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Why is Food Cheaper in Rich (European) Countries?

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LEON PODKAMINER

1. Introduction

As compared with non-food items, food in rich countries tends to be cheaper than in poor countries – a fact borne out by any number of comparative, cross-country statistics on price and expenditure structures. A typical relationship between real GDP per capita (in terms of purchasing power parities[1]) and the relative price of food (defined as the ratio of food-to-GDP purchasing power parities) is shown by the scatter diagram in Figure 1 below.

Whereas the specific cross-country pattern of relative food prices must certainly have been noted by some writers and researchers, to his

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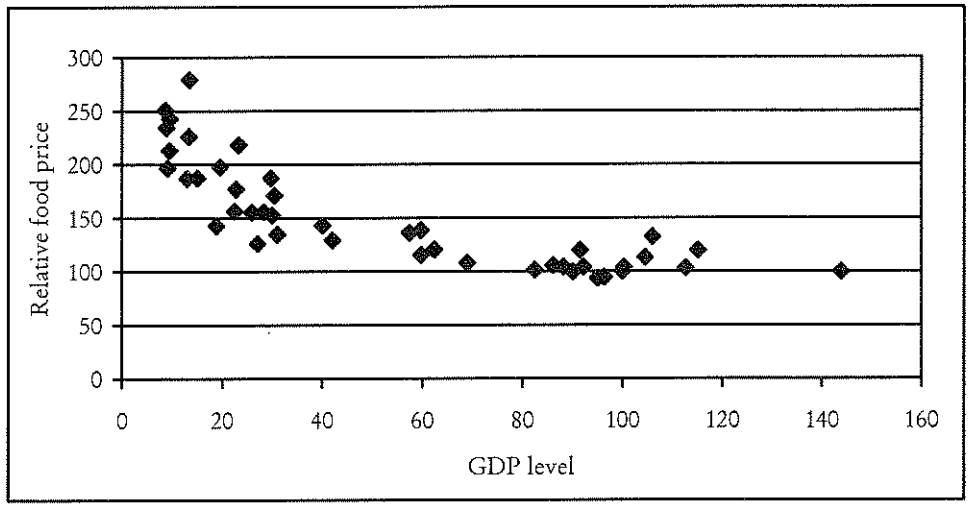
[1] The Eurostat authorities recently renamed the age-old term 'purchasing power parity' (PPP). In current Brussels newspeak, PPP is now referred to as 'purchasing power standard' (PPS). Given the dubious benefits of this neologism, the present paper has opted for the traditional term. PPP for any specific item for a country reflects, popularly speaking, its (market) price level vs other countries. The same applies to broader aggregates of goods and services (PPPs for government services reflect input cost levels vs other countries). The PPPs for 'food' are calculated from the PPPs for more detailed aggregates: 'bread & cereals', 'meat', 'fish', 'milk, cheese & eggs', 'fats & oils', 'fruit, vegetables & potatoes', 'other food'. PPPs for each of the detailed food aggregates are derived from the PPPs from even more detailed aggregates. Thus 'bread & cereals' consists of 9 commodity groups of which 'pasta products' is just one (with three types of pasta distinguished). PPPs for 'non-food' aggregates are derived similarly. In principle the baskets of goods and services considered across all countries should be representative and yet comparable (in terms of quality of individual items). See the methodological notes in OECD (2002).

FIGURE 1

RELATIVE PRICE OF FOOD (AUSTRIA = 100)
VS GDP PC LEVEL (AUSTRIA = 100) IN 1996



Source: Eurostat-OECD (1999). The country sample includes all European countries, excluding Malta, Cyprus, FR Yugoslavia, Bosnia and Herzegovina. All former USSR republics and Mongolia are included.

own (admittedly imperfect) knowledge the author is unaware of any systematic attempt having been made to explore, let alone explain, that pattern – at least in the literature dating back to the 1960s. This state of affairs is perhaps attributable to a widespread conviction, which has since acquired the status of an indisputable truth, that differences in relative prices reflect in some way or another differences in relative costs or productivity levels. On this principle, facts about relative food prices could be dismissed as of no interest on the grounds that, if the prices are such, it follows that relative food costs must be higher in poor countries than in rich. Here the causality runs from relative costs to relative prices – never in the opposite direction. A more elaborate general explanation along the same lines may be drawn from popular pure trade-theory models, such as Balassa (1964) and Samuelson (1964). The lack of real interest in the subject of relative prices is also indirectly confirmed by its striking absence in major works on development and associated structural change (which, after all, are all about the relative contraction of agriculture in comparison to the manufacturing and tertiary sectors). Thus, price developments (whether absolute or relative) do not even feature in seminal empirically-oriented works (e.g. those assembled in the 1988 *Handbook of*

Developmental Economics[2]). Admittedly, many more recent contributions are just as resoundingly silent on price issues.

The aim of this paper is to propose a positive explanation for the observed regularity as illustrated in Figure 1. The first two sections of the paper, however, discuss the conventional wisdom about factors contributing to the pattern observed (first casting doubts on the idea that relative costs are all that important and secondly dismissing the idea that in one way or another foreign trade has something to do with it). Backed up by econometric analysis of a cross-country price-augmented modification of Engel's Law, the explanation had already been alluded to in Podkaminer (1999). It is shown that the specific pattern of relative food prices emerges from the interaction of supply, income and consumer demand. The fact that Engel's Law applies appears quite essential – in contrast to the non-role attributed to that law by various other authors, such as Pasinetti (1993, pp. 38-40).

2. The significance of cost developments

Arguably, the fact that food becomes cheaper as real incomes rise[3] could be seen, broadly speaking, as a reflection of cost developments. Heuristically, then, one should expect unit costs in non-food sector to rise *faster* than in the food sector as growth proceeds. Of course, this hardly seems consistent with traditional beliefs about technological differences between farming and non-farming (the former likely to display 'Malthusian' diminishing returns, the latter likely to enjoy some scale economies). Thus, even heuristically the concept of evolving costs as underlying the observed price regularity does not seem convincing. Going beyond heuristics, one would first have to consider two 'exogenous' factors that may bear on prices, and which could be

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[2] Chenery and Srinivasan (1988). The only definite reference to relative price trends associated with economic development made in the *Handbook* is by Syrquin (1988, p. 259), who quoted, approvingly, the following earlier statement by Nurkse (1959): "[...] changes in relative prices have no close or determinate relation to economic growth as such [...]".

[3] Figure 1 could be complemented by any number of time-series statistics on relative food/non-food and farm/non-farm producer price developments in individual countries. Throughout, overall GDP growth is associated with 'the price scissors' working to the detriment of food/farming.

invoked to account for the GDP level-relative food price regularity observed:[4] *a*) rich countries subsidise agricultural production heavily, while poor countries can at best afford only a modest level of subsidisation; *b*) in rich countries VAT rates on food tend to be lower than the standard rates applicable to non-food items.

Either of the above-listed factors may play a role – but their impact is unlikely to be significant or even consistent with the Regularity. Let us briefly discuss these two factors.

2.1. *Higher subsidies to farming in rich countries?*

Farming subsidies in rich countries do *not* aim to lower domestic prices for farm (and food) products. In rich countries the operational goals of subsidisation are quite different. They aim to: *a*) stabilise farm produce prices by introducing *minimum* guaranteed procurement prices, running publicly-financed intervention procurement schemes and maintaining buffer stocks. The minimum price and buffer stock systems are both designed to avert a drop, not a rise, in farm prices; *b*) support food and farm product exports by actually providing public funds to back large-scale institutionalised dumping; *c*) restrict farm output with a variety of schemes, such as offering premiums for letting arable land lie fallow or setting production quotas; *d*) bolster the incomes of selected social groups (landowners and farmers) and promote or protect lobby interests (e.g. sugar cartels). Meeting these subsidisation/overall farm policy goals must *necessarily increase* domestic prices for food and farm products. The same effect finds its complement in the national agricultural trade policies pursued by rich countries, i.e. maintaining high protectionist barriers to foodstuff and farm produce imports. Of course, a 'political economy' explanation can be found to account for agriculture in rich countries being subsidised at the expense of the rest of the economy (to the detriment of the consumer). In rich countries the farming population accounts for a very small share of the population. Effective and successful lobbying on the part of the farmers becomes essential – and with it the extraction of rents from the remaining population. In poor countries, it is

[4] Hereinafter, the GDP level – relative food price regularity of the type represented by the scatter diagram in Figure 1 will be referred to as 'the Regularity'.

quite the reverse. When farmers account for, say, some 90% of population, the rent (per farmer) to be extracted from the remaining 10% is of necessity very low – all the more so when part of that rent has to be shared in some way or another with 'kindly disposed' politicians.[5] In summary, the agricultural policies pursued in the rich countries actually lead to food prices being higher than they would be, were such policies not pursued.

2.2. *Reduced VAT rates on foodstuffs in rich countries?*

Most rich countries levy lower (than standard) VAT on foodstuffs. Whether the differentials in the VAT rates are reflected in the price differentials is a separate issue (VAT differentials may possibly affect the structure of production/profits rather than the price differentials). Notwithstanding, assuming that VAT differentials play a direct role in price determination, lower (than standard) VAT rates can also be seen to apply in most poor countries as well. Moreover, at least some poor countries (even Hungary, for example, which is reasonably well-off) actually subsidise consumer prices for selected basic foodstuffs (e.g. bread) indiscriminately – apparently for 'social reasons'. This kind of food price subsidy is unknown in rich countries, where the incidence of starvation among the poor is reduced by means of more or less indiscriminate income transfers (or, as in the United States, by transfers of 'food vouchers' to specific social groups). In addition, it can be argued that indirect taxation of non-food items may tend to be relatively high in poor countries which often levy high import duties (or excise tax) on selected 'luxury items' (viz. non-food commodities). Thus, the differentials in indirect taxation structures may ultimately play an insignificant role, at best. At worst, they are inconsistent with the Regularity.

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[5] Certainly, in a poor country with highly stratified farming the position of a small class of wealthy landowners is different. Collectively they can (and of course do) have a say in overall policy. However, where the shares of poor farmers or farm workers in the total population are large, it makes sense to extract the rents from the rural poor as well (if not primarily). Fortunately, in the poorer European countries the transformation of farming (from state or collective to private ownership) has not (yet) yielded a high concentration of assets and political influence. In the post-accession phase, however, this process may be expected to accelerate.

2.3. *Higher food quality in poor countries?*

In principle goods and services whose domestic prices serve as inputs for the calculation of purchasing power parities should be the comparable, in terms of quality, across all countries. Thus, in principle one should rule out the possibility of food being relatively more expensive in poor countries on account of its quality being relatively higher compared with non-food items. In practice, however, the calculation of purchasing power parities for any aggregate of goods may produce biases similar to those resulting from the erroneous identification of goods of different quality that derives from differences in the numbers of representative products reported in individual countries. Price levels for countries having a smaller number of representative products will generally tend to be overestimated. However, the Regularity cannot be attributed to the biases due to the differences, between poor and rich countries, in the representativeness of their baskets of goods and services. Food consumption in the poor countries is not so very different from that of the rich countries, but the levels of other GDP items (and in particular of household consumption of non-food items) are much lower (see for example Table 2). Although the poor countries have generally less representative baskets (with fewer varieties available or demanded, as compared with the rich ones), that unrepresentativeness must be overwhelmingly more pronounced with respect to non-food items. Therefore the poor countries' PPPs for non-food are likely to be overestimated to a much higher degree than their PPPs for food. Thus the relative food prices, defined as the ratios of food to non-food PPPs, may actually underestimate the 'genuine' (unbiased) relative food prices in poor countries. A 'true' Regularity (somehow coping with the otherwise intractable problem of comprehensively allowing for the differences in varieties) would be even steeper than that in Figure 1.

2.4. *Relatively low unit costs in rich countries?*

We now turn to the central issue of differentials, across countries at different levels of affluence, between the relative (food vs non-food) unit costs. Of course it would be necessary to work with *full* costs, or at least with *full variable costs* encompassing – in the latter instance –

full wage contents of two final good-aggregates, namely food, on the one hand, and all the other GDP items (non-food), on the other. It may seem that the calculation of such full-cost contents of food and non-food could, at least theoretically, be achieved, for example, upon application of the well-known input-output schemes. In practice this cannot work, though, if only because 1) agriculture is a joint-product branch (supplying not only raw materials for food processing but also raw materials such as wool, fibres and tobacco, for non-food manufacturing); 2) the cost data for the wholesale/retail trade, whose business is to sell products of all kinds, can hardly be split into parts attributable to foodstuffs as opposed to all other goods.[6] Apart from these two practical difficulties there is a more fundamental one. Agriculture, at least throughout Europe, continues to be dominated by family farming – with the bulk of work performed by the farm-owners themselves (and their family members). Hired labour accounts for insignificant parts of the overall agricultural employed workforce in Eastern and Central Europe (e.g. about 5% in Poland). But also in West European countries own labour is essential (e.g. in Germany, where it accounts for about 50%). Measuring the cost-contents of agricultural product prices is therefore bound to be biased and highly misleading (due to the relatively higher wage contents of those prices in the richer countries). This can be exemplified with comparisons of unit variable costs (intermediate plus wage as shares of gross output) in agriculture and the whole national economy for two countries: Germany and Poland (two largest representatives of the 'old' and 'new' Europe). In these countries the economy-wide unit variable costs prove almost identical (0.792 vs 0.793), while the unit variable cost in the German agriculture (0.71) turns out to be *higher* than its Polish counterpart (0.66).[7] At face value, then, agriculture in either country would have to be rated as highly profitable (as compared with the whole economy). Nevertheless, this finding appears utterly incompatible with the

[6] Some countries' national statistics provide data on sub-branches of trade in terms of main specialisation. Petrol stations are thus classified as specialising in petrol products, the volumes of their sales of food and other non-petrol products and services notwithstanding.

[7] All items quoted here refer to 2000. They have been calculated from the data reported by respective national statistical yearbooks.

fact that food, relative to all other GDP items, is much more expensive in Poland than in Germany.[8]

That cost-content comparisons will inevitably produce patently absurd results follows from the fact that in farming, unlike most other activities, it is well nigh impossible to split the value added into wage costs and operating surpluses (profits and possibly land rents[9]).

It would be equally improper to relate the relative food prices to the relative levels of *intermediate* costs in agriculture – thus implicitly identifying all agricultural value added with profits. The basic reason for this is quite simple. Insofar as the prices received by farmers for their produce proxy the final food prices and the prices paid by farmers for their intermediate production inputs proxy the prices of all GDP, the intermediate-cost content of the farm prices is itself dependent on the relative food/non-food prices. Or, more precisely, the intermediate cost content *is defined* as the relative price level, corrected for the relevant input-output coefficient. Thus, the question why the relative food price (or intermediate cost content) is systematically related to the overall GDP level remains, upon unit-cost consideration, unanswered.[10]

2.5. *Some qualifications*

Whereas invoking the factors that may have a bearing on relative costs cannot help us to understand the Regularity 'in its entirety', such factors may well be important 'locally', i.e. when considering the dispersion of relative food prices in countries at approximately the same level of GDP. Thus, for example, it seems reasonable to link the high (but only when compared to other rich EU countries) relative

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[8] In 1996 the Polish relative food price was 1.347 while the German 0.951. In 1999 those prices were 1.154 and 0.947 respectively.

[9] In relative terms, agricultural rents must be *disproportionately low* in poor (European) countries. This is confirmed by comparison of farmland prices. For instance, in Poland on average 1 hectare of farmland costs 3.3 times more than the average agricultural gross value added per hectare in 1996. In Germany the factor was 7.7. Overall farmland prices in Germany are *depressed* on account of much lower land prices observed in the poorer part of the country – i.e. the former German Democratic Republic. In the rich western part of the country, the factor is about 10.

[10] Administrative regulations in food production and distribution in the EU are excessive compared with those in poor countries. This too fails to be reflected in relative food prices.

food price in Denmark to the fact that only in Denmark is the VAT on food the same as the standard rate. In other rich 'outlying' countries (Switzerland, Norway, Iceland and Finland), natural (climate and soil) conditions are obviously much less conducive to farming than elsewhere; this too is likely to have some bearing on local food prices. In Iceland and Finland food prices may well reflect these natural factors, as well as the higher transportation costs associated with imported foodstuffs given the countries' geographical location[11] (it is somewhat ironic that both Switzerland and Norway, whose relative food prices are distinctly higher than in the EU, subsidise/protect their farmers even more stoutly than the EU). In poor countries (and especially in the poorest), natural conditions may also have a significant bearing on costs in local agriculture. Unfavourable conditions prevail in the arid countries of Central Asia and Mongolia; in the Baltic states (above all Latvia and Estonia) the summers are shorter and cooler than further south, while the Caucasus region (Armenia, Georgia and Azerbaijan) is a mountainous area ill-suited to the cultivation of most food crops. Furthermore, the poorest countries with the worst natural conditions for farming happen to be landlocked, and far from potential foreign suppliers of food/farm products. Their food import costs are likely to be compounded by inordinate freight costs.

Apart from variations in the country-specific cost factors, other factors may contribute to the observed dispersion of relative food prices among countries at approximately the same level of GDP. In particular, national variations in the relative prices of services supplied by the sector known as 'restaurants, cafes, hotels' defy accounting, as do the real volumes of that sector's output consumed. Obviously, output in that sector has a marked 'food content', yet the size thereof (probably not very large in rich countries) remains unknown; it might well vary across countries with different gastronomic traditions. Of course, it is impossible to determine the prices for the 'food content' of those services. Accordingly, the overall price of food (allowing for food consumed both at home and out) cannot be established.[12]

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[11] The shares of food produced *and* consumed locally are larger in poorer countries. Larger rural populations can rely on local foods available on nearby markets; farmers can consume own products. Arguably, the costs of internal transportation of food should be relatively lower in poorer countries. Even if they do in fact prove lower, the final food prices are not.

[12] There is an additional complication here. It is not clear whether the pricing of foodstuffs (be they supplied jointly with other services related to 'restaurants, cafes,

3. Trade developments fail to explain the Regularity

3.1. *Trade data cannot tell us much*

The question arises whether the Regularity can be explained in terms of the impacts of trade between rich and poor countries. In principle, to approach this question would require studying a gargantuan set of detailed data on prices (and volumes) related to mutual trade between individual countries. The set of countries to be included in such a study could not be restricted to Europe and the former CIS countries, since some of them trade extensively with China, USA and Argentina, which would necessarily extend the focus to third-party countries, thereby hardly boding well for the research strategy – if only because intractable difficulties would inevitably arise.[13] One problem is that domestic relative prices tend to be loosely related (or completely unrelated) to relative prices of ostensibly the same goods, be they exported or imported. Wedges are being driven between domestic and export (import) prices of various goods by a variety of factors, such as differences in freight costs, the intensity of protection measures applied or the different types of price-discrimination practices ('pricing to market') employed by major multinational enterprises active in international trade.

Of course, it cannot be claimed that foreign trade has no impact on domestic price structures. Cars imported from the rich countries are sold in poor countries at prices close (in terms of exchange rates, but not purchasing power parities) to those prevailing in rich countries. Here, foreign trade is proving highly effective in cross-border transmission of prices. In this specific case, food is very *cheap* relative to cars in poor countries, no doubt due to the fact that cars sold in

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hotels' or as retail items) does not somehow allow for the presence of foreigners. It cannot be ruled out that the food prices facing *nationals* are actually different from the prices *recorded* for both foodstuffs and gastronomy services. This complication may be particularly serious in countries that rely heavily on foreign tourism, such as Croatia, Italy or Turkey.

[13] At a practical level, statistics on trade values are always problematic. In theory, exports from A to B must equal imports of B from A, so that in mutual trade (A with B) the sum of their trade balances equals zero. This feature is seldom observed in real statistics. For example, it turns out that the EU countries' mutual trade has always been significantly unbalanced. The EU as a whole has a comparatively large deficit in its trade with itself.

poor and rich countries alike are produced and marketed by a number of major multinationals able to pursue specific pricing strategies on an international scale. Many similar instances are to be found when the domestic relative prices of specific goods stand in a fairly precise relationship to foreign trade developments – and events in the domestic markets of individual foreign countries. However, when it comes to the relative prices of broad categories, such as the private consumption of food, the private consumption of all non-food goods and services or GDP as a whole, the role of foreign trade (and foreign market) prices is of necessity limited – barring exceptional cases (such as rich oil-exporting emirates relying on imports of just about everything). Even if export and import volumes are very high in relation to GDP, the bulk of trade is in raw materials, intermediate inputs and capital goods. Some of the imports of non-consumer goods are then used for export production, and may therefore have no impact whatsoever on the structure of domestic consumer prices.[14] The prices of raw materials, intermediate inputs and capital goods used in the production of domestic *consumer* goods may generally be expected to have *some* bearing on the domestic prices of the latter. However, the links between prices of imports and prices of finished consumer goods are generally far from straightforward. In the final analysis the situation is ambiguous, even if account is taken of the imports of finished consumer goods (the latter typically accounting for comparatively minor amounts, 10-30%, of the value of foreign trade – and even smaller amounts of final private domestic consumption). The onus is on the importers, followed by the wholesalers and finally the retailers, to work out their mark-ups. Ultimately, the price facing the final consumer of an imported good may have little in common with the price actually received by the exporter or even paid by the importer.

3.2. *Irrelevance of pure-trade theories*

The number of 'pure trade theory' studies focusing on two-country two-goods general-equilibrium models is quite staggering. As long as

[14] This is particularly obvious in the case of outward processing trade (OPT) flourishing in Europe. EU firms engaging in OPT supply sub-contractors in Eastern Europe with raw materials, technology and designs. The sub-contractors use cheap local labour to assemble or sew together, as the case may be, more or less 'finished' products that are then re-exported to the 'parent' firms in the EU.

this literature is concerned with postulating, proving or attempting to document the benefits of a fully liberalised trade regime (under friction- and cost-free tradability of both goods), it is of no practical use for our purposes. This impracticality comes about not only because, unlike in real life, transportation and other trade-related costs as well as such factors as protectionism are simply ignored, but also because the bulk of commodities included in the non-food aggregate are in fact non-tradable and immovable services, of which housing is the prime example. Furthermore, the related literature is quite irrelevant for our purposes because it revolves around the idea that international trade equalises relative prices of goods worldwide (as well as those of production factors, provided there are only two of them). However, my starting point is that, *in empirical terms*, the relative price of food is not equalised across countries in any way at all – although it tends to be equalised for countries at a similar level of development.

Admittedly, it is possible to extend the two-country two-goods pure trade-theory models in a number of ways: e.g., by distinguishing three *final consumer* goods (two tradables and one non-tradable). Let us assume that one of the two tradables is food (although, of course, international trade in proper food *is* severely restricted not only by omnipresent protectionist practices, but also – and primarily – by the prevailing prohibitive costs of long-haul transportation of most *finished* food products, such as *fresh* bakery, dairy and meat products). None the less, it is perhaps reassuring to learn that in such a model free trade maintains (and sometimes even strengthens) the Regularity. More specifically, in a multi-country model distinguishing two types of tradables (one of them being food) and one non-tradable (services), built and specified on the basis of data from the European Comparison Project (ECP) for 1990 (Podkaminer 1999), it transpired that, were pan-European free trade to equalise relative food/non-food-tradables prices, it would in actual fact leave largely unchanged the gaps between the relative prices (food/non-food) of the rich and poor countries – and on occasion the gaps would be even larger.[15]

[15] According to this model, the equalisation of the food/non-food-tradables relative prices also definitely altered the relative *domestic* prices (food/non-tradables) in individual countries. In most cases the 'equalisation gain' due to free trade in 'food' and 'non-food tradables' was undone by rising disparities between poor and rich countries in terms of relative prices (food/non-tradables).

To some extent, the Regularity may seem to be in keeping with the axiom 'Services are cheaper in poor countries'. This is merely another way of saying that non-services (i.e. tradable goods) are more expensive (relative to services) in poor countries. Of course, insofar as food is included among the tradables, the observation is *not* inconsistent with the Regularity. Thus, given the vast literature addressing the reasons for services being cheaper in poor countries, the impression may arise that the real reason is more a matter of food being *more* expensive in poor countries. This impression is in fact totally unfounded. The explanation, derived from specific variants of the pure trade two-country model with two goods (one tradable, the other non-tradable) in the tradition originating with Samuelson (1964) and Balassa (1964),[16] popularly known as the Balassa-Samuelson Effect (BSE), is basically this: in poor countries the supply of services becomes *increasingly* cheap because, for technological reasons, relative labour productivity (tradables/non-tradables) in poor countries *tends to rise* faster than in rich countries (implicit in this explanation is the suggestion that, at any point of time in a poor country, non-tradables *are* cheaper to produce than tradables, although it fails to explain why this should be so).

The essential assumptions behind the BSE models are quite restrictive: both the homogeneous tradable good and homogeneous capital (which is also assumed to be internationally mobile) are subject to the law of one price worldwide; on the domestic front homogeneous labour is fully mobile; production in either sector is characterised by 'surrogate production functions' (homogeneous Cobb-Douglas functions in either sector of either country); labour and capital are rewarded according to their 'marginal productivities'; intermediate inputs are not used; and, finally, the underlying technical change is neutral. A number of purely formal, or even logical, problems with the BSE models destroy the validity of the answer itself. One such problem[17] is that these models effectively rule out international trade.

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[16] Later contributions on the same topic, by Kravis and Lipsey (1983) and Bhagwati (1984), turn out to be specialised versions of the models following the Balassa-Samuelson tradition.

[17] *Analytical* discussion of these models is to be found in Podkaminer (2003) where it is demonstrated that the BSE breaks down not only when allowing for intermediate inputs or non-homogenous Cobb-Douglas 'surrogate functions', but also even if all canonical BSE assumptions are accepted – provided that technical progress is non-neutral in at least one sector in one country.

Since there is only *one* tradable good worldwide, what is actually the purpose of engaging in international trade – and how does the single global price of tradables ever come into existence?

One crucial assumption behind the BSE models (and much of the other trade theories) pertains to the power of the one price law. For all practical purposes, however, this assumption is false. In fact, the relative prices of roughly *equally tradable* goods do differ systematically across countries. Poor and rich countries display some systematic differences. For example, the scatter diagram in Figure 1 does not differ significantly from the scatter diagram showing the relationship between the level of GDP and relative food/clothing prices. Thus, the Regularity does not occur solely on account of 'services being cheap in poor countries'. Some other non-food tradables *also* happen to be cheap in poor countries. It follows that domestic food prices may be high in poor countries because they may be essentially unrelated – or at best weakly related – to 'international' food prices. Indeed, this makes discussion of the possible contribution of the foreign trade theories to interpretation of the Regularity fairly pointless. However, a pragmatic approach of that kind, denying the foreign trade any positive role, would have left too much room for doubts about the theory explaining the Regularity (which will be developed below). Prior to that step, however, a final attempt will be made to square the Regularity with conventional ('theoretical') wisdom about the impact of foreign trade.

3.3. *Attempting a positive approach*

The real world fails to satisfy the assumptions accepted in pure trade theories. Sometimes, however, some of these failures may seem relatively unimportant. For example, let us consider mutual trade between members of a group of countries located in one relatively small geographical area. Moreover, let the barriers to their mutual trade be relatively non-restrictive – and integration through mutual trade high. Here indeed, the reservations about ignoring transaction costs, distance and policy-related obstacles to free trade may prove less relevant. Mutual trade between the member states of the EU and the accession countries (ACs) in Central and Eastern Europe seems to

satisfy these conditions. EU-AC trade has been largely liberalised – and in essence it may be assumed to be relatively unaffected by other factors (distance, transportation costs, etc).[18] Next, let us ignore the fact that the bulk of mutual trade between the EU and the ACs is in intermediate inputs (raw materials, parts and components) and not in finished (consumer and capital) goods. More precisely, let us assume that all trade activities can somehow be classified in terms of their final destination (i.e. they end up as components in the final consumption of food or non-food – or investments in capital goods). Of course, trade is primarily in *tradable goods* – some GDP components (most services) are non-tradable. In principle, it is possible to calculate, for each country considered, the price of food (assumed to be tradable) relative to the price of an aggregate comprising all other potentially tradable goods. Such a relative price should be reasonably uniform across countries (by virtue of the law of one price). As things stand, however, this price does *not* turn out to be uniform – even when considering rich countries or EU member states alone (see Figure 2).[19]

Moreover, it appears that relative to non-food *tradables*, food is consistently *cheaper* in poor countries (be they present members of the EU or ACs).

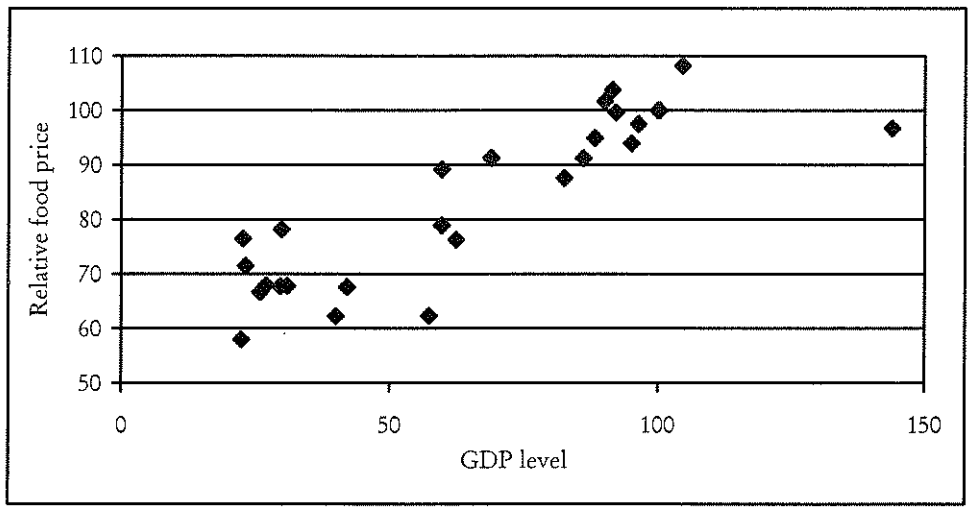
Although not really compatible with conventional trade-theory wisdom (which presumes equalisation of relative prices for any pair of tradable goods), the cheapness of food (relative to other tradables) in poor countries seems quite compatible with the structure of the trade imbalances observed between the ACs and the EU. The bulk of deficits in AC trade with the EU is actually in goods which have very little to do, at least directly, with either food consumption or agricul-

[18] The accession treaties between the EU and the ACs, signed in the early 1990s (and much earlier in the case of Turkey), stipulated a liberalisation of mutual trade in most industrial goods (with a gradual liberalisation of trade in farm/food products and selected 'sensitive' manufactured goods such as textiles or steel). Geographically, most of the ACs are closer to the EU economic heartland (Germany) than such EU members as Greece, Portugal, Italy, Finland or Ireland. The ACs are highly integrated with the EU, whose share in AC imports and exports is some 65% or more.

[19] The non-food aggregate considered includes private (household) purchases of apparel, automobiles, household appliances, sports and recreation equipment, as well as machinery and equipment which belong to gross capital formation. Many tradables hidden in broad service aggregates (e.g. pharmaceuticals as a component in the consumption of 'medical care') are not accounted for.

FIGURE 2

PRICE OF FOOD RELATIVE TO NON-FOOD TRADABLES (AUSTRIA = 100) VS GDP PC (AUSTRIA = 100) IN 1996



Source: Eurostat-OECD (1999). The country sample includes all the EU and ACs (excluding Malta and Cyprus, but including Turkey, Bulgaria and Romania).

tural production.[20] All ACs tend to run deficits, usually quite large, in their overall trade with the EU. In 1996, Latvia and Bulgaria alone recorded overall trade surpluses.[21] All of them, excluding Bulgaria and Hungary (and excluding Turkey), also ran deficits in their trade in foodstuffs and farm produce (combined). This is at least partly consistent with the differentials between countries in terms of the price of food (relative to non-food tradables). The net flows of non-food goods from the rich countries where they are relatively cheap to the poor countries where they are relatively expensive are considerable. ('Non-food seeks the place where it can sell at a higher price'.) The implica-

[20] The share of food/farm products in the total of exports of 10 European ACs (excluding Turkey) to the EU was 4.4% – the corresponding share in their imports from the EU was 5.3%. Their overall deficit in trade in food/farm products constituted 8.2% of the overall deficit in trade with the EU (all indicators quoted here are calculated from data in the Eurostat Comext Database).

[21] Latvia's foreign trade position is quite unique because the country is a major transit/intermediary agent for Russian foreign trade – and a kind of safe haven for profits earned by Russian exporters. Moreover, Bulgaria's situation proved quite exceptional in 1996, when both the Bulgarian currency and the domestic financial/payment system collapsed. Exporting, even at a loss, became the safest activity resulting in trade surpluses. Later on, a gradual financial consolidation started to diminish the attractiveness of exports. Since 2000 Bulgaria has recorded growing trade deficits, returning to the pre-1996 pattern.

tion of this fact is that the impact of trade may have been consistent with the Regularity. Sizeable net imports of non-food goods, the local prices of which are high compared to food must have depressed the local relative prices of non-food tradables – thus contributing to food prices being high relative to all prices. This implication can be schematically studied as follows. First, observe that the price of food relative to all non-food components of the GDP can be stated as

$$P_F/P_{GDP} = P_F/(aP_F + bP_{N-F} + cP_S) = 1/(a + bP_{N-F}/P_F + cP_S/P_F), \quad (1)$$

where P_F, P_{N-F}, P_S are prices (or PPP) of food, non-food tradables and non-tradables (services) respectively, and a, b, c are suitable weights.[22] Now, since in the ACs the P_{N-F}/P_F price is higher (or, P_F/P_{N-F} is lower, as shown in Figure 2) than in EU, their net imports of non-food must lower it somewhat. This, however, would have increased the overall P_F/P_{GDP} (see equation 1) in the ACs. One might therefore wonder whether the specific pattern of AC-EU trade offers an explanation for the Regularity. Actually, it does not. The pattern of trade may have added marginally to the Regularity, but it cannot explain it. This observation finds support in the following experiment. Suppose trade resulted in the ACs actually 'importing' from the EU the latter's high relative P_F/P_{N-F} price (the average EU P_F/P_{N-F} price amounts to 0.97 of the respective Austrian level). Let us then recalculate the overall P_F/P_{GDP} substituting observed P_{N-T} with $P_F/0.97$.[23] It will be seen that the recalculated values of P_F/P_{GDP} yield a scatter diagram that does not differ greatly from the original diagram (see Figure 3). The Regularity even shows up under extremely (and unrealistically) strong assumptions about the power of the one price law.

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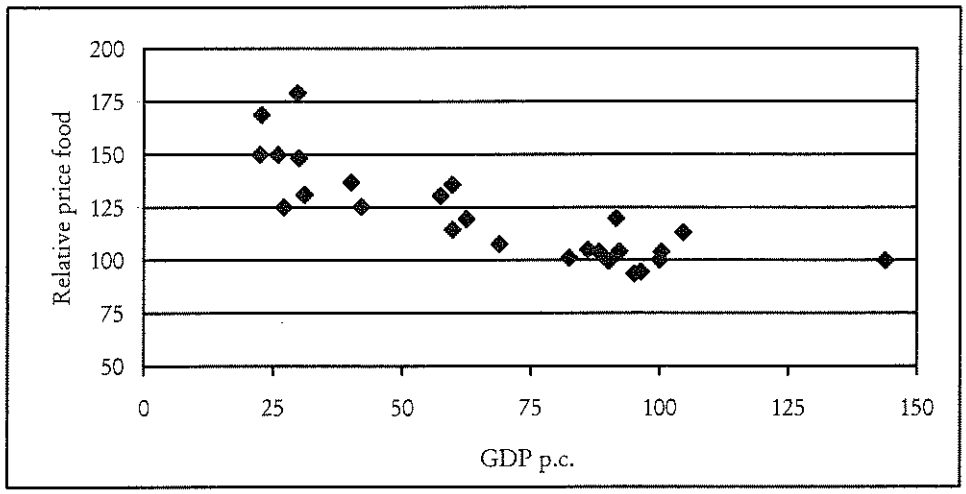
[22] PPP_{GDP} is not a simple weighted average of the PPP for its components. The formula used for PPP_{GDP} (or for the PPP for any other aggregate) is the so-called EKS method involving Fisher-type price indices. Our argument also applies when substituting EKS for equation 1.

[23] AC trade with the EU is very important for the former, yet of marginal importance to the EU; it can therefore be assumed that trade which (in my experiment) exerts such a powerful effect on prices in the ACs has practically no impact on prices in the EU.

FIGURE 3

RELATIVE PRICE OF FOOD (AUSTRIA = 100) VS GDP LEVEL (AUSTRIA = 100) UNDER RELATIVE PRICE (FOOD/NON-FOOD TRADABLES) = 0.97



Source: Eurostat-OECD (1999). The country sample includes all the EU and ACs (excluding Malta and Cyprus, but including Turkey, Bulgaria and Romania).

4. The hypothesis: the clue lies in demand-income-supply interactions

4.1. *The demand side*

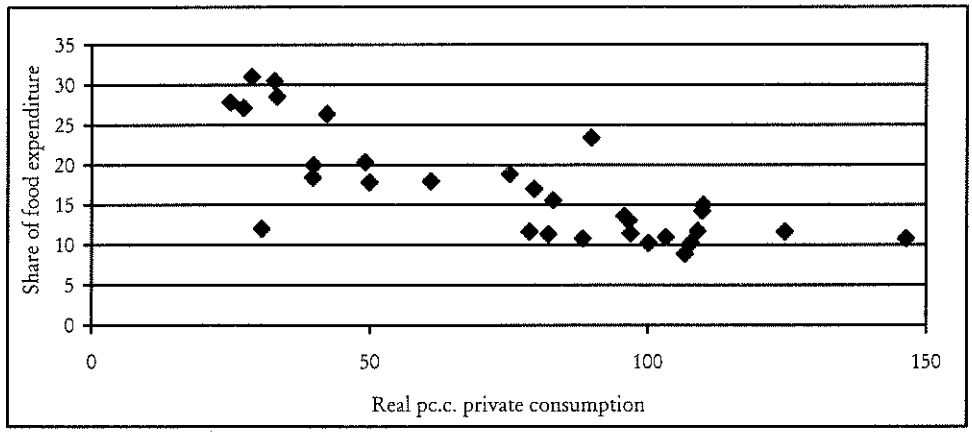
Neither cost nor foreign-trade considerations allow for differentials (food vs non-food) in *consumer* demand across countries at different levels of GDP. Such differences would, however, seem quite obvious. For example, Engel's Law, which also appears to apply internationally, requires systematic differences in the structure of consumer demand, depending on the level of income. The share of food expenditure in total private (household) consumption expenditure is clearly related to GDP p.c., with rich countries displaying definitely lower shares than poor countries.

Two qualifications are now in order. First, Engel's Law relates the share of household food expenditure to total household expenditure – and not to the level of GDP. With sizeable national variations in the share of total private expenditure in the GDP, the relationship between the latter and the share of food expenditure in the GDP

cannot be expected to provide literal (and accurate) representation of Engel's Law. In order to correct for national variations in the share of total private consumption in the GDP, it is expedient to relate food expenditure to total *real private consumption expenditure.*[24] As can be seen (Figure 4), Engel's Law so defined obtains internationally[25] (the

FIGURE 4

SHARE OF FOOD EXPENDITURE (%) IN TOTAL PRIVATE CONSUMPTION VS TOTAL REAL PC PRIVATE CONSUMPTION IN 1999 (EU=100)



Source: own calculations based on Eurostat (2002) data. Sample includes 12 ACs, Turkey, 15 EU countries, Switzerland, Iceland and Norway.

[24] The European Comparison Project (ECP) yields two kinds of final results: one conforming to the Standard National Accounts concept of national accounts, the other to a concept of its own. In the latter concept, private consumption/expenditure also includes publicly-financed items (education, health, etc.), the former concept restricts private consumption to proper individually acquired items. On further analysis, the data conform to the Standard National Accounts concept.

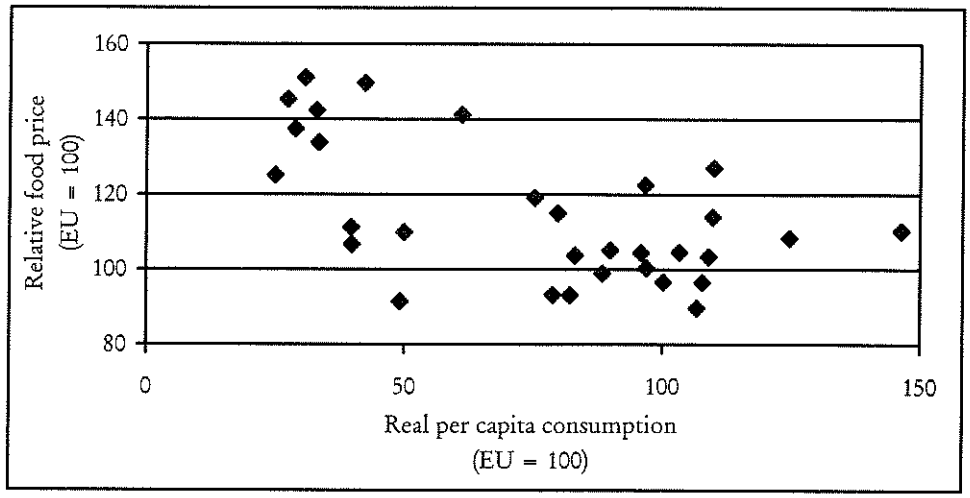
[25] Figure 4 (and the consecutive figures) refers to ECP for 1999. The advantage of using ECP-1999 is that it provides more recent data than ECP-1996. Given the ongoing transition/stabilisation in the ACs (and anticipated improvements in their statistical reporting) the ECP-1999 data may be considered more accurate than the ECP-1996 data. The advantage of using ECP-1996 would be that (unlike ECP-1999) it also included countries that had not (yet) been considered candidates for EU accession, even though it did not include Malta and Cyprus which are covered by ECP-1999. The post-Soviet countries, other than the three Baltic countries, Mongolia, Albania and the countries of former Yugoslavia (except Slovenia) are not covered in ECP-1999. ECP-1996 thus covered a much broader range of countries, starting with the extremely poor (e.g. Tajikistan, whose p.c. GDP was about 4% of the EU level in 1996). The poorest country in ECP-1999 is Romania, with a p.c. GDP equivalent to 24% of the EU level. The basic reason, however, for continuing to use ECP-1999 is quite prosaic. ECP-1999 data were first used to conclude detailed (and very labour-intensive) calculations that were subsequently utilised in a study dealing with a different issue (Podkaminer 2004).

two obvious 'outliers' in Figure 4 happen to be Cyprus and Bulgaria; the reason for their singular position is commented on below).

Secondly, the traditional version of Engel's Law does not allow for variations in prices, the reason being that in a static national setting (e.g., when analysing household budget survey data for a given country in a given year) no attention need be (nor even can be, for want of reliable data) paid to possible differences in prices faced by household groups distinguished by income level.[26] In international comparisons, food prices (relative to all other components of *private consumption*) may (and do) differ (see Figure 5); this, of course, may somehow affect the relationship observed between total real private consumption and the share of food expenditure. In particular, it is open to conjecture whether the tendency of rich countries to have low food shares does not somehow reflect their relatively low food prices, rather than some systematic factors responsible for engendering demand for food (and non-food).

FIGURE 5

PRICE OF FOOD RELATIVE TO NON-FOOD CONSUMER GOODS (EU=100) VS TOTAL REAL PER CAPITA CONSUMPTION IN 1999 (EU=100)



Source: Own calculations based on Eurostat (2002). (Sample: same as in Figure 4.)

Making allowance for both prices and the level of total consumption necessitates a certain modification of Engel's Law. One such

[26] Price indices, often available, for individual income or professional groups primarily reflect differences in the composition of the baskets of goods consumed, not in the prices of individual items.

modification, particularly relevant in the context of international comparisons, was pioneered by Henri Theil.[27] The Theil approach builds on the classic 'statistical laws of family expenditure' (Working 1943) applicable to national household budget survey data. The Working model relates the shares of individual items in total expenditure to total expenditure in the following fashion:

$$s_j = \alpha_j + \beta_j \log(M), \qquad (2)$$

where s_j is the share of the j-th good in total expenditure, *log(M)* is the logarithm of total (nominal) expenditure and α_j and β_j are good-specific parameters (with the sum of alphas equal to 1, and the sum of betas equal to 0). Theil and Suhm (1981) and Theil and Clements (1987) complement equation 2 postulating preference independence with constant income flexibility and adding to the right-hand side of equation 2 some fairly complex terms intended to reflect the possible impact of country-specific prices (i.e. PPP values) for the goods considered. Econometric estimates of the parameters of the Theil model, specified with data from various international comparison projects, shed some light on the 'cross-country' parameter β for food. As a rule, the estimate for β_{food} ranges from –0.14 to –0.16; in most cases it is fairly close to –0.15.[28] The statistical quality of the equation explaining s_{food} in the Theil model is very high (and the standard errors of estimated β_{food} tend to be very small), all of which suggests that the modified Working model is close to reflecting a cross-country version of Engel's Law.

The classic Working formula 2 also underlies the Almost Ideal Demand System (AIDS) invented by Deaton and Muellbauer (1980). AIDS was adapted as an alternative[29] to the Theil model in econo-

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[27] See Theil and Suhm (1981), Theil and Clements (1987). More recent contributions in the Theil tradition include Clements and Selvanathan (1994), Dongling (1999) and Selvanathan and Selvanathan (2003).

[28] For reviews of evidence on this see Fiebig, Seale and Theil (1988) and Clements and Selvanathan (1994).

[29] The Theil model has many advantages – and one major disadvantage. Given the complexity of its price terms, it probably cannot be used to evaluate the impacts of *real* quantity changes on relative prices. It is not even clear whether such impacts are well defined. The AIDS, which is more tractable analytically, has many advantages – but also some well-known drawbacks. It does not, generally, satisfy the Slutsky symmetry conditions required by the orthodox demand theory presuming convex preferences. Moreover, AIDS cannot be applied to very large values of real income because it would predict negative expenditure shares for certain goods, including food.

metric analyses of cross-country demand functions, with data coming from both ECP-1990 and ECP-1999 (Podkaminer 1999 and 2004). For 1999 the two-good cross-country AIDS model (distinguishing food and all non-food items of private consumption) takes the following form:

$$s = \alpha + \beta\{\log(M/M^{\circ}) - \alpha\log(p_f) - (1-\alpha)\log(p_n) - 0{,}5\gamma[\log(p_f/p_n)]^2\} + \gamma\log(p_f/p_n), \quad (3)$$

where s is the share of food expenditure in total (nominal) expenditure; M is total nominal (in national currency units) per capita expenditure; M° is the average total nominal per capita expenditure in the EU; p_f is the PPP_{food}; p_n is $PPP_{non\text{-}food}$ (for items included in private household consumption); p_f/p_n is the relative price of food vs non-food consumer items; and α, β, γ are the parameters estimated (the hypothesis being that they are the same across countries).

The results of estimation[30] of equation 3 are summarised in Table 1.

TABLE 1

RESULTS OF ESTIMATION OF EQ. 3, IN SUMMARY

Parameter	Estimate	Standard error	t-statistics	Probability
α	0.12137	0.0021	57.39	0.0000
β	−0.15747	0.0165	−9.56	0.0000
γ	0.73727	0.0591	12.47	0.0000
R^2 adj. = 0,9982			F_{stat} = 5439	Prob(F_{stat}) = 0.000000

As can be seen, the statistical quality of the estimates is very high. It is also reassuring to note that the estimate of β (−0.15747)

The violation of Slutsky symmetry does not necessarily make AIDS inconsistent with the 'budget-constrained utility maximisation'. In the context of Lancaster's (1971) 'new approach' to demand theory, convex preferences may be compatible with non-satisfaction of Slutsky symmetry.

[30] A non-linear OLS procedure was applied and EViews econometric package used. Individual country data, corrected for possible impacts of consumption by foreign tourists, were weighted with population numbers. As the correction is not without its own problems, the sample excluded several countries with very high shares of consumption attributed to foreign tourists (such as Cyprus where, according to ECP data, p.c. real consumption of food is about twice the average EU level). Bulgaria, which is another outstanding 'outlier', was excluded because its ECP p.c. food consumption is unbelievably low, implying mass starvation (something that has not been observed there). For more details see Podkaminer (2004).

comes pretty close to the estimates obtained in numerous Theil models.[31] Assuming that equation 3 specified with the parameter estimates from Table 1 (or with numbers roughly similar thereto, with β equal to about -0.15) reflects a kind of a cross-country Engel's Law, the demand functions for food and non-food can be stated for any country. The functions are as follows:

$$q_f = M\, s/p_f \quad \text{and} \quad q_n = M(1-s)/p_n, \tag{4}$$

where q_f and q_n are real demand quantities (at PPP) for food and non-food respectively and s, given by equation 3, is specified with relevant parameter estimates. Conventional analyses of equations 4 are, of course, possible. For example, the income (or rather total expenditure) elasticity of demand for food proves lower than 1 in any country – a finding that is not too surprising. Furthermore, as was to be expected, the income elasticity of demand for food is generally lower in rich countries. In the poor ACs this elasticity ranges from 0.656 (Czech Republic) to 0.792 (Latvia); in the rich EU countries it ranges from 0.170 (UK) to 0.565 (Italy).[32] In contrast, there are no systematic differences across countries where the income elasticity of demand for non-food is concerned. That particular elasticity is about 1.08 in all countries, irrespective of the level of income.

The differences between rich and poor countries in terms of income elasticities of demand for both goods (food and non-food) do not explain the Regularity. Nevertheless, the fact that the income elasticity of demand for food is lower than the income elasticity of demand for non-food throughout may be invoked, heuristically, to describe the likely effects of rising income in a country at *any* level of affluence. Heuristically, a rise in income generates, *all other things being equal*, a much sharper rise in demand for non-food than for food; this, in turn, may translate into a drop in relative food prices. Thus, given that the elasticity differentials (non-food vs food) are greater in rich countries, a more pronounced drop in relative food prices might be expected in these countries. This heuristic argument suffers from two fatal (and

[31] The (three-goods) AIDS model estimated with the ECP-1990 data produced $\beta = -0.145$ (Podkaminer 1999). The two-good AIDS model for ECP-1996 (including very poor post-Soviet countries) produced $\beta = -0.147$.

[32] The two poorest EU countries also display large income elasticities: 0.623 (Greece) and 0.652 (Portugal). The two rich non-EU countries: Iceland and Norway also happen to have high elasticities (0.644 and 0.639, respectively).

related) flaws. First, it abstracts from the supply-side considerations. More precisely, it leaves open the question of the possible role played by differences in availability (supply) of both goods. For example, if food happens to be in short supply (in the face of rising demand), its price need not erode at all. Secondly, it abstracts from the fact that in general a rise in total expenditure cannot be independent of changes in the quantities demanded (and consumed) nor of the prices that ultimately obtain. At a national level it does not make sense to study variations in total expenditure (or income) as if separable from the transactions through which certain levels of consumption and prices come into being (this type of study may make perfect sense at the 'micro' level – e.g. while dealing with the likely demand responses of a single – preferably small – income group to variations in *its* nominal income.) Use of this particular *ceteris paribus* clause is therefore untenable when asking questions about a nation's demand responses to its own income level.

4.2. *Demand-expenditure-supply interdependence*

M, the nominal total expenditure in equations 2-4, is the sum of expenditures on food and non-food, and hence equals $(q_f\ p_f + q_n\ p_n)$. Thus, *M* has no independent existence of its own. A change in *M* follows a change (or changes) in one (or more) of its determinants (q_f, p_f, q_n, or p_n). A change in *M* itself does not mean anything – unless it reflects definite changes in some of the four variables (q_f, p_f, q_n, p_n). However, changes in one – or more – of the variables (q_f, p_f, q_n or p_n) must be linked through equations 4. In the final analysis, one can dispose of *M* altogether and work with two equations:

$$q_f = (q_f p_f + q_n p_n)s/p_f \quad \text{and} \quad q_n = (q_f p_f + q_n p_n)(1-s)/p_n, \tag{5}$$

where *s* is similarly free of *M*:

$$s = \alpha + \beta\{\log[(q_f p_f + q_n p_n)/M^\circ] - \alpha\log(p_f) - (1-\alpha)\log(p_n) - 0{,}5\gamma[\log(p_f/p_n)]^2\} + \gamma\log(p_f/p_n).$$

Equations 5 make it clear that quantities consumed and prices are interdependent. In particular, if prices are what they are, a specific demand pattern emerges. Conversely, if quantities consumed are given, a specific pattern of prices must obtain. This raises the question

as to which of the two 'causalities' is to be preferred in further considerations. Starting with *given* prices facing the consumer and treating demands as their endogenous consequences does not seem a very promising approach since it would place price determination completely outside the demand side (and hence throw us back to cost or foreign-trade considerations). Moreover, it would leave no room for the supply-side aspects, viz. the fact that the actual availability of the two goods may differ from the quantities in demand. Under such circumstances, the likely effects of an excess supply of one or both good(s) would have to be ignored. Excessive supplies would affect both prices and the quantities actually consumed (or otherwise the markets would not clear – a highly improbable development). The route starting with the quantities *consumed* as price determinants shows greater promise because at least it does not relegate price formation to cost or foreign trade considerations, unpromising as they are. However, that route also neglects the possible discrepancies between supply and demand. In any event, whichever route is taken, it is important to consider in some detail the role played by the availability (supply) of both goods.

To disentangle things, first let us begin by barring as unrealistic the situation in which supplies happen to be precisely equal to the quantities demanded at given prices. In practice, suppliers enter the market with specific quantities of goods which reflect their sales expectations. Of course, the goods are offered for sale at prices which also reflect suppliers' own expectations (and, no doubt, other factors such as cost considerations, return required on capital and the impact of competition – including competing importers). As sales/price expectations can seldom be accurate, adjustments are made to clear the market, with the quantities ultimately consumed (equal to quantities supplied) satisfying equations 5. However, with given supplies, market clearing can only ensue by means of price adjustments. Thus, in a *very* short-term context at least, the route starting with given quantities supplied (and consumed) appears capable of offering an explanation for the prices. Whether such an interpretation of price formation is valid over the long term remains an open – and somewhat irrelevant – question. Current price patterns are the outcome of current interactions between supply and demand – even if some suppliers enter into long-term investment with a view to the profits they expect to earn in the remote future. In a reasonably short-term setting, the supply of

goods is more or less restricted, primarily by: *a*) the stocks available of productive assets; and *b*) the quantity/quality of a country's labour force. And, insofar as rich countries have the capacity to produce large quantities of non-food items which poor countries obviously lack, the potential supply – and hence consumption/price – patterns are crucially different in the respective countries.

Returning to equations 5, it will be observed that the two absolute price levels p_f, p_n can both be eliminated and replaced by the relative price p_f/p_n (for the sake of convenience denoted hereinafter as π). Equations 5 thus take the following form:

$$q_f = (q_f + q_n/\pi)s \quad \text{and} \quad q_n = \pi(q_f + q_n/\pi)(1-s), \tag{6}$$

with s given as

$$s = \alpha + \beta\{\log[(q_f + q_n/\pi)/M^\circ] - \alpha\log(\pi) - 0.5\,\gamma\,[\log(\pi)]^2\} + \gamma\log(\pi).$$

For any reasonable value of π, equations 6 have one solution alone (q_f, q_n). Conversely, each of the equations 6 determines (the same) single π corresponding to any fixed pair of values for q_f, q_n. Of course, the relationship $\pi = \pi(q_f, q_n)$ is somewhat complex and probably cannot be expressed in explicit terms. However, the nature thereof can be illustrated by means of a numerical tabulation. In particular, it can be illustrated with data from the ECP-1999 sample of countries (see Table 2 for countries selected).

TABLE 2

THE RELATIVE PRICE π AS A FUNCTION OF q_f AND q_n, EXEMPLIFIED

	Turkey	Poland	Czech Republic	Portugal	UK	Germany
q_f (PPP €)	855	912	994	1480	1262	1382
q_n (PPP €)	2615	3898	5033	7591	11604	11617
π (UE = 100)	137.4	106.7	109.9	119.1	89.8	96.6

One general conclusion to be drawn at this juncture is that the relative price π is a function of *two* possibly distinct variables. As such, it is *not* a straightforward function of any single item, even if that item incorporates both original variables. In particular, it is not a precise function of the level of real p.c. consumption, which according to the ECP methodology approximately equals $(q_f + q_n)$.[33]

[33] The scatter diagram relating the observed π to the observed values of a term $(q_f + q_n/\pi)$ appears much more 'functional' than that in Figure 5, with π showing

More about the properties of the function $\pi = \pi(q_f, q_n)$ may be learned through application of the implicit functions theorem to either of the equations 6. In particular, the impact of 'minor changes' in q_f, q_n on the relative price π can be studied. A study along those lines yields interesting results when applied to the ECP-1999 sample of data. It turns out that π of the ACs is highly susceptible to changes in both q_f and q_n. The elasticity[34] of π with respect to q_f is *positive*, with the lowest value (0.240) in the Czech Republic. In several (very poor) ACs, such as Latvia, Lithuania and Bulgaria, it even exceeds 1 (and comes close to it in Turkey). Thus, the relative food price *rises* in response to a rise in food supplies. The elasticity of π with respect to q_n is *negative* and ranges from -0.663 in the Czech Republic to -1.865 in Latvia (see Figure 6). Thus, the relative food price *falls* in response to a rise in the supplies of non-food. Those responses are qualitatively the same in the EU. Quantitatively, however, they are much weaker, especially in the rich countries. In the EU, elasticity of π with respect to q_f ranges from 0.249 in Portugal to 0.024 in the United Kingdom and the elasticity of π with respect to q_n from -0.058 in the United Kingdom to -0.640 in Portugal.

A number of simple 'developmental' stories are implicit in the elasticity values of π. If the relative price π is to remain unchanged given a 1% growth in food supplies, non-food supplies must increase by about 1.4-1.6% in the ACs, about 1.7 % in the poor EU countries (Greece, Portugal and Spain) and about 2.1-2.8% in the rich EU countries (except the UK, where the rate would have to be 6.4%). A more pronounced rise in the supply of non-food would depress π; a lesser rise would increase it. In a poor, successfully industrialising country (i.e. enjoying a marked increase in the supply of non-food consumer goods) π will drop, unless the supply of food happens to rise even more vigorously (the latter trend, however, may be prevented by the typically slow pace of structural change in the farming sector, inflexi-

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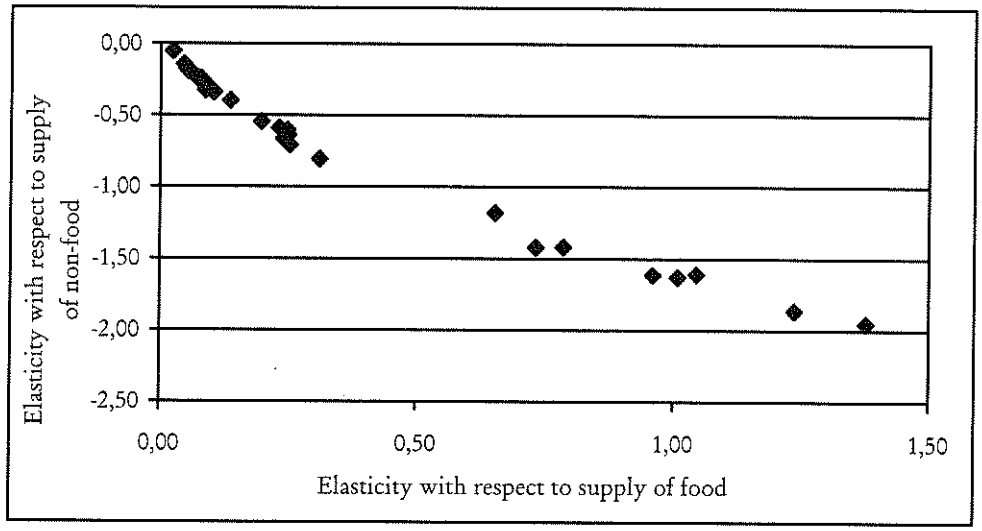
much less dispersion for similar values of $(q_f + q_n/\pi)$. Since the latter term plays the role of total income (or expenditure) in equations 6, it may actually represent an alternative and better measure of real total expenditure than $(q_f + q_n)$.

[34] The elasticities referred to here were computed at 'theoretical' (and not observed) values of q_f and q_n for individual countries. Given the quality of the 'fit' of the estimated equation 3, the differences between observed and theoretical q_f and q_n are not large for most (especially larger) countries. None the less, on account of the form of equation 3, computation of the theoretical values calls for quite a substantial mathematical effort (as can be seen from equations 5, theoretical values for q_f and q_n must satisfy a complex non-linear equation).

FIGURE 6

ELASTICITIES OF RELATIVE PRICE OF FOOD, 1999



Source: own calculations. Sample: same as in Figure 4.

bility of farm supplies and other bottlenecks). Conversely, unsuccessful industrialisation (or a trend favouring agricultural growth) will nudge the relative food price π upwards. In rich EU countries the limits on the growth of non-food supplies (consistent with a 1% growth in the supply of food and constant π) can be seen to be quite high, thus increasing the likelihood of maintaining a more or less constant π. Of course, an active policy encouraging cuts in agricultural production (and indirectly reductions in the supply of food) will temper the drop in π, even if the supply of non-food increases at a faster rate. A 'very successful' agricultural policy (one that makes for a decline in farm/food production) may thus prevent a drop in π, even if the supply of non-food increases rapidly.

Finally, the responses of π to changes in the supply of both q_f and q_n explain not only the Regularity itself, but also other empirically observed facts which have never been properly expanded upon theoretically (such as the 'price scissors' tendency.) More importantly, those responses may explain why structural change – the shift from production of food to production of non-food goods and services – is such a powerful process that it can be only checked by means of singularly inappropriate domestic policy (or unfriendly foreign interventions, or trade arrangements that impose some sort of agricultural specialisation). As an increase in the supply of non-food actually

strengthens its relative price ($1/\pi$) and, most probably, the profitability of producing it as well, structural change is a self-reinforcing process. Positive feedback must be at play here: the higher the non-food supply, the better the conditions for its further expansion. Conversely, in countries seeking to break out of the poverty trap by increasing the production of farm/food products, the state of structural backwardness is also likely to be a self-supporting on account of domestic price developments.

5. Concluding remarks

In basic micro-economics, the structure of consumer demand plays an important role in the determination of relative prices. However, beyond the 'micro', economics largely ignores the peculiarities of consumer demand formation. While this neglect may be justifiable in macro-economics, it is hardly acceptable in considerations addressing structural, developmental or international trade issues. It is a pity that the only economic law that has proven empirically valid – Engel's Law – has in practice been ignored in preference to concepts predicated on pure speculation (e.g. the law of one price or the idea that prices are somehow determined by costs). This paper has attempted to demonstrate that in a concrete context, where distinction is made between food and non-food consumer goods, the specific pattern of demand formation is essential to understanding the empirical facts. In particular, it has been demonstrated that the actual causality may extend from demand (and income) formation to prices, without giving much weight to what happens to cost or productivity developments. A further possible implication of all this is that incomes earned through the production of different goods and services may ultimately be determined by the demand for those goods and services. Thus, the relatively low wages and incomes – and ultimately costs – in farming/food production may be due primarily to the fact that the demand for food is relatively weak – and not because the productivity in farming is very high (or low). It remains to be seen whether this reverse approach to one specific aspect of economic reality proves applicable in other contexts. It would not, after all, be all that surprising if it were to.

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