988 levels) and to the environment (50-80% as compared to 1998 levels).[7] Though the outcome coincides with the introduction of the tax, other policy factors also contributed to these reductions such as policies aiming at an integrated pest management and stricter permissions for the registration and application of pesticides (as well as usage of low dosage pesticides) (see Chapter 2; Böcker and Finger, 2016).

International comparison of taxes on means of agricultural production

In recent years, greater prioritisation of climate change issues, in particular, has led to increased production taxes on heating fuel and diesel oil, as well as fewer opportunities to cut carbon dioxide taxes and energy taxes. It is difficult to compare the impact of production taxes on businesses across different countries due to policy changes and other developments, including innovations, streamlining or changes to the focus of production that influence the consumption of inputs and thus may also affect production taxes.

The production tax on diesel oil is one of the most burdensome taxes on the agricultural sector in Sweden (SOU, 2015). A comparison between the taxes imposed by different countries on diesel prepared by the Swedish Government Commission for Competitive Agriculture shows that the cost level varies substantially between countries (Figure 3.16). In this context it should be noted that consumption of diesel oil is higher in Sweden than in Denmark and the Netherlands due primarily to Sweden's longer distances and sparse population.

Figure 3.16. Taxation of agricultural diesel 2010-14, selected countries



Note. EUR per 1 000 litres after tax reductions.
Source: Calculations based on data from LRF; updates for 2014 from SOU (2015).
StatLink http://dx.doi.org/10.1787/888933709907

Table 3.3 shows the cost changes that would arise in replacing the Swedish tax rate with the tax rates applied in Denmark, Finland and Germany. Overall, the Swedish and Danish total costs were broadly comparable. However, the German costs were approximately 12% less than in Sweden, and in Finland the tax rates were about 60% lower, or approximately SEK 600 million. Within the European Union, tax is levied on pesticides in Sweden and Denmark. The Danish tax level is considerably higher than in Sweden, but is returned to the industry for various development measures. This comparison includes only taxes and other regulations, such as the Danish fertiliser accounting requirements, are not included in the calculations (SOU, 2015).

Table 3.3. Farmers' tax burden in Sweden and selected countries, 2014

SEK million

	Sweden	Denmark	Finland	Germany
Electricity	7	123	87	188
Fuel oil	55	28	41	38
Diesel oil	847	161	233	616
Pesticides	51	255	0	0
Commercial fertilisers	0	0	0	0
Land value tax	0	530	0	0
Total	960	1 097	361	842

Source: Calculations based on data from LRF (SOU, 2015). Calculations are based on Swedish agriculture's consumption in 2014.

Notes

1. Regulation (EC) No. 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market 1107/2009

2. The sizes of the three zones differ. According to figures from 2014, the total area of arable land in the European Union is about 113 million ha, and the Northern Zone is about 10% of the total arable area in the European Union (SOU, 2015)

3. See www.oie.int/en/animal-health-in-the-world/official-disease-status/ and www.oie.int/wahis_2/public/wahid.php/Wahidhome/Home.

4. Venture capital is the collective term for the investment of equity capital in unlisted companies. Private equity is an asset class with high risk that requires a high return. Specialised venture capital companies reduce the effects of the high risks through specific skills that increase the success potential of individual projects.

5. Most of this sub-section is based on information from the Swedish Tax Agency (2015).

6. Sweden was among the first countries to introduce a carbon tax (in 1991).

7. The risk is expressed in relation to the risk posed by pesticides in 1990. It actually indicates the potential risk for human and the environment. The health and environmental risk indicators are calculated by a point system and a set of scores. Among others, the environmental score, the application method score, the persistence score, and the operator toxicity score are used for the exact calculation.

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