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Food security in the United Kingdom: External supply risks

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ABSTRACT

This paper examines some of the factors that contribute to an understanding of the notion of food security for a developed country like the UK. These include the level of self-sufficiency, the agricultural sector's dependence on imported inputs, and openness of the economy. An interesting parallel between the food security debate and that of security of energy supplies is also explored. A quantitative assessment of the security of external food supply, based on indices borrowed from the recent literature on energy security, shows that whilst the position of the UK may have worsened slightly, the level of external supply risk is very low. In consequence, security of food supply in the UK does not appear to be an issue that warrants alarm or undue concern, although the debate is likely to rumble on.

Introduction

Food security in the UK has once again risen to the top of the agenda. Interest was heightened by the sudden and sharp increase in world food prices in 2007–08, but concerns had been raised earlier (Defra, 2006). In response, a comprehensive assessment of UK food security was undertaken (Defra, 2009a,b). A number of factors are adjudged to pose a threat to food security in the 21st century, e.g. climate change, oil shortages, increased use of bio-fuels, rapidly growing demand in China and India, embargos and international terrorism. Thus, whilst food prices on world markets have subsided, concerns about the ability of the UK to maintain an adequate supply of food have not. Food security is not a new issue. In some developing countries it can still be, regrettably, a matter of life and death, but in developed countries, like the UK, domestic food security is generally much less of a concern.[1] Its periodic rise up the agenda is usually in response to a shock or significant event that appears to undermine what are otherwise stable food markets. Such an event was the recent escalation in world food prices and a similar situation arose in the mid-1970s when neo-Malthusian concerns were reawakened by the 'world food crisis' (see, for example, Ritson, 1980).

The Common Agricultural Policy of the EU, which has shaped agricultural policy in the UK for the past 40 years, featured security of food supply as one of its original objectives, but a definition was carefully avoided. There are, however, a number of definitions in the literature. That used by the Food and Agriculture Organisation of the United Nations is of "*a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life*" (FAO, 2012). A similar definition is used by Defra (2009a, p. 6): "*ensuring the availability of, and access to, affordable, safe and nutritious food sufficient for an active lifestyle, for all, at all times.*" A threat to food security may arise in one of two ways: either through higher prices, making food unaffordable for a significant number of people, or through food being unavailable at *any* price, for example as a result of an embargo.

Defra (2009b, p. 80) notes that while food security and energy security are distinct, "*there are themes common to both . . ., [including] the diversity and reliability of supplies and supply routes . . .*".[2] Indeed, there is an interesting parallel between the food security debate and that of security of energy supplies. In commenting on the latter, Löschel et al. (2010, p. 1607) note that whilst some people argue for "*reducing dependence on foreign energy sources, others suggest expanding and diversifying import channels*", whilst similarly Cohen et al. (2011, p. 3) note that "*Rising imports as a share of total consumption is thus taken to imply lower energy security . . .*" These sentiments could apply equally to the issue of food security. The parallel continues in that Löschel et al. (2010, p. 1607) cite three major

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[1] In Britain today, "*more illness and death are caused by excessive, rather than deficient food consumption*" (Defra, 2006, p. 72).

[2] Diversity refers to "sourcing nutritious food from a diverse range of stable countries [which] enhances security by spreading risks" (Defra, 2009b, p. 2). Risks refer to political, technical, demographic, economic and environmental threats and challenges to UK food security and are summarised in Defra (2009b, p. 5).

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reasons why "*the concept of 'energy security' is exploited in various ways by different interest groups. ... (i) it concerns many aspects which are vital to the major economies, (ii) it is a complex and interrelated issue and (iii) it lacks a well-defined idea behind it, potentially involving more than just one scientific discipline.*" In terms of the food security debate, Defra (2006, p. 6) notes that "*Discussions around food security can be confusing because ... for a developed economy like the UK, national food security is multi-faceted and complex in which different aspects are inter-linked*". This commonality is explored in the current paper by assessing external supply risks through the application of two indices which have featured in recent literature on energy security. In so doing, the paper directly addresses a question raised by Defra (2008, p. 29), "*How diverse and secure are our [food] imports?*" The outcome is a quantitative measure of security of external supply, which contributes to the on-going debate surrounding food security in the UK.[3]

The analysis undertaken in this paper is partial in nature, in that only some of the factors that have a bearing on food security are examined. Food security is a large and nebulous issue that defies comprehensive summary measures. The focus here is on selected aspects of the debate, namely, self-sufficiency in food and import dependency (Section 2), the growing 'openness' of the UK economy (Section 3), and the application of the two security of external supply indices (Section 4). Some concluding remarks are offered in the final section.

Self-sufficiency and import dependency

Sturgess (1992, p. 314) noted that the UK's self-sufficiency in food had long been a subject of interest and has been "meticulously calculated". He also noted that the original food security objective of the Common Agricultural Policy, dating from the early 1960s, had been widely interpreted as pursuit of self-sufficiency. However, as is now widely acknowledged, self-sufficiency in food is not synonymous with food security (Defra, 2006).

Self-sufficiency is typically measured as the proportion of total food consumed that is produced domestically.[4] In 2010, the UK was 60% self-sufficient in all foods, almost 20 percentage points lower than 25 years earlier, but higher than in the 1960s (Defra, 2012a). The recent fall is of particular concern to those who see a link between self-sufficiency and food security, but as Defra (2006, p. vi) points out this "... *has often obscured the real issues.*" An economy with a high level of self-sufficiency may be heavily dependent on imported intermediate inputs, which may threaten the security of its domestic food supply. Conversely, an economy that is less self-sufficient, but open to imports, may actually improve its food security through diversification of supplies. Nevertheless, a common interpretation of lower self-sufficiency is that the country is more dependent on imported foods and therefore that food security is undermined.

It is notable, though perhaps unsurprising, that in times of crisis the UK has succeeded in raising its agricultural output. In both World Wars, wheat production, for example, increased substantially: output was 16% per cent higher during 1914–18 than over the previous five years; and 46% higher during 1939–45 than over the previous six years (MAFF, 1968). Similarly, the 'world food crisis' of the mid-1970s was followed by production increases: wheat output was 13% higher during 1973–75 than 1970–72 (Defra, 2012b). However, the extent to which current output might be raised in times of crisis and within the necessary timescale remains an open question. Moreover, increased output is conditional, at least in part, on continued supplies of imported inputs.

Agriculture in the UK is heavily dependent on imported inputs. Input–output tables for the UK (ONS, 2012) show that intermediate inputs (e.g. animal feeds, fertilisers and pesticides) imported *directly* into UK agriculture account for 6% of the total value of gross output. *Indirect* imports (imported inputs used by, for example, the domestic animal feed, fertiliser and pesticide industries) account for a further 9%. Thus, imported inputs (direct and indirect) account for 15% of total gross agricultural output (Table 1). However, for animal feeds, fertilisers, pesticides and those purchases from within the agricultural sector itself, which together comprise over half of all intermediate inputs, the dependence on imports is considerably greater. For example, 37% of fertiliser used by agriculture is imported directly into the agricultural sector (ONS, 2012). Additionally, the UK fertiliser industry itself is dependent on imported inputs, as are some of the industries from which the fertiliser industry purchases its inputs, and so on. When all such indirect imports are traced, an import dependency ratio can be calculated as the percentage of each £1 of input accounted for by direct and indirect imports, i.e., either of the input itself, e.g. fertiliser, or other imported inputs required to produce it domestically. For fertiliser, this dependency ratio is 55%; each £1 of fertiliser used by UK agriculture is 55% dependent on imports of one kind or another (see Table 1). The equivalent dependency ratio for pesticides is 47%, for animal feeds somewhat lower at 19%, and for inputs purchased from within agriculture itself, 26%. The weighted average across all intermediate inputs is 28%, i.e. over a quarter of these inputs are imported, directly or indirectly. This underlines the extent to which agricultural production in the UK is dependent on imports, a dependency in addition to that which underlies the nation's self-sufficiency in food.

Openness of the economy, globalisation and diversification in sources of supply

A popular view in some quarters is that imported food represents a threat to food security because of the risks associated with a dependency on foreign suppliers. However, imports can also be viewed as beneficial in that they are likely to involve a diversification in sources of supply (Defra, 2006). The UK economy has become increasingly 'open' to international trade in recent decades, as successive governments have sought to champion globalisation. Membership of the EU and support for the GATT/WTO[5] have widened and deepened the UK's international trade relations. A simple and generally accepted measure of openness is that of a country's total trade (value of exports and imports) as a percentage of its Gross Domestic Product (GDP). Using this measure, the openness of the UK economy has increased from around 44% in 1970 to around 63% in 2010 (Fig. 1).

Another measure of the extent to which the country has embraced globalisation is provided by the Swiss Economic Institute's KOF index (Dreher, 2006 and Dreher et al., 2008). This combines three components: economic globalisation, which accounts for economic flows with an allowance for restrictions to trade and capital; social globalisation, which accounts for the spread of ideas, information, images and people; and political globalisation, which accounts for the diffusion of government policies (KOF, 2012). These three components are assigned weights of 37%, 36%

[3] Clearly, in a country like the UK, agriculture and food production are heavily dependent on the use of energy and other inputs which themselves are energy-dependent, e.g. fertiliser and transport, but this is not the focus of the paper. Rather we draw attention to the similarity between the debates surrounding food security and energy security.

[4] The calculation does not take into account use of imports from outside the agricultural sector. See later in this section.

[5] General Agreement on Tariffs and Trade/World Trade Organisation.