Domestic Demand, Comparative Advantage, and the Pattern of Trade

ROLF WEDER*

1. INTRODUCTION

International trade theory has recently been expanding into various fields of economics and, thereby, begun to address interesting issues which the theory was not able to tackle before. Examples are international trade in similar or identical products – established by KRUGMAN (1980), LANCASTER (1980), and BRANDER (1981) –, the reasons for and patterns of geographic concentration – introduced into trade theory by KRUGMAN (1991, 1993) –, as well as the expanding field of endogenous innovation and trade – heavily influenced by GROSSMAN and HELPMAN (1991, 1994).

At the same time, however, the principles developed by the classical, Ricardian trade theory have not become obsolete, nor do they seem to have lost their power. For example, differences in technology among countries are considered to be important determinants of the pattern of trade, even though these differences are now being made endogenous to the theory. Also, RUFFIN (1988) re-interpreted the Ricardian trade theory in terms of factor endowment and, thus, provided a missing link to the Heckscher-Ohlin-type explanation of trade patterns. Furthermore, JONES (1980) extended the classical model by allowing for internationally mobile labour and showed that the relative attractiveness of a country for a certain industry depends on both absolute and comparative advantage. This latter extension represents an interesting way of connecting Ricardian trade theory to questions associated with the regional structure of production.

In this paper, I want to discuss the relationship between domestic demand and the pattern of trade. This is a rather neglected topic in international trade theory. The emphasis on demand is motivated by recent case studies which indicate that differences in the consumption patterns among countries are important determinants of the pattern of trade. The paper intends to make two points. First, it is suggested that the «new» trade theory, i.e., the theory of intra-industry trade and, in particular, the «monopolistic competition cum transaction cost» approach established by KRUGMAN (1980), provides

* Institut für Volkswirtschaft, Wirtschaftswissenschaftliches Zentrum (WWZ), Universität Basel, Petersgraben 51, CH-4003 Basel. The paper benefited from helpful comments by and discussions with RONALD JONES, JAMES MELVIN, NICOLAS SCHMITT and ALBERT SCHWEINBERGER. Financial support from the WWZ-Förderverein is gratefully acknowledged.

a better basis to account for the empirical observations than the traditional inter-industry trade literature. Second, it will be argued that in spite of this necessary leap to the new trade theory, the Ricardian principle of comparative advantage still holds if applied to differences in demand among countries. This latter point is a short discussion and interpretation of one result of a model I have derived and proposed elsewhere [WEDER (1995)].

Some examples may help to understand more precisely what kind of observations have motivated this research. For example, Italy accounted for about 60% of world exports of ceramic tiles; at the same time, the country's per capita consumption of ceramic tiles has traditionally been the highest among ceramic tile producing countries [PORTER (1990, pp. 210)]. Switzerland's sugar confectionery industry is a successful exporter of sugar-free herbal cough drops which, again, represents a segment with a large domestic expenditure share compared to other countries' domestic demand [RICHTERICH (1995)]. Other examples of this type are Japanese exports of small cars and TV sets, Swedish exports of small Scandinavian furniture, British exports of auctioneering services, or Canadian exports of undersea vehicles to examine oil drilling sites, and many more.3

The paper is in three parts. The first part describes to what extent these observations are or could be brought in line with international trade theory. Thereby, it will be distinguished between the traditional and the new trade theory. The second part undertakes an interpretation of the favored approaches - rooted in the new trade theory - in the light of the classical trade theory. The third part concludes.

2. DEMAND AND TRADE IN INTERNATIONAL TRADE THEORY

The examples mentioned above create a positive relationship between a country's domestic demand or home market size for a certain product, on the one hand, and its exports, on the other. Interestingly, a relationship like this between domestic demand and the pattern of trade is not new. It has already been suggested by scholars such as LINDER (1961), GRUBEL (1970) and GRUBEL and LLOYD (1975), whereas KRUGMAN (1980) and HELPMAN and KRUGMAN (1985) were the first to make it part of a particular formal model. Other contributions in this area include ETHIER (1982), BHAGWATI (1982), FEENSTRA (1982) and DINOPoulos (1988).

There exist two «branches» in international trade theory which could form a basis for a discussion of domestic demand and international trade patterns. These are the traditional inter-industry and the new intra-industry trade literature. The former describes

2. In 1987, per capita consumption was 3.33 square meters in Italy, followed by Spain with 2.55 square meters per capita. Italy had also the absolutely largest domestic market for ceramic tiles with a share of 15% of world consumption [PORTER (1990), p. 214].

3. These examples are described in PORTER (1990), Globerman (1990), and GRUBEL and LLOYD (1975).
trade of goods which are rather different with respect to technological requirements or factor-intensity in a world with constant returns to scale and perfect competition. The latter analyzes trade of close substitutes which are subject to a technology yielding increasing returns to scale in a market characterized by imperfect competition.

### 2.1 Demand and the Traditional Trade Theory

Suppose two countries which differ with respect to the representative consumer’s expenditure share for two goods, $X$ and $Y$. This difference may arise because there exists a distortion in one country’s goods market (e.g., a consumption tax) or simply because the consumers in the home and the foreign country have different preferences. This latter situation can be described by the following utility functions of the representative consumer in the home and the foreign country, respectively:

$$U = X^h Y^{1-h},$$
$$U^* = X^f Y^{1-f}. \tag{1}$$

It is important to note that $h$ ($f$) is the home (foreign) country’s constant expenditure share of income on $X$ and that $1 - h$ ($1 - f$) the home (foreign) country’s expenditure share on $Y$ ($0 < h < 1$ and $0 < f < 1$). Let us assume that the home country has a higher expenditure share for $X$ ($h > f$). How will this affect the pattern of trade between the two countries?

It is well-known that this difference in demand does not affect the pattern of trade at all in the case of the classical trade model. The linear production technology in the Ricardian model prevents that differences in demand may change the pattern of trade which is determined solely by the comparative labour productivity advantage. In the Heckscher-Ohlin model, however, differences in demand create a tendency towards the import of the relatively preferred good as shown by JONES (1957). Because of diminishing marginal returns to each input factor in this model, the home country’s relatively large domestic demand for $X$, ceteris paribus, gives rise to an import of $X$. If the countries have similar factor endowments, considerable differences in demand may create a pattern of trade which violates the predictions by the Heckscher-Ohlin Theorem.

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4. Note that the realizations of $X$ and $Y$ for the home and foreign country’s residents may certainly differ from each other.

5. Note that differences in domestic demand among the two countries will affect the relative wage rate in equilibrium. A relatively large demand of the home country for $X$ increases, ceteris paribus, the relative price of this good in equilibrium. If $X$ is also the good where the home country has a comparative productivity advantage, the home country’s relative wage rate is positively affected by this difference in domestic demand; for a general and excellent discussion of the Ricardian model see CAVES, FRANKEL and JONES (1993).
It should be noted that differences in demand among countries have been introduced by a number of scholars on the basis of the Heckscher-Ohlin model. MELVIN (1985) showed how taste differences among domestic consumers may induce cross-hauling. On the basis of a quasi-homothetic utility function, MARKUSEN (1986) as well as HUNTER and MARKUSEN (1988) explain why the trade volume between a rich and a poor country may be lower than predicted by the relative factor endowment. HUNTER'S (1991) empirical study about the importance of non-homothetic preferences in international trade refers to the same model. In all these cases, however, a relatively large domestic demand for a particular homogeneous good creates an incentive to import it. Even though the papers by HUNTER and MARKUSEN mention LINDER (1961) to motivate the analysis, it should be noted that LINDER had in mind an inverse, i.e., a negative relationship between domestic demand for and imports of a good.

A positive relationship between home market size and exports within the framework of traditional inter-industry trade theory could only be obtained if the home country’s relative preference for X is assumed to be directly associated with a comparative advantage in this good. For example, one could argue that, ex ante, domestic firms are more likely to invest and to innovate where the domestic expenditure share is larger which then, ex post, leads to a comparative advantage in technology reflected by the exogenous labour coefficients in the Ricardian trade model. In other words, a positive relationship between the countries’ expenditure shares, described by the parameters h and f, and the labour productivity (LP), described by the reciprocal value of the labour coefficients, for the home (LPX, LPY) and the foreign (LPX*, LPY*) country, is postulated. The home country’s large domestic demand for X is finally reflected in its comparative labour productivity advantage,

\[
\frac{LP_X}{LP_Y} > \frac{LP^*_X}{LP^*_Y}.
\]

However, if the process between demand and labour productivity itself is not made endogenous to the model, this interpretation of the traditional theory is not very helpful because we basically assume what we want to explain. Even though the empirical observations mentioned above could be brought in line with traditional trade theory on the basis of this interpretation, it does not increase our understanding with respect to the relationship between domestic demand and trade.

6. Note that such a transmission mechanism from domestic demand to innovation and exports forms the basis of LINDER’S hypothesis. LINDER (1961, p. 90) argued: «the production functions of goods demanded at home are the relatively most advantageous ones».

7. It should be noted that also BHAGWATI (1982, p. 176) described such a process between domestic demand and localized technical change which, in a second stage, would lead to a comparative advantage. This «biological» model of trade in similar products has, in part, been formalized by FEENSTRA (1982) who, however, requires an explicit movement from autarky (where firms decide what products to develop) to
Furthermore, there still exists the problem that, in the Heckscher-Ohlin model, a relatively large expenditure share for $X$ creates a current tendency towards the import of $X$, even though it may have created a comparative advantage and thus a tendency towards the export of $X$ in the past.\footnote{Note that, in the H-O-S model, the comparative advantage arising from demand could be represented by the home country’s relative factor endowment (e.g., in human capital) favouring the production of $X$.} The net effect of this trade-off from differences in demand is not clear, \textit{a priori}, and the existence of this trade-off itself is somewhat awkward.

Therefore, I conclude that traditional trade theory is hardly able to cope with the particular relationship between demand and the pattern of trade which motivated this paper, even though the theory does not really contradict the empirically observed relationship.

\section*{2.2 Demand and the New Trade Theory}

The second branch, i.e., the theory of intra-industry trade based on imperfect competition, seems to be a better candidate to account for the empirical findings. Suppose now that $X$ and $Y$ are two goods produced by a technology which is subject to increasing returns to scale or that $X$ and $Y$ are two groups of products which are composed of many varieties ($x_i$ and $y_j$) of which each one is produced at decreasing average costs. The latter situation can, for example, be represented by assuming familiar subutility functions of the \textsc{Dixit-Stiglitz} (1977) «taste for variety» type for $X$ and $Y$ in equation (1). How do differences in domestic demand between the two countries – reflected by differing parameters $h$ and $f$ – affect the pattern of trade in this new situation?

Let us assume that there is \textit{instantly} free trade between the two countries. Because of increasing returns to scale, the two countries will specialize in the production of one of the two goods, $X$ and $Y$, or of some varieties $x_i$ and $y_j$ of the two goods. Note, however, that the pattern of production and thus the pattern of intra-industry trade is completely indeterminate – a standard result of most models in the intra-industry trade literature as shown by \textsc{Krugman} (1980, 1981) and \textsc{Lancaster} (1980). Differences in the expenditure share of the two (groups of) goods do not affect the pattern of trade because it does not make any difference where the products are produced, given identical countries with respect to factor endowment and technology and given no international transaction costs.

The first possibility of creating a positive relationship between the home country’s demand for and export of $X$ is to assume an explicit movement from autarky to free trade. This has been emphasized by \textsc{Grubel} (1970) who introduced demand effects in this theory by observing that, in autarky, production costs and thus the relative price of that good is smaller for which there exists a larger expenditure share. He concluded that it is most efficient for a country to specialize in the production of the good with the lower relative price in autarky [\textsc{Grubel} (1970), p. 40]. However, \textsc{Corden} (1970, pp. 52)
correctly mentioned the point that this pattern only arises if we assume, on the one hand, an explicit movement from a situation with no trade or with trade restrictions to free trade and, on the other hand, some «rigidities» with respect to the first stage (e.g., external economies of scale, learning effects, sunk costs). Models which are based on this first approach of introducing a positive relationship between domestic demand and exports include ETHIER (1982) and DINOPOLOUS (1988).

The second possibility is to assume international transaction costs, i.e., any incremental variable costs associated with the supply of a product to a foreign market. This approach has been introduced by KRUGMAN (1980) and HELPMAN and KRUGMAN (1985) in the Chamberlinian models of monopolistic competition – an approach which also plays a significant role in the topical discussion of geography and trade [KRUGMAN (1991)]. These international transaction costs are obviously crucial to create the home market size effect and thus a role for domestic demand. Having a large home market implies an advantage for a firm because, at home, the firm does not incur the described costs of supplying a product. Assuming that both countries are identical in size and that \( h = (1 - f) \), KRUGMAN (1980) found that the home country is a net exporter in that group of products where it has a larger home market. He also showed that, for very small transportation costs, there is complete specialization, i.e., the home country is the only producer and exporter of \( X \) if \( h > f \).

Thus, there exist two approaches rooted in the new trade theory which create a positive relationship between domestic demand and exports of a country. In both cases, the large domestic demand for \( X \) in the home country causes a comparative cost advantage for this good either by reducing average production costs of \( X \) in autarky or by lowering average transaction costs of \( X \). This result is obtained endogenously, i.e., based on a transmission process from demand to relative costs. This is a great advantage compared to the traditional trade theory where the relationship between demand and comparative advantage would have to be assumed.

However, I consider the second approach, i.e., the «monopolistic competition cum transaction cost» approach to be superior to the first one because of the following reasons. The first approach builds on an explicit movement from an autarky situation to free trade as well as on some adjustment costs for firms if they switch to new varieties. This is a strong assumption and its suitability depends on whether, in reality, this movement in direction of a less protective stage by countries is observed and important for firms. In contrast to this, the second approach captures quite well the economics of the demand effect. International transaction costs imply additional costs of supplying a product to foreign customers. These costs may arise because of any additional «difficulties» associated with the export of products. They do not only consist of additional transportation or communication costs, but also of greater marketing costs or of any special costs of selling a product in a foreign country with another culture and language. As the firm has an advantage in providing the product to its customers at home, firms tend to enter product segments for which the home market is larger.
The conclusion from this reasoning is that the new trade theory «is the way to go» if we want to explain the observed positive relationship between domestic demand for and export of a product. In the next section, we want to interpret this result.

3. INTERPRETATION

The results obtained from these models with respect to domestic demand and the pattern of trade are now compared with those of a standard Ricardian model. Let us extend the KRUGMAN-model by allowing for different country sizes. The number of residents in the home country (L) may differ from that in the foreign country (L*). We also assume that the expenditure shares (h and f) for X in the two countries can take any values between zero and one. This makes the analysis much more complex because, with different country sizes, the wages are endogenous to the model and thus may also differ in equilibrium. We can introduce the following simple notions for the different home market sizes described by the exogenous parameters L, L*, h, and f:

\[ hL = HM_X, fL^* = HM_X^*, \]
\[ (1-h)L = HM_Y, (1-f)L^* = HM_Y^*. \]  
(3)

Note that HM_X and HM_X^*, e.g., are the home and the foreign country’s home market size for good X, respectively. With respect to the relationship between home market size and the pattern of trade, my extended model [WEDER (1995)] provides the following result which includes KRUGMAN’S (1980) special case where L = L*. The home country is a net exporter of X – and, if transaction costs are very small, the only producer and exporter of X – if and only if the following relationship holds:

\[ \frac{HM_X}{HM_Y} > \frac{HM_X^*}{HM_Y^*}. \]  
(4)

This is a relationship between the relative home market sizes of the two countries in the two groups of goods. Thus, the home country is a net exporter of X if it has a relatively larger home market for this good, or as I called it, a comparative home market advantage. Equation (4) also implies that the foreign country is a net exporter of Y because it has a relatively larger home market for Y.

The intuition behind this result is as follows. If countries have the same size, there is a tendency for firms to enter that product segment where the domestic market is absolutely larger than abroad [KRUGMAN (1980)]. This effect arises from international transaction costs which provide a transaction cost advantage to firms with a larger home
market relative to their competitors abroad. Thus, exports are boosted and the country becomes a net exporter of these varieties and a net importer of the other varieties.

Now imagine what happens if one country is larger than the other one. The larger country experiences a boost in its exports of both goods. But this cannot be an equilibrium because the country would face a trade surplus for the two goods and a labour shortage in its labour market. Thus, something has to compensate for the greater «competitiveness» of the larger country which, not surprisingly, is the endogenous relative wage rate of the two countries in this general equilibrium model. The larger country will have a higher wage rate in equilibrium. In other words, the «overall» home market advantage of the larger country is compensated by a higher wage rate which in turn establishes the relative difference in home market sizes as the determinant of the pattern of trade.\(^9\)

One would expect that the result from a GRUBEL-type model described in section 2.2 is similar to the one described here. Suppose the home country is larger than the foreign country. Also assume that the production of \(X\) and \(Y\) is subject to decreasing average costs arising from a mixture of scale economies and learning effects. In autarky, the home country will thus have relatively lower average costs in \(X\) (because of the assumed larger expenditure share on \(X\)) and absolutely lower average costs in both goods because of the larger country size. Now suppose trade is opened up. Because of the considerable learning effects, the larger country will have an absolute cost advantage in both goods which implies a greater wage rate in equilibrium. At the same time, however, the home country has a relative cost advantage in \(X\) which establishes a pattern of trade determined by the relative home market sizes. Thus, the relationship described in equation (4) can be expected to be quite general and also to hold in a model which is based on the first approach of the new trade theory discussed above.

Let us compare these results with those of a standard Ricardian trade model. In the classical model, \(X\) and \(Y\) are two homogenous goods produced at constant returns to scale. In the new trade theory models discussed above, \(X\) and \(Y\) are produced with increasing returns to scale and may be composed of many varieties. However, in both models the differences among countries are exogenous. In the classical trade model, the labour coefficients are assumed to be exogenously given. It is usually argued that differences in the productivity between countries arise because of differences in technology, in labour skills or in other factors like climate. In the models rooted in the new trade theory, differences in the market sizes for the two groups of differentiated products between the countries are also assumed to be exogenously given and may arise because of similar reasons (e.g., because of climatic restrictions).

It is important to note that, in both models, the pattern of trade is determined by comparative advantage. In the Ricardian model, each country exports that good for which it has a comparative productivity advantage. Not absolute differences in the productivity are important, but only relative differences. Similarly, the pattern of trade is determined by relative differences in demand in the models described above. Countries

\(^9\) See WEDER (1995) for a more precise description of the adjustment process and this result.
are (net) exporters of those differentiated products for which they have a comparative home market advantage. Absolute differences in the home market size do not have an impact on the pattern of trade, but only relative differences. This analogy can be expressed formally by

\[
\frac{LP_X}{LP_Y} > \frac{LP_X^*}{LP_Y^*}; \quad \frac{HM_X}{HM_Y} > \frac{HM_X^*}{HM_Y^*}.
\]

(5)

The first inequality reveals a comparative productivity advantage of the home country in good X. The second inequality shows a comparative home market advantage of the home country in X. Both countries are (net) exporters of that good where they have a comparative advantage.

4. CONCLUSION

The role of domestic demand in determining the pattern of trade seems to be a rather neglected topic in international trade theory. This has been emphasized indirectly by JONES and NEARY (1984) who stated: «Although the theory of international trade combines elements of demand behavior with production structure in a general-equilibrium context, it is primarily variations in the specification of the production side that distinguish the basic models of trade» (p. 4). It has also been mentioned by HUNTER (1991) – «Little or no attention has been paid to the role of demand in determining trade patterns» (p. 345) – and others. This paper attempted to make two points with respect to this relationship.

First, traditional trade theory is only able to account for the relationship between demand and trade by integrating differences in demand directly into country-specific differences in technology or factor endowment. However, as long as this process from demand to comparative advantage is not made endogenous to the models, traditional trade theory cannot capture the economics of the observed relationship between demand and the pattern of trade. A more satisfactory approach is thus provided by the new trade theory and, in particular, by the KRUGMAN-type «monopolistic competition cum transaction cost» model which creates home market effects and thus can readily be extended to discuss the issues associated with demand and trade.

Second, despite this «deviation» from traditional trade theory, the introduction of differences in demand among countries creates an interesting relationship between the classical theory of trade and the demand-driven models of the new trade theory – a link which I have derived and established more rigorously and extensively elsewhere [WEDER (1995)]. Thus, the Ricardian wisdom of comparative advantage, almost 180 years old, seems also to be extendible to «demand and trade».
Interesting future research in this area includes to allow explicitly for learning effects or for technological changes in the described models. Another issue is the discussion of government policies which influence domestic demand and of the impact from internationally mobile buyers. A further interesting extension is to allow for changes in the pattern of demand among countries over time. Finally, the discussion of differences in «derived» domestic demand for intermediate products seems to be most promising.

REFERENCES


ZUSAMMENFASSUNG

Fallstudien weisen darauf hin, dass Unterschiede in der inländischen Nachfrage zwischen Ländern wichtige Determinanten der Handelsstruktur sind. Dieser Artikel diskutiert, wie die beobachtbare Beziehung zwischen Nachfrage und Handel in der handelstheoretischen Literatur behandelt wird und in diese Literatur integriert werden könnte. Es wird behauptet, dass die neue Handelstheorie für die Erklärung der empirischen Beobachtungen grundsätzlich besser geeignet ist, obwohl das Ricardianische Prinzip der komparativen Vorteile auch hier anwendbar zu sein scheint.

SUMMARY

Case studies indicate that differences in domestic demand among countries are important determinants of the pattern of trade. This paper discusses how the observed relationship between demand and trade is part of and could be integrated into international trade theory. It is argued that the «new» trade theory is a better candidate to account for the empirical observations, even though the Ricardian principle of comparative advantage seems to hold.

RESUME

Certaines études indiquent que la demande nationale diffère de pays en pays et que ces différences sont des déterminantes importantes de la structure des échanges commerciaux. Cet article discute comment la relation observée entre la demande et le commerce fait partie de, et pourrait être intégrée dans la théorie du commerce international. Il se trouve que la «nouvelle» théorie du commerce est la meilleure approche pour l'explication des observations empiriques, même si le principe des avantages comparatifs de Ricardo semble être applicable.