CARBON FOOTPRINT, FOOD MILES AND THE INTERNATIONAL WINE TRADE: SOME IMPLICATIONS
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Introduction
Food production and consumption is one of the most resource and energy demanding activities of households in the developed world. Throughout the life cycle of foods, the provision and use of materials and energy result in contributions to a wide range of environmental impacts. Wine industries have significant impact on vineyard microclimates alteration, and they also incur costs that are passed on to society. These externalized costs include non-product output such as Carbon Dioxide (CO$_2$) emission, chemical effluent, and other wastes that contributed to the global tragedy of commons. Understanding the type and magnitude of these externalities helps prepare companies and industries for potential impacts from regulation on such externalities, helps to promote accountability to consumers, and helps to identify opportunities for innovation and cost-savings. The environmental performance of products and processes has become a key issue, so that some retailers took position in relation to imported wines: eg the British Tesco since January 2007, announced that every product sold would have a carbon rate or the “carbon footprint” displayed on its label (Rigby et al, 2007); Wal-Mart, has recently introduced a ‘Global Sustainable Sourcing Initiative’, committing it to prefer suppliers that aggressively reduce CO$_2$ emissions and use recycled or recyclable packaging, which is why some research centres and companies are investigating ways to minimize their effects on the environment. Wine is a widely consumed product and has an important role in world trade, with the United States and the United Kingdom being the largest importing countries, so this could also lead to implications for the Italian market.

By directly or indirectly encouraging discrimination against products originating in geographically distant markets, however, importing states risk breaching the Marrakesh Agreement and in particular the General Agreement on Tariffs and Trade and the TBT Agreement. Although the objective of sustainable development has been embedded within the World Trade Organization framework, under these Agreements environmental measures must be WTO compliant and must not constitute disguised restrictions on international trade. Arguably, discriminating against food products on the basis of food miles without scientific evidence, establishing a link between long distance transport and negative impact on sustainability amounts to a disguised restriction on international trade.

In the food miles debate, several authors have calculated the consumption of CO$_2$ associated with the distance traveled by the wine to reach the target markets and means of transport used: It seems that the distance travelled may not be as important as the transportation method. Nigel Greening of Felton Road Vineyard in New Zealand has calculated that shipping a case of his wine by container vessel to London uses 4.048kg of CO$_2$ which is equivalent to 1,150 km by truck, giving a bottle a 337g carbon count.

That could mean it's better to buy wine from New Zealand than it is from southern France, Italy or Spain where it comes by truck to the UK. But this area is under-researched and more reliable data is needed.

Alternatively, adopting a mandatory carbon footprinting framework which imposes significant cost upon exporters in distant markets discriminates unnecessarily against those exporters and creates a substantial impediment to international trade. The embrace of carbon footprinting and local food sourcing as environmental measures designed to reduce greenhouse gas emissions poses a potential threat to Italian wine export industries which are geographically distant to importing market and vice versa. Food transport costs can add considerably to a product’s carbon footprint.
and detrimentally affect sales. The raison d'être of carbon footprinting is to encourage responsible environmental production methods. However, the author questions whether this aim can be effectively fulfilled and whether carbon footprinting and local food sourcing policies are instruments of anti-globalisation sentiment and thus can be challenged under the World Trade Organization framework.

So, the aim of this paper is to reasoning around these demands: Does Food Miles Labelling or Carbon Footprinting Lead to Discrimination against Imported wines? What impact it can have on the final consumer? And so on.

1. Some conceptual reminders: Carbon Footprinting and Food Miles definition

Carbon footprinting has received much attention recently (see e.g. Wiedmann, 2007; Risk & Policy, 2007; Padgett, 2008; Weidema, 2008). There are a number of different definitions of carbon footprint; for the purposes of this study, it is defined as the total amount of GHG emitted in the whole life cycle of the system under consideration, i.e. from 'cradle to grave'.

So, a carbon footprint is a technical assessment which determines the amount of emissions of certain gasses resulting from a process, an activity, a business or even a person's life-style. There are six primary gasses of interest: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), sulphur hexafluoride (SF6), perfluorocarbons (PFCs) and hydrofluorocarbons (HFCs). These are often referred to as greenhouse gasses or GHGs as they are believed to contribute to a "greenhouse effect" which traps heat in our atmosphere. This greenhouse effect has the potential for global warming resulting in climate change on earth. The global warming potential, or GWP, of each of these gasses is different and to be quantified needs to be adjusted to a common unit of measure. That common unit is carbon dioxide and is expressed as a carbon dioxide equivalent (CO2e). These emissions are generally measured in metric tons (2,204 pounds), the international standard. Carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O) are the primary GHGs that result from agricultural and livestock operations. The other three gasses are not generally associated with agricultural operations. As the following table reflects, these gasses have different global warming potential when converted to carbon dioxide equivalents. Each ton of methane (CH4) and nitrous oxide (N2O) released to the atmosphere is equivalent to 21 tons and 310 tons of carbon dioxide, respectively.

A carbon footprint estimates the size and breakdown of GHG emissions; identifies areas where emissions may be positively impacted by improved efficiencies; and, provides a mechanism to track performance in improving efficiencies and reducing emissions. There are two options: an operational assessment and a product life-cycle assessment.

Several approaches to estimating the carbon footprint currently exist, depending on whether the footprint of an organisation, product or individual is considered. These methodologies include the Greenhouse Gas Protocol ('GHG Protocol') produced by the World Resources Institute and World Business Council for Sustainable Development and a standard produced by the International Organization for Standardization, ISO 14064. Both of these methods use life-cycle analysis techniques and measure corporate or project greenhouse gas emissions rather than a per product carbon footprint. The GGA Protocol (Forsyth et al., 2008) is based upon the GHG Protocol, although ISO 14064 was extensively consulted during its development. Hence, the GGA Protocol is intended to be used from a whole of company or enterprise perspective. In response to the threat of climate change Carbon Trust, a company established by the UK Government, is currently trialling a carbon label that shows the carbon content of a product in grams as well as a signal of the producer's commitment to lowering their products' carbon footprint. This Company, to support the label, has developed a carbon footprint methodology, drawing heavily on the life-cycle assessment techniques outlined in the GHG Protocol and ISO 14064. This methodology calculates

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the carbon footprint for each item purchased by consumers, inclusive of all greenhouse gases, all supply chain inputs and outputs (including transportation) minus indirect emissions. The European Commission favours a similar method for measuring the greenhouse gas emissions of retail items. The “food miles” concept refers to the distance travelled between production and consumption: it is based on the rather simplistic notion that the further food travels between farm and plate, the greater must be its negative environmental impact. The term was apparently first coined in the United Kingdom in the early 1990s, and has been variously attributed to “The Food Miles Report” published by the SAFE Alliance in 1994, and to Tim Lang. At its inception, food miles was based on the idea that growing and consuming local product was inherently less wasteful than importing it from elsewhere. “Food miles help make the environmental impacts of long-distance transportation more visible over space and time” (Illes, 2005, p. 169). According to Coley et al. (2009, p. 150) “the concepts of ‘local food’ and ‘food miles’ have become powerful polemical tools in policy discourses built around sustainable agriculture and alternative food systems” (Lang and Heasman, 2004).

With global warming becoming a pressing issue, the food miles debate has become a cause celebre for environmental activists around the world: many association of farmers have seen the opportunity provided by this debate promoting local food instead of food miles. There has been a tendency to assume that local food is a solution to the problem of food miles. Originally the environmental impact of food miles was broadly conceptualised (SAFE Alliance, 1994; Raven and Lang, 1995; Subak, 1999). The reduction of food miles was seen as an aspect of making more explicit the links between particular foods and particular natures, a re-territorialisation or re-spatialisation of food production which begins to reverse the aspatialities which are, or were, an intrinsic part of a globalised food order (Winter, 2005). This was based on a growing realization that the properties of food are ‘natural’ and that heterogeneity of edaphic conditions gives rise to varied natures represented in varied foods. To reduce food miles implies the need for food systems grounded in local ecologies and responsive to consumer demands for quality food (Murdoch et al., 2000), hence the growing literature on the benefits of a more localised food supply system (Winter, 2003; Sage, 2003; Morris and Buller, 2003; Cowell and Parkinson, 2003). However more recently, food miles have been linked much more explicitly to carbon accounting (Jones, 2001; Pirog et al., 2001; Smith and Smith, 2000; Lal et al., 2004) and the climate change debate. In some ways this has served to radically shift the food miles argument away from sustainable agriculture production systems per se to food distribution and retailing and, in particular, the use of carbon in transport.

Rapidly the food miles debate morphed into the carbon footprint debate recognizing that “Food miles have a complex relationship to sustainability, and there can be trade-offs between environmental, social and economic factors” (DEFRA, 2005, p. 95). The problem linked with food miles has become the assessment of CO$_2$ emissions associated with transporting the final product from the place of production to consumption as the key indicator of sustainability, and operates with a correspondingly narrow conception of environmental sustainability.

Most of the articles that have been involved in calculating CO$_2$ emissions associated with producing a bottle of wine by applying the Life Cycle Assessment (LCA) methodology have found that the environmental impact of transport phase takes a high value compared to the phases of the production process (Aranda et al, 2005; Ardente et al, 2006; Gonzalez et al, 2006; Garnett, 2007), but the distinction regarding mode of transport has often been blurred both in the public and scientific debate. However, some studies have shown that the mode of transport is the key element (Colman e Paster, 2007; Wrap, 2007; Cholette e Venkat, 2009). According to DEFRA (2005, p. v) “Air transport has a very high climate change impact per tonne carried, whereas sea transport is relatively efficient.” Mason et al. (2002, p. 52) state that “international distribution patterns involving air freight generate 30 times more CO$_2$ than sea transport”. As DEFRA (2005) point out, sea transport accounts for only 12% of CO$_2$ emissions arising from food transport into and in the UK, compared to 77% of CO$_2$ emissions attributable to road transport within the UK.
2. The link between food miles and carbon footprinting labelling and discrimination against imported wine

There are concerns that carbon footprinting generally favours domestic producers over exporting ones; it provides a means for consumers to differentiate between retail goods on the basis of whether they are made and marketed in a carbon sustainable manner. As was already pointed (Heyes and Smith, 2006; Waye, 2008; Kemp, 2010) it has been argued that the food miles campaign could create a new type of non-tariff trade barrier, and this may in fact be the motivation of many of its promoters. Wilson (2007, p. 43) writes: “Neo-protectionism? With little scientific evidence to support it, it seems that the food miles campaign is just another ruse to justify protectionism. Many of the supporters of food miles actively state in their commentary that food miles are a legitimate justification for limiting imports. The food miles campaign suffers from the systemic myopia that the left has towards free markets”. According to the DEFRA report on food miles (2005, p. 5): “Food miles are often discussed in the context of decreasing farm gate prices, the disappearance of local shops and detrimental effects on rural economies and farming communities in the UK” which sound very much like the arguments used by lobby groups opposed to free trade. Also in Italy, on the basis of environmentally sustainability, was a lively debate in support of short chains, especially for fruits and vegetables.

Also, as Waye (2008) point out, by focusing upon carbon labelling, consumers and producers have less incentive to address other environmental and social factors and consequently carbon labelling may lead to inappropriate trade-offs. For example, a research undertaken by Thottathil (2008), has demonstrated that a significant proportion of consumers will avoid fair trade products in favour of locally produced items to reduce the use of fossil fuel in the food system. So a focus upon carbon output may unduly favour conditions in the importing countries. Instead, the main objective of carbon footprinting, in terms of affecting the rate of climate change, is to enable consumers to discriminate between environmentally responsible and environmentally harmful production practices. However, there is little clarity about the actual impact of climate change on consumer perceptions and purchasing behaviour. In relation to wine production and marketing, many winemakers and wine retailers regard responding to climate change as a form of good corporate social responsibility. It remains unclear, however, whether and how consumers will respond to the redesign of supply chains, environmental assurance labelling, carbon footprinting or food miles, or how they will prioritise these against other hedonic factors such as region and brand. The strength of the link between consumer behaviour and carbon labelling are further exacerbated by the interactions carbon labelling might have with other existing regulatory requirements such as health warnings, alcohol to volume labelling, and allergen labelling. There may be a risk that too much detailed information attached to food products, especially products such as wine which are already subject to substantial labelling regulation, will simply lead consumers to rely upon heuristics such as country or brand rather than to identify, assimilate and compare carbon value. This is an important issue that has to be depth.

I very much agree with Waye (2008) when she expresses concern about the decisions of highly monopolised wholesalers and retailers in key importing countries, because the capacity of relatively high carbon value products to be exported or sold within these markets may be substantially diminished. This is what could probably happen to Italian wine exported by air in the U.S. or UK markets. In this regard it is necessary to carry out studies to identify alternative means of transport of Italian wine exported over long distances to find ways to reduce CO₂ emissions such as that done by WRAP (2007).

Where you want to find a link between the imposition on the label of the level of CO₂ emitted in the production of wine and the violation of the rules of international trade you should refer to the General Agreement on Tariffs and Trade (GATT) 1994. There is no specific WTO agreement governing regulation of carbon footprints and accounting for food miles, but Article III of the GATT 1994 and the TBT Agreement are the WTO provisions which most directly address these issues. Article III of GATT 1994 applies to ‘laws, regulations and requirements affecting the internal sale, offering for sale, purchase, transportation, distribution or use’ of products. These terms are interpreted broadly. Most pertinent to the issues of food miles and carbon footprinting is art III:4, which requires that ‘products imported from other WTO countries should be accorded treatment’ no
less favourable than ... like products of national origin in respect of all laws, regulations and requirements affecting their internal sale, offering for sale, transportation, distribution or use'.

Several questions arise from the above requirements first of all connected to the possibilities that Food Miles Labelling or Carbon Footprinting lead to discrimination against imported product, or wine. Carbon footprinting and food miles labelling apply equally to imported and domestic products. Nevertheless, measures need not directly discriminate against imported products in order to breach art III:4. According to the WTO Appellate Body, 'whether or not imported products are treated “less favourably” than like domestic products should be assessed instead by examining whether a measure modifies the conditions of competition in the relevant market to the detriment of imported products'. Thus in EC — Trademarks and Geographical Indications European regulations that limited the legal protection for geographical indications in relation to imported agricultural products and foodstuffs by imposing more onerous requirements upon exporting producers than those which applied to European Community producers were found to breach the national treatment principle embedded within GATT 1994 art III:4 as well as TRIPS Agreement art III:1.1. Carbon footprinting and food miles labelling would not prevent wine and other food products from being sold freely, nor would they directly affect the price of wine in the same manner as a tax. Rather carbon footprinting and food miles labelling provides consumers with ‘credence’ information that they would not otherwise be able to obtain concerning the carbon sustainability of their purchase (Waye, 2008). However, it may be possible to argue that food miles labelling is different to carbon footprinting, because of exporting producers are far from market than domestic producers. Consequently, if food miles labelling were transformed from an uncoordinated market activity to government supported measure, imposition through labelling of a negative implication regarding a product’s sustainability or health attributes may be considered a form of competitive disadvantage indirectly related to its foreign origins, above all if the negative implication cannot be objectively justified.

Indeed, many WTO members have expressed the opinion that the topic of eco-labelling is better dealt with by the TBT Committee rather than the CTE (Committee on Trade and Environment). The aims of the TBT Agreement are to reduce the extent to which technical regulations and standards operate as barriers to market access and to encourage the development of international standards that reflect legitimate objectives, such as sustainability. Different provisions of the TBT Agreement apply depending upon whether the relevant measure is characterised as a ‘technical regulation’ or a ‘standard’. Technical regulations are mandatory specifications applicable to a product or group of products, related processes or production methods, whereas standards are voluntary specifications for products, related processes or methods of production. Regulations and standards include ‘terminology, symbols, packaging, marking or labelling requirements as they apply to a product, process or production method’ (Waye, 2008). Members are still obliged to observe the national treatment principle, while regulations and standards must not create an unnecessary obstacle to international trade. Thus, even though low carbon and high carbon wine might be regarded as ‘like products’, the level of CO₂ emissions associated with each particular wine may still constitute a basis for discriminating between wines which have otherwise equal characteristics, at least for a substantial group of consumers. In some cases the environmental measure may actually define the product for the consumer. As a result, a regulation mandating a certain minimum level of recyclable input defines whether the product can be marketed as a recycled product. In the same manner, regulations specifying how a carbon footprint is measured and the relevant labelling that should apply to products, define whether products can be marketed as low carbon or carbon neutral.

While regulation may be considered in the near future, at this stage neither carbon footprinting nor food miles labelling are imposed by the state. Questions may still be raised, however, as to whether food miles labelling and carbon footprinting constitute standards. The reason for extending the TBT Agreement to standards devised by government and non-government bodies is that these may operate as de facto mandatory requirements and therefore stymie international trade in the same manner as regulatory measure (Waye, 2008).
3. Some final considerations

The brief examination performed in the study has highlighted that many questions may be raised when it comes to Food Miles and Carbon Footprinting of an exported wine: there is a first methodological problem connected with the content of these indicators and the need to identify standard methods of assessment of CO₂ emissions which could allow to compare the results included in wine labels; but also with the implementation cost and the different information they provide to the final consumer. We also underlines the opportunities to select methods that capture the factors that consumers take into account when purchasing food and minimise potential for social desirability bias to contaminate consumers’ reasons for buying food. In particular, there is value to be gained from adopting revealed preference techniques to overcome the undue influence of socially desirable explanations for stated food preferences. Furthermore, as Kemp (2010) point out, there is a danger in assuming that all players in the food supply chain, including farmers, food importers and retailers, share the same motivations and views regarding the impact of food miles and carbon footprint, and similar protectionist arguments, on consumers’ food purchase behaviour. Also, from an international trade perspective, carbon footprinting using the methods developed by Carbon Trust (or other similar methods) is less likely to constitute an arbitrary and unreasonable restriction upon international trade than discrimination based upon a one-dimensional concept like food miles. Nevertheless, given the findings of the American Association of Wine Economists referred to earlier, if the only reason that wine produced in Australia is more carbon intensive than wine produced in Europe or the US is distance to market, is this an acceptable basis for Australian wine to be assigned a higher carbon value with presumably diminished competitive advantage? Distance to market is not an environmental factor which Australian winemakers are able to affect, thus falling outside of the rationale of carbon footprinting. While at this stage carbon footprinting is voluntary, efficacy demands that the methodology become mandatory, or at the very least that its adoption become widespread, to achieve standardisation in measurement and universality of coverage.

If only a small number of producers applied carbon footprints to their products and used different methods to assess greenhouse gas emissions, consumers would not be able to use carbon labelling to effectively discriminate between environmentally responsible and environmentally harmful products. In addition, producers would have little incentive to adopt carbon labelling unless they could attain competitive advantage. There is no competitive advantage unless comparisons can be made across a range of substitutable products. There is also a suggestion that carbon footprinting could be deployed in the development of low carbon product standards. Clearly such standards would not be feasible without a universal means of assessing a product’s carbon footprint.

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