ECN330 Module 3 SRP. WTO Rules on Trade in Goods: Subsidies

1. Subsidies and Domestic Support

Evolution of multilateral rules on subsidies

Point three of US President Wilson's "14-point plan" at the end of the first world war called for:

> "The removal, so far as possible of all economic barriers and the establishment of an equality of trade conditions among all the nations consenting to the peace and associating themselves for its maintenance." [1]

Though subsidies were not specifically mentioned, one could come to consider how a subsidy might qualify as an economic barrier, creating an inequality of trade conditions among nations and which could give rise to trade tensions. Point 14 of the plan called for the creation of a general association of nations. Under the Treaty of Versailles, ending the war, point 14 was incorporated as the creation of a League of Nations (LoN), under which the rules governing economic barriers (including subsidies) from point three of Wilson's plan could be multilaterally developed.

The LoN made only limited progress on multilateral commercial policy, but its conferences held in the 1920s and 1930s did lay the groundwork for the post-second world war institutions that formally established rules and disciplines on international trade relations.

A UN conference in 1947 drafted the Havana Charter for an International Trade Organization (ITO). Chapter IV of the Charter outlined the provisions on commercial policy. Among other provisions, Section C highlights the articles on subsidies and their application in certain sectors, e.g., primary commodities (see text box).

CHAPTER IV – COMMERCIAL POLICY
Section A. Tariffs, preferences, and internal taxation and regulation
Section B. Quantitative restrictions and related exchange matters
Section C. Subsidies
    Article 25 Subsidies in general
    Article 26 Additional provisions on export subsidies
    Article 27 Special treatment of primary commodities
    Article 28 Undertaking regarding stimulation of exports of primary commodities
Section D. State trading and related matters
Section E. General commercial provisions
Section F. Special provisions

The ITO was never ratified because countries did not have an appetite to sign up to a treaty to join such an organization. The text on subsidies under the commercial policy of the Charter became Article XVI of the GATT-1947. The articles on "Subsidies in general" and "Additional provisions on export subsidies" did not provide a definition of subsidy. It only provided instances of how a subsidy can affect trade, i.e., by increasing exports or reducing imports. Where a policy or program supported income or price, governments were required to provide notification explaining and justifying the measure, the degree to which the measure affected the good and the traded volume of like goods. Measures to increase exports, directly or indirectly, that resulted in the sale of a product

for a price lower in the export market than in the domestic market (allowing for differences in quality and conditions and the terms of sale) were to be avoided. Overall, though, GATT-1947 was tolerant of subsidies, but established rules on the response to subsidy where an import-competing sector was injured by the effect of a subsidy.

Concepts related to subsidies and their adverse effects were developed with each round of GATT negotiations (Sykes, 2003).[2] In the 1950s, a working party found that a subsidy could substitute for the market access provided by a tariff reduction, i.e., nullification or impairment of benefits (i.e., the benefits of market access from a reduction in tariffs by 10% can be offset by a 10% subsidy for domestic producers). Further developments came with subsidies related to primary commodities (products of farm, forest, or related to fishing or mineral extraction). Subsidies on those products were to be avoided if they resulted in a more than an equitable share of world export trade. For non-primary commodities, GATT articles were amended to make export subsidies prohibited, but not all GATT signatories agreed to these provisions.

In 1960, a GATT working party devised an "illustrative list" of practices that would likely result in a two-tier pricing structure (i.e., where the domestic price of a good differs from alike good at the border) which would violate the obligations under Article XVI as they pertained to non-primary commodities. The working party report was adopted by the GATT. This became a means of determining when a rules violation occurred for which a country could respond.

In the 1970s, during the Tokyo round of GATT negotiations, a Subsidies Code was drafted. It set out to: (1) strengthen restrictions on the use of export subsidies; (2) establish a list of criteria to be used to determine whether subsidized exports were a cause or threat to domestic firms; and (3) elaborate the procedures that had to be followed in subsidy investigations which would allow another member to respond with trade policy. As with previous text on export subsidies, the Code was only limitedly accepted by GATT signatories.

Thus, prior to the WTO, domestic subsidies were generally permissible, loose obligations existed to reduce the use of export subsidies on non-commodity products, and an understanding was developing on when subsidies violated GATT rules (by nullifying market access). Policy responses to a subsidy could be invoked if the subsidy could be linked to injury of a domestic industry and the response limited to the value of the subsidy.

Though economists have long referred to measures as providing a "subsidy", there had been no legal definition of what a subsidy constituted. In some instances, it can relate to government transfers to a private entity. In other instances, it can refer to the provision of a good at a price less than what a private entity would have to pay for it though a market transaction. Yet in other instances, it can refer to measures that favorably affect the competitive position of private entities through public procurement procedures or programs aimed at improving the education or skills of workers.

WTO Rules and Disciplines on Subsidies

There are two WTO agreements that address subsidies and the treatment of subsidies: the WTO Agreement on

[1] National Archives, 2016, "President Woodrow Wilson's 14 points (1918)",
https://search.archives.gov/search?query=woodrow+wilson%27s+14+points+speech&submit=&utf8=&affiliate=national-archives.

[2] Sykes, A.O. (2003). "The Economics of WTO Rules on Subsidies and Countervailing Measures", Law School, University of Chicago, John M. Olin Law & Economics Working Paper, No. 186, May. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=415780

Subsidies and Countervailing Measures (SCM Agreement), for subsidies in general, and the Agreement on Agriculture (AoA) covering agriculture-specific subsidies.

The SCM Agreement provides the legal definition of a subsidy and categorizes them. It addresses two separate but closely related topics: multilateral disciplines regulating the provision of subsidies, and the use of countervailing measures to offset injury caused by subsidized imports (module 4) [1].

Multilateral disciplines are the rules regarding whether a subsidy may be provided by a Member. They are enforced through invocation of the WTO dispute settlement mechanism. The response to an illegal subsidy is a countervailing duty, a unilateral tariff which may be applied by a Member after an investigation by that Member and a determination that the injury criteria set forth in the SCM Agreement are satisfied [1].

Unlike the Subsidy Code drafted during the Tokyo Round, the SCM Agreement defines a "subsidy". The definition contains three basic elements: (i) a financial contribution (ii) by a government or any public body within its territory, (iii) which confers a benefit. All three elements must be satisfied for a subsidy to exist [1].

The concept of "financial contribution" was included in the SCM Agreement only after a protracted negotiation. Some Members (i.e., EC) argued that there could be no subsidy unless there was a public outlay. Other Members (i.e., the US) considered intervention that did not involve an expense to the government (e.g., price support) nevertheless distorted competition and should thus be considered a subsidy. The SCM Agreement requires a financial contribution made by or at the direction of a government or any public body within its territory, e.g., national government, sub-national government, or any public body such as a state-owned enterprise. A list of the types of measures that represent a financial contribution include: grants, loans, equity infusions, loan guarantees, fiscal incentives, the provision of goods or services at below market prices, the purchase of goods at above market prices [1].

A financial contribution by a government is not a subsidy unless it confers a "benefit." In many cases, as in the case of a cash grant, the existence of a benefit and its valuation is clear. In some cases, however, the issue of benefit will be more complex. For example, when does a loan, an equity infusion or the purchase by a government of a good confer a benefit? Although the SCM Agreement does not provide complete guidance on these issues, the Appellate Body has ruled (Canada – Aircraft) that the existence of a benefit is to be determined by comparison with the marketplace (i.e., based on what the recipient could have received in the market). In the context of the multilateral disciplines, however, the issue of the meaning of a "benefit" is not fully resolved [1].

A subsidy within the meaning of the SCM Agreement, is not subject to the SCM Agreement unless it has been specifically provided to an enterprise or industry or group of enterprises or industries. The basic principle is that a subsidy that distorts the allocation of resources within an economy should be subject to discipline. Where a subsidy is widely available within an economy, such a distortion in the allocation of resources is presumed not to occur. Thus, only "specific" subsidies are subject to disciplines. There are four types of "specificity" within the meaning of the SCM Agreement:

- **Enterprise-specificity**. A government targets a particular company or companies for subsidization;

- **Industry-specificity.** A government targets a particular sector or sectors for subsidization.
- **Regional specificity.** A government targets producers in specified parts of its territory for subsidization.
- **Prohibited subsidies** (product-specific)**.** A government targets export goods or goods using domestic inputs for subsidization [1].

The SCM Agreement creates two basic categories of subsidies: those that are prohibited, those that are actionable (i.e., subject to challenge in the WTO or to countervailing measures). All specific subsidies (on non-agricultural goods) fall into one of these categories [1]. Industrial (i.e., non-agricultural) subsidies are classified as per the traffic light system: green, meaning go ahead, and red, meaning stop or prohibited. Green light subsidies are those that are not intended to affect trade (e.g., research and development, programs, environmental programs, etc.), but are subject to strict conditions.

Subsidies that increase exports or reduce imports are prohibited because they are designed to directly affect trade, making them most likely to have adverse effects on the interests of another Member. A subsidy contingent, in law or in fact, whether wholly or as one of several conditions, on export performance is prohibited as an "export subsidy". A list of export subsidies is annexed to the SCM Agreement. A subsidy contingent, whether solely or as one of several other conditions, upon the use of domestic over imported goods qualifies as a "local content subsidy" [1].

Most subsidies, such as production subsidies, fall in the "actionable" category. Actionable subsidies are not prohibited. However, they are subject to challenge, either through multilateral dispute settlement or through countervailing action, if they cause adverse effects to the interests of another Member. There are three types of adverse effects. First, there is injury to a domestic industry caused by subsidized imports in the territory of the complaining Member. This is the sole basis for countervailing action. Second, there is serious prejudice. Serious prejudice usually arises as a result of adverse effects (e.g., export displacement) in the market of the subsidizing Member or in a third country market. Thus, unlike injury, it can serve as the basis for a complaint related to harm to a Member's export interests. Finally, there is nullification or impairment of benefits accruing under the GATT 1994. Nullification or impairment arises most typically where the improved market access presumed to flow from a bound tariff reduction is undercut by subsidization [1].

The WTO AoA, the first multilateral agreement dedicated to the agricultural sector, specifies special rules regarding agricultural subsidies. The objective of the AoA is to reform trade in the sector and to make policies more market-oriented. This would improve predictability and security for importing and exporting countries alike [2].

The rules and commitments related to subsidies apply to:

- domestic support — subsidies and other programmes, including those that raise or guarantee farmgate prices and farmers' incomes; and
- export subsidies and other measures that make exports artificially competitive [2].

The agreement allows governments to support their rural economies, but preferably through policies that cause less distortion to trade. It also allows some flexibility in the way commitments are implemented. Developing countries did not have to cut their subsidies as much as developed

countries, and they were given extra time to complete their obligations. Least-developed countries did not have to do this at all. Special provisions deal with the interests of countries that rely on imports for their food supplies, and the concerns of least-developed economies [2].

Domestic support

The argument against policies that support domestic prices or subsidize production some other way is that they encourage over-production. This squeezes out imports or leads to export subsidies that lower prices of goods on world markets. The AoA distinguishes between support programmes that stimulate production directly, and those that are considered to have no direct effect [2]. This distinction is important because it is most likely to affect trade causing a distortion (see text box).

What is a 'distortion'?

Trade is distorted if prices are higher or lower than normal, and if quantities produced, bought, and sold are also higher or lower than normal — i.e. than the levels that would usually exist in a competitive market.

Governments usually give three reasons for supporting and protecting their farmers, even if this distorts agricultural trade:

* to make sure that enough food is produced to meet the country's needs;
* to shield farmers from the effects of the weather and swings in world prices; and
* to preserve rural society.

But the policies can be expensive and have created gluts leading to export subsidy wars. Countries with less money for subsidies have suffered. The debate at the WTO center on whether these objectives can be met without distorting trade [3].

Domestic policies that had a direct effect on production and trade had to be cut back. WTO members calculated how much support of this kind they provided for the agricultural sector (using calculations known as "total aggregate measurement of support" or "Total AMS") in the base years of 1986-88. Total AMS was to be cut from a 1986-88 benchmark level. Developed countries agreed to reduce these figures by 20% over six years starting in 1995 (see table 1, reduction commitments on support). Developing countries cut support by 13% over 10 years. The least-developed did not need to make any cuts [2].

Table 1. Reduction commitments on support		
Domestic support	Developed countries	Developing countries
Phase-in period	1995-2000	1995-2004
Total AMS cuts for the sector (1986-88 base period)	-20%	-13%
Export subsidies		
Cuts in the value of subsidies	-36%	-24%
Subsidized quantities (base period 1986-90)	-21%	-14%

Export subsidies

The AoA allowed export subsidies on agricultural products in cases where a member negotiated for its right and where the subsidies were specified in the member's list of commitments. Export subsidies in conformity with the AoA were not prohibited by the SCM Agreement. The AoA required members to cut both the value of the export subsidy and the volume of exports that received subsidies. Export subsidies were reduced from a 1986-90 benchmark. Developed countries agreed to cut the value of export subsidies by 36% over the six years starting in 1995

(24% over 10 years for developing countries), and to quantities of subsidized exports by 21% over the six years (14% over 10 years for developing countries). Least-developed countries did not need to make any cuts [2]. The agreement also included a commitment to continue the freform through negotiations to be launched in 2000. While a comprehensive agreement was never agreed, follow-up negotiations in 2015 set the date for the full elimination of agricultural export subsidies (i.e., their prohibition) at the end of 2020 for developed countries and 2022 for developing countries.

WTO classification of agricultural support

In WTO terminology, subsidies in general are classified by how much they affect production and therefore distort trade. They are classified in boxes also identified by colours of traffic lights: green box (permitted) and amber box (slow down — i.e. be reduced), but under agriculture the classification is more complex. There is no red-box subsidy, although domestic support exceeding the value of support ceiling is prohibited. Then, there is a blue box of allowable support as discussed below.

The green box is defined in Annex 2 of the AoA. To qualify, green box subsidies must not distort trade, or at most cause minimal distortion (paragraph 1). They must be government-funded programmes that to not charge consumers higher prices (i.e., do not involve price support). Subsidies complying with the conditions for the green box can be used freely and are not subject to reduction commitments [4].

Green box programmes do not target specific products but include direct income support for farmers that are not related to current production levels or prices (i.e., are "decoupled" from production). They include certain direct payments to farmers that do not stimulate production such as for assistance to help farmers restructure agriculture, or direct payments under environmental and regional assistance programmes are also green box. They include government services such as research, disease control, infrastructure and food security [2].

At the other end of the subsidy spectrum are all domestic support measures considered to distort production and trade fall into the amber box, which is defined in Article 6 of the AoA. Amber box measures include programs to support prices, or subsidies directly related to production quantities, excluding de minimis support [4].
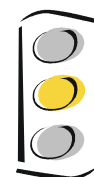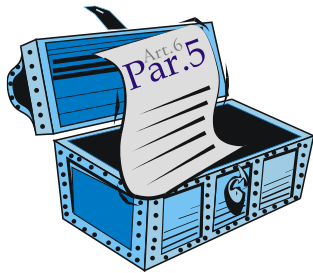
Any value of support below the "de minimis" level, i.e., 5% of the value of agricultural production in developed countries (10% for developing countries) was allowed and not subject the reduction commitments outlined in table 1. The 30 WTO members that had subsidy values greater than the de minimis levels at the inception of the WTO were committed to reduce these subsidies [4].

The reduction commitments are expressed in terms of a "Total Aggregate Measurement of Support" (Total AMS)

which includes all supports for specified products together with supports that are not for specific products, in one single figure [4]. This amounts to the summation of all amber box subsidy value less any de minimis that applies. The 1986-88 base value served as the benchmark from which reduction commitments would apply.

Another category of subsidy is the blue box. This is the "amber box with conditions" — conditions designed to reduce distortion. Any support that would normally be in the amber box, is placed in the blue box if the support also requires farmers to limit production (details set out in Paragraph 5 of Article 6 of the AoA). This includes certain direct income payments to farmers where the farmers are required to limit production. It also includes government assistance programmes to encourage agricultural and rural development in developing countries. There were no limits on spending on blue box subsidies. Some countries see this as a crucial means of moving away from distorting amber box subsidies without causing too much hardship. Others wanted to set limits or reduction commitments, some advocating moving these supports into the amber box [4].

Development Box

Article 6.2 of the AoA allows developing countries additional flexibilities in providing domestic support. The type of support that fits into the developmental category are measures of assistance, whether direct or indirect, designed to encourage agricultural and rural development and that are an integral part of the development programmes of developing countries. They include investment subsidies which are generally available to agriculture, agricultural input subsidies generally available to low-income or resource-poor producers, and domestic support to producers to encourage diversification from growing illicit narcotic crops [4].

Treatment of subsidies by the EU vs US states

By way of contrast to multilateral rules, the EU's rules on the treatment of the use of subsidies by its members falls under the Law on "State Aid". Under Part Three: Community policies, Title VI: Common rules on competition, taxation, and approximation of laws, Chapter 1: Rules on competition, Section 2: Aids granted by States, Article 87 states:

1. Save as otherwise provided in this Treaty, any aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition by favouring certain undertakings or the production by favouring certain undertakings or the production of certain goods shall, in so far as it affects trade between Member states, be incompatible with the common market [5].

2. Aid deemed compatible with the common market include:

(a) aid having a social character, granted to individual consumers, provided that such aid is granted without discrimination related to the origin of the products concerned;
(b) aid to make good the damage caused by natural disasters or exceptional occurrences;
(c) aid granted to the economy of certain areas of the Federal Republic of Germany affected by the division of Germany, in so far as such aid is required to compensate for the economic disadvantages caused by that division [5].

3. The following may be considered to be compatible with the common market:

(a) aid to promote the economic development of areas where the standard of living is abnormally low or where there is serious underemployment;
(b) aid to promote the execution of an important project of common European interest or to remedy a serious disturbance in the economy of a Member State;
(c) aid to facilitate the development of certain economic activities or of certain economic areas, where such aid does not adversely affect trading conditions to an extent contrary to the common interest;
(d) aid to promote culture and heritage conservation where such aid does not affect trading conditions and competition in the Community to an extent that is contrary to the common interest;
(e) such other categories of aid as may be specified by decision of the Council acting by a qualified majority on a proposal from the Commission [5].

Article 88 states:

1. The Commission shall, in cooperation with Member States, keep under constant review all systems of aid existing in those States. It shall propose … measures required for … the functioning of the common market [5].

2. If … the Commission finds that aid granted by a State or through State resources is not compatible with the common market (Article 87), or that such aid is being misused, it shall decide that the State concerned shall abolish or alter such aid [5].

If the State concerned does not comply with this decision within the prescribed time, the Commission or interested State may … refer the matter to the Court of Justice [5].

3. The Commission shall be informed, in sufficient time to enable it to submit its comments, of any plans to grant or alter aid. If it considers that any such plan is not compatible with the common market having regard to Article 87, it shall without delay initiate the procedure provided for in paragraph 2. The Member State concerned shall not put its proposed measures into effect until this procedure has resulted in a final decision [5].

Thus, EU law is more aimed at avoiding undermining internal competition among its member state' markets and is not aimed at addressing any economic effects outside the common market. The large-country case that is potentially the EU for a particular good, however, does imply that state aid, while complying with EU goals, may be incompatible with its multilateral obligations.

In the US, by contrast, federal law does not prohibit measures being taken by one state to provide an incentive to the benefit of that state, even if it has negative economic consequences to another state within the US. In other words, there is no provision in the US law to prevent "state aid" as articulated by the EU. The following example illustrates the case of leaving subsidies undisciplined, even within the territory of a country.

In West Point, in the US state of Georgia, economic fortunes improved in 2006 when Kia Motors, the South Korean carmaker, announced it would build a $1.2bn assembly plant. The investment was celebrated for the 2,800 jobs it created in town. Outside West Point not everybody was so happy about the town's windfall. Kia was lured to Georgia by $400m of tax breaks and other economic sweeteners paid out of state coffers [6].

Critics question whether the $160,000 cost of bringing each Kia job to the state represents a wise use of taxpayers' money and argued the deal puts existing Georgian firms at a disadvantage. "It is objectionable to offer incentives to a single company at the expense of ordinary taxpayers and businesses who do not get the same benefits", says a retired North Carolina Supreme Court judge and campaigner against corporate tax breaks. The Kia deal was among the biggest in a wave of investment incentives offered to big business by job-hungry US states. As the giveaways become bigger and the inter-state rivalry more cut-throat, the doubts grow about the economic merit of such deals. Companies become addicted to incentives and states forget how to attract investment without offering them [6].

The issue was thrust onto the national agenda when the US Supreme Court heard arguments about $280m of tax breaks by Ohio to secure a DaimlerChrysler jeep plant in 1998. Activists who brought the case claimed the incentives were unconstitutional. Similar deals across the US would be open to challenge if the Court agreed [6].

Georgia was desperate to win the Kia plant after missing out on earlier investments by foreign carmakers in the south. The state lost 5,000 jobs from the closure of two Ford and General Motors plants near Atlanta, increasing political pressure on the Governor to create new jobs. But Georgia faced stiff competition from other states (e.g., Tennessee, Kentucky, South Carolina and Mississippi), sparking a bidding war to offer Kia the most generous incentives. Georgia won by offering $195m in tax breaks and credits, $60m to buy and prepare land for the factory, $57m in improvements to local transport infrastructure and $71m to build and fund a training centre [6].

The Development Authority of LaGrange, the neighboring town, said the deal would benefit the entire state by creating a new industrial cluster to fill the vacuum left by abandoned textile mills. Kia promised to bring five of its suppliers to create an additional 2,600 jobs. But the head of Good Jobs First, an advocacy group, said there was little evidence that incentives encouraged sustainable growth. "Mississippi offered these deals for decades, but still ranked 49th of 50 states in per capita income" [6].

Opponents argue that states should focus on making their entire economies more competitive. Offering tax breaks is admitting there is something wrong with the tax system. If tax rates were low for all businesses additional incentives would not be needed. Georgia's Dept. of Economic Development would prefer an incentive-free environment, but as sweeteners are offered by other states, Georgia must do likewise. Many states want to stop playing the incentives game, but none wants to be first to stop [6].

Thus, in the absence of disciplines on subsidies at the sub-national level (e.g., regional level) can distort competition at the national level, then the loose enforcement of multilateral subsidy rules can distort international markets and trade.

2. Economics of Subsidies and Domestic Support

Applying WTO principles to subsidies
Disciplining the use of subsidies will always present a greater challenge for multilateral rulemaking. First, a

subsidy is a domestic regulation and is not trade policy (unless it is a subsidy intended to directly affect trade, i.e., an export subsidy).[3] Then there is the difficulty in assessing the economic goodness or badness of a subsidy, which requires welfare analysis, and which must be done on a case-by-case basis. WTO rules and the treatment of subsidies relate to trade distortion, rather than welfare analysis. Moreover, basing rules on the degree of trade distortion is made more complicated by the fact that a subsidy can be applied on the production, consumption, or marketing of the good. All this makes applying WTO principles to the use of subsidies difficult.

Consider non-discrimination. What might MFN mean in the context of a subsidy program given that it could be applied on domestic production or exports? Would it be possible to argue that a subsidy to production or exports treats all trading partners the same? National treatment, however, could have some meaning. For example, if a subsidy is to be provided on the domestic production of a good, then a government transfer could be granted to all producers of the good in the domestic market, whether the producer is a nationally-owned or foreign-owned entity. This could resemble a policy that encourages investment in productive capacity in the Home country, e.g., reshoring manufacturing of a good (as opposed to using tariffs to protect domestic manufacturing).

The principles of predictability and transparency can also have proper meaning. A subsidy because of its specificity can be predictable. The value of the government transfer can be divided by the value of production (or exports) to get a per unit subsidy allowing foreign rivals to see how much the program supports domestic production (or exports). Given that the transfer involves a budgetary outlay, the cost of the program should be publicly available. The subsidy analysis to follow will help to illustrate the amount of support offered to exporters and domestic producers under different programs.

Analysis of export subsidies: the small-country case
Start with a free trade equilibrium that serves as a benchmark to analyze the effects of subsidizing exports. Suppose the domestic market of a small-country exporter looks as presented in the left panel of figure 1. The internal market situation, i.e., closed market (autarky) equilibrium price, P_0, is determined by domestic supply (S) and demand (D).

Figure 1. Free trade equilibrium: case of a small exporting country
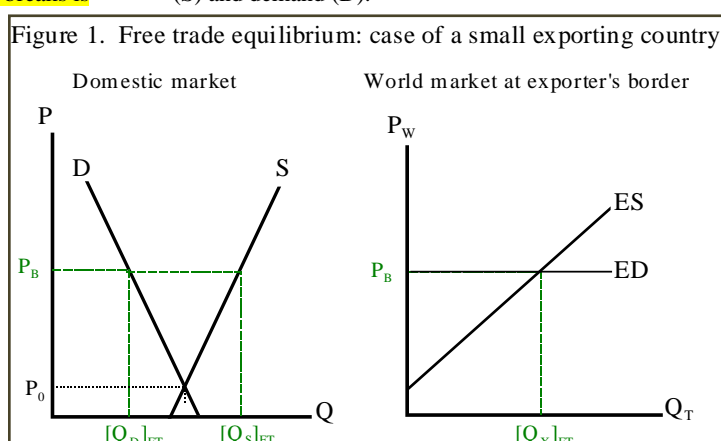
On the right panel of figure 1 is the world market at the exporting country's border. The excess supply (ES) curve shows how much the country would export at any price greater than P_0. At P_0, the country is in equilibrium and there would be no need to export, but for any price greater

country's poorest. However, instead of an import subsidy, what happens in such cases is that food aid is provided by non-government organizations such as the UN World Food Programme.

than P_0, the country would have a surplus as S is greater than D. The surplus is exportable.

Excess demand (ED) is shown to be horizontal, meaning the country is a price taker and is unable to affect the world price. If there was a change in the domestic market (i.e., a change in D or S) causing a change in ES (a shift to the left or right), it would not cause a change in P_B, the border price.

In equilibrium, where ES intersects ED, P_B shows how much the quantity exported (Q_X) would be. In the absence of trade policy (or any violation of the underlying conditions supporting the law of one price), P_B determines the free trade export volume, $[Q_X]_{FT}$. P_B also determines the quantities demanded and supplied on the domestic market, $[Q_D]_{FT}$ and $[Q_S]_{FT}$, respectively. The surplus on the domestic market, at that price, is the volume of exports, i.e., $[Q_D]_{FT}$ - $[Q_S]_{FT}$ = $[Q_X]_{FT}$.

Now, suppose that the exporting country's government intends to increase exports. The policymaker's decision is whether to apply a specific or an ad valorem export subsidy, or a quota that sets a minimum volume of exports (set at the same level of exports as under either export subsidy program). All three export subsidy measures are shown in figure 2: a specific subsidy per unit in red, the ad valorem subsidy in blue and the quota in purple.

Figure 2. Trade equilibrium under export promotion
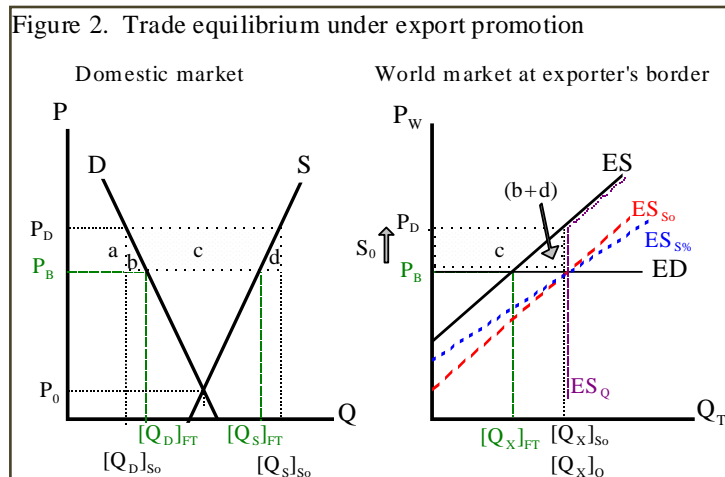
The promotion of exports by the government is essentially a choice to increase the country's willingness to increase ES. In the small-country case, the only way to increase exports is to encourage greater production. This is achieved by raising the domestic price, P_D. The per unit subsidy results in a parallel shift in the ES curve to the right. For each unit exported a payment of S_0 is made to the exporter equal to (P_D – P_B). The new equilibrium, with the export subsidy, is at $[Q_X]_{So}$, where ES_{So} intersects ED.

P_D determines the new quantities consumed and produced. The higher price encourages production and discourages consumption, resulting in a larger surplus which can exported, $[Q_X]_{So}$.

Policymakers could achieve a similar outcome by providing an ad valorem subsidy. In this case the ES curve rotates to the right where the difference between ES and $ES_{S\%}$ reflects the percentage of the price that is to be supported, e.g., 10% of the price. In this case, P_D is 10% higher than P_B the price at which the good is sold on the world market, i.e., $[(P_D – P_B)/P_B]\cdot 100\% = 10\%$. The same volume of exports is illustrated to show that a specific export subsidy can have an equivalent trade effect as an ad valorem export subsidy.

Finally, a minimum export quota is shown as the ES being vertical at the minimum volume set by policymakers, at $[Q_X]_Q$, and becomes kinked where it hits the original ES

curve. Presumably policymakers are not troubled with exports exceeding the minimum, so any domestic prices above P_D will result in a surplus as determined by S – D. The domestic price necessary to generate a surplus equal to $[Q_X]_Q$, the desired minimum export volume, is P_D. A payment of (P_D – P_B)·$[Q_X]_Q$ would be required for the government to achieve that export volume objective.

Since both subsidies and the minimum export quota result in the same trade effects and the same domestic price, the welfare effects of each of these programs to increase exports is the same (i.e., policy equivalence). The welfare values reported in table 1, correspond with the areas denoted in figure 2.

Table 1. Welfare analysis from the tariff	
	Areas representing welfare
ΔCS	- (a+b)
ΔPS	+ (a+b+c)
ΔG	- (b+c+d)
ΔNSW	- (b+d)

The change in consumer surplus, ΔCS, represents the value lost to consumers from the higher domestic price. It is essentially a tax on domestic consumers, which is measured as the area under the demand curve associated with the change in price, the increase from P_B to P_D, area (a+b).

Producers, on the other hand, are made better off because the export subsidy offers them support to produce more (to increase the exportable surplus). The value to producers is the change in producer surplus, ΔPS, is the value of revenue that is earned which is greater than the additional cost of producing the increased output, or area (a+b+c).

Because the subsidy implies a government outlay, the program has a cost equal to area (b+c+d). This represents the export subsidy. It is the per unit cost (P_D – P_B) times the total number of units exported, $[Q_X]_{So}$. The cost to the government would be the same if the ad valorem subsidy amounted to $P_B\cdot (1 + S_\%)$, where $S_\%$ is 0.1 if the percent applied was 10% over the selling price. Again, this cost would be the same if a lump-sum payment were made to ensure that $[Q_X]_Q$ were exported.

Thus, the net welfare effects would be the same. The value of area (a+b) is a domestic income transfer from consumers to producers. Area (c) is an income transfer from the government to producers. The cost of the export subsidy program is area (b+c+d) so society loses area (b+d) which are the dead-weight losses reflecting the inefficiency associated with the policy.

Export promotion programs in practice
Almost all countries have incentive schemes. These schemes make it possible for exporting enterprises to claim exemption from, or drawback of, customs duties paid on inputs used in the manufacture of export products and the reimbursement of indirect taxes borne by such products.

Import protection generally shelters the least productive industries and therefore the ones least likely to export. The argument for protecting or subsidising "infant industries" until they have become strong enough to compete abroad is complicated. Sometimes it has worked: defence spending, for example, was critical to the early development of computers, semiconductors and the internet. But how can it be made to fit in with world trade

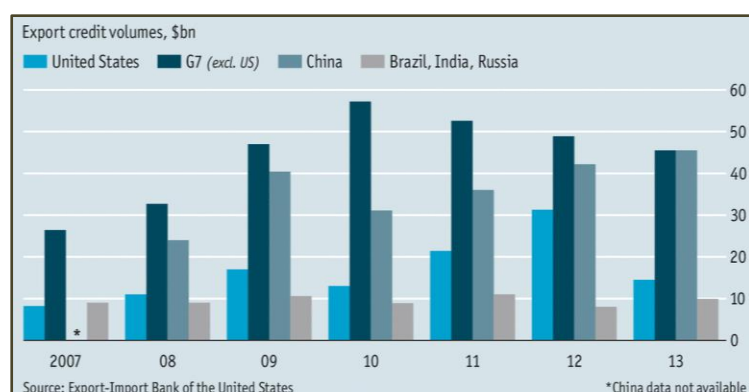rules? New findings on the nature of exporting reveal a potentially productive role for government [7].

It starts with the insight that exporting is a bit like films: failures far outnumber successes, but the successes are often spectacular. Marc Melitz of Harvard University notes that making just one foreign sale entails big fixed costs: finding a buyer, setting up distribution and learning to deal with regulations that might be tilted in favour of local companies. Many companies that export once never do so again. But those that do so regularly often grow at a remarkable speed. Eventually, exports come to be dominated by firms and products that survive this winnowing process [7].

This suggests that the right role for government is not to shower money on a handful of putative winners but to take a portfolio approach: finding companies on the margin of exporting and helping as many as possible overcome the fixed costs of entry. Eventually some should become big, productive exporters. Consular services that guide companies through foreign markets are one form of support; trade finance is another especially when financial markets seize up [7].

A similar approach applied to innovation. One study found that federal energy-research spending became more productive when it switched from large-scale demonstration projects to lots of smaller-scale technologies. Many failed, but the handful that succeeded, such as advanced refrigerator and freezer compressors, generated outsized returns [7].

One means of facilitating exports is the creation of export credit agencies, which started early in the last century. Britain's, established in 1919, was part of an effort to improve its balance of payments and thus return to the gold standard. The US Export-Import (ExIm) Bank was originally conceived as an instrument of foreign policy, to provide leverage over the Soviet Union and support for Cuba. For most of its 80 years, Ex-Im laboured in obscurity, providing loans, loan guarantees and credit insurance to foreign buyers of US products from jumbo jets to food. In the early 2010s, it was in the spotlight being declared to be the embodiment of corporate welfare [8].

The global financial crisis gave such banks a new lease of life. When banks pulled back from trade finance after Lehman Brothers collapsed in 2008, governments prodded their export agencies to fill the gap to prevent a bigger fall in trade volumes. Official export credit extended by the G7 alone soared from $35 bn in 2007 to $64 bn in 2009 (see chart, export credit values) [8]. The Ex-Im Bank in 2010 authorised record volumes of trade credit, but Fred Hochberg, its president, said the US spent less on such efforts than China or Canada did, even though its economy was larger [7].

Export credit volumes, $bn
■ United States ■ G7 (excl. US) ■ China ■ Brazil, India, Russia
2007 08 09 10 11 12 13
Source: Export-Import Bank of the United States   *China data not available

Subsidised loans for exports have long been recognised as a form of mercantilism, which is why rich countries struck a gentlemen's agreement in 1978 to curb them. Signatories to the "OECD arrangement" agree to maximum loan maturities, commercially-based interest rates and minimum risk premiums for insurance. When one signatory strikes a financing deal, it notifies the others, giving them the opportunity to match the terms [8].

Given these safeguards, many advocates say official export credit is not really a subsidy at all but simply compensation for a market failure. Banks are reluctant to provide long-term export financing, to lend to countries with shaky political or legal regimes, or to small businesses, even more so since new capital standards have made such loans costlier. Export-credit agencies simply fill an unmet need—and their profits prove it [8].

These arguments are suspect. The scarcity of private financing for certain exports reflects genuine risks that taxpayers are forced to assume. The profit earned by lenders may simply reflect the advantages that come with being part of the government. The Congressional Budget Office reckons that if Ex-Im's future revenue were discounted using the interest rate paid by the Treasury (the bank's main source of funding), it would make a profit of $14 bn over the next decade. But discounting at market rates would turn that into a loss of $2 bn. This is far less than the implicit cost of federal student and mortgage loan guarantees. But it does not suggest Ex-Im has found lucrative untapped opportunities [8].

Even if export credit is a subsidy, advocates say it is unavoidable. Any high-minded country that refuses to subsidise exports simply surrenders sales, jobs and income to countries with no such qualms. If Ex-Im stopped financing sales of Boeing aircraft, the argument runs, either Airbus would grab market share, or Boeing would move production to another country that did finance those sales. This line was trotted out as a growing share of export finance took place outside the OECD arrangement. Two factors were at work. First, many OECD members use instruments not covered by the arrangement, such as "untied" development aid that implicitly, but not explicitly, pays for the donor country's exports, as is common with Japan's lending [8].

The second factor is the surge in lending by countries outside the OECD, above all China. Ex-Im reckons that China's official export credit in 2010 amounted to $45.5 billion. Adding in untied aid, project finance and other surreptitious forms of export credit boosts the total to $111 bn, more than a third of the global total. China regularly offers easier terms than the OECD arrangement would allow. Other countries feel obliged to match them, as Ex-Im Bank did in 2012 for a Pakistani purchase of locomotives [8].

Ordinarily, export subsidies are a bad bet even if used to match another country's handouts. The resources used to provide the support must either come from distortionary taxes or borrowing, which in normal times would raise interest rates and crowd out private investment. Industries receiving the boost would also absorb capital and labour that might be more productively used elsewhere. Unless foreign subsidies create some market failure (by threatening to destabilise an industrial cluster, for instance) the least harmful course of action may be to accept the foreign government's largesse. When the world was awash in savings and interest rates were near zero, the case against subsidies is weaker. Subsidising exports may boost demand for domestic production, leaving the country better off—unless, of course, every country does the same, in which case no one gets an advantage [8].

The WTO discourages protectionism by permitting a country hurt by another's subsidies to raise tariffs in retaliation. But this is of limited use with export credits because the victim is neither the importer nor the exporter, but a third country whose exports are artificially suppressed. That country would accomplish nothing by raising tariffs. The world would be better off without subsidised export credits. Failing that, the best solution would be for the OECD arrangement to cover more types of lending and more countries (OECD membership is not required to be a party to the agreement) [8].

Grey areas: export credit and industrial policies

In 2012 Fred Hochberg, head of the US ExIm Bank, joined the chief of Westinghouse on a sales trip in the Czech Republic. A Czech official, he recalls, told him they would not even consider Westinghouse's bid to expand a nuclear power plant without finance from his bank. Russia's state-owned nuclear-energy company, Rosatom, had already offered to fund half the project. Mr Hochberg promised to do the same if Westinghouse, a US unit of Japan's Toshiba, won the bid [9].

"It's time to drop the fantasy that a purely free market exists in the world of global trade," Mr Hochberg told an US audience shortly after returning from Prague. "In the real world our private enterprises are pitted against an array of competitors that are often government-owned, government-protected, government-subsidised, government-sponsored or all of the above." Russia was particularly active, pledging $38 bn to finance Rosatom's global ambitions [9].

The rival loans from the US and Russia to win the Czech Republic's business do not fit the usual definition of protectionism. Less overt protectionism has crept back in often to avoid running afoul of WTO rules. The WTO concentrates on measures designed to keep out imports (e.g., tariffs and quotas). Global Trade Alert (GTA), a monitoring service operated by the London-based Centre for Economic Policy Research, defines protectionism more broadly as anything that hurts another country's commercial interests. It thus includes government bailouts of domestic companies, wage subsidies, export and VAT rebates, export credits and financing from state-owned banks. For example, it classifies France's loan guarantee to the financing arm of PSA Peugeot Citroën, a carmaker, as protectionist because, by helping sales of the company's cars, it hurts their competitors' sales. It reckons that at least 400 such "beggar-thy-neighbour" policies have been put in place each year since 2009, and that the trend is on the rise. Many countries do not complain about covert protectionism because they are guilty of it themselves: The reaction of many trading partners to illegal subsidies is to have subsidies of their own [9].

Brazil has perfected the art. In 2012, looking for a way to reduce car imports, it introduced a new programme to encourage innovation, Inovar-Auto. Designed to stay within WTO rules, this required Brazilian car manufacturers (all foreign-owned) to invest in local innovation and engineering and to meet certain fuel-efficiency standards by 2017, or else face higher excise taxes and import tariffs on domestic sales. This has boosted domestic investment in engineering and fuel-saving technology [9].

Brazil has also used state-controlled companies and banks to encourage domestic innovation and industry. Over the past decade it has required Petrobras, the state-controlled oil company, to meet ever tougher domestic-content requirements. BNDES, the state-owned development bank, expanded its lending and equity investment since 2007 by 140%. Recepta, a biotech company, received a grant, a low-interest loan and, a direct equity investment by BNDES worth about $15m. José Fernando Perez, who founded Recepta in 2006, does not like the Brazilian government's propensity to meddle in markets, but he makes an exception for innovation policy, noting that Australia, Britain and the US all subsidise basic biotech research. "I could not have survived if I'd paid commercial interest rates." Even so, he complains about the thickets of red tape that make it hard for his company to develop and test its new drug [9].

It is no surprise that the BRIC countries figure prominently in GTA's record of covert protectionism. Thanks to their embrace of state capitalism, the line between industrial policy and export subsidy is blurred or non-existent. China has long used compulsory joint ventures, technology transfer and access to cheap land and loans from state-owned banks to boost companies in strategic sectors. In the mid-2000s it invited foreign manufacturers, including Germany's Siemens and Japan's Kawasaki, to supply locomotives for its high-speed rail network. Later it switched to Chinese companies, which now compete with Siemens and Kawasaki in foreign markets [9].

A similar story unfolded in wind power. After 2000 foreign companies such as Spain's Gamesa had a significant share of China's market for wind-power turbines, but now Chinese companies, many using skills acquired as partners or subcontractors to Western suppliers, along with subsidised land and credit, dominate the Chinese market and compete fiercely with those original Western suppliers [9].

For decades rich countries have financed exports within guidelines laid out by the OECD, but after the global financial crisis much more business has been conducted outside those guidelines. They do not cover non-OECD countries such as Russia, Brazil and, of greatest concern to the rich world, China, which has used export finance to turn its construction-equipment manufacturers into world leaders. But OECD countries, too, have found ways to offer loans that are not covered by the guidelines, such as floating-rate loans. The ExIm bank reckons that in 2012 export credit regulated by the OECD guidelines amounted to $120 billion, unregulated credit by OECD countries to $110 billion and lending by Russia, Brazil, India and China to $70 billion [9].

The US has been no slouch itself. The ExIm bank made new loans of $31 billion in 2012, up from $8 billion in 2007, and focused on key industries: oil and gas; mining and agriculture equipment; agribusiness; renewable energy; medical technology; construction; aircraft; and power generation [9].

Although export promotion and industrial policy are less likely to trigger retaliatory action and trade wars than import suppression, that does not make these subtler methods less distortionary or damaging, says GTA's Mr Evenett. If country A's exports to country B benefit from generous export credit, country B can complain. But the real damage is being done to the exports of other countries that are being hit indirectly [9].

And just like import tariffs, export subsidies cause many distortions. Delta Air Lines, for example, has complained it was hurt by ExIm Bank's financing of the purchase of Boeing jets by Air India, which competes with Delta on certain routes. And should a loan go bad, taxpayers would have to foot the bill [9].

Industrial policy also often has unexpected consequences. In 2010 India required central-government solar-power projects that used crystalline modules and, later, cells to source them locally. Since India has a limited capacity for producing such technology, many developers imported American-made thin-film transistor technology instead, taking advantage of low-interest loans from ExIm bank [9].

Brazil's industrial policy, too, is riddled with problems. Buy-local requirements hampered Petrobras's ability to exploit new deep-sea oil deposits because the country's capacity for producing oilfield equipment was limited. Idiosyncratic fuel standards mean the new engines spurred by Inovar-Auto restricted export potential. Brazilian businesses appreciate the help they get from the government but would prefer more growth-friendly policies on taxes, investment and pay [9].

Hidden protectionism and industrial policy may boost specific industries or exports, but that does a country no good if other policies stifle private enterprise and cause underinvestment in human and physical capital. Brazil and India have been held back because their governments funnelled state resources to preferred sectors and constituencies instead of boosting their economies' underlying potential, slowing down their growth [9].

In China, covert protectionism helped domestic manufacturers achieve formidable market share at home and abroad, but excessive lending by state-owned banks to state-owned enterprises and local government caused investment and property bubbles [9].

Another means of promoting exports that is popular with politicians is the creation of free-trade zones, or special economic zones (SEZs). SEZs are all the rage among governments hoping to pep up their trade and investment numbers. "Any country that didn't have [an SEZ] in 2005 either does now or seems to be planning one," says Thomas Farole of the World Bank in 2015 [10].

Studying history may give eager trade ministers pause. SEZs—enclaves in which exporters and other investors receive tax, tariff and regulatory incentives—create distortions within economies. Other costs include required infrastructure investment and forgone tax revenues. The intent is for these costs to be outweighed by the boost to jobs and trade. In reality, many SEZs fail. Performance data are elusive because the effects of zones are hard to disentangle from other economic forces. Anecdotal evidence suggests they fall into three broad categories: (1) a few runaway successes, (2) a larger number that come out marginally positive in cost-benefit assessments, and (3) a long tail of failed zones that either never got going, were poorly run, or where investors gladly took tax breaks without producing substantial employment or export earnings [10].

SEZs have a long history: the first free-trade zones were in ancient Phoenicia. The first modern one was set up at Shannon airport in Ireland in 1959, but the idea took off in the 1980s after China embraced them. There are now more than 4,000 SEZs (see chart, number of SEZs). A study conducted in 2008 estimated that 68m people worked in them. They come in many forms, from basic "export processing zones" to "charter cities", urban zones that set their own regulations in all sorts of areas that affect business [10]

The biggest success story is China, whose decision in 1980 to create a zone in Shenzhen transformed the city into an export powerhouse. Dozens of SEZs have since popped up across the country. In March 2015, Xi Jinping, the president, urged a faster pace of roll-outs. Other successes include the United Arab Emirates, South Korea and Malaysia. The Philippines won praise for its "PEZA" zones, which offer a streamlined permit process for foreign investors, says Shang-Jin Wei of the Asian Development Bank. Most economists agree that SEZs catalysed liberalisation in China, which used them to test reforms that were seen as too hard to unveil nationwide. In the Dominican Republic they helped create a sizeable manufacturing sector in an economy previously reliant on agriculture [10].

Number of special economic zones worldwide '000

Countries with SEZs, % → 73

SHANNON AIRPORT — 1   SHENZHEN

1959 70 80 90 2000 10 14

Sources: International Labour Organisation; T.W. Bell, Chapman University

The overall impact of SEZs on trade is poorly understood. A paper by economists at Paris-Dauphine University (2014) found that, for a given level of tariff protection, SEZs increase exports for the countries they are in and for other countries that provide intermediate goods or components. This helps explain why the WTO generally tolerates SEZs, even though many breach its subsidy rules. However, the paper also concluded that zones sometimes give countries an excuse to retain protectionist barriers around the rest of the economy [10].

Other problems pop up: bureaucracy can be excessive or the bureaucrats underfunded (or both); and too little spent on railways, roads and ports to link the zone to the rest of the world. Many African SEZs struggle for such reasons. One in Senegal flopped due to excessive bureaucracy, high electricity costs and its distance from a good port [10].

Developers have withdrawn from 61 of the 139 approved SEZs in the Indian state of Maharashtra because of capricious policymaking, a murky screening process and concern over economic prospects. One survey found that firms had to deal with 15 different agencies to do business in an Indian zone. Violent protests by locals over land acquisition for zones have deterred investors [10].

Moreover, governments sometimes embrace SEZs for the wrong reason: to win praise for reform (and votes) without having to risk full liberalisation. Partial liberalisation can also be a way to preserve some of the rents earned elsewhere by shielding businesses from competition. Some zones are vehicles for corruption or money laundering. In 2005 some 60% of firms in Indian SEZs reported having to make "irregular" payments to zone authorities. Ukraine's prime minister opposed SEZs because of corruption. SEZs in Nigeria were resisted by the customs agency, which did not want to lose its clout. By inflating export values, SEZs can launder money [10].

The SEZ concept appears to have natural limits, too. What works in manufacturing may not work in other sectors. The Shanghai Free Trade Zone, launched in 2013 and focused on finance, has disappointed. Economists fret that it is impossible to tinker within the zone with China's capital controls, for instance, without the effects spilling over to the rest of the economy. Perhaps as a result, the authorities have been cautious: in a recent survey, three-

quarters of US firms in Shanghai said the zone offered them no benefits [10].

 This has not stopped China approving plans for more financial SEZs. The government is also promoting zones abroad: it is helping six African countries to set some up. Although China's are state-run, more SEZs are likely to be privately owned and operated. <mark>The Philippines already has more than ten times as many private zones as public ones. This shift may go further, if privately run charter cities and other so-called "special governance zones" gain traction. The idea is to create enclaves that write their own rules in all business matters, from labour regulation to anti-corruption codes</mark>—"to look at laws as services that companies demand", says Lotta Moberg of George Mason University. Such ventures will provide competition more effectively than zones focused on fiscal incentives [10].

Analyzing domestic support: a small net importer
To simplify, the analysis of the economic, trade and welfare effects of domestic support is limited to the small-country case under the condition of a perfectly competitive market. The intention is to focus on the government's policy objective and how the program affects the domestic market. Of course, a subsidy program can have implications for trade and those effects influence the policy objective <mark>because there is an interplay between domestic support and market access</mark>. Thus, some subsidy or support will require complementarity of a trade policy instrument. Thus, it is also useful to highlight the effects of agricultural programs by large countries whose subsidies affect world markets.

Suppose that a government decides to protect or support a particular sector in the domestic economy. Furthermore, <mark>the objective is to ensure that some targeted level of production is met</mark>. This can be achieved <mark>by supporting the output price, subsidizing inputs (or a tax incentive) to support production, or through the provision of an income support conditional on the targeted level of output</mark>.

In figure 3 the case for protecting/supporting a sector is presented for a net importing country. The base situation is the free trade equilibrium. Under free trade, $[Q_S]_{FT}$ is the level of production but, for whatever reason, policymakers have decided that the level of production is inadequate, and that $[Q_S]_1$ is more appropriate for society. The issue is to determine which policy instrument is most appropriate to achieve the objective by comparing trade and welfare effects.
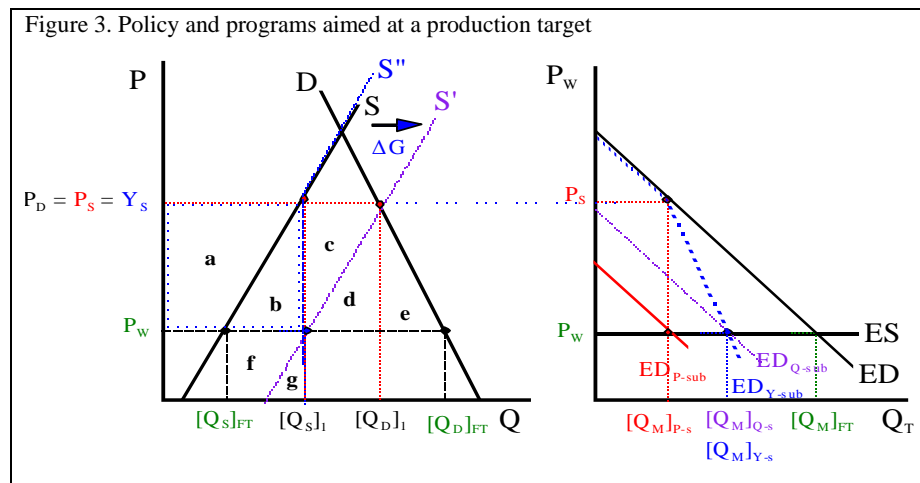
$[P_D – P_W]$ would encourage production to the desired level, $[Q_S]_1$. Producer surplus is equal to area (a) and the consumer surplus loss would equal area (a+b+c+d+e) as reported in table 2.

Table 2. Welfare effects under various programs whose policy objective is a targeted volume of output, $[Q_S]_1$

	Import tariff regime		Price support program	
	Welfare estimate	Tax/subsidy equivalent	Welfare estimate	Tax/subsidy equivalent
ΔCS	-(a+b+c+d+e)	-(a+b+c+d)	-(a+b+c+d+e)	-(a+b+c+d)
ΔPS	+(a)	+(a+b)	+(a)	+(a+b)
ΔG	+(c+d)	Tax received	+(c+d)	Tax received
ΔNSW	-(b+e)	DWL$_S$	-(b+e)	DWLs

	Production support program		Income support program*	
ΔCS	0	No tax	0	No tax
ΔPS	+(f)	Support	+(a)	+(a+b)
ΔG	-ΔG	Program cost	-(a+b)	Program cost
ΔNSW	+(f) - ΔG	Benefit – cost	-(b)	DWL$_Q$

Note: * Income supported at the same level as price support, $P_S = Y_S$

Similarly, a price support program would intentionally set an administered price at P_D to encourage output at $[Q_S]_1$. However, to ensure the administrative price is not undercut on the domestic market by imports, a tariff of rate $[P_D – P_W]$ would be necessary. In other words, the price support scheme requires tariff protection and tariff protection provides price support. The economic, trade and welfare effects are identical in this case: there is price support equal to tariff protection, $[P_S – P_W] = [P_D – P_W]$; the quantity supplied is $[Q_S]_1$, quantity demanded is $[Q_D]_1$, and quantity imported at $[Q_M]_{P-S}$, and net welfare effects are equal to the dead-weight losses in production and consumption, area (b) and area (e), respectively.

What is noteworthy is the role of the government. Because the price support requires tariff protection, the government collects tax revenue equal to area (c+d). The support received by producers is paid for by consumers and not by the government. Hence, this does not meet the legal definition of a subsidy despite one recognizing that the support producers receive is the result of a government-administered price set above the market price which is protected by a trade restriction. Table 2 shows the welfare areas associated with the different programs considered.

A second program that appears in figure 3 is a production subsidy. In this case the objective is to increase output but without supporting the price. The government assumes the expense of reducing production costs for the producers, (i.e., ΔG is the budgetary outlay associated with the cost of

Figure 3. Policy and programs aimed at a production target

the program, e.g., a subsidized input price or a tax exemption), shifting the supply curve to S' and increasing output to $[Q_S]_1$ at the prevailing market price, P_W.

The support to production to achieve a level of $[Q_S]_1$ is a more targeted measure than supporting the output price. A value of support equal to area (g) can be enough to encourage producers to provide the additional output. Consumers can be left unaffected paying the same price, P_W, to consume $[Q_D]_{FT}$ as under the free trade equilibrium. The volume imported decreases relative to the free trade equilibrium to $[Q_M]_{Q-s}$ which is equal to $[Q_D]_{FT} - [Q_S]_1$. However, the import volume is greater than under the price support that

First, it must be noted that any policy intervention results in a redistribution of income, taxing some agents while supporting others. Consider a trade policy instrument aimed at protecting the sector. A specific tariff of the rate

achieves the same level of production. The excess demand (ED) under the production support is shown as a leftward shift to $[ED]_{Q-S}$, intersecting the horizontal ES curve at P_W, $[Q_M]_{Q-S}$.

This program would satisfy the legal definition of a subsidy because the cost of providing inputs below market prices to producers would imply a government outlay, which would appear in the national budget. That actual cost is unobservable in figure 3, but the shift in the supply curve is the result of a government outlay, ΔG, which should be observable in the national budget. How the program affects net welfare depends on the cost of the program, ΔG, relative to the benefit to the producers, area (f), the benefit to the firm implied by the savings from lowering of cost of inputs.

It could be concluded that the cost of the program would exceed the benefits. Otherwise, it would make sense for the market (investors) to fund producers' increased input use to increase output and profit.

A price support at $P_S = P_D$ increases production to the targeted level resulting in an exportable surplus of $[Q_S]_1 - [Q_D]_1$, or $[Q_X]_{So}$ units exported. The export subsidy value per unit would be the amount at which the price is supported, i.e., $P_D - P_W$ and the export subsidy equivalent would be area (b+c+d+e+f). A price support would have the same effect as an export quota at $[Q_X]_{So}$ shown as ES_q.

Figure 4. Export subsidy equivalence of domestic support programs

Finally, an income support program might be considered. For comparison, let producers' income be supported at the same level of the price support, $Y_S = P_S$, but the income support is conditional on maintaining the desired level of production, $[Q_S]_1$. Production over the desired level is not eligible for the income support. Thus, the production-limiting condition of the income support is like setting a production quota at $[Q_S]_1$. The supply curve is kinked, rising from $[Q_S]_1$ until it meets the original supply curve, S, and then traces it along S". If market prices were above the income support, then producers could respond to output as per their supply curve. Again, consumers are unaffected by the program, paying P_W and consuming $[Q_D]_{FT}$. Producers receive an income support payment equal to $[Y_S - P_W]$ per unit at a total cost to the government equal to area (a+b). The support equivalent to producers is area (a) with part of the cost of the program lost as a dead-weight loss, the value equal to area (b).

The amount imported is the same as under the output support, with the excess demand curve kinked at the level of the income support, Y_S, intentionally set at the level of the price support, P_S. Below that price, the ED_{Y-sub} curve slopes down by an amount equal to $D - [Q_S]_1$ until it hits ES at P_W, $[Q_M]_{Y-s}$.

Both the production support and the income support achieve the desired level of output without distorting price, P_W, which makes them less trade distorting. The import volume is greater than under the prices support – tariff protection equilibrium. The welfare effects are likely less costly for society as well as there are no dead-weight losses in consumption. However, there is not sufficient information to conclude by how much the cost of the production subsidy exceeds the benefits to producers.
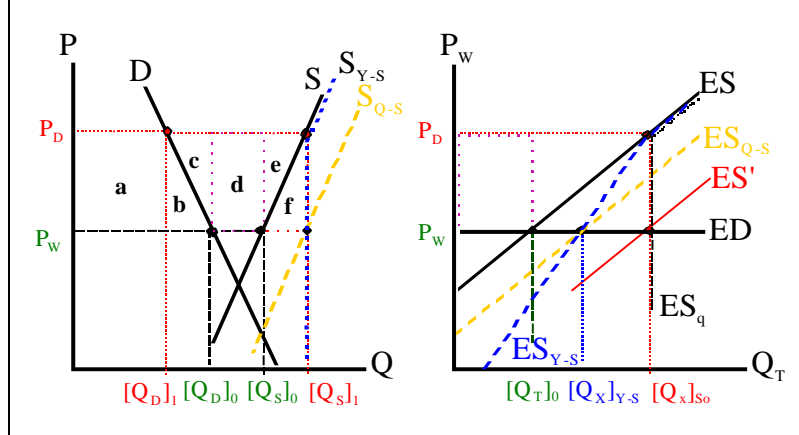
Analyzing domestic support: a small net exporter
When domestic support is offered to producers in a net exporting country, the implication is a larger surplus (unless there are programs in place to increase consumption or use of the good domestically). Thus, programs that affect production can have the effect of increasing exports as well. There will be an export subsidy equivalence of a domestic support program.

In figure 4, price and income support are matched against a production subsidy targeting the same level of production. The government's objective is not to increase exports, per se, but rather to increase production to $[Q_S]_1$.

Suppose instead the targeted level of production of a good was targeted through production support, a program that encourages output to $[Q_S]_1$, without affecting the market price. This could be shown as an input subsidy that shifts the supply curve to S_{Q-S}. Output would increase without taxing consumption. Thus, the volume exported would increase, but by less than a price support. The shift in supply is matched with a shift in ES, but the exported volume would amount to $[Q_X]_{Y-S}$. The cost of the program is not observable in the figure, but the shift in supply would imply a cost of the program.

Finally, an income support program could also achieve the objective of meeting the targeted level of production. The government could make the income support conditional on production at $[Q_S]_1$, again without directly affecting the market price. In this case the effect of the program would be the kinked supply curve, S_{Y-S}. The supply is vertical at $[Q_S]_1$, i.e., production no less than the targeted level, rising to the original supply curve. In this example, the level of income support is set at P_D, the same level of support as under the price support. At that P_D along the original supply curve, S_{Y-S} becomes kinked. That is, if the market price ever went above P_D producers could produce more than $[Q_S]_1$. Output would increase without consumers being taxed, so again the exportable surplus is less than in the case of a price support at P_D.

The ES_{Y-S} is also kinked starting with a surplus of $S - D$ at a price of zero and increases until it becomes identical to the original ES curve at P_D. The exported volume is the same as under the production subsidy, $[Q_X]_{Y-S}$, and the equivalent value of the export subsidy is area (d+e+f). Thus, under WTO rules, consistent with economic theory, production and income support are more appropriate policy alternatives to a price support in meeting and support objective or a production target. In both cases, there is less of a trade distortion.

3. WTO Commitments on DS and ES

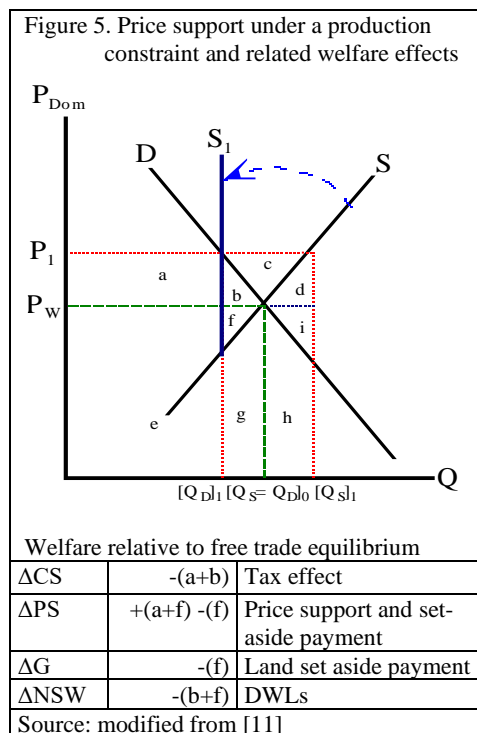**Background on agricultural subsidies**
Support for agriculture in the post-World War II era until the conclusion of the UR-GATT was characterized by governments finding a means of controlling farm commodity surpluses. High war time prices and access to production technology rapidly expanded farm out in the late 1940s, particularly in the US. The surge in output exceeded the growth in demand, putting downward

pressure on prices. But in the post-war period support programs increased agricultural output in net exporting and importing countries alike.

Across the mature economies, agricultural policy aimed at raising production to achieve a level of self-sufficiency and/or to bring up rural income levels in line with urban income levels. Over time, as the output objective was achieved, agricultural programs required land retirement schemes to reduce production surpluses. For a net exporting country such as the US, foreign demand helped maintain sales, but increases in productivity in Europe and Asia, for example, weakened foreign sales and stocks began to accumulate.

In Europe, the Common Agricultural Policy's success helped convert the EC into a net exporter of some crops or to reduce its net importer status across a range of agricultural commodities. Heavy protection and support created surpluses that became a costly burden to governments which had to find a means of addressing the surpluses, stockpiling goods through stock interventions or turning to export subsidization. By the 1980s, US and EC surpluses produced a tit-for-tat export subsidy war in wheat.

Figure 5 illustrates the trouble with supporting price above the market price and the need for production controls. For convenience, the domestic market price is set at P_W initially where the market clears, $Q_S = Q_D$. When the government supports price above the market price at P_1 the result is a surplus of $[Q_S]_1 - [Q_D]_1$. The government now requires a program to address the surplus. There are four options: destroy the surplus which is an outright admission of a policy failure; distribute the surplus through a food program (e.g., a school lunch program), presumably without displacing the private sector; maintain publicly-owned stocks, without displacing private actors; or compensate foreign sales through an export subsidy at a cost of $(P_1 - P_W)$ for each unit sold abroad.

Figure 5. Price support under a production constraint and related welfare effects

Welfare relative to free trade equilibrium

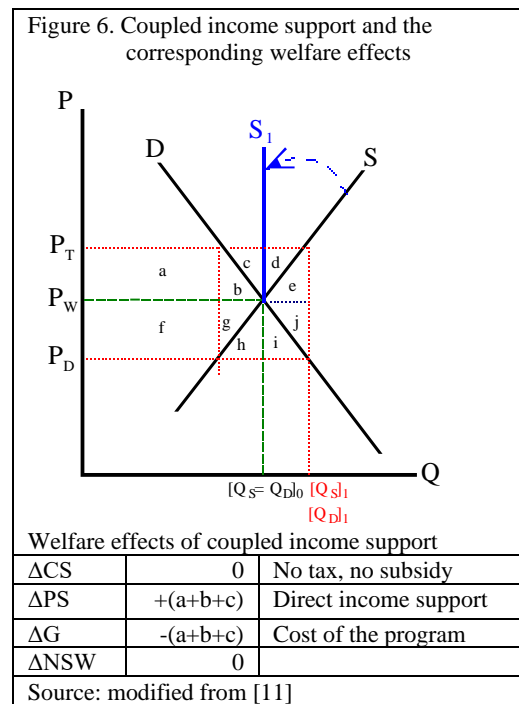| ΔCS	-(a+b)	Tax effect
ΔPS	+(a+f) -(f)	Price support and set-aside payment
ΔG	-(f)	Land set aside payment
ΔNSW	-(b+f)	DWLs
Source: modified from [11]		

Rather than any of these options, suppose that government wanted to avoid the surplus by requiring producers to retire land, e.g., imposing a land set-aside program. Continuing with figure 5, this would shift supply from S to S_1, which kinks at $[Q_D]_1$. Ideally, the removal of land from production would bring output in line with demand, with the market clearing at the price support, P_1, and D = S_1 at

$[Q_D]_1$. However, taking land out of production reduces producers' income. Relative to a free trade equilibrium, the land set-aside program has a cost to producers who lose an equivalent value of area (f). A government outlay in the form of a set-aside payment can compensate for the loss in whole or part. Assuming an outlay of the same value would leave producers indifferent in terms of their income. The net change in social welfare would be area (b), the dead-weight loss in consumption. Area (a) would be a transfer from consumers to producers and area (f) is a transfer by the government, a direct payment for the set-aside loss.

In reality, production controls were not an effective means of supporting price or reducing surpluses. First, set asides may have successfully taken land out of production, but it led to the most marginal land being removed. Second, land set asides with price supports encouraged intensification of agriculture as chemicals, improved seeds and other inputs substituted for land which increased yields on land in production. As a result, supply shifted further to the right and restored the surpluses over time.

In the 1970s, the US pioneered coupled income support payments to farmers. Income was supported at a price above the market rate but only for a targeted level of output. Income was supported at an administered price, a target price (P_T), and a per unit payment based on P_T was made. That is, the income support was tied to the level of production, or that it was coupled.

For example, in Figure 6, the initial market situation is a market-clearing equilibrium, i.e., P_W, $[Q_S = Q_D]_0$. The government's intention is to provide support without distorting trade or creating a surplus situation. A target price is announced at P_T, but that the market clears without any other policy intervention (i.e., no price support). P_T would be a guaranteed government price for producers regardless of what they would earn from the market, conditional on production at $[Q_S]_1$.

Figure 6. Coupled income support and the corresponding welfare effects

Welfare effects of coupled income support

ΔCS	0	No tax, no subsidy
ΔPS	+(a+b+c)	Direct income support
ΔG	-(a+b+c)	Cost of the program
ΔNSW	0	
Source: modified from [11]		

Producers would increase production to $[Q_S]_1$. The domestic market clearing price would be at P_D. Consumer expenditures would total $P_D \cdot [Q_S]_1$, which would be the revenue producers received from the market. Producers would receive a supplemental income support payment of $(P_T - P_D)$ per unit from the government, resulting in a total government outlay of $[P_T - P_D] \cdot [Q_S]_1$ equal to the area (a+b+c+d+e+f+g+h+i+j). Such a program without

production controls would prove to be very costly and taxpayers would take notice. The advantage of this program is that the market clears without a trade distortion and consumers are not taxed to support producers. (This assumes the consumer is a different person from the taxpayer.) The net welfare effects would still result in a loss of area (e+j) reflecting the dead-weight losses (DWLs) in production and consumption, respectively. This would be an example of amber box income support because it is coupled (i.e., directly related) to production.

If instead the government needed to limit the cost of the income support program, a production quota could limit supply to the previous level, at $[Q_S]_0$, along S_1. Producer income is supported at the guaranteed price, P_T, but the market clears at P_W and $[Q_S = Q_D]_0$. The government's outlay for this program would be a per unit payment of ($P_T - P_W$) to the producer, or total income support payments worth area (a+b+c). Consumers would be unaffected, and the net social welfare change would be zero because the income support payment would be a pure income transfer (no change in the output level).

Now, suppose that the announced income support was not based on a rate known in advance. That is, the support would be based on the differential between the target price and the market price, but the market price is an average price of the good after it is sold. This the producer does not know in advance. What the producer does know is that there will be an income supplement if and when P_T is higher than the average market price in the future.

Let there be two producers (farmer 'i' and farmer 'j') of a specific commodity for which the government implements an income support program. To control the costs of the program, the government specifies the volume that is eligible for income support. To participate in the program each producer agrees to limits on their production, $[q_S]_i$ and $[q_S]_j$, respectively, for farmer 'i' and 'j'. These volumes could be established based on some historical average output per hectare they produced. Anyway, $[q_S]_i$ and $[q_S]_j$ sum to the specified volume eligible for national income support as depicted in Figure 6.

Next, the government announces that the income support payment is based on the difference between the target price, P_T, and the average market price, P_W, over some specific period. The market price varies over the marketing year and each producer decides when to sell, based on their understanding of the market. To ensure that producers take an interest in marketing and selling at the highest price, the government can announce a lower limit on what the market price can be (and reducing the income support payment).

Figure 6. Semi-decoupled income support
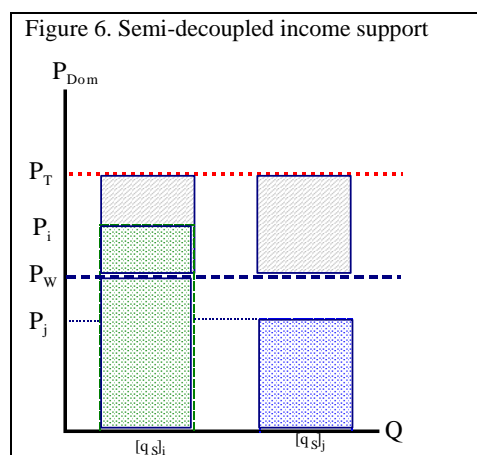
The market situation in this case shows that farmer 'i' sold at a high price, P_i, whereas farmer 'j' sold at a low price, P_j. The average of the prices is the market price, P_W.

Farmer 'i' earns revenue equal to $P_i \cdot [q_S]_i$ from the market while farmer 'j' earns $P_j \cdot [q_S]_j$. In addition to the revenue from the sales on the market, each producer earns an income support payment based on $P_T - P_W$. The total cost of the income support is equal to $[P_T - P_W] \cdot [q_i + q_j]$. By selling at a high price, farmer 'i' earns $P_i - P_W$ from the market and again in income support. Farmer 'j' loses $P_W - P_j$ by selling below the market price. Thus, an incentive to sell at a higher price is cooked into the program and the government can find other means to limit its support payout such as by specifying the average price during a period when prices are at their highest during the marketing year (and excluding the months around harvest when prices tend to be at their lowest). This would help ensure that the per unit cost, $P_T - P_W$, is low because the average price, P_W, would be at its highest.

In this semi-decoupled income support program, consumers are unaffected as the market price is not directly affected by the program. Producers do not have full knowledge of the per unit payment rate. The payment is based on some announced rate, the difference between a known target price and an unknown average market price. Market discipline is reinforced as producers are incentivized to sell at high prices, lowering the potential cost of the program. If such a program is not accompanied by trade policy (e.g., no tariff protection or subsidies for exporting), then it can serve as a means of reform or structural adjustment, rewarding efficient producer-marketers and penalizing the inefficient. Unfortunately, the reality is that trade policy has always accompanied agricultural income support programs, making the payment more tied to production to avoid actual reform.

Moreover, the fact that income supports are transparent, an observable budgetary outlay, makes it politically more vulnerable to taxpayer backlash. Furthermore, producers complain that income support made producers "employees" of the state, losing their independence to make their own production decisions. This, producers argued, was more the case when payments were most decoupled from production.

WTO rules on income support programs look at the cost of the program and its production and trade implications (and disregarded the any price effect that simultaneously applied). If the income support was coupled to production, it fell under the amber box. If the income support required a reduction in output relative to the base year, it fell under the blue box. If there was tariff protection on imports of a like good, then this was computed as market price support and was not linked to the income support.

Income support under the green box was made to producers regardless of what they produced and how much they produced, and the payment was not linked to current production. Producers could receive the support even if they chose not to produce. Thus, it is not clear how production of a particular agricultural good would be affected. The income support could lead to efficient producers producing more and inefficient producers producing less, but the net effect could be positive or negative in terms of overall production. However, in this way the program could gradually reduce inefficient producers from remaining in the sector, resulting in structural reform. Nevertheless, if tariffs were also in play, then structural reform based on inefficient producers leaving the sector would stall structural reforms. This seems to be what has happened.

UR-GATT implementation commitments
The UR-GATT implementation period, 1995-2000, was relatively quiet for cases involving agricultural subsidies because Member states respected their bound rate ceilings and reduction commitments in compliance with their

13

obligations. When negotiations during the Doha round started, the agenda for the new commitments had to be agreed and given the expanded and varied membership, addressing agricultural subsidies was a top priority. But even so, economists were not in agreement on what the implications of eliminating subsidies would do to developing countries' welfare.

In table 3 is the computation of the aggregate measure of support for 2001 (current total) relative to the bound value of AMS, i.e., the ceiling on the value of support the EU was allowed. The current total AMS, amber box support less the de minimis level of support, amounted to €39.3trn relative to its bound rate of €67.2trn.

Table 5. Total ES commitments, US, EU, and Norway					
Base 1986-90	Sum 1995-00	1995-2000	2000	2001-2010	2011-2018
US AMS commitments, $ million					
Bound	5 283.4	880.6	594.4	594.4	-
Outlay	501.5	83.6	15.3	86.6	-
EU-15 and EU-27 AMS commitments, € million					
Bound	57 539	9 590	7 448.4	7 705.5	-
Outlay	28 524	4 754	2 763.2	1 653.5	-
Norway, AMS commitments, NOK million					
Bound	4 313.7	862.4	493.2	493.2	493.2
Outlay	3 738.0	505.3	393.2	288.2	177.5
Source: www.wto.org; ES doc series, G/AG/N/USA/; G/AG/N/EEC and EU; and G/AG/N/NOR					

Table 3. Calculation of EU current total AMS, 2001, € million						
	Type of AMS		Production value		Notified AMS	
Selected products	Product specific	Equivalent support	Total	5%	De minimis	Current total AMS
Wheat	1 236.6		8 984	449.2		1 236.6
Grains	8,2		23 429	1 171.5	8.2	0.0
Barley	1 640.4		4 963	248.2		1 640.4
Sugar	5 732.2		8 938	446.9		5 732.2
Milk	212.2		40 134	2 006.7	212.2	212.2
Beef	9 708.7		20 671	485.4		9 708.7
Apples		2 059.5	4 334	216.7		2 059.5
Total-all	29 934.9	9 183.9	246 418	12 320.9	289.8	
Non-product-specific		573.5			573.5	
Current total AMS					863.3	39 281.3
Current total bound AMS						67 159.0
Source: www.wto.org; constructed from notification docs, G/AG/N/EEC/51						

In table 4 is the reduction commitments of AMS over time for the US, EU and Norway relative to the base rate of support from 1986-88. In 2000, the bound value of support has been reduced by 20% relative to the base rate. The bound rate remains the same after 2000, except for the EU whose membership increased, adding the AMS of each new member to the total AMS of the EU. The applied rate of support is less than the bound rate in compliance with WTO obligations. However, in the case of the US and EU there was more room for support, implying that the bound rate is a non-binding constraint. For Norway, the applied rate is very near the bound rate, suggesting that Norway has little room for further amber box support.

Table 4. Total AMS commitments, US, EU, Norway						
Base 1986-88	1995-00	2000	2006	2007-17	2018	Commitment
US AMS commitments, $ million						
23 879	21 093	19 103	19 103	19 103	19 103	Bound rate
-	10 401	16 843	7 742	4 980	13 085	Applied rate
EU-15 and EU-27 AMS commitments, € million						
83 949	72 916	67 159	72 244	72 378	72 378	Bound rate
-	48 242	43 654	26 632	7 752	5 137	Applied rate
Norway, AMS commitments, NOK million						
14 311	12 641	11 449	11 449	11 449	11 449	Bound rate
-	10 468	10 293	10 766	10373	10 106	Applied rate
Source: www.wto.org; DS doc series, G/AG/N/USA/; G/AG/N/EEC and EU; and G/AG/N/NOR						

In table 5 the commitments under export subsidy use are reported, in value terms relative to the bound rates for the US, EU and Norway. The US and EU had already phased out their use of export subsidies after 2011. Norway completely phased out its export subsidies in 2021.

Rich countries were under pressure to end their farm subsidies during the Doha round talks, but not all poor countries would be benefitted by their removal. Burkina Faso, in west Africa, is an example of a country that would benefit because it depended on cotton for about 40% of its merchandise exports. According to the International Cotton Advisory Committee, a body that advises governments, world prices would have been about 26% higher in the 2001-02 season were it not for the $4 billion the US subsidized its cotton growers [12].

However, Jagdish Bhagwati, an economist at Columbia University and defender of globalisation, was wary of the effects of eliminating subsidies. Agricultural subsidies are certainly undesirable, he wrote in the *Far Eastern Economic Review*. But the claim that removing them will help the poorest countries is "dangerous nonsense" and a "pernicious" fallacy [12].

Arvind Panagariya[4], a colleague of Mr Bhagwati's at Columbia University, agreed. His argument rests on a surprising observation: most poor countries are net importers of agricultural goods. A study in 1999 found that 33 of the 49 poorest countries imported more farm goods than they exported; 45 of them were net importers of food. Subsidies depressed the price of agricultural products on world markets. That hurts rival exporters, as Burkina Faso can testify. But importers gained [12].

Thus, the repeal of subsidies should benefit exporters but hurt importers. An IMF study by Stephen Tokarick[5] estimated the effect of OECD countries scrapping their subsidies (but keeping their tariffs). Brazil and Argentina, both strong agricultural exporters, would gain. The rest of Latin America would lose. India would benefit a bit, but the rest of South Asia would be worse off. Sub-Saharan Africa, North Africa and the Middle East would also lose [12].

---

[4] Arvind Panagariya, "Agricultural liberalisation and the developing countries: debunking the fallacies", Sep 2005, available at http://www.columbia.edu/~ap2231/

[5] Stephen Tokarick, "Measuring the impact of distortions in agricultural trade in partial and general equilibrium". IMF working paper 03/110, 2003.

The impact on different households within a poor country is another question. William Cline[6], in a study for a US think tank, pointed out that poor households tend to be rural, and rural households tend to sell more food than they eat. For them, rising farm prices are to be welcomed. It is the urban poor that should worry—and maybe the rulers of poor and fragile nations, who have traditionally striven to keep food prices low. Hard-pressed peasants are less of a threat than disgruntled city folk within a stone's throw of the presidential palace. An end to OECD farm subsidies, however, would transfer money from town to countryside [12].

If such a transfer is to be welcomed, Mr Panagariya asks, why wait for OECD countries to cut their subsidies? Poor countries could take matters into their own hands by slapping a countervailing tariff on the subsidised produce. That would raise the domestic price of food, benefiting rural households. It would also be a neat way of raising revenue at rich countries' expense [12].

Such a tariff would only raise farm prices at home, of course. Mr Cline thinks most poor countries would benefit from a rise in the relative price of agricultural goods in the world market. Many poor countries possess an underlying comparative advantage in farm goods. Yes, they tend to be net importers of food. But that is deceptive. Thanks to the large aid flows such countries receive, they tend to be net importers of everything [12].

Mr Panagariya again demurs. He points out that many poor countries enjoyed privileged access to the sheltered markets of the EU. Thus, they already enjoyed higher prices for their exports than they could expect to find on the open market [12].

The sugar producers of Mauritius, for example, sold their produce behind the EU's steep import barriers at three times the market rate. By some estimates, the island owed almost 30% of its export earnings to the preferences the EU bestowed upon it. But these privileges were not without cost. The World Bank reckons that every $1 that a country such as Mauritius gained from its trade privileges costs the EU and the US $6. As an aid programme, it was not terribly efficient [12].

The paradox of the Doha round was that the members fighting hardest to retain subsidies, such as the EU, were those with most to gain from abolition. Poor countries, on the other hand, stood to gain more from cuts in tariffs. If they also liberalised their own agricultural trade, there would be further gains [12].

The US administration prided itself on taking an aggressive liberalising stance in farm talks [13]. Rob Portman, then US trade representative, offered to cut the US's farm-production subsidies ceiling [bound AMS] by 60%, which stood at $19.1 bn, if the EU agreed to cut its permitted subsidies, which totalled more than $75 bn, by 80%. These were the most trade distorting subsidies. Mr Portman also suggested the EU limit other subsidies, which do not distort trade as heavily [e.g. blue box], to 2.5% of the value of agricultural production. These two limits provided plenty of scope for creative accounting. Even as the US lowered the ceiling on the most trade-distorting subsidies, some of this money would be reclassified as something else [14].

To the big agricultural exporters, such as Brazil, handouts to rich-world farmers, however galling, matter less than access to rich-world consumers [14].

US administrations have long argued that the solution to farmers' problems is expanding markets abroad. The reality is more complex. While some corn, soyabean and big dairy farmers may be efficient enough to compete in world markets without subsidies, many of their counterparts in rice, sugar and fruit and vegetables are not. Even where US farm productivity is better than its competitors, higher costs and land prices wipe out the advantage. In rice, for example, US farmers have the highest yields in the world, of some 7 tonnes a hectare. According to a UN conference in 2004, their unit cost of production per tonne was $331 compared with $79 for Vietnam and $70 for Thailand [13].

Overall, the US subsidises its farmers less than many rich countries: in the early 2000s subsidies accounted for 17% of gross farm receipts compared with an average of 30% for OECD nations. But the export orientation of its farmers raises hackles elsewhere. Pedro de Camargo Neto, the Brazilian lawyer who put together the cotton case, regards the US as a worse offender than the EU, since subsidised US farmers compete with Brazilians in global markets. "Europe is a closed market, certainly, but the US is an unfair competitor," he says [13].

A World Bank study found that 92% of the benefit to the developing world from rich nations' farm liberalisation would come from cutting tariffs, not reducing or reforming subsidies. This placed the US in conflict with the EU – not just because the US wanted access to EU markets but because the EU emerged as one of the strongest of those holding out against a multilateral tariff reduction formula in Doha that would have cut higher import taxes across the world by more than lower ones [13].

While the EU's farm subsidies remain larger than those in the US, it pointed out that it moved in the direction of making them less distorting of trade. The latest version of the Common Agricultural Policy moved from the traditional regime of price supports towards making direct payments to farmers, "decoupled" from production. This reduces the incentive to overproduce or exporting the surplus driving down prices abroad [13].

The US, on the other hand, wanted to change the rules in the WTO to allow some of its current subsidies to continue. In particular, the US wanted to be able to keep a programme known as "counter-cyclical payments", which compensate farmers for falls in prices. Such payments, together with related marketing loans, increased six-fold in 2004 because of lower food prices. The US argued that, because such programmes were in essence a form of insurance and merely smooth farmers' incomes over time, they did not lead to overproduction [13].

Critics say the programmes act as a permanent production subsidy. In the 2005 OECD assessment of agricultural policies in its member countries, it argued: "Although potentially less distorting, counter-cyclical payments . . . continue to be significant and limit market signals" [13].

US farm programs offered a "bait and switch" trick. Direct payments were the bait, he explains, but they were replaced by an expanded programme of subsidised crop insurance. Direct payments were subsidies paid to producers of crops whether they actually grow the crops – or even plant them. The CBO calculated that more than two-thirds of the $50 billion saved by cutting direct payments would be used to boost other farm programmes, such as crop insurance and disaster relief. If crop prices fall, insurance payouts will explode, especially when crop

---

[6] William Cline, "Trade Policy and Global Poverty". Centre for Global Development and Institute for International Economics, 2004.

prices were near historic highs as in 2013 (see chart farm subsidies)[15].

Farm subsidies, $bn
Direct payments   Crop insurance
2004 05 06 07 08 09 10 11 12
Source: Environmental Working Group
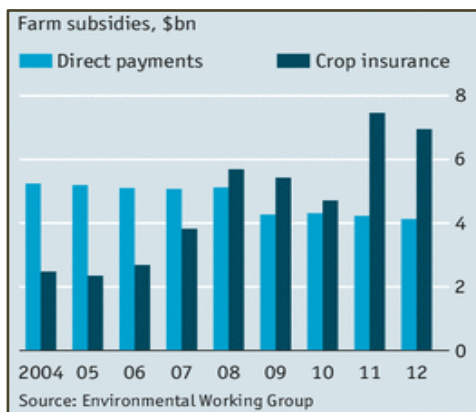
Federal crop insurance is not new; it began in the 1930s, but its cost rose from $2 bn in 2001 to $7 bn in 2012. Taxpayers paid two-thirds of each farmer's previous, and most of the claims. The 2012 drought led to crop-insurance payouts of $17 bn. Uncle Sam shouldered three-quarters of that. Insurance already costs more than direct payments, and there is no limit to how much of it farmers may receive. The bigger the farm, the bigger the trough. (If taxpayers need insurance against misfortune, they must pay for it themselves, of course) [15].

In the early 1990s, the EU had already begun reforming its Common Agricultural Policy (CAP). The MacSharry Reforms began the rethink of the logic of high tariff protection and price supports that produced mountains of surplus commodities that required stock interventions and export subsidies. It involved more coupled income support with production controls (compliant with the WTO's blue box support payments) which aimed at reducing the surpluses but acknowledged the need for export subsidies. With a view to the Doha round of negotiations, further CAP reforms were introduced under Agenda 2000, which increased coupled direct support, reduced price support to allow increased market access, and lowered export subsidies. The Fischler Reform in 2003 created a single payment scheme where decoupled income payments, with less production requirements, targeted environmental objectives and rural development. This further reduced export subsidies.

In 2010 the EU Commission kicked off a new debate on the reform of the CAP—a mere 40 years or so after the first such debate began. As always, France was the self-appointed leader of the pro-CAP camp. It remained the biggest single beneficiary, scooping up about a sixth of the EU farm budget of €57 billion in 2010. The French president said France should be "flexible" over subsidies, but "unbending" in its demands for more regulation of market prices and for "community preference" (ie, favouring EU produce over imports) [16].

The CAP reform came as the taps on farm money for eastern Europe opened (new members had only partial payments in their early years). In 2013 France would become a net contributor to the CAP—and, coincidentally, be more open to budget rigour. The switch from taxpayers' cash aid to price support via "community preference" is a step back from reform [16].

EU leaders agreed that the overall budget should focus more on competitiveness. There was talk of money for non-CAP things like research, innovation and "green" industries. Rich countries that bankrolled the EU, including Germany, the UK and France, said that the next overall budget must remain no bigger than what it was: about 1% of overall EU national income. So, the CAP was to get smaller proportionally (agriculture accounted for

some 40% of EU spending, down from two-thirds 20 years ago) [16].

Yet a smaller CAP budget would also be under greater pressure. Even with payments at full flow, there were huge inequalities between new and old members. That must change, says the new agriculture commissioner, Dacian Ciolos, a Romanian. The CAP must be "fair and transparent" if all Europeans were to support it. Mr Ciolos talked of the need to compensate farmers for "public goods" such as landscape management and animal welfare. Voters need to understand that farmers cannot live by selling their produce alone [16].

Bruno Le Maire, the French farm minister, advanced a bolder argument. "The legitimacy of CAP funding is derived exclusively from the environmental and food-safety demands we make of our producers," he declares. Yet in the next breath, he talked of the "strategic" goal of securing the "total food independence" of Europe. The Chinese were buying up millions of hectares of Africa to grow food, he noted. But is it coherent to scaremonger about food security in Europe and yet to call for less intensive (and thus less productive) agriculture? Europe has made an "idealistic" choice, Mr Le Maire says cheerfully, and an "expensive" choice: to produce more food and pay attention to the environment [16].

Such rhetorical leaps and pirouettes conceal something more pragmatic: a drive by CAP supporters to find mechanisms that do not involve big subsidies but still stabilise the incomes of farmers. Paolo De Castro, chairman of the European Parliament's agriculture committee, says no country wants a bigger EU budget, so CAP reform "is not a question of more money, it means more regulation." The EU needs "better market instruments". Mr Le Maire is frank that French farmers long for a return to price controls, production quotas and other tools of state planning. Those old ways are gone, he said. Instead he paints a corporatist vision of managed markets, in which "producer organisations" fix maximum and minimum market prices (this would mean changing EU competition rules). Alongside EU-subsidised insurance for farmers, there could be new "adjustment funds" to smooth variations in farm revenues, with governments and farmers putting aside money when things are going well, for release in leaner times [16].

Mr Le Maire fudges just what he means by "community preference". It could mean a tax on imports that do not meet EU standards, he says. Or it could mean more precise labelling (to encourage consumers to buy local produce and shun imports), or distribution networks to favour local sales. Better to play to Europe's strengths, said Mr Ciolos: local production and quality. His big idea was CAP mechanisms that help small farmers sell directly to local shoppers, bypassing big supermarket chains [16].

The Germans like the idea of the EU compensating farmers for higher Euro-standards, but are wary of market-meddling (and not sure who would pay). CAP reformers used to dream of simply slashing the farm budget. But they also favoured direct cash support for farmers because it is visible and so stirs up political debate. By contrast, price regulation and obscure trade barriers are harder to spot and more burdensome to the poor [16].

In Japan, by contrast, direct payments to hundreds of thousands of farmers were at the heart of its agricultural policy since 1970, when the government began to prop up prices by subsidising production of table rice according to annual estimates of demand, while encouraging shifts to other crops such as wheat, soybeans or rice for animal feed. Yoshimasa Hayashi, agriculture minister, announced in 2013 that subsidies for producing table rice tied to quotas would be scrapped by 2019. A separate system of

payments to rice farmers, introduced by the previous government in 2010, would also be abolished and replaced by a fund to support agricultural infrastructure in villages particularly affected by the changes, he said. The package amounted to "a historically great transformation", said Akira Amari, economy minister. The reforms should spur consolidation of small, individually owned paddies into larger, more productive fields, making Japan's farmers more competitive on international markets, he said [17].

Japan's government approved a plan to overhaul its decades-old system of handouts to rice farmers, signalling progress on a much-trumpeted policy goal amid negotiations with the US and 10 other partners (such as Australia and Vietnam) in the Trans-Pacific Partnership (TPP), a regional trade pact. "It is essential to change farm policies to enable farmers with good management abilities to become financially independent," said Mr Amari. The decision to end the subsidies came as Japan was deep in talks under the TPP. Japan's complex system of subsidies and tariffs, which combined to guarantee farmers' incomes well above those of most other rural households, was a source of friction in TPP negotiations [17].

Under the then current system, farmers producing rice for staple food received a subsidy of ¥150,000 ($1,480) per hectare after each harvest, while producers of rice for flour or animal feed got ¥800,000 per hectare. If the new law is passed as planned, the subsidy for staple rice would be steadily cut to zero by fiscal 2018. The basic subsidy for flour or feed rice would remain the same, rising to ¥1.05m if yields were better than average. An official at the ministry of agriculture, forestry and fisheries said that the shift should encourage farmers to think less about meeting shrinking demand at home and more about exporting [17].

Developing countries farm subsidies
The total value of support given by the Chinese government to farmers exceeded that of any other country: $165 billion in direct and indirect agricultural subsidies in 2012. The next highest totals were those of Japan at $65 billion and the US at just over $30 billion, according to research by the OECD. On a relative basis, however, China's support was more in line with global norms. Subsidies as a share of farm income were about 17%, rapidly catching up with the average for the OECD. The most lavish spenders include Japan, South Korea and Switzerland, where subsidies accounted for more than half of farm income [18].

More troubling is the trajectory (see chart, government transfers to farmers). Among major emerging markets tracked by the OECD, China is second only to Indonesia in the rate of its subsidy growth. China's farm support rose from 1.4% of GDP in 1995-97 to 2.3% in 2010-12. It is moving in the opposite direction from developed countries, which are gradually reducing such support. OECD average support fell from 1.6% of GDP in 1995-97 to 0.9% in 2010-12 [18].

There are also concerns about the kind of support provided by China. Even those who advocate less intervention in farming by governments acknowledge that it can play a useful role in mitigating boom-bust cycles. The challenge is to design support that minimises distortions. Schemes that lead to more investment in yield enhancements or that provide flat subsidies, regardless of production levels (i.e. decoupled), are best. Those that encourage farmers to plant crops (coupled) even if real demand is weak are harmful [18].

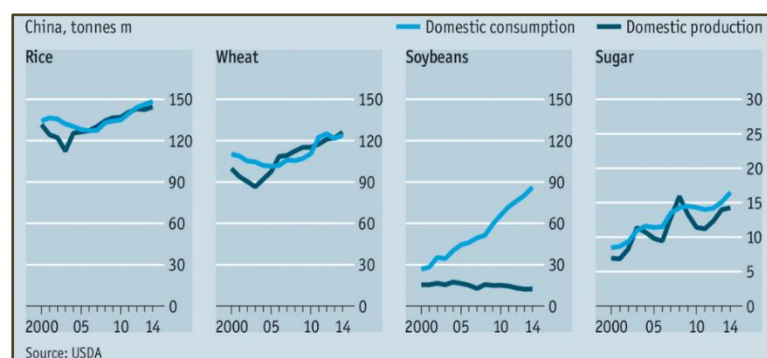The OECD calculates that nearly 70% of Chinese subsidies are of the most distorting sort. For

example, the government guarantees minimum purchase-prices, well above global levels, to grain growers. Other Asian countries are worse offenders. In Indonesia, the most problematic forms of subsidies account for nearly all of the government's agricultural spending. But given China's size, its interventions and the mismanagement of its food reserves are likely to have more far-reaching consequences for global markets [18].

Government transfers to farmers
As % of agricultural revenues, selected countries
■ 1995-97 ■ 2010-12
Source: OECD *1996-97

By 2015, the drive for food self-sufficiency had come at a growing cost. During 2010-15, as farm wages soared, sugar-cane growers in southern China looked across the border to Vietnam for help. They hired (illegal migrant) Vietnamese workers—nearly a quarter cheaper than Chinese ones—to tend their fields, especially during the winter harvest. For sugar-cane growers, the effect was akin to Mexican workers suddenly disappearing from Californian fruit farms. To encourage loss-making farmers to go on planting sugar cane, officials in Beijing were considering a system of direct subsidies. Costs were rising, crop yields stagnated and the government provided ever more support to keep its farms afloat [19].

Since a largely man-made famine that started in the late 1950s, in which tens of millions died, China has defied the odds by feeding its people almost entirely on its own. It provided for a fifth of the world's population with less than a tenth of its arable land. As middle-class appetites grow, China is past the point of being able to rely on its own farms (see chart, tonnes, consumption and production). In 2011 it became the world's largest importer of agricultural products, powered by its demand for soybeans, a feedstock for pigs [19].

Since the earliest days of its rule, the Communist Party has striven for self-sufficiency in grains and extensive self-reliance in commodities from sugar to pork. The second draft of a proposed new law in 2015 on national security specified the state's responsibility for guaranteeing "grain security", a term that Chinese officials often associate with self-sufficiency. Enabling China to grow enough to feed itself was a strategic goal for Mao (notwithstanding the famine he caused). For much of his rule, the Soviet Union and the US were enemies; he had little faith in global markets. Some Chinese officials think in much the same way today [19].

China, tonnes m
— Domestic consumption — Domestic production
Rice Wheat Soybeans Sugar
2000 05 10 14
Source: USDA

17

Maintaining self-reliance is expensive. China spent $165 bn on support for farmers in 2012, twice as much as five years earlier and a third more than the EU, according to the OECD. It also creates inefficiency. State-set minimum purchase prices for rice, wheat and corn were well above global levels. This boosted production, but it also deterred farmers from diversifying into cash crops that would make better use of land resources. The state's intervention resulted in thirsty crops such as wheat and corn being widely grown on land where water is scarce. Chemicals used to boost their production polluted water supplies. Yield growth slowed since the 1990s and output plateaued more recently, but costs continue to rise—not least of labour, as the young migrate to cities [19].

In years when China's farms produce a surplus of staple crops, the state bought the excess for its reserves. Many countries do the same, building up reserves to stabilise food prices and as insurance in case of drought or blight. But China's reserves were believed to be unnecessarily big (exact figures are a state secret). Its corn stockpile, for example, was estimated to cover seven months of consumption; a level of three months is normally seen as safe [19].

While the government's grain chief called the huge reserves "a cheerful burden", reports revealing corruption in the system undermined that view. Officials in the north-east had bought low-quality grain at discounted prices, reporting that they had paid the higher state-set price for good grain. They pocketed the difference, stuffing the inferior product into the reserves. Such fiddling was thought to be common [19].

Even in the production of sugar, a commodity that is less important to China's food strategy than rice or wheat, dysfunction caused by the state's interference was apparent. Officials called for 85% of annual consumption to be met through domestic production. But Chinese sugar-cane farms are inefficient, producing less than half the yield of those in Brazil, the world's biggest producer. Domestically grown sugar costs more than twice as much as international sugar. After factoring in shipping costs and import tariffs of up to 50%, it is still cheaper to buy from abroad—hence the government's foot-dragging on import approvals, to prevent the local market from being flooded. Not wanting to stoke unrest in the countryside, it continued to block imports when it felt domestic producers were threatened [19].

Cases of Industrial Subsidies
Cases at the WTO involving subsidies are relatively few. Agricultural subsidies were negotiated by WTO members and were not subject to dispute settlement if the subsidy value remained below their bound rate. Subsidies on industrial goods are allowed under very strict conditions. Thus, subsidy cases tended to be high-profile cases involving industrial goods. An important example is the counter claims by Boeing and Airbus of accusing each other of illegal subsidies in the manufacture of civilian aircraft.

Government support for developing new passenger aircraft first emerged as a contentious issue back in 1988. Airbus

was beginning to eat into Boeing's market with its A320 single-aisle jet—the sort of plane that accounted for four out of five planes sold. An agreement in 1992 limited government launch aid to 33% of the cost of developing an aircraft, to cap subsidies to Airbus, while the support to Boeing from the Pentagon and NASA was held to 3% of turnover. But Boeing tore up the deal in 2004 as Airbus prepared to launch the A380 super-jumbo (to challenge Boeing's 747) and the A350 (to vie with the 777 and 787). This was the restart of the long-running and tortuous transatlantic trade dispute [20].

In Jun 2010, the WTO dispute settlement body in response to a US complaint, announced that Airbus, Europe's aircraft-making champion, received billions of euros in illegal subsidies that allowed it to snatch half the market for big passenger jets. It found that some government support to Airbus, in the form of repayable "launch aid", was illegal [20].

In the tit-for-tat nature of dispute, the EU filed a complaint about Boeing's subsidies. In Sep 2010 the WTO found that much of the $22 billion benefit Boeing enjoyed from tax breaks and Department of Defence and NASA research contracts was also an illegal subsidy because they violated trade rules. Airbus long complained that, whereas it repaid the launch aid it received with interest, Boeing never had to pay back a cent [20].

That was true but disingenuous. EU governments shoulder a hefty share of Airbus's risk and the loans were cheaper than private investors would offer. Despite Boeing's Jun 2010 win, it appealed against some aspects of the decision. Airbus, in turn, claimed that about 70% of Boeing's allegations had been dismissed by the WTO, which also failed to detect any price undercutting by Airbus as a result of the subsidies [20].

The scene was set for further appeals and counter claims, which could last for years. This was not just the biggest and most intractable trade row to come before the WTO. It developed into a political battle. If governments on either side were to levy countervailing import duties (as the WTO allows when an illegal subsidy persists), it could have sparked a disastrous trade war [20].

In 2011 the WTO upheld a ruling that Airbus benefited from some illegal government subsidies to develop almost its entire range of aircraft but overturned a more serious finding that the A380 super jumbo had received prohibited export subsidies [21].

In its original report, the WTO found that the loans on the A380 were structured so that they had to be repaid only upon successful aircraft sales, and therefore constituted prohibited export subsidies – the most egregious form under the trade body's rules. Boeing calculated that Airbus received $18bn in illegal subsidies, including $4bn for the A380 aircraft. Airbus, a subsidiary of EADS, disputed the figure, pointing out that most of the state subsidies were in the form of repayable loans, an instrument that in principle the WTO has declared legal. However, Airbus conceded that the ruing upheld earlier findings that the interest rates charged on some of the loans provided by the UK, France, Spain and Germany amounted to a subsidy as they were not competitive with market rates. The WTO gave the EU six months to comply [21].

The WTO gave no guidance on how the sins it exposed should be remedied. An Airbus executive observed that the legal battle could end in one of three ways. The two sides could negotiate a bilateral deal like the previous one, something Boeing rejected out of hand. They could get bored and give up. Or they could carry on fighting indefinitely, to the benefit of no one but lawyers [20].

Changes to the aircraft business were also increasing pressure for a settlement. Manufacturers in Russia, China and Japan are joining Brazil's Embraer and Canada's Bombardier in the market for big passenger jets. Most of these newcomers get government support [20].

Indeed Boeing was no stranger to launch aid from government. Japanese manufacturers making a third of Boeing's 787 received such aid from the Japanese government. And Boeing was in line to get such help directly from the US government back in the days when it was considering building a supersonic rival to the Anglo-French Concorde [20].

Privately, EU officials acknowledged that they would probably have to adjust the interest rates on government loans to bring them into line with commercial rates. The outcome could have implications for the global aviation industry as Russia, China and Brazil try to bolster their own commercial aircraft champions, say executives, but they warn that this dispute could drag on for years [21].

The WTO still had to rule on an appeal on a separate report that found Boeing had benefited from at least $5.3bn in US subsidies [21].

In addition to high-profile transatlantic cases, accusations of emerging economies using subsidies have put strain on the WTO's DSM. As a large economy, China's trade policy regime attracts much attention.

By the first half of the 2000s, China had become the workshop to the world. It is the global economy's most formidable exporter and its largest manufacturer. The explanations for its success range from a seemingly endless supply of cheap labour to an artificially undervalued currency. However, Usha and George Haley[7] of West Virginia University and the University of New Haven, pointed to another reason for China's industrial dominance: subsidies [22].

The Chinese government does not report all subsidies made to domestic industrial firms, so the Haleys plugged the holes with information from industry analysts, policy documents, non-governmental outfits and companies themselves. By looking at the gaps between end-user prices and benchmark prices, they cobbled together numbers on many of the subsidies enjoyed by the biggest industrial state-owned enterprises (SOEs) [22].

On their conservative calculations, China spent over $300 billion, in nominal terms, on the biggest SOEs between 1985 and 2005 (see chart, subsidies to Chinese industry). This help often came in the form of cheap capital and underpriced inputs unavailable to international rivals. The glass industry got soda ash for a song, for example. The auto-parts business got subsidies worth $28 billion from 2001 to 2011 through cheap glass, steel and technology; the government promised another $10.9 billion by 2020. The subsidies to the paper industry topped $33 billion from 2002 to 2009. All industrial SOEs benefited from energy subsidies [22].

The Haleys chronicled the harm done by these subsidies to foreign competitors. Rivals were forced to go up against national champions enjoying subsidised inputs and seemingly free money in markets that are protected. Worse, the bosses of Chinese SOEs were not in business principally to make a profit: they are often encouraged by the government to pursue other goals, such as resource acquisition, foreign policies and technology transfer, regardless of cost [22].

Subsidies to Chinese industry, $bn
SOEs'* working capital
Loss-making SOEs*
Innovation & technology
Cumulative subsidies
Source: Usha Haley and George Haley   *State-owned enterprises

Indeed, these barriers to creative destruction were even higher than they first appeared, because state subsidies extended beyond state firms. Another study by Fathom China, a research firm, argues that although small and medium-sized private firms were often starved of capital in China, many big private firms were at the official trough. The researchers looked at 50 prominent private-sector Chinese firms, and found that 45 received subsidies (see chart, subsidies for selected firms). Top of the list was Geely, an automobile firm that bought Sweden's Volvo, which on Fathom's reckoning would have lost more than half its net profits without official aid [22].

Subsidies for selected private-sector Chinese firms 2011		
Company	Subsidy as % of net profit	Subsidy, $m
Geely Automobile	51.3	141
China Yurun Food	36.1	84
Uni-President	18.2	9
Sihuan Pharmaceutical	14.5	19
Wuxi PharmaTech	12.2	10
Want Want China	11.3	47
Hengan International	10.3	36
Gome	9.2	27
China Shanshui Cement	7.6	28
China Gas Holdings	7.2	7
Sources: GK Dragonomics; Fathom China		

Such distortions breed indiscipline and overcapacity. An effort to sponsor clean-energy champions was partly responsible for a global glut of solar panels, for instance, forcing even Chinese manufacturers such as Suntech into bankruptcy. A similar problem loomed in the steel industry, where the country's excess capacity of some 200m tonnes surpassed the entire capacity of Japan's steelmakers in 2013 [22].

Leaders in Beijing tried to encourage consolidation among SOEs but, as the Haleys note, "the central government's removal of subsidies has often resulted in the provincial governments increasing them." The unhappiest consequence of China's subsidy policy may be that it created beasts too powerful to rein in [22].

In 2012, the Obama administration lodged a trade complaint alleging that China unfairly subsidised car-part exports. The timing coincided with elections in the US, when China-bashing tends to be at its peak. The dispute over Chinese export subsidies was a real one. The US car-parts industry—which supplied carmakers with everything from seats and bumpers to axles and electronic devices—is big, with exports of close to $60 billion in 2010. The industry was a major employer in several states, but had endured years of gradual decline. In 2001, five of the top ten global firms were American; by 2009 just two made

[7] Haley, Usha and George Haley, *Subsidies to Chinese Industry,* UK: Oxford University Press, April 2013.

that list. The first years of the credit crunch hit employment especially hard, with the US industry shedding around 200,000 jobs—some 30% of its total—between 2007 and 2009 [23].

The Obama Administration complained that this related to "export bases" set up across 12 Chinese municipalities. In these areas, the US complaint alleged, firms were handed $1 billion in government grants, tax breaks, and subsidised loans between 2009 and 2011, on the condition that they exported the car parts they produced. The WTO has ruled against export subsidies for manufactured products and has interpreted them broadly [23].

China lodged its own complaint at the WTO against the US in September 2012. Many Chinese goods face "countervailing" duties when they are shipped to the US. These measures, applied to paper, steel, tyres and chemicals among others, are designed to offset China's subsidies [23].

These tit-for-tat complaints against existing trade barriers may have caused headaches for the WTO's dispute settlement mechanism (DSM), but it is better than the alternative, a fight in which countries put up new barriers [e.g., the tit-for-tat trade war initiated by the Trump administration in 2019 and again in 2025]. The optimistic view was that a flurry of WTO disputes would actually reduce protectionism, unclogging trade channels and reassuring the majority of Americans who told the Pew Research Centre's Global Attitudes Project that their country's overall trade deficit with China was a "very serious problem" [23]. As the Biden administration continued the Trump administration's tariffs and added subsidies to reshore manufacturing and derisk from China's economy, it is clear the optimistic view was not correct.

4. Incompatibility/incoherence between WTO rules and economic theory

OECD Indicators of Agricultural Support
The OECD indicators of support were developed to monitor and evaluate developments in agricultural policy, to establish a common base for policy dialogue among countries, and to provide economic data to assess the effectiveness and efficiency of policies. The indicators were mandated by OECD Ministers in 1987 and are calculated for OECD and some non-OECD countries, and are widely referred to in the public domain [24].

The objectives and priorities of agricultural policies in OECD countries encompassed over time a wide range of issues – from overcoming food shortages or surpluses in the post-war period to securing food safety, environmental quality and preservation of rural livelihoods at present. Policy instruments have been equally varied, reflecting changes in domestic political and economic settings and, progressively, developments in the international economic arena. Despite this diversity, policy measures applied in a country within a certain period of time can be brought together and expressed in one or several simple numbers – called support indicators – which are comparable across time and between countries. The utility of doing this is three-fold [24].

First, support indicators can be used to *monitor and evaluate developments of agricultural policies*.[8] This includes the extent of policy reform achieved by countries, both over time and through specific reform efforts (*e.g.* the US Farm Bills and various CAP reforms). The 1982

OECD Ministerial Council commitment to agricultural reform stated that "agricultural trade should be more fully integrated within the open and multilateral trading system", and it called for OECD countries to pursue "a gradual reduction in protection and a liberalisation of trade, in which a balance should be maintained as between countries and commodities." Ministers also requested the OECD to develop a method to measure the level of protection to monitor and evaluate progress [24].

Agricultural policies may provide direct payments to farmers. They may maintain domestic agricultural prices above those at the country's border, or grant tax and credit concessions to farmers. Support is not only comprised of budgetary payments that appear in government accounts, but also includes support of market prices, as well as other concessions that do not necessarily imply actual budgetary expenditure, such as tax concessions. The common element to all these policies is that they generate transfers to agriculture [24].

The concept of "transfer" presumes both a source of the transfer and the existence of a recipient. In the present methodology, agriculture is generally regarded as a supported sector and the main recipient of policy transfers. Consumers of agricultural commodities and taxpayers represent the two sources of transfers, *i.e.* the economic groups bearing the cost of agricultural support. The term "agriculture" designates primary agricultural producers as an economic group. Agricultural producers are viewed from two perspectives – as individual entrepreneurs, and collectively. These distinctions underlie the key dimensions in which agricultural support is measured and the basic structure of the indicators [24].

The terms "support" and "policy transfers" are broadly synonymous, but may be used in different contexts. The term "support" is predominantly used to mean a "policy measure" (that generates a policy transfer) and usually appears when identifying, scoping and classifying the relevant policies. The term "policy transfer" is used mainly with respect to calculations, *i.e.* the process of obtaining numerical expressions of policies [24].

The actual impact of policies on its recipients will depend on, among other things, the basis upon which support is provided (*e.g.* whether it is provided per tonne of output, per land unit, per farm, etc.), the level of support, and the responsiveness of farmers to changes in support. The indicators, therefore, are not intended to and do not measure *the impact* of policy effort on farm production, farm incomes, trade or environment. This explanation of the indicators as representing measures of policy effort is crucial for understanding them properly [24].

Finally, the indicators can be distinguished according to the *type of aggregation* at which they can be derived — across commodities or geographically. While all the indicators can be calculated at the national and multi-country level, some can also be calculated for individual commodities or for groups of commodities [24].

> Names and definitions of the OECD indicators of agricultural support
>
> 1. Indicators of support to producers
>
> *Producer Support Estimate (PSE):* the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, measured at the farm-gate level, arising from policy

---

[8] The term "policy evaluation" is understood to be the analysis of levels and composition of agricultural support with respect to the implementation of the policy reform agenda. The term is not used

as the evaluation of the effectiveness or efficiency of policies, except in the cases where the foucs is specifically on that issue.

measures that support agriculture, regardless of their nature, objectives or impacts on farm production or income. The PSE in percentage terms (%PSE) is the PSE as a share of gross farm receipts (inclusive of support). The PSE is the most widely reported support measure. (Other support measures are not provided in this summary.)

2. Indicators of support for general services in agriculture

General Services Support Estimate: the annual monetary value of gross transfers to general services provided to agricultural producers collectively (such as research, development, training, inspection, marketing and promotion), arising from policy measures that support agriculture regardless of their nature, objectives and impacts on farm production, income, or consumption. The GSSE does not include any transfers to individual producers. It is also measured as a share of GDP.

3. Indicators of support to consumers

Consumer Support Estimate (CSE): the annual monetary value of gross transfers from (to) consumers of agricultural commodities, measured at the farm gate level, arising from policy measures that support agriculture, regardless of their nature, objectives or impacts on consumption of farm products. It is also measured as a share of consumption expenditure (measured at farm gate) net of taxpayer transfers to consumers. (There are other measures of support to consumers that are not provided in this summary.)

4. Indicators of total support to agriculture

Total Support Estimate (TSE): the annual monetary value of all gross transfers from taxpayers and consumers arising from policy measures that support agriculture, net of associated budgetary receipts, regardless of their objectives and impacts on farm production and income, or consumption of farm products. TSE is also measured as a share of GDP [24].

Basic principles of measuring support
Several key principles determine the scope and policy measures to be considered in the estimation of agricultural support and the method for measuring support, such as:

- A policy measure is included if it generates transfers to agricultural producers, regardless of the nature, objectives or impacts of the policy measure;
- Transfers are measured in gross terms, taking no account of adjustments which producers may make to receive the support, e.g., to meet compliance conditions; and
- Transfers to individual producers are measured at the farm gate level [24].

The need to develop an appropriate basis for measuring agricultural subsidies became apparent with the widespread use of support programs. After considering the options available, the OECD Secretariat decided to use the Producer Subsidy Equivalent (PSE), initially defined as *the payment that would be required to compensate farmers for the loss of income resulting from the removal of a given policy measure* (OECD, 1987).[9] While the PSE was at first used for modelling the effects on world commodity

prices of a small reduction in agricultural subsidies, it was also recognised as a very useful tool in its own right to establish a consistent and comparative method to evaluate agricultural policies between countries [24].

The notion of a "subsidy equivalent" derives from the economic theory of protection developed in the 1960s to evaluate the effects of tariffs (Corden, 1971). According to this theory, the *producer subsidy equivalent of a policy measure,* whether an import tariff, export subsidy, payment per tonne or per hectare, etc., is the payment per unit of output that a government would have to pay producers to generate the same impact on production as that policy measure. (Likewise, the consumer tax equivalent is the per unit tax that a government would have to impose to generate the same impact on consumption as that policy measure.) In the early 1970s, Tim Josling had applied this concept to the empirical measurement of agricultural subsidies in work for the FAO, introducing the term PSE (Josling, 1973 and Josling, 1975) [24].

In 1987, a major OECD study entitled *National Policies and Agricultural Trade* offered an in-depth analysis of the agricultural policies of individual OECD countries based largely on the PSE and related indicators. This study recognised the linkages between domestic and trade policies and concluded that to improve the trading environment actions were necessary on both trade barriers and domestic policies [24].

The PSE was redefined in 1990 as *the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, measured at the farm-gate level, arising from policy measures that support agriculture, regardless of their nature, objectives or impact on farm production or income* [24].

The evolution of producer support equivalent measures is presented in the table summarizing the different categories of support (table 6, evolution of producer support). The changes introduced in 2007 enabled the indicators to better capture policy developments, *e.g.* the move to ―decouple‖ the provision of support from specific commodity production and ―re-couple‖ the provision of support to other criteria. Three major changes were made:

- Although still based on implementation criteria, the PSE categories were substantially redefined.
- Each policy, in addition to being classified into a PSE category, could also give additional information on whether a payment is with or without limit, or whether a payment implies any constraints on input use by the recipient, etc.
- PSEs for individual commodities are no longer calculated. Instead, a country total PSE is divided into Single Commodity Transfers, Group Commodity Transfers, All Commodity Transfers; and Other Transfers to Producers. This change reflects the fact that as a result of policy reform, support in many OECD countries is less tied to an individual commodity. Support is being increasingly provided to groups of commodities or all commodities in general, or without obliging a recipient to engage in commodity production at all. In this situation the link between some support transfers and individual commodities becomes less apparent. This necessitated an alternative presentation of support transfers with respect to their commodity specificity [24].

---

[9] The consumer subsidy equivalent (CSE) was defined as the "implicit tax on consumption resulting from a given policy

measure (market price support element of the PSE) and any subsidies on consumption."

Table 6. Evolution of produce support equivalent measures	
Initial 1987 categories	1999 Revision
A. Market price support B. Direct payments C. Reduction in input costs D. General services E. Other	A. Market price support B. Payments based on output C. Payments based on area planted/animal numbers D. Payments based on historical entitlements E. Payments based on input use F. Payments based on input constraints G. Miscellaneous
2007 Revision	

A. Support based on commodity output
  A1. Market price support
  A2. Payments based on output
B. Payments based on input use
C. Payments based on current area, animal numbers, receipts or income, where production is required
D. Payments based on non-current area, animal numbers, receipts or income, where production is required
E. Payments based on non-current area, animal numbers, receipts or income, where production is not required
F. Payments based on non-commodity criteria
G. Miscellaneous	

5. Doha and Post-Doha Round Negotiations

Modalities for Agriculture:

The Committee on Agriculture, WTO, was responsible for synthesizing the positions of members during the Doha development round negotiations. Before the collapse of the round, the modalities for agriculture read as follows [25].

A new concept was defined, the level of overall trade-distorting domestic support (OTDS), The base level for reductions in OTDS ("Base OTDS") was to be the sum of:

(a) the Final Bound Total AMS specified in Part IV of a Member's Schedule; plus
(b) for developed country Members, 10% of the average total value of agricultural production in the 1995-2000 base period (this being composed of 5% of the average total value of production for product-specific and non-product-specific AMS respectively); plus
(c) the higher of average Blue Box payments as notified to the Committee on Agriculture, or 5% of the average total value of agricultural production, in the 1995-2000 base period.

For developing country Members, item (b) of the above paragraph was to be 20% of the average total value of agricultural production in the 1995-2000 or 1995-2004 period as may be selected by the Member concerned. For a developing country Member, the base period for the purposes of item (c) of the paragraph above shall be 1995-2000 or 1995-2004. The member can select.

The Base OTDS shall be reduced in accordance with the following tiered formula, where the Base OTDS is:

(a) > US$60 billion (or equivalent in the monetary terms) the reduction shall be 80%;
(b) > US$10 billion and ≤ US$60 billion (or equivalent in the monetary terms) the reduction shall be 70%;
(c) ≤ US$10 billion (or equivalent) the rate of reduction shall be 55%.

Developed country Members with high relative levels of Base OTDS in the second tier (i.e. at least 40 per cent of

the average total value of agricultural production in the 1995-2000 period) shall undertake an additional effort. The additional reduction to be undertaken shall be equal to one half of the difference between the reduction rates specified in paragraphs 3(a) and 3(b) above.

For developed country Members, the reductions shall be implemented in six steps over five years.

The Final Bound Total AMS shall be reduced in accordance with the following tiered formula, where the Final Bound Total AMS is:

(a) > US$40 billion (or the equivalent in the monetary terms) the reduction shall be 70%;
(b) > US$15 billion and ≤ US$40 billion (or equivalent) the reduction shall be 60%;
(c) ≤ US$15 billion (or equivalent) the rate of reduction shall be 45%.

Developed country Members with high relative levels of Final Bound Total AMS (i.e. at least 40 per cent of the average total value of agricultural production during the 1995-2000 period) shall undertake an additional effort in the form of a higher cut than would otherwise be applicable for the relevant tier.

The maximum value of support that can, under the criteria of "Blue Box", be provided under Article 6.5 shall not exceed 2.5 per cent of the average total value of agricultural production in the 1995-2000 base period on the basis of notifications to the Committee on Agriculture where they exist. This limit shall be expressed in monetary terms in Part IV of Members' Schedules and shall apply from the first day of the implementation period.

In cases where a Member has, consistent with the terms of Article 6.5(a) of the AoA, placed in the Blue Box an exceptionally large percentage of its trade-distorting support – defined as 40 per cent – during the 1995-2000 base period, the limit for that Member (i.e., Norway) shall, instead, be established by application of a percentage reduction in that average base period amount. That percentage reduction shall equal the percentage reduction that the Member concerned is to make in its Final Bound Total AMS.

Export subsidies were eliminated in subsequent ministerial meetings. Export credits, credit guarantees or insurance programmes [provided in annex J] are defined as follows.

Members undertake not to provide export credits, export credit guarantees or insurance programmes otherwise than in conformity with this Article. These export credits, export credit guarantees and insurance programmes (hereinafter referred to as "export financing support") shall comprise:

(a) direct financing support, comprising direct credits/financing, refinancing, and interest rate support;
(b) risk cover, comprising export credit insurance or reinsurance and export credit guarantees;
(c) government-to-government credit agreements covering the imports of agricultural products from the creditor country under which some or all of the risk is undertaken by the government of the exporting country; and
(d) any other form of governmental export credit support, direct or indirect, including deferred invoicing and foreign exchange risk hedging.

The provisions apply to export financing support provided by or on behalf of the following entities, hereinafter referred to as "export financing entities", whether such

entities are established at the national or at the sub-national level:

(a) government departments, agencies, or statutory bodies;
(b) any financial institution or entity engaged in export financing in which there is governmental participation by way of equity, provision of funds, loans or underwriting of losses;
(c) agricultural export state trading enterprises; and
(d) any bank or other private financial, credit insurance or guarantee institution which acts on behalf of or at the direction of governments or their agencies.

Subsidies on Fishing

In 2015 world leaders signed up to a list of sustainable development goals, among them was an agreement to limit subsidies that contribute to overfishing. Negotiators at the WTO were told to finish the agreement by 2020.

Overfishing is a tragedy of the commons, with individuals and countries motivated by short-term self-interest to overconsume a limited resource. Overfishing has reduced the fish stocks of several species and governments make things worse by an estimated $22bn of annual subsidies that increase capacity, including gear, ice, fuel and building boats. The murky nature of subsidies for unregulated and unreported fishing makes the work unusually difficult. Governments do not have lines in their budget that say "subsidies for illegal fishing".

When it comes to legal fishing of overfished stocks, it is easier to spot the subsidies in the government budget lines, but no easier to agree on what to do about them. The US and EU, for example, have argued over whether to allow subsidies up to a cap, or whether to ban some subsidies an take a lenient approach o the rest The EU favours the second option, arguing that where fisheries are well managed, subsidies are not harmful.

Further complicating factors are how to treat developing countries. All WTO members agree that some need special consideration. But 17 of the world's 26 most prolific fishing countries are developing ones. That means that a broad carve-out for them would seriously weaken any deal.

China, both the world's biggest fisher and biggest subsidiser of fishing, has proposed capping subsidies in proportion to the number of people in each country who work in the industry. But it is the world leader there, too, with 10m at last count (2016). Such a rule would constrain China too little, especially since the Chinese fishing fleet has the worst reputation for illegal, unreported and unregulated fishing globally.

Economist, "The WTO: What's the catch?" 4 Jan 2020, p. 53.

At the 12th ministerial meeting of the WTO in Geneva, 2022, an agreement on fisheries subsidies was reached. No member was to grant or maintain any subsidy to a vessel or operator engaged in illegal, unreported and unregulated (IUU) fishing or fishing-related activities. Moreover, no member is to maintain subsidies for fishing or fishing related to an overfished stock. The agreement provides definitions and specifies other conditions related to fishing and for the notification requirements.

WTO. "Agreement on Fisheries Subsidies", Ministerial Decision of 17 Jun 2022, WT/MIN(22)/33

Post-Doha trade facilitation versus food security
In 2014 WTO officials had a spring in their step. In December 2013 its 159 members, meeting in Bali, had struck a "trade facilitation agreement" (TFA)—a pledge to cut red tape at customs posts around the world. It was the first big win of the Doha round, a 13-year slog to bring down trade barriers. But on 31 July, just before ratification, India withdrew its support, prompting the deal's collapse [26].

Developing countries had the most to gain from the TFA. Despite it being a limited bargain, which does not cut tariffs, it was estimated to boost developing-country GDP by $523 billion. India, among a handful of countries which receives help from the WTO to boost its trade, would have seen large payoffs. Thus, at first glance its volte-face may have seemed surprising. The deal was negotiated by India's previous, protectionist-minded government, yet the relatively business-friendly administration of Narendra Modi scuppered it. In truth, it was never clear if India's farming policies could be compatible with any WTO deal [26].

Under the WTO's rules, trade-distorting subsidies to farmers in a developing country cannot exceed 10% of the total value of its harvests. But under a new food-security law, India brought in a $4 billion-a-year scheme to provide cheap food for 800m people; and the minimum support prices the government offered to farmers, which for rice had more than doubled since 2001-02, would continue rising. If these measures breached the 10% limit, India would be open to a WTO challenge. The government insisted it would not sacrifice food security on the altar of a trade deal [26].

Before India's elections, the WTO tried to accommodate its demands with a "peace clause" that would have made the food-security programme immune from challenge for four years. But the new government was unsatisfied with the fudge, worried that 2017 would come and it would have little bargaining power to get a permanent exemption for its food security program [26].

India's hardball tactics would reenforce its protectionist reputation. Of 95 countries tracked by the World Bank in 2013, India's exports-to-GDP ratio was 19th from bottom. Agricultural protection is high. In 2012 the EU, rightly scorned for its own farm policies, spent the equivalent of 0.73% of GDP on agricultural support. India's 1.15 trillion rupees ($18.8 billion) spending on food subsidies touches 1% of GDP—and has doubled since 2009. Even that is before counting subsidies to farmers for fertilisers, tractor fuel and the like [26].
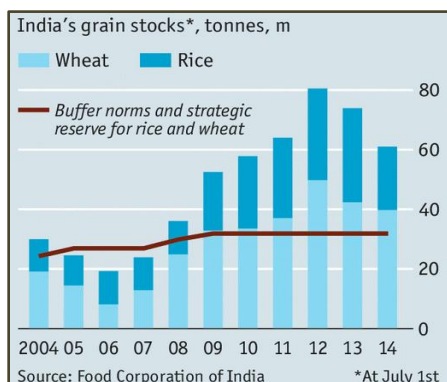
Arvind Subramanian of the Peterson Institute argues that India has been let down by agreements made during the Uruguay round of trade talks that finished in the mid-1990s. At that time, rich countries were allowed to keep many protectionist policies in return for promising to reduce them progressively. India, which was deemed not to subsidise domestic agriculture at the time, was thus left with stricter limits on supporting farmers, even as it lowered its import tariffs [26].

The WTO could help out. The reference prices for commodities that it uses to measure handouts to producers date from 1986-88, which has the effect of exaggerating India's protectionism. Rich countries are loath to update the reference prices, lest it open the floodgates for all sorts of other quibbles [26].

India could do some things to help itself. Three things stood out. First, it could exploit another historical legacy
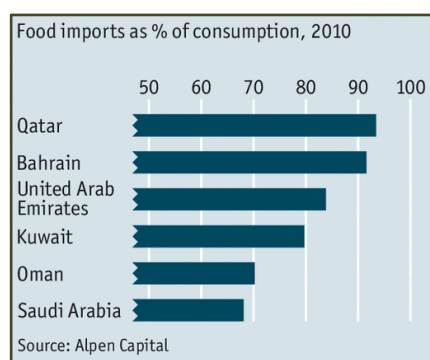
23

of the Uruguay deal. It has been a more enthusiastic tariff-cutter than that deal required: it is free, for example, to raise the tariffs on vegetables from 30% to more than 100%. A commitment to keeping such tariffs low, or cutting them further, could form part of a deal whereby the WTO turns a blind eye to other subsidies even beyond 2017 [26].

Second, India's food-security law need not lead to increases in rice and wheat purchases. The government intended to buy more than 30m tonnes, a 13% rise on the last haul. But its rice reserves exceeded 21.2m tonnes half way through the season—over twice the recommended buffer stock (see chart, India's grain stocks). Stores get so bloated that grain threatens to spoil and bureaucrats dump it on the world market: India is the world's largest exporter of rice. To help poor farmers, India could instead focus on producer subsidies that are not linked with levels of output, such as cash transfers. The WTO finds this sort of help more palatable [26].

India's grain stocks*, tonnes, m
Wheat Rice
Buffer norms and strategic reserve for rice and wheat
2004 05 06 07 08 09 10 11 12 13 14
Source: Food Corporation of India   *At July 1st

Third, it could phase out minimum support prices, which tend to favour bigger, richer farmers (and which 62% of Indian farmers do not even know exist). With the money saved, it could focus on subsidising grain sales to India's poor. No-one objects to using state funds to subsidise consumption, at least not on trade grounds [26].

The Gulf countries have long been preoccupied by the question of how to feed their people. Turmoil in the Arab world since 2011 has spiced up such concerns, which are further sharpened by a rise in the price of staples since 2009 and memories of a threatened 1970s grain embargo. The region's population is expected to grow by 40% between 2010 and 2030. Some Gulf countries import as much as 90% of their food (see chart, food imports) [27].

Food imports as % of consumption, 2010
50 60 70 80 90 100
Qatar
Bahrain
United Arab Emirates
Kuwait
Oman
Saudi Arabia
Source: Alpen Capital

Their governments have been unsure of the best way to keep everyone fed—and content. Qatar reportedly declared that it would produce 70% of its food at home by 2023, by adopting new technologies of desalination and hydroponics. That idea was soon dropped. Saudi Arabia, with the busiest farm sector among the six countries of the Gulf Co-operation Council, scaled back wheat grown by irrigation because it was draining non-renewable aquifers [27].

Heavy reliance on imports is problematic when countries such as Argentina suddenly restrict their exports in response to rising prices. Buying farmland in countries such as Sudan, Tanzania and Pakistan is another Gulf ploy. The UAE and Saudi Arabia are among the top ten investors in land abroad, according to Land Matrix, a body that tracks such deals. But this has drawbacks, too. Getting big projects off the ground in places that lack infrastructure is tricky [27].

Many of the region's rulers are now considering investing in food companies abroad, often in more developed countries. The UAE's Al Dahra Agriculture, which works closely with the government and owns land abroad, recently bought eight farm companies in Serbia for $400m. It has also invested in an Indian rice producer. In addition, countries like Saudi Arabia are looking at ways of keeping strategic food reserves [27].

Gulf rulers may end up following a mixture of such strategies to fill their peoples' stomachs. They should at least be commended for grappling with the problem, says a regional food expert. Poorer and hungrier Arab countries, like Egypt and Yemen, have far fewer policy options to address it [27].

6. Geopolitics and Subsidies

China's rise through industrialization
In the early 1990s, China's development and growth strategy had a focus on investment to form economies of scale. Industry was to develop through technological transformation. State resources were committed to the promotion of 'indigenous innovation' to establish China as a producer (rather than a purchaser) of cutting-edge technology. China was more open, encouraged inward FDI, and more firms were allowed to engage in international trade.

An important feature of China's industrial push was spending on more explicit industrial policies, including subsidies, tax breaks and cheap credit. In 2019 that amounted to 1.7% of GDP. What China really wants to be is the leader of the next industrial revolution, breaking foreign strangleholds on existing technologies and forging a new path in industries of tomorrow [28].

China's leaders have promised a "whole of nation" effort to boost technological self-reliance. The central government's budget of 2024 increased annual spending on science and technology by 10%. Frugal innovation, this is not. Nor is it China's first assault on the problem. In 2006 a 15-year plan set national targets to raise R&D spending, reduce dependence on foreign technology and increase technology's contribution to growth. It also identified 16 "megaprojects", such as building China's own large passenger aircraft and landing a probe on the moon. These were largely attempts to replicate existing technologies [28].

In 2010, after the GFC, China changed tack, lavishing some of its heave stimulus on a variety of "strategic emerging industries", including new kinds of information technology, renewable energy and EVs – many of which were still embryonic. Six years later, China shifted emphasis again. Its "innovation-driven development strategy" expressed faith that the world was in the midst of an industrial revolution. Advances in digital technologies, the internet of things, green tech and AI, promised breakthroughs across the economy. Rather than pick a miscellany of emerging industries, China's new strategy emphasized this cluster of mutually reinforcing technologies. China aimed to become a world power in innovation by the middle of this century [28].
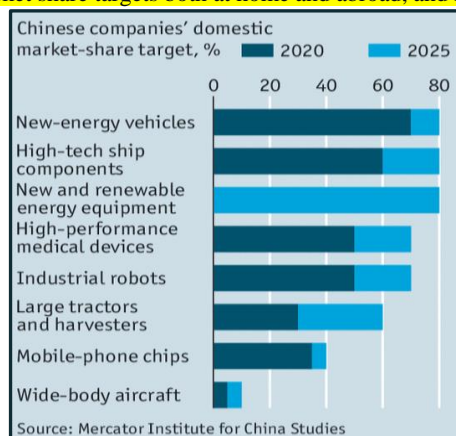
With these strategies, industrial growth accelerated (see chart, manufacturing as a % of GDP). The output share of textiles and food processing declined as machinery's share rose to almost half of the manufacturing output.[10] By 2010 China's manufacturing share peaked at more than 30% of GDP. Through the 2010s the share continued to exceed 25% [28].

China, manufacturing as % of GDP
Source: National Bureau of Statistics
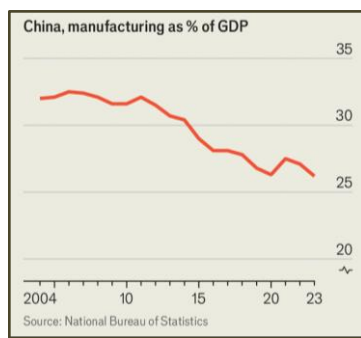
Manufactured exports grew rapidly and become highly competitive. Foreign firms initially focused on using Chinese land and labour to reduce production costs for components and final goods sold overseas. Duty-free zones allow importation of materials and components and propelled China into global production chains. As China's manufacturing capabilities improved, foreign firms turned to its domestic suppliers to source an increasing range of components to help lower their costs. China's role in international and regional supply chains became entrenched (see chart, manufacturing output) [29].

Manufacturing output
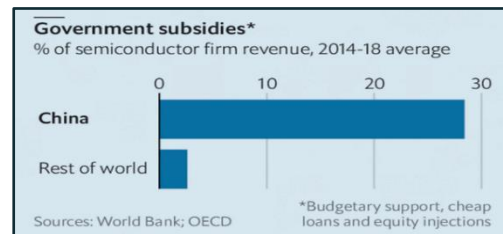As % of global total
Source: United Nations
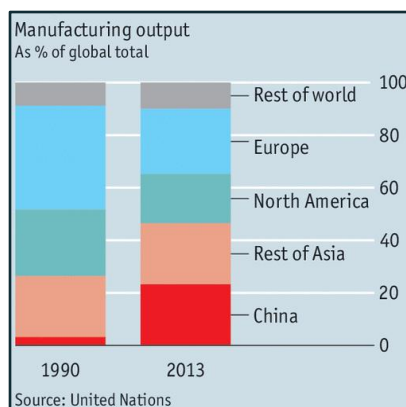
China's challenge to the multilateral trading system is highlighted by the number of cases in which members have called into question its policies. For example, in 2015 China launched a 10-year plan, Made in China 2025, an industrial policy strategy that targets various strategic, high-tech sectors (see chart, domestic market-share target). As part of the strategy there were manufacturing subsidies, market share targets both at home and abroad, and local

Chinese companies' domestic market-share target, %
Source: Mercator Institute for China Studies

content requirements [30].

[10] Brandt, L., D. Ma and T.G. Rawski, "Industrialization in China",

One of the sectors that has emerged as a flashpoint in geopolitical tensions with the West is in semiconductor manufacturing and subsidies have promoted China's rise (see chart, subsidies as % of semiconductor firms' revenue). The subsidies in this sector are emblematic of how China has implemented its industrial policy [31]. Western firms have complained of a loss of competitiveness, market share and declining manufacturing activity as a result of what they perceive as unfair trade practices.

Government subsidies*
% of semiconductor firm revenue, 2014-18 average
Sources: World Bank; OECD
*Budgetary support, cheap loans and equity injections

New EVs and equipment was another technology sector targeted for global leadership under the Made in China 2025 plan. China's EV industry benefited from massive state subsidies and other government support. This paved the way for the country to become the largest global vehicle exporter in 2023, surpassing Germany and Japan [32]. BYD, a Chinese firm, surpassed Tesla as the world's biggest manufacturer of purely battery-powered vehicles. Rhodium Group, a research firm, estimates that between 2015 and 2020 BYD alone received $4.3bn in cheap loans and equity [33].
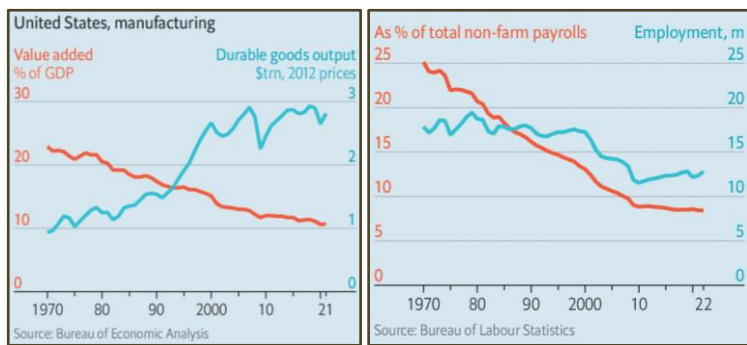
Moreover, China has strategically secured critical mineral deposits around the world needed for battery production, such as lithium [32]. State support for CATL, a battery producer, amounted to $2.5bn in similar subsidies, allowing it to become the world's biggest manufacturer of lithium-ion batteries used in most EVs. China makes 70% of the world's lithium-ion batteries [33]. This ensured that Beijing had the ability to dictate that EVs used Chinese-made batteries, which account for up to 60% of the value of a car [32]. Purchase subsidies, worth more that $4,000 a car in 2023, also helped the EV industry. However, only cars with domestically made batteries are eligible for the purchase subsidies, a rule which effectively shut out Japanese and South Korean competition in China [33].

While China has the world's largest domestic automotive market at some 26mn vehicles, its EV companies are producing way more than the domestic market can consume – an excess of as much as 10mn a year, according to some estimates. In many respects, the EV playbook looks similar to those followed by Beijing in developing its solar, steel and aluminium sectors. In those industries, massive subsidies led to overproduction and excel supply, saturating global markets and crippling international competitors. The oversupply of EVs has already found its way to Europe and many other corners of the world [32].

US deindustrialization and its new industrial policy
Manufacturing has long been declining as a share of US GDP. Most economists, however, view this as natural. As countries become richer, a rising share of output routinely shifts from manufacturing to services. In absolute terms, after all, manufacturing output has continued to grow (see chart, US manufacturing output). The same is not true of jobs in manufacturing, which have declined outright as factories have become more efficient (see chart, US manufacturing employment) [34].
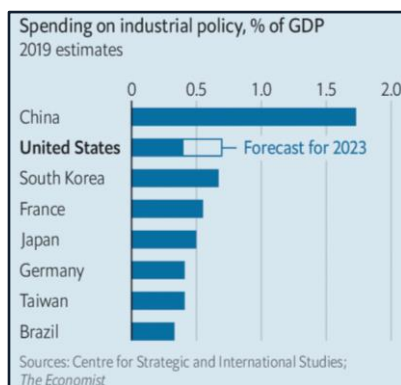
United States, manufacturing
Value added % of GDP — Durable goods output $trn, 2012 prices
Source: Bureau of Economic Analysis

As % of total non-farm payrolls — Employment, m
Source: Bureau of Labour Statistics

The decline in the share of jobs and output tied to manufacturing is no greater in the US than in other rich countries. Relative to GDP, the US manufactures more than the UK or France, but less than Germany and Japan. Indeed, many economists are just as inclined to blame the gradual loss of US factory jobs on automation as on competition via trade. The long-running decline in employment in manufacturing, starting in 1980, long before FTAs proliferated, supports this view. So does research such as that of Daron Acemoglu of MIT, who found that places in the US that install more robots tend to lose more manufacturing jobs [34].

Under the Trump administration, the measures to implement decoupling from China's economy was primarily through application of tariffs, export and investment controls and other sanctions. The Biden administration kept those measures in place while pursing old fashioned industrial policy through subsidies.

The new US strategy, as it related to subsidies, was to reshore manufacturing where possible, or to near share or friend-shore (see chart, spending on industrial policy). This amounted to investing in targeted sectors, aligning by fostering commercial ties with allies, and competing by strengthening high-tech supply chains (i.e., making them China proof) [35].
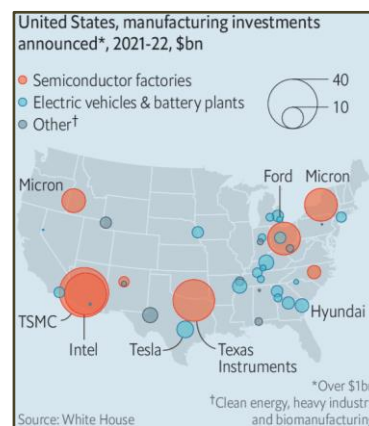

Spending on industrial policy, % of GDP
2019 estimates
Sources: Centre for Strategic and International Studies; The Economist

In 2022, the US government enacted a series of laws to revive manufacturing in the US, as part of a $2trn overhaul of the economy. The Chips and Science Act offered more than $200bn in tax credits, loans and subsidies, includes $39bn to spur domestic production of semiconductors along with even bigger investments in R&D. The Inflation Reduction Act (IRA) boosts clean energy in many ways, including tax credits for manufacturing. The Congressional Budget Office estimates these will cost $37bn over a decade, although it could be much more since the IRA does not limit the total value of credits that can be claimed. There are indirect subsidies for manufacturers, too, in the form of tax credits for consumers who purchase US-made goods. Then there are a multitude of factory-friendly regulations, such as "Buy American" rules for government procurement. In 2021 Congress also approved $1.2trn in spending on infrastructure, intended in part to make US manufacturing more competitive [34].

The subsidies apply mainly to two industries: clean energy and semiconductors. Many of the incentives take the form of tax credits. Solar panels, wind turbines and even certain minerals used in clean technology benefit from the credits. There are tax credits for investments, as well, in manufacturing facilities producing gear used in all manner of clean-energy projects, from geothermal power to carbon capture and storage. The intention is not just to spur manufacturing, but also to curb climate change, limit dependence on China and pep up parts of the US that have fallen behind. The multiple objectives explain why the laws feature so many complicated and overlapping incentives. Tax credits can be conditional on companies paying good wages or hiring a certain number of apprentices. Other rules encourage the construction of new facilities in places with coal mines or oil and gas deposits, so that workers who lose jobs in dirty energy can slip seamlessly into clean employment [34].

The same industries will also be boosted by indirect subsidies. Investment in low-carbon power-generation can enjoy bigger tax credits if the equipment involved is US made. The same applies of the power generated by such facilities. Tax credits for consumers who buy EVs can be claimed only if the cars in question are made in North America [34].

Companies are rewarded for reorganising supply chains to be located either in the US or among allies and partners. The EU says the IRA's local-content requirements are incompatible with WTO rules that are meant to bar discrimination against products based on their country of origin. US-EU discussions made progress in the dispute as it affects EVs and batteries. What makes the debate difficult is the extent to which the US has ditched fair-trade norms in its legislation (though in a manner that hints of national treatment except for China), which provides tax credits and federal support to industries ranging from hydrogen and EV batteries to solar panels and sustainable aviation fuel [36].

The subsidies for favoured industries amount to around 0.5% of GDP, but it is more than in any big country bar China. Nevertheless, the subsidies are already shaping US industry, with supply-chains being reforged along the lines that US politicians had hoped (see chart, manufacturing investments). Eventually, the US could become a net exporter of goods whose domestic production was negligible prior to the Biden administration's stimulus [34]. The largest commitments have come from semiconductor groups: Intel, Taiwan Semiconductor Manufacturing Company, IBM, and Micron [37].

United States, manufacturing investments announced*, 2021-22, $bn
● Semiconductor factories
● Electric vehicles & battery plants
● Other†
*Over $1bn
†Clean energy, heavy industry and biomanufacturing
Source: White House

The manufacturing push will also help to realise Mr. Biden's green ambitions. The IRA cleverly turns cuts to US emissions of greenhouse gases into a boon for industry, rather than a costly burden. But coating greenery

with subsidies might solve a political problem, it can create some practical ones. It might be hard to develop new suppliers as quickly as the IRA envisages. It will be difficult to build new solar factories, for instance, without using equipment from China, which has cornered the market [34]. Even if the US achieves self-sufficiency in battery cell and solar module production by 2025, it will still depend on imports for parts, including anodes and cathodes for batteries and polysilicon for solar modules, predicts research firm Rystad Energy [37].

The same applies for the tax credits for EVs. For buyers to receive the full $7,500 rebate, a rising share of the materials used to make the car's battery must have come either from the US or a country with which it has a free-trade agreement. The trouble is, many of the minerals concerned are concentrated in countries with which the US does not have a FTA, including Malaysia and Indonesia in the case of nickel, and Argentina in the case of lithium. New mines take years to develop as do negotiating FTAs with the US. Thus, manufacturers might be unable to comply with the IRA's strictures, requiring them to forgo the full tax credit [34].

Loosening the local content rules could lower costs of EVs and speed their adoption. For makers of chips and solar panels, the possibility of a glut is another potential problem. Duplication of supply chains is yet another outcome that raises costs and adds to the overproduction problem [34].

The proliferation of subsidies in the US raises concerns from other manufacturing powers, which fear their companies will be disadvantaged. South Korea was first to complain noting that the EV rules would hurt their carmakers that have invested in new factories in the US because their suppliers do not meet the IRA's local content requirement to qualify for the tax credits [34].

US states accelerated the race to offer tax breaks and deal sweeteners as they aggressively courted foreign investors drawn by the clean energy and chips subsidies. The wave of potential clean energy money looking for a home in the US triggered a state-level incentives war as governments compete to win lucrative investments that would bring jobs to their regions. States rolled out their own funding packages to land investment projects to top up the federal incentives [38]

Everyone is in the incentives game and jobs will be created but will go to the state offering the most. The Norwegian battery company, Freyr was offered a $358mn incentive package by the state of Georgia for its $2.6bn battery gigafactory. The company had considered more than 25 states for its site [38].

The tit-for-tat handouts will make the impending glut in chips even worse, requiring further subsidies for firms to stay in business. In 2023, the subsidies on offer to chipmakers around the world added up to 60% of their total annual turnover – a massive distortion [34]. Plus, the benefits to workers in manufacturing can be overstated because manufacturing jobs no longer pay a premium over comparable service work [39].

Generating employment through investments in cutting-edge manufacturing is wildly expensive. The $20bn of private investment in factories involved in making chips will create about 40,000 jobs (not counting any positive knock-on effects), according to the Semiconductor Industry Association. That works out at roughly $5mn a job. Semiconductors are an extreme example because making them is especially capital-intensive. The IRA might create 912,000 jobs each year over the next decade, at a cost of $98bn a year in public and private investment. That is more than $100,000 a worker [34].

The sums being spent are vast and growing. Germany increased its handout to Intel to build a chip plant. India's central government subsidized a Micron factory to assemble and test chips, spending an amount equal to a quarter of its annual budget for higher education. An industrial subsidy race in under way and Biden welcomed it saying the world needs green technologies and a diversified supply of chips. Duplicating production reduces specialization, raising costs and hitting economic growth. Countries subsidizing chips and batteries are not pursuing catch-up growth but fighting over cutting-edge technology. The market for EVs and batteries is unlikely to become an Airbus-Boeing style duopoly [39].

Proponents of the subsidies retort that lowering the cost of crucial goods is part of the goal of the manufacturing drive, not an unfortunate side effect. They argue that the world will benefit from the US subsidies, which will help usher nascent technologies along the learning curve and thus make them cheaper for everyone in the long run. The declining cost of clean energy will have positive spillover effects throughout the world [34].

EU industrial policy and subsidies
To illustrate the effect that North American incentive programs could have on competition with the EU, consider the following examples. Ecocem, an Irish low-carbon cement producer, upon qualifying for federal supported loans and other resources, planned to double a $120mn investment in California as it reoriented spending towards the US instead of Europe in 2023. It qualified on the basis that its cement is produced with carbon emissions that are 40 times lower than average [36].

According to Reuters, a news agency (21 Apr 2023) VW had put on hold a planned European battery plant as it sought €10bn of US support. In the end, VW reached an agreement with Canada instead where the government would provide C$13.2bn in manufacturing tax credits through 2032 and a C$700mn grant. The EU was put in a position that it needed to respond (see chart, annual clean energy investment worldwide) [36].

Annual clean energy investment, worldwide ($bn)

FINANCIAL TIMES

Source: IEA • 2022 = estimate
*Carbon capture, usage and storage
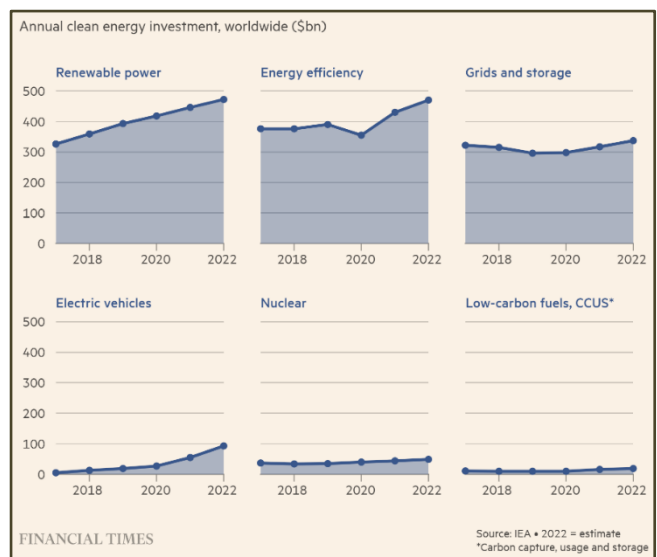
However, an EU response involving subsidies was always going to be a challenge. The single market has been based on the idea that a level playing field needs to be secured for both the wealthier and poorer nations and strict limits are therefore needed on state aid that members offer their industries. Even before the US announced its green subsidies, the rules on state aid were already being watered down – in response to the pandemic and the impact of the war in Ukraine [36].

France among others pushed for further loosening the rules on subsides as part of an active industrial policy aimed at securing key supply lines, embedding the drive towards its climate objectives, and holding its own in the great power competition between the US and China. The concern, however, is that the competition for subsidies would end up fragmenting the single market by allowing big member states such as France and Germany even greater latitude to lavish cash on top companies, creating a race to the bottom on state aid [36].

In 2023, the debate over loosening of state aid rules reawakened a related dispute over how to fund EU subsidies. The unbalanced distribution of subsides across the EU was already a concern as Germany accounted for more than half of the total state aid spent by a member state (see chart, subsidies across Europe).

Europe comes up short in financing disparity

Clean technology venture and growth capital funding, by region (€bn)

FINANCIAL TIMES   Source: Cleantech for Europe

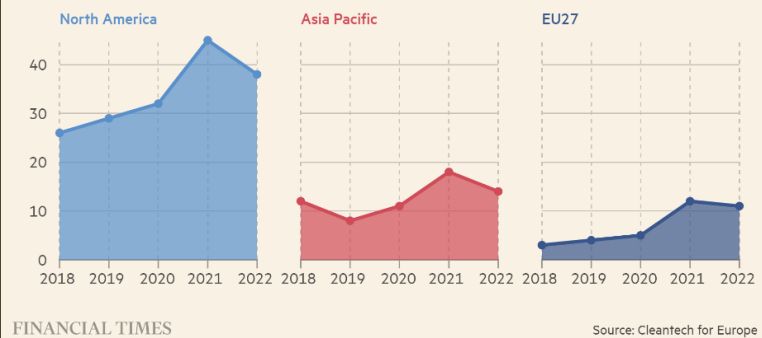Unbalanced distribution of €672bn in subsidies across Europe under the temporary crisis framework
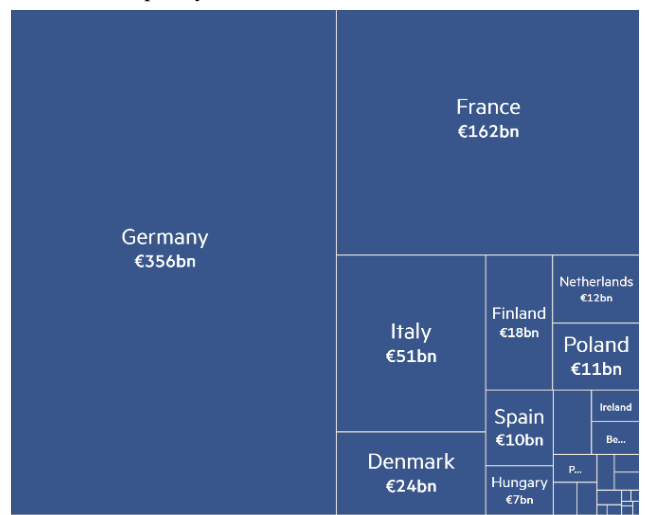
European countries with strained finances insist than any loosing of state aid constraints needs to be balanced by the creation of a big new EU-wide pot of cash to help to support member states with limited fiscal resources. Germany and the Netherlands opposed any additional common EU borrowing arguing that the bloc had ample funding available for its green transition, and that it was the US that was playing catch-up with the EU's existing initiatives. Back in 2020, for example, across the EU some €81bn was available to subsidise renewables, according to commission figures [36].

That was enhanced by the €800bn in NextGenerationEU Covid-19 recovery programme, under which capitals were required to commit at least 37% of spending to the green transition. On top of that, about €100bn of the EU's 2021-27 cohesion spending, which boosts regional development was expected to be green. Even the tax credit for consumers on EVs (equivalent to $6,500) was not far behind what was on offer by the US ($7,500). Nevertheless, where the EU falls behind is in the financial disparity across regions for clean technology (see chart, disparities) [36].

The EU strategy produced the Green Deal Industrial Plan – a transition to a net-zero economy through the rapid roll-out of many clean energy technologies required to reach carbon neutrality by 2050. The starting point for the Plan as the ned to massively increase the technological development, manufacturing production and installation oof net-zero products and energy supply, and the value added of an EU-wide approach to meet the challenge. The EC legislative initiatives were enacted in Mar 2023 to secure the following objectives: support the reform of the EU's electricity market through the 2022 REPowerEU plan launched in 2022; passage of the Critical Raw Materials Act; and passage of the Net-Zero Industry Act.[11]

In Jan 2024, the EC approved a €902mn German state aid measure to retain Germany as the location of Northvolt's new EV battery manufacturing plant. This is despite more funds being offered under the IRA and that it would not make the investment more profitable than had it been made in the US. [12]

Critical raw materials, or critical minerals, are those resources seen as essential for manufacturing technologies and equipment considered to be of strategic importance (based on its economic importance and its supply-related risk). The net-zero part of the plan aims to retain or claw back EU competitive advantages in the clean tech manufacturing sectors, e.g., wind, where the EU is strong, and solar where the EU has lost its edge. The plan identifies technologies whose manufacturing should be supported by the EU, but rather than fostering innovation it is more aimed at mature, tried-and-tested technologies (FSR, 2024).

The EU's Critical Raw Materials Act aims to shore up its EV supply chain by sourcing more battery metals such as lithium, cobalt and nickel domestically. Europe's transition to EVs is under threat because of persistent shortages of lithium, the key battery component that will power the vehicles of the future. The urgency reflects the EU's plan to ban sales of new petrol and diesel cars by 2035. This will translate into demand for lithium that surges fivefold by 2030 to 550 000 tonnes a year, more than double to 200 000 tonnes the region will be able to produce, according to Benchmark Mineral Intelligence [40].

In 2024, European solar panel makers were hit by a growing glut of Chinese photovoltaic cells, with thousands of panels waiting in warehouses unable to be installed due to lack of grid connectors or skilled labour. The surplus is driven by a clean tech manufacturing boom in China, which has outstripped domestic demand. Tough tariffs

---

[11] Florence School of Regulation (FSR), 2024, EUI, The Green Deal Industrial Plan, https://fsr.eui.eu/the-green-deal-industrial-plan/#:~:text=other%20global%20players%3F-,What%20is%20the%20Green%20Deal%20Industrial%20Plan%3F,for%20the%20Net-Zero%20Age.

[12] Tech EU, "Northvolt chooses Germany over US for new EV battery plant with €902mn aid", https://tech.eu/2024/01/09/northvolt-chooses-germany-over-us-for-new-ev-battery-plant-with-eur902m-aid/.

against Chinese imports in the US means that most excess panels are shipped to Europe [41].

The EU launched two investigations into Chinese panel manufacturers that Brussels said benefited from market-distorting subsidies. The probes reflect a hardening stance in Europe towards cheap Chinese imports, which the EU industry blamed for losses and plant closures at several European panel makers. Solar panels have become strategically important for Europe, according to the EU internal market commissioner Thiery Breton. The two new in-depth investigations on foreign subsides in the panel sector aim to preserve Europe's economic security and competitiveness by ensuring that companies in the single market are truly competitive and play fair [41].

In 2024, a quarter of the EVs sold in the EU will have been made in China. About 19,5% of the battery cars sold in the bloc in 2023 were made in China. Some non-Chinese brands such as Tesla, BMW and Renault make EVs in China, they import to Europe. But Chinese-branded EVs alone accounted for 11% of the EU's car market in 2024., rising 20% by 2027 [42].

EU probes into the subsidies are considering whether the subsidies have helped the EVs made in China to undercut European-made models. The finding are expected to lead to an increase in tariffs on EVs coming from China. A 25% tariff – compared with the 10% MFN rate – could raise up to €6bn a year for the EC and make EU cars competitive with EVs made in China [42].

Opponents of the anti-subsidy tariffs on EVs argue that tariffs will not shield legacy carmakers for long. Chinese companies will build factories in Europe and when that happens, the EU's car industry will need to be ready [42].

BYD was building a factory in Hungary that it expects to begin producing EVs by end of 2025. It wants to become one of the largest European EV brands by the end of the decade and to account for one in 10 battery cars sold in the region by 2030. A spokesperson by BYD in Europe said that subsidies were less important than "technology" an "efficiency" in making vehicles cheaper. BYD invested in the technology much earlier, and much more, than competitors. It was not the result of the subsidy [42].

In 2025, the EU sought to extend a relaxed subsidy regime for energy. EU guidelines allowed members to keep pouring cash into clean the investments until the end of the decade. These were designed to avoid a continent-wide subsidy race and wasteful grants to uncompetitive companies. The EU's unique state aid regime empowers the EC to monitor state support [43].

The approach led to tensions between France and Germany, and the smaller members with less financial firepower concerned with undermining the bloc's single market. The EU first relaxed the rules on state aid during the 2008 financial crisis, allowing governments to intervene to save failing banks [43].

The Covid-19 pandemic and energy crisis sparked by Russia's invasion of Ukraine delayed the return to the EU's strict rules and framed the state aid regime was a tool for wider goals [43].

What was happening in the EU now appeared to be a response to the US Inflation Reduction Act for the green transition that the EU wanted to accelerate. The new state aid framework is a key pillar of the EU's own Clean Industrial Deal, which tries to balance the bloc's climate goals and efforts to improve the bloc's competitiveness. To balance these goals the EU allows countries to fund investments that cut emissions [43].

In the automotive sector, the EC will uphold its 2035 ban on petrol cars but will allow flexibility over the next years how carmakers meet stricter CO_2 emission targets entering into force in 2025. The targets stay the same [43].

The incoming Trump administration in 2016 took a more aggressive stance toward China and any other countries he considered rivals by taking products, jobs and companies from the US. Rather than take up grievances at the WTO through the DSM, Mr. Trump addressed perceptions of unfair trade practices, among others Chinese subsidies and its theft of intellectual property that resulted in the loss of jobs and industrial activity, through bilateral trade sanctions. In 2019, threats of trade wars on several fronts were launched against allies and rivals alike. The US-China trade war involved a tit-for-tat tariff escalation. Other shots that were fired resulted in renegotiated trade deals or fell short of tit-for-tat escalation. Nevertheless, the Trump administration's action was a reminder of the consequences of pursuing unilateral rather than multilateral action.

References:

[1] WTO, "Subsidies and Countervailing Measures: Overview", Agreement on Subsidies and Countervailing Measures, accessed 2021, https://www.wto.org/english/tratop_e/scm_e/subs_e.htm

[2] WTO, "What is the WTO: Understanding the WTO, The Agreements", Agriculture: fairer markets for farmers, accessed 2021, https://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm3_e.htm

[3] WTO "What is distortion?", The Agreements", Agriculture: fairer markets for farmers, accessed 2021, https://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm3_e.htm#distorted

[4] WTO, "Domestic support in agriculture: The boxes", under trade topics, agriculture, negotiations, accessed 2021, https://www.wto.org/english/tratop_e/agric_e/agboxes_e.htm

[5] EC, Treaty Provisions on State Aid, accessed 2021 https://ec.europa.eu/competition/state_aid/legislation/compilation/a_01_03_11_en.pdf

[6] *Financial Times*, "US States Become Addicted to Use of Economic Sweeteners", Mar 23, 2006, p. 4.

[7] *Economist*, "Work to be done: How the government can help things along", *Economist,* 3 Apr 2010, p. 14-5.

[8] *Economist*, "Free exchange: Beggar-thy-neighbour banking," 5 Jul 2014, p. 67.

[9] *Economist,* "Protectionism: The hidden persuaders", 12 Oct 2013, p. 16-18.

[10] *Economist*, "Special economic zones: Political priority, economic gamble", *4* Apr 2015, p. 59-60.

[11] Owens, R.E., "An overview of agricultural policy . . . Past, Present and Future", Federal Reserve Bank of Richmond, *Economic Review* 75 (May/Jun 1987), p. 39-50.

[12] *Economist*, "Economics focus: Punch-up over handouts", 23 Mar 2005, p. 76.

[13] "Country Roads: America Looks for New Ways Forward for Its Worried Farmers", *Financial Times*, Sep 14, 2005, p. 15.

[14] *Economist*, "A stopped clock ticks again", 13 Oct 2005, p 78.

[15] *Economist*, "Agriculture: At the trough", 1 Jun 2013, p. 43.

[16] *Economist*, "Charlemagne: If the CAP doesn't fit", 24 Apr 2010, p. 30.

[17] *Financial Times*, "Japan sets out plans to reform rice subsidies", 27 Nov 2013, p. 4.

[18] *Economist*, "China and global farming: The wrong direction", 16 May 2015, p. 51.

[19] *Economist*, "Farm subsidies: bitter harvest", 16 May 2015, p. 50-1.

[20] "Aircraft-makers: Another nose in the trough", *The Economist,* 16 Sep 2010, p. 69-70.

[9] "Twin WTO ruling on Airbus dispute", *Financial Times,* by J. Chaffin, M. Odell, J. Lemer, and H. Weitzman, 18 May 2011.

[22] *Economist*, "China's economy: Perverse advantage", 27 Apr 2013, p. 61.

[23] *Economist*, "Trade and the campaign: Chasing the anti-China vote", 22 Sep 2012, p. 47.

[24] OECD, *OECD's Producer Support Estimate and Related Indicators of Agricultural Support (The PSE Manual)*, OECD: Paris, 2010. http://www.oecd.org/tad/agricultural-policies/psemanual.htm

[25] WTO, "Modalities for Agriculture: Domestic support", Committee on Agriculture, WTO document number TN/AG/W/4/Rev.4, 6 Dec 2008.

[26] *Economist*, "World trade: Baling out of Bali," 9 Aug 2014, p. 54-5.

[27] *Economist*, "Food security in the Gulf: How to keep stomachs full," 22 Feb 2014, p. 30.

[28] *Economist*, "New productive forces: Hye and hyperopia", 6 Apr 2024, p. 58-60.

[29] *Economist,* "The future of factory Asia: A tightening grip", 14 Mar 2015, p. 61-2.

[30] *Economist*, "China's economy: Biting the bullet", 23 Sep 2018, p. 61-2.

[31] *Economist*, "Free exchange: Planned obsolescence", 4 Jan 2020, p. 56.

[32] *Financial Times*, "US has the trade tools needed for China's EVs – but it must use them", by W. Cutler, 3 Oct 2023, p. 17.

[33] *Economist*, "The car east", Briefing on Chinese electric vehicles, 13 Jan 2024, p. 14-6.

[34] *Economist*, "Rosy for riveters", Briefing: Re industrializing America, 4 Feb 2023, p. 16-9.

[35] *Economist*, "Adieu, laissez-faire", Briefing on Bidenomics, 29 Oct. 2022, p. 21-3.

[36] *Financial Times*, "Can the EU keep up with the US on green subsidies?", S. Fleming, A. Hancock and J. Espinoza, 2 Feb 2023, p. 15.

[37] *Financial Times*, "US subsidies generate $220bn clean tech boom", A. Chu and O. Roeder, 17 Aug 2023, p. 4.

[38] *Financial Times*, "States rush to cash in on Biden's subsidies", A. Williams and A. Chu, 8 May 2023, p. 4.

[39] *Economist*, "Industrial policy: Deluded about manufacturing", 15 Jul 2023, p. 11-2.

[40] *Financial Times*, "Lithium shortages threaten EU's EV transition", P. Nilsson and H. Dempsey, 3 Apr 2023, p. 8.

[41] *Financial Times*, "EU turns up heat on cheap China solar panels", A. Hancock and E. White, 4 Apr 2024, p. 4.

[42] *Financial Times*, "China's EVs seep into Europe", P. Campbell, 28 Mar 2024, p. 7.

[43] *Financial Times*, "EU to extend relaxed subsidy regime for energy in green push", B. Moens, 4 Mar 2025, p. 2.