

Chapter 4

INVESTMENT IN THE US FOOD AND AGRICULTURE SYSTEM

This chapter reviews general incentives for investment decisions by US farms and agribusinesses. Those decisions affect the development and diffusion of innovations, the pace of productivity growth, and the sustainability of food production. They are in turn affected by a range of government regulatory policies, which can encourage or deter investments. While some US regulations are state-specific, most regulatory policies covered in this chapter are federal, and apply across all states. Some are general, covering all firms in the economy, while important elements of others are specific to agriculture. The chapter starts with the overall regulatory environment as it focuses on the behaviour of firms and farms, and surveys broad-based policy regarding taxes, finance, and international 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.

Regulatory environment

The overall regulatory environment establishes basic conditions within which all firms, including farms, input suppliers, and food companies operate and make investment decisions. Competitive conditions in domestic markets, including low barriers to entry and exit, can encourage innovation and productivity growth, including through their impact on structural change. Regulations may also enable or impede knowledge and technology transfer directly, contributing to more or less innovation, including in sustainability-enhancing technologies.

The regulatory environment in agriculture encompasses three major areas: the regulatory environment for entrepreneurship, including the ease of entry by new businesses, and the role of competition policy in furthering innovation and adaptation to new market conditions; regulations on the use of natural resources, with a particular focus on agriculture; and regulations concerning products and practices that affect animal, plant, and human health in agriculture, including the control of animal and plant pests and disease, biotechnology, and animal drugs.

Regulatory environment for entrepreneurship

The environment for entrepreneurship refers in part to government regulations and programmes that affect the ease with which new firms can start and grow, which in turn can affect the pace with which new innovations can spread through the economy. It also refers to competition policies, including antitrust policies, which aim to protect economic freedom and opportunity by promoting free and fair competition in markets.

The United States relies heavily on competition, and less on government intervention in markets, to guide production decisions in the economy. This is borne out by inspection of OECD indexes for Product Market Regulation (PMR) (Koske et al., 2015; OECD, 2015). The PMR indexes tell a striking story (Figure 4.1.A). The United States had the second least restrictive set of PMRs in 2008 (no US data were reported for 2013), reflecting both an historical emphasis on competition in markets, and a shift in the 1970s and 1980s away from existing PMRs. However, PMRs in each of the 15 OECD countries have become less restrictive over time, as countries have shifted away from using product market regulations to realise social goals. Two countries — the Netherlands and the United Kingdom — had lower values of the index (i.e. less restrictive PMRs) in 2013 than the US value in 2008.

Box 4.1. Restrictions on entry and exit in agriculture

With a few exceptions, US agricultural policy places few restrictions on entry, exit, production, and structural adjustment in farming. The sugar programme does retain marketing allotments for processors that limit how much sugar can be marketed domestically in a given year. However, the allotments have not been binding in recent years. In addition, marketing orders for ten commodities — almonds, dates, hazelnuts, prunes, raisins, walnuts, tart cherries, Florida citrus, cranberries, and spearmint oil — retain volume control options. Marketing orders, once approved by producers and the Secretary of Agriculture, are binding on producers in a specified geographic region. They function as a collective device for supporting marketing and research expenditures, for setting quality standards, for standardising packaging and containers, and for regulating the flow of products to markets. They may also have authority to set volume controls, so as to affect prices and grower returns.

Supply controls were more widely applied in the past. Today, volume controls in marketing orders are only active for tart cherries. In addition, the Secretary of Agriculture retained, and sometimes used, his authority to impose supply controls on wheat and feed grains, in the form of acreage reduction programmes and annual acreage set-asides, under laws that go back to the 1930s. However, commodity programmes moved away from supply controls over time, and the authority was revoked in the 1996 farm bill (the Federal Agricultural Improvement and Reform Act).

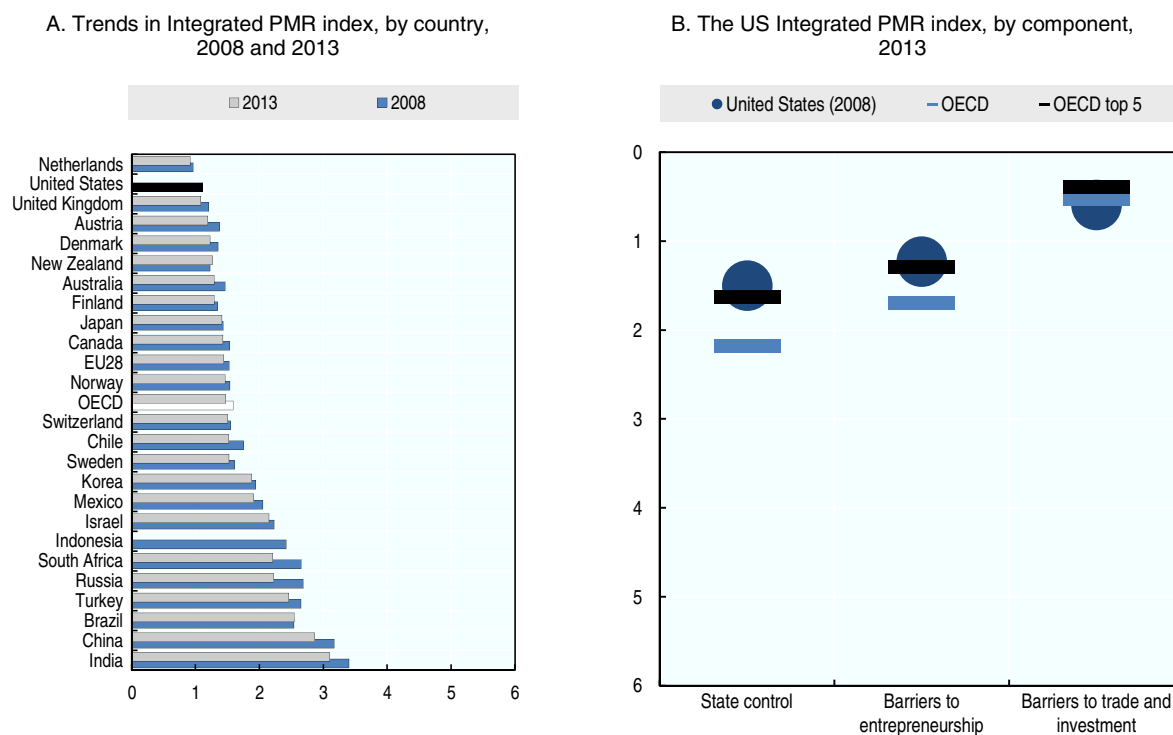
Federal peanut and tobacco programmes relied on marketing quotas to regulate production and to support prices paid to producers. Quota rights were valuable, but the transfer of the rights among farmers was restricted to narrow geographic areas. After the programmes were terminated in the early 2000s, production shifted rapidly to different geographic areas and consolidated onto larger farms (Dohlman et al., 2009; Kirwan et al., 2012). The rapid structural changes indicated that policy had previously restricted adjustment in those industries.

The indexes include a range of components. Compared to OECD averages, the United States was considerably less reliant on state control or public ownership of industries in 2008, ranking 2nd lowest of the 34 OECD countries in each (Figure 4.1.B). There is effectively no state ownership of commercial farms in the country, and virtually no state ownership of food processing firms. Publicly owned water, electric, and telephone utilities provide services to farmers, especially in rural areas (Section 5.1).

The United States also ranks second lowest among OECD countries in overall barriers to entrepreneurship, according to the PMR indicators (Figure 4.1.A). In three key components — legal barriers to starting a business, administrative burdens on corporations, and administrative burdens on start-ups — the United States has lower barriers or burdens than the OECD average, but it does place relatively higher burdens on start-ups than on incumbents (Figure 4.2).

Figure 4.1. OECD Integrated Product Market Regulation (PMR) Indicator, 2008 and 2013

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



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.

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

OECD Product Market Regulation (PMR) indicators measure key regulations in the areas of state control, barriers to entrepreneurship, and barriers to trade and investment.

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

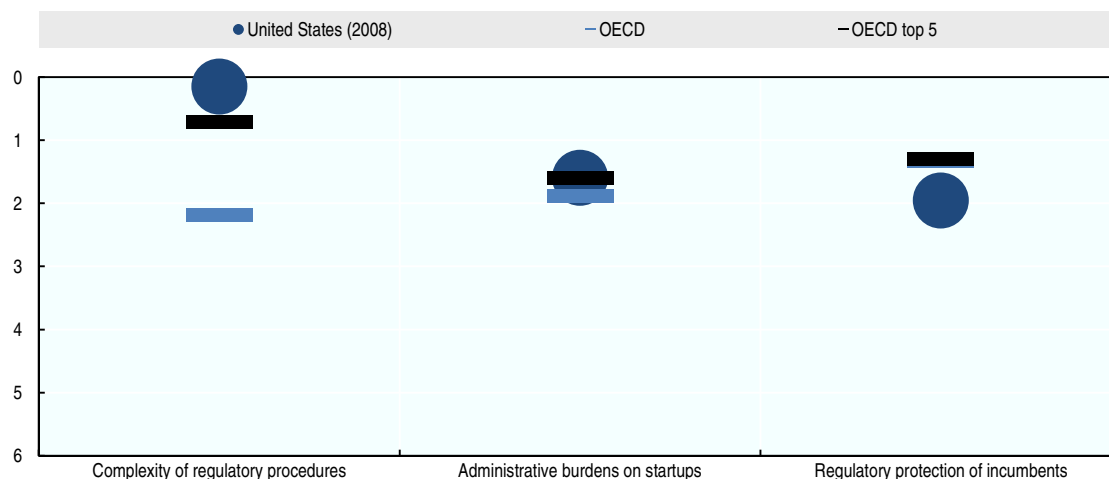
StatLink  <http://dx.doi.org/10.1787/888933408443>

The antitrust laws in the United States are broadly applied across the economy, except for a few industries with explicit exemptions. The laws, primarily the Sherman Antitrust Act (1890) and the Clayton Act (1914, significantly amended in 1936 and 1950) are enforced by the Antitrust Division of the Department of Justice (DOJ) and by the Federal Trade Commission (FTC), an independent regulatory agency. Enforcement focuses on collusion among competitors (to fix prices or allocate markets), mergers that might lessen competition, and predatory or exclusionary business practices that might allow firms to acquire or retain monopoly power.

The Packers and Stockyards Act (1921) focuses on business practices in livestock industries, and is enforced by the Grain Inspection, Packers and Stockyards Administration (GIPSA) of USDA. The Act deals with practices deemed to be deceptive and unfair, as well as certain practices that violate antitrust laws by restraining competition. The antitrust provisions of the Act appear to some to cover a broader set of practices and injuries to producers than are generally covered under antitrust statutes, but US courts have interpreted the Act in line with other antitrust laws, and have required evidence of a practice's injury to competition, in the form of effects on production and market prices, to support allegations of a violation of the Act (Hovenkamp, 2011).

Figure 4.2. Barriers to entrepreneurship indicator, by regulatory area, 2013

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



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 (2014) Product Market Regulation Database, www.oecd.org/economy/pmr.

StatLink  <http://dx.doi.org/10.1787/888933408456>

Antitrust policy proceeds on the presumption that competition benefits consumers through lower prices, better quality, and wider choice, and that it supports innovations, productivity growth, and opportunities for businesses. However, US antitrust policy does not focus on maintaining or achieving market structure goals, on the grounds that market structure alone is not a sufficient indicator of competition. Instead, it can be argued that the main concern of US antitrust lies in restraints on output, and output can be measured in terms of production or innovation (Hovenkamp, 2005). A restraint on production, such as that created by a sellers' cartel, forces prices up while a restraint on innovation forces customers to accept inferior goods, services, or methods of distribution.

In the late 1990s, international price fixing cartels in three products used as agricultural inputs — lysine, vitamins, and citric acid — were uncovered. This led to legal actions, resulting in severe penalties. This and other experiences revealed that cartels could last for periods up to a decade, that they

tended to occur in markets for homogeneous products with a small number of sellers, and that they could have significant effects on prices.

Explicit collusion (agreements among rivals to fix prices or market shares) is a *per se* violation of the antitrust laws, meaning that the act itself is a violation, without regard to its economic effects. Collusion is a criminal offense, and the DOJ has sought and obtained jail terms in some major cases, as well as substantial fines.

However, mergers and other business practices are approached on a case-by-case basis, with a substantial application of economic and legal theory, and fact-based evidence. They are evaluated for their likely effect on output, innovation, and ultimately prices in markets. Mergers or practices that are likely to lead to reduced output or higher product prices are said to damage competition, and antitrust agencies are likely to oppose them.

In agribusiness, seeds, agricultural chemicals, and railroad transportation tend to be highly concentrated, with few sellers in relevant markets. Specific concerns in agriculture also relate to monopsony power exercised by commodity buyers. The most well-known issues concern meatpacking, where in most markets producers of fed cattle, pigs, or poultry sell their goods and services to a small number (one to three) of processors. In cases of monopsony, the antitrust concern is with mergers or business practices that might lead to restraints on market purchases, and lower prices for sellers. The issue of concentration in agriculture attracts widespread attention, including a series of hearings held by the DOJ and USDA in 2010.

However, high concentration does not necessarily lead to the exercise of market power, in the form of restraints on output that lead to lower prices paid to farmers or higher prices charged to them for inputs. High concentration that results from the exploitation of scale economies and cost reductions can lead to increased production, and therefore increased demand for the farm products that are used in production.

The Economic Research Services of the USDA has recently published a review of the theoretical and empirical impacts of increased concentration and segmentation in US agricultural markets (Adjemian et al., 2016). Most research finds that increased concentration has had negligible price impact. High concentration has been reinforced by segmentation and vertical coordination (including contracting), potentially leading to lack of transparency in thinner markets that complicates the design, monitoring and evaluation of policies pursuing price and income objectives. Suggestions are made to establish a common contracting format in each market in order to reduce transactions costs and improve the participation of small producers; to improve data collection on prices and quantities; and provide production and marketing advice to producers through public extension services.

For storable commodities with multiple uses — such as grain and oilseed crops — farmers can ship to multiple buyers in different industries and at different times, and markets remain quite competitive. In some industries, such as dairy and pork, farmer cooperatives have limited the potential market power of processors, by bargaining and sometimes by entering processing on behalf of their members. Over longer periods of time, farmers can change the commodities that they produce, which limits the pricing power of concentrated commodity buyers. A firm's ability to exercise market power depends only in part on concentration in a market.

When evaluating whether a merger of rivals might reduce competition, US antitrust agencies focus on the level of market concentration before and after the merger, the extent of barriers to entry into the market, and the extent of price competition from differentiated rival products. In practice, the agencies have tended to oppose mergers between competitors in highly concentrated agricultural markets, such as the purchase of National Beef Packing by JBS Swift in 2008, which would have reduced the number of fed cattle buyers from three to two in many markets, and from two to one in others. Mergers that leave four or more competitors active in a market are much less likely to be opposed (Kwoka, 2015).

Some argue that merger policy should be more aggressive against mergers between competitors in concentrated industries (Kwoka, 2015). However, anti-trust authorities face severe difficulties in

pursuing a more aggressive antitrust policy in part because they must make a legal case against mergers in non-specialist courts and bear the burden of proof against well-funded firms with plenty of lawyers (OECD, 2016a).

The 1922 Capper-Volstead Act grants certain agricultural cooperatives limited immunity from the antitrust laws, permitting their members to jointly process, prepare for market, handle, and market their commodities, and to jointly purchase inputs. Proponents of the Act viewed cooperatives as important bulwarks for farmers against monopsony power exercised by processors and other market intermediaries. Exemptions concern activities related to marketing, not activities that restrict output.

Currently, some cooperatives face allegations that they have taken actions to limit production and raise prices. Private lawsuits alleging such behaviour have been filed in the egg, potato, and milk industries. Historically, antitrust agencies have taken the position that the Capper-Volstead Act does not exempt production limits from the antitrust laws (Varney, 2010). The issues at hand then come down to questions of economic theory and evidence — whether cooperatives have the power to effectively restrict market output, and whether they have in fact done so.

Regulations on natural resources

General environmental regulations

Regulations on the environment and natural resources are central to ensuring the long term sustainable use of natural resources and in large part determine access to and use of land, water and biodiversity resources. Regulations on natural resources impose rules on industrial and agricultural activities in order to protect the state of the natural resource (e.g. water pollution, soil degradation, greenhouse gas emissions). Environmental quality has the attributes of a public good, which can make it unprofitable for the private sector to provide, even when the benefits to the public exceed the costs of provision. The design of natural resources and environmental policies is important in terms of their incentives for innovation and sustainable productivity growth.

Other environmental regulations, less specific to agriculture also apply to the agricultural sector and include among others: regulations on oil storage and use, on hazardous substances, on buildings, constructions and renovations, and on waste management.

The States have their own environmental and natural resource regulations, and they sometimes have enforcement responsibilities for federal (EPA) regulations. In particular, land and water rights are mostly regulated at the State level and vary by State depending on resource availability and pressure. Land zoning is also set and managed at the state level, with Eastern States being more likely to have programmes to deal with land development rights. Zoning generally limits farmland being used for development. Box 4.2 provides an illustration of state regulations in the case of water for California, Florida, and the Chesapeake Bay. Box 4.3 outlines the water scarcity challenges in the South Central Valley, California.

Box 4.2. Water regulation: Illustration of the role of states in the case of water quality management in Chesapeake Bay and of groundwater management

Water quality and ecosystem restoration in the Chesapeake Bay

The Chesapeake Bay suffers from problems of water quality, degraded habitats and reduced population of shellfish, mainly due to nitrogen and phosphorus pollution. Agriculture is the largest source of nutrient emissions in the Bay, arising from fertiliser use, livestock manure and certain cropping practices. To meet this challenge, a strategy for restoring the Bay was released in 2010. As part of this strategy, for each water body impaired by pollution, a Total Maximum Daily Load (TMDL) has been established. TMDL is set at the state level or, by default, by the EPA. To comply with TMDL, implementation measures should be put in place by 2025. States of the Watershed (Virginia, Maryland, West Virginia, Delaware, Pennsylvania, and District of Columbia) have prepared Watershed Implementation Plans (Phase 1) to meet the standard in place in 2017.

Groundwater regulation

The States have “primary responsibility for the design and implementation of groundwater withdrawal policies on private and State-owned land — including most lands used for agricultural crop production” (OECD, 2015c). This means that regulations differ across states, for example: groundwater management plans are mandatory in some states (especially in the Northern High Plains and the Mountain and Pacific Regions) but voluntary in other states. Differences in groundwater regulations across states also include: regulation on irrigated areas; on expansion of agricultural lands; regulations on groundwater withdrawals and restrictions. In addition to these differences in regulatory approaches, the states. Besides these differences in regulatory approaches, States also develop their own specific policy packages using tools such as economic instruments and collective management approaches.

Source: Adapted from US Congressional Research Service (2014) and from OECD (2015c).

Box 4.3. The South Central Valley in California continues to face water scarcity

In the mid-19th century the southern part of California's "Central Valley" contained several natural lakes, notably Tulare Lake covering 450 to 800 square miles; the San Joaquin River was large, though shallow, and formed the basis of the early transport system in the valley. In the 21st century not only do long sections of the San Joaquin river and its tributaries frequently run dry, but Lake Tulare has been dry for several decades, except after rare extreme precipitation or snowmelt. Other rivers, too, are mostly dry except where used as part of the canal system. Average annual water extraction now exceeds average annual water supply

After several years of drought, many inhabitants of East Porterville, about five miles from Lake Success, an important storage dam on the Tule River, relied on water delivered in road tankers, or bottled water. Their wells had run dry as the water table dropped, and most of the town has no piped water (unlike its contiguous neighbour, West Porterville). Waters near the mouth of the San Joaquin suffer from excess nutrient problems and some increase in salinity. Fish stocks are much reduced, although still significant in the lower reaches of the river system. Commercial river fishing for Chinook salmon ended in 1957.

Water supply comes from local rain in the valley itself, but more importantly from precipitation in the neighbouring mountains, mostly stored in the snowpack. Dams retain nearly all river inflows, which are highly seasonal, when or before they reach the valley, for distribution through an extensive set of canals.

Agriculture represents a major pressure on water resources in a context of insufficient regulation of groundwater

Land in the Central Valley is particularly fertile, provided there is enough water for crops. California supplies around 8% of US agricultural output, much of this in south Central valley. It is very flexible, adjusting to changes in demand, for example supplying nearly 100% of the fast growing US demand for almonds as well as exporting abroad. In the recent drought, although much land lay fallow for lack of irrigation water, average farm incomes were rising and farmers were increasing their planting of almond trees (OECD, 2015c).

When the dams run low in dry years, farmers make up the difference by pumping more groundwater, with net recharge of the groundwater occurring in wet years. However, on average, over a series of wet and dry years, farmers use more water than is supplied from precipitation (sometimes twice as much), hence the falling water table and other phenomena described above. The effects have been extreme during the 2012-15 droughts, partly because the droughts were severe and the weather warm, and partly because agricultural water use is increasing and groundwater supplies already overstretched.

Pumping groundwater was until very recently largely untouched by direct state regulation in California, as state law allows landholders to pump any amount of groundwater below their property, unlike some other states such as Kansas and Texas, where it is regulated in various ways. There is not always a simple free-for-all, however, as past conflicts between competing users have led to court cases under which quasi-collective management develops under a court-appointed Water Master (Cooley et al., 2009). It is not clear that such arrangements restore sustainable use of groundwater. According to Cooley et al. (2009) there were 19 adjudicated water basins in California, most of them in Southern California (i.e. not in Central Valley).

The resource rent is thus entirely absorbed within the agricultural industry and the lack of regulation may imply that water is used in agriculture which could be better used for some alternative activity. Grismer (2001) estimated the value of water used for one South Central Valley crop in the 1990s to have been between USD 150 and USD 240 per acre-foot, depending on the county, "considerably less than [the price] paid by municipalities" (Grismer, 2001). A significant part of agricultural production in the area is clearly due to the running down of groundwater stocks, and therefore eventually unsustainable.

Policy challenges and responses to sustainable water management in the South Central Valley

Groundwater is the archetypal "tragedy of the commons" (Coman, 1911). Except in rare cases where there is no link at all between a local aquifer and adjacent groundwater levels, each farmer's use of groundwater reduces the supply of water for neighbouring farms, but no-one has an incentive to take this into account. The situation will become even less sustainable if climate change confirms the expected reduction in water storage capacity in the snowpack, so that dam capacity will become even less adequate and reliance on pumped groundwater increase. Yet the observation that farmers were planting more (thirsty) almond trees in the middle of the recent drought suggests that this is not being taken into account.

To achieve sustainability before the point of economic exhaustion is reached, OECD (2015c) provides some guidelines for successful management, noting six key conditions, that need to be built into a mix of economic, regulatory and collective action approaches:

- build and maintain sufficient knowledge of groundwater resource and use
- manage surface and groundwater conjunctively (together) where relevant
- favour instruments that directly target groundwater use over indirect measures (e.g. land use regulation), where possible
- prioritise demand-side approaches
- enhance the enforcement of regulatory measures (e.g. water entitlements) before moving to other approaches
- avoid non-water related price distorting policy measures, such as subsidies towards water intensive crops and energy, which could affect groundwater use.

There have been attempts to improve groundwater management, for example the Central Valley Project Improvement Act of 1992, but they have often foundered on the difficult problem of changing property rights in water as well as the fact that active groundwater management in California, and especially in Central Valley, where adjudicated basins are rare, was largely voluntary (Moran and Cravens, 2015). Most water districts do have a groundwater management plan, but they have rested on voluntary cooperation and, although loss of groundwater slowed down overall prior to the recent drought, it had not generally stopped and losses during the recent drought have been large.

In 2014, California adopted the Sustainable Groundwater Management Act of 2014 (SGMA). The SGMA mandates local water authorities to adopt sustainability plans by 2020 (or 2022 for less severely stressed areas), with a view to actually achieving sustainability by 2040. The major advance on previous programmes is that the SGMA gives the state the power to intervene and impose a sustainability plan if the local agency does not or if its plan is not adequate. It is also a good example of the "tripod" approach combining a mix of economic, regulatory and collective action approaches (OECD, 2015c).

The SGMA may be very slow-acting, however because some key issues remain to be clarified. The first issue is simply what constitutes a local water authority (known as a Groundwater Sustainability Agency, GSA) responsible for setting up and implementing the plans. In most places there is as yet no such body; the Act invites potential agencies to propose themselves as GSAs, after which negotiation or arbitration will sort out competing or overlapping claims to jurisdiction.

The second issue for the SGMA is to clarify what constitutes sustainability. The Act takes a common sense approach in defining it as avoiding "undesirable results" defined as "significant and unreasonable" results in specific dimensions such as lowering of groundwater levels, depletion of surface water, degraded water quality and subsidence. On any of these criteria the situation in South Central Valley is unsustainable. But as Moran and Cravens (2015) points out, there is nevertheless room for disagreement on what is "significant and unreasonable" so that litigation on specific future measures is quite likely. The fact that "not a single legislator from the San Joaquin Valley voted in favour of [the SGMA]" (Green et al., 2015) may presage some of the difficulties.

Additionally, there are potential coordination problems: the legislation does not grant GSAs permitting authority for the construction, modification or abandonment of groundwater wells; rather this authority remains the jurisdiction of local government agencies. Close coordination between GSAs and permitting agencies will therefore be essential in order to ensure that groundwater sustainability goals are consistent with the well permitting and land use actions of the local government agencies (Moran and Cravens, 2015). These potential problems will be compounded by the system of entitlements to water use in California, which does not define clear property rights in water but in practice often gives strong precedence to prior use of water.

If the SGMA leads to clearer definitions of property rights and effective monitoring of water use, extraction of groundwater, and the state of groundwater reserves themselves, use of market mechanisms could increase the efficiency of water allocation (Aladjem and Sunding, 2015). A homogeneous market with a single price for groundwater is unlikely to develop – the externalities associated with pumping water can vary from place to place. But price signals could nevertheless help to better negotiate various trade-offs, between agriculture, industrial and household water use, as well as between these and environmental services.

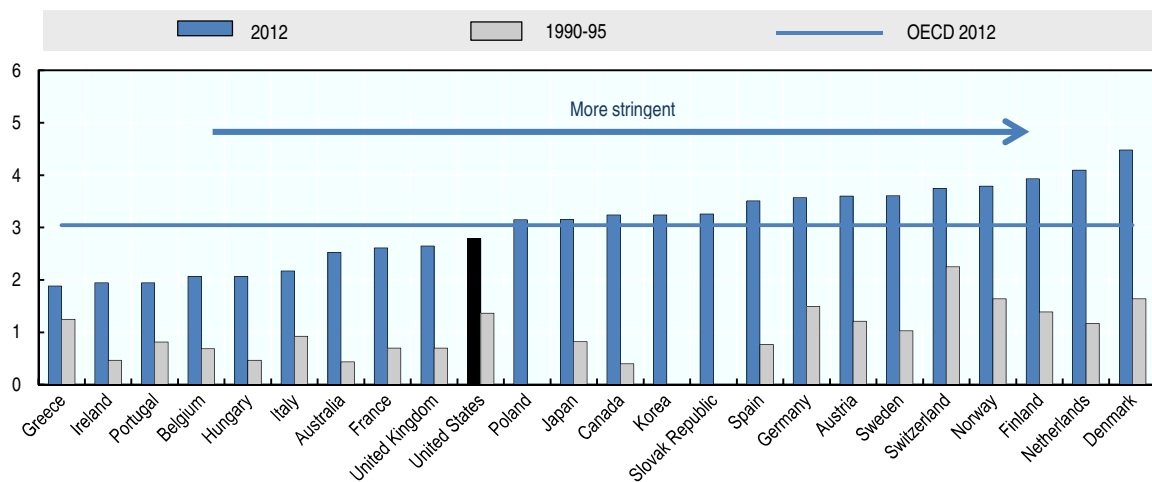
The SGMA also mandates better collection of data on stocks and flows of groundwater. Together with better information on willingness-to-pay for water, this information can help to make better decisions on infrastructure. According to PPIC (2015), in addition to the problem of water shortage for droughts, infrastructure finance, provision of safe and affordable drinking water in some communities, and funding for ecosystem management programmes are all "fiscal orphans" with more resources required but responsibility and the assessment of costs and benefits unclear.

Stringency of environmental regulations

Overall the stringency of environmental policy, as measured by the OECD index, has increased since the 1990s, in the United States as in other OECD countries (Figure 4.3). US environmental policy remained, however, less stringent than on average in OECD countries in 2012. In comparison with large countries with low population density, environmental policy is less stringent than in Canada, but more than in Australia. It is also lower than in Japan and countries of Northern Europe, but higher than in France and the United Kingdom. This indicator, however, is not disaggregated by economic sector, so it is important not to extrapolate these results to the agricultural sector, which requires more specific investigation.

Figure 4.3. Stringency of environmental policy, 1990-95 and 2012

Index scale from 0 (least restrictive) to 6 (most stringent)



Source: Botta, E. and T. Kožluk (2014), <http://dx.doi.org/10.1787/5jxrcnc45qvg-en>.

StatLink  <http://dx.doi.org/10.1787/888933408463>

Farming practices and the environment

As discussed in Chapter 2, some farming practices can degrade resources and the environment in the United States, such as: sediment, nutrient, and pesticide runoff and leaching that can impair water quality, either in surface waters or in groundwater.¹ Excessive nutrients can create algae blooms that affect the colour and taste of drinking water, as well as nitrate concentrations that can affect human health; runoff of nutrients and pesticides can also affect aquatic life in streams, lakes, and estuaries. Agriculture also accounts for 9% of national greenhouse gas emissions through fertiliser application, certain soil management practices, and livestock (methane emissions).

Some agri-environmental programmes provide financial incentives to adopt various conservation practices (voluntary programmes), while others tie eligibility for agricultural commodity and insurance programmes to compliance with certain conservation practices (mandatory programmes). Chapter 6 provides an overview of these programmes, and their relative importance over time. There are five main voluntary conservation programmes, which include both land retirement and programmes on working farmland, including agricultural land preservation and adoption of environmentally friendly production practices. They are presented in Box 6.3, while Box 6.2 presents changes in mandatory compliance since the 1996 Farm Bill.

This reliance on incentives over direct regulation follow in part from the structure of the farm sector: direct regulation would be quite costly in a sector with over 2 million farms. It also follows from the nature of farming, where a farm's impact on the environment depends on many different decisions at farms as well as the specifics of the natural environment that any particular farm operates in, and regulators cannot easily observe those decisions.

In the United States, there are some environmental regulations concerning agriculture at the federal level. These regulations include, in particular: 1) regulation on Concentrated Animal Feeding Operations (CAFOs); and 2) regulations on pesticides.² The Clean Water Act has an impact on private land as it prevents landowners from draining wetland, but its impact on farmland is limited. The agricultural sector is generally excluded from the scope of federal regulations on greenhouse gas (GHG) emissions, notably with regard to mandatory reporting of GHG (Greenhouse Gas Reporting Rule)³ and to permitting requirements for stationary sources of air pollutants, such as livestock operations.

The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) constitutes the regulatory framework for the sale and use of pesticide products, with the objective to prevent health and environmental risks.⁴ All pesticides should be licensed by the Environmental Protection Agency (EPA), and types of allowed uses and restrictions should be indicated. About 600 pesticides are currently registered for use in food production in the United States. Pesticides should follow a re-registration process every 15 years on the basis of updated regulatory rules and scientific methods. However, the chemical runoff from fields that can degrade the environment is a nonpoint source of pollution, which is quite difficult to regulate directly. USDA aims to limit the environmental risks associated with use of approved pesticides, by implementing financial incentive, compliance and information programmes.

Regulations on Concentrated Animal Feeding Operations (CAFOs)

Manure contains valuable crop nutrients. However, over-application of manure to fields can create water pollution through run-off to surface waters, and may also contaminate ground-water. Manure storage and transportation carries risks of spills, which also may lead to water pollution, and volatilisation of stored manure may lead to air pollution. Some farms have been designated as point sources of manure effluents and are under direct regulation of production and manure management practices.

Specifically, the EPA regulates production practices at certain livestock operations under provisions of the 1972 Clean Water Act. The EPA "CAFO" regulations require farms to seek permit coverage under the National Pollutant Discharge Elimination System (NPDES) if they have been designated as a concentrated animal feeding operation (CAFO), and are discharging — or proposing to discharge — manure effluent. In turn, a permitted CAFO must have a Comprehensive Nutrient Management Plan (CNMP) that identifies site-specific practices to ensure agronomic use of nutrients. CAFOs that are not required to have an NPDES permit, but that wish to claim an agricultural stormwater exemption from the Clean Water Act for runoff from fields receiving manure, must also have a nutrient management plan.

CAFOs are defined according to three criteria — the quantity of manure produced on the operation, whether manure is discharged to surface water, and whether the farm is significant contributor of pollutants. The quantity of manure criterion is defined according to the number of animals onsite (for example, operations with at least 700 mature dairy cows, 2 500 feeder pigs, or

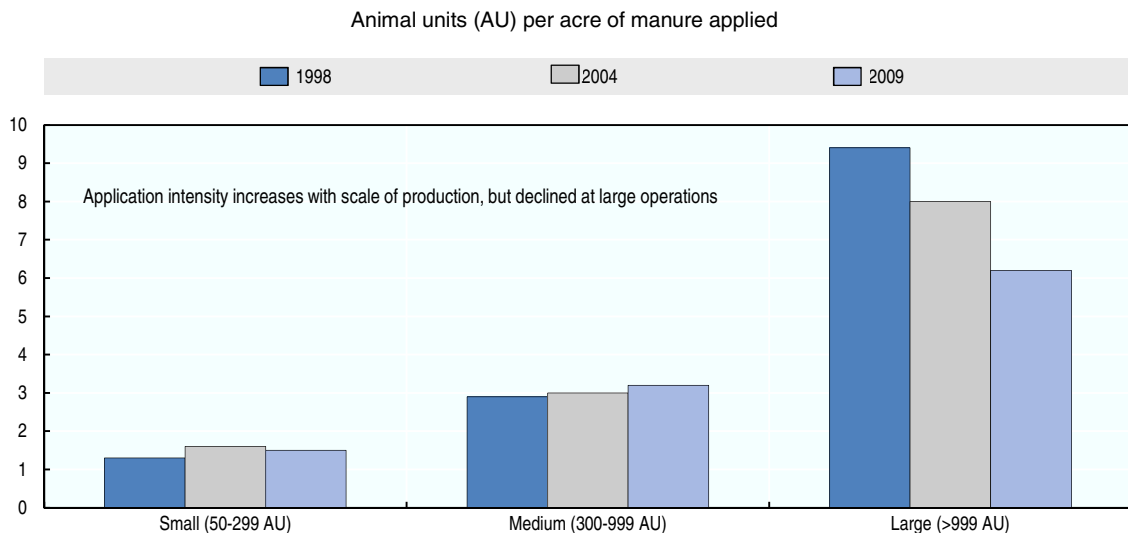
125 000 broilers are defined as large CAFOs). Medium CAFOs are smaller (for example, 200-699 mature dairy cattle, or 750-2 499 feeder pigs) and have man-made conveyances that discharge animal waste to waters, or the animals come into contact with surface water while confined. Small CAFO's fall below the medium size threshold but have been designated by the permitting authority as a significant contributor of pollutants.

The EPA develops CAFO standards, but enforcement is carried out by individual States, which have adopted the new rules at varying rates. States may also have specific environmental regulations affecting livestock operations. USDA's Natural Resources Conservation Service provides technical assistance in developing CNMPs, and also administers programmes, like the EQIP, that assist producers in developing structures or practices to improve manure management and comply with nutrient management plans.

Livestock production has shifted steadily toward much larger operations (Table 2.3), with particularly rapid consolidation in dairy and pig production (MacDonald and McBride, 2009; MacDonald, Korb, and Hoppe, 2013). The EPA estimates that 18 651 operations were CAFOs in 2014.

Consolidation of production also concentrates manure in fewer locations, but regulations appear to have an impact on manure management practices among larger operations. For example, larger US pig operations produce considerably more manure, per acre of land to which manure is applied, than smaller operations (Key et al., 2011). However, the average application rate among large operations was cut by about one-third between 1998 and 2009 (Figure 4.4).

Figure 4.4. Manure application intensity in pig production, 1998, 2004 and 2009



One animal unit (AU) is equal to 1 000 pounds of live weight production.

Source: Key et al. (2011). www.ers.usda.gov/publications/eib-economic-information-bulletin/eib81.aspx.

StatLink  <http://dx.doi.org/10.1787/888933408474>

In broiler production, operations in sensitive areas near major estuaries and river basins are likely to have nutrient management plans. Farms without nutrient management plans have substantially higher litter application rates than farms with such plans; moreover, application rates — defined as the number of birds produced, per acre of land to which litter was applied — fell among operations with plans between 2006 and 2011, while rising at operations without such plans (MacDonald, 2014).

Farms can adjust their practices to meet the regulations in several ways, including the use of manure application methods — such as injection into the soil — that limit runoff, spreading manure over more cropland acres, and adjusting feed rations to reduce nutrients in manure. Farms can also remove manure from the operation, typically to crop farms, and removals from pig and from broiler operations increased in the 2000s (Key et al., 2011; MacDonald, 2014). However, manure application rates at crop farms are not federally regulated (although some states apply manure application rules to crop farms).

Federal CAFO rules effectively establish size thresholds for regulations, with larger farms facing greater regulatory stringency. Farms make investment decisions with those thresholds in mind (Sneeringer and Key, 2011). After the 2003 introduction of size-based thresholds, newly constructed pig operations clustered just below the size threshold for regulation, thus avoiding more stringent regulation. The avoidance actions, which covered 7-11% of potentially regulated new entrants, suggest that regulation has had an impact on manure management and costs at regulated operations.

Regulations on products and processes

Regulations on products and processes that aim to protect human, animal and plant health can also impact on natural resource use. Other process regulations, like those governing organic farming, provide consumers with assurance of certain production practices and influence investment decisions. 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 dis-proportionate regulations can stifle innovation and technological developments.

Several government regulatory programmes on products and processes with a direct focus on agriculture have a significant link with innovation and sustainable productivity growth (Box 4.4). The programmes affect the nature of investment and innovation carried out by private firms, and can affect the mix of products offered by those firms. They include programmes aimed at agricultural pests and disease; environmental regulation, particularly as it is aimed at chemical use; the regulation of agricultural biotechnology; the regulation of livestock drugs; and the regulation of organic farming. Each of these programmes have a pronounced scientific bent, use risk-based analyses to support actions, and rely on significant public and private investments in research (Olmstead and Rhode, 2015; Olmstead and Rhode, 2008; Peck, 2013; Phillips, 2013; Fernandez-Cornejo et al., 2014).

Box 4.4. Economics of regulatory intervention for the environment, pests and diseases

Private efforts to control animal and crop pests and diseases, as well as environmental damage, are often limited by certain economic attributes of the activities: public goods, asymmetric information, and externalities. These attributes support public intervention, but also affect how public regulation is designed.

The term “public good” refers not to the provider of a product, but to two product attributes — non-rivalry and non-excludability. A product is non-rival if consumption of it by one individual does not reduce the amount available for another, and it is non-excludable if it is impossible to exclude any individuals from consuming it. Contagious disease control can be non-rivalrous: if one livestock owner benefits from a reduced incidence of disease that does not reduce the benefits available for others. Control may also be non-excludable: reducing the incidence of disease in a region can provide benefits to all producers, whether they pay for the control or not.

If products are non-excludable, consumers have no incentive to pay for them, but if no one pays there is no incentive to produce them. If products are non-rivalrous, then prices become a poor tool for rationing access, and there may be no good reason to ration access. Private markets may be ineffective in delivering public goods.

Public provision may be necessary in this case; however, the degree to which public good attributes hold can vary widely across products. Moreover, public provision alone does not solve the problem of providing a product and apportioning its use. As a result, effective public intervention will likely require different institutional designs for different circumstances.

Some animal and crop diseases may not be observable by buyers, even if sellers are aware — that is, there is asymmetric information in the markets. In that case, sellers therefore may obtain little direct benefit from disease control, because control cannot be observed by the buyer. The seller may have strong incentives to sell diseased animals in commercial channels before diseases become observable.

Similarly, pests migrate across farms. Individual efforts to manage pests may largely benefit other producers, such that a farmer gains little of the benefits from his or her own actions. In that case, an individual farmer again has little economic incentive to manage pests. Actions to control nutrient runoff to rivers from fields may largely benefit downstream users of the resource, while the farmer obtains little of the benefits from control.

Such externalities, in which an individual's actions generate uncompensated benefits or costs for outside parties, abound in disease, pest, and environmental management. If they are large enough, private decision-makers will not carry out control activities, because they do not capture enough of the benefits from their own expenditures.

Regulation of pests and disease

Pests and diseases can, if unmanaged, impose large direct costs on livestock and plant producers. They can reduce meat, dairy, and crop yields, foreclose marketing options, hamper product quality, and raise farmer costs. Some diseases are zoonotic, and therefore can have important effects on human health and health costs. Moreover, improvements in the control of animal and plant health may complement other agricultural innovations. Indeed, pest and disease risks can deter producer and processor investment in new products and production methods if diseased plants and animals do not show the same yield or quality improvements from new products or methods that healthy plants and animals do (Olmstead and Rhode, 2015). Since such investments often embody new innovations, such risks can reduce agricultural and food product innovation and productivity growth in the long run, creating costs for producers and consumers.

Primary responsibility for programmes aimed at protecting animal and plant resources from agricultural pests and disease lies with USDA's Animal and Plant Health Inspection Service (APHIS). The objectives of the APHIS are to i) keep foreign pests and disease out of the country; ii) provide an emergency response when foreign pests and disease do enter the country; iii) control or eradicate major domestic pests and disease; iv) prevent the interstate spread of disease and pests; and v) facilitate agricultural trade by attesting to the health status of outgoing animals.

The APHIS budget amounted to USD 1.14 billion in 2014, with USD 296 million devoted to animal health and USD 286 million devoted to plant health. The agency also allocated USD 58 million to plant pest and disease management, USD 99 million to wildlife services, and USD 232 million to agricultural quarantine inspection. The funds appropriated to agricultural quarantine inspection are supplemented with user fees collected at ports of entry. APHIS also works closely with USDA's Agricultural Research Service (ARS) on topics related to animal and plant health; the ARS budget included USD 189 million for crop protection in 2014, and USD 90 million for livestock protection. Resources devoted to APHIS animal and plant health programs have been cut in budgets enacted after the financial crisis. The 2014 allocations for animal and plant health were 15.2% and 17.3%, respectively, below their 2010 values.

The agency maintains a specific focus on foreign pests and disease because domestic plants and animals have more limited biological defences against them. Moreover, expanded agricultural trade and increased international travel and tourism increase the likelihood that foreign pests and disease will be introduced into the country (Peck, 2013).

APHIS acts to prevent non-native pest incursions through layers of safeguards including its port inspection activities of imported products, financed through a system of user fees, with fines imposed on violations. APHIS also directs several programmes aimed at identifying pests in other countries to prevent their export to the United States. Information from the programmes allows domestic APHIS

staff to anticipate potential pest risks and adjust inspection procedures in response to changing risks. The agency also conducts offshore commodity pre-clearance and certification programmes to facilitate the export of low-risk products to the United States, and it works with trade partners to manage pests that might pose a significant threat to US agriculture.

The agency collaborates with State animal health agencies to combat domestic diseases that have significant economic impacts. The cooperating agencies implement surveillance at farms, slaughter facilities, and points of sale to identify diseased animals and herds. APHIS and cooperating agencies also utilise certification programmes to identify disease-free herds to provide sources of new stock. Control of disease may be realised through quarantines on herds and flocks; through movement restrictions; vaccinations, where possible; and through depopulation of diseased herds and flocks.

Effective control of pests and disease has necessitated the development of novel and innovative organisational arrangements. Specifically APHIS pursues a wide range of joint actions with other State and federal agencies, as well as other national governments. Moreover, the agency engages in public-private partnerships with private firms, academia, and with farms in support of surveillance activities and control pursuits (Olmstead and Rhode, 2015).

USDA's Bureau of Animal Industry, a forerunner agency to APHIS, the ARS, and the Food Safety Inspection Service (FSIS), led efforts to control and eradicate several animal diseases in the late 19th and 20th century. As part of that effort, the agency created fundamental new scientific breakthroughs that benefitted science and agriculture, initiated a range of new control technologies, and implemented organisational innovations to implement controls (Olmstead and Rhode, 2015).

Regulation of biotechnology

A Coordinated Framework for Regulation of Biotechnology, a science-based federal initiative, was introduced in 1986, and updated in 1992. The framework aimed to use existing statutory authority and agency expertise for a regulatory approach aimed at ensuring the safety of biotech products. A key regulatory principle is that biotechnology products should be regulated according to their characteristics and unique features, and not according to their production method — that is, regardless of whether they were created through the use of genetic engineering techniques. The three main federal agencies responsible for regulating the safe use of genetically engineered organisms are the US Environmental Protection Agency (EPA), the US Department of Health and Human Services' Food and Drug Administration (FDA), and USDA's APHIS.

The EPA regulates pesticides, including plants with plant-incorporated protectants (pesticides intended to be produced and used in a living plant), to ensure public safety under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Specifically, some Insect Resistant crops have been genetically engineered to carry a gene for a Bt (*Bacillus thuringiensis*) toxin; EPA requires the developer to verify that the toxin is safe for the environment and to conduct a food-safety analysis to ensure that the foreign protein is not allergenic.

As part of the registration process, the EPA requires technology developers and farmers to develop refuges of non-Bt crops near Bt crops; this has been the primary strategy for delaying the development of insect resistance, based on the idea that insects feeding on refuge plants are not selected for resistance. Farmers purchasing Bt seed are surveyed by a third party to measure compliance with the regulations, and those who are out of compliance risk losing access to the technology. Nonetheless, compliance was far from complete, in the range of 70-80%, and there was concern that rising maize prices would lead to declines in compliance (Goldberger, Merrill, and Hurley, 2005). In response to those concerns, seed companies have moved to mixing Bt and non-Bt seeds in seed bags (a programme marketed as "refuge in a bag"), instead of relying on farmers to plant non-Bt refuges adjacent to or in parts of Bt fields.

The FDA is responsible for regulating the safety of GE crops that are eaten by humans or animals. According to a policy established in 1992, FDA considers most crops produced from GE seeds as

“substantially equivalent” to crops produced from seeds without GE traits. In such cases, GE crops are designated as “Generally Recognised as Safe” under the Federal Food, Drug, and Cosmetic Act (FFDCA) and do not require pre-market safety approval. If, however, the insertion of a transgene into a food crop results in the expression of foreign proteins that differ significantly in structure, function, or quality from natural plant proteins and are potentially harmful to human health, FDA reserves the authority to apply more stringent provisions of FFDCA requiring the mandatory pre-market approval of food additives, whether or not they are the products of biotechnology.

APHIS, through its Biotechnology Regulatory Services (BRS) programme, regulates the importation, interstate movement, and field testing of GE plants and organisms that are or might be plant pests — defined as organisms that cause disease, injury, or damage to plants or plant products, including viruses, bacteria, fungi, and parasitic plants. A regulated plant cannot be introduced into the environment, even for field testing, without APHIS authorisation. The agency enforces guidelines for field testing and for data to be collected and reported during testing. A sponsor may seek “non-regulated status” from APHIS after field testing as a step toward commercial release. APHIS conducts environmental and pest risk assessments before deciding whether to approve non-regulated status.

Gaps remain in the existing regulatory system regarding accidental contamination from GE crops (Carter and Gruère, 2012). Aside from issues concerning the enforcement of refuges for Bt crops noted above, GE crop varieties in regulated field trials, which were not approved for commercial release, were found to be commingled in commercial shipments in several high-profile cases, leading to the closure of important export markets. In several other cases, Federal courts have stopped the distribution of new GE seed varieties, on the grounds that USDA had not properly considered coexistence issues — how to prevent the commingling of GE varieties with organic and non-GE crop varieties, which would impose economic damages on the organic and non-GE growers. While the US Supreme Court later vacated the lower court rulings, the issue remains contentious, and the current regulatory framework for GE crops does not explicitly account for economic damages arising from commingling.

The Obama Administration embarked on a review of the Coordinated Framework in 2015. The Administration argues that advances in biotechnology have altered the biotechnology landscape since 1992, enabling the development of products not foreseen at that time. Moreover, it argues that the current regulatory system, while protecting health and the environment, encompasses a complex set of rules administered by three different agencies, which imposes unnecessary costs and burdens in some cases, as well as a lack of predictability of timeframes for review (Executive Office of the President, 2015). The review is expected to result in the development of an updated Coordinated Framework to clarify the roles and responsibilities of agencies that regulate biotechnology products by the summer of 2016.

Regulation of animal drugs

Antibiotic drugs are used for treatment of animal diseases, and they are provided in feed or water to control and prevent transmission of disease among herds and flocks. Antibiotics have also been used for “production purposes”, because they have been found to improve the efficiency with which feed is converted to weight gain and reduce the time needed for animals to reach market weights. By the end of 2016, new federal rules will remove approval for the use of medically important drugs for production purposes.

While the primary agricultural use of antibiotics lies in livestock production, antibiotics are also used in aquaculture and in some specialty crops, and appear to be heavily used in the care of companion animals (Hollis and Ahmed, 2014).

When used for disease treatment, control, and prevention, antibiotic drugs improve productivity growth in livestock agriculture by reducing animal mortality and morbidity; drugs administered for production uses also contribute to productivity growth by reducing the amount of feed and housing required for any given amount of production. Antibiotic drugs are used widely in the United States — although not universally — for disease treatment and prevention and for production purposes in

livestock industries, and particularly in fed cattle, swine, and poultry production. The impact of antibiotic provision on feed conversion (a production purpose) appears to have declined over the years. The decline may reflect growing pathogen resistance but may also reflect changes in animal genetics, feeding formulations, housing, and production practices (Sneeringer et al., 2015).

Antibiotics kill a wide range of pathogenic bacteria that harm humans and animals and have provided enormous health benefits in the last 80 years. However, they are losing their effectiveness to treat human illnesses because bacteria are evolving resistance to them. Use of antimicrobial drugs creates selective evolutionary pressure that enables antimicrobial resistant bacteria to increase in numbers more rapidly than antimicrobial susceptible bacteria and thus increases the opportunity for individuals to become infected by resistant bacteria. Resistance to specific antibiotic drugs can spread among bacteria, jump from one type of bacteria to another, and move across regions. Growing resistance follows in part from widespread use of antibiotics in humans and animals.

Individual decisions to use antibiotics, whether prescribed by a doctor to treat a cold or sore throat that will get better without drugs, or administered by a farmer to promote more rapid weight gain, are generally carried out without regard to the costs that may be imposed on others through the impact on antimicrobial resistance. On the other hand, a decision to forego an antibiotic carries some risks for the person going without, while the benefits, in terms of a reduced spread of resistance, go to others. In short, antibiotic use creates uncompensated costs or benefits for others, which have little influence on decision-makers' calculations. This is a classic instance of externalities, under which private markets are likely to induce overuse of antibiotic drugs.

The Food and Drug Administration (FDA) of the Department of Health and Human Services has responsibility for approval of drugs used in human or animal medicine. The FDA's process focuses on whether the drug is safe and effective for its indicated uses.

The United States has long had regulations focused on testing for and controlling antibiotic residues in animal products. As part of its approval process, the FDA establishes minimum withdrawal periods between the last use of a drug and slaughter, which allows time for the drug to fall below the tolerance level deemed appropriate for human consumption. If the withdrawal time is followed, food products made from the treated animal are considered safe for people to eat. USDA's Food Safety and Inspection Service's (FSIS) monitors animal products at slaughter facilities and US ports of entry to test antibiotic residue levels (and other substances) in meat samples. Carcasses found with residue violations may be partly or entirely condemned.

The FDA also has primary responsibility for monitoring antibiotic residues in milk. If cows have been treated with antibiotics, they must undergo a withdrawal period before their milk can be considered safe for human use. Monitoring is carried out by state regulatory agencies, acting under contracts with the FDA. Milk is collected in specialised tankers at dairy operations, either daily or every other day. Samples are taken from each tanker arriving at a processing plant, and if a sample tests positive for antibiotic residues, the entire tank must be dumped, entailing a financial cost to the producer.

The FDA is also responsible for ensuring that antimicrobial drugs are used judiciously, so as to slow the development of resistance. In pursuit of that goal, the agency has introduced a guidance supporting two important changes, beginning in 2017, in the marketing of medically important antimicrobial drugs used in livestock production (US Food and Drug Administration 2013). The agency classifies specific drugs as medically important based on their microbiological effects on bacteria of human health concern.

The agency will withdraw approval of the use of medically important drugs for growth promotion or production purposes; they will only be approved for use in livestock production for disease treatment or prevention. The FDA also proposes to move all use of medically important drugs to veterinary oversight. Previously, many antimicrobial animal drugs were given over-the-counter (OTC) marketing status, which is generally provided for products for which adequate directions for use can be written for

lay persons. Based on the evidence regarding antimicrobial resistance, FDA believes that judicious use decisions require the scientific training of a licensed veterinarian. Under the new guidance, medically important antibiotic drugs will have to be distributed under Rx prescription (for drugs delivered in water) or Veterinary Feed Directive (VFD, for products delivered in feed).

There is considerable consumer and retailer interest in the US in meat products that have been raised without antibiotics, and their actions can affect antibiotic drug use irrespective of changes in federal regulation and guidances. However, such products must be advertised and labelled to influence consumer behaviour. Many consumers appear to be willing to pay price premiums for products labelled as “raised without antibiotics” (implying no antibiotics provided for production purposes) and for products labelled as “never administered antibiotics” (implying no antibiotics administered for any purpose). However, because consumers have no way of directly ascertaining the truthfulness of claims regarding antimicrobial drug use (or other on-farm production practices), firms could have strong incentives to issue misleading or inaccurate claims. In that case, markets are unlikely to effectively transmit consumer preferences to producers.

USDA/FSIS has responsibility for approving label claims made regarding meat products, including claims regarding antibiotic usage, while USDA’s Agricultural Marketing Service (AMS) provides process verification services for animals raised according to certain specified production practices, including processes that forego antibiotics. Each agency faces the challenge of defining the substances that are to be classified as antibiotics, and defining precisely what specific label claims mean, in ways that are informative and useful for consumers.

Regulation of organic farming

The federal regulation on organic agriculture imposes standards for organic farming under the framework of the Organic Food Production Act, and of the USDA organic regulations. Like other OECD countries, overall, organic farming in the United States is based on the following general principles and rules: preserve natural resources and biodiversity; support animal health and welfare; provide access to the outdoors so that animals can exercise their natural behaviour; only use approved materials; do not use genetically modified ingredients; and separate organic food from non-organic food.

To ensure that these rules are being followed, and in the interest of good consumer information, the USDA has developed a set of standards for agricultural practices that, if followed, make producers and processors eligible for organic farming labelling. The certification of organic farming labelling is given by the USDA, and requirements are controlled by agents who should receive accreditation for doing so. One important dimension is the potential for expanding market shares through trade.

Beyond this regulatory role, the United States provides support to Organic Agriculture, through a set of funding, grants, specific organic insurance programme, and microloans. To facilitate the pursuit of these development efforts, a new Guidance on Organic Agriculture, Marketing and Industry, issued in 2013, “directs all USDA agencies to support organic agriculture and markets.”

Trade and investment policy

Trade can facilitate the flow of goods, capital, technology, knowledge and people needed to innovate. Openness to trade and capital flows is conducive to innovation as it provides a larger market for innovators, reinforces competition, increases access to new technologies, ideas and processes, including from foreign direct investment (FDI) and related technological spill-overs, and facilitates cross-country collaboration. Trade and investment openness can influence innovation throughout the food supply chain, from input suppliers to food service and retail firms. Input and output markets that operate effectively can foster productivity growth. Trade and investment openness can also facilitate the development of market mechanisms to foster more environmentally sustainable production.

The United States has historically been open to trade. Tariff barriers have been consistently low by world standards, as shown in Chapter 6.

The United States participates in several major regional trade agreements, the most notable of which is the North American Free Trade Agreement (NAFTA), an agreement with Canada and Mexico. These two countries receive the greatest share of US exports, and are two of the three largest sources for US imports (Global Trade Atlas, 2015). The United States has also concluded a free trade agreement with the Central American countries, the Central American Free Trade Agreement (CAFTA). In addition, the United States is in the process of finalising an agreement with fellow Pacific Rim nations, the Trans-Pacific Partnership Agreement (TPP), and is currently negotiating an agreement with the European Union, the Transatlantic Trade and Investment Partnership (TTIP). All these agreements contain provisions affecting agricultural trade.

The United States has also negotiated a number of bilateral free trade agreements with individual countries, including Australia, Bahrain, Chile, Colombia, Israel, Jordan Morocco, Oman, Panama, Peru, Singapore, and Korea (US State Department, 2015).

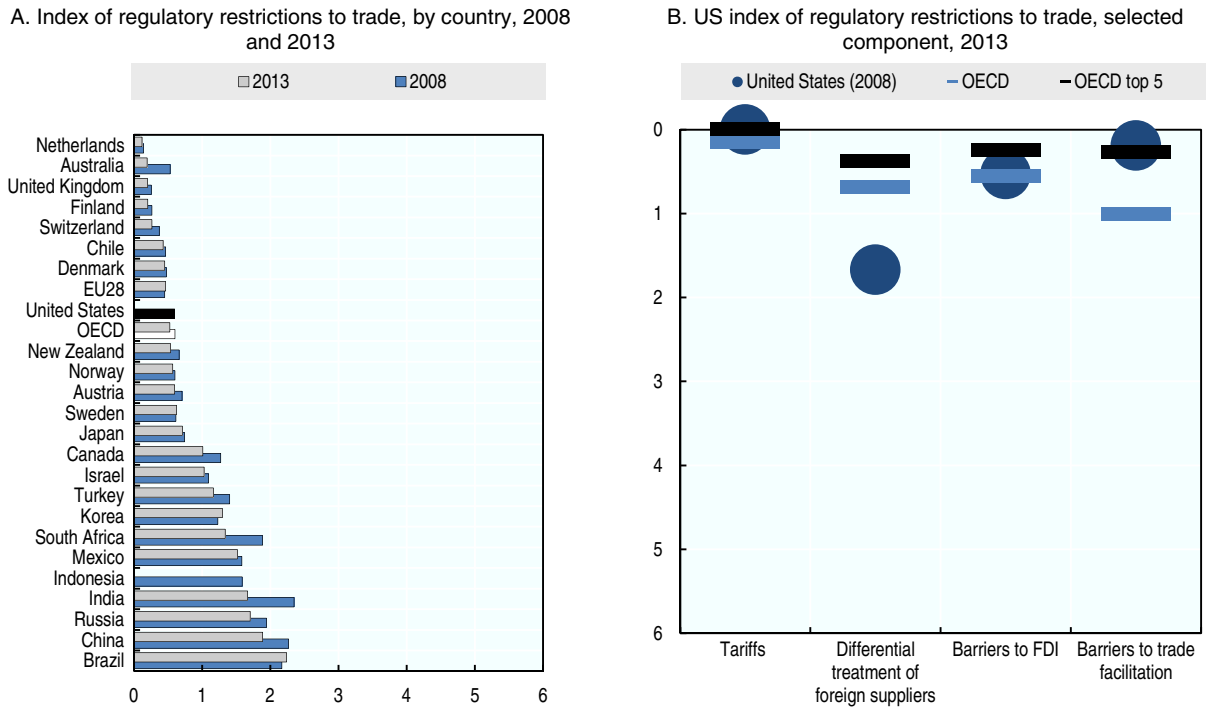
The barriers to trade and investment in the United States are moderate among OECD countries (Figure 4.5). At 0.60 on a 0 (least) to 6 (most restrictive) scale, the US score on the OECD's Barriers to Trade and Investment Index in 2008 was equal to the OECD average, lower than in Canada or Mexico, but higher than the average of EU28 member state (0.45). In most countries, restrictions have continued to decrease between 2008 and 2013, with the OECD score now averaging 0.52. More recent data for the United States is not available. The index includes four components: tariffs; trade facilitation, which measures the availability of US trade regulations to exporters in other countries, as well as whether countries use international standards for products and recognise equivalent standards of other countries; barriers to Foreign Direct Investment (FDI); and differential treatment of foreign suppliers. US scores that are significantly above zero (i.e. potential barriers to trade and investment) include restrictions on mergers and acquisitions in certain sectors, and restrictions on foreign providers of legal services, which are reflected in the relatively high score for differential treatment of foreign suppliers (Figure 4.5B).

Barriers to trade facilitation are low and a number of measures have or are being put in place to facilitate trade. They include the establishment of a single-window application across all agencies, through which traders can submit electronic data for importation and exportation; and the creation in 2014 of a Border Interagency Executive Council (BIEC), which is in charge of developing common risk management principles and methods; developing policies and processes to improve and accelerate electronic data treatment, in consultation with stakeholders; encouraging other countries to develop similar single window systems to facilitate sharing of data, and assessing opportunities to facilitate electronic payments of duties, fees and taxes (WTO, 2014).

The United States has some barriers to FDI, as illustrated by the OECD Restrictiveness Index for FDI being consistently 0.089 during the period 1997-2014 (Figure 4.8). During that time the OECD average fell from 0.127 to 0.068, but the index remains higher than in the United States in major OECD regions such as Australia, Canada or the EU28 average, as well as in BRIICS countries. An examination of the underlying data indicates that the largest US barriers to FDI fall under the heading of restriction on foreign equity, and less on the other components of the index, including screening/approval of foreign purchases, restrictions on foreign personnel, and other restrictions (Kalinova et al., 2010).

For the agriculture and food categories, the US Restrictiveness Index has been 0 consistently in both the food and the agriculture subsectors since 1997, and, as such, has been well below the OECD average (Figure 4.6). The only agriculture-related provisions regarding foreign investment are that foreign ownership of agricultural land must be reported to the Secretary of Agriculture and that US citizenship is required for a permit to allow grazing on public land (WTO, 2014, Table 2.4).

Figure 4.5. Index of regulatory restrictions to trade and investment, 2008 and 2013
Scale from 0 (least) to 6 (most) restrictive

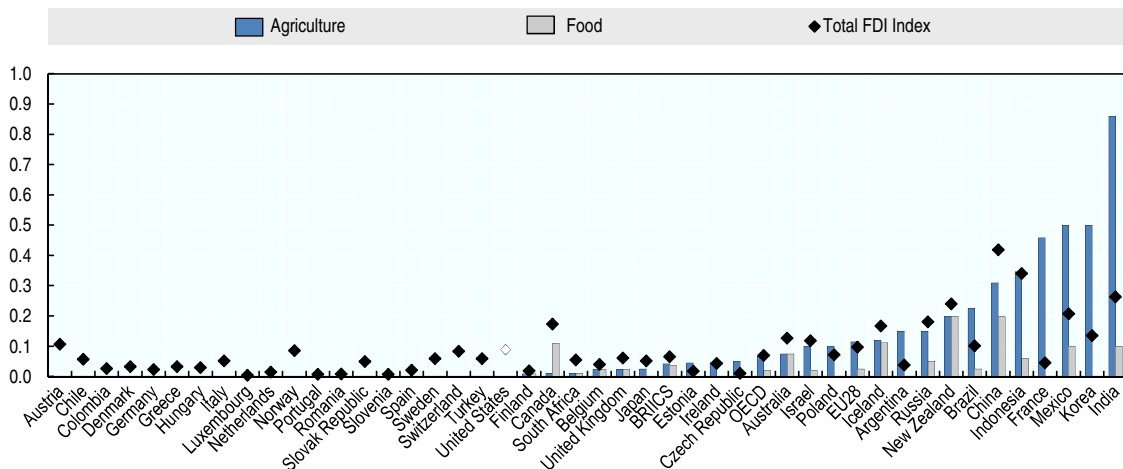


Indices for EU28 and OECD are the simple average of member-country indices. Barriers to trade facilitation refer to the extent to which the country uses internationally harmonised standards and certification procedures, and Mutual Recognition Agreements (MRAs) with at least one other country. OECD top 5 refers to the average of the scores for the top five performers among OECD countries (Netherlands, Luxembourg, Ireland, United Kingdom and Finland).

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

StatLink <http://dx.doi.org/10.1787/888933408482>

Figure 4.6. OECD FDI Regulatory Restrictiveness index, by sector, 2014
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 (2015b), Investment Statistics, FDI Regulatory Restrictiveness Index. www.oecd.org/investment/fdiindex.htm.

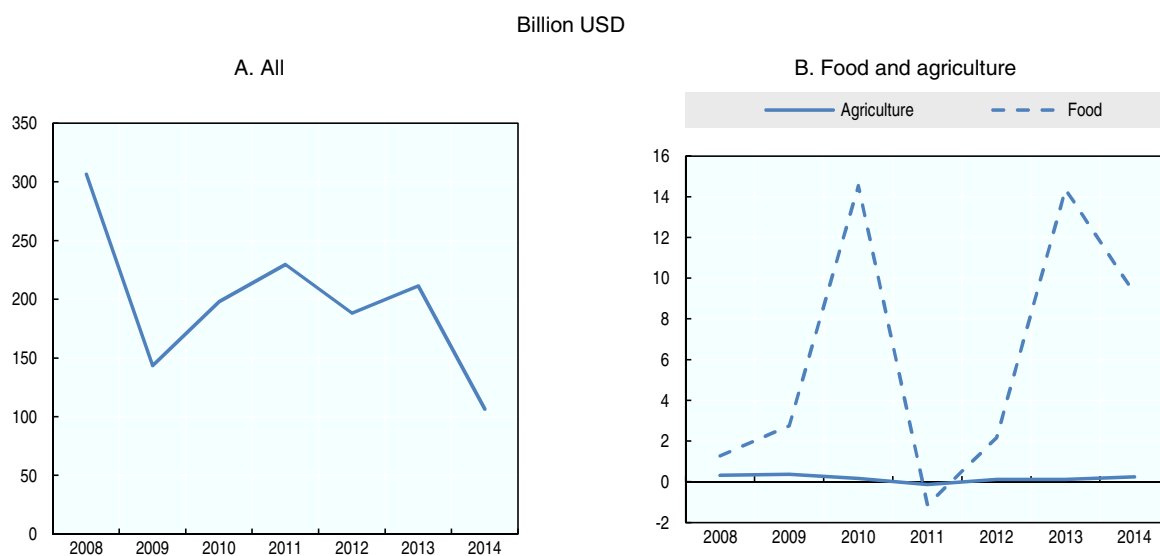
StatLink <http://dx.doi.org/10.1787/888933408492>

Annual inflows of FDI have been falling in the United States (Figure 4.7A). Overall inflows into the country follow the business cycle: they declined in 2008-09, and again from 2011 to 2014 (Jackson, 2013; US Department of Commerce, 2015). This follows a period in the late 1990s early 2000s in which it was particularly high (Jackson, 2013). The United States has traditionally served as a safe haven for investors, and therefore the cumulative sum of FDI into the country has been rising, but at a slower rate, as inflows fall (Figure 4.8A). In 2014 FDI stock as a percentage of GDP was close to the OECD average (Figure 4.9).

FDI in agriculture is low compared to total FDI (Figure 4.7B). Inflows of FDI in agriculture, forestry and fishing have averaged about 0.1% of total FDI inflows, and 0.2% of cumulative FDI, despite low barriers to investment, a lower share than would be predicted by agriculture's share of GDP.

Foreign direct investment in the food industry (food, beverage, and tobacco processing) has been large. The food industry's share in annual FDI inflows (8.8% on average from 2011 to 2014) have been considerably greater than the share of the industry in GDP (1.4% in 2014), and the industry's share of cumulative FDI (an average of 3.4% from 2008 to 2014) also exceeds its share in GDP (Figure 4.8B). Annual flows vary sharply from year to year; corporate mergers are an important element in food FDI, and these can be very large and intermittent events (Kwoka, 2015; Connor and Schick, 1997; US Federal Trade Commission, 2015).

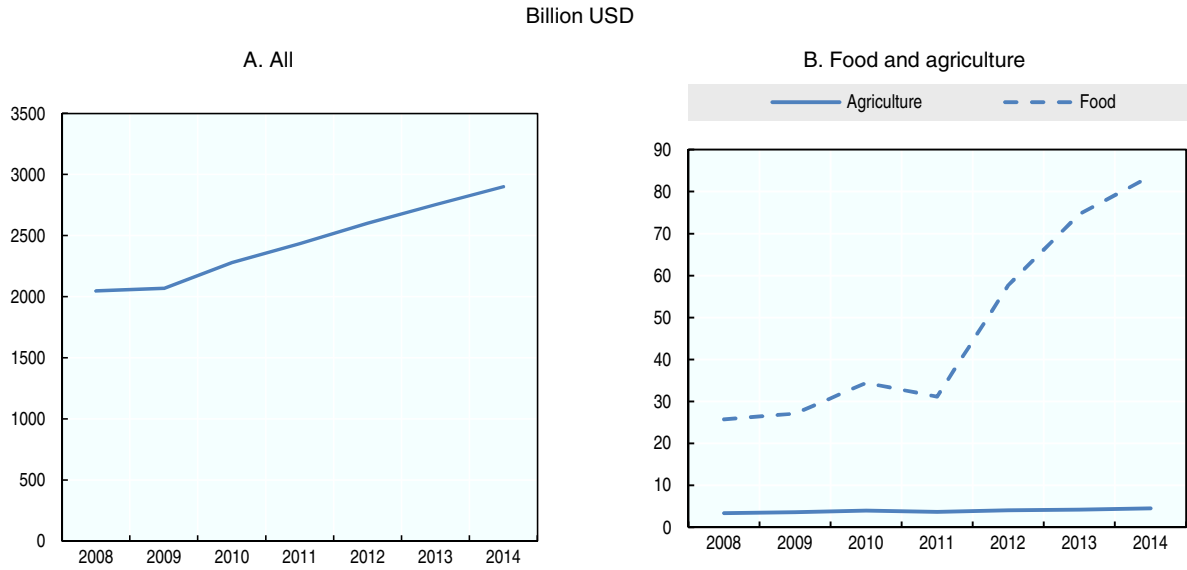
Figure 4.7. FDI inflows into the United States, 2008-14



Source: US Department of Commerce (2015), *Bureau of Economic Analysis*, www.bea.gov/international/index.htm#iip.

StatLink  <http://dx.doi.org/10.1787/888933408503>

Figure 4.8. Cumulative FDI into the United States, 2008-14

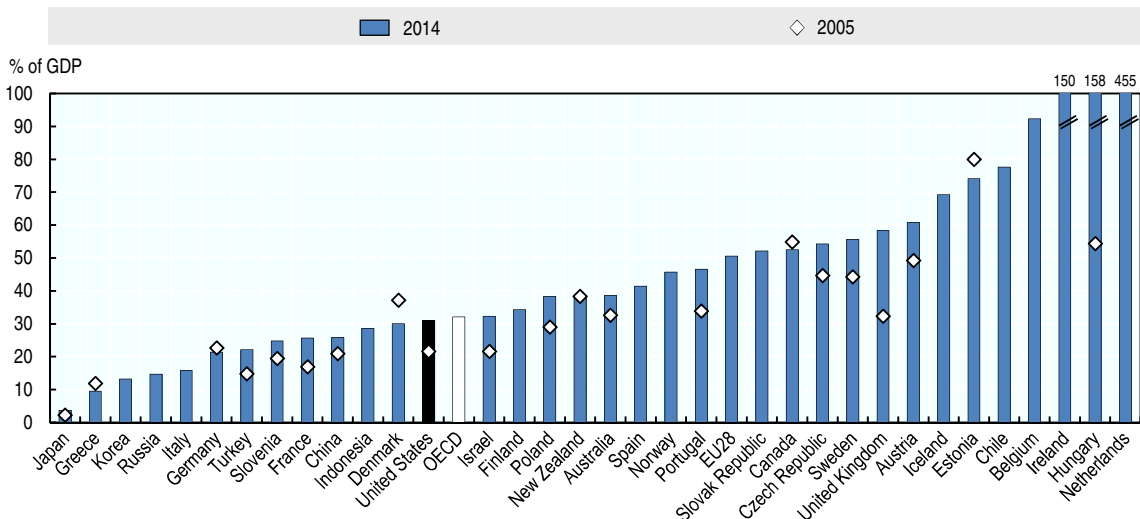


Source: US Department of Commerce (2015), Bureau of Economic Analysis, www.bea.gov/international/index.htm#iip.

StatLink <http://dx.doi.org/10.1787/888933408516>

Figure 4.9. Total FDI inward stocks by country, 2005 and 2004

As a percentage of GDP, 2005 and 2014 or latest available year



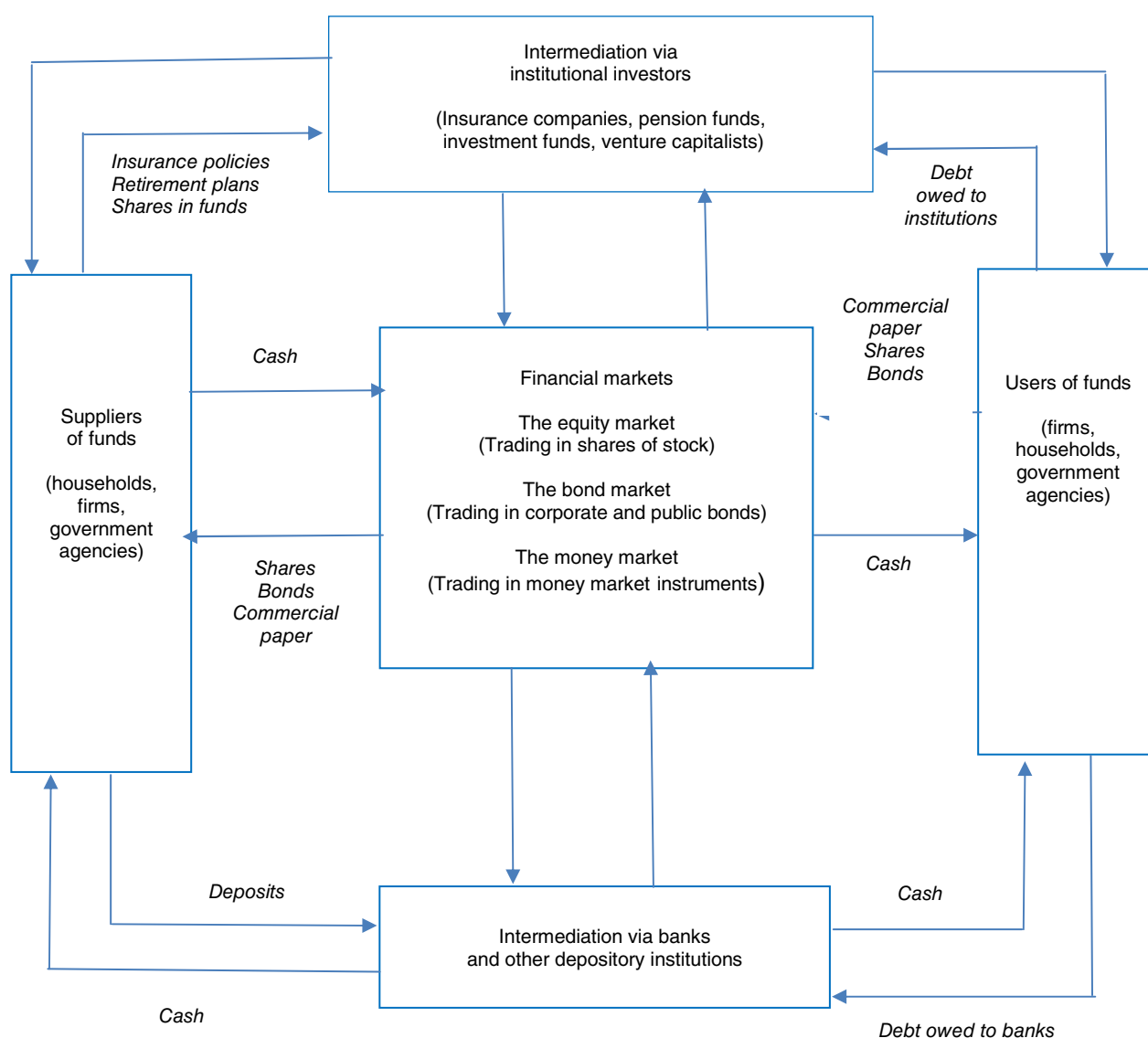
Source: OECD (2015d), *International Direct Investment Statistics, Benchmark definition*, http://stats.oecd.org/BrandedView.aspx?oeid_bv_id=idi-data-en&doi=data-00746-en.

StatLink <http://dx.doi.org/10.1787/888933408521>

Finance policy

Efficient financial markets are one key to enable balanced development of any economy and society. 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 enable the most efficient firms to expand. Policies may also facilitate access to funding for sustainability enhancing investments. Low cost loans and venture capital can also be an important source of funding for innovative firms with high growth potential. In the United States, the ready availability of agricultural credit has facilitated considerable gains in agricultural productivity, the mechanisation and modernisation of farming operations, more orderly marketing of farm commodities, and liquidity management (Barry and Robison, 2002). The USDA has also sought to ensure the availability of credit for young, beginning, and disadvantaged farmers, who may otherwise not have had access. However, studies have consistently shown that attempts to convey subsidies through financial markets, as opposed to ensuring access, have been largely ineffective (Barry and Robison, 2002).

Figure 4.10. The US financial system

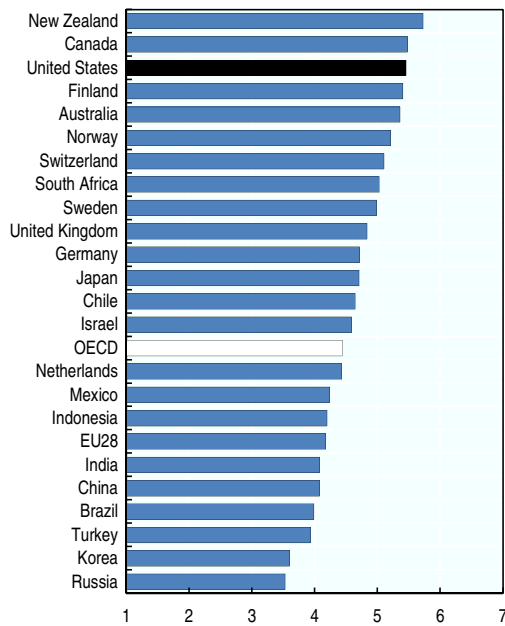


The United States has a very large and deep financial sector that maintains close links to global financial markets. Financial intermediaries — such as banks, pension funds, insurance companies, and investment funds — aggregate the savings provided to them by households, firms, and government agencies (see Figure 4.10 above, a simplified depiction of the US financial system). They may also raise funds in financial markets, rather than access funding directly from suppliers of funds, and some financial intermediaries acquire all of their funding in this way.

Figure 4.11. Global Competitiveness Index: Financial market development, 2015-16

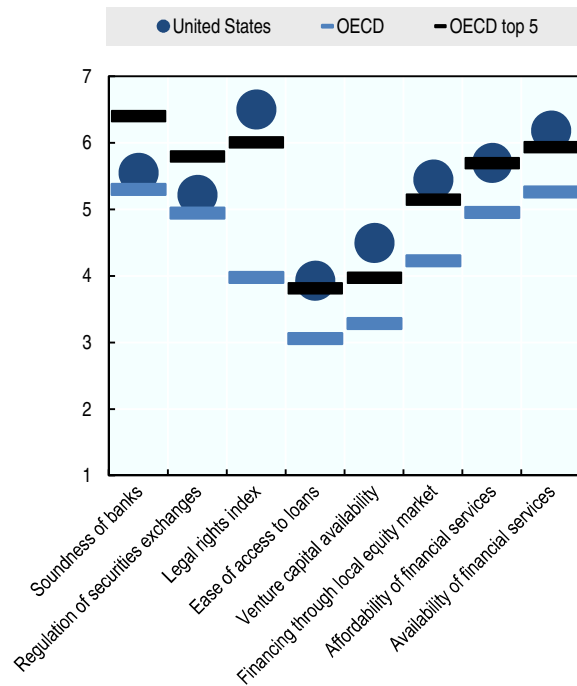
Scale 1 to 7 (best)

A. Total index of financial market development, by country



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

B. US index of financial market developments, by component



OECD top 5 refers to the average of the scores for the top 5 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 2015.

Source: World Economic Forum (2015), *The Global Competitiveness Report 2015-2016*, www.weforum.org/reports/global-competitiveness-report-2015.

StatLink  <http://dx.doi.org/10.1787/888933408530>

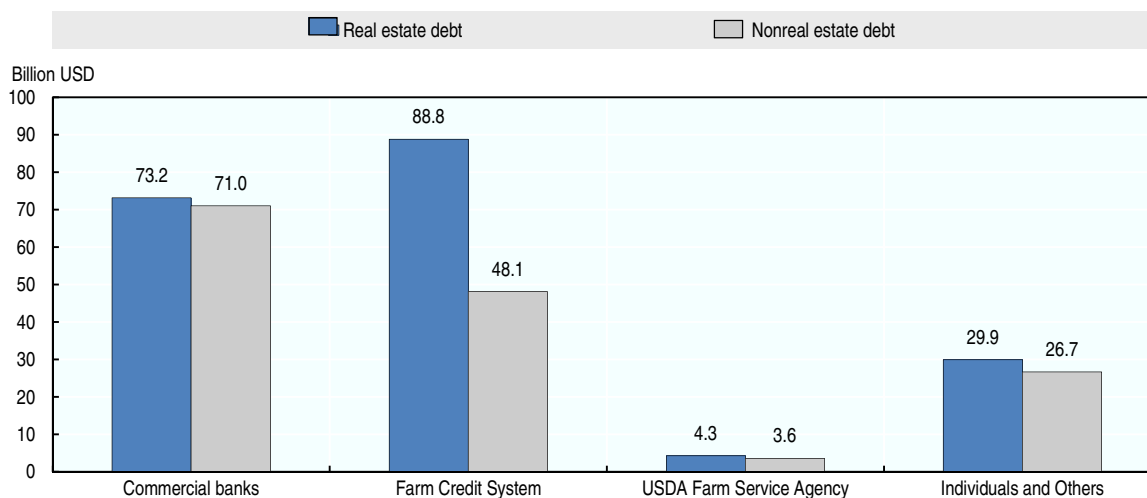
Financial intermediaries may lend directly to users of funds, but they may also act through financial markets to lend indirectly through the purchase of stocks, bonds, and other financial market instruments. Major financial institutions often provide sources of funds to smaller financial institutions and nonfinancial lenders to business, as well as to investment banks.

According to WEF competitiveness indicators, the United States ranks among the OECD top five in terms of financial market development (Figure 4.11). The components of the US financial market indicator outline its strength in terms of the availability and affordability of financial services and access to financing through local equity markets. The United States is also top in the OECD (together with

Finland) in terms of availability of venture capital, which has been crucial for the financing of innovative start-ups in information technology and biotechnology.

Two types of financial intermediaries — commercial banks and the Farm Credit System (FCS) — accounted for 81% of all lending to the farm sector in 2014, when total US farm sector debt amounted to USD 345.7 billion (Figure 4.12). Commercial banks, which raise funds from depositors and from equity and debt providers in financial markets, split their lending almost evenly split between real estate and non-real estate lending. Nearly two-thirds of FCS farm loan volume was secured by real estate.

Figure 4.12. Farm sector debt, by type of lender, 2014



Source: USDA (2015), *Economic Research Service, Farm Income and Wealth Accounts* www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/balance-sheet.aspx.

StatLink  <http://dx.doi.org/10.1787/888933408540>

The FCS, created by Congress in 1916 to provide a source of reliable credit for agriculture, is a network of borrower-owned cooperative financial institutions and service organisations. FCS institutions provide credit and financially related services to farmers, ranchers, and aquaculture producers, and to their cooperatives. The FCS also makes credit available for certain farm-related businesses, rural housing, rural utilities, and foreign and domestic activities in connection with international agricultural trade. Loans to production agriculture represented 69% of total loans outstanding in 2014.

The FCS raises funds for its business activities by selling securities in national and international money markets. Its system-wide debt funding is subject to approval by an independent regulatory agency (the Farm Credit Administration), and its securities are not guaranteed by the Federal Government.

Four Farm Credit banks raise funds and provide credit to 74 Agricultural Credit Association (ACA) parent organisations and two stand-alone Federal Land Credit Associations (FLCAs). Each ACA contains two subsidiaries, a Production Credit Association which can make only short- and intermediate-term loans, and an FLCA, which can only make long-term real estate loans. FLCAs are exempt from State and federal income taxes.

Life insurance companies are also significant providers of finance to agriculture, and the largest single entity under “Individuals and others” (Figure 4.12). Life insurance companies held about USD 12 billion in real estate debt in 2014, and an undisclosed amount of non-real estate debt. Loans

from life insurance companies are concentrated among relatively large farms, especially livestock producers and fruit and vegetable operations.

Federal policy also seeks to make credit more easily available to new and beginning farmers. Through the Farm Credit Act, Congress requires FCS banks and associations to have programmes to provide financially sound credit to young, beginning, and small (YBS) farmers. System institutions offer interest rate concessions, certain exceptions to underwriting standards, and concessionary loan fees to YBS farmers and ranchers to meet that mandate.

Acting through the Farm Service Agency (FSA), USDA directly provides ownership and operating loans to family farmers, emergency loans for losses from natural disasters, and conservation loans to finance completion of a conservation practices in an approved conservation plan. Loan recipients must be actively engaged in the farming operation, and direct loans cannot exceed certain maximums. FSA accounted for about 2% of farm sector debt in 2014 (Figure 4.12).

FSA also provides guarantees for qualifying loans made by other financial institutions, such as commercial banks or FCS institutions. Guarantees cover up to 95% of the principal and interest outstanding in the event of default. By 2013, the volume of guaranteed loans was 60% greater than that of direct loans with the guaranteed loan programme, with the goal of reducing risk and interest rates through increased liquidity.

FSA direct loans and guarantees are directed to farmers who would not qualify for loans from commercial lenders, typically because they have little wealth and limited farming and credit experience. Fifty percent of the volume of direct and guaranteed loans is held by beginning farmers and 24% is held by women and minority farmers. FSA losses on direct loans are quite low — loan losses have amounted to less than 1% of the outstanding principal balance in 2014 and 2015, and repayment delinquency rates have consistently been between five and six percent of outstanding balances. Losses on guaranteed loans have been lower, with delinquency rates between 1 and 2% of outstanding balances.

Tax policy

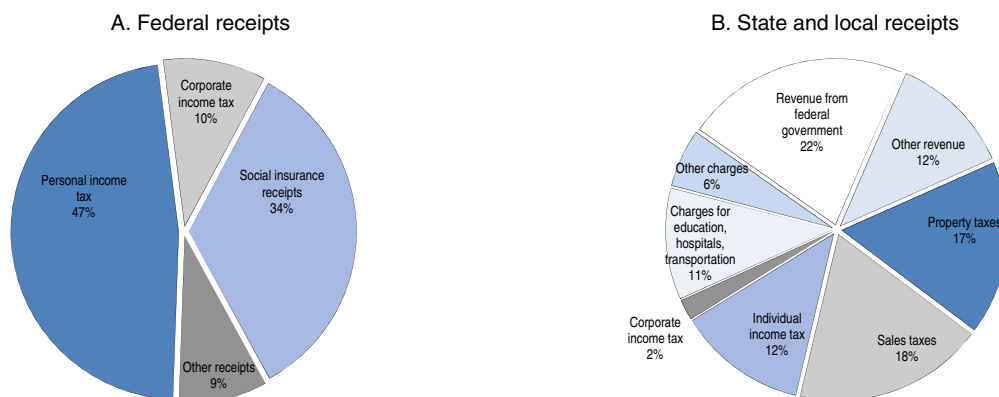
Tax policy affects innovation, productivity and sustainability in many ways: it affects the decision of firms and households to save or invest in physical and human capital, and thus the adoption of innovation; it raises government revenues, which can then finance public services, including those enabling 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 to investments in private R&D or to 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 environmental friendly), resources, or input use may affect sustainability.

The Federal Government raises nearly half of its revenue from personal income taxes while relying on social insurance payroll taxes for just over one-third, and corporate income taxes for about one tenth (Figure 4.13a). State and local governments rely on a wider range of sources of funds (Figure 4.13b). About 22% of state and local funds come through transfers from the federal government, while property, sales, individual income and corporate income taxes and sales taxes and direct charges for activities together account for 50%. Direct charges — for education, hospitals, transportation, and other functions—contributes about one-sixth of state and local receipts.

Farms and agribusinesses — including those involved in food processing, wholesaling, retailing, and farm input — are subject to the wide range of different taxes and charges at federal, state, and local levels. These taxes have a significant impact on the management and investment decisions of farmers and agribusinesses with regard to investment in both human and physical capital.

The federal income tax has the greatest potential impact on investment, management, and production decisions in the agricultural sector. Farmers benefit from both general tax provisions available to all taxpayers and from provisions specifically targeted to farmers. In general, income from farming is taxed more favourably than income from many other businesses. Some of the specific provisions that are responsible for this treatment include the current deductibility of certain capital costs, capital gains treatment of proceeds from the sale of farm assets, cash accounting, and farm income averaging. These and other provisions reduce the farm income tax base, allow some farm income to be taxed at reduced rates, and contributes to smoothing annual income variations.

Figure 4.13. Federal, state and local government receipts, by source, 2013



Source: Economic Report of the President (2016) www.whitehouse.gov/administration/eop/cea/economic-report-of-the-President/2015.

Source: US Census Bureau (2015). www.census.gov/.

- Capital Gains Treatment for Assets Used in Farming.** Although assets used in a trade or business (section 1231 property) are not capital assets, gains from the sale of such assets are treated as capital gains, and losses are treated as an offset to ordinary income. Among the farm assets eligible for such treatment are farmland and livestock held for draft, dairy, breeding, or sporting purposes.
- Current Deduction for Development Costs.** Another feature of the federal income tax that applies specifically to farmers is the ability to deduct the cost of developing certain farm assets in the tax year when the costs are incurred or paid. Examples of pre-productive development costs include raising dairy, draft, breeding, or sporting livestock to their age for mature use, caring for orchards and vineyards before they are ready to produce crops, and clearing land and building long-term soil fertility by applying lime, fertiliser, and other materials.
- Cash Accounting.** While businesses are generally required to use the accrual method of accounting for tax purposes, most farm sole proprietors are allowed to use the cash method of accounting. A large number of farm partnerships and small business corporations also are allowed to use the cash method. Only corporations (other than a family corporation) that had gross receipts of more than USD 1 million for any tax year beginning after 1975 or a family corporation that has gross receipts of more than USD 25 million for any tax year after 1985 are required to use the accrual method of accounting.
- Current Deduction for Soil and Water Conservation Expenditures.** Since 1954, farmers have been allowed to claim immediate federal income tax deductions for certain types of expenditures on soil and water conservation or for the prevention of erosion of land used in farming. Examples of expenses have included levelling, grading, terracing, custom furrowing, planting windbreaks, and constructing, controlling, and protecting diversion channels, drainage ditches, irrigation ditches, earthen dams, watercourses, outlets, and ponds.

- **Income Averaging.** Under the current law, a farmer can elect to shift a specified amount of farm income, including gain on the sale of farm assets except land, to the preceding three years and pay tax at the rate applicable in each year. The current income shifted back is spread equally among the three years. If the marginal tax rate was lower during one or more of the preceding years, a farmer may pay less tax than without income averaging. This helps to reduce the potential higher taxes that might otherwise occur as a result the combination of variable farm income and a progressive tax rate structure.

In addition to targeted provisions, farmers and agribusinesses benefit from various general provisions including the tax treatment of capital investments. Over the last decade, the amount that could be immediately expensed has increased substantially to USD 500 000 in 2014. Recent legislation (The Protecting Americans from Tax Hike Act of 2015) made the USD 500 000 expensing provision permanent.

In addition to this expensing amount, an additional first year depreciation deduction of 50% has been provided. The 2015 legislation noted above extended the additional first-year depreciation deduction through 2019, but limited it to 40% in 2018 and 30% in 2019. Allowing a large share of investment to be recovered at an accelerated rate reduces the tax rate and encourages additional capital investment.

At the state and local level, property taxes are of the greatest significance. All states have at least one programme designed to reduce the amount that farmers are required to pay in state and local property taxes. The most important type of programme allows farmland to be valued at its farm use value rather than its fair market value. This can provide significant property tax relief, lowering farm operating expenses and reducing the potential that financial pressures could force some farmers to sell their land for development purposes.

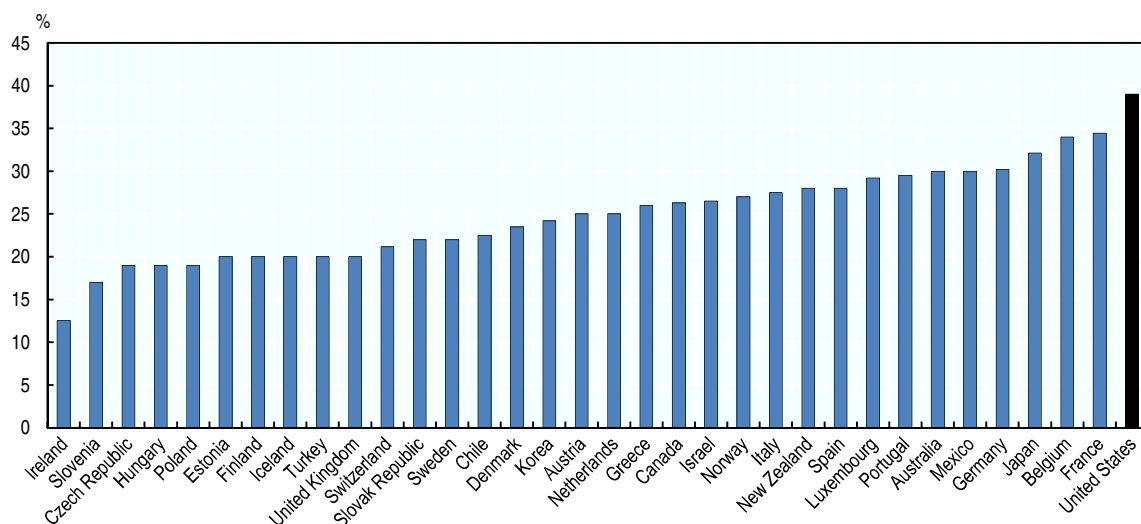
Sole proprietorships, partnerships, and subchapter S corporations are all taxed at the individual level. The most common form of farm organisation is the sole proprietorship which, according to the 2012 *Census of Agriculture*, comprises 87% of all farms. Partnerships comprise about 6.5% of farms while corporations account for about 5%. Income from farm partnerships and subchapter S (small business) corporations is also passed through to the individual partners or shareholders for taxation at the individual shareholder or partner level. While the Census does not separate subchapter S corporations from other corporations, family-held corporations account for about 90% of all corporations. Most of these corporations are subchapter S corporations. Therefore, about 97% of all farms are taxed under the individual income tax rather than the corporate income tax.

Most agribusinesses are large corporations and taxed under the corporate income tax structure. The applicable federal and state income tax rate structures for both individual and corporate taxes are presented in Table 4.1.

Table 4.1. US income tax rates by organisation structure

Type of organisation	Federal	State	Combined marginal rates
Individual	10.0-39.3%	0.0-13.3%	10.0-52.6%
Corporate (regular)	10.0-35.0%	0.0-9.99%	10.0-44.9%

Source: Internal Revenue Code.

Figure 4.14. Combined corporate income tax rate, 2015¹

1. Basic combined central and sub-central (statutory) corporate income tax rate given by the adjusted central government rate plus the sub-central rate.

Source: OECD (2015c), OECD Tax Database, www.oecd.org/tax/tax-policy/tax-database.htm.

StatLink  <http://dx.doi.org/10.1787/888933408552>

While the United States has the highest corporate income tax rates (Figure 4.14), a variety of special provisions narrow the base of corporate income that is subject to tax. Consequently, corporate taxes provided only 6.7% of total government receipts in 2013, and amounted to 2.1% in the US GDP, compared to an OECD average of 2.9%.

The weight of taxation on labour costs is lower than the OECD average. The tax burden (Income tax plus employee and employer contributions less cash benefits) as a % of labour costs for single persons without children at 100% of average earnings was about 32% in 2015, which is below the OECD average of 36% (OECD, 2016b, Table 6.2a). While the share of income tax is higher than average, employee and employer social security contributions are much lower. As a result, social contributions do not burden the cost of hired labour, including farm labour with low wages (Chapter 5).

An OECD examination of the efficiency of the US tax system in supporting growth notes that numerous exemptions to corporate and personal income tax distort economic activity and are often regressive (OECD, 2015b). A number of recommendations are made to "cut the statutory marginal corporate income tax rate and broaden its base to reduce the incentive to shift business activity to non-corporate forms; act towards rapid international agreement and take measures to prevent base erosion and profit shifting; eliminate regressive exemptions such as mortgage interest deductions for owner-occupied housing; simplify eligibility procedures for numerous (and often changing) tax provisions; reduce record keeping requirements when the tax authorities already possess the underlying information from other sources with a view to lower the cost of tax compliance and raise the efficiency of taxation; and increase reliance on consumption and environmental taxation." OECD (2016b) reports on actions taken recently, which do not involve any large change in fiscal policy, but include extended tax credits for R&D (Chapter 7), expensing for small businesses and a number of tax credits targeted at low-income households. US participation in the OECD/G20 Base Erosion and Profit Shifting (BEPS) Project is also noted.

Summary

- The United States has one of the least restrictive set of product market regulations among OECD countries. Businesses operate in a competitive environment conducive to investment, with little state control or public ownership of industries, and effectively no state ownership of commercial farms, and virtually no state ownership of food processing firms.
- With a few exceptions, US agricultural policy places few restrictions on entry, exit, production, and structural adjustment in farming. Marketing orders remain for over twenty commodities, but only one utilises volume controls.
- US antitrust policy does not focus on market structure *per se*, but on the likely effect of mergers and other business practices on output, innovation, and ultimately prices in markets. The issue of concentration in food and agriculture attracts widespread attention, and the impact of concentration in US agricultural markets has been recently reviewed.
- Certain agricultural cooperatives have been granted limited immunity from the antitrust laws, permitting their members to jointly process, prepare for market, handle, and market their commodities, and to jointly purchase inputs.
- In the United States, land and water rights are regulated at the State level and vary by State depending on resource availability and pressure. The stringency of US environmental policy has increased since the 1990s, but remains lower than on average in OECD countries.
- There is some direct government regulation of farm practices on environmental grounds, but the country relies heavily on voluntary incentive programmes to address natural resource issues. Some programmes provide financial incentives to either retire land from crop production or adopt more environmentally benign practices on land that is in production, while others tie eligibility for agricultural commodity and insurance programmes to compliance with certain conservation practices.
- Federal agri-environmental regulation concerns mainly livestock production and manure management practices. While standards are set at federal level, enforcement is carried out by individual states. Larger animal feeding operations must have a comprehensive nutrient management plan that identifies site-specific practices. Consolidation of production in larger operations concentrates manure in fewer locations.
- Primary responsibility for programmes aimed at protecting animal and plant resources from agricultural pests and disease lies with USDA’s Animal and Plant Health Inspection Service (APHIS). APHIS acts to keep foreign pests and disease out of the country; to provide an emergency response when foreign pests and disease do enter the country; to control or eradicate major domestic pests and disease; to prevent the interstate spread of disease and pests; and to facilitate agricultural trade by attesting to the health status of outgoing animals. The funds appropriated to agricultural quarantine inspection are supplemented with user fees collected at ports of entry.
- Under the coordinated Framework for Regulation of Biotechnology, biotechnology products are regulated according to their characteristics and not their production methods, as any product. Following the regulations applying to pesticides, the EPA verifies the toxin produced by insect resistant plants is safe for the environment, and does not cause allergy in food. The FDA is responsible for regulating the safety of GE crops that are eaten by humans or animals. It considers most crops produced from GE seeds as “substantially equivalent” to crops produced from seeds without GE traits, unless the insertion of a transgene into a food crop results in the expression of foreign proteins that differ significantly in structure, function, or quality from natural plant proteins and are potentially harmful to human health. The APHIS regulates the importation, interstate movement, and field testing of GE plants and organisms that are or might

be plant pests: a regulated plant cannot be introduced into the environment, even for field testing, without APHIS authorisation. The agency enforces guidelines for field testing and for data to be collected and reported during testing. The coordinated framework is being reviewed to address regulatory gaps regarding contamination and to respond to biotechnology developments.

- Antibiotic drugs are used widely in US livestock production, for disease treatment and prevention, but also as growth promoters. The United States has long had regulations on testing for and controlling antibiotic residues in animal products. USDA agencies have responsibility for approving label claims made regarding meat products, including claims regarding antibiotic usage, and provide process verification services for animals raised according to certain specified production practices, including processes that forego antibiotics.
- As a competitive net exporter in many products, the United States has traditionally been open to trade. Import tariffs are relatively low, except for some agricultural commodities. In addition to being part of numerous bilateral agreements, the country participates in major regional trade agreements with Northern and Central American countries, and is in the process of negotiating transpacific and transatlantic partnerships. Barriers to trade and investment are close to OECD standards. US barriers to trade facilitation are particularly low and electronic data exchange is increasingly used to further reduce them, but there are significant restrictions on foreign mergers and acquisitions in certain sectors and on foreign provision of legal services. Some barriers to FDI exist as in other OECD countries, but not in agriculture and food. The United States attracts FDI but at a lower rate in recent years. In cumulative terms, FDI stock as a percentage of GDP is close to the OECD average. FDI is low in agriculture like in most countries, while stocks of FDI in food have almost tripled in recent years.
- The United States has a very large and well-developed financial sector that maintains close links to global financial markets. Access to loans and financial services scores among the OECD top-five performance. There is a diversity of financial intermediaries such as banks, pension funds, insurance companies, and investment funds, but commercial banks and the Farm Credit System (FCS) account for over 80% of all lending to the farm sector.
- The Farm Service Agency (FSA) of the USDA directly provides ownership and operating loans to family farmers, emergency loans for losses from natural disasters, and conservation loans to finance completion of conservation practices in an approved conservation plan, but FSA accounts for a very small share of farm sector debt (2% in 2014). FSA direct loans and guarantees are directed to farmers who would not qualify for loans from commercial lenders, typically because they have little wealth and limited farming and credit experience. A share of direct loans is set aside for beginning farmers and ranchers and minority loan applicants.
- The United States has the highest corporate income tax rates among OECD countries, but a variety of special provisions narrow the base of corporate income that is subject to tax. This concerns most agribusinesses that are large corporations and taxed under the corporate income tax structure, but most farms are taxed under the individual income tax. Farmers benefit from both general tax provisions available to all taxpayers and from provisions specifically targeted to farmers. Some of the specific provisions that are responsible for this treatment include the current deductibility of certain capital costs, capital gains treatment of proceeds from the sale of farm assets, cash accounting, and farm income averaging. These and other provisions reduce the farm income tax base, allow some farm income to be taxed at reduced rates, and contribute to smoothing annual income variations.

Notes

1. Other farming practices can enhance resources and environmental quality by, for example, improving wildlife habitat or soil quality.
2. See section Regulations on Products and Processes.
3. Only very large livestock facilities with “manure management systems for livestock manure that emit equal to or greater than 25 000 metric tonnes CO₂ equivalent per year (...) would be required to report emission estimates.” (EPA, 2016).
4. The requirement is that using the pesticide according to specifications "will not generally cause unreasonable adverse effects on the environment”, meaning “(1) any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide, or (2) a human dietary risk from residues that result from a use of a pesticide in or on any food inconsistent with the standard under section 408 of the Federal Food, Drug, and Cosmetic Act."

References

- Adjemian, M.K., B. Wade Brorsen, W. Hahn, T.L. Saitone, and R.J. Sexton (2016), *Thinning Markets in U.S. Agriculture*, Economic Information Bulletin No 148, 45 pp, March. www.ers.usda.gov/publications/eib-economic-information-bulletin/eib-148.aspx.
- Aladjem, D., and D. Sunding (2015), "Marketing the Sustainable Groundwater Management Act: Applying Economics to Solve California's Groundwater Problems", *Natural Resources & Environment*, Vol. 30, No. 2, Fall. www.downeybrand.com/portalresource/lookup/wosid/cp-base-4-26658/media.name=/NRE_v30n02_feat06_AladjemSunding.pdf
- Barry, P.J., and L.J. Robison (2002), "Agricultural Finance: Credit, Credit Constraints, and Consequences", in B. Gardner and G. Rausser, eds., *Handbook of Agricultural Economics: Vol. 1A, Agricultural Production*, Amsterdam: Elsevier.
- Botta, E. and T. Koźluk (2014), "Measuring Environmental Policy Stringency in OECD Countries: A Composite Index Approach", *OECD Economics Department Working Papers*, <http://dx.doi.org/10.1787/5jxrjnc45gvg-en>.
- Carter, C.A., and G.P. Gruère (2012), "New and Existing GM Crops: In Search of Effective Stewardship and Coexistence", *Northeastern University Law Journal* Vol. 8, pp. 169-207.
- Coman, K. (1911), "Some Unsettled Problems of Irrigation", Reprinted in *American Economic Review*, Vol. 101, No. 1, pp. 36-48.
- Connor, J.M., and W.A. Schick (1997), *Food Processing: An Industrial Powerhouse in Transition*, John Wiley and Sons, New York.
- Cooley, H., J. Christian-Smith, and P. Gleick (2009), "Sustaining California Agriculture in an Uncertain Future", *Pacific Institute*, July. Retrieved on 6 April 2016 from <http://pacinst.org/publication/sustaining-california-agriculture-in-an-uncertain-future/>
- Dohlman, E., L. Foreman, and M. Da Pra (2009), *The Post-Buyout Experience: Peanut and Tobacco Sectors Adapt to Policy Reform*, US Department of Agriculture, Economic Research Service, Economic Information Bulletin No. 60, November. www.ers.usda.gov/publications/eib-economic-information-bulletin/eib60.aspx.
- Fernandez-Cornejo, J., S.J. Wechsler, M. Livingston, and L. Mitchell (2014), *Genetically Engineered Crops in the United States*, US Department of Agriculture, Economic Research Service, Economic Research Report No. 162, February. www.ers.usda.gov/publications/err-economic-research-report/err162.aspx.
- Global Trade Atlas (GTA) (2015), Global Trade Database. www.gtis.com/gta/
- Goldberger, J., J. Merrill, and T. Hurley (2005), "Bt Corn Farmer Compliance with Insect Resistance Management Requirements in Minnesota and Wisconsin", *Agbioforum* Vol. 8, pp. 151-160.
- Green, S., E. Hanak, and D. Zoldoske (2015), "Why Farming Needs the New Groundwater Law", *PPIC Blog*, Public Policy Institute of California, 2 June. www.ppic.org/main/blog_detail.asp?i=1786.
- Grismer, M. (2001), "Sudangrass uses water at rates similar to alfalfa, depending on location", *California Agriculture* Vol. 55, No. 4, pp. 44-48.
- Hollis, A., and Z. Ahmed (2014), "The Path of Least Resistance: Paying for Antibiotics in Non-Human Uses", *Health Policy* No. 118, pp. 264-270. www.ncbi.nlm.nih.gov/pubmed/25240271.

- Hovenkamp, H.J. (2011), *Does the Packers and Stockyards Act Require Antitrust Harm?* University of Iowa – College of Law, 9 January. Available at SSRN: <http://ssrn.com/abstract=1737440> or <http://dx.doi.org/10.2139/ssrn.1737440>.
- Hovenkamp, H.J. (2005), *The Antitrust Enterprise: Principle and Execution*, Cambridge: MA, Harvard University Press.
- Jackson, J.K. (2103), “Foreign Direct Investment in the United States: an Economic Analysis.” Congressional Research Service, 11 December. www.fas.org/sgp/crs/misc/RS21857.pdf.
- Kalinova, B., A. Palerm and S. Thomsen (2010), "OECD's FDI Restrictiveness Index: 2010 Update", *OECD Working Papers on International Investment*, No. 2010/03, OECD Publishing, Paris. <http://dx.doi.org/10.1787/5km91p02zj7g-en>
- Key, N., W.D. McBride, M. Ribaud, and S. Sneeringer (2011), *Trends and Developments on Hog Manure Management: 1998-2009*, US Department of Agriculture, Economic Research Service, Economic Information Bulletin No. 81, September. www.ers.usda.gov/publications/eib-economic-information-bulletin/eib81.aspx.
- Kirwan, B.E., S. Uchida, and T.K. White (2012), “Aggregate and Farm-Level Productivity Growth in Tobacco: Before and After the Quota Buyout”, *American Journal of Agricultural Economics* Vol. 94, No. 4, pp. 838-853. <http://ajae.oxfordjournals.org/content/94/4/838.full.pdf+html>.
- Koske, I., I. Warner, R. Bitetti, and O. Barbiero (2015), "The 2013 update of the OECD's database on product market regulation: Policy insights for OECD and non-OECD countries", *OECD Economics Department Working Papers*, No. 1200, OECD Publishing, Paris. <http://dx.doi.org/10.1787/5js3f5d3n2vl-en>
- Kwoka, J. (2015), *Mergers, Merger Control, and Remedies: A Retrospective Analysis of US Policy*, Cambridge, MA, The MIT Press. <https://mitpress.mit.edu/books/mergers-merger-control-and-remedies>.
- MacDonald, J.M. (2014), *Technology, Organization, and Financial Performance in US Broiler Production*, US Department of Agriculture, Economic Research Service, Economic Information Bulletin No. 126, June. www.ers.usda.gov/publications/eib-economic-information-bulletin/eib126.aspx.
- MacDonald, J.M., P. Korb, and R.A. Hoppe (2013), *Farm Size and the Organization of U.S. Crop Farming*, US Department of Agriculture, Economic Research Service, Economic Research Report No. 152, August. www.ers.usda.gov/publications/err-economic-research-report/err152.aspx.
- MacDonald, J.M., and W.D. McBride (2009), *The Transformation of US Livestock Agriculture: Scale, Efficiency and Risks* (with W. D. McBride), US Department of Agriculture, Economic Research Service, Economic Information Bulletin No. 43, January. www.ers.usda.gov/publications/eib-economic-information-bulletin/eib43.aspx.
- Moran, T., and A. Cravens (2015), “California’s Sustainable Groundwater Management Act of 2014: Recommendations for Preventing and Resolving Groundwater Conflicts”, key findings of a workshop on groundwater dispute resolution co-hosted by Stanford University’s Water in the West program and the Martin Daniel Gould Center for Conflict Resolution Program on 5-6 November 2014. http://waterinthewest.stanford.edu/sites/default/files/SGMA_RecommendationsforGWConflicts_2.pdf.
- OECD (2016a), *OECD Economic Surveys: United States 2016*, OECD Publishing, Paris. http://dx.doi.org/10.1787/eco_surveys-usa-2016-en.
- OECD (2016b), *Taxing Wages 2016*, OECD Publishing, Paris. http://dx.doi.org/10.1787/tax_wages-2016-en.
- OECD (2015a), “Product Market Regulation Database,” including Underlying Data and Schemata. www.oecd.org/eco/growth/indicatorsofproductmarketregulationhomepage.htm#indicators
- OECD (2015b), *Drying Wells, Rising Stakes: Towards Sustainable Agricultural Groundwater Use*, OECD Studies on Water, OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264238701-en>.

- OECD (2015c), *OECD Tax Database*, www.oecd.org/tax/tax-policy/tax-database.htm.
- OECD (2015d), *International Direct Investment Statistics, Benchmark definition*, 4th edition (BMD4). http://stats.oecd.org/BrandedView.aspx?oecd_bv_id=idi-data-en&doi=data-00746-en.
- OECD (2015e), *Investment Statistics, FDI Regulatory Restrictiveness Index*, www.oecd.org/investment/fdiindex.htm.
- OECD (2014) *Product Market Regulation Database, 2014*, www.oecd.org/economy/pmr.
- Olmstead, A. (2009), “The First Line of Defense: Inventing the Infrastructure to Combat Animal Diseases. *The Journal of Economic History* Vol. 69, No. 2, pp. 327-357. <http://journals.cambridge.org/action/displayFulltext?type=1&fid=5594036&jid=JEH&volumeId=69&issueId=02&aid=5594028>
- Olmstead, A.L., and P.W. Rhode (2015), *Arresting Contagion: Science, Policy, and Conflicts Over Animal Disease Control*, Cambridge: MA, Harvard University Press.
- Olmstead, A.L., and P.W. Rhode (2008), *Creating Abundance: Biological Innovation and American Agricultural Development*, New York, Cambridge University Press.
- Peck, D.E. (2013), “Nonnative Pest Prevention and Control”, in W.J. Armbruster and R.D. Knutson, eds., *US Programs Affecting Food and Agricultural Marketing*, New York, Springer.
- Phillips, M. J. (2013), “Agricultural Biotechnology Issues”, in W.J. Armbruster and R.D. Knutson, eds., *US Programs Affecting Food and Agricultural Marketing*, New York, Springer.
- PPIC (2015), "Paying for Water", Public Policy Institute of California, Water Policy Center, April. www.ppic.org/main/publication.asp?i=1086.
- Sneeringer, S., and N. Key (2011), “Effects of Size-Based Environmental Regulations: Evidence of Regulatory Avoidance”, *American Journal of Agricultural Economics* Vol. 93, pp. 1189-1211, July. <http://ajae.oxfordjournals.org/content/93/4/1189.abstract>.
- Sneeringer, S., J. MacDonald, N. Key, W. McBride, and K. Mathews (2015), *Economics of Antibiotic Use in US Livestock Production*, US Department of Agriculture, Economic Research Service, Economic Research Report No. 200, November. www.ers.usda.gov/publications/err-economic-research-report/err200.aspx.
- Varney, C.A. (2010), “The Capper-Volstead Act, Agricultural Cooperatives, and Antitrust Immunity”, American Bar Association, *The Antitrust Source*, December. www.americanbar.org/content/dam/aba/publishing/antitrust_source/Dec10_Varney12_21.authcheckdam.pdf.
- US Congressional Research Service (2014), *Environmental Regulation and Agriculture*, Congressional Research Service Report 7-5700, 16 June. www.fas.org/sgp/crs/misc/R41622.pdf.
- Economic Report of the President (2016). www.whitehouse.gov/administration/eop/cea/economic-report-of-the-President/2015.
- USDA (2015), *Economic Research Service, Farm Income and Wealth Accounts*, www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/balance-sheet.aspx.
- US Department of Commerce (2015), *Bureau of Economic Analysis*. www.bea.gov/industry.
- US Department of State (2015), “Benefits of Free Trade Agreements”. www.state.gov/e/eb/tpp/bta/fta/c26474.htm.
- US Federal Trade Commission (2015), Annual Highlights 2015, <https://www.ftc.gov/reports/annual-highlights-2015>.

US Food and Drug Administration (2013), “New Animal Drugs and New Animal Drug Combination Products Administered in or on Medicated Feed or Drinking Water of Food-Producing Animals: Recommendations for Drug Sponsors for Voluntarily Aligning Product Use Conditions with GFI #209”, Guidance for Industry #213, December.

www.fda.gov/downloads/AnimalVeterinary/GuidanceComplianceEnforcement/GuidanceforIndustry/UCM299624.pdf.

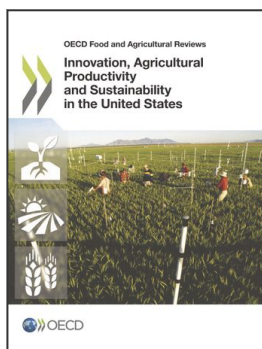
World Economic Forum (2015), *The Global Competitiveness Report 2015-2016: Full data Edition*, Geneva 2015. www.weforum.org/reports/global-competitiveness-report-2015.

World Bank (2015), *World Development Indicators 2015*. <http://data.worldbank.org/products/wdi>.

World Trade Organization (WTO) (2014), *Trade Policy Review – United States*, Report by the Secretariat, WT/TPR/S/307, November.

US Census Bureau (2015). www.census.gov.

US Department of Commerce (2015), Bureau of Economic Analysis, 2015, www.bea.gov/international/index.htm#iip.



From:
Innovation, Agricultural Productivity and Sustainability in the United States

Access the complete publication at:
<https://doi.org/10.1787/9789264264120-en>

Please cite this chapter as:

OECD (2016), "Investment in the US food and agriculture system", in *Innovation, Agricultural Productivity and Sustainability in the United States*, OECD Publishing, Paris.

DOI: <https://doi.org/10.1787/9789264264120-7-en>

This document, as well as any data and map included herein, are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area. Extracts from publications may be subject to additional disclaimers, which are set out in the complete version of the publication, available at the link provided.

The use of this work, whether digital or print, is governed by the Terms and Conditions to be found at <http://www.oecd.org/termsandconditions>.